

## CRITICAL PATH FOR ENVIRONMENTAL MANAGEMENT IN DEVELOPING COUNTRIES OF LATIN AMERICA\*

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### ABSTRACT

Many Latin American countries are currently promoting the development of industry and exploitation of natural resources in an attempt to improve their economic stability. Regrettably, this development process is inevitably accompanied by environmental contamination. However, most of these countries lack the economic base and trained manpower essential for the implementation of a "corrective" strategy using costly and sophisticated pollution abatement technology. Furthermore, most of these countries lack the public support, governmental motivation, legislation, and regulatory infrastructure needed for effective environmental management.

This paper outlines, in a simplified critical path format, some of the important elements for an environmental management program in developing Latin American countries.

### INTRODUCTION

The development of a country generally connotes the growth and expansion of industry, the exploitation of natural resources, and/or the strengthening of economic stability. The merits of development by comparison with its negative consequences could be argued, but in another paper at another time. Most observers would no doubt concur, however, that development elevates the standard of living (at least for a few) and enhances the influence and prestige of

\*This paper is based upon experiences gained while serving as a Senior Consultant to UNESCO on environmental education for engineers in developing countries. This one-year mission (July 1977 through June 1978) included assignments in the Philippines, Venezuela, Costa Rica, Guatemala, and Mexico.

a country in its continent, its hemisphere, and even in the world. An excellent illustrative example is the very rapidly developing and influential Latin American country, Venezuela. But seldom are the deleterious impacts of development enumerated or discussed. One inevitable, concomitant aspect of development is the generation of residues which, if left unregulated, can degrade environmental quality and impact the quality of life of all residents of all economic classes.

The so-called developed countries of the world have provided incentives, motivation, capital, expert manpower, and technology to enhance the rate of development of Third World countries, including several in Latin America. It is likely that as severe environmental crises become manifest as a result of development, the developed countries will offer their sophisticated techniques and technologies for pollution abatement. But will the techniques and technologies utilized by industrially developed countries be appropriate or applicable in Latin America? The author believes "no," and discusses the basis for this opinion in subsequent sections of this paper.

The sophisticated, modern "technological approach" is not sensitive nor responsive to the tremendous social, cultural, economic, political, and educational differences which exist between most Latin American countries and a highly developed country like the United States. Yet these non-technological factors must be considered as essential, often critical, ingredients if an environmental management program is to be successful in Latin America.

Prior to discussing environmental management problems and approaches for Latin America, it would be meaningful to first examine the recent history of environmental quality control in the United States and look for possible parallels with situations in Latin America.

## THE UNITED STATES EXAMPLE

During and immediately following World War II in the 1940's, the process of economic, resource, and industrial development accelerated rapidly in the United States. A large segment of the American population held as a high priority monetary gain and its associated elevated standard of living. Public concern for environmental quality was not high on the priority list, except for a relatively few far-sighted conservationists. To many, especially those associated with industry, environmental quality control was viewed as an impediment to national growth and development.

But the rapid exploitation of natural resources, the unregulated expansion of industry, and the unplanned growth of urban areas soon resulted, however, in the uncontrolled discharge of vast quantities and types of residues. As a consequence, severe environmental degradation followed closely on the "heels of development" nationwide. The parallel relationship between economic development and environmental contamination is illustrated in Figure 1. By the late 1950's and early 1960's pollution problems in many parts of the country

