

Urbanization and Economic Growth in Latin America and Caribbean Damaging Air and Water Quality

Latin America and the Caribbean (LAC) is a biologically rich region with complex political, social and natural contrasts. However, economies share a heavy reliance on primary products and natural resources, which account for approximately 50 per cent of all good exports. Urban areas continue to grow along with populations, coupled with growing consumption by middle classes. This has led to a situation in which air quality in cities has declined, emissions are growing, and water and other natural resources are under pressure. The future of the region's economies depends heavily on the region's natural capital, mitigating and adapting to climate change, and decoupling economic growth from resource consumption. The GEO-6 report looks at the state of play in five key areas, highlights drivers of environmental impacts and looking at ways to address them.

Air Quality

Greenhouse gas emissions are growing in LAC as a result of urbanization, economic growth, energy consumption, land use changes and other factors. These changes result in degradation of air quality, both indoors and outdoors. Most of the cities in the region for which data are available have concentrations of particulate matter (PM) above World Health Organization (WHO) guidelines. Monterrey in Mexico, for example, has measured concentrations of PM_{2.5} of 85.9, well above the WHO recommended limit of 20. LAC region has, however, made progress on the reduction of ozone-depleting substances and the elimination of lead in gasoline.

Drivers

- **Urban growth:** This is a major pressure, due mainly to increased energy consumption and transport. Carbon dioxide (CO₂) emissions increased by 14.18 per cent between 2006 and 2011. The transportation sector represents 35 per cent of the total greenhouse gas emissions, accounting for 506.4 million tonnes of CO₂ per year.
- **Agriculture:** This has a strong effect on emissions of nitrous oxide and carbon dioxide. Nitrous oxide emissions from soils, from leaching and runoff, direct emissions, and animal manure, increased by about 29 per cent between 2000 and 2010. The abundance of beef and dairy cattle in the region leads to methane emissions, which grew by 19 per cent between 2000 and 2010.

Impacts

- **Human Health:** In LAC, an estimated 100 million people live in areas susceptible to air pollution, mostly in highly populated areas of cities. In 2012, a total of 138,000 deaths in the Americas (low and middle income) were attributed to ambient air pollution and household air pollution.

Responses

- LAC nations have adopted the Regional Plan of Action on Atmospheric Pollution. The plan, which is the first of its kind in the world, recognizes the importance of the issue of air quality and encourages governments to identify the economic resources needed for the sustainability of the air quality monitoring networks.

- The Climate and Clean Air Coalition is working with governments in the region to reduce emissions of short-lived climate pollutants such as black carbon and methane.

Freshwater Quality and Access

There is an increasing demand for water for agriculture, industry, energy generation and domestic use. These demands, coupled with climate change and increasing pollution, change the hydrological cycle and water resource systems. In Meso and South America there has been a steady decrease in water availability per person, due mainly to the fact that the population increased from 463 to 606 million between 1992 and 2011. Haiti saw its freshwater availability drop from 1,338 cubic metres per person per year in 2007 to 1,297 in 2014, with most other countries seeing a similar trend. While surface water is the most common source of water in the region, groundwater use has increased. Groundwater use is especially relevant in Argentina, where it accounts for 30 per cent of total water withdrawals. These trends represent a threat to groundwater resources if they are not managed properly.

Drivers

- **Agriculture:** In 2011, agriculture accounted for 68 per cent of the total freshwater withdrawals in LAC. The industrial and domestic sectors accounted for 11 and 21 per cent, respectively.
- **Inefficient water use:** Many industries use more resources than required due to a reliance on outdated and inefficient practices. Meanwhile, 45 per cent of water is lost before it reaches the customer.
- From 2014 till early 2016, the region has experienced high temperatures and reduced rainfall resulting in extreme drought conditions.
- **Pollution:** At the basin level, 37 transboundary river basins in LAC were found to be highly polluted with wastewater.

