



Research article

Collaboration and capacity for climate change and health research: An analysis of stakeholders in the Philippines

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ARTICLE INFO

Article History:

Received 4 September 2021

Accepted 19 December 2021

Available online 23 December 2021

Keywords:

Philippines
climate change
health
stakeholders
collaboration
capacity building
health research system

ABSTRACT

Rationale: The Philippine government included the health impacts of climate change as a priority area for research funding. An analysis of stakeholders was done to assist the government in engaging research and government stakeholders in producing climate change and health research.

Methods: Fourteen interviews and two consultation meetings were conducted from March to July 2018. Two categories of stakeholders were interviewed. The first are government entities with institutional mandates encompassing national climate change action plans, state socioeconomic plans, state bureaus for health, the environment, and scientific research. The second are research and professional service providers such as a scientific agency for climatological services, universities and their research arms, private consulting firms, and a private foundation supporting research on climate change adaptation.

Results and Discussion: Stakeholders expressed that there is a need to establish the links between climate change and health in the country context, and to determine which prevalent health issues of the Philippines are climate-sensitive. While some research is conducted, priorities and agenda of stakeholders are not guided by an overall plan for the development of research on climate change and health. Technical expertise on climate change and health exists independently, but there are few perceived experts on the impacts of climate change on health. Available funding can be used to support the work of existing experts on climate science and health research and invest in building cross-disciplinary expertise.

Conclusion: Deliberate capacity development is needed particularly for disease burden modeling and projections. This supports the generation of context-relevant evidence needed for health adaptation against climate change.

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1. Introduction

The impacts of climate change on health will be most keenly felt in low- and middle-income countries [1,2]. The Philippines is one such country, and its health system faces existing challenges exacerbated by the effects of extreme events and other impacts of climate change [3]. Temperature increases and climate change-induced rainfall variability are projected to have the most significant impact on the Philippines [3]. Awareness of these impacts is reflected in the Philippines' National Unified Health Research Agenda 2017 - 2022 (NUHRA), which includes climate change and health as a core topic in its Health Resiliency section [4]. The NUHRA is the third iteration of a set of health research priorities created through consultation with

groups nationwide, while complementing the goals of government socioeconomic plans [5].

Research on the health impacts of climate change in low- and middle-income countries is scarce [6]. To determine what research existed on the Philippines, the Philippine Council for Health Research and Development (PCHRD) sought to map the extent of climate change and health research in the country. In 2018, the PCHRD supported the creation of a research agenda for climate change and health to scope the extent of available research and generate funding priorities [4]. An analysis of Philippines-based stakeholders was done to support the process.

Understanding the interests of these stakeholders is important for the implementation of plans and research agendas [7,8]. Complementing this is the assessment of their capacity – an important element in climate change adaptation (CCA), including the generation of research [9]. Further literature supports the call for the collaboration

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of stakeholders in the production of climate change and health research, given that the area of research covers phenomena traditionally held by different disciplines [3,10,11]. Collaboration is also considered necessary in the role of regional organizations in Southeast-Asia that support work in CCA and health. Encouraging collaboration has its challenges, among which include less funding, the absence of common spaces to meet and work, and a general lack of confidence and experience in interdisciplinary work [11–13].

We examined the interests and capacities of stakeholders for climate change and health to determine how to move forward in generating research. We report on one initiative in the Philippines where interviews and consultation meetings were held for Philippines-based university researchers, policymakers, private funders, and other professionals.

2. Methods

A list of possible stakeholders was identified through an initial document review, consultation with the Department of Science and Technology - Philippine Council for Health Research and Development (DOST-PCHRD), the professional network of the proponents, then snowballing. The stakeholder categories used were adopted from the categories identified by Schiller et al. [14].

Two stakeholder categories were selected. The first category, Policy Makers and Government, are public sector stakeholders whose work either supports the generation of research or uses research in policymaking. The second category, Research and Professional Community, are stakeholders whose primary activities include the generation and the dissemination of research. These include research

centers as well as independent professional networks. Health research fields considered include epidemiology, environmental health, occupational health, infectious diseases, nutrition, and health policy and systems. Climate research fields include climate modeling, climate projections, air quality, and geomatics. These were defined based on fields of concern as identified in the Lancet Countdown on Health and Climate Change [15], the Philippine Climate Change Assessment on Human Health [3], and the World Health Organization (WHO) report on climate change and health in the Western Pacific Region [16]. Only Philippines-based actors were considered.

