The INTEGRATE Project[1] Report

Fostering Intersectoral Networks for Climate Change Resilient Health Systems

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ReBUILD FOR RESILIENCE

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Cover image: Building rain gardens for climate change adaptations with icddr,b and community members in Bangladesh

Executive summary

Introduction and context

The climate crisis presents an existential threat to the stability of healthcare delivery in low-income settings, with Bangladesh serving as a frontline example of this vulnerability. Despite a highly decentralised healthcare system, the country's ability to withstand frequent cyclones, flooding, and extreme thermal stress is consistently undermined by a lack of systemic resilience. This report details the findings of a comprehensive qualitative study—comprised of a narrative review, key informant interviews with 16 senior and junior stakeholders, and collaborative stakeholder workshops with 26 leaders from the climate and health sectors—designed to identify how to overcome barriers to coordination between climate change and health stakeholders in Bangladesh.

As Bangladesh prepared to implement a new health sector plan and the 2024 Health National Adaptation Plan (H-NAP), a critical window of opportunity emerged at the start of this research. This research provides a roadmap to move beyond reactive, siloed responses toward a proactive, integrated governance framework that prioritises health system resilience.

Key Findings: The Gap Between Policy and Practice

A central finding of this research is a primary 'policy-practice paradox.' While recent national policies for climate change and health have begun to include the other sector on paper, the operational reality remains one of deep fragmentation. During the stakeholder workshops, it was revealed that high-level officials from the Ministry of Environment and the Ministry of Health had frequently never met or previously collaborated. Most existing collaborations were limited to 'validation workshops' or data-sharing on specific, time-bound donor projects rather than sustained institutional partnerships.

The research identified three primary pillars of obstruction: top-down exclusion of stakeholders, lack of financial commitment, and systemic inertia. Governance in Bangladesh remains heavily centralised within ministerial classes, often excluding NGOs, academia, and civil society from the design phase of climate-health initiatives. This is compounded by 'boundary control' and a lack of institutional memory-due to frequent personnel rotations could mean that important ministry staff may only hold a post for six months to two years, causing established relationships and collaborative momentum to evaporate with their departure. Furthermore, the reliance on donor-driven funding often forces stakeholders to adhere to external priorities that do not

align with the holistic needs of the Bangladeshi health system. Transparency issues and perceived corruption are reported to further erode the trust necessary for multi-stakeholder networks to thrive.

Contributions to the Evidence Base

This study adds a nuanced layer to the existing literature on health system resilience by shifting the focus from *what* is missing to *how* to overcome the barriers set by existing structures that can actively inhibit progress. It introduces the concept of 'reified hierarchies', where top-down ministerial control is so normative that stakeholders rarely consider lateral or bottom-up collaborative models, even when the central government fails to provide leadership. Similarly, many informants still view climate change and health as separate challenges, failing to acknowledge how environmental stressors can become the primary drivers of disease.

Finally, by capturing data during a period of significant political upheaval in Bangladesh, the findings may suggest that resilience is currently tied to individual personalities rather than robust institutional systems.

Actionable Recommendations

To bridge the gaps identified, informants propose a series of immediate and long-term interventions focused on improving inclusivity, transparency, and institutional integration. In the short term, the government and climate change/health stakeholders should prioritise the creation of a '4W' type of Digital Repository for climate change and health stakeholders (i.e., providing Who, What, Where, and When information). This central platform would provide a transparent map of all active climate and health projects, funding sources, and lead stakeholders, effectively breaking down information silos and knowledge gaps. Simultaneously, the establishment of a dedicated 'Climate-Health Hub' or Technical Committee is essential. This hub should operate under clear Terms of Reference that mandate regular inter-ministerial communication and move beyond the 'one-off' workshop model.

For the long-term, informants recommend that Bangladesh must shift toward a 'Whole-of-Team' approach. This involves decentralising authority and providing stakeholders with the financial autonomy to execute policy and implementation. Capacity building must be re-framed to move beyond internal staff training toward 'Vision Exercises' that involve all stakeholders—including the most vulnerable community representatives—from the project design phase through to evaluation.

Finally, future National Action and Adaptation Plans for both sectors should be harmonised into an integrated framework with shared monitoring and evaluation mechanisms. By institutionalising these collaborative networks, Bangladesh can ensure that its health system is not merely surviving climate shocks, but is building resilience through collective, coordinated action.

