NON-PROFIT ORGANIZATIONS AND CLIMATE CHANGE KNOWLEDGE MANAGEMENT IN INTERNATIONAL DEVELOPMENT: A STUDY OF THE HI-AWARE PROJECT

FOWZIA GULSHANA RASHID LOPA
Master of Science, Asian Institute of Technology, 2011

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University of Lethbridge
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FOWZIA GULSHANA RASHID LOPA

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Dr. D. Johnson Thesis Supervisor	Professor	Ph.D.
Dr. J. Byrne Thesis Examination Committee Member	Professor	Ph.D.
Dr. J. Asselin Thesis Examination Committee Member	Associate Professor	Ph.D.
Dr. L. Many Guns Thesis Examination Committee Member	Professor	Ph.D.
Dr. K. Peacock Internal External Examiner Philosophy Faculty of Arts & Science	Professor	Ph.D.
Dr. D. McCaskill External Examiner Trent University Ontario, Canada	Professor	Ph.D.
Dr. H. Jiskoot Chair, Thesis Examination Committee	Associate Professor	Ph.D.

DEDICATION

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ABSTRACT

This research described the operation of the collaborative education and risk reduction programs undertaken to reduce harm resulting from climate change and flooding in Bangladesh, including transferring knowledge into projects and programs for the beneficiaries and assessing effectiveness. It observed the operation and outcomes of an international collaborative research project on climate adaptation, HI-AWARE, where a Bangladeshi Civil Society Organization (CSO) partnered with a Canadian development organization and other southern organizations. The research included on-site observations, interviews with Bangladeshi CSO and Canadian development organization officials, and Focus Group Discussions with beneficiaries at sites. The findings showed that the HI-AWARE project successfully built coordination among partners tackling issues like budget equity, collaborative research activities, and fund transfers. It demonstrated the value of flood-resilient houses as an adaptation option. The beneficiaries clearly indicated improved living in the flood-resilient houses; however, such houses would need further monetary and technical assistance to remain effective.

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LISTS OF ABBREVIATIONS

ADB	Asian Development Bank
BCAS	Bangladesh Centre for Advanced Studies
BDP	Bangladesh Disaster Management Policy Delta Plan 2100
BFRI	Bangladesh Forest Research Institute
BAP	Bali Action Plan
BWDB	Bangladesh Water Development Board
BCCSAP	Bangladesh Climate Change Policy and Strategic Action Plan
BCCTF	Bangladesh Climate Change Trust Fund Act
CSOs	Civil Society Organizations
CFR	Climate and Flood Resilient
CARIAA	Collaborative Adaptation Research Initiatives in Africa and Asia
C4RE	Centre for Rediscovered and Redefined Natural Resources Research and Education Service Ltd.
COHA	Coordination of Humanitarian Affairs
CMIP5	Coupled Model Inter-comparison Project Phase 5
RCMs	Computing Regional Climate Models
GCMs	Computing Global Climate Models
EME	Expertise, Measures, and Environment
FGDs	Focus Group Discussions
FAD	Flood Action Plan
FCDO	Foreign, Commonwealth, and Development Office
GBM	Ganges, Brahmaputra, and Meghna
GOs	Governmental Organizations
HKH	Hindu Kush Himalaya
HSRC	Human Subject Research Committee
HI-AWARE	Himalayan Adaptation, Water and Resilience Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods
IPCC	International Panel on Climate Change
IDRC	International Development Research Centre
KFPE	Commission for Research Partnership with Developing Countries
NGOs	Non-Government Organizations
NEMAP	National Environment Management Action Plan
NAPA	National Adaptation Program of Action
NPOs	Non-Profit Organizations
NCCARF	National Climate Change Adaptation Research Facility
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Program
UNDRR	United Nations Office for Disaster Risk
QDA	Qualitative Data Analysis
RCPs	Representative Concentration Pathways
RCMs	Regional Climate Models
ToC	Table of Contents

CHAPTER ONE: BACKGROUND OF THE STUDY

1.1 INTRODUCTION

The climate change crisis identified in the International Panel on Climate Change (IPCC) reports in the mid-1990s is well-known. As the growth of fossil fuel emissions increases, climate risk increases, and vulnerable regions have had to pivot to adaptation strategies to reduce the impact of climate disasters (IPCC, 2001, 2014a, 2014b). These adaptation strategies draw attention to the most vulnerable regions, particularly developing countries, where people face risks from the increased frequency of floods, droughts, and other disasters like landslides. Those areas suffer from the potential loss of human life, food and drinking water scarcity, property loss, damage to household dwellings, and lack of livelihood opportunities (Leary et al., 2008).

Regular updates of IPCC assessment reports on adaptation clarified current science and policy over periods (Second Assessment, 1995; Third Assessment Report, 2001; Fourth Assessment Report, 2007; Fifth Assessment Report, 2014; Sixth Assessment Report, 2021).

Ireland (2011, 2012) found a link between adaptation and development and explored how adaptation works against climate distress. The United Nations (UN) also focused on several adaptation strategies that showed how they contributed to reducing climate vulnerability and ensuring adaptation development. For example, the UN researched marginalized communities in India's Himalayan region and focused on several adaptation strategies for water resources, such as spring rejuvenation, rainwater harvesting, drip irrigation, and sprinklers (United Nations, 2022). It also brought attention to adaptation in human settlements by constructing climate-resilient houses against flood hazards (United Nations, 2022).

The topic of adaptation remains a subject of debate and proposed action. For example, the main agreement to result from the COP27 meeting (Conference of the Parties of the UNFCCC,

United Nations Climate Change Conference, November 2022, Egypt) was the creation of a loss and damage fund for countries damaged by climate damage, such as the flooding in Bangladesh and Pakistan, sea level problems that are more extreme for certain nations, or more severe drought in places such as Africa (Future Earth, The Earth League, WCRP, 2022).