Impacts

- **Food security:** Rural areas are expected to experience impacts on water availability and supply, food security, infrastructure and agricultural incomes.
- **Human health:** 30 million people lacked safe water supply in 2013. Inadequate supply of water, collapsed sanitation systems and contaminated water are the main causes of illness, such as malaria, cholera, dysentery and diarrhea. In Guatemala in 2012, for example, 4.8 deaths per 100,000 were down to inadequate water, sanitation and hygiene.
- **Energy:** Brazil gets 70 per cent of its electricity from hydroelectric power. In 2015, the country experienced a debilitating drought. Many hydroelectric facilities neared zero capacity, triggering power cuts in several major Brazilian cities.

Responses

- Countries from Antigua and Barbuda to Venezuela have introduced policies and programmes on Integrated Water Resources Management, a key step in managing water resources.

- The water agency in Brazil (ANA) is now monitoring freshwater resources throughout the country and has done so based on information collected and provided by the different states.

Health of Oceans, Seas and Coasts

The LAC region has a maritime territory of 16 million square kilometres and 64,000 kilometres of coastline. Even though some of the coastline is protected by coral reefs, sea grass beds and mangrove forests, they are still vulnerable to natural and man-made threats. Improperly managed coastal developments have created problems related to water pollution from land-based sources, degradation of critical habitats, and depletion of natural resources. These impacts negatively affect economy and society through loss of employment, increased costs of living and health problems. Climate change and its impacts have made the coastal zone more susceptible to disasters. More than 8.4 million people live in the path of hurricanes, and roughly 29 million live in low-elevation coastal zones where they are vulnerable to sea-level rise, storm surges and coastal flooding.

Drivers

- **Land use change:** Land-clearing activities, such the expansion of agriculture and urbanization, are a major driver of coastal degradation.
- **Coastal tourism:** The high number of tourists (24 million in 2012) leads to problems with waste water and sewage, often from cruise ships. On a one-week voyage, a moderate cruise ship generates 795,000 litres of sewage, 3.8 million litres of grey water, 500 litres of hazardous waste, 95,000 litres of oily bilge water and 8 tonnes of garbage .
- **Urbanization and waste:** Unsustainable consumption patterns and the lack of waste management in the basins of rivers cause problems.

Impacts

- **Climate Change:** Storms and hurricanes can damage and remove corals from a reef. The destruction of this sensitive ecosystem makes the countries that they surround more vulnerable to the impact of high intensity waves, leading to coastal erosion and infrastructure damage.
- **Climate Change:** Tropical storms, believed to be more frequent and strong due to climate change, can generate significant losses and damages. For example, Hurricane Ericka killed 37 people in Dominica in 2015 and caused over \$228 million in losses; nearly half of the nation's annual GDP.
- **Human Health:** In the absence of public health services and beach cleaning programmes, from 10 to 100 times more bacteria can be found at the beach than inland.

Responses

- As of 2015, LAC had 756 marine protected areas (MPA), which covered about 300,000 square kilometres. The largest MPA is the marine reserve of the Galapagos Islands in Ecuador (133,000 square kilometres).
- The Regional Action Plan for Marine Litter (RAPMaLi) for the Wider Caribbean Region promotes collaboration and engagement of a wide range of actors in actions aimed at improving the management of marine litter, at local and regional scales.
- Integrated Coastal Zone Management has been implemented in Argentina, Barbados, Brazil, Colombia, Costa Rica, Ecuador, Mexico, Jamaica, Venezuela, Uruguay, St Lucia, and Belize.

Habitat Loss and Degradation on Land

LAC contains 12 of the world's 14 biomes and 191 of the 867 unique eco-regions of the world. These regions provide valuable ecosystem services – such as water regulation, carbon storage, food and livelihoods. Habitat loss and degradation continues to be one of the greatest challenges in the region. Deforestation, in the Amazon and in other forest ecosystems, and decimated grasslands and fragile mountain biomes are examples of these degradation processes. In turn, habitat degradation decreases ecosystem services, functions and biodiversity, threatening development and human well-being.

From 2001 to 2013, 17 per cent of new cropland and 57 per cent of new pasture land in LAC were established in forest areas deforested for that purpose. By 2012, the region had an estimated 1.01 million square kilometres devoted to agriculture and 3.59 million to pasture. The widespread degradation of land ecosystems in LAC is mostly the result of unsustainable land management. Regional and international demand for food crops, livestock, wood, oil, and mining, coupled with adverse socio-economic conditions and the need for foreign investment, exerts pressure on decision makers to prioritize short-term goals that may result in degradation of land.

