



HEALTH AND ENVIRONMENT MINISTERS OF THE AMERICAS (HEMA)

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HEALTH AND ENVIRONMENT IN THE AMERICAS: ISSUES OF COMMON CONCERN AND POSSIBLE SHARED GOALS

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1.0 INTRODUCTION

The purpose of this paper is to provide an overview of the current situation in the Americas regarding environment and health issues and to identify critical areas for cooperation between health and environment sectors to address priority issues. It is also intended to initiate discussion on common goals for advancing priority issues in the hemisphere. It was developed in consultation with numerous health and environment experts and institutions in the region.

What is environmental health?

The concept of environmental health refers to the health implications of the interaction between individuals and their natural and built environments. As our knowledge and understanding about the linkages between environment and health evolve, so will the concept.

2.0 OVERVIEW OF THE CURRENT SITUATION IN THE AMERICAS

2.1 Population and Urbanization

Countries of the Americas are in demographic transition. Improvement of public health conditions drove the first phase, characterized by a sustained abatement of mortality rates. A slowdown in total fertility rates is driving the second phase. The population of the Americas is young: currently, over 27% of the population is under 15 years old.¹ Average life expectancy is 77 years in the US and Canada and 72 years in the English-speaking Caribbean and the Southern Cone countries. In Central America, the Hispanic Caribbean and Haiti, life expectancy is 68 years.

The Region is highly urbanized, with 75% of the population living in cities in 1999.² There is, of course, significant variation by sub-regions, ranging from a high of 85% living in urban areas in the Southern Cone, to a low of 54% living in urban areas in Central America, the Hispanic Caribbean and Haiti. The pace of urbanization remains high throughout the Region however, and by the year 2015, it is estimated that 80% of the population of LAC will be living in urban areas.

Although poverty may be found in Canada and the United States, it is concentrated mainly in Latin America and the Caribbean. Since the early 1980's, the majority of the population of LAC living in poverty is in urban areas.

Between 1980 and 1990, the number of urban poor increased by over 60 million. While poverty decreased in the 1990s, first in relative terms, then in total numbers.

Still in 1997, approximately 128 million urban dwellers (35% of households) were living below the poverty line⁴. The poor remain in urban slums and peri-urban areas because of greater opportunities for employment and access to education, health care and other essential services. However, they often remain marginalized from such services and can only find employment in the informal sector.

Basic cause-effect framework

The basic model of the interactions between the environment and human health is the Pressure-State-Response model that is represented by the cause-effect framework:³

driving force → pressure → state → exposure → effects on human health → action
(← feedback)

The framework recognizes that although exposure to a pollutant or other environmental threats may result in ill-health, controlling the "driving force" and the "pressures" leading to environmental degradation may be the most effective way to address the problem.

2.2 Environmental Trends

The Conference on the Human Environment (Stockholm 1972), and particularly the United Nations Conference on Environment and Development (Rio 1992) are landmarks of environmental policy. Since the Rio Earth Summit, much institutional progress has been achieved throughout the region, in terms of improving public awareness, governmental capacity and legislation. Nevertheless, in most countries environmental deterioration continues.

Latin America and the Caribbean holds the largest biodiversity in the planet, in terms of species and ecoregions. The abundance of endemisms adds to the biological relevance of this region. Land use changes and other processes are wearing out this biodiversity at an alarming rate, with health implications that are only beginning to be understood.

An important environmental asset of the Americas is the abundance of freshwater resources. More than 46% of the world's average annual internal renewable water resources may be found on this continent.⁵ The regional average of water available per capita exceeds by far that of any other region on the planet. Uneven distribution results, however, in some areas of Mexico, Central America, the Caribbean and the southern Pacific coast suffering from water stress. In addition, there is the emerging, and formidable, problem of water quality. Throughout the continent, many freshwater and groundwater systems tend to be heavily polluted due to uncontrolled discharges from human settlements, industries and agricultural fields. The result is a scarcity of good quality water, and water stress even while the resource remains abundant.

Pollution is a core issue of environmental health. The main pollutants affecting the region include biological and chemical pollutants in water resulting from urban, industrial and agricultural effluents; atmospheric air pollution from vehicular emissions and industrial and domestic energy use; and pesticides and other toxic chemicals, to which vulnerable populations in particular are increasingly exposed. The continued degradation of water, air, and land resources is a growing threat to human health in the region.

With the globalization of economies, environmental impacts know no borders. The results include loss of biodiversity, desertification, climate change, stratospheric ozone depletion, long distance transport of pollutants, and the pollution of oceans. The deterioration of life supporting systems may have serious implications for human health, including increasing poverty and malnutrition.

2.3 Environment and Health Trends

In recent decades, general health conditions have improved in the region, demonstrated through indicators such as infant mortality and life expectancy. Within the last two decades, Canadians and Americans have added three to four years to their life expectancy at birth. Although starting from a much shorter life expectancy, South Americans have gained an average of five to seven years over this same period.⁶

Spatial dimension of environmental health problems

As a guiding principle, environmental management should be based on a participatory approach, involving users, planners, and policy makers at all levels, with decisions and actions taken at the lowest appropriate level.

Intervention strategies for environmental infrastructure and services need to take place at three levels:

- *The Household and neighborhood:* Many of the most immediate threats to health are linked to environmental conditions at the urban or rural household or neighborhood level. For example, diarrhea is directly linked to the lack of household water supply, sanitation and hygiene. Additionally, acute respiratory infections in children and women that are linked to indoor air pollution or occupational and hazardous waste problems linked to micro-enterprises that operate in homes and neighborhoods.
- *The city level:* Municipal management of major infrastructure systems are linked to pollution in the city. Examples are trunk water and sewer systems, water and wastewater treatment plants, sanitary landfills, and other environmental infrastructure needed to protect the urban population and limit the environmental impacts caused by the concentration of urban wastes on land and water resources. Similarly, urban energy use and transport systems are directly linked to the quality of urban air and related health outcomes.
- *The broader ecosystem:* There is concern with the impacts of cities, industry, and agriculture on the broader environment. For example, water quantity and quality at the level of river basins, aquifers, or coastal zones are determined by water abstractions and effluent discharges from all three sectors. Some problems are manifested at a regional or global ecosystem scale, such as acid rain or global warming.

