

SCIENCE FACING NATURAL DISASTERS: PREVENTION AND ADAPTATION

Latin America and the Caribbean are among the most exposed regions on the planet to large-scale natural phenomena. Hurricanes, floods, droughts, wildfires, earthquakes, and volcanic eruptions are part of a dynamic geography, shaped by the Pacific Ring of Fire and climate systems that are intensifying with global change. The recurrence of these events shows that they are not exceptional emergencies but structural conditions with which societies must coexist.

Science plays a decisive role. The region has generated significant research in geology, climatology, oceanography, ecology, and the social sciences to understand and mitigate risks. However, scientific knowledge alone does not guarantee a reduction in vulnerability: public policies and land-use planning often fail to incorporate evidence, early warning systems are insufficient, building codes are not always enforced, and the culture of prevention remains weak. This gap between what is known and what is done explains much of the human and material losses after each disaster.

Much public investment is directed toward emergency response rather than prevention. Reconstruction becomes a costly cycle that consumes resources that could have reduced risk. Public education on risk culture is limited. Nevertheless, there are success stories: community alert systems, watershed management programs with social participation, and seismic codes that have reduced damage. These examples show that when science engages with society and institutions, the results are tangible and save lives.

Climate change worsens the challenge: stronger hurricanes, extreme rainfall, prolonged droughts, and heat waves are increasingly frequent. Adaptation requires local observation systems, real-time data generation, and scenario modeling. International cooperation is essential to share information, transfer technology, and coordinate regional action; however, the region must also strengthen its own capacities to ensure scientific sovereignty in meteorology, seismology, and ecosystem management. Exclusive reliance on external information limits response and delays vital decisions.

Disaster management requires an interdisciplinary approach. Understanding physical phenomena is not enough:

social sciences, economics, communication, and public policy must also be integrated. Risk perception, poverty that amplifies impacts, and land-use decisions are as decisive as geophysical factors. It is essential to recognize and value local knowledge. Indigenous and rural communities have developed adaptation practices over generations; integrating them with academic science enables more inclusive and effective strategies.

Prevention and adaptation are not luxuries for prosperous times but conditions for survival. Every dollar invested in prevention avoids multiple losses and saves lives. Latin American science is called to promote development models that incorporate risk reduction as a structural component, fostering collaboration among universities, research centers, governments, the private sector, and communities.

Since its founding, *Interciencia* has sought to highlight the region's scientific production and its relevance to the challenges that shape the lives of millions. Today, as extreme events become more frequent, this commitment gains renewed urgency. Science must not limit itself to describing disasters after they occur; it must anticipate, prevent, and help societies to be better prepared.

Natural disasters are not only the result of nature's force but also of the social, economic, and political vulnerability of those affected. At the intersection of physical phenomena and social structures lies the true dimension of risk. Recognizing this complexity and acting accordingly is an urgent task for Latin America and the Caribbean.

Prevention and adaptation are expressions of science committed to life. A science that not only accumulates data but becomes a tool for social transformation. In this spirit, *Interciencia* reaffirms its mission to be a bridge between scientific knowledge and society, calling on the academic community and policymakers to strengthen the region's resilience and make science a driver of preparedness and hope.

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