However, Ireland (2010) and Mercer (2010) observed that several theorists found adaptation strategies as a repackaging of current development approaches. For example, Burton et al. (1998) argued that there is a linkage between adaptation strategies and disaster risk reduction strategies since adaptation focuses on reducing the vulnerability of climate risks, such as floods and droughts. Thomalla et al. (2006) and Paavola (2008) found an interaction between adaptation and poverty alleviation strategies. When climate change adaptation brought conflicts, making the linkage between adaptation and development strategies of disaster risk and poverty reduction, Du Toit (2004), McKinnon (2007), and Pieterse (2010) found that understanding the development approaches, whether it is an adaptation, disaster risk reduction, or poverty alleviation, such approaches depend on how the development actors or practitioner use the development approaches. Moreover, their studies showed that understanding the development project's success and failure depends on how development organizations apply development approaches.

With the challenges of climate change only expected to grow, bilateral and multilateral bodies, non-profit organizations, including Non-Government Organizations (NGOs) and Civil Society Organizations (CSOs), are collaborating to work on the 'frontline' of development and implementation. They began to focus on adapting their projects labeled as climate change adaptation projects to address climate exposure (Ireland, 2012). One of the studies by Ireland (2012) investigated how development organizations involving NGOs from different nationalities, such as African nationals and those in Nepal and Bangladesh in South Asia, utilized climate

change adaptation discourses to implement climate adaptation projects. The findings by Ireland (2012) showed that development organizations conceptualized climate change adaptation projects in two different ways. First, some development organizations used climate change adaptation discourses to gather funding for their projects, even if such projects could not relate to adaptation. Aid donors approached development organizations to fit their projects into a climate change adaptation theme. Though the development organizations did not understand adaptation projects, they tried reprioritizing them and renamed climate change adaptation projects to secure project funds (Ireland, 2012).

Ireland (2012) also argued that many development organizations failed to secure funding because their projects needed to relate to the climate change adaptation theme. Although climate change adaptation discourses became an opportunity to get funding from donors through changing the language, such adaptation development projects might lose the value of climate adaptation. Moreover, such projects would repeat top-down practices in development instead of showing a change (Djankov et al., 2008; Glennie, 2008; Hubbard & Duggan, 2009).

Second, Ireland (2012) found that other development organizations utilized climate change adaptation discourses as a mechanism for a broader change in the development sector, focusing on identifying the need for adaptation development and facilitation. This group posited a climate change adaptation project as a particular type of development in which the participation of all development actors and stakeholders under the project is essential; moreover, this group explored climate change adaptation projects doing things differently. For example, this could involve helping people participate in addressing underlining drivers of vulnerability for adapting to climate change.

Ireland's (2012) study investigated the differences between climate change adaptation projects and existing development projects. It focused on the fact that such an adaptation project

was an opportunity to develop collaboration and participation. Moreover, a climate change adaptation project intends to produce actionable information focusing on delivering efficient information immediately to deal with the situation at hand through collaborating with development actors, such as project partners, and other stakeholders, such as local level communities, which is vital. Actionable adaptation information requires altering, explaining, understanding, and combining with other information, to finalize the adaptation information (Feldman & Ingram, 2009; Dilling & Lemos, 2011; Preston, 2013; Klein & Juhola, 2014; de Bremond et al., 2014; Preston et al., 2015; Meerow & Stults, 2016). A collaborative decision-making process facilitates altering by exchanging and integrating participants' views to generate actionable knowledge. In this process, developing interactions among partners and communities is essential because interaction among participants allows the coordination of several determinants, ideologies, and efforts of participants to produce knowledge in an iterative way (Liu et al., 2007; Lemos et al., 2012; Bierbaum et al., 2013; de Bremond et al., 2014). Such iterative inputs from participants clarify the actual need and help to determine the effective development strategies for ensuring sustainable development (Cash et al., 2003; Barnett & O'Neill, 2010; Dilling & Lemos, 2011; Lemos et al., 2012; Bierbaum et al., 2013; de Bremond et al., 2014; Magnan & Ribera, 2016).

Climate change adaptation emphasizes iterative inputs, continuously polishing the inputs until the participants reach satisfied results to produce actionable information through collaboration. However ideally, such collaboration efforts are sound for developing adaptation knowledge, but the project partners need help to practice this approach in the field (Lesnikowski et al., 2011, 2013; Mimura et al., 2014; Woodruff & Stults, 2016). For example, Ireland (2012) found that local-level non-government organizations lacked a climate change adaptation discourse in project planning, and consequently, the donors withdrew funding. In this case,

Ireland saw the particular climate change adaptation agenda imposed by the donors as a burden to the local-level organizations and communities facing climate change risks. He raised several questions regarding the project planning and design, funding and budgeting, and implementation processes. These activities need to involve vulnerable communities. They must also consider the benefit of project(s) and the measurement of a successful climate change adaptation project (Ireland, 2012, p. 107).

The climate change adaptation project focuses on transboundary issues collaborating with more than two partners from several countries. Such transboundary collaborations between multi-partners open up sources of mutual learning for innovative research and action (Leydesdorff & Wagner, 2009). It is because such transboundary research collaborations provide the opportunity for partners to go further than conventional boundaries, crossing national, social, or cultural limits and sharing their expertise from different disciplines and experiences (Bradley, 2008; Commission for Research Partnership with Developing Countries (KFPE), 2012; Carbonnier & Kontinen, 2015; Maringe & de Wit, 2016; Kotze & Dymitrow, 2021, p.2). Academic experts have recognized transboundary research collaborations as more appropriate for climate change issues (Gaillard, 1994; Castilla, 1997; Jentsch, 2004). For example, Castilla (1997) said transboundary collaboration research would provide scope to work on efficiency and effectiveness through sharing responsibilities, synergizing ideologies, and mobilizing responsiveness to tackle problems such as poverty. Kotze & Dymitrow (2021) mentioned that transboundary research collaborations became the backbone of international development. Several research institutions, either governmental or non-governmental, or universities from developed and developing countries, are doing research jointly, exchanging staff and students for training and enhancing network activities. They also publish together and involve themselves in policy advocacy (Kotze & Dymitrow, 2021).