Continuous environmental deterioration may, in the long term, jeopardize this trend towards longer life expectancy. Diseases resulting from environmental conditions are already affecting the present generation, in particular the most vulnerable populations: the poor, indigenous people, children, women and the elderly. Vulnerable populations are more often exposed to traditional risks from the environment, often related to poverty, such as a lack of access to safe water, inadequate sanitation and waste disposal, indoor air pollution, and vector-borne diseases. At the same time, they are

increasingly exposed to modern environmental hazards due to urban air pollution and exposure to agro-industrial chemicals and hazardous waste, which may contain substances that take a long time to biodegrade or are cumulative in nature. In the industrialized north, it is the modern environmental hazards that pose the greatest health risks, while in the south, traditional environmental threats continue to be prominent.

A recent review was conducted by the World Bank of the direct disease burden from major environmental risks in LAC.⁷ The measure of different disease impacts used in the study is the Disability Adjusted Life Years (DALY) indicator.⁸ The study reports that 11% of all DALYs lost in LAC are directly due to environmental factors. While this is lower than that for developing regions as a whole, estimated to be 18% of DALYs lost, it is much higher than that of the United States, Canada, and other industrialized countries, which have an estimated DALY loss of 4.5% due to environmental factors. The same report estimates that the disease burden of air pollution alone in LAC

over the next two decades will amount to an average of 140,000 premature deaths per year and a loss of 4 million DALYs per year, unless action is taken to improve air quality in cities and in homes.

Poor children are particularly impacted by environmental factors. Globally, about 43% of the total burden of disease directly due to environmental risks falls on children under five years of age, even though they only make up 12% of the population.⁹ Two-thirds of all DALYs lost due to environmental factors are by children from 0 to 14 years of age.¹⁰ The main environmentally induced diseases are diarrhea and respiratory infections. Given the differences in health, environment and development that exist within the region, decision-making about how to address health and environment issues would be greatly improved through national studies focused on the burden of disease due to environmental factors.

2.4 The value of shared goals

Coalescing around shared goals is a powerful mean to addressing environment and health issues of common concerns in the hemisphere. In the past, shared goals have demonstrated that much can be achieved despite differences in levels of development, culture and institutions between countries. For example, shared goals for clean water

Ecosystem Approaches

The ecosystem approach to human health is based on the premise that it is impossible to improve human health without considering the viability of surrounding ecosystems. By the same logic, improving the condition of ecosystems will have positive, cost-effective benefits to human health. The ecosystem approach to human health seeks to identify the complex range of ecologically-based factors that influence human health, and to propose broad-based solutions which are economically, socially and environmentally appropriate. This approach promotes sustainable development by simultaneously considering the well-being of individuals as well as the health of the ecosystems in which they live. The International Development Research Centre (IDRC) is holding an International Forum on Ecosystem Approaches to Human Health (Ecohealth Forum) in Montreal, Canada, in May 2003.

and sanitation services have enable concrete progress towards the provision of water supply and sanitation services to urban and rural populations in the Americas. Shared goals for the phasing out of leaded gasoline have resulted in 15 lead-free countries in the hemisphere. Important environment and health gains have also been made in working together to find alternatives to DDT in malaria control program.

Great things can happen when countries work together toward common goals. It can help countries of the hemisphere promote environment and health agendas at the national and community levels. It can also help address transboundary, regional and global problems, motivate countries to work towards a common vision, provide synergies in the search for solutions and promote the exchange of information on successful approaches and technologies.

Shared Agenda for Health in the Americas

The Environmental Health Working Group of the Shared Agenda for Health in the Americas, an important initiative sponsored by PAHO, the World Bank and the Inter-American Development Bank, provides a mechanism for interchange and coordination in the areas of clean water and basic sanitation, clean air and environmental health indicators. The Shared Agenda seeks synergies among the different services that each institution provides to countries by working toward a common policy and approach, so as to increase the flow of technical and financial cooperation. The mandate of the Working Group can be broadened to include other priorities.

3.0 KEY HEALTH AND ENVIRONMENT ISSUES

There is a large range of environmental factors that can influence human health, as illustrated in Annex A. However, this paper is centered around select environment and health issues that can be addressed in a cost-effective manner and whose solutions will lead to improvements in the environment and health conditions, particularly for the most vulnerable populations. Of the five issues selected, the first three have long been priorities in the region, and the latter two have been assuming increasing importance over the past decade:

- 3.1 Clean water and basic environmental sanitation;
- 3.2 Clean air;
- 3.3 Chemical safety;
- 3.4 Anticipating and preventing the health effects of climate variability;
- 3.5 Anticipating and preventing the health effects of natural disasters.

3.1 Clean Water and Basic Environmental Sanitation

The need to provide universal clean water and basic environmental sanitation¹¹ remains the environmental health priority for LAC, due to the high rates of diarrheal and other water-borne diseases. Diarrhea accounts for half of the disease burden in LAC, and is responsible for some 153,000 deaths and 5.4 million DALYs lost annually. Children under five years of age account for eighty five percent of all deaths attributed to diarrhea and 84% of all lost DALYs. The brunt of this disease burden falls on poor peri-urban and rural households.

3.1.1 Regional trends

Starting with the efforts made during the 1960's, which were primarily a result of the agreements reached by the Ministers of Health in the Charter of Punta del Este in 1961, and reinforced by the Third Sepcial Meeting of Ministers of Health in 1972 and by the International Drinking Water Supply and Sanitation Decade (1981-1990), LAC has made consistent progress in improving the coverage of water supply and sanitation services. Water supply coverage in Latin America and the Caribbean has expanded from coverage of 33% of the population in 1960 to 85% today and sanitation services expanded from only 14% in 1960 to 76% today. This progress has been accompanied by a steady decline in infant mortality and increased life expectancy. Nevertheless, 77 million inhabitants (26 million urban and 51 million rural) in LAC remain without adequate access to drinking water, and 103 million (37 million urban and 66 million rural) lack any kind of sanitation. Also, there are significant differences in services between urban and rural populations. Improvements to wastewater treatment and water pollution abatement are still needed. Currently, less than 14% of all collected sewage receives any treatment, usually by inadequate and poorly operated treatment plants. The rest is discharged untreated back into the environment.