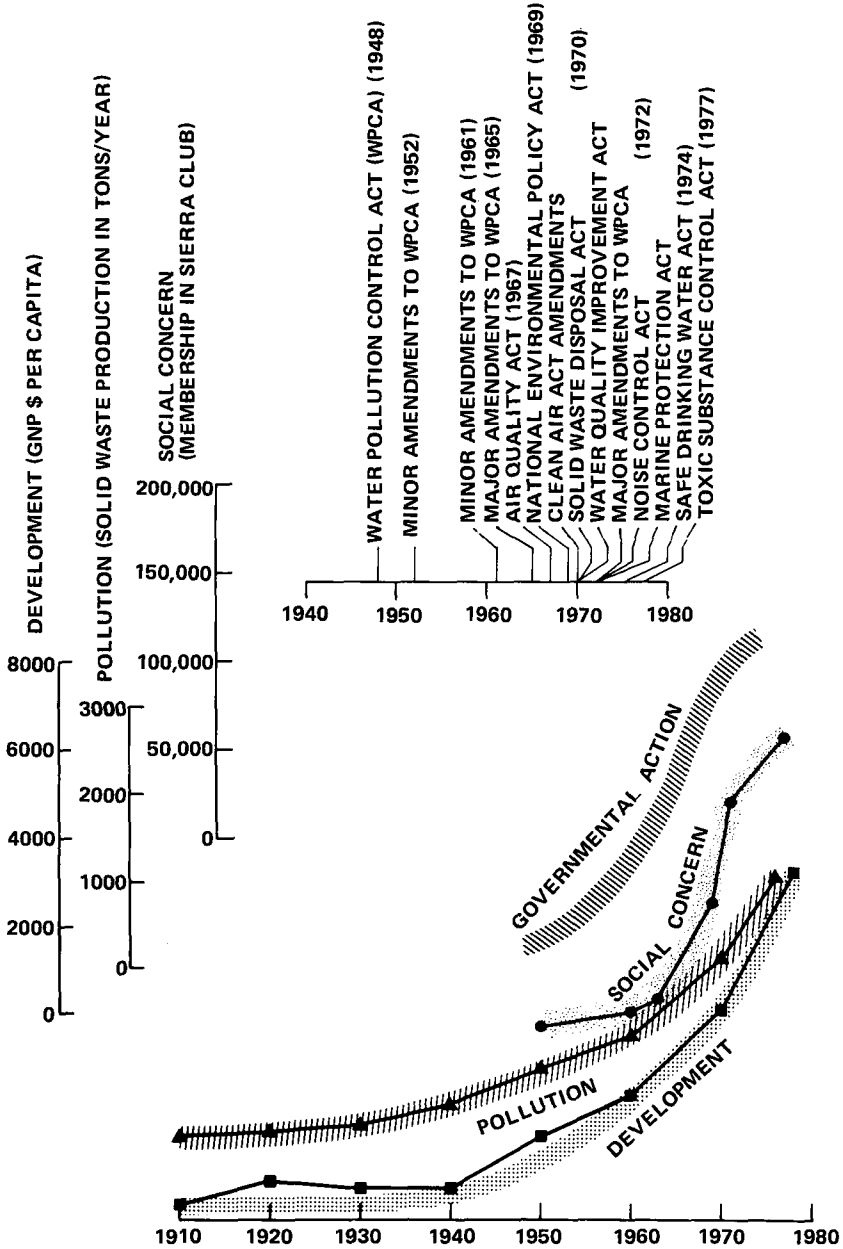


Figure 1. Impact of development on environment paralleled by social and governmental response.

reached *crisis* proportions – then the environmental consciousness of the country arose. This sudden change in values and priorities is evidenced by the dramatic increase in membership in the conservation-oriented Sierra Club shown in Figure 1.

Public demand for a clean, liveable environment was clearly heard by voter-sensitive politicians in Washington, D.C. who responded rapidly, though under a cross-fire from industry, to promulgate a variety of pollution control legislation. Figure 1 shows the response of Congress to public opinion and public activism regarding environmental protection. The enormous support of the public also provided the U.S. Government with the motivation and mandate for rigorous enforcement of the new legislation. The ground swell of public opinion obviously was more potent than the powerful industrial lobbies. As a net result of this sequence of events over the past thirty-five to forty years, i.e.,

industrial development → residue production → environmental crises → →  
 governmental action ← societal consciousness and demand ← ←↓

environmental quality has improved markedly throughout the country.

But consider the question, “What would have happened to the development process in the United States if the rigorous pollution control laws and the costly requirements for pollution abatement of the 1970’s had been precipitously imposed upon the weak economy and evolving industry of the 1940’s?” The answer to this question could provide an insight into what would likely happen to the development process in Latin America if the rigorous pollution control laws and costly pollution abatement technology of North America were suddenly imposed.

## AN APPROACH FOR LATIN AMERICA

In recent years nearly all Latin American countries have sought to more rapidly develop their natural resources, industrial enterprise, and economic base. Progress in the development process has varied widely, ranging from resource-wealthy Venezuela with a per capita gross national product of \$1166 to economically-depressed Bolivia with a per capita GNP of \$146 [1].<sup>1</sup> Regrettably, however, there is mounting evidence of serious environmental contamination in Latin America, especially in the most rapidly developing countries. For example, the large, freshwater lake, Lake Valencia in Venezuela is seriously contaminated from receiving vast quantities of untreated human and industrial wastes and agricultural runoff. Also the oil-rich floor of Lake Maracaibo has provided a tremendous source of economic wealth to the country, but the exploitation of this resource has had a deleterious impact on water quality.

