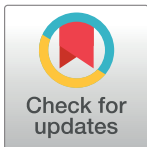# PLOS CLIMATE

OPINION

Not what the doctor ordered: Prioritizing transdisciplinary science on climate, environment and health in the Latin American and Caribbean region

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The Latin American and Caribbean (LAC) region is highly diverse and unequal [1]. It is also host to extreme weather events and changing climate patterns increasingly impacting infrastructure, livelihoods, food security, and peoples' health and wellbeing. Understanding the interactions between climate, environment and health to develop evidenced-based solutions is therefore crucial for improving health outcomes. However, and despite growing concerns [2], critical gaps in data and scientific capacities remain, impeding effective policy and decision making.

Indeed, resources are lacking, and/or are improperly assigned and invested, to address the impact of climate events and environmental degradation on health in the LAC region. Although several of the 33 countries have progressed in developing national-level climate change and health vulnerability assessments and adaptation plans, these continue to have "limited influence on the allocation of human and financial resources" [3]. That is, even when the assessments highlight the need for greater capacity to respond to the challenges at the intersection of climate, environment and health, governments may not be allocating funds for the production and use of evidence for decision making. We argue here in favor of prioritizing a transdisciplinary approach to science, focused on solutions-oriented research, to create the tools and collect the data we need.

In August 2021, more than 150 researchers and government officials from 35 states met to identify research and capacity building priorities at the Climate, Environment and Health Latin America and Caribbean scoping workshop [4] organized by the Inter-American Institute for Global Change Research (IAI), the U.S. Global Change Research Program (USGCRP), and the Belmont Forum. The event was held in conjunction with the Americas Group on Earth Observations, AmeriGEO Week 2021. Among the most important concerns that emerged in the discussions were: a) Data are produced and collected in the region, but they may not be granular enough, or datasets may have limited interoperability, such that diverse data from different sectors remain siloed or not useful; b) Transdisciplinary research frameworks supporting the integration of knowledge from different academic disciplines and non-academic ways of knowing are essential for improved databases and tools/interventions to support decision making; c) Effective communities of practice informing policy and decision making require

the participation of non-governmental stakeholders, including from civil society and the private sector.

There are several issues within the challenges related to data. A lack of purposeful data collection is a major challenge, due in large part to the related epistemological and ontological challenges of bringing various disciplines and sectors together to build and share common understandings of the transdisciplinary nature of the issues stemming from climate events and environmental degradation on health. The sharing of climate and health data presents issues of standardization, across sectors and national borders, contributing to the dearth of evidence-based tools or interventions to inform prevention, mitigation, and adaptation to climate change at a regional level.

This gap in turn limits disease prevention and health promotion efforts. For example, although software tools abound to model climate-sensitive infectious diseases, most are not operationalized, long-term sustained, kept up to date, or even easily available to end users. Existing tools overemphasize vector-borne diseases, while neglecting other equally important climate-sensitive diseases such as those that are food, water, and soil borne [5]. While additional funding is needed to change this scenario [6], governments could, in a first instance, shift resources by sharing data openly, thus freeing personnel from fulfilling redundant data requests from different sectors, institutions and research groups. An open data landscape would further enrich policy and decision making, as well as research, by bringing about the space needed to identify data gaps and plan how to bridge them at national and regional levels.

Governments play an important role, but data collection and analysis cannot rely solely on governmental initiatives and leadership, or on scientific expertise. Societal demands and needs are better served when policies are relevant to affected populations and can be implemented effectively. To accomplish this, the knowledge, perspectives and values of different stakeholders must be integrated. These include scientists and practitioners, government, civil society, private sector, and funders [7]. The solutions can be generated using a transdisciplinary approach derived from knowledge co-creation and negotiation processes across the natural and social sciences, and the humanities, as well as by incorporating other diverse ways of knowing and engaging diverse actors [8].

Finally, to build effective communities of practice informing policy and decision making, we must promote spaces of dialogue and build trust among stakeholders, for which it is necessary to invest in participatory skills training and mechanisms to scaffold participation. At present, participatory processes are usually reserved for the consensus-reaching stage or to validate findings, long after research results are available, or are utilized to extract information. This takes away the opportunity to collaborate and co-create solutions that will resonate with the end users. Implementation partners should be involved from the planning stage, when objectives are defined, and throughout the life cycle of the project to adequately incorporate their evolving interests and viewpoints.

The Inter-American Institute for Global Change Research (IAI) and partners involved in the Climate, Environment and Health Scoping Workshop are supporting regional coordination of funding and training efforts [9] to increase evidence-driven decisions at the interface of climate, environment and health. However, tailored interventions, programs and long-term planning require long-term commitments and funding. Latin American and Caribbean countries must find ways to prioritize investment in transdisciplinary science, nationally and regionally, to confront the impacts of climate and global environmental change on health and health services.

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