Within the Americas, the provision of safe water and basic environmental services varies greatly. Canada and the United States have achieved virtually universal coverage for both urban and rural drinking water and environmental sanitation services, including urban wastewater treatment. The primary concern in these countries is the needs to make major investments to replace worn or obsolete infrastructure.

With respect to municipal solid waste management, only very limited data is available. Collection coverage typically ranges from 50% to over 90% of the population. The capital cities and major metropolitan areas of LAC consistently provide higher levels of service, while intermediate and smaller sized cities often have inadequate collection services. With the exception of Canada and the United States, most solid waste collected in the region is simply disposed of in open-air dumps where it is common to observe people scavenging for useful materials or to see animals feeding on the waste. Properly situated, well designed and effectively operated sanitation landfills are only seen in some of the major metropolitan areas of LAC, most often where private operators are engaged. Cost recovery for this service is very low and municipal budgets are often inadequate for the provision of good quality and environmentally sound collection, treatment and disposal systems.

3.1.2 Issues

Inadequate water supplies and basic environmental sanitation services, as well as poor housing conditions, lead to increased exposure to biological pathogens by poor peri-urban and rural inhabitants. While the desirable solution is the provision of universal access to basic environmental sanitation, lack of resources hinders progress towards

this goal. Too often, the poor are left to solve their own problems and suffer the health consequences.

Beyond expanding the coverage of water and basic sanitation services to poor households and communities, the overall management of these systems is a major concern for cities throughout the region. Emphasis must be placed on the effectiveness and efficiency of the operation of these systems. In particular, there is a need to strengthen the capacity of local authorities to plan, invest in, operate and maintain these systems. Strategies for improving financial management, public private partnerships, cost-effectiveness, and cost recovery (applying the polluter pays and user pays principles) must be stressed. Only then can cities provide high quality water and sanitation services for their citizens. For small town and rural village systems, improving operations will require innovative approaches.

Integrated water resource management is also needed to confront and prevent problems of degradation and depletion of water resources at the river basin or aquifer level due to municipal, industrial and agricultural activities. Comprehensive assessments of both biological and chemical pollution sources are required to determine a cost-effective abatement strategy. Emphasis on reduction and control of municipal and industrial effluents in highly polluted river basins is warranted, as LAC's cities are increasingly linked to sewer systems and discharges are therefore concentrated at a few points. Major investments are needed in some river basins, and should be prioritized on the basis of the downstream effects. Cost effective solutions will have to be implemented in accordance with budget constraints. New financing mechanisms, including environmental subsidies, will be essential. Economic instruments can provide very powerful incentives to manage water better and reduce pollution loads. For example, watershed protection can be financed by a surcharge on water consumption, which is being done in some river basins in Brazil and Ecuador, or by a unit charge on wastewater effluents ("Polluter Pays"), as is the case in Colombian river basins.

Integrated water resource management is also fundamental to prevent and/or control degradation of estuaries, bays and coastal zones, which are impacted by urbanization and other land-based sources of pollution. Some 80% of the pollution load in oceans originates from land-based activities. The health and, in some cases, the very survival of coastal populations, depends upon healthy ecosystems such as estuaries and wetlands. Environmental health issues include beach and shellfish contamination, and loss of biodiversity.¹²

In some countries, water resource management is the responsibility of Ministries of Water Resources, while in others it is managed by Ministries representing end users, such as Agriculture or Energy. In the latter situations, health and environment sectors may be marginalized from the process of developing water and sanitation policy. Mechanisms are needed that permit greater interaction and broader coordination in water resource planning and management. In recent years, a few countries such as Brazil, Colombia, and Mexico have introduced river basin management institutions, which work in collaboration with stakeholders in planning and decision-making. The

health and the environment sectors need to play an active role in the work of such institutions and should advocate vis-à-vis the ministries of Economy and Finance for sector reform and for new mechanisms of financing water and sanitation infrastructure and services.

3.1.3 Policies and programs for clean water and basic environmental sanitation

The Rio Conference on Environment and Development and the resulting Agenda 21 gave clear priority to improving water supply and sanitation within the context of better water management. In *Vision 21*, a number of targets are suggested that can be adapted by individual countries (Table 2), taking into account their current situation and pace of development.¹³ Each community, or country, is encouraged to set its overall targets, as well as intermediate targets as stepping stones.

Table 1. Suggested Vision 21 Targets for Safe Water, Sanitation, and Hygiene

Suggested Targets for 2015 and 2025	
2015	
1.	Universal public awareness of hygiene
2.	Percentage of people who lack adequate sanitation halved
3.	Percentage of people who lack safe water halved
4.	80% of all primary school children educated about hygiene
5.	All schools equipped with facilities for sanitation and hand washing
6.	Diarrheal disease incidence reduced by 50%
2025	
7.	Good hygiene practices universally applied
8.	Adequate sanitation for all
9.	Safe water for all
10.	All primary school children educated about hygiene
11.	Diarrheal disease incidence reduced by 80%

(Source: WSSCC, 2001)

To achieve the target of safe water supply and sanitation for all by 2025, given the present deficit in services and the expected population growth, an expansion of services in LAC at a rate of 32,000 people per day will be required.¹⁴ Based on the experiences of the past decade, this is an achievable target, but it will require coordinated investments from multiple sources – drawn from revenue generated by water utilities, intergovernmental transfers, multilateral investment banks and private sector partnerships. The mobilization of significant private sector investments is likely to be the key to achieving universal service.

A framework for action is now needed to ensure that LAC countries can achieve the target of universal service. In recent years, there has been a remarkable consensus on

the need for people-centered, market-and environment-friendly policies for managing water resources and for delivering water and sanitation services on an efficient, equitable and sustainable basis. At the heart of this consensus are a number of key principles:

- Participatory water development and management, involving users, planners and policy makers at all levels, with decisions taken at the lowest appropriate level -- for water supply and sanitation services this means a household-centered approach.
- Recognition of the economic, social and environmental value of water and implementation of full-cost pricing of water services, with targeted subsidies to protect the poor.
- Holistic, systematic approaches, based on integrated water management, which pays attention to both water quantity and quality.
- Institutional, technological, and financial innovation.
- Governments as enablers, providing effective and transparent regulatory frameworks for private sector action.

