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Short communication

Strengthening climate resilient health systems in the Caribbean

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1. Introduction

The Caribbean sub-region of the Americas spans nearly 2000 miles, has a rich multicultural identity, and represents the extremes from a warm climate attracting millions of tourists annually to a vulnerable collection of Small Island Developing States (SIDS). The Caribbean is comprised of 28 SIDS including the low-lying nations of Central and South America (Guyana, Suriname, and Belize). Most of these Caribbean communities are coastal and/or low lying, where climate has a more visible direct and indirect impact on human health. The increasing vulnerabilities associated with sea level rise, storms and floods, complicated by the economic and health stressors from the COVID-19 pandemic, require a new set of interdisciplinary approaches to establishing climate resilient health systems [1]. Fundamental to accomplishing this is the engagement of health and non-health sectors alike to address the complex relationship between climate, the environment, infectious disease, non-communicable diseases, and the built environment.

The models forecasting future Caribbean climate-related risks indicate that an increase in temperature is predictive of sea level rise, more extreme floods/droughts and increases in the number and intensity of storms [2]. Under a high emissions scenario, the longer temperature goals (LTTGs) of 1.5, 2.0, and 2.5 °C above pre-industrial warming levels will be attained in the mid-2020s, end of the 2030s, and the early 2050s, respectively [3]. These forecasts are of concern considering the lack of adequate sub-regional and national programs to address the direct (e.g., heat stress, hurricanes, floods, and droughts) and indirect health impacts (e.g., water quality, food safety, and increase in vector-borne diseases like dengue and leptospirosis) from climate change.

The implications for the Caribbean are heightened in that many of these climatic threats are already undermining public health, health services and the environmental determinants of health [4]. Caribbean health providers directly attribute rises in mosquito-borne, flood-related, heat-related, respiratory, and mental illnesses to local impacts of climate change, undermining already vulnerable public health systems. Health services are also affected by the intensity of storms and are ill-prepared to respond to other climate-related public health emergencies. The limited habitable land mass and fragility of natural resources exacerbate the effect of a changing climate on the environmental determinants of health, requiring a more concerted emphasis on environmental risk management and protection of public health. The protection of key environmental health determinants such as water, air and soil are interrelated and critical to national climate and health considerations.

As the Caribbean is increasingly vulnerable to rising temperatures, but has significant resource constraints for adaptation, it is critical that this sub-region continues as a global advocate for mitigation [3] by engaging in efforts to further reduce emissions. Despite the relatively low greenhouse gas emissions in the Caribbean, some countries have significant morbidity and mortality attributable to poor air quality. Many of these countries lack robust systems linking health outcomes with air quality or the built environment. The ability to quantify the health and economic benefits of mitigation measures will further support action from decision makers at a national level [5].

Caribbean nations face challenges in integrating climate and health programs, and ministries of health are not always included in the development of climate change programs and policies. This, along with a lack of data on climate change and health issues, highlights the need for an intersectoral approach with standard procedures to identify the most vulnerable populations, to develop sex-disaggregated data and to establish plans to safeguard public health. In the Caribbean health is oftentimes not adequately considered in national adaptation and mitigation planning processes [6] and when compared to other global regions, the Caribbean has among the lowest levels of climate and health research and financing [7,8].

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Among the Caribbean health concerns linked to rising temperatures are protecting the most vulnerable from heat stress, vector borne diseases, contamination of food/water, and variations in air quality [4,9]. The establishment of climate sensitive early warning systems to better forecast and prepare for these health concerns are further hindered by inadequate health and climatic data collection and a lack of systems and tools to analyze and integrate the data [10].

The Caribbean climate and health workforce is limited, and few programs exist to train professionals in interdisciplinary approaches. This results in a shortage of skilled climate and health practitioners, both at the technical and policymaking levels. Training programs are not widely available for the generation and analysis of climate and health data, applied research, and policy development. Professionals are needed in government, academia, non-governmental organizations, community-based organizations, and youth. While the appreciation for the importance of climate and health is increasing, there remains the need for leadership programs.