<sup>1</sup> Both Venezuelan and Bolivian figures represent 1973 values.

The growing problem of environmental contamination in Latin America cannot and will not, in my opinion, be solved only by the application of costly, sophisticated pollution abatement technologies. Instead, there are numerous, interrelated factors which will require consideration if environmental quality improvement is to be achieved. Several of these factors are shown in "critical path" format in Figure 2. Undoubtedly there are many other factors which could, and perhaps should, be incorporated in the diagram. However, the diagram was purposely simplified to facilitate its application by those who are, or will soon be, involved in environmental management in Latin America.

### Values and Priorities

The most basic and perhaps the most important element in environmental management is the concern and support of the people. This implies that the people are aware of and sensitive to environmental quality and how it impacts their quality of life. If a substantial segment of a population has little or no concern for clean air, clean water, an uncluttered landscape, and tranquil surroundings, then environmental quality merits low social priority. Recall that the effectiveness of environmental management in the United States was minimal until the values and priorities of the people were altered in the mid-1960's.

The priority for a clean environment must necessarily be placed below that of the basic necessities of life, namely food, clothing, shelter, health, safety, and security. A person cannot appreciate a clean environment on an empty stomach. Yet in many emerging countries of Latin America, one or more of these basic needs of life are not adequately met for a substantial segment of the population. Malnutrition and public health problems plague many of the countries, even some with relatively high gross national incomes.

The cultural patterns of most Latin American countries are highly complex and varied due to the heterogeneous racial-cultural mixture of national populations. Most countries include essentially three racial-cultural categories:

1. descendants from pre-Columbian Indian stock who maintain the social and cultural ways of their ancestors;
2. caucasian descendants of the Spanish conquerors who often form the highest socio-economic class; and
3. racially-mixed or "mestizo" groups which generally comprise the "working class" segment of the population.

The percentage of the population falling into each category varies widely as shown in Table 1.

Also shown in Table 1 is the average annual per capita income for the countries listed. If this parameter can be accepted as a gross measure of standard of living, it becomes obvious that to a great many people in Latin America, the