Furthermore, Dodson (2017) elaborated on the purpose of such contemporary transboundary research collaborations between developed and developing countries as two-way benefits. One is that research collaborations help the Global South recognize and understand problems and determine solutions sustainably. Such collaborations also build the capacities of southern stakeholders in the local context. Second, this North-South collaboration benefits the developed countries to participate in knowledge management and perceive new ideas.

However, although transboundary research collaborations are sound theoretically, some critics around the implementation of transboundary research collaborations raise several questions. For example, Schmidt & Pröpper (2017) questioned the operation process of collaborative knowledge management in the real world. Bleck et al. (2018) questioned the power distribution and its effect on the result of transboundary research collaborations. They also question how different organizational structures, diverse organizational behaviors, and implementing limitations and barriers influence equity within multi-organizational collaborations. The recent Kotze & Dymitrow (2021) study evaluated the North-South research collaborations to address global issues. The findings from their study show that international development practitioners are widely using the transboundary research collaborations approach to address international development issues. They concluded that though advanced funding models focus on establishing equity among multi-partners under transboundary collaborations, there are failures that do not arise from administrative or institutional structures.

Kotze & Dymitrow (2021) elaborated that the failures came from the individual partners involved with transboundary research collaborations. They claimed that such collaborations enhance the inequalities among partners based on cultural differences, political influences, knowledge capacity, or past conflicts. Moreover, it creates new forms of inequality among institutional or organizational southern partners, who better maneuver transboundary research

collaborations for their gains. Kotze & Dymitrow (2021) recommended more efforts to establish the norm of practices, ethical rules, and a code of conduct at the time of implementing research collaborations and concluded that such collaborations require assessment regarding objectives of ensuring participation in the process—focusing on the detailed work of how different partners organize the transboundary research collaborations, how they facilitate the activities and how they interact within themselves under such collaboration practices.

Some research focused on directly examining the circumstances and activities of collaborative knowledge production (Miller et al., 2018). Very few research activities or works of research covered the challenges the partners or stakeholders face to stay in the collaborative knowledge management process (Ernst et al., 2019)—this doctoral research plans to fill that gap. This doctoral research is to study the '*Himalayan Adaptation, Water and Resilience Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods (HI-AWARE)'* project. The HI-AWARE project partners came together from four South Asian countries: Bangladesh, India, Nepal, and Pakistan. They collaborated within themselves, involved a western organization as a consultant, and conducted the HI-AWARE action research jointly with the financial support of Canada's International Development Research Centre (IDRC).

The international HI-AWARE collaborative research project is important to study because this partnership project provides the scope to observe the project's knowledge management process. More particularly, the HI-AWARE project allows us to evaluate the form of partnerships, interactions among partners, and the nature of community involvement suggested in the collaborative decision-making process for generating adaptation knowledge. It also provides an opportunity to identify the challenges faced by the partners and how, in some cases, they overcame those constraints to make the project successful.

The field of study for this Doctoral research considers the Bangladeshi partner, Bangladesh Centre for Advanced Studies (BCAS), a CSO, and it includes the International Development Research Centre, Canada (IDRC) to help understand knowledge transfer and management in the HI-AWARE project. More particularly, at the core of this doctoral research is an analysis of how knowledge, practices, and the beliefs of Southern CSOs, such as BCAS, work to improve livelihoods and encourage adaptation practices that offset climate vulnerability, with the support of Northern international development organizations, such as the IDRC.

1.2 RESEARCH QUESTION

The questions central to this research are:

1. How did the BCAS form collaborative partnerships with other project partners, and how did they interact among themselves and the donor, IDRC, to acquire adaptation knowledge in the HI-AWARE international collaborative research project on climate change adaptation?
2. How was this knowledge translated into programs under the HI-AWARE project, and did it appear to be effective from the perspectives of the beneficiaries and participants?

1.3 OBJECTIVES

Following the research questions, the specific objectives are:

1. The determinants of, and processes through which, the HI-AWARE project partner in Bangladesh, BCAS, acquires knowledge on climate change adaptation and the challenge(s) faced in doing so.
2. The evaluation of the performance of the locally transferred knowledge on climate change adaptation in Bangladesh.

The first objective focuses on the HI-AWARE project's collaborative decision-making process for managing climate change adaptation knowledge and identifying what forms of

collaborative partnership, steps, or activities followed in decision-making processes. It also investigates the challenges BCAS faced during its participation in the project activities. Furthermore, it observes the initiatives taken to tackle those challenges.

The second objective focuses on converting that knowledge to fit the program considering local conditions and practices; moreover, it evaluates the knowledge flows to see the changes in beliefs, culture, and economic issues that affect climate-resilient development interventions through a pilot program targeted at household development strategies.

Altogether, this Doctoral research aims to understand the determinants, processes, and outcomes of such a collaborative research project on adaptation knowledge. This study analyzes how the partner organization, BCAS, interacts with donors, state, and other partners and how it ensures that internal organizational objectives (such as the need to survive and grow) maintain the core development objectives. A focus here is on understanding how being part of a significant movement on climate change—with its own internal goals, objectives, and targets—affects how programming decisions represent local decisions. Besides, there is also a concern about understanding the role of the donor, the IDRC, in a collaborative partnership, focusing on collaboration techniques, budget preparation, funding operation, and monitoring.

1.4 CONTEXT

1.4.1 OVERVIEW OF GLOBAL NEOLIBERALISM, NON-PROFIT ORGANIZATIONS, DEVELOPMENT, AND ADAPTATION

Lewis & Mosse (2006) described global neoliberalism that shaped the institutional changes in the global governance system toward economic growth and development. Such neoliberal policies encourage free-market capitalism by transferring economic power to the non-government sectors from the government sector, reducing government control over laws, offering open markets and businesses, and decentralizing developmental activities through privatization.

