
CASE STUDY

Academic/NGO Collaboration to
Understand Climate Change and
Disaster Resilience Implementation
in Bagerhat District, Bangladesh



HARVARD
HUMANITARIAN
INITIATIVE

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March 2020



The **Harvard Humanitarian Initiative (HHI)** is a university-wide initiative with a mission to advance the science and practice of humanitarian response worldwide through research and education. HHI serves as the humanitarian arm of Harvard University and brings an interdisciplinary approach to building the evidence base of humanitarian studies and professionalizing the field of humanitarian aid. Through its research programs and educational offerings, HHI is an influential forum for humanitarian innovation, effectiveness, and leadership.

HHI's **Program on Resilient Communities** uses evidence-based approaches to interpret how communities mitigate the impact of disasters. The program's starting point is the central role local communities play in both disaster preparedness and response. Communities are the front line and locus for interactions with local civil society organizations, the private sector, national disaster management agencies, and the international humanitarian community.

DisasterNet, as part of the Program on Resilient Communities, specifically seeks to support local and national capacity for disaster preparedness and response by enabling grassroots organizations to: 1) adopt evidence-based tools and practices; leverage existing HHI best practices, data collection systems, and online educational tools to enhance research and training; 3) build leadership capacity; and, 4) promote intellectual exchange across national and disciplinary boundaries. DisasterNet will establish a foundation for more integrated, coordinated, and evidence-based preparedness and response structures for humanitarian disasters.

Acknowledgements

The authors thank Concern Worldwide and Jagrata Juba Shangha (JJS) for their support of the network analysis survey, as well as their review of the case study. The authors also thank the organizations who participated in the survey for their time and interest in supporting this research.



PROGRAM ON
**RESILIENT
COMMUNITIES**



**HARVARD
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ABOUT THE CASE

This case study describes a research collaboration between an academic institution and non-governmental organizations (NGOs) designed to inform programs to strengthen coordination in Bangladesh. The case describes the rationale for conducting the study, the research process, and outcomes of the research.

The objective of the case study is to support local or municipal governments, NGOs, students, or other program managers to consider how collaboration with academic institutions could enhance their programs, as well as how research such as a network analysis could be useful to inform their work. For those interested in conducting a network analysis, the case also provides resources and tools to support researchers and organizations to replicate the study in their program context.

Key guiding questions for the case include:

1. Could a network analysis approach be useful in your context? If so, how? For what types of programs?
2. What sort of research questions do you have that could inform your programming?
3. What academic/NGO collaborations might be useful to support your program design and implementation?

THE CASE

Helen Ware, Palash Haldar, Enzo Bollettino, Patrick Vinck, and Zakir Hossain are in an annual work planning meeting. They represent different organizations working toward a similar mission – enhancing the resilience of coastal communities in Bangladesh to the effects of natural disasters and climate change. Palash and Helen work for Concern Worldwide, a large, international non-governmental organization (NGO) that has been working in Bangladesh since 1972 to strengthen development, resilience, and disaster response (1). Zakir is the founder and Executive Director of Jagrata Juba Shangha (JJS), a Bangladeshi NGO that has worked in the coastal region of Bangladesh since 1985 to enhance resilience and support development efforts (2). Enzo and Patrick are researchers at the Harvard Humanitarian Initiative (HHI), a research initiative based at Harvard University in the United States, which recently received a grant to support research to enhance resilience in Bangladesh (see Annex 1 for the mission statements of these organizations at the time of this project).

These three organizations were brought together to implement a joint project to enhance coastal community resilience in Bagerhat District, Bangladesh. Within the project, Concern and JJS jointly implement activities within these coastal communities, while HHI's role is to conduct research to support these programs and to advance global understanding of what makes households and communities resilient. Each organization has different capacities, interests, and activities, leading the group to wonder – how can an academic actor support local and international NGOs to enhance coastal community resilience?

