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Environmental Awareness and Conservation of Natural Resources in Latin America: A Brief Review

One of the significant recent developments in Latin America is a growing awareness of the fragility of ecosystems in the region and a broadening understanding of the need to conserve and manage the region's natural resources. The principal aims of this paper are: 1) to trace briefly the historic attitudes concerning natural resources in Latin America, 2) to trace briefly the development of the first conservation efforts within the region, 3) to identify the major influences on conservation efforts in Latin America, and 4) to describe and evaluate the status of environmentalism as well as conservation and management of natural resources in Latin America today.

Colonial Period

A major motivating force behind efforts to colonize the New World by the two Iberian nations was acquisition of wealth in the form of silver and gold or any other natural resources that would show a profit after the long voyage from the colonies to Iberia. The methods used to acquire the resources were not gentle, for those were not gentle times either for the earth's ecosystems or for humans. The heavy pressures imposed by the imperialist nations, and particularly Spain, to maximize resource extraction as well as the requirement that the crown be given one-fifth of all treasure and precious metals obtained, encouraged development of a *raubwirtschaft* view of the region's silver resources and also a *raubwirtschaft* approach to the use of renewable natural resources.

It is this widespread transference of the colonial robber-economy mind-set from gold and silver mining to the use of renewable resources that has cost Latin America dearly and which continues to hamper the development of adequate programs and public support of programs designed to conserve renewable natural resources.

Independence to Late 19th Century

The immediate aim of most of the independence movements in the early nineteenth century was to throw off the bonds of absentee government and thus

allow local elites to occupy positions of economic and political power previously denied them. It is only by an act of imagination that one can discern in these independence movements even the tiniest flicker of concern for the conservation of the region's natural resources.

All of the new nations had in common a lack of capital for the development of their natural resources and a lack of surface transport. Frequently these states were only a collection of *patrias chicas* each identifying more closely with a local region than with the new nation that claimed them. This is not the place to review the political difficulties of the post-independence years of the nineteenth century. Suffice it to say that only rarely were political conditions conducive to a calm and reasoned approach to making inventories of the natural resources, much less planning how they might most intelligently be managed.

As many parts of the region drifted toward a kind of feudalism of large land-based estates each with its self-sufficient operations and unfree labor, urban elites chafed under what were perceived as lamentably backward economic conditions. But how to unlock the wealth of their nations while lacking both capital and technological capability? The answer was found again and again in foreign investments; that is, in inducing foreign capital to come in and "develop" a nation's natural resources. The extreme example of this occurred in Mexico during the on-and-off rule of Porfirio Díaz (1876-1910).

In an effort to get the economy of Mexico moving in the direction taken earlier by Europe and the United States, Díaz allowed foreigners to obtain control of an astonishing range of Mexico's natural resources, including soil, minerals, forests, and petroleum. This loss of Mexican ownership of a large share of the country's natural resource patrimony involved not only the items noted above but also the liberties and private lands of many Mexican citizens. The Mexican Revolution, beginning in 1910, was directed toward abrogating these acts of Porfirio Díaz.

In nation after nation in Latin America the most valuable natural resources passed into foreign control and citizens often became as foreigners on their own soil. Although a modicum of political independence had been won in the early nineteenth century, many a nation had to adjust to the ignominy that it had not achieved sovereignty over its natural resources and that time and again it was a foreign corporation that really controlled the nation because it controlled the nation's natural resources.

The Twentieth Century and Natural Resource Sovereignty

It can be and has been argued that the only way Latin America could have made the first step in the direction of developing the region's natural resources after political independence was to encourage the participation of foreign capital and that such participation would not have been tendered except under exceptionally generous terms. Be that as it may, the impact upon thinking relative to conservation was far from constructive. In place of Spain or some other colonial power, there were now other economic rulers no more sensitive to the needs of the region and all too often acting in ways that produced antisocial effects. This is not meant to kick a long-dead horse but merely to remind one that this more recent period of foreign domination could only have exacerbated the destructive attitudes concerning natural resource exploitation that had so long been present in the region.