However, the reality of neoliberalism's effect is far from the ideology's expectation. In the 1980s and 90s, neoliberal policies and their governance patterns increased global inequality. The free-market capitalist growth in many states increased instability, insecurity, and vulnerability, despite reforming the old policies and new approaches to institutional economics and post-development perspectives. When social scientists in the 1990s participated in various critical debates on the nature of development, the 'globalization' of development emerged. Globalization focused on institutional development, harmonizing several policies around institutions and moving to maintain a multi-level governance system (Lewis & Mosse, 2006, p.2). At that time, the terms 'governmentality,' 'good governance,' and 'stakeholder participation' developed the theoretical base for enhancing multi-level governance practices. These terminologies highlighted the integration of different actors, networks, informal institutions, and communities for reducing inequalities and sustainable development (IPCC, 2018). Moreover, multi-level governance worked to " bring the state back in" to ensure that the state creates a more consistent policy framework involving all levels of governing actors and community people (Lewis & Opoku-Mensah, 2006, p.667).

At the same time, non-profit organizations drew attention to foreign donors for their voluntary work in humanitarian, social, and environmental sectors. Academic experts in economics and political science praised the work of non-profit organizations to reduce poverty. Moreover, involving local people in the project activities, ensuring local people's active participation in generating knowledge, and disseminating that local knowledge incorporating science makes the non-profit organizations efficient in facilitating people-centered development. (Leve & Karim, 2001). Leve & Karim (2001) also praised non-profit organizations as the magic bullet that can work in any situation. Because of the working attitude of non-profit organizations in the development field, international multilateral and bilateral agencies and donor states moved

to provide direct aid to them, reducing the financial aid to governments and private sector actors. Since then, non-profit organizations have exploded in number and size with the available international funds and have expanded their development activities, particularly in rural agricultural development, early education programs, plantation, forestry development, microcredit programs, and other awareness-raising activities, such as voter skills, and monitoring peoples' fundamental needs and services that governments rarely provided (Leve & Karim, 2001, p. 53).

Lewis & Opoku-Mensah (2006) discussed the criticism of non-profit organizations. They mentioned a common complaint that non-profit organizations, the NGOs/CSOs, are too corporate and professional. Newsweek (2019) presented NGOs/CSOs as big business operators who spend trillions on their actions, bringing tension to the relationship with less-funded governments. This negative image of non-profit organizations diverted international donors' attention to governments.

However, some research on organizational behavior showed that it is essential to understand how non-profit organizations operate within the donor policies and practices that ultimately relate to their organizational performance. For example, Leve & Karim (2001) emphasized observing the relationship and interconnection between non-profit organizations, government, international funds, and development through ethnographic studies apart from accepting that non-profit organizations do work for the welfare of poor people against global capitalism. Moreover, such ethnographic case studies display the realities and potentials of non-profit organizations to ensure development (Leve & Karim, 2001. p.55).

Non-profit organizations drew attention again to global governance with the current environmental policies on climate change. Global governance introduced the importance of the role of non-profit organizations under international environmental treaties and conventions, such

as Agenda 21 in 1992 in Rio de Janeiro, Brazil, and the creation of the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement in 2015. These global environmental treaties reframed the institutional framework by identifying the different modes of cross-stakeholder interaction in preparing climate policy and implementation. The cross-stakeholder communication involved non-profit organizations as crucial players along with other non-state actors, multinational corporations, and small enterprises (IPCC, 2018). For example, Agenda 21 emphasized the engagement of non-state actors, including CSOs/NGOs, in decision-making. Subsequently, the UNFCCC, Kyoto Protocol, and Bali Action Plan elaborated more on the role of CSOs/ NGOs than as observers; moreover, such environmental agreements documents highlighted their contribution as technical resources to prepare the policy documents.

IPCC (2018) mentioned that the adaptation sector's global governance pattern differs from mitigation. The adaptation process needs the involvement of multi-stakeholders. Signing international agreements makes the national governments obliged to follow the rules and plans of those agreements. The national government should establish the process of inviting local government officials, non-government bodies (particularly CSOs), academic researchers, and even the local community. The adaptation process should focus on bilateral and multilateral cooperation as sometimes adaptation needs transboundary collaboration to address climate vulnerability.

For example, the Asian Development Bank (ADB) promoted ADB-State-CSOs cooperation to work on strategic programs that included climate resiliency, poverty alleviation, and sustainable development. This program involved local citizens, minority groups, and CSOs in the adaptation process and asked for their input to develop project plans (IPCC, 2018). The Paris Agreement also focused on cooperation to make a success of climate action. It emphasized the involvement of CSOs, among other non-state actors, in climate action (IPCC, 2018).

The above discussion makes clear that global neoliberalism encourages economic liberalization policies that increase the involvement of the non-state sectors in the economy and societal development. However, several critics highlight that neoliberal policies focus on economic development apart from ensuring equity in the case of providing public services and environments. Globalization focuses on more participation or building cooperation among all levels of organizations and people. Besides state reform, CSOs have drawn attention to facilitating development activities voluntarily or providing services as implementing agencies through a public-private partnership. As CSOs have already involved themselves in filling the gaps in public services such as health, education, and other humanitarian activities, which reduced government spending, international donors/organizations favored them as leading actors in further international development activities. The opposing groups criticize non-profit organizations as donor-driven actors, "too much of a good thing," or "too much corporate and professional." However, it is difficult to deny the growth of non-profit organizations on a large scale and their role in facilitating development in economics, social services, and the environmental sector. Several international treaties and policies helped non-profit organizations to flourish as development partners, but the recent environmental agreements on climate change enhanced their role and ability to work in the field of climate change and environmental management to bring change in the development sector. Moreover, international treaties and strategies encourage CSOs/NGOs to learn about climate change adaptation through local participation, share information, and transfer knowledge to partner organizations.