Key stakeholder interviews were conducted from March to May 2018. Interviews were conducted individually and were done in-person or via email. A semi-structured interview form was created. Questions were developed for two main areas, namely, the stakeholder's roles and interests, and their capacities. Areas for capacity building were also identified based on elements of institutional capacity for adaptation to climate change, namely financing, collaboration, and perspectives [9]. Research questions are provided in an annex. Thematic analysis was used to analyze the interview responses [17]. Data familiarization was done by reviewing the interview responses in their entirety. Notes on the gathered data were also created as an aide in the analysis process [18]. Text was initially coded in a first reading after familiarization, and then a second time after further review of the notes. Coded text and notes were reviewed to identify key themes. Two other members of the research team then reviewed the themes, and these were further refined.

A consultation meeting was conducted in June 2018 to validate the results of the analysis. A second consultation was conducted in

Table 1
Overview of interviewed stakeholders.

Institutional Affiliation	Summary of Mandate and Main Activities
Policy Makers and Government	
Climate Change Commission (CCC)	Lead policymaking body tasked to coordinate, monitor, and evaluate government programs on climate change in national, local, and sectoral development plans towards a climate-resilient and climate-smart Philippines
Department of Health – Health Emergency Management Bureau (DOH – HEMB)	Coordinating unit and operation center for all health emergencies and disasters
Department of Environment and Natural Resources – Environmental Management Bureau (DENR-EMB)	Formulate plans and policies on environmental quality standards Implement research program on environmental compliance monitoring Promote public information and education on environmental quality planning and monitoring
National Economic Development Authority (NEDA)	Coordinate formulation, monitoring, and evaluation of policies, plans, and programs for socioeconomic development
National Academy of Science and Technology (NAST)	Recognize exemplary science, provide independent and science-based advice to the President and Cabinet members
Philippine Council for Health Research and Development (PCHRD)	Formulate policies, plans, programs, projects, and strategies for health science and technology development
Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA)	Maintain nationwide network for observation and forecasting of weather, flood, and other climatological conditions Engage in studies of atmospheric phenomena
Research and Professional Community	
University of the Philippines – College of Public Health	College for public health education [undergraduate to doctoral], research, and community health development
University of the Philippines – College of Medicine	State medical school, with teaching hospital
Ateneo School of Medicine and Public Health	Medical and public health school that house the MD-MBA program of the university
De La Salle University – Social Development Research Center	Academic research center focused on poverty, people empowerment and social development Establishes linkages with research and academic institutions in the ASEAN region
Oscar M. Lopez Center	Produce and utilize scientific information on climate, to promote science informed management decisions Conducts and funds research Produces the Philippine Climate Change Assessment
Access Health International	Private, international healthcare consulting and technical assistance firm that documents best practices in healthcare and investigates success factors of successful systems.
EpiMetrics, Inc.	Private health research and consulting firm

July 2018 to discuss possibilities for local and regional research collaborations, as well as to develop professional networks in South-east-Asia for climate change and health research.

3. Results

3.1. Participants

A total of 14 representatives from 14 different stakeholder institutions were interviewed. Seven stakeholders were government entities with institutional mandates encompassing national climate change action plans, state socioeconomic plans, state bureaus for health, the environment, and scientific research. Seven stakeholders were research and professional service providers, including a scientific agency for climatological services, universities and their research arms, private consulting firms, and a private foundation supporting research on climate change adaptation. These are enumerated in Table 1 below.

The first consultation was attended by twenty-four participants representing government agencies, academic institutions, and private research groups. The second was attended by twenty-eight professionals working in the fields of climate change adaptation and disaster management from the Philippines, Germany, Cambodia, Indonesia, Lao PDR, Malaysia, Thailand, and Vietnam.

3.2. Status of climate change and health research in the Philippines

3.2.1. Expressed research need

Some stakeholders expressed that climate change is abstract, complex, and a problem in the future. There is also a perception that research on the impacts of climate change on health in the Philippines are scarce. The studies that exist were seen to be focused on subnational localities, or where climate and health are treated separately, not linked. An example was given where dengue outbreaks are seen as unrelated to climate change, even within the context of flooding. Moreover, it was stated that what limited research exists is not used for policies or programs.

There was some interest in the conduct of climate change and health research with varied areas of focus among the participants. The strongest expressed need was for research that will establish the links between climate change and health in the Philippine context, including correlating climate variables with diseases. This was also expressed as a need to determine which prevalent health issues of the Philippines are “climate-sensitive”, particularly through modeling and disease burden projections. An institution’s research agenda, national research priorities, or funding opportunities determined whether stakeholders were interested in climate change and health research.

3.2.2. Agenda and priorities

There is a mixed picture on the inclusion of health and climate change as a research or institutional priority. Some institutions continue to fulfill their own respective priorities that are related to health and climate change. The DENR-EMB continues with its work on climate and clean air in relation to health. The PAGASA remains true to its mandate of providing weather-related information relevant to health, such as its work on data for a heat index.