Regarding the protection of marine environments, the 1995 Global Programme of Action (GPA) for the Protection of the Marine Environment from Land-based Activities identifies the municipal wastewater as one of the major issues that contributes to the marine environment degradation. GPA provides a sound framework to implement international coastal and oceans governance under ocean-related conventions. The GPA is a source of conceptual and practical guidance for devising and implementing sustainable action to prevent, reduce and/or eliminate marine degradation from land-based activities such as sewage, run-off from agricultural and industrial sites, and habitat destruction. The provisions of the Montréal Declaration, issued in November 2001 by the first Intergovernmental Review Meeting of the GPA, bear strong implications for environment and health in the region.

Possible common goals

- Adopt the Vision 21 goals of universal clean water, basic environmental sanitation and hygiene by the year 2025, with clearly defined interim targets for 2015.
- Preventing and abating water pollution from urban, industrial and agricultural sources through integrated water resource management and through efforts to fulfill commitments made in the 2001 Montréal Declaration on the Global Programme of Action for the Protection of the marine Environment from Land-based Activities (GPA)
- All medium to large cities achieve a sound management of municipal solid wastes by 2015

3.2 Clean Air

Air pollution is a major environmental health problem affecting all countries of the Americas, rich and poor alike. Air pollution contributes significantly to a number of diseases such as acute respiratory infections, chronic obstructive pulmonary diseases,

cardiovascular diseases, and cancers. The lung is the most common site of injury by airborne pollutants. Acute effects, however, may also be non-respiratory. Acute respiratory infections (ARI) are of particular importance to children's health. In LAC, it is the third leading cause of death, and 55% of all ARI-related deaths occur in children age five years and under. The elderly are also very susceptible to ARI. The relationship between ARI and emissions from fuel combustion is well established, especially for fine particulate matter. Chronic obstructive pulmonary diseases (COPD) and asthma also disproportionately affect the young and the elderly.

3.2.1 Indoor air pollution

The use of firewood and other low quality fuels for domestic cooking and heating in poor rural areas, particularly in the Andean and Central American highlands is a major source of air pollutants (especially particulate matter) that lead to ARI, COPD and asthma, among other illnesses. These conditions present particular risks to the respiratory health of women and young children, who have the most exposure in poor households. Attention needs to be given to affordable clean fuels, improved stoves and better household ventilation.

Indoor air pollutants other than those associated with fuel combustion are also of concern in some circumstances. They include asbestos fibers from insulation or asbestos cement, organic solvents used in building materials, wood preservatives, cleaning agents, and radon gas. Environmental tobacco smoke is another major factor influencing the quality of indoor air and the health of exposed individuals. Biological pollutants, such as dust mites, molds, pollen and animal allergens are also a concern. Education and awareness raising programs are an important instrument for addressing these health problems and should be carried out as part of primary environmental care programs.¹⁵

3.2.2 Sources and impacts of urban air pollutants

Ambient air quality problems are observed in the urban air sheds of many American metropolitan areas and industrial zones. The sources of air pollution vary in each city, and include industry, domiciles, and vehicles. On average, vehicular emissions account for more than 70% of urban air pollution in cities of the region. While automobile ownership and usage in the United States and Canada is the highest in the world, the growth in ownership and concentration of vehicles remains high in metropolitan areas of LAC.

Recent PAHO estimates show that more than 100 million people in the region are exposed to levels of urban air pollutants that exceed WHO recommended ambient air quality standards, and more than 100,000 people die each year due to exposure to particulate matter.¹⁶ Major pollutants of concern include fine particulate matter (mainly from vehicular emissions), lead, oxides of sulphur and nitrogen, carbon monoxide, ozone, and airborne toxics. The use of fossil fuels also contributes significantly to the emission of green house gases, and hence to the warming of the global atmosphere.

Comparative risk assessment and health studies in a number of cities (among them, Mexico City, Quito and Santiago) indicate that the greatest damage comes from exposure to ozone and fine particulate matter (PM₁₀ -- particulates smaller than 10 microns in diameter). Next to the elimination of lead from gasoline, which is already a regional success story (see Box entitled "*Phase-out of lead in gasoline -- a regional success in eliminating a silent threat*") reduction of ozone and fine particulate matter is by far the highest air quality priority.

The costs associated with mortality and morbidity from urban air pollution are also significant. A recent study of the benefits of improving air quality in Metropolitan Mexico City found that annually, a 10% reduction in PM₁₀ and ozone would result in a savings of US\$759 Million, and achieving air quality compliance would save US\$2 Billion per year.¹⁷ Not included in the economic valuation was that these two scenarios would result in 266 and 585 fewer infant deaths respectively. The health benefits of reducing urban air pollution justify major investments in abatement activities.

3.2.3 Urban air quality management

Tackling urban air pollution requires coordinated actions at many levels. While national governments set the needed policies and regulatory frameworks, the responsibilities for implementation are divided between several ministries including energy, industry, transport, trade, finance, environment and health. Sub-national authorities often have major enforcement responsibilities for environmental regulations, and local governments typically manage key areas such as land use and urban transport planning. There are also other, non-governmental stakeholders with important roles. For example, of the approximately US\$1.3 Billion invested in the Santiago Metropolitan Region over the last decade, 90% was from the private sector.

The development of a comprehensive strategy for tackling air pollution requires a level of information and understanding that is often lacking. Thus, another important role of national and local authorities is to develop capacities and support activities to collect reliable air quality data, develop emissions inventories, model air quality and its impacts, identify measures for improving air quality and assess costs across sectors.

In LAC, there are three regional urban air quality programs. The first is the *Clean Air Initiative in Latin American Cities*, supported by a partnership that includes donor agencies, private companies and foundations, NGOs and a technical secretariat at the World Bank.¹⁸ One of the main goals of this initiative is to promote the integrated development or enhancement of action plans to improve air quality in metropolitan centres. Six cities are currently participating: Buenos Aires, Lima-Callao, Mexico City, Rio de Janeiro, Santiago, and Sao Paulo. Each city is considering a wide range of policies and investments needed to improve the quality of urban air. Of course, the final choice will vary by city.