1.4.2 OVERVIEW OF GLOBAL GOVERNANCE, CSOS, AND CHALLENGES TO CLIMATE ADAPTATION

Although several international environmental treaties and conventions around global governance reveal opportunities for building a partnership, association, or cooperation with

different levels of stakeholders to facilitate adaptation work, several challenges need to be addressed in working with various stakeholders. These challenges are:

First, multi-level stakeholders may have different priorities, preferences, or opinions regarding climate change. They may need more knowledge and careful consideration of the predictability of climate risk and its vulnerability. Lack of knowledge and understanding of the participants may increase conflicts that blur the meaning of collaborative participation in decision-making. IPCC (2018) drew some examples of the need to handle the decision-making process carefully. It highlighted that people might have a misconception or lack of knowledge about embodied energy, putting more stress on savings from low-energy activities than high-energy ones. People may combine climate risk with other natural calamities that hinder the compelling adaptation need for a particular one (IPCC, 2018, p. 364).

Second, a power imbalance may exist between the participants from the public and private sectors. For example, the partnership between state and non-state sometimes needs to be more effective as some countries control non-state organizations. Government organizations keep private organizations in decision-making as they have agreements with international treaties. However, governments are reluctant to see them as partners (Lewis & Opoku-Mensah, 2006). This situation rarely allows non-governments to talk openly to ensure active participation in decision-making.

Third, local people may not accept new technology for adaptation. Though multi-level stakeholder participation in decision-making encourages local people to be involved in the field, they may be unwilling to adapt to new technology they did not see before or would need more knowledge. Policymakers also sometimes demonstrate actions despite observing the disinterest of local people in new knowledge (IPCC, 2018. p 365).

Fourth, local people pay less attention to continuing adaptation practices after adopting new interventions. International adaptation projects tend to hand over the responsibility to the beneficiaries after completing projects, but local people relying on donor funds are less active in continuing the practice further. For example, some assume that God will protect them from disasters, or some lack personal motivation to continue with the new perception or information. Also, some interventions are not cost-effective (IPCC, 2018. p.365).

Despite multiple challenges in the adaptation process, the global governance development policies reveal the scope of work for climate change knowledge management and provide an opportunity to enhance institutional capacity through multi-level partnerships. Moreover, the framework of public-private partnerships, joint venture work, or collaborative research work influences policymakers to keep CSOs/NGOs in the decision-making process and work together to determine goals, actions, and strategies to cope with constraints. In this case, the process of the international joint venture or collaborative research work provides credible, tailored, and targeted information regarding climate change strategies and builds the institutional capacity of the parent and partner organizations through learning together.

The international joint venture or research collaboration allows knowledge creation and transfers in two ways. First, the formation of joint ventures and interactions between individuals from two or more partners; second, the transfer of knowledge from joint ventures to the partners. Knowledge management is a continuous process. The parent organization provides technical support to the partners' organizations. The partner organizations transfer or convert those technologies to create new knowledge in the local context through an experiment involving the local community. Other organizations then replicate that newly created knowledge for their development projects (Inkpen & Dinur, 1998). The international joint venture gives scope to demonstrate through experiments and discover the modified or alternative technologies that carry

cultural support. To support this, the Paris Agreement reflected on providing overarching guidance on developing an action plan for implementing new technologies along with the development vision (IPCC, 2018).

Working internationally through building partnerships or collaboration has already become the norm in global governance. However, building adaptability following 1.5^{o}C consistent strategies needs clear guidelines regarding the role and responsibilities of multi-level stakeholders for delivering the services (IPCC, 2018). The Paris Agreement focused on monitoring and timely reporting of project partners during project periods. However, post-development monitoring strategies are essential to see the ultimate adaptation outcomes in the local areas (IPCC, 2018). Recently, the 2022 COP27 agreement to create a loss and damage fund for less prosperous countries affected by climate damage further emphasized the need to work together (Future Earth, The Earth League, WCRP, 2022).

1.5 THE HI-AWARE PROJECT AND ITS PROJECT PARTNERS: BCAS AND IDRC

1.5.1 BCAS

Like other CSOs in Bangladesh, BCAS began poverty alleviation projects in 1971 (Kennedy, 1999; Quddus et al., 2009; Rahman, 2003; World Bank, 2005; Zohir, 2009) and soon realized that this must include sound environmental management to maximize productivity. The country experienced hugely destructive cyclones in 1991 and 1997 and suffered significant damage related to the flood of 1998 (Thomalla et al., 2005). BCAS, along with other CSOs, advocated Environmental Policy 1992, National Environment Management Action Plan (NEMAP) 1995, Flood Action Plan (FAP) 1995, and Bangladesh Climate Change Policy and Strategic Action Plan (BCCSAP) 2008. Furthermore, it conducted several programs regarding adaptation and mitigation to address climate vulnerability, such as those on plantation, solar energy, biogas plants, organic shrimp aquaculture, saline-tolerant rice seeds production, and

saline water treatment, when Cyclone Sidr and Aila, in 2007 and 2009 respectively, hit the coastal areas- the southern parts of Bangladesh (Lonnqvist et al., 2010). BCAS, with other Bangladeshi organizations, reached a stage where the Government of Bangladesh declared that, along with other CSOs, BCAS's experiences and capacity would expand into developing innovative approaches, including adaptation and mitigation strategies (BCCSAP, 2008). NGOs, government departments, private organizations, and UN organizations replicated BCAS's idea (BCAS, 2018). This situation indicates that BCAS does not limit its work within the country's boundary; it crosses the boundaries of sharing experiences and practices with other Southern and Northern counties. Consequently, the HI-AWARE project resulted from a collaborative partnership among the BCAS and other Southern partner organizations, in which the IDRC played a donor role.