Lastly, little is known about public perceptions on climate and health in the Caribbean. This knowledge is needed to develop sound communication programs. Limited research exists on public awareness of the human health implications of climate change, the role of government in identifying solutions, and the specific actions that need to be taken. Despite the risks to human health, the Caribbean lacks a network of organizations to 1) empower the health sector and non-health sectors to engage in climate and health; 2) communicate the relationship between climate and health; and 3) support the media to cover these issues at a national and regional level.

2. A novel approach to establishing caribbean climate change and health programs

In 2018 an important policy to action document was signed by 18 Caribbean ministers of health and the environment in Grenada. The Caribbean Action Plan on Climate and Health provided a roadmap to meet the health and climate challenges of the 21st century within this network of vulnerable SIDS countries [11]. In response to this call for action, the European Union (EU) in collaboration with Caribbean Community (CARICOM), funded the first multi-partner grant to strengthen climate resilient health systems in the Caribbean. This novel climate and health proposal was launched in July 2020 and included six Caribbean institutions with either a mandate and/or the scope to address this multifaceted threat to a healthy Caribbean (Table 1). The Project outputs require the formation of multisectoral and interdisciplinary teams and increasing the leadership of subregional institutions and the Ministries of Health.

Among the more specific climate and health gaps that the EU/CARIFORUM project is addressing are the following:

2.1. Climate and health data linkages

The PAHO/WHO health co-benefits tools are being piloted in select Caribbean countries to enhance surveillance systems and collect data on climate sensitive health outcomes. The use of these tools - Health Risk Assessment of Air Pollution (AirQ+), Health Economic Assessment Tool for Active Transportation (HEAT) and Green Urban Spaces (GREEN UR) - will support the understanding by decision makers of health impacts of harmful emissions and the health benefits of active transportation and green spaces (Table 2). It will further provide decision makers with data to form policies and strengthen surveillance systems. Furthermore, the case that will be made for the health benefits achieved through the development of healthy Caribbean places and spaces and the engagement of non-health sectors (environment, air quality, climate, financing, urban planning, etc.) has been a long sought-after area of development. Through the incorporation of tools to measure the immediate health benefits from climate action, interest will grow in the scale-up of national and subregional climate policies. This will then reduce emissions and engage populations in physical activity, thereby furthering the non-communicable disease and built environment agendas.

2.2. Prioritization of climate change and health impacts and financing

The Project is supporting the writing and development of Health Vulnerability and Adaptation Assessments (V&As) and Health National Adaptation Plans (HNAPs) in at least 8 Caribbean countries, along with the development of transformational projects through climate change and health financing. These assessment and planning processes will serve to highlight the importance of robust public health systems, prioritize the most urgent adaptation/mitigation needs, generate climate and health data, and support communication between the government and the public. Furthermore, at a national level, the HNAP and V&As will promote climate and health research, and findings will support the development of new areas for climate and health financing.

2.3. Climate and health early warning systems

Climate sensitive early warning systems to detect and respond to potential public health threats are being developed. This will include the development of national systems to integrate currently disparate climate and health data, so more robust and functional national early warning systems can be generated. Among the expected results will be an increase in the availability and dissemination of climate data to inform health sector planning, identifying high-risk communities by monitoring environmental factors, and the use of an interdisciplinary approach to integrate climate, entomological and epidemiological data.

2.4. Environmental determinants of health

The project will address the environmental determinants of health influenced by climate with major implications for human health and well-being. There will be an emphasis on water, sanitation, and food systems, through the development of online and in-person training programs for national interministerial committees. The project will also develop nationally led pilot projects to develop climate resilient food, water, and sanitation safety plans in Caribbean countries.

2.5. Climate and health leadership

Training and empowering of Caribbean climate and health leaders and the environmental health workforce to better address future threats is also a major focus of the project. These leadership programs will result in positive change by enhancing the capacity of subregional organizations and developing a cadre of multisectoral and multigenerational leaders from the Caribbean. As part of their training program, these interdisciplinary leaders will develop and implement community-based projects in the areas of 1) human-interest stories through social media and photography; 2) community capacity building to develop vulnerability and adaptation assessments; 3) improved management of solid waste and recycling; 4) community greening and urban forestry; and 5) water conservation and ensuring clean water for all.