Introduction

Background

The resilience of health systems and their ability to withstand environmental and social shocks and stressors is challenged by climate change, particularly in low-income settings where resources are limited and vulnerability to systemic shocks is high. With its myriad past and ongoing climate-related shocks and stressors, including cyclones, seasonal and flash flooding, drought, and extreme heat and humidity –all impacting a highly decentralised healthcare system in a low-income, resource-poor setting– Bangladesh provides a diverse case example by which to examine health system resilience in an environment of ongoing climate change shocks and stressors.

In a 2024 NIHR-funded pilot study -concerning health system and community adaptations to climate change conducted by Kadetz and Rasheed in Chakaria and the slums of Dhaka, Bangladesh- stakeholders interviewed identified that collaboration and coordination between various stakeholders, particularly healthcare stakeholders, was a marked barrier to climate change adaptation and resilience.

Although health has had some inclusion in climate change development plans,[2] climate change has not been included in health planning until recently,[3] and few climate change activities have been implemented. As a new health sector plan is awaiting implementation, there is a window of opportunity to bring multisectoral actors together and identify a strong role for the health sector in working with climate change adaptation, as well as for health system resilience. This is corroborated by the literature, which identifies coordinated and inclusive governance as a requisite for resilient health systems (Bigdeli et al. 2020). Hence, the initial identification of a lack of broad formal networks encompassing health system and

[2] Including the National Adaptation Programme of Action 2005, 2009, the 2009 Bangladesh Climate Change Strategy and Action Plan, and the 2023 National Adaptation Plan that included health as a cross-cutting issue rather than a priority sector, and only 4 of 113 priority interventions directly addressed health.

[3] The 2011 National Health Policy and 2017–22 Health, Nutrition and Population Sector Program (HNPSP) identified climate change as a major risk and proposed initial actions. A draft 2024-29 HNPSP set out several priority CRHS strategies, including capacity development, resilient infrastructure, and climate-related disease programmes. The draft also emphasised coordination across health, environment, and climate change, including through H-NAP approval and mainstreaming climate across health sector activities.

climate change stakeholders in Bangladesh, supports the need for and value of this project.

Research Questions
This research was conducted to answer the following questions:

- What factors have been successful in building climate change stakeholder networks in Bangladesh that can be scaled up and across the health sector and other pertinent sectors?

- What are the obstacles/barriers that prohibit more inclusive, collaborative, and coordinated networks of climate change stakeholders?

- What short and long-term measures can be employed to develop more collaborative/coordinated networks among climate change stakeholders that benefit health system and community resilience?

Methodology

Data collected from 1) a narrative review of the literature, 2) key informant structured interviews with climate change and healthcare stakeholders, and 3) a stakeholder workshop which grouped diverse climate change and healthcare stakeholders into teams that developed action plans for coordination and collaboration between both sectors, was triangulated. This qualitative research explored the facilitators and barriers to cultivating inclusive, coordinated networks between climate change and healthcare stakeholders in Bangladesh to improve adaptation and resilience to climate shocks and stressors.

Narrative Review
The narrative review was conducted using the following inclusion criteria: Peer-reviewed papers published within the past 10 years in English, as well as pertinent policies in Bangladesh including the 2018 and 2024 Health National Adaptation Plan (H-NAP), the 2005, 2009 National Adaptation Programme of Action (NAPA) as well as the 2023 National Adaptation Plan (NAP), and the 2011 National Health Policy. Search engines included MEDLINE via PubMed, Scopus, Web of science, and Google Scholar. The Boolean operator 'AND' was used for search terms including 'Climate Change'; 'Climate Change Adaptation'; 'Climate Stressors'; AND 'Health System'; 'Health System Resilience'; AND 'Governance'; 'Stakeholders'; 'Coordination'; 'Collaboration'; 'Policy'; AND 'Bangladesh'.

Structured interviews and Stakeholder Workshops

Sampling

The sample for both the structured key informant interviews and the stakeholder workshop was targeted for representativeness of stakeholders from both climate change and health sectors across administrative levels from the government ministries, academia and research, NGOs/INGOs, private sector, and civil society. Sample selection was an iterative process among colleagues at icddr,b, and recruitment was facilitated by icddr,b's extensive national networks with the goal of achieving stakeholder representativeness.

Data Collection

Data collection tools were designed through an iterative process. Themes identified from the narrative review (Months 1-4) were used to design the structured interview schedule (Appendix 2) for 16 Key Informant Interviews carried out both in-person and online using the Zoom platform (Months 5-8).[4] In turn, data from both the narrative review and the Key informant Interviews were used to design the elements of the stakeholder workshop action plan (Appendix 3) employed in the stakeholder workshops held at icddr,b in Dhaka (Months 9-10) -that included 26 diverse stakeholders from climate change and health sectors who were grouped into 3 working group teams for each workshop.