1.5.2 IDRC

The IDRC, a Canadian Crown Corporation, aims to work on climate change research activities. It provides funds to Canadian organizations and organizations of developing countries through the Minister of International Development (IDRC, 2019). The IDRC follows a consortia model bringing researchers and practitioners together from different nationalities to share their experiences and develop new knowledge on climate change, particularly in the area of adaptation. It focuses on geographic locations and the commonalities of climate change risk and vulnerabilities to make consortia. The organizations in such consortia can be from different countries across the world. The researchers or practitioners of those organizations can be experts in various disciplines and sectors. Such consortia aim to ensure the interactive participation of those researchers/practitioners in collaborating action research to address climate vulnerability. Collaborative Adaptation Research Initiatives in Africa and Asia (CARIAA) research consortia are such collaborative research initiatives of the IDRC and the partner Foreign, Commonwealth,

and Development Office (FCDO) of the UK. CARIAA had four consortia that focused on particular climate hot spots. The HI-AWARE project emerged from one of the consortia under the CARIAA program that focused on the Hindu Kush Himalaya (HKH) climate hotspot region (IDRC, 2019).

1.5.3 THE HI-AWARE PROJECT

The HI-AWARE project addressed the flood vulnerability in the HKH region, containing transboundary territories that connect eight countries: Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan. The northern Rangpur division in Bangladesh, which included Gaibandha, Kurigram, Lalmonirhat, Nilphamari, and Rangpur districts, fell into the eastern HKH region (Wester et al., 2019). The typical river system from the Himalayas in this region is the Ganges, Brahmaputra, and Meghna (GBM), which connects Bangladesh with other countries, such as Bhutan, China, India, and Nepal (Rasul, 2015).

The GBM river basin frequently faces floods and droughts, and the weather condition of the GMB river basin is changing because of climate change. Climate change increases temperature, precipitation in the monsoon season, and the frequency of floods/droughts, significantly impacting the country's social economy. Also, the increased melting of the Himalayas ice causes short and long-duration surface runoff to employ more floods. These climatic changes bring water scarcity and security problems that severely impact the riverine communities' livelihood in agriculture and fisheries. Consequently, poor communities lack food security (Rasul, 2015, pp. 387–389).

The Teesta River, another river of the HKH region, flows through India's Sikkim and west Bangle and extends to the northern side of Bangladesh across the Rangpur division of this country. This river joins the Brahmaputra river preliminary, then expands to the Ganges and the Meghna River before flowing into the Bay of Bengal, located on the southern side of Bangladesh.

The Teesta crosses a long distance of 414 km with an average slope of about 1.7% of the total area. Because of that moderate slope pattern, The Teesta River basin frequently faces natural flash floods and riverbank erosion (Syed et al., 2017).

Around 30 million people live in The Teesta River basin, of which 71% live in northeastern Bangladesh. The Teesta River basin in Bangladesh part is rich in flat topography and low-land agricultural activities. People's livelihoods in this basin area depend heavily on agricultural work and fishing. However, there was a change in the socioeconomic condition of this area after the construction of the Teesta Barrage because such dam construction devasted a significant portion of farmland, causing floods (*ibid*).

A 30-year (1976-2005) precipitation analysis during monsoon and dry seasons in the Teesta basin, Bangladesh part showed a decline in monsoon precipitation (7.4mm/year) compared to the dry season precipitation (0.8mm/year). However, the data analysis of annual precipitation (1981–2010) and maximum and minimum temperatures showed that Bangladesh's Rangpur and Dinajpur stations had an increased trend of annual mean maximum and minimum temperatures. The minimum temperature of the Rangpur and Dinajpur stations had more rising trends than the maximum temperature. It indicated a decrease in the maximum and minimum temperature differences. This situation negatively impacts agriculture and other riverine livelihood activities (*ibid*).

The HI-AWARE technical report 2017 discussed the rationale of the HI-AWARE project. The HI-AWARE project emphasized the climate risk and the predicted vulnerability of the four river basins, including the Indus, Upper Ganga, Gandaki, and Teesta. It had 12 project sites to conduct action research, including pilot programs. For example, considering the Teesta basin, it discussed the extreme events, the risk, and the vulnerability. Furthermore, this report mentioned little knowledge regarding the vulnerability of more than 1.5 million people in The Teesta River

basin. There also needed to be more information about how many people would suffer during extreme events, what adaptation techniques the poor communities adopted, and how they adapted to survive, facing floods and droughts. This report also heightened that poor communities used to pick their adaptation techniques, but those needed to be more. The vulnerable people demanded planned adaptation that drew from local knowledge and science. Based on this requirement, the HI-AWARE project tried to work on planned adaptation through action research. The action research activities focused on identifying the critical moments of those project sites, adaptation turning points, and adaptation pathways.

1.6 OUTLINES OF CHAPTERS

Chapter Two reviews and discusses literature relevant to this project and research topic. Chapter Three describes the methodology. Chapter Four traces how the Bangladeshi partner, BCAS, collaborates with other southern partners and donors under the HI-AWARE project. Moreover, it identifies the nature of the partnership and describes the interaction among partners and other stakeholders to acquire adaptation knowledge. Chapter Five deliberates on the challenges in the collaborative relationship of the HI-AWARE project, focusing on the challenges the BCAS faced in conducting the HI-AWARE project and identifying initiatives to tackle challenges for staying together in such a partnership. Chapter Six presents observations on the impacts of the HI-AWARE project adaptation intervention (climate- and flood-resilient houses) on the local communities, drawing attention to the change before and after the implementation of the HI-AWARE project. It also includes the local people's opinions and their views of several challenges for the further expansion and development by local people of those houses. Lastly, Chapter Seven summarizes the findings in the thesis and conclusion.