IDENTIFYING THE PROBLEM

The team lands on an idea – coordination and collaboration. Bangladesh is unique in its rich history of NGO engagement. The country is home to over 6,559 NGOs and NGO branches supporting development, health, microfinance, livelihoods, and other development and disaster relief and preparedness efforts (3). Recent studies of disaster response efforts in the region found that, while many government, INGOs, and local NGOs mobilized to provide disaster relief following devastating cyclones in 2007 and 2009, lack of coordination between actors hindered efficient delivery of services (4,5). Enhancing the capacity of actors on the ground to integrate resilience into their programs, and creating or strengthening platforms to support coordination, could be an important first step toward strengthening program delivery and, ultimately, community resilience.

Resilience in Coastal Bangladesh

Bangladesh is ranked seventh on the 1998–2017 Climate Risk Index of countries most affected by climate change – the country experienced 190 extreme weather events causing over 2.4 million USD in losses and 635.5 deaths annually during this period (15). Located on the Bay of Bengal and in the floodplains of several major rivers, Bangladesh is particularly vulnerable to tropical cyclones and seasonal flooding (16). These events, as well as drought, soil salinization, storm surges, and other climate change-related events, are predicted to increase in frequency and severity due to climate change (16). The country has one of the highest population densities in the world, and this high population density, combined with high probability of natural disasters and low levels of development, make Bangladesh particularly vulnerable to the effects of climate change (17-19).

The country's low-elevation coastal zones are especially vulnerable, and are already heavily impacted by the effects of climate change (20). Coastal zones account for over 40 percent of the country's landmass and 49 percent of the country's total population (20). In recent years, coastal zones have been significantly impacted by coastal erosion, cyclones, flooding, saltwater intrusion, sea level rise, and more (19, 21, 22). Agriculture is a key economic activity; however, food yields are threatened by limited availability of freshwater for consumption and irrigation, increasing temperatures, soil salinization, and unpredictable rains (23). These effects are a significant threat to livelihoods and food security in the region (24).

But who were these organizations, and how were they collaborating and coordinating already? Before designing interventions to enhance capacity and support coordination among these actors, HHI, Concern, and JJS needed a more in-depth understanding of the current network. Were organizations coordinating at all? If so, what types of groups collaborated? Did they see value in coordination and collaboration? Patrick and Enzo's colleagues at HHI had recently completed network analyses of humanitarian actors in eight countries as part of a program evaluation. They suggested that a similar approach could be used in this context to help Concern, JJS, and HHI better understand the implementation environment and design targeted programs to improve coordination and strengthen capacity.

THE NETWORK ANALYSIS APPROACH

Network analysis techniques seek to illustrate and analyze formal and informal connections between actors to build an understanding of a network structure (6–8). Through this analysis, processes of network governance, influential actors, social capital, and information flows become apparent (6–8). This information is key to understanding how these networks are able to leverage social capital, exchange ideas, and work effectively and efficiently before, during, and after a disaster (9).

THE VALUE OF A NETWORK ANALYSIS IN THIS CONTEXT

A number of studies of recent emergencies in Bangladesh, including Cyclone Sidr (2007), Cyclone Aila (2009), and the Rohingya refugee crisis (2017-ongoing), recommended mapping local organizations to promote capacity building and coordination and to strengthen disaster management and response (4,5,10). Due to the number of actors involved in disaster management, coordination among actors during an emergency is crucial for an effective, efficient response (6,8). Studies have shown that the existence of pre-disaster relationships between actors can strengthen the speed with which coordination occurs in a disaster setting, making relationship-building before a disaster an important element of preparedness (6,8). As such, using a network analysis approach to map the relationships of stakeholders working to advance climate change adaptation and disaster resilience is a crucial first step in designing programs to strengthen institutions, build capacity, and increase coordination and collaboration (9,11).

PROCESS OF IMPLEMENTATION

Together, HHI, Concern, and JJS discussed a plan for completing the research. The research would be led by HHI, and HHI researchers would create the survey tool and research plan, train data collectors, oversee data collection, and analyze the data. Concern and JJS would support the HHI research team with on-the-ground logistics to identify respondents, recruit data collectors, support translation, and arrange transport for the research team in the field. The organizations would jointly review the results of the study to identify program recommendations and support dissemination and use of the data in-country.