Data Analysis

In addition to a narrative review of pertinent policies, 13 peer-reviewed papers that were published in English within the past 10 years were analysed with an excel sheet and grouped according to the purpose of the study, the methods used, the key findings, and the recommendations using a basic thematic analysis. Two reviewers coordinated their analysis to inductively identify themes pertinent to the research questions of this project. The structured key informant interviews were conducted in Bengali, transcribed to English, and input to an excel sheet for basic inductive thematic analysis. The stakeholder workshop team action plans were input into tables that were analysed across groups also using a basic inductive thematic analysis.

Ethics

All informants were provided with information regarding the purpose of the research; their voluntary and autonomous participation (including that informants could withdraw their data at any point up to the data analysis -at which point the data cannot be disaggregated); how data was anonymised (no identifiers were collected with the data) and safely stored; and how confidentiality was protected in data

[4] Note that due to changes in government administration and threats of violence, the research needed to be paused for approximately 9 months during this phase and was resumed when the new administration was in place and travel around Dhaka was deemed safe.

collection, storage, and dissemination. All Informants were required to sign an informed consent to participate. Informed consents were linked to data through alphanumeric codes. All data gathered and reviewed for this research was encrypted and stored on the Queen Margaret University cloud for a period of five years, after which it will be destroyed. All publications and other public dissemination of the data will protect confidentiality. This study received ethical approval from Queen Margaret University in the UK, and from the Institutional Review Board of icddr,b, Bangladesh.

Results

Demographics

Key Informant Structured Interviews

Of the 16 key informants who completed structured interviews, 11 worked specifically in areas of climate change and 5 in health. Ranks were evenly divided between 8 senior-level and 8 junior-level. Nine informants worked 10 or more years in this disciplinary area and 7 worked in this field for less than 10 years. Six informants completed a PhD (and 1 a MBBS) and 9 held a master's degree. Nine informants were 45 years of age or older (with the eldest being 70) and 7 informants were less than 45 (with the youngest being 29). All but two informants were male. Hence, the informants were fairly evenly divided in all areas except gender and disciplinary field of work. The informants were also evenly divided according to their work sector: research/higher education (n=6); Government Ministry and Policy (n=5); and NGOs and Private Sector (n=5).

Table 1: Key Informant Interviews Demographics

Work Field	Rank	Years in Work Field	Education	Age	Gender
Climate Change 69%	Senior 50%	>10 Years 56%	PhD/MBBS 44%	>45 56%	Male 88%
Health 31%	Junior 50%	< 10 Years 44%	Master's 56%	< 45 44%	Female 88%

Stakeholder Workshops

Of the 26 Stakeholder Workshop participants: 14 were from the health and agriculture sectors and 12 were from the climate and environment sectors;10 held doctorates and 16 held master's degrees; and there was more gender equity in the workshops compared to the key informant interviews with 42% females (n=11) and 58% males (n=15).

Table 2: Stakeholder Workshop Demographics

Work Area	Education	Gender
Climate Change 46%	PhD/MBBS 39%	Male 58%
Health 54%	Master's 61%	Female 42%

Results organised across thematic areas

The following themes that are pertinent to the research questions were triangulated across the three areas of data collection.

I Factor that has been most successful in building climate change stakeholder networks

Inclusion
According to Bigdeli et al. (2020) 'Health systems processes must move from a top-down to inclusive policy, planning and implementation processes, increasingly adopting a people-centred approach'. In general, across all data collected, inclusivity was identified as a significant factor for supporting collaboration and coordination between climate change and health stakeholders. Yet, the actual amount of different kinds of stakeholders who are collaborating is limited in this sample. Of the 12 (75%) key informants who reported coordination with other stakeholders in structured interviews, less than half had worked with more than 1 other organisation and less than 20% worked with more than two. Furthermore, almost all collaborations were limited to specific activities (such as data sharing or work on a specific funded project) and were not ongoing or sustained.

According to one key informant:

> 'In terms of coordination, we regularly participate in meetings and workshops with different ministries' personnel. For example, in the health sector plan, we are asked to provide feedback or opinions. We attend these meetings and review
> the plan. We are also invited to various meetings by the Ministry of Disaster Management and Relief, where we provide our input.'

II Barriers to more inclusive, collaborative, and coordinated networks of climate change stakeholders

Exclusion
Even though Bangladesh has decentralised health and environmental sectors, the central government ministries -who were identified to maintain control of activity

collaboration and coordination- were commonly exclusive in practice and particularly restricted to state level ministries.