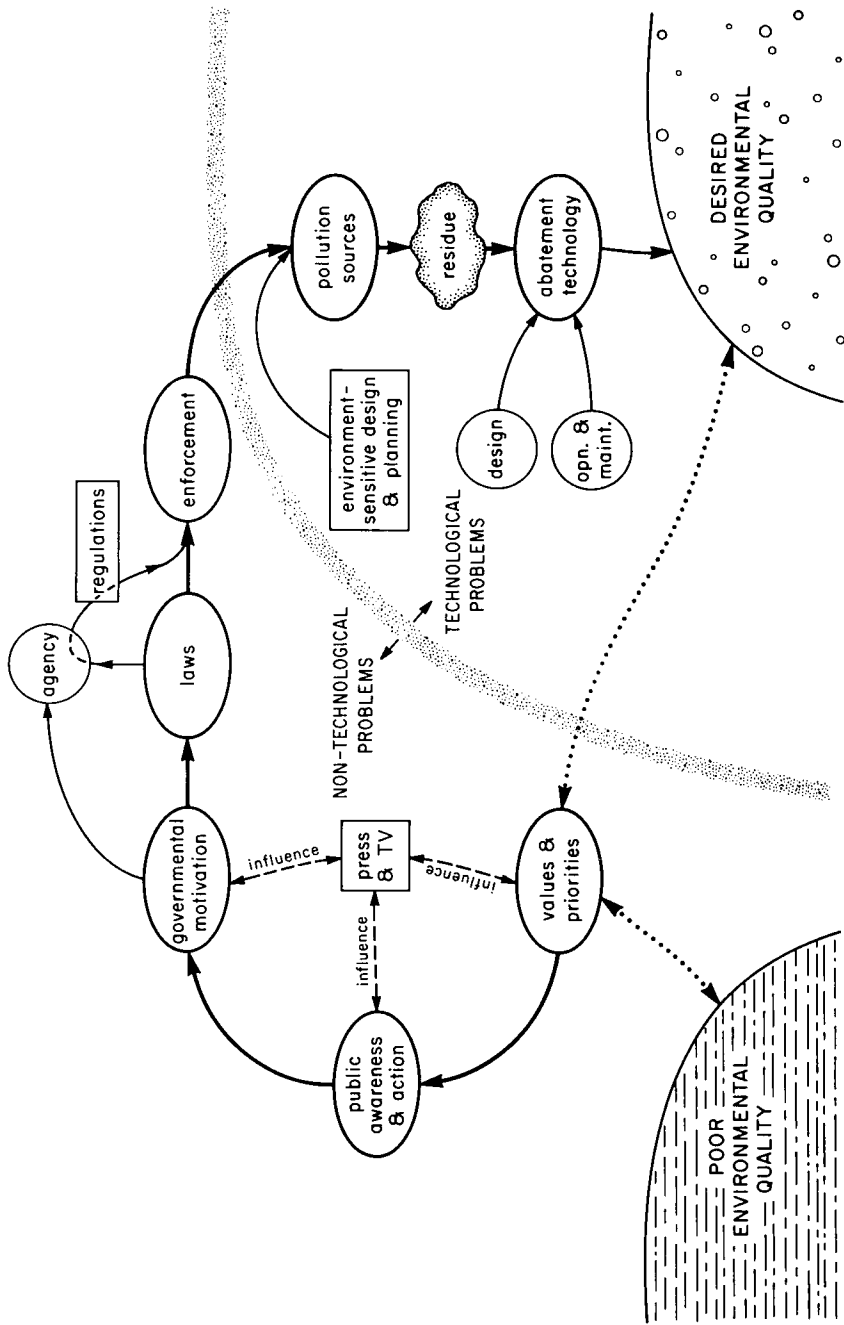


Figure 2. Critical path for environmental management.

Table 1. Racial/Cultural Distribution, Literacy, and Income of Populations in Selected Latin American Countries

Country	Population <sup>a</sup> (in millions)	Per Cent Population <sup>b</sup>				Literacy Rate <sup>b</sup> %	GNP <sup>c</sup> \$ per capita
		Spanish Decedents	Indian	Mestizo (mixed)	Other		
Costa Rica	2.1	80	2	17	1	90	623
Ecuador	7.9	10	40	40	10	67	309
El Salvador	4.5	5	3	92	—	60	305
Guatemala <sup>d</sup>	6.4	—	45	55	—	40	387
Honduras	3.4	2	10	85	2	50	271
Mexico	66.7	10	30	60	—	75	753
Nicaragua	2.4	10	5	75	10	50	463
Panama	1.9	10	6	68	15	80	839
Venezuela	13.1	20	1	69	10	77	1166

<sup>a</sup> Source: (1978 estimates) *World Book Encyclopedia*, 1978.

<sup>b</sup> Source: *Middle America — Its Lands and People* by R. L. West and J. P. Augell: 1976, Prentice Hall, Inc.

<sup>c</sup> Source: *Selected Economic Data for the Less Developed Countries*, RC-W-136, Agency for International Development, July 1974.

<sup>d</sup> In Guatemala, the term "Ladinos" is used to categorize people who follow Spanish-American customs and traditions. Hence a pure blooded Indian who dropped his/her ancestral ways of life would be included.

need for the basic necessities of life would lessen the significance and priority for environmental quality. It should be reemphasized that the "fruits" of development are usually enjoyed by those in the high socio-economic class whereas the disbenefits of development such as environmental contamination affect all socio-economic classes.

Another important socio-cultural factor which must be considered is the general education level of a population. One of the most effective means of influencing public opinion is through a variety of educational media. But this approach requires a reasonably high education level for a population, a condition which does not exist in several Latin American countries. Literacy rates for some countries are shown in Table 1.

### Social Awareness and Concern

Social awareness of and concern for environmental quality have not evolved to a significant extent in the developing countries of Latin America. However, the significance and influence of public sentiment, once generated, would vary widely depending upon the socio-political system of a country. By comparison, residents of the United States are able to exert governmental influence through:

1. their substantial contribution as tax payers to governmental income;

2. their vote in free political elections;
3. their freedom of expression; and
4. in other ways.

One or more of these fundamental vehicles of public influence on governmental action are absent in many developing Latin American countries where governments range in type from the functional democracy of Costa Rica to rule by military dictatorship in Peru and presidential whim in Haiti [2]. An interesting and unique situation exists in Venezuela where free elections and freedom of expression are permitted; however, since the government "owns" and directly profits from the development of the abundant natural resources in the country, less than 10 per cent of the government's income is derived from personal income taxes. Hence, the government can assume a more autonomous posture with regard to social problems.

### Governmental Motivation

Governmental motivation for seeking a clean, liveable environment can result from a concerned public as described for the United States, or can evolve from internal convictions and moral responsibilities of those within the government itself. Venezuela can once again serve as a good example of the latter type of governmental motivation. In April 1977, the Venezuelan Government created a new ministry for environmental protection. One of the first programs initiated by this new ministry focused on the generation of public awareness and concern for environmental quality. An extensive public education program was begun which included the production of theater and television films, printed literature, and educational materials for school children. There are other examples in Latin America where governments are attempting to educate and motivate the citizenry, rather than the reverse situation.