Priorities and agenda are developed independently and remain unguided by an overall plan for the development of research on climate change and health. The national health research agenda provides the overall framework for what health research to support and fund, but it does not provide details for how climate change and health research will be supported. A “roadmap” was suggested as a necessary step to provide direction for researchers and institutions, leading to production of climate change and health research.

3.2.3. Technical capacity

There is a perception that there are few experts, if any, for research on the impacts of climate change on health in the Philippines. Technical expertise on climate change and health exists independently. Expertise exists for health economics, biostatistics and disease burden modeling, and downscaling of regional climate models, among others. No respondent claimed to have expertise on methodologies on climate change risk assessment, health impact assessments, and burden of disease modeling for climate sensitive diseases. While government agencies were interested in the topic, they usually must contract out research to external organizations that have the technical capacity. These challenges in both the interest and capacity to produce such work have so far hindered attempts at sustained collaborative work.

3.2.4. Existing activities to produce or in support of research

There is little sustained institutional effort to produce climate change and health research. It was reported that activities done by institutions are mostly in support of research. The Department of Health, DENR – EMB, and PAGASA collect some of the data necessary, including climatological normal and extremes data, climate pollutants, and health data sets. Technical assistance is also provided by PAGASA for groups that use their weather and climate data. They also claim to host databases for environment and health research. The OML center publishes its own journal on climate research for adaptation, disseminates knowledge resources via an online portal, develops policy briefs for legislators, and creates the Philippine Climate Change Assessment. The PCHRD funds research, with support for projects on vulnerability reduction, a survey on knowledge, attitudes, and practices on heat health, and other projects under their disaster risk reduction and climate change adaptation funding stream [19]. Still, the activities to generate research remain largely uncoordinated

Table 2
Challenges and opportunities for producing climate change and health research.

	Challenges	Opportunities
INTEREST in producing climate change and health research	<ul style="list-style-type: none"> • Scarce literature on Philippine context • Perception of no or unclear links between climate change and health • Perception of climate change as a less pressing concern, as a problem in the future • Perception of climate change as abstract and complex 	<ul style="list-style-type: none"> • Common expressed interest in modeling for disease burden projections • Presence of climate change and health in the national health research agenda
CAPACITY to produce climate change and health research	<ul style="list-style-type: none"> • Scarce technical expertise specific to climate change and health • Absence of guiding strategy for development of research • Funding may not be sufficient 	<ul style="list-style-type: none"> • Expertise, independently for health research and climate science, exist • Some data available, though data quality and availability need to be improved

amongst these institutions, without a clearly defined goal for sustaining interest, evidence-generation, or policy translation.

4. Discussion

4.1. Challenges and opportunities for generating climate change and health research

There is little sustained institutional effort to produce climate change and health research and consequently, scarce literature (Table 2). The limited expertise on climate and health research is a major challenge. The scarcity of literature, especially one that is written for the Philippine context, may mean that there is no common ground for climate and health researchers to work on. There was, therefore, an emphasis on the need to conduct research to link the changes in climate to health. Even if the impact of climate change on health is acknowledged, it is seen as too abstract, as a problem in the future, or as less urgent than other more pressing and observable health issues. The absence of a guiding strategy to link the priorities of the various stakeholders also hinders the formation of possible collaborative work. These are similar with challenges identified in other countries, including evidence and knowledge gaps, institutional arrangements, and lack of technical capacity [6,20,21]. However, these findings are drawn mostly from high-income countries, which highlights the need for more research from low and middle income countries [21].

The existence of climate change and health research as a priority in the country's national research agenda document is a signal that the government has expressed interest in supporting climate change and health research. The annexes of the agenda document even contain specific research suggestions, such as health co-benefits from mitigation policies, linkages with challenges in food production, and national health assessments [4]. The need for research to link climate with health and the limited expertise to do so underlines the need for capacity development on climate change and health research. At this stage, capacity building for research must be valued as much as research outputs themselves [22]. Some approaches for building capacity were suggested by Lansang and Dennis, which include capacity building for individuals, institutional partnerships between developed and developing countries, and creating centers of excellence [23].

Capacity building for individuals may include support for graduate or postgraduate education [23]. Capacity building for institutions include the creation of institutional partnerships between developed and developing countries. One example would be the ARCADE RSDH project (Asian Regional Capacity Development for Research on Social Determinants of Health) between 12 universities in Europe and Asia which built grants management and communications capacity, developed courses, and delivered these courses across the member institutions [24]. Another example would be the SDH—Net collaborative project (Sustainable Research Capacity for Health and its Social Determinants in low- and middle-income countries) that created a network of institutions from Europe, Africa, and Latin America, and which led to the design of research capacity building tools and learning platforms [25]. While not specifically for climate change and health research, these can still serve as models. Centers of excellence can also be built or supported, following similar centers already existing in the Philippines, like the Philippine Genome Center, the vector-borne diseases research center, and other specialized “Niche” centers supported by the country's Department of Science and Technology [26,27].