> 'Organizations with the most influence over the governance process reside at the national level, even though both top-down and bottom-up processes co-exist in different phases of adaptation governance; i.e., planning, implementation, and monitoring (Ishtiaque et al. 2021A).'

Exclusion from participation in climate change and health activities was identified as the primary barrier to collaboration and coordination across all data collected.

Key informants noted:

> 'There are many bureaucratic hurdles [to collaboration]. Sometimes ministries or departments show a lack of interest, remaining informal in their approach. Even when we show interest, the response from their side is not enthusiastic.'

These exclusionary practices are well documented in the literature:

> 'Barriers to the adaptation governance process in Bangladesh include enclosure and exclusion, boundary control, organizational inertia, belief formation, and frame polarization (Ishtiaque et al. 2021B).'

Regardless of the inclusion of health in the National Adaptation Plan (2023), policymaking has been identified as particularly restricted to ministerial actors.

> 'Policymaking is largely top-down, favouring techno-managerial solutions and lacking inclusivity for marginalized actors. These power dynamics among ministerial agencies hindered the policy implementation process (Stock 2021).'

At best, policymaking may include targeted expertise. For example, in the Bangladeshi National Adaptation Programme of Action (NAPA) process, 'economists, scientists, and government officials were involved, but representatives from the most vulnerable groups, their professional associations, and civil society organizations were not included' (Sovacool 2018).

The exclusion of participation to the ministerial class is further problematised by the impermanence of many of these positions, which result in gaps in institutional memory. The stakeholder workshops identified 'a lack of regulatory authority for collaboration'. And key informants identify:

> ‘Though we work permanently in this sector, changes in leadership in the [ministry] departments often create gaps. For instance, at the Department of Disaster Management (DDM), although there are permanent staff, positions like the Director General change every six months, a year, or two years. Since we interact with them frequently, relationships are developed, but gaps remain because new officials are unaware of our previous engagements or collaborations. They may miss what has been done with our institution and shift focus to working with other departments, sometimes based on a personal relationship. This creates a challenge.’

This is further corroborated by the literature:

> ‘Administrative traditions imply that bureaucratic actors operate within defined routines and a rigid administrative framework. These traditions prioritize members of the general administration cadre, but the lack of technical expertise, stemming from their general backgrounds and work experiences, is compounded by regular personnel rotations among ministries and departments (Rahman et al. 2020).’

Funding

Funding was also listed as a significant barrier to collaboration across all the data collected.

One key informant noted:

> ‘Although we enter into many MoUs, the outputs are often limited because funding is quite constrained.’

Similarly, donor demands were singled out by key informants as an important challenge:

> ‘As various organisations work together, especially the donors have some specific priorities. It is sometimes challenging to work in any other way than the way the donor require.’

> Furthermore, ‘Local governing bodies and their associated institutions lack adequate financial and technical resources, primarily due to their limited autonomy in financial and administrative decision-making’ (Choudhury et al. 2019).

Corruption and Transparency

Along with challenges due to exclusion and funding, corruption was identified as a significant barrier to collaboration and coordination across all data collected;

> 'Corruption is significant in increasing vulnerability to the adverse impacts of climate change' (Rahman 2018). 'Few social programs in Bangladesh are specifically designed to consider the effects of climate change and policies generally do not recognize the links between human rights and climate change adaptation' (Hossen et al. 2019).

Transparency between collaborators, particularly from the ministries, was identified as a similar challenge to collaboration among key informants, noting the challenge of 'non-transparent mechanisms for resource sharing'.

Similar to issues of widespread corruption and lack of transparency, political favouritism, accountability, and political stability, limited inclusion of local residents in decision-making processes, lack of political commitment, and poor quality of regulatory instruments have been identified as barriers (Bhuiyan 2015; Uddin et al. 2021).

Differences in knowledge and approach

Different ways of working and understanding was identified as another issue by key informants:

> 'There are also challenges regarding perceptions as different stakeholders hold different perceptions and understandings of the issue at hand.'
> And a lack of understanding of stakeholder roles and responsibilities.

Similarly, stakeholder workshops identified information and data gaps (with little sharing among stakeholders) and both a lack of an integrated vision and a lack of a sustainable mechanism for integrating climate change and health.

Time as a limiting factor

Time was another factor that limited collaboration. According to a key informant:

> 'In validation workshops, stakeholders may point out issues or suggest improvements, but there is no time left to address them effectively.
> This means the project's outcomes are unlikely to meet expectations.'