CHAPTER TWO: METHODOLOGY

2.1 INTRODUCTION

Methodology, data acquisition, and analysis for this research protocol included:

- A study area selection process.
- Choice of the data collection method.
- Selection of participants to be interviewed and questioned.
- Choice of type of data to be collected, which would be appropriate for testing research hypotheses.
- Preparation of the question checklists.

The description below describes how I conducted the interviews and Focus Group Discussions (FGDs) and carried out data summary, presentation, and analysis. The project received human research ethics approval on February 13, 2019, from the University of Lethbridge Human Subject Research Committee (HSRC). The approval number is 2019-015.

The main goal of the research was to understand better climate change knowledge dissemination, circulation, and applications within international developmental organizations, particularly Non-Profit Organizations (NPOs). Additional objectives included the assessment of the attitudes, adoption, and opinions of program participants. I chose an international development research project focusing on collaborative partnerships between developed and developing countries. I intended to assess program activities and provide an understanding that could lead to improved climate change adaptation options.

2.2 RESEARCH PARTNER SELECTION

To meet these goals, I followed Hese-biber's (2017) "snowball" process, a typical sampling technique to select an international development project in which Canadian

international development organizations work with Bangladeshi NPOs in climate change. I studied several Canadian and Bangladeshi development organizational websites, developed my communication network through email, attached my research proposal and identity details, and scheduled video conferences with personnel of related organizations who might be eligible. In addition, I asked for referrals because one research contact can lead to another. Through this process, I finally selected the International Development and Research Centre (IDRC), a Canadian research organization that likewise agreed to work with me on obtaining the data for this research project. Restrictions related to worldwide Covid rules and policies were observed but overcome during the research with remote communications, where possible.

The IDRC operated a collaborative adaptation research project titled 'Himalayan Adaptation, Water and Resilience Research on Glacier and snowpack Dependent River Basins for Improving Livelihoods (HI-AWARE) with four southern organizations, including a Bangladeshi organization, an Indian organization, a Nepal organization, and a Pakistani organization (HI-AWARE, 2018). The partner organizations under this project had established a successful coordination among themselves through a partnership. They worked on improving the adaptive climate capacities of vulnerable people in the Indus, Ganges, and Brahmaputra River basins in the Hindu Kush Himalayan (HKH) region (HI-AWARE, 2018). The HI-AWARE action research project looked at temporary and long-period climate trends and adaptation systems, considering local and seasonal impacts and responses through collaborating with partner organizations, local beneficiaries, and other key stakeholders, such as academics, to improve climate change adaptation practices in the HKH region (HI-AWARE, 2018). Since my Doctoral research covers the collaboration scenario among partners in an international development project on adaptation and the way to create climate adaptation knowledge, I selected the HI-AWARE project as a study unit for conducting case study research.

I investigated the activities and outcomes of the Bangladesh component of the HI-AWARE project. For the Bangladesh component, I selected the Bangladeshi organization and a partner of the HI-AWARE project, Bangladesh Centre for Advanced Studies (BCAS), working as a civil society organization on environmental and climate change issues.

2.3 CHOICE OF METHOD

In this Doctoral research process, I followed the qualitative case study research approach of Yin's (2014) perspectives on a case study inquiry. A case study aims to go through every detail and deeply understand every step of the knowledge management process. Moreover, a case study helps us to examine the actors, groups, or organizations on several issues like, how they participate, what they do, how actors/organizations face challenges and tackle those, and the outputs and learnings. It provides opportunities to perceive the participants' behavior, professional attitude, and interaction to produce knowledge together over periods (Yin, 2014). Also, gaining detailed descriptions through a case study approach uses several research techniques, including direct observation by the researcher, participant interviews, and document collection and analyses (Woodside, 2010, pp. 6-7).

In my research project, the research question focused on how the BCAS, a Bangladeshi civil society organization, collaborated with the Canadian organization IDRC and other southern partners under the HI-AWARE project to develop knowledge and skills for climate change adaptation; how the BCAS transferred that knowledge into the pilot program, and how to measure the effectiveness of the program in a project site. To understand partnership techniques, I described and analyzed the knowledge management process of the HI-AWARE project, focusing on project budget, collaboration, and knowledge-sharing activities. Therefore, a case study approach was suitable for such descriptive research.

2.4 METHODS OF DATA COLLECTION

Interviews and Focus Group Discussions (FGDs) were the data collection methods. I followed Stake's (2000) perspectives to create a detailed description of collaborative knowledge management of the HI-AWARE project from the viewpoints of project personnel, participants, and housing improvement beneficiaries through FGDs to understand their perspectives. After gaining participant consent, I recorded participants' observations and opinions during interview sessions and FGDs. Stake (2000) explains the importance of describing the physical environments during interviews, FGDs, or observations, to give readers a sense of 'being there,' for example, a description of households- their access points, houses, courtyards, landscaping, location map, and surroundings. To this end, I used the techniques of field note-taking, audio recording, and video recording to keep a record of the physical environments of project sites, participants' interviews, and FGDs, as evidence for further data analysis.

2.5 SELECTION OF PARTICIPANTS

I conducted six interviews with key HI-AWARE project staff and held two FGDs involving 45 local participants at two project sites of the HI-AWARE project in Bangladesh (see table 1). Since my research focused on the Bangladesh part of the HI-AWARE project, I also conducted interviews with the Bangladeshi partners of BCAS and the Centre for Rediscovered and Redefined Natural Resources Research and Education (C4RE) Service Ltd. (C4RE). C4RE is a contractual partner of BCAS for implementing the pilot program of the Bangladesh component. I also conducted two interviews with IDRC personnel, though mainly as supporting information in my research, to better understand the knowledge-transfer process in the HI-AWARE project to the people living in the project region.

I once again followed a snowball process to select BCAS, C4RE, and IDRC organization personnel. This technique uses each research participant’s referrals to recruit further research

participants. I asked each participant for additional information about the HI-AWARE project to gather more research participants.