2.6. Climate and health awareness and action

The Project emphasizes health communication approaches to engage and motivate the Caribbean public. This is being carried out through awareness campaigns, climate and health solutions-based journalism programs and the development of human-interest stories that address climate problems and solutions. Communication experts

Table 1
EU/CARIFORUM Strengthening Climate Resilient Health Systems Project Partners.

Main Project Partners	Primary Partner Contribution/Linkage with Caribbean Action Plan on Health and Climate Change	Example of Multidisciplinary Approach
Caribbean Community (CARICOM)	Climate change and health youth leadership programs and engagement of Ministries/Empower health leadership and strengthen institutional structures on climate change and health	Engaging youth from many disciplines including health with other sustainable development and climate partners
Caribbean Climate Change Community Center (5Cs)	Climate and health concept note development for financing and communicating the importance of climate and health nexus/Strengthen capacities and coordination to access resources and improve communication	Linking the health sector with climate, planning and financing across the Caribbean
Caribbean Institute for Meteorology and Hydrology (CIMH)	Development of enhanced early warning systems and climate and health bulletins/Develop and provide climate-informed health services	Creating bulletins, making linkages with health and climate sectors
Caribbean Public Health Agency (CARPHA)	Climate and health early warning systems and climate resilient water, sanitation, and food safety plans/Implement early warning systems for weather and climate-related diseases and conditions	Development of systems to collect data across multiple disciplines
Pan American Health Organization (PAHO)	Lead implementing partner. Development of Health Vulnerability and Adaptation Assessments (V&As), National Adaptation Plans (HNAPs), health co-benefit tools and climate resilient water, sanitation, and food safety plans/Promote health in intersectoral climate change agenda and build and use evidence for planning and decision-making	Formation of interministerial committees for conducting national assessments and plans
University of the West Indies (UWI)	Climate change and health leadership programs / Empower health leadership and strengthen institutional structures on climate change and health	Formation of cadre of future climate and health leaders across different sectors and disciplines

Table 2
Description of the PAHO/WHO Health Co-Benefits Tools.

Health Co-Benefits Tool	Brief Description
Health Risk Assessment of Air Pollution (AirQ+)	AirQ+ is a software tool for quantifying the health burden and impact of exposure to air pollution. Informs decision-making by estimating the adverse health impacts attributed to air pollution and the public health benefits of air quality improvements.
Health Economic Assessment Tool for Active Transportation (HEAT)	HEAT is designed to help users conduct an economic assessment of the health benefits of walking or cycling. Used by researchers, planners, and policy makers to assess and influence walking and cycling policies at local and national scales
Green Urban Spaces (Green UR)	Green UR is a tool for the quantification of the impacts of green spaces at urban scale on health. Serves as an educational, communication and planning support tool.

from the Caribbean will use these human-interest stories to inform the public about climate change and health in an engaging, motivating and culturally relevant way.

Finally, the Project aims to promote long-term transformational change in the Caribbean beyond the life cycle of the project. This will be achieved through:

(1) continued strengthening of climate resilient health systems among the CARIFORUM member countries through the development of new organizational structures and capacity to address health outcomes involving both health and non-health sectors;

(2) the use of multisectoral approaches to climate and health that are collaborative, interdisciplinary, and transdisciplinary, recognizing the interconnection between people, animals and their shared environment;

(3) improved levels of stakeholder participation and capacity through the development of new climate and health plans, programs and policies;

(4) increased levels of public and community participation through increased levels of public awareness of the interplay between climate and health and active community involvement in climate and health actions and solutions.

3. Conclusions

The nexus between climate change and health in the Caribbean is a growing area of interest and importance, as the region is already experiencing the devastating health impacts from climate change. The EU/CARIFORUM project has been leading a multisectoral and interdisciplinary collaboration to successfully engage and expand the network of practitioners and fulfill the objectives of the Caribbean Action Plan on Climate and Health. Notable advances towards this end have been inter-disciplinary planning/training, workshops that unite multiple sectors, and generating applied research that engages both health and non-health sectors. This represents the first large-scale multi-organization project of its kind in the Caribbean with significant resources for the development of climate and health best practices. It is anticipated that the implementation of these novel activities will generate an in depth understanding of the benefits and challenges inherent in national health mitigation and adaptation measures, as well as direction for future scale-up across the Caribbean.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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