A flow chart of the study activities can be found on the following page, with a sample detailed implementation plan in Annex 2. The sections below provide more details on the implementation process for each step of the study.

1. STUDY SCOPE AND OBJECTIVES

As with any research, the first step is to identify the research question and objectives as well as to define the study population. This study's research question was defined as:

Implementation Process



Study scope and objectives



Survey tool and research plan



Organization list



Data collector training



Participant recruitment and data collection



Data analysis



Data sharing and use

What are the relationships between existing actors (NGOs, government, academic and research institutions, private sector, and community-based organizations) working to support climate change adaptation and disaster resilience in Bagerhat District, Bangladesh? What is the nature of those relationships, and what is the network structure?

To answer this question, the objectives of the study were to:

- 1) Understand the relationships among actors supporting climate change adaptation and disaster resilience work among coastal communities in Bagerhat District, Bangladesh, and
- 2) Develop a representation of the disaster risk and resilience system in Bagerhat through a depiction of the structure and characteristics of the relationships among the actors that make up the system.

Because the study was intended to inform Concern and JJS' programs in Bagerhat District, the research team made a conscious decision to narrow the study scope to focus only on this district. Compared to a nationwide study, a narrower focus was more feasible given available resources, and would allow for more rapid data collection and analysis to inform program design at an earlier stage in the project. In addition, following the protocol used by the DEPP study, the study would focus on collaboration within the last 6 months to get a current understanding of the network as well as to keep the survey length manageable.

2. SURVEY TOOL AND RESEARCH PLAN

To implement this research, HHI adapted the network analysis questionnaire used the DEPP study and developed by Phuong Pham, director of Evaluation at HHI. The first few sections of the questionnaire included basic questions about organization size, activities, capacities, and funding. The final section asks respondents to name the other organizations with which their organization has collaborated in the last 6 months. For each organization identified by respondents, the survey asks a series of questions about the frequency and nature of the collaboration.¹ With the support of Concern and JJS, the questionnaire was translated into Bengali, so that the survey could be given in English or Bengali, in whichever language respondents were most comfortable. Ethical approval for the study was sought from the Harvard Institutional Review Board.

The team used Kobo Toolbox, a free, open-source data collection platform. Because the questionnaire used a unique repeat section pattern, using the Kobo Toolbox platform supported

¹ A public version of the study questionnaire can be viewed and downloaded at the link below. A Kobo Toolbox account is required to view and download the form. <https://kf.kobotoolbox.org/#/forms/aUzx7Qb7rP9LMumwwqreHW/landing>

automated skip and repeat sections when administering the survey on a tablet, making the survey easier to use than paper forms. In addition, survey data could be collected offline on tablets, and then uploaded by data collectors at the end of each day. The research team in Boston could monitor the data daily to ensure data quality and track implementation progress. While the Kobo Toolbox platform would allow for the survey to be administered online, a similar, ongoing survey in the Philippines found that participants were not motivated to complete the survey online when asked by email or phone. As such, the research team decided to administer the surveys in person to achieve a high response rate.

3. ORGANIZATION LIST

One of the most crucial steps in a network analysis is identifying organizations to include in the survey. The survey intended to provide results that were representative of the variety of organizations working in Bagerhat District. Concern and JJS estimated that there were approximately 50 eligible organizations in the district, and it seemed feasible to interview all 50 organizations, so the sample population comprised all organizations (international, national, and local NGOs; relevant government representatives and departments; private sector actors; academic and research institutions; and community-based organizations) doing work related to climate change adaptation and disaster resilience in coastal communities in Bagerhat district. To avoid introducing bias into the results by using local partner contact lists, the initial sample was based on a list of NGOs and other humanitarian and climate-change-related actors registered with the district government. This initial set of actors was invited to participate in the survey, and any additional actors identified as collaborating organizations through initial round surveys were also asked to participate using a snowball sampling approach (9). Organizations were determined to be eligible if they were an organized group of people which had conducted any work related to climate change or disaster resilience in Bagerhat district in the past 6 months.