It appears that in many Latin American countries, the governmental position on environmental protection is more strongly influenced by industrial interests and by the news media (radio, TV, and press) than by public sentiment. Governments of developing countries must confront the onerous dilemma of encouraging industrial activity and resource exploitation while at the same time discouraging environmental contamination.

Governmental motivation and action toward environmental protection might be categorized into two types or degrees. The first is *relatively* simple, inexpensive, and politically expedient. It includes the following elements:

1. promulgation of a national law (and regulations) for environmental protection;
2. creation of an agency or ministry for environmental management;
3. authorization of a study to examine national environmental problems and to recommend solutions; and
4. development of a national plan for environmental quality control.



The second level of action is, by contrast, very difficult and highly expensive. It can be summarized in a single word – IMPLEMENTATION. The national law will have negligible impact and value *unless* it is equitably and rigorously enforced; the agency or ministry will be totally ineffective without authority; the study will serve only as a delaying tactic unless its recommendations are followed; and the plan will be just “window dressing” unless the elements are implemented.

### **Laws, Regulations and Enforcement Procedures**

Environmental legislation and regulations for developing countries should be designed *for* developing countries, i.e., they should reflect national needs, capabilities and limitations. The laws developed by the United States and Western Europe are not appropriate for developing countries in Latin America, hence they should not simply be translated into Spanish for immediate adoption. Persons involved in the preparation of laws and regulations (often foreign consultants) should understand and be sensitive to social, cultural, economic, educational, and political realities in a given developing country.

Laws and regulations for pollution control have little significance without rigorous and equitable enforcement. This element of the critical path may be the most difficult to achieve in Latin America for the following reasons:

1. Effective enforcement requires a substantial pool of qualified manpower and budget for monitoring and surveillance. Most developing countries lack both the manpower and financial resources.
2. The infrastructure for enforcement of pollution control laws is non-existent in many countries. For example, Costa Rica has a very general pollution control law but has yet to develop any specific regulations and enforcement procedures.
3. There appears to be a general public apathy and disregard for laws and law enforcement. Unless this fundamental attitude is dramatically altered, pollution control laws and enforcement, regardless of appropriateness and merit, will be ineffective.

### **Environment-Sensitive Design and Planning**

The application of “corrective” measures such as high-efficiency pollution abatement facilities would likely create an enormous economic burden on developing countries and could significantly deter the development process (which might be argued as beneficial). Perhaps a more feasible approach would be to first attempt the prevention or minimization of pollution through environment-sensitive engineering design and planning of systems, processes, and facilities. Of course such an approach would require special environmental awareness education for engineers and planners together with a responsive government, industrial community, press, and public. Since 1974, UNESCO has supported pilot projects in developing countries around the world, including

Latin America, which focus on the enhancement of environmental awareness among engineering students and practicing engineers. More programs of this type are needed.

### **Design and Operation of Facilities**

Even the most environment-sensitive design of industrial processes or the most effective planning of urban areas will not be sufficient to maintain environmental quality at a liveable level. Residues will always be produced and these must be brought to rest within the physical environment. Hence some pollution abatement facilities will be needed by developing countries; and these must be properly designed, operated, and maintained to be effective. Several Latin American countries have adequate engineering talent to design at least the standard types of pollution abatement facilities. However, nearly all countries have a serious shortage of skilled facility operators.

### **SUMMARY**

The data presented in Figure 1 depict the inevitable, concomitant relationship which exists between economic (and resource) development and environmental degradation. Hopefully, countries which are currently in the early stages of development will heed and benefit from the negative example set by highly developed countries and will seek to design plans, programs, processes, systems, and facilities which will minimize the production of environmental contaminants. This "preventative" approach would be much less costly than the implementation of "corrective" measures such as pollution abatement technologies.

Furthermore, as developing countries initiate plans and programs for environmental management, a critical path scheme similar to that shown in Figure 2 should be thoughtfully considered. This diagram reveals the importance of such non-technological considerations as social, cultural, political, and economic factors which exist within the country. Stern environmental laws and sophisticated pollution abatement technologies alone will not provide an appropriate or lasting base for effective environmental management.

### **REFERENCES**

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2. G. R. Waggoner and B. A. Waggoner, *Education in Central America*, University of Kansas Press, p. 2, 1971.

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