The second regional initiative is the Program *Aire Puro* in Central America, support by Switzerland. The main goal of this program is to improve urban air quality through the training of professionals in the automobile industry sector, establishment of inspection and maintenance programs for automobiles, and public awareness.

Third, PAHO's Regional Plan on Urban Air Quality and Health¹⁹ proposes activities to be undertaken by countries to improve indoor and outdoor air quality. It covers areas such as policy, standards and regulation; environment and health surveillance; and education, training and public awareness.

Possible common goals

- For large metropolitan areas, adopt the approach of the Clean Air Initiative in Latin American Cities.
- For intermediate cities, adopt prevention policies and strategies.
- Achieve the regional plan for eliminating lead in gasoline and set goals for the elimination of other harmful sources of lead
- Include steps for reducing indoor air pollution within primary environmental care programs.
- Reductions in ozone and particulate matter

3.3 Chemical Safety

Tens of thousands of chemicals are in use throughout the world, and each year between 1,000 and 2,000 new chemicals are introduced into the market. Many of these chemicals pose hazards to exposed populations. The lack of detailed, quantitative information on the production, use, and disposal of such chemicals, and on the resulting human health risks, severely hinders efforts to safely manage chemicals.

Data from Brazil²⁰ indicate that there were 79,000 cases of poisonings resulting from acute exposure to toxic chemicals in 1998, 59.7% which were accidental, 22.9% which affected children under four years old and 30.5% which affected adults from 20 to 39 years old. Chronic exposure to toxic chemicals represents an equal threat, having been linked to adverse effects on genes, the nervous system, reproductive and developmental problems, as well as cancers. It is estimated that the total disease burden of acute and chronic exposure to agro-industrial chemical pollutants in LAC is on a scale of 1.7 million DALYs lost each year and that this number is increasing with industrial development.

In response to growing concerns about chemical safety, a number of international efforts have been initiated. The International Programme on Chemical Safety (IPCS) is a joint effort by UNEP, ILO, and WHO. The IPCS' goals are to establish the scientific basis for the health and environmental risk assessment for the safe use of chemicals, and to strengthen national capacities to manage chemicals safely. Following UNCED recommendations, two international entities have been formed -- the Inter-Organizational Programme for the Sound Management of Chemicals (IOMC), and the

Intergovernmental Forum on Chemical Safety (IFCS); both administered by WHO. They have different, but inter-related, roles and responsibilities.

Phase-out of lead in gasoline -- a regional success in eliminating a silent threat

Lead ranks as one of the most serious environmental threats to human health, especially in urban areas. Perhaps its most alarming effect is on the mental development of children. Young children are especially susceptible: their digestive systems absorb heavy metals rapidly. Poor children are most at risk because malnourishment intensifies lead absorption. For adults, lead adsorption can cause hypertension, high blood pressure, and cardiovascular problems.

Leaded gasoline is a problem worldwide; in large cities where it is still used, it accounts for 80% to 90% of airborne lead pollution. Lead contamination and exposure in those cities are typically 3 to 4 times higher than in the suburbs and 10 times higher than in rural areas. As a result of this exposure, children living in the inner cities may suffer as much as a 4-point IQ loss compared to children in the suburbs. If the use of leaded gasoline continues, the problem will become worse. Vehicle use is soaring in developing cities, and as cities grow, more and more people are being exposed to lead pollution.

In LAC, a regional program has been undertaken with the support of the World Bank and several other international agencies and private organizations. The project has included health and technical studies, regional and country-based technical assistance, and dissemination of information and experience. Most LAC countries made commitments to phase out leaded gasoline by 2000, and several accelerated their phase out plans. The use of lead is declining, from 27,000 tons in 1990 to an estimated 5,000 tons by 2000 (see figure). Today, all but one country has successfully reduced lead in gasoline, and there were 15 lead-free countries in 1999. The effort has been so successful that 80 % of the remaining 5,000 tons of lead is generated by only one country.

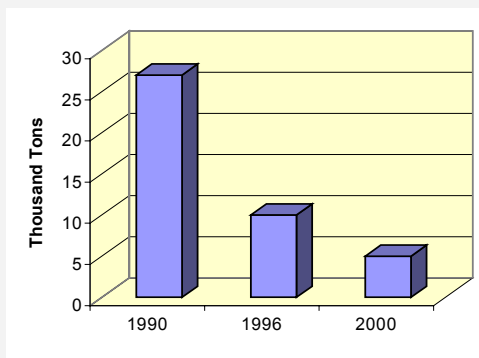


Figure. Lead added to gasoline in Latin America and the Caribbean, 1990, 1996, and 2000
(Source: Lovei, 1999; ESMAP, 1997)

Of particular importance to the sound management of chemicals is the Stockholm Convention. Signatories to the Convention agreed to reduce and/or eliminate releases of persistent organic pollutants (POPs). POPs are highly stable organic compounds used in pesticides and by industry, which travel great distances by air, persist in the environment, accumulate in the fatty tissues of most living organisms, and are toxic to humans. Fetus and children are especially vulnerable, as are northerners due to subsistence diets that include animals found to contain contaminants. The governing bodies of both WHO and UNEP have adopted resolutions on the elimination of POPs.²¹

Equally important are some heavy metals, such as lead and mercury, that exhibit persistent, bio-accumulative, and toxic effects. Both POPs and heavy metals, along with other chemical hazards to human health, require integrated approaches to reduce hazards from multiple sources.

Chemical safety and toxicology programs in LAC are uneven, vary by country, and have difficulty keeping pace with the accelerated production, importation and use of toxic chemicals. For example, Central America has an agriculturally-based economy and imports of pesticides increased 275% from 1992 and 1999.²² Brazil is one of the four countries in the world using the most agrochemicals -- in 1997, some 2.33 kg of active ingredients were used per hectare.²³ The indiscriminate use of mercury for gold extraction is a problem in Brazil, Peru, Colombia, Bolivia, and Surinam. Also, hazardous waste resulting from industrial production processes, often disposed of in dumps and landfills, is increasing proportionate to industrial development in LAC. In many micro-enterprise activities that are centered in the home (e.g., small-scale tanneries, lead-acid battery recycling, etc.), workers and family members suffer from exposure to hazardous materials. Of special concern for the health sector is the management of hazardous health care waste from hospitals, clinics, and laboratories. In response to these growing problems, national chemical safety and toxic substances programs need to be expanded and strengthened.