III <u>Short and long-term measures that can develop more collaborative/coordinated networks among climate change and health stakeholders</u>

Short Term

Inclusivity
A more equitable distribution of power (roles and responsibilities) among stakeholders, including civil society and the incorporation of community expectations, may reduce the negative implications of government/ministry centralization (Ishtiaque et al. 2021A), particularly in terms of more inclusive and equitable policymaking processes that facilitate the participation of marginalized populations and that represent their concerns and aspirations (Stock 2021).

According to the stakeholder workshops, one action plan that could immediately be implemented to effectively promote inclusivity is data sharing between all stakeholders. Stakeholder action plans also prioritised: stakeholder mapping activities; development of a central regulatory body or hub/network/technical committee for climate change and health'; developing a ToR; 'sensitization workshops' for all stakeholders; 'Vision exercises' for goals, opportunities, roles, inter-sectoral collaboration, as well as capacity building activities for stakeholders; mapping/identifying climate funding that includes health and that contributes to the sustainability of the hub; and fostering strong leadership.

Almost all workshop stakeholders identified the urgency for the immediate development of a central digital repository accessible to all stakeholders that details which stakeholders are working on which projects, who received funding, and what funding is becoming available (i.e., similar to a 4W Platform). Similarly, establishing a central hub with a dedicated coordinator and a central communication channel were also mentioned as immediate short-term activities.

Long Term

Framing and Understanding
According to Key Informants, a problem with climate and health collaboration is how these are framed, understood, and practiced:

> 'If we continue discussing climate change and the health system separately, it may confuse people. We need to clarify that these are interconnected issues.
>
> Many scientists appear to lack a clear understanding of this relationship. This is where our focus should be. Environmental and climate factors should be incorporated with the current challenges facing the health sector, such as the ongoing epidemiological transition. Strengthening collaboration is essential for addressing climate change and health risks.'

Hence, an holistic approach and an integrated vision for climate change and health that is institutionalised (particularly in ministries) will be essential. In-depth political economy analysis of the challenges is essential to identify re-oriented institutional arrangements, and efficient governance frameworks (Islam et al. 2020). And Integrating National Action Plans for climate change and health for 2030 that include mechanisms for monitoring and evaluation will also provide the basis for climate change and health integration.

Building Capacity

Capacity building in climate change was emphasised across all three kinds of data collection. Of the organisations that key informants identified, 67% offered capacity building for their own employees and the remainder for the general public.

The technical and financial capacity of local institutions and stakeholders should be strengthened to enable them to execute policy actions, delegate activities and build community and they 'should be empowered with self-governance instruments, resource procurement and allocation and decision-making capacity' (Barura et al. 2021). The establishment of specific funding mechanisms will be central to sustaining coordination and the development of a hub. Organizations can be bridged in order to scale up lessons from episodic events into national-level policy and practice (Haque and Doberstein 2021).

Similarly, an absence of strong leadership was identified in stakeholder workshops as a particular challenge.

Mutual Respect and Inclusive Teamwork
Key informants identified:

> 'For successful collaboration, it is imperative to respect your partners and ensure responsibilities are clearly defined to avoid overlap. Identifying efficiencies within the organization and avoiding biases is also essential. Responsibilities should focus on the organization as a whole rather than individual levels.'

The idea of collaborating as a team rather than a group of individuals was elaborated by another key informant:

> 'The concerned government institutions should involve all relevant stakeholders as a whole team. This approach does not happen in our country. Often, out of 100 stakeholders or even 50, only five or six are repeatedly engaged,

> while many others are excluded or remain unaware of what's happening […] for projects related to climate change, the concerned ministries should consult all stakeholders, including government bodies, non-governmental organizations, and academia, while designing projects. Projects developed solely by one entity often have significant gaps. Hence, if a project is developed based on input from stakeholders and involves them from the beginning to the end, the objectives set for the project and it's expected outcomes will be clearly assessed by both the project initiator and stakeholders. However, if a project is initiated and funded without consulting stakeholders, and the work is carried out solely by internal personnel or validated through a final workshop, gaps are likely to remain.'

This is echoed in the literature in a call for participatory management:

> 'A participatory management approach is needed wherein central and local government agencies, NGOs, civil society, private sectors, and citizens collaborate' (Rahman and Huang, 2019).

Resources needed for these activities that were identified in stakeholder workshops can be grouped in four main categories: financial, technical (including digital), materials, and human.