4. TRAIN DATA COLLECTORS

Data collectors fluent in English and Bengali were trained to conduct the interviews. The primary data collector was a local researcher hired as a consultant for the project, and JJS staff were also trained in the use of the tool to provide support as needed. Everyone involved in data collection participated in a day-long training on the research protocol and objectives, study questionnaire, use of the Kobo Toolbox application, and research ethics and confidentiality. During the training, the data collection team and researchers reviewed the questionnaire and Bengali translation together, discussed the definitions of key terms and their accompanying translations, and conducted practice interviews with peers to become familiar with the tool.

5. PARTICIPANT RECRUITMENT AND DATA COLLECTION

JJS and Concern were crucial in supporting data collection and participant recruitment. HHI had few contacts in the region, so JJS and Concern were able to connect HHI and the data collectors to relevant staff for organizations on the district government list. The recruitment process was as follows:

1. Introduction by a JJS or Concern staff member to colleagues at eligible organizations identified in the district government's list of registered organizations. When contact was made, the research team provided information about the survey and requested permission for an appropriate contact and permission to do the survey interviews.
2. If no contact information for an organization was known, the research team reached out to the official contact email listed on eligible organizations' websites and requested an appropriate contact and permission to do the survey interviews.
3. Referrals to additional organizations identified by respondents during the survey were used to identify contacts in additional eligible organizations, and outreach proceeded as in step 1.

Once organizations had agreed to participant, data collectors visited the organization at a time that was convenient for the survey respondent. An HHI research team member accompanied the enumerators for two weeks of data collection to ensure that the enumerators were comfortable with the tool. After two weeks, the

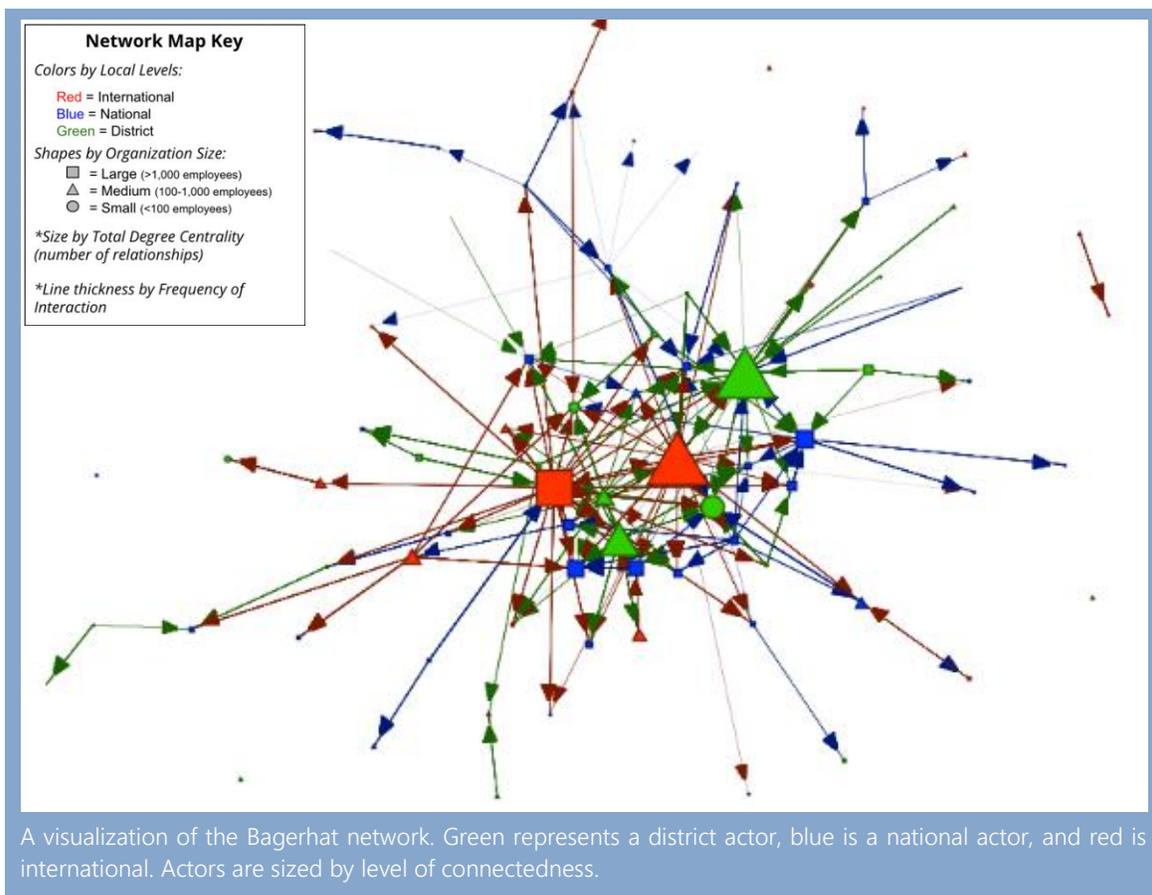
HHI team monitored data collection remotely, receiving and reviewing daily data uploads from enumerators and tracking progress of implementation.