3.3.1 *Chemical safety initiatives in the Region*

A number of important toxic chemical pollution prevention initiatives are being carried out in the Region through inter-country cooperative programs, including the Canada - U.S. Bi-national Toxics Strategy, aimed at the virtual elimination of persistent toxic substances in the Great Lakes; the new Integrated Program for the Progressive Elimination of DDT aimed at reducing long term exposure in Mexico and Central America (see Box entitled "*Discontinuing DDT while Fighting Malaria in the Americas*") the North American Commission for Environmental Cooperation's (CEC, comprising Canada, the United States and Mexico) tripartite action plans on DDT, chlordane, PCBs, and mercury. Other action plans under development or being considered by the CEC address dioxins/furans, lead and lindane. Individual countries in LAC have become increasingly involved in efforts to prevent chemical exposure. Activities include implementing restrictions or prohibitions on the use of specific pesticides or chemical pollutants, systems of registration and control of pesticides, encouraging organic farming methods, training of pesticide users, and surveillance systems to improve information on poisonings. In response to an acknowledged under-registration of poisoning cases, many countries have established toxicology centers aimed at increasing information exchange, standardizing reports on poisoning cases, standardizing techniques for laboratories, and treatment protocols. Many countries have also promulgated regulations on hazardous chemicals. In a few cases, toxic chemical control boards have also been established.

3.3.2 Strengthening chemical safety programs

In strengthening chemical safety, countries should consider the guidance provided by the IFCS.²⁴ The starting point for each country is a good emissions inventory. Inventories are an important tool to raise public awareness about potential chemical risks and an effective environmental management tool to stimulate chemical risk reduction. Emphasis should be placed on priority persistent organic pollutants (POPs), such as the pesticide DDT, and on heavy metals such as mercury and lead. National efforts should then focus on strengthening capacities to restrict or prohibit the use of priority chemical pollutants, principally pesticides; (such as eliminating the use of DDT), establishing new priorities for POPs, heavy metals, or other chemical hazards; and providing toxicological services and establishing and strengthening toxicology networks. To reinforce the scientific basis for this work, better information and research is needed on pesticides and other hazardous chemicals, their use, and their impacts on human health. Finally, the national regulatory framework should continue to be updated and institutional reforms undertaken with a view to achieving greater program integration and cross-sectoral coordination for program implementation.

A. Discontinuing DDT while Fighting Malaria in the Americas

In Mesoamerica over 89 million people live in areas environmentally suitable for the transmission of malaria, a protozoal disease transmitted by anopheline mosquito bites. Over 23 million people live in highly endemic areas. Since the 1950's, countries affected by malaria in the Americas have made intense use of DDT, as a cheap and rather effective way of vector control as well as for agricultural purposes, particularly for cotton crops. In Mexico and Central America at least 85,000 tons of DDT were sprayed in malaria endemic areas in the last 40 years. However, given that vectors develop resistance to DDT, a DDT-based strategy has been unable to eradicate malaria in the region, where the incidence of the disease is still high in Belize, Guatemala, Nicaragua and Honduras. Indigenous populations are particularly exposed.

Most Central American countries had replaced DDT with other insecticides in the 1980's or early . In 2000, no DDT was spread in Mexico. Phasing out DDT and other persistent organic insecticides while keeping malaria under control is a shared sub-regional commitment that calls for international cooperation. In recent years, new methods of malaria vector control have been developed, with promising results. Alternative methods include bed nets, algae withdrawal, use of substitute insecticides such as delthametrin, and use of biological tools.¹ Most important, a new ecological, integrated approach to malaria control is emerging, leading to Persistent Organic Pollutant-free methods that are replicable, cost-effective and sustainable.

One of the most promising initiatives under way is the *Program of Action and Demonstration of Sustainable Alternatives to DDT for Malaria Vector Control in Mexico and Central America*. It is an inter-institutional initiative promoted by Mexico, Central America and Panama, in collaboration with UNEP, PAHO and the North American Commission for Environmental Cooperation (CEC). The total cost of the project is estimated at US\$ 11 Million, of which 2/3 are requested from the GEF (Focal Area: International Waters).

¹ The biological tools that have been tested include the use of *Bacillus thuringiensis* and *Bacillus sphaericus*, larvae eating fishes and Neem tree, an African plant that may act as a repellent.

(Source: ISAT (2002) Instituto de Salud, Ambiente y Trabajo, S.C. : *Diagnostico Situacional des Uso del DDT y el control de la Malaria. Informe Regional para México y Centroamérica*). PNUMA, GEF, CEC. December 2001)

Possible common goals

- Reduce use of, and exposures to priority toxic chemicals, principally pesticides.
- Establish and strengthen poison centers.
- Prepare and regularly update national chemical safety profiles.
- Establish emissions inventories following IFCS guidelines.
- Ratify the POPs Convention. Begin activities on priority POPs, such as DDT, with elimination of illegal uses and disposing of unwanted stockpiles.
- Establish integrated programs to address lead exposure from sources other than gasoline.

3.4 Anticipating and Preventing Health Effects of Climate Variability

Climate variability, whether occurring naturally or induced by human activity, has powerful implications for human health and for the stability of ecosystems. Globally, the 1990's were the warmest decade on record. Current temperature projections for this century are of an increase in average surface temperature in the range of 1.4°C - 5.8°C, and a sea level rise of 0.09-0.88 m. Sudden, non-linear changes have not been ruled out.