It is fitting that Mexico, having been one of the most generous of Latin American nations regarding foreign investment in its natural resources, should lead the way in gaining freedom from such foreign domination. This was not accomplished immediately after the Revolution. Although the Constitution of 1917 spelled out in detail how the nation's natural resources were to be owned, reserving to the nation all subsoil resources, it was not until 1938, during the administration of President Lázaro Cardenas that Mexico felt safe to redeem the provisions of the Constitution that gave the nation ownership of its petroleum resources. Mexico's success did not pass unnoticed in other Latin American nations, but most of them were unable to act in similar ways at that time.

Since the second world war the pace of nationalization of natural resources has accelerated in the region. This has not always worked to the immediate benefit of the region's nations, but it has brought about conditions of ownership necessary to the development of natural resource conservation and management programs. Outstanding has been the achievement of Venezuela under the presidency of Carlos Andrés Perez. Under this man's administration, Venezuela nationalized its petroleum resources, began to gain national control of its vast mineral resources, and began to use the income from the sale of petroleum and other resources to resettle farmers and develop agriculture; that is, to use the resources for the national good. Conservation of petroleum in Venezuela has included a sharp reduction in production from a prenationalization daily average of about 3.25 million barrels to something below 2 million barrels and stepped-up exploration for new oil deposits. The government is totally aware that petroleum is a non-

renewable resource and that it must be exploited at a pace in keeping with the nation's needs and not one dictated by world market demand. The list of nations that have recently gained control over all or part of their natural resources continues to grow. Although nationalization of natural resources is seldom perceived as an act of conservation, such acts, as already noted, and repeated here for emphasis, are required before effective conservation and management of natural resources can occur. Unfortunately, there is no certainty that conservation will occur, but that is another matter.

Beginnings of a Conservation Movement In Latin America

It is not possible to assign a date and a place for the development of a conservation movement in Latin America. As in the United States, the first major conservation efforts centered on the establishment of parks and preserves, and this is still the strongest identifiable conservation activity in Latin America. It appears that, by and large, the United States stimulated widespread interest in parks and preserves when, in 1872, it created Yellowstone National Park. That there were preserves in Latin America established at an earlier period should be noted -- for example, a 22 hectare forest preserve on the island of St. Vincent was established in 1791 -- but the main interest derived from the United States' exemplar.

Although not unique in its efforts to establish major parks and preserves, Mexico must be ranked in the forefront of Latin American nations engaged in such efforts. The oldest national park in Mexico, the *Desierto de los Leones*, located in the Distrito Federal, was given official status in 1917, although the area was set aside unofficially in 1876 to protect springs which provided the capital city with part of its potable water. In 1912, Chile set aside the Alto Río Bío-Bío forest reserve comprising about 34,000 hectares, and there are a few other early efforts in the region. However, the major park development effort began in the 1930s when "paper" parks appeared in many parts of the region. I use the term "paper" to describe the parks that are created by edict, are designated on a map, but are not surveyed or given any actual protection. This is not meant to be derisive. It is admirable that so many first steps were made in park and reserve creation, and the lack of a follow-through is usually explainable by a lack of funds to make the parks functioning, protected realities.

After the 1930s, interest in park establishment waned in many nations but lately has reawakened, and there is presently considerable effective activity in many

nations directed toward the establishment and maintenance of parks and preserves. In this new era one frequently finds trained biologists providing scientific information as well as justification for parks. The latter is very important and especially so in small nations where taking any land out of potential commercial exploitation has to receive more than platitudinous justification. That small nations do set aside land in parks is certainly one of the most admirable achievements in Latin American conservation. It has been said that no politician plants a tree for another politician to harvest. While this may often be the case the world over, there are exceptions. Of the several exceptions that might be mentioned are those of Costa Rica and Panama where presidents have recently set aside large tracts of land as parks that are not to be exploited commercially. These were acts of the highest environmental responsibility and required political courage.

Not a little of the pressure brought to bear for the establishment of parks and preserves in Latin America comes from the United States but, with rather few exceptions, there is a naive ignorance on the part of many of the persons exerting such pressure of the fact that the parks must be maintained and that this costs money. All of these Latin American nations are third world nations and thus often do not have the financial means to administer the parks they set aside. It is all well and good to write a letter to a nation's president congratulating him or her for having set aside an area for a park but unless there is follow-up funding a number of the parks will disappear in the not distant future. This is a critical situation right now that is receiving far too little attention from conservation and environmentalist groups in the United States.