6. DATA ANALYSIS

The HHI team worked in collaboration with Root Change, a consulting firm in Washington, D.C. with expertise in network analysis to analyze the data. The group reviewed key indicators from the survey such as average number and range of total and unique links per organization, collaboration areas per link, most common areas of collaboration, types of collaboration (formal or informal; mandated or self-initiated), frequency of collaboration, likelihood of recommendation, network density, reciprocity of relationships, etc. (9). Results were stratified by type of organization (district, national, or international; small, medium, or large) to identify whether or not there were different patterns of networking and collaboration between types of organizations or in different types of collaborations. In addition, network analysis maps were created to illustrate network density and key nodes in the network, with different symbols used for type of NGO and number of links. A number of analysis software was used, and more information about the analysis can be found in the final report for this study.²

OUTPUTS AND USE

Overall, the study identified 80 actors working to support climate change adaptation and disaster resilience in Bagerhat District, Bangladesh. Of these organizations, eight did not have connections to any other organizations. The other 72 organizations reported 1312 total relationships with one another.



² Program on Resilient Communities. *Network Analysis of Climate Change & Disaster Resilience Actors Working in Bagerhat District, Bangladesh*. Harvard Humanitarian Initiative. 2020.

Data analysis revealed interesting trends and insights for efforts to improve collaboration in the district. A visualization of the network can be seen on the previous page; it depicts a core group of actors working actively together and exchanging information, ideas, and support on climate change adaptation and disaster resilience. However, there are also a number of actors working on the periphery or working in isolation. Analysis of the data revealed a high degree of localization (many district and national actors in influential positions in the network), as well as high collaboration between local and international actors. However, international actors held an outsized position in the network, accounting for only 22% of actors but 51% of relationships, pointing to a need to strengthen collaboration between district and national actors to support greater resilience if international actors leave the system. In addition, the study found a need for increasing engagement with and between community-based organizations and increasing coordination between government departments. Key study results can be found in Annex 3.

KEY CONSIDERATIONS

BUILDING TRUST: INDEPENDENT RESEARCHERS AND LOCAL CONTEXT

One of the strongest considerations in conducting a study like this is building trust with participants. Asking organizations about their operating practices and collaborations with peer organizations can be sensitive. Indeed, many participants were interested in learning more about the research team's use of the data and privacy protections during recruitment. The research team found that the study's combination of an independent research organization and collaborating organizations and individuals with an understanding of the local context was crucial in supporting participants' confidence in the research process and willingness to participate.