The expressed interest in modeling disease burden projections can serve as an opening for capacity development initiatives. This can begin with training of individual researchers, as they are “the backbone of human resource development for national research systems” [23]. Training and short courses on modeling and creating disease

burden projections can be provided by technical experts from institutions with the expertise. As some expertise and data are already available, longer term partnerships involving training, joint conduct of projects, or data sharing are options. Ultimately, creating “centres of excellence” may provide the greatest likelihood of consistent quality in capacity building but are these also the hardest to develop [23]. In the Philippines and Southeast-Asia, this is especially important in creating more enabling research environments, raising leadership, and increasing the quality and volume of context-relevant research [28].

The need for two independent research fields to work together requires collaboration [29–31], which stakeholders recognize. The main opportunity is the expressed need for work that links climate change with health, particularly the modeling of select diseases to project disease burdens. To move forward from this, identifying in detail which diseases to make projections for can be a next step. Researchers with expertise on disease burden modeling, and those working on climate science may need to be linked and supported with enough funding to carry out this work [32]. Weather and climate data, as well as downscaled regional climate models can be acquired and used alongside disease burden data and models already developed. However, the quality of the health outcome data may need to be improved via data quality and monitoring improvements [33].

The challenges to collaboration also need to be addressed, which include creating collegial working environments for researchers, and ensuring that researchers know of and can communicate with each other. The direction is to create a common place of work where researchers are given enough time and space to converse, explore differences, understand common overall objectives, and develop confidence in collaborative work, gradually building trust and a community of practice [13]. This will be important especially for international collaborations, which may be necessary to access expertise that is absent in the country. Experiences from other countries can serve as models to guide development of research collaboration. Some examples are the research collaboration on climate change and health between Umea University in Sweden and Vietnam's Hanoi Medical University [30], the SoutheastAsia based research group for climate science called SEACLID/CORDEX-SEA [34], as well as UK institutions like the Tyndall center and the Imperial College London's Grantham Institute [13]. It was suggested that a research consortium [35] that would direct the development of research, together with a roadmap, could be created. A single institution could oversee and maintain this consortium.

4.2. Limitations

Our study may not give a complete picture of the stakeholders in the Philippines. While we interviewed those whom we identified as best able to represent the organization, particularly those who are involved in management or who have a broader view of the organization's activities, more respondents may have provided a fuller picture. As this study was done by a group of health researchers, it is also possible that there are stakeholder groups or areas of work on climate science and environmental research that we could have missed.

The interview data was encoded as notes and not recorded as full transcripts, which may have provided a more detailed data source. The results of the interviews were presented during the consultation, and this served as a form of data validation, but full transcriptions would still be preferable.

5. Conclusions

In this work on the Philippines, we presented the challenges and opportunities for climate change and health research, expanding on

the body of literature specific to a low- and middle-income country context. Our work provides some evidence on which plans for capacity building can be created.

In the Philippines, stakeholders expressed that there is a need to establish the links between climate change and health in the country context, and to determine which prevalent health issues of the Philippines are “climate-sensitive” through modeling and disease burden projections. While some stakeholders consider it a priority to produce or support creation of this research, their agenda are not coordinated. Still, climate change and health research itself is identified as a priority area in the country’s national health research agenda. This unlocks some funding, which can be used to support the work of existing experts on climate science and health research and invest in building cross-disciplinary expertise. Collaborative work is recommended to produce climate change and health research. This is being addressed in some recent efforts, such as the establishment of Planetary Health Philippines, a professional community [36].

Understanding the interests and capacities of stakeholders is important in promoting collaborative work that would generate climate change and health research. This can inform plans to guide the building of capacity for climate change and health research. Deliberate capacity development is needed in order for low- and middle-income countries to generate the context-relevant evidence needed for health adaptation against climate change. Guidance for doing so can be sought from international examples or local examples in other fields of research. This will involve supporting the education of individuals and building institutional research capacities.

Declaration of Competing Interest

The authors declare no conflict of interest. Besides assistance in identifying stakeholders, the funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Acknowledgments

This study was funded by the Philippine Council for Health Research and Development. Some additional support was provided by the German Academic Exchange Service. We would like to thank all the interview respondents and the participants of both consultations for providing meaningful critique and recommendations. We would also like to thank the Ateneo School of Medicine and Public Health for their assistance with the documentation of the consultations.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.joclim.2021.100107.

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