The links between weather/climate and environmental health have attracted much interest in recent years, as evidenced by the amount of publications, workshops and research. Overall, climate variability is projected to increase threats to human health, particularly in lower income populations, predominantly within tropical/subtropical countries. The possible impacts on health include the following:

- increase in frequency and intensity of heat waves and other climatic circumstances;
- increase in the frequency and intensity of extreme events such as storms, floods, droughts and cyclones;
- increase of urban air pollution problems;
- alteration of the geographic ranges and seasons of transmission of vector-borne infectious diseases.
- changes in marine environments, and surface water quality and quantity, (possible consequences on the epidemiology of some infectious diseases); and
- changes in food supply.

The potential threats to human health of climate variability and global environmental change should be considered as a common concern in the region because:

- all countries in the Americas, without exception, have expressed serious concern about climate change and its potential impacts, including impacts on human health.
- multilateral, sub-regional and bilateral arrangements and previous institutional experiences offer a broad, common ground for cooperation in the climate/health field in the Americas.

- the health co-benefits of reducing greenhouse gases may help define the approach to mitigation and broaden the scope of "no-regrets" and "win-win" policies and measures.
- Coping with the human health implications of climate change calls for a revision of current public health policies in the region.
- The recurrence of El Niño/Southern Oscillation (ENSO) is already a serious threat to environmental health in the Americas. Regional cooperation may contribute to reducing ENSO-related disease.

Health implications of climate variability are perhaps the best examples of the new breed of environment and health hazards encountered by humans in the age of globalization. The consideration of the potential health effects of global climate variability may further contribute to redefining the environment and health agenda for regional cooperation.

Possible common goals:

- creation of a regional monitoring, surveillance and response network;
- multidisciplinary research on the linkages between global climate change, climate variability and human health, including cross-boundaries epidemiological studies (i.e. studies of dengue fever in broad geographic regions);
- development of environmental health indicators, including environmental signals such as weather watch indices, insect population densities and crop production, shifts in the ranges or densities of sensitive indicator species (such as rodents and phytoplankton).
- capacity building and improved environmental health training for health professionals; outreach programs;
- adoption of common and specific adaptive strategies, particularly with respect to El Niño/Southern Oscillation health impacts.
- reinforcement of control measures against vectors (mosquitoes, ticks, flies and rodents), including ecosystem approaches;
- development or reinforcement of early warning systems, in connection with appropriate disaster reduction and preparedness programs for extreme weather events; and
- "no-regrets" climate change mitigation measures, on the basis of health co-benefits.

3.5 Anticipating and Preventing the Health Effects of Natural Disasters

In many countries of the Americas, natural disasters are a growing threat to environmental health. Over the last three decades, the most significant natural disasters in Latin America and the Caribbean affected the lives of over twelve million people and resulted in 108 000 deaths and economic losses of over US\$ 50 Billion (with nearly half of these economic losses occurring over the last decade). The Caribbean and Central America are particularly at risk. The disasters brought about by the last El Niño/ Southern Oscillation (1997-98) resulted in losses in the Andean sub-region equivalent to 2.6 % of its GDP. Extreme weather events, such as Hurricanes *Georges* and *Mitch*, have undergone extensive analysis, which includes their human health consequences.

Environmental deterioration, both in urban and rural contexts, is one of the main factors contributing to growing vulnerability and risk. In order to tackle the root cause of disasters, emphasis needs to be placed on integrated risk management, long term reduction of vulnerability and disaster prevention, without neglecting traditional disaster relief. This new emphasis on prevention also makes economic sense: it is estimated that one dollar spent on disaster prevention reduces the cost of disaster relief by seven dollars.

Prevention requires countering complex processes such as uncontrolled occupation of a territory, substandard urbanization, inadequate disposal of waste, unsustainable rural production, ecosystems and watershed degradation, deforestation, loss of biodiversity and desertification. The Cities without Slums Action Plan, a joint program of the World Bank and the United Nations Centre for Human Settlements (HABITAT) is one important tool that contributes to reducing the vulnerabilities of the poorest to natural disasters by upgrading slums and squatter settlements. Natural disasters prevention also implies improving awareness and organization, as well as broadening participation in prevention activities. Reducing risks related to natural disasters is thus concurrent with promoting sustainable development. As a multi-sectoral endeavor, disaster prevention should find its place in all relevant planning activities.

Integrated risk management offers new possibilities for cooperation between health and environment sectors. A strategic alliance between both sectors for disaster prevention could be the basis for the involvement of other sectors and social groups. This cooperative relationship could rely upon existing sub-regional institutions such as, the SICA-related official Coordination Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC); the Caribbean Disaster Emergency Response Agency (CDERA); and the Andean sub-region Regional Program on Risk Prevention and Reduction (PREANDINO). Regional cooperation may also count on some very active documentation centers or networks, such as the Caribbean Disaster Information Network (CARDIN) and the Regional Center of Information on Disasters (CRID), which is currently the most comprehensive source of information on natural disasters in LAC.

At the international level, the creation and consolidation of the International Strategy for Disaster Reduction offers a framework for much needed, effective coordination within the UN system. Within this framework, international institutions related to health and environment may support new regional initiatives. PAHO has been extremely active in the field of natural disasters, especially in the last decade. It has a well-established institutional presence in sub-regional/national contexts and has accumulated valuable experience. Involvement of UNEP-ROLAC in the field of natural disasters is more recent; it has nevertheless much to offer in terms of tackling the environmental roots of disasters and reducing vulnerability.

Possible common goals:

- Development of Vulnerability and Risk Assessments at sub-regional/ national levels. This includes the revision of current risk mapping efforts and the development of new ones.
- Enhancement of existing information and monitoring capacities.
- Watershed management for flood control.
- Land use/ eco-regional planning for disaster prevention and reduction, taking also into account immediate health co-benefits.
- Expediting the adoption of Cities without Slums Initiatives
- Strengthening early warning systems.
- Exchange of experiences in communication, public awareness, social participation and education in the field of natural disasters.
- Fostering research on the health implications of natural disasters and on the possible environmental roots of the latter.
- Improvement of existing disaster relief cooperation schemes.

4.0 CONCLUSIONS AND RECOMMENDATIONS

To respond to the five priority areas outlined above, numerous common goals and actions have been suggested. There is solid evidence for action in the first three areas. The growing recognition of the significance of the health impacts of climate variability and natural disasters also suggest a call for joint action is necessary in the spirit of prevention.