Organizations may understandably be hesitant to provide some information about their operating practices to a peer organization for fear of disclosure or loss of competitive advantage. In conversations with the research team, many respondent organizations expressed that they were willing to participate precisely because the study was being managed by a neutral, third-party academic institution, and that they would have been hesitant to provide some information on the questionnaire to a competitor organization directly. Ensuring clear explanations about the nature of the study, data use, and privacy in participant consent forms was also helpful to allay participants' concerns. In addition, the recruitment of a local, independent researcher as a data enumerator helped instill trust in data protection and to allow respondents to feel that they could speak candidly about their practices and collaborations. The enumerator's ability to conduct interviews in local languages was also crucial to support data quality and respondents' comfort with the survey questions.

However, the engagement of local organizations was equally as important as the engagement of an independent research organization. Concern's and JJS's local knowledge were crucial in facilitating researcher access and working with the district government to obtain the sample list. Concern, JJS, and the local enumerator also had access to local contacts who could provide introductions to potential respondents, likely resulting in a much higher and more rapid response rate than the HHI team could have achieved through cold recruitment calls and emails alone. Through their introductions, Concern and JJS were able to vouch for HHI's work to potential respondents, cultivating trust for the research team.

RESOURCES NEEDED

The resources needed to conduct a network analysis will depend on the scope of the study. For reference, this study required approximately 29 working days for 1 dedicated enumerator to complete 63 interviews, including travel and training time, 2-3 interviews per day, and time to arrange interviews. In addition to enumerator time, an estimated 20 days in HHI, Concern, and JJS support staff time was needed to arrange logistics, support data collection, and train and shadow the enumerator during the data collection phase. These numbers are provided

as estimates for reference, as a formal costing study was not conducted as part of this research. Data collection took approximately 6 weeks, with some delays due to holidays and bad weather. In addition to the 18 days required for data collection, the study also required part-time availability of a research manager at HHI and in-country partners to support study preparation, data analysis, and reporting for several months (as outlined in Annex 2).

For organizations used to conducting household surveys, the time needed and methodology used to conduct this study may be unfamiliar in a few ways. First, depending on the scope of the network analysis, participants may be distributed over a wide geographic area, requiring more travel time between surveys than a usual household survey. Second, availability is often much more variable for organizations than for households. Scheduling times to meet with participating organizations took a significant amount of research team time, as respondents were often project or organization leads with frequent travel and busy schedules. Combined, these factors resulted in many fewer interviews conducted per day compared to a traditional household survey. The research team found that scheduling no more than 3 interviews per enumerator per day was appropriate to allow for up to 1.5 hours per interview (accounting for time needed to be formally introduced to and to brief organization leadership, as well as accounting for the possibility that an interview may go longer than the usual 30 minutes), travel time between interviews, and time to finalize the schedule for the following day's interviews.

In addition to staff time and expertise for study preparation and data collection, expertise in analyzing network data is also needed. Network analyses are relatively uncommon in the development field, so it is unlikely that organizations will have researchers with this background on staff. If that is the case, resources will also be needed to contract an outside organization such as Root Change that has this expertise.

LIMITATIONS

Network structures and relationships captured in a network analysis are dynamic (7). The activities actors conduct will change rapidly due to funding cycles, changes in community needs, etc. As such, the network identified through a study like this will change over time as actors enter and exit the space, and as new relationships form and previous relationships fade. While a network analysis can be helpful in informing ongoing or upcoming programs, its results should only be used to understand the landscape of actors at the time the study was conducted. When this study was conducted, no major disasters had occurred in the last 6 months, limiting the number of organizations that were working in this space, and presenting a network that may be different from the district's network during an emergency response period.

Another potential limitation of this methodology is that researchers may not be able to identify all actors working in the study area. Some local organizations may not be registered with the government or may not be identified by survey respondents. It is important to include a variety of actors from the onset to avoid capturing only one network where any may co-exist but not collaborate. The risk of leaving out some actors from the researchers' recruitment lists must be acknowledged and addressed actively during data selection. Leaving out informal organizations with fewer collaborations, or only identifying organizations with more active collaborations, may make networks appear more connected than they are in reality. These limitations are all important to try to mitigate in study design and to consider when interpreting study results.