Conservation, Use and Management of Renewable Natural Resources

Although parks and preserves are important aspects of conservation, they do not, in my opinion, represent the area of central concern. The area of central concern is comprised of the natural resources people use, such as soil, water, air, trees, and animal life; in short, all the renewable natural resources. Concern for these resources in Latin American has been slow to develop.

Soil Conservation

Serious and effective efforts directed toward conservation and management of soils is recent in some parts of Latin America and still non-existent in other parts. This is particularly surprising since soil is of transcendental importance to virtually

every Latin American nation. Some of the earliest scientific studies of soils were conducted on a local basis by foreign-owned banana companies, but little of this information ever became generally available. A major early contribution was made by Hugh Hammond Bennett of the United States Soil Survey. In the 1930s and 1940s, Bennett conducted soil surveys in a number of countries that remained, for years, the only such work accomplished. Recently, one finds more and more nations recognizing the need for sophisticated soils studies as a prelude to soil conservation programs, but there is still a great lack of research in many parts the region.

Even when detailed soil surveys are conducted there is little machinery in place to bring about other than the most superficial soil management efforts. Decades ago, Bennett, showed that accelerated soil erosion was a problem of serious magnitude in most Latin American nations. Unfortunately, one often finds that the conditions reported by Bennett have not been altered in any significant way. There is no lack of general knowledge vis-a-vis good soils practices. The trouble seems to stem from heavy population pressure on some soils, cultural inertia (often remarked of other farm regions in the world) and a lack of real concern on the part of national governments.

Some progress is being made, however, and one may point to examples of such in Mexico, Colombia, Venezuela, and Brazil. However, the scourge of accelerated soil erosion continues little abated or unabated in far too many parts of this region and a major international effort (as well as individual national efforts) may be required to halt this staggering loss of soil.

Water

Until quite recently water conservation in this region equated with dam construction for power generation and/or irrigation. Although these are commendable aims, little thought was given to water quality, a situation not very different from the United States. Water polluted by intestinal disease pathogens was and still is general in rural areas of Latin American and in some urban situations as well. One need only look at the mortality data for children in nation after nation to discover that gastrointestinal illness is the chief killer of the very young.

Concomitant with industrialization is the potential for the appearance of other kinds of water pollution. Some nations are taking a greater interest in industrial-

caused water pollution but that interest has seldom extended to taking effective measures of control over such pollution. This is understandable because such control means added costs of production which in third world nations is often seen as unacceptable. Is it necessary to draw attention to the United States, where virtually every move of the EPA to control pollution by industry is met with resistance?

Air

In many of the larger cities of Latin America air pollution caused by industry and the internal combustion engine is frightful. The Bolsón de Mexico must have some of the most polluted air in the Western Hemisphere. It is an event these days to see Ixtacihuatl or Popocatepetl from the floor of the Basin. Sao Paulo, Brazil also enjoys status as a smoggy city, and no one is likely to forget Santiago, Chile on a winter's day when the fog is heavy and filled with coal smoke and soot.

Such foul air seldom receives more attention than derisive comments in newspaper editorials, and smog control devices on automobiles appear a long way off in the future. There is little prospect that air polluting industries will soon be required to alter their ways of operation. Economics as well as indifference are responsible for these conditions.

Forest

Latin America rivals the United States in the destructive manner in which it has used its forests. Although most nations in the region have long had a national forest agency, often joined with fisheries and agriculture, until recent years there has been a glaring lack of in-country expertise. This lack may be attributed to a number of factors, of which a traditional Iberian lack of regard for trees has played and still plays a part in what Gerald Brenan has called "Iberian dendrophobia." Under shifting cultivation the forest has a chance to survive, providing the human population does not become too large, but the introduction of livestock and permanent cropping systems has spelled finis for vast tracts of forest.

Today, as beef prices soar and the world market demand for animal protein appears to be without end, moist tropical forests are being sacrificed to make way for pasture on which to grow beef to earn foreign exchange. In most forest-to-pasture conversions a few commercially useful tree species are utilized but the rest

often end up on monstrous pyres, tragic ecological funerals, producing an ephemeral dressing of ash on the soil and an increment to the atmospheric content of CO₂.