Health and environment sectors have an essential advocacy role to play in highlighting the links between health, environment, and sustainable development in the development of national policies and actions. A much stronger partnership between human health and environment sectors, and with other sectors, is needed for the successful reduction of health threats arising from poor environmental conditions. Partnerships with civil society and the private sector are also essential.

The guiding principles for reducing environmental risks and improving health include the following:

- Nature does not respect political boundaries, so effective solutions require integration at the ecosystem level, which requires inter-sectoral and inter-jurisdictional coordination and collaboration, and full stakeholder participation.
- Inter-sectoral action needs to be facilitated through new approaches to legislation, budgeting and finance, and human resources development.
- Better knowledge of health and environment linkages is required at all levels to support effective policy development, priority setting, and decision making.
- Actions for improving environmental health are required at all levels -- local, provincial or state, national, and international.

Many challenges remain in addressing health and environment issues in the Americas. To effectively address these challenges requires that countries coalesce around key priorities and shared goals for actions.

Two general questions for consideration during Session 2 of the Health and Environment Ministers of the Americas Meeting are as follows:

- 1. Do these priority areas meet your needs and would they provide a suitable framework for identifying shared goals and concrete actions?**
- 2. Within these areas, what common goals could be promoted within the region? What could be good initial goals?**

Annex A

Condiciones ambientales y su influencia en los efectos en la salud

	Condiciones												
	Ambientales												
Condiciones de Salud	1	2	3	4	5	6	7	8	9	10	11	12	13
Infecciones respiratorias agudas					X	X		X	X				
Diarreas y otras enfermedades gastrointestinales agudas	X	X	X	X		X	X		X			X	
Otras infecciones		X	X	X			X						
Enfermedades transmitidas por vectores (Malaria, Dengue, Fiebre Amarilla, Chagas)	X		X	X		X			X		X	X	X
Zoonosis (rabia, leptospirosis, hantavirus, an. Ponzosñosos)		X	X	X		X	X					X	X
Agravios e intoxicaciones por sustancias químicas (Plaguicidas, metales pesados)		X		X	X	X	X	X	X		X		
Condiciones de Salud Mental						X	X					X	
Enfermedades cardiovasculares					X								X
Cáncer	X	X			X	X	X	X	X	X	X		X
Enfermedades respiratorias crónicas					X	X	X	X					X
Accidentes de tránsito y laborales							X		X	X			

- 1 - Agua potable y saneamiento;
- 2 - Contaminación del agua;
- 3 - Drenaje de aguas pluviales;
- 4 - Desechos Sólidos;
- 5 - Contaminación del aire;
- 6 - Vivienda;
- 7 - Contaminación de alimentos;
- 8 - Riesgos ocupacionales;
- 10 - Radiaciones y otros riesgos físicos;
- 11 - Peligros inherentes al desarrollo;
- 12 - mitigación de desastres;

- 9 - Riesgos Químicos;
- 10 - Radiaciones y otros riesgos físicos;
- 11 - Peligros inherentes al desarrollo;
- 12 - mitigación de desastres;
- 13 - Cambios mundiales en el medio ambiente

(Source: Situation Analysis of Health & Environment in the Region, PAHO, 2000 draft.)

References

- ¹ See CEPAL/ PNUMA-ORPALC (2001).
- ² See UN Population Division (2001a).
- ³ The basic model framework has been adapted for the analysis of health-and-environment cause-effect relationships by Briggs et al. (1996).
- ⁴ See CEPAL (1999); CEPAL/ PNUMA-ORPALC (2001).
- ⁵ See World Resources Institute/ UNEP/ UNDP/ World Bank (2000), Data Table FW.1.
- ⁶ United Nations Population Division (2001b).
- ⁷ See Lvovsky (2001).
- ⁸ Disability-Adjusted Life Years (DALY) is a composite measure of years of life lost due to premature mortality and years of life lost as a result of illness or disability. Developed by the World Bank, the World Health Organization, and Harvard University, the DALY is a useful, if imperfect, measure for quantifying the burden of disease. For a description of the DALY concept and estimates of the global burden of disease, see Murray and Lopez (1996). For a more recent discussion of methodology for assessment of environmental burden of disease, see Kay *et al.* (2000).
- ⁹ Smith et al. (1999).
- ¹⁰ WHO (1997).
- ¹¹ The WSSCC has defined Environmental Sanitation as: "Interventions to reduce peoples' exposure to disease by providing a clean environment in which to live, with measures to break the cycle of disease. This usually includes hygienic management of human and animal excreta, refuse, wastewater, stormwater, the control of disease vectors, and the provision of washing facilities for personal and domestic hygiene. Environmental sanitation involves both behaviours and facilities which work together to form a hygienic environment." This is the definition used in this report.
- ¹² Examples are provided by the UNEP-sponsored Regional Seas Programmes, such as the Plan of Action for the Protection and Development of Marine Ecosystems in the Wider Caribbean (based on the Cartagena Convention).
- ¹³ *Vision 21* (WSSCC, 2001) is a global strategy for achieving universal access to water, sanitation, and hygiene. It was prepared, through a participatory process, by the Water Supply and Sanitation Collaborative Council (WSSCC) as an input to the *World Water Vision* of the Global Water Partnership.
- ¹⁴ Estimate of Mara and Feachem (2001).
- ¹⁵ Primary Environmental Care (PEC) is a regional strategy for protecting the community environment through the promotion and execution of basic and preventive actions at the local level with community participation. See PAHO, 1998.
- ¹⁶ See PAHO (2000).
- ¹⁷ Cesar *et al.* (in press).
- ¹⁸ See Bigio (2001)
- ¹⁹ See PAHO (2000).
- ²⁰ Data of the Sistema Nacional de Información Toxicofarmacológica (SINITOX), available at <http://www.fiocruz.br/sinitox>.
- ²¹ The 1997 World Health Assembly Resolution WHA50.13, and the UNEP Governing Council Decision 19/13C(1997).
- ²² See PAHO (2001).
- ²³ See UNEP (2000).
- ²⁴ See IFCS Priorities for Action Beyond 2000, <http://www.who.int/ifcs/forum3/f3-finreprodoc/annex6.pdf>.

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