POTENTIAL ALTERNATIVES

A network analysis approach is useful to take bird's eye view of a network. An impartial, research-driven approach can support implementers to identify patterns in coordination and collaboration that aren't readily apparent from their own vantage point as an actor within the network. However, a network analysis can take time and resources that may not always be available. If funding or outside collaborations are not available to support a formal network analysis, other stakeholder analysis exercises can be used, such as key informant interviews with a variety of actors in a program area or traditional stakeholder analysis workshops (12). While

traditional stakeholder analyses focus on understanding the potential power and interest of organizations with respect to a particular issue, similar methods can be used to gather information to gauge key stakeholders' perceptions on coordination patterns and trust (12). While these methods may not provide exactly the same type of information regarding network structure, actors, interactions, and governance that a network analysis could provide, expertise to conduct these activities may be more readily available within organizations and these activities could work to reveal insights that can inform efforts to strengthen network coordination and capacity overall.

DISCUSSION POINTS/LEARNING TAKE AWAYS

- Do you think that conducting a network analysis like this would be useful in your context?
- Thinking about your ongoing program(s), what questions do you have that could be supported by research?
- Can you think of any academic/NGO collaborations that could be useful to inform your work?

ANNEX 1. MISSION STATEMENTS OF THE PARTNER ORGANIZATIONS

MISSION STATEMENT: CONCERN WORLDWIDE

- Our mission is to permanently transform the lives of people living in extreme poverty, tackling its root causes and building resilience.
- When an emergency strikes, we are among the first on the ground – mobilizing expert teams in just 24 hours. From hurricanes in Haiti to famine in South Sudan, we go to the ends of the earth to reach the most vulnerable.
- For the voiceless, we use our voice to bring the human stories of extreme poverty to the tables of world leaders.
- Our mission doesn't stop until extreme poverty does. (13)

MISSION STATEMENT: HARVARD HUMANITARIAN INITIATIVE (HHI)

The mission of the Harvard Humanitarian Initiative (HHI) is to conduct research and education on the practice of relieving human suffering in war and disaster by advancing the science and practice of humanitarian response worldwide. HHI's aim is to relieve human suffering in war and disaster by conducting interdisciplinary, practice-based research and education that can be used by scholars, policymakers, NGOs, and others to foster interdisciplinary collaboration in order to:

- Improve the effectiveness of humanitarian strategies for relief, protection, and prevention;
- Instill human rights principles and practices in these strategies; and
- Educate and train the next generation of humanitarian leaders. (14)

MISSION STATEMENT: JAGRATA JUBA SHANGHA (JJS)

- To build and strengthen resilience of vulnerable communities through disaster risk reduction, climate change adaptation, mitigation, and humanitarian response.
- To ensure resource equity and sustainability through empowerment of the people in a way so that access to information and resources are shared fairly while safeguarding the interest of all living species considering the earth's finite resources and responsive governance.
- To eliminate poverty through promoting resilient livelihoods, creating market opportunity, ensuring value chain development, environment-friendly income generation and optimum use of resources.
- To eliminate social discrimination, inequality, injustice and violence against women and children through quality education, protection and development of children, mobilization, appropriate partnership and strategic alliances with multidimensional actors. (2)

ANNEX 2. RESEARCH IMPLEMENTATION PLAN

Below is a sample research implementation plan for the network analysis. This plan assumes part-time availability of a research manager and in-country partners to support study preparation in addition to other duties, as well as full time availability of an enumerator during the data collection period. The plan assumes 10-12 surveys/week per enumerator, accounting for far distances between interview sites, variable participant availability, and delays due to bad weather and/or holidays.