Aside from soil, there is no other natural resource in the region that is so out of balance with the size of the human population. In a majority of nations, forest conservation cannot and will not work until there are smaller human populations. In the moist tropical forest most of the tree species presently have little or no market value for lumber or even charcoal. Mature tropical moist forest when clear-cut recovers very slowly; so slow, in fact, that such forest has been characterized as a non-renewable resource.

Because there is such a low per-hectare economic return from moist tropical forests the pressure to convert them to more "productive" eco-systems is often great. In Central America much of the forest has already been converted to cattle pastures and Brazil is embarked upon a major program of forest-to-pasture conversion in the Amazon Basin.

Not only tropical moist forests are or have been under attack. The (Pinus) and oak (*Quercus*) resources of Middle America have been also been the object of wasteful exploitation for centuries. In some areas, most notably Mexico, the highest use of which many such forests can be put is for watershed protection. In the case of Mexico with its great supply of natural gas it would probably be in the nation's best interest to pipe the gas to as many parts of the nation as possible and thus reduce the terrific pressures to which the nontropical forests are subjected for domestic fuel.

Mexico has a good recent record with regard to concern for its forests, although it has often appeared that such concern has been too infrequently matched by concrete forest management. The outstanding leader of forest conservation in Mexico is certainly Enrique Belrán, whose indefatigable efforts in the field of forest conservation in Mexico especially merit one's admiration. There is no lack of forestry expertise in Mexico nor, for that matter, laws and regulations governing the use of the forest resources. However, human needs have all too frequently stimulated practices that result in major degradation of the forest.

Most, if not all, of the Latin American nations have long had laws governing forest use, but enforcement has often been lax. Today there is a growing number of trained forestry personnel that is already having a positive effect. However, in

general, the forest resources of this region are still being over-exploited, abused, or simply destroyed to make way for non-forest land-uses. Few leaders appear to appreciate the seriousness of the situation and too little help is being given from outside the region. With regard to the last, not enough middle latitude-trained forestry experts have had the ecological and human sociological insights required to devise workable forest management programs. Often the focus has been on the economics of harvesting a few tree species rather than on concern for the entire forest ecosystems.

Animal Life

The human impact on non-aquatic and aquatic animals in Latin America has been highly destructive and particularly so within the present century. The past 50 years have witnessed a marked decrease in the populations of many animal species and this has greatly stimulated the most recent interest in the establishment of parks and preserves in the region. With few exceptions, all the larger edible mammal and bird species and subspecies are in troubled status. For example, in some areas where deer were plentiful as recently as three decades ago, the animals are now present only in the memory of the older people. Freshwater fish have become scarce in places where they were formerly abundant. Iguanas, once a staple food during Lent in parts of Latin America, are now usually so scarce that merely to see one is an event.

Many species valued for their hides or furs have been hunted to rarity and local extinction. These include most of the cats, many other mammals, and some reptiles, especially crocodilians (caymans and crocodiles).

There have been laws regulating hunting in some of the nations for many years but they have been largely ignored or, as is often the case, people are not informed of their existence.

Virtually all of the systems of law designed to regulate hunting in Latin America appear to be addressed to an affluent urban sport-hunting group or to wealthy foreigners. An outstanding example of the latter is to be found in Mexico.

Mexico has a "model" set of hunting laws that are perfectly appropriate to the cultural and economic realities of the State of California but not for the ecologically heterogeneous human populations of Mexico. Thus, the laws are fairly well enforced with regard to foreigners who hunt in Mexico but are

frequently ignored by native Mexicans. For example, the government watches closely to see that no foreigner trades in live wild animals or in hides and furs, such trade by anyone being against Mexican law, but one may encounter street vendors in various cities offering live birds or deer and jaguar hides for sale and so openly as to suggest that there is little to fear from the authorities.

What is needed in much of Latin America (Chile, Argentina and Uruguay may be exceptions) are laws that indicate an awareness that there are people who still rely upon the wild animal resource for food. While all commercial hunting should be forbidden, subsistence hunting should be recognized in the hunting regulations of several Latin America nations. Management of the wildlife resource should include recognition of this aspect of hunting, especially those regions where protein deficiency occurs.

Wildlife management is almost totally unknown in much of Latin America. Governments often show concern or interest in wildlife only when an international agency such as the International Union for the Conservation of Nature and Natural Resources presents evidence that a particular animal species is threatened with extinction unless afforded complete protection. Admirable as this response may seem to be it is often too late to accomplish very much.