Drivers

- **Agriculture and cattle grazing** are the most widespread pressures leading to land transformation. Agriculture in the region continues to grow, driven mainly by international demand for crops. In Bolivia, the international demand for soybean has caused a 21 per cent expansion in the cultivated area and an 84.7 per cent jump in the value of exports of this crop
- **Infrastructure development** is usually the first stage of habitat degradation as it allows the inflow of landless rural inhabitants and large landholders. The Inter-oceanic Highway, inaugurated in 2011, with a length of 5,404 kilometres links the Peruvian ports of San Juan de Marcona to Brazilian ports and cities throughout the City of Rio Branco Special Export Zone.
- **Illegal mining** is a significant environmental issue in many countries. For instance, in Madre de Dios, an important area of the Peruvian Amazon, alluvial gold mining has devastated more than 500 km² of forest.

Impacts

- **Land degradation** affects the productive capability of land and its ability to provide ecosystem services required for human well-being. Land degradation has indirect impacts at larger scales; for example, a degraded ecosystem may cause migration to cities as rural populations cannot earn a living. Desertification now affects 14 per cent of Cuba's territory.
- Habitat loss also has **socioeconomic impacts**. Research in the Peruvian and Brazilian Amazon indicate that ecological changes associated with deforestation improve the breeding conditions for the mosquitoes that are vectors of diseases such as malaria. In the case of malaria (about 469,000 cases with 108 deaths in 2012), the resources mobilized for treatment and prevention between 2000 and 2012 ranged between \$77 million and \$211 million annually.

Responses

- **Payment for Ecosystem** (PES) services allows users of an ecosystem service to pay land managers to preserve the ecosystems that supply the service. A specific example is REDD+, the United Nations collaborative initiative on Reducing Emissions from Deforestation and forest Degradation. In 2014 there were 117 REDD+ registered projects in 14 countries of the region.

- **Certification and verification schemes.** In terms of forest management, the Forest Stewardship Council (FSC) is the most common standard. In LAC, the number of square kilometres with a sustainable forest management plan under FSC has increased from 32,000 in 2002 to 128,000 in 2011, mostly in South America.
- **Moratoria:** As one example, members of the Brazilian Association of Vegetable Oil Industries (ABIOVE) and the National Association of Cereal Exporters (ANEC) signed a moratorium, a voluntary agreement for not purchasing soybeans produced in areas deforested after 24 July 2006. It has been successful in arresting deforestation in the Amazon biome.

Biodiversity

Latin America and the Caribbean supports a rich biological diversity, which accounts for 60 to 70 percent of all known life on Earth. The wide diversity of ecosystems provides critical services to support economic development and ensure a good quality of life. Yet the biodiversity of the region continues to be threatened, putting many ecosystems and species at risk. Land use change continues to be the greatest threat, but other pressures such as pollution, overharvesting, climate change, unsustainable tourism, and alien invasive species continue to exacerbate already stressed systems.

Unsustainable patterns of production and consumption and global demand for food and raw materials continue to place growing pressures on the region's ecosystems. Although the regional deforestation rate has been reduced, LAC is still losing about 2.18 million hectares of its forests annually.

Data has shown that although the rate of conversion of natural systems has begun to slow, the overall rate of loss of ecosystems remains high. The continued loss of LAC's biodiversity is set to have far reaching consequences. The loss of biodiversity has direct consequences for the economic and social well-being of the 630 million inhabitants of the region, and impacts will be felt globally.

Drivers

- **Land-use change, particularly urbanization:** In 2015, about 80 per cent of LAC's population lived in urban areas. Population growth in coastal areas has been rapid; between 1945 and 2014, the population in coastal cities with more than 100,000 inhabitants increased by 778 per cent.
- **Pollution:** Around 96 700 million m³ of water is affected by nitrogen-related pollution every year in the LAC region. The main sources of this pollution are crop production (46 per cent), domestic water (37 per cent), industrial production (17 per cent) and production for exports (7 per cent).

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