Activity	Months									
	01	02	03	04	05	06	07	08	09	10
Study Preparation										
Determine study scope and objectives	■									
Draft study protocol, questionnaire, and research plan	■									
Questionnaire revised and translated with in-country partners	■									
IRB and CAB approval		■								
Sample list obtained from district government		■								
Questionnaire programmed into Kobo Toolbox		■								
Local enumerators hired			■							
Data Collection										
Training of enumerator(s)			■							
Survey piloted and revised			■							
Recruitment of participants			■	■	■					
Surveys administered (10-12 surveys/week for 6-8 weeks)				■	■					
Data Analysis and Reporting										
Data cleaned						■				
Data analyzed						■	■			
Data validation workshop								■		
Report/publication written								■	■	
Data dissemination to relevant stakeholders										■

ANNEX 3. KEY STUDY RESULTS

The following is a summary of findings, remaining questions, and potential recommendations from the network analysis.

LOCALIZATION

- Overall, local actors (both district and national) were found to play a prominent role in the network. District and national actors held influential positions in the key actor analysis. Furthermore, international actors had high cross-collaboration with local actors and were well connected to local actors.
- While international actors only made up 22% of the network, when they were removed, we saw a loss of 51% of relationships, and the creation of 13 local actor isolates.
- Collaboration could be increased between local actors to support greater resilience in the event that influential international actors withdraw from the area. This collaboration could potentially be fostered through multi-stakeholder platforms, such as social labs or collective impact strategies, that bring together diverse local actors to work towards a common agenda on issues related to climate change and disaster resilience. These platforms help emphasize mutual accountability and co-creation between local actors and groups and can help to support local system self-reliance.

NETWORK OF PEERS AND COLLEAGUES

- The actors working on climate adaptation and disaster resilience in Bagerhat district represent a network of peers and colleagues, made up primarily of district and national level organizations. The majority of local actors have more than a decade of experience working with each other, they interact frequently, and have fairly high levels of trust.
- Formal partnerships and mutual interests also define the majority of relationships. This is evident both in how they have described their relationships and in the network structure.

LIMITED MUTUALITY

- Reciprocal, or bi-directional, ties remain quite low, representing only 7.5% of relationships in the full network, and only 2.4% of relationships between local actors. With actors' long history of engagement and formal partnerships, we would expect to see a higher rate of reciprocity as a sign of mutual collaboration.
- Further research is needed to determine why collaboration is predominately unidirectional and if there are opportunities for local actors to co-collaborate and jointly develop or test solutions.

LIMITED ENGAGEMENT WITH CBOS

- There is low presence and engagement with academic institutions, community-based organizations (CBOs), the media, and the private sector, representing untapped potential resources and knowledge to improve climate change and disaster resilience in Bagerhat district.
- Engagement with and between CBOs is a key area that could be strengthened. Half of the isolates in the network (50%) were CBOs, and this group had no relationships with one another.

LIMITED COLLABORATION AMONG GOVERNMENT

- Government was the main actor type working in this system, accounting for the highest percentage of actors at 30%. Government was in 730 total relationships in the network (55.6% of all relationships) and also had the highest cross-collaboration with other types of actors. However, government actors were found to have very little collaboration with each other—out of 24 government actors, only 10 relationships were found between them. Therefore, government actors are very present in the network, but they are not collaborating much with one another.

- Given the focus area of this network on climate change adaptation and disaster resilience, we might expect there to be greater collaboration and exchange of information and learning between government departments. This may be an area that warrants further investigation to understanding the relationship between government agencies and how collaboration could be strengthened.

DOMINANCE OF FEW KEY ACTORS

- Across the multiple collaboration areas, four key actors were consistently found to be the top collaboration hubs in the network, having the most relationships: 2 mid-sized local NGOs, a mid-sized international NGO, and a large international organization.
- Their position of influence makes them good candidates to act as brokers and help to connect others in the system. Further research is needed to determine if they are playing brokering roles. Their central position in the network also makes them potential bottlenecks for the flow of information and ideas within the network.
- Engaging with these actors on their role in the system and sharing the findings of this work to determine if there are actions they are taking or could take in the future to elevate other local actors who are providing expertise, resources, and support.

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