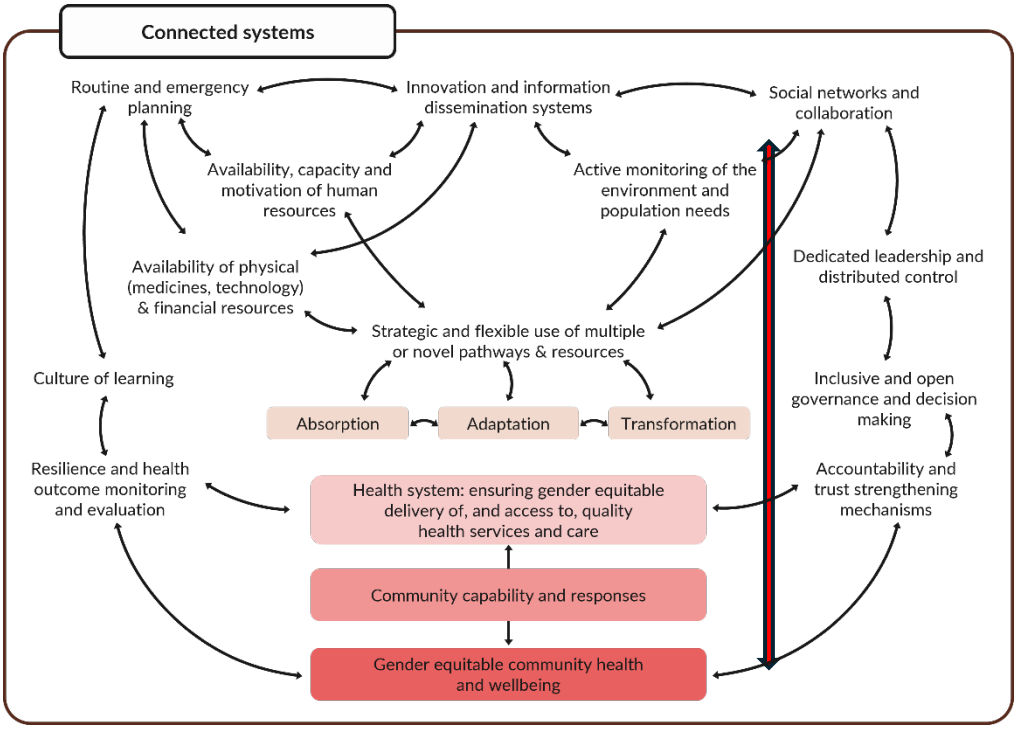
Key informants identified one way forward was to develop an action plan for multi-stakeholder
consultation in climate change and health. This suggestion, along with the literature review and the key informant interview data, directly influenced the action plans of the stakeholder workshops.

Discussion

Locating this Project in the Rebuild for Resilience Framework

This project directly addresses a section of the Rebuild for Resilience Framework, as this project was concerned with the impact of governance and connected systems on resilience (or everything to the right of the arrow in Figure 1).

Figure 1: Rebuild for Resilience Framework



Overall challenges to climate change and health coordination/collaboration identified

In general, this project identified three main barriers to climate change and health coordination and collaboration in Bangladesh that was corroborated across the data collected from the narrative review, the key informant interviews, and the stakeholder workshops. The three barriers include: 1) top-down exclusion (both between ministries and with non-ministry stakeholders); 2) a lack of funding or access to funding; and 3) corruption and a lack of transparency. Other barriers mentioned less frequently, but still relevant include the knowledge and skills capacity needed for collaboration, the time needed to collaborate and coordinate stakeholders, and how climate change and health expertise and activities are normatively siloed and framed separately.

In considering the recent climate change and health sector policies and National Adaptation Plans that have begun to incorporate one another it appears there is a contradiction between policy and practice. In climate change and health sectors in Bangladesh, research participants reported a marked lack of coordination between the Ministry of Environment, Forests and Climate Change and the Ministry of Health. Health sector input to the NAP was limited due to an understanding that health-related aspects of climate change would be addressed in the new health sector plan. Inadequate operational coordination has limited integration of health in planning, budgeting, and implementation of climate change initiatives. Climate sector input to health policies has also been somewhat marginal, but there are indications of improvement. For example, listed participants in the 2018 H-NAP were almost all from the health sector, with the exception of the Meteorological Department, but the 2024 H-NAP also included input from several environment department officials. There have been efforts to improve convergence; including a high-level interministerial meeting on climate and health in 2023. However, overall coordination remains limited. Illustrating this, the 26 climate and health leaders who participated in the stakeholder workshops all remarked that they had not previously met or collaborated. In fact, fewer than half the stakeholders interviewed identified working with one other climate or health stakeholder, and under a fifth had worked with two or more.