In Central America, for example, the once moderately abundant Central America or Baird's Tapir is an endangered species and may become extinct even though it now enjoys complete legal protection. Similarly, the larger cats will soon be no more than a memory in Central America unless effective means are found to stop hide hunters and sufficient forest area in one place is set aside for these animals.

Marine fishery resources have not fared well. The failure of the anchovy fishery of Peru is common knowledge. The collapse was due to a combination of natural events (e.g. the El Niño current) and over-harvesting. Most if not all the valuable shrimp fisheries of the region are being over-fished. Even the economically modest green turtle fishery has been brought to the verge of destruction. With regard to the latter, however, foreigners such as Archie Carr and Bernard Nietschmann have generated international concern for these creatures and have been instrumental in getting first the government of Costa Rica and very recently the government of Nicaragua to set aside patrolled reserves where female turtles may lay their eggs without fear of human predation.

Anchovies, shrimp, and other valuable products of the ocean readily translate into

foreign exchange, toward the acquisition of which almost every nation in the region directs some of its economic strategy. The sea is not managed but mined and when a fishery collapses almost every possible (and impossible) cause is cited except that of over-harvesting. Well-meaning foreign agencies have aided and abetted some of this behavior by stressing increased catches but giving too limited attention to studies of primary productivity. In most coastal nations there are either no data on primary productivity or the data are so sparse as to be useless for accurate determination of the harvest limits.

Sometimes when there are sufficient data on which to make sound management judgements, as was true of the Peruvian anchovy fishery and has been true in more than one shrimp fishery, short-run economic concerns, political pressures, and greed have brushed aside the scientific data. Even after the anchovy fishery in Peru collapsed, the government was very reluctant to put a complete stop to anchovy harvests, and it was only after a public break between the Instituto del Mar del Peru and the military government that the latter reluctantly, in 1978, called a temporary halt to the anchovy harvest, possibly too late to save the fish or at least to permit the species ever regaining the biomass it once possessed.

There does appear to be a growing awareness, albeit slowly, at the highest governing levels in Latin America that responsible government requires responsible behavior toward a nation's renewable natural resources no matter how pressing the current need for foreign exchange may be. As the cadre of trained biologists increases in Latin America, and this is one of the brightest of current developments in the region, one can expect more and more natural resource decisions to be based at least in part on biological realities.

Human Population

No comment, however brief, on conservation and management of natural resources in this region can afford to ignore the issue of human population. The current size of that population as well as the present and recent past trends in its growth are too well known to require repeating here. For many years it was only foreigners who raised the unpopular issue of population growth and limited natural resources. Foremost among these was William Vogt. Vogt has been more than just concerned with human population, as his many publications clearly indicate, but he saw, with a particular and unique clarity, how conservation of the region's natural resources was tied to the size and per-capita needs and demands of the human population. For years his mild but direct warnings went unheeded

by the region's decision makers, but this is now changing rapidly.

One of the most promising developments in some parts of Latin America, in addition to the awareness that there are human population difficulties, are actual government efforts to educate persons to reduce their expectations as to the number of children they intend to produce.

Mexico is clearly a leader in this effort and one must commend to the highest degree the political courage that was required to get this nationally-endorsed and supported program under way. Who, even ten years ago, would have dared suggest that Mexico's government would openly advocate birth control and devise a program designed to encourage the limitation of births? Although too new for its effectiveness to be evaluated, this program represents one of the most significant ecological break-throughs ever to occur in Latin America. One may be certain that Mexico will help to encourage other governments to follow a similar course. It will be a long time before one can speak of the stabilization of human population in Latin America, but in Mexico the first major step has been taken to achieve that end.

In brief summary, it can be said that Latin America is making important gains in some areas of resource conservation and management but still lags in others. Viewing the region as a unit, there is reason to be optimistic for the future. More and more frequently one observes an increase of informed awareness of the critical need for conservation and management of natural resources. No longer is the growth of human population totally disregarded. The rapidly growing number of Latin American biologists and resource managers is most likely the key element in the hopeful changes now occurring and which may be expected to occur vis-a-vis the region's natural resources. Only a continued too rapid growth of human population in the region can derail the region's promising future.

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