However, although stakeholders often complained about the lack of their inclusion with a particular governmental ministry, they did not consider working outside of this top-down structure controlled by ministries. In other words, this particular hierarchical process had essentially become reified and seemingly intractable, even though there are significant examples of successful bottom-up processes in Bangladesh, especially in the health sector. Granted, this seeming reification of this structural hierarchy may be particular to this sample and not representative. But, according to this research, what is represented in policy may not necessarily be practised or applied. This is supported by key informants who mention collaboration that was primarily limited to policy.

> ‘We worked very closely with the Ministry of Disaster Management and the Disaster Management Department. Whenever they developed disaster-related policies or moved towards implementation, they would seek our opinions as experts.’

> ‘In terms of coordination, we regularly participate in meetings and workshops with different ministries' personnel. For example, in the health sector plan, we are asked to provide feedback or opinions.’

This need for the coordination of all stakeholders (regardless of administrative level) is echoed by Bigdeli et al. (2020), ‘Very often, we place decision making power in the

hands of the Minister of Health while actually, critical decisions in health systems may depend on a variety of actors from party elites, local governors, civil society organisations, labour unions and international actors'.

The idea that collaboration and coordination require a 'team effort' among stakeholders is emphasised by a key informant in their summary of the challenges and response needed:

> 'We need stability, consistency, and a commitment from both sides with other organisations to ensure the success of this collaboration. If one party weakens or loses motivation, the effort falters. Some organizations begin with a lot of enthusiasm but lose steam midway, often halting progress. Funding interruptions can also be a challenge. Another issue is that not all scientists have the same level of expertise or vision—some might think up to level 95, while others stop at level 15, and they may conclude that further efforts aren't worthwhile. Much of our research remains fundamental or superficial, which limits its real-world impact. We need to focus on work that benefits and is effective for end-users. Some may feel they lack the capacity to carry the study forward. The situation in developed countries is different; here, unfortunately, ego can be a significant barrier, often disrupting progress.'

These observations are supported by the literature, which identifies that highly centralized administration, fragmented and ineffective resource allocation and management systems, and a focus on project-oriented planning rather than resource-based planning have all thwarted climate change and health coordination and collaboration (Rahman 2019).

According to workshop stakeholders, issues of exclusivity, lack of data and information sharing, funding, and capacity building can all be immediately addressed via the development of the central digital repository and establishment of a central hub with a central communication channel.

Conclusion

This study adds a nuanced layer to the existing literature on health system resilience by shifting the focus from *what* is missing to *how* to overcome the barriers set by existing structures that can actively inhibit progress. Both the key informant structured interviews and the stakeholder workshop corroborated many of the findings identified in the literature, particularly regarding the lack of inclusivity in practice, regardless of policy. However, many of the specific actionable recommendations, particularly those that could be instituted immediately (highlighted above), offer solutions beyond what is identified in the literature and build the evidence base of this area.

It also introduces the concept of 'reified hierarchies', where top-down ministerial control is so normative that stakeholders rarely consider lateral or bottom-up collaborative models, even when the central government fails to provide leadership. Similarly, this study revealed how many informants still view climate change and health as separate challenges, failing to acknowledge how environmental stressors can become the primary drivers of disease.

Yet, although this research has triangulated three different streams of data collection that appear to corroborate one another -concerning the challenges and solutions for coordination and collaboration between climate change and health stakeholders in Bangladesh- the representativeness of the data may be challenged due to the limited size of samples and the cessation of the research for a period of nine months (in the midst of key informant interviews) during political upheavals in Bangladesh that resulted in the input of stakeholders from two different administrations (albeit the end of one and the beginning of another) -which may suggest that resilience is currently more dependent on individual personalities than robust institutional systems.

Regardless, it is well-documented and agreed that coordination and collaboration between climate change and health system stakeholders is essential for health system and community resilience. Further research that develop solutions for the ways forward, as suggested by this research, would be valuable to further build the evidence base on health system resilience affected by the shocks and stressors of climate change in Bangladesh and beyond.

Appendix I

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Appendix II

Key Informant Structured Interview Schedule

1. Demographic Information (*Please fill in the following*):

    1. Field of expertise _____
    2. Rank in your organization _____
    3. Years spent in organization _____
    4. Level of education _____
    5. Age _____
    6. Sex _____

2. How would you categorize your work organization? (*Please check all that apply*)

*For example if you conduct research in the private sector in Energy and teach in higher education, then you would check **b.** Higher Education and **r.** Private sector (Energy).*

1. Research Institute
2. Higher Education teaching and Research
3. Policy making
4. Public sector (MoHFW)
5. Public sector (agriculture)
6. Public sector (education-primary and secondary)
7. Public sector (energy)
8. Public sector (communication)
9. Public sector (transportation)
10. Public sector (housing)_
11. Public sector (urban planning)
12. Public sector (Infrastructure/civil engineering)
13. Public sector (Emergency/Disaster Management)
14. Public sector Other (please specify) _____
15. Private sector (Health)
16. Private sector (agriculture)
17. Private sector (education-primary and secondary)
18. Private sector (energy)
19. Private sector (communication)
20. Private sector (transportation)
21. Private sector (housing)_

22. Private sector (urban planning)
23. Private sector (Infrastructure/civil engineering)
24. Private sector (NGO)
25. Private sector (INGO)
26. Private sector (Emergency/Disaster management)
27. Private sector Other (please specify) _____

3. Please check all the specific areas/fields of climate change engagement of your organization (*Please specify the kind of work your organization does in this area*)

Policy Engagement (Please specify)_____-_____

Standards and Regulations (Please specify)_____

Communication and advocacy (Please specify)_____

Programming (Please specify)_____

Financing (Please specify)_____

Capacity building (Please specify)_____

Technology (Please specify)_____

Research (Please specify)_____

Other (Please specify) _____

4. What is your specific role in your organization (*Please specify your area of work as it pertains to climate change*)?

a. researcher (please specify your area) _____

b. teacher (please specify your area) _____

c. managerial (please specify your area) _____

d. healthcare worker (please specify your area) _____

e. technician/technical worker (please specify your area) _____

f. policy maker (please specify your area) _____

g. Other (please specify your area) _____

5. With which organizations/departments has your organization collaborated on climate change in the past? (*Please name the organization and/or department name **but do not name specific individuals***) and for how long. **(Please mark as √) (Check all that apply)**

	Type of organization			**Duration**		
	GoB	NGO	Private	< 1 year	1 to 5 year	> 5 year
1. Research Institute						
2. Higher Education (teaching and research)						
3. Policy making						
4. Ministry of Health & Family Welfare (MoHFW)						
5. Agriculture						
6. Education-primary/secondary						
7. Energy						
8. Communication						
9. Transportation						
10. Housing						
11. Urban planning						
12. Infrastructure/civil engineering						
13. Emergency/Disaster Management						
14. Other (please specify) _____						

6. Please give 3 examples of climate change collaborations with other organizations that worked and 3 that didn't work? What specifically helped or hindered each collaboration?

<u>Collaborations that worked and why</u>

A.

B.

C.

Collaborations that didn't work and why

A.

B.

C.

Please briefly answer the following questions:

7. Are there any organizations who would be relevant to, or important to collaborate with, for your work on climate change with whom your organization has not collaborated? Why are (each of) these collaborations important? (Please name these specific organizations)

8. Do you anticipate any challenges/barriers in collaborating with these named organizations/ individuals, and if so what are these?

9. How do you suggest overcoming these challenges to work with these organizations/ individuals?

10. What, in general, would help you facilitate you and your organization's work with others on climate change in Bangladesh?

Appendix III

Stakeholder Workshop Agenda

13:00-14:00 Lunch and Overview of Data Collected

14:00-16:00 Action Plan Breakout Groups
Goal: Each Group develops an (outline) Action Plan for Climate Change and Health Coordination/Collaboration and write out on large flip chart sheets.

Contents of Action Plan outlines:
1) **WHAT** Problem Statement: What are main barriers to collaboration/coordination for climate change adaptation and resilience?

2) **WHAT** is ultimate objective for climate change coordination? (define short, medium, and ultimate goals)

3) WHAT are the activities and actual steps needed to reach these goals? (prioritised and sequenced)

4) **WHEN** Possible timeline/sequence for each activity? (with deadlines and milestones)

5) **WHAT**: Types of Resources: Financial, Technical, Material needed

6) **WHO**/Human Resources: Government Sectors, NGOs/INGOs/Private and public partnerships

7) WHO Roles and Responsibilities for each activity

8) **WHAT** Can you reach a consensus on regarding what should be included in Preparedness Planning?

9) **HOW** How can the progress of this action plan be tracked and adjusted (Key Indicators)

10) **Who** could be added to a repository?

Stakeholder Action Plan for Collaboration and Coordination

	1	2	3	4	5	6	7	8	9
Groups	Problem	Goals	Activities	Timeline	Resources	Human Resources	Roles	Preparedness Planning	Indicators for tracking Goals
1									
2									
3									
4									
5									

16:00-16:30 Each Group presents

16:30-17:00 Commonalities of Action Plans and ways forward discussed