Initially, I communicated with the managerial staff of the HI-AWARE project, both from IDRC and BCAS, through email, phone, and Skype to get their approval to conduct my research fieldwork with them. During fieldwork in Bangladesh, I selected other project staff through their help. Finally, I picked two managerial staff from the IDRC organization. One was at the IDRC main office in Ottawa, Canada, and the other worked in the IDRC regional office in India. I selected two managerial staff, each from BCAS and C4RE. I interviewed six expert interviewees covering the Canadian and Bangladesh parts of the HI-AWARE project to understand their partnership in the knowledge management process. The C4RE staff arranged the meetings, inviting local participants for my project, from which I selected 45 local participants for the FGDs. There were 15 beneficiaries and 30 non-beneficiaries from the two FGDs at the two project sites of the HI-AWARE project in Bangladesh.

Table 1

A List of Key Informants for Interviews and Focus Group Discussions (FGD)

Bangladesh Part of the HI-AWARE Project		Canada Part of the HI-AWARE Project	
BCAS	4 interviewees	IDRC	2 interviewees
C4RE	2 interviewees		
FGDs	45 local participants (15 beneficiaries and 30 non-beneficiaries)		

2.6 TYPE OF DATA AND QUESTION CHECKLISTS

I collected primary data from the interviews and FGDs. The structured question checklists with open-ended questions included general information on the selected organizations and two sets of question-based checklists made separately for Canadian (IDRC) and Bangladeshi organizations (BCAS and C4RE).

I also collected secondary data on the HI-AWARE pilot program in Bangladesh during interviews with the C4RE staff, which included baseline household survey format, proposals for up-scaling the climate and flood resilient housing, and photographs related to project sites' scenarios before and after piloting climate change interventions. The baseline household survey format shows the condition of the households in some specific areas. It included housing conditions, drinking water sources, toilet and sanitation, and other household-related information, such as land ownership. The C4RE organization surveyed households and collected information on those issues before providing its services. I used this baseline data to observe the problems after project interventions and prepared a note to discuss those issues in FGDs. However, more issues came out beyond the baseline focused through informal discussion. The primary data from FGDs covered climate change interventions' before and after scenarios. Table 2 update shows a summary of subjects covered by the question checklists for collecting data through interviews with organizational staff and an overview of discussion topics during FGDs.

The IDRC and BCAS also shared secondary documents with me; some were confidential. Table 3 shows a list of secondary documents collected during fieldwork from the interviewees.

Table 2

Subjects Covered by the Question Checklists for Interviews and Informal Discussion Topics Covered by FGDs

Question Checklist for Interviews with Bangladeshi Organizations (BCAS and C4RE)	Question Checklist for Canadian Organization (IDRC)	Informal Discussion Topics for FGDs
• Questions regarding why they are working on climate change. • Question regarding the sources of climate change information • Opinions on government-citizen participation, the potential barriers, and facilities • Discussions on the process of international fund sanctions and the barriers • Detailed discussion on the conversions of climate change information into project and program in the context of the HI-AWARE project - prioritizing the climate change area for developing the pilot	• Questions regarding the scope of international development, the potential policies, and barriers • Discussion on the process followed in sanctioning the HI-AWARE project under Canada's international development scope. • Discussion on the driving force and influential sources to undertake the HI-AWARE project. • Discussion on the fixation of the HI-AWARE project in line with other national countries' development policies • Tools for selecting partners, collaboration mechanism, roles and responsibilities, funding	• Questions about inundation scenarios of homesteads during floods and what may change after the project intervention. It discussed the specific areas: - courtyard inundation - dwelling units/housing inundation - duration of floods and - capacity of families to stay at their own house during floods - other ancillary arrangements' inundation situation centering courtyard and dwelling units, such as toilet, cooking shelter, drinking source spot (e.g., tube-well), homestead gardening, fodder, and shelter for the livestock, such as cows, goats, and hens.

program - participation in decision-making activities, with other partners and donors, for knowledge-sharing - the decision to declare 'climate change knowledge' and what adaptations have been made to the 'original' concept, programming, and institutionalization of the climate change package used in BCAS. - considerations for deciding which 'climate change knowledge' packages get transferred and why • Discussion on immediate project benefits of the HI-AWARE project and its measurement • Discussion on legal, political, institutional, and financial barriers to implementing the HI-AWARE project as best practice.	mechanism, communication protocols, and dissemination of information. • Discussion on the technical assistantship provided to partners, along with its barriers and opportunities. • Discussion on the evaluation process, the external assessment, and favorable or unfavorable conditions. • Discussion on the international conferences and workshops and the necessity of those activities. • Discussion on the organizational performance of the HI-AWARE project in terms of cost, effectiveness, ease of implementation, timeframe, size of beneficiaries, and institutional capacity.	• Questions about water-borne diseases and other health conditions women faced during floods and the change that situation after project intervention. • Questions regarding how the project intervention, such as climate-resilient houses, helped the neighbors, the social status of the beneficiaries after getting the new houses, and the bonding with the neighbors. • Questions regarding women's empowerment through the project • Questions regarding the participatory process for implementing the house from beneficiaries' points of view and local perspectives. • Questions regarding income sources, job opportunities, future for adopting new technology for that house, repairing, and maintenance.

Table 3

Secondary Documents Supplied by Participant Organizations

List of secondary documents supplied by organizations	Source
BCAS short pitch on Flood and Climate and Flood Recilient (CFR) housing (2017)	BCAS
HI-AWARE Technical Report on Participatory Assessment of Socioeconomic Drivers and Climate Stressors leading to Vulnerabilities in Dimla (2017)	
HI-AWARE Technical Report on Participatory Assessment of Socioeconomic Drivers and Climate Stressors leading to Vulnerabilities in Kawnia (2017)	
HI-AWARE Mid-Term Learning Review Report (2016)	IDRC
HI-AWARE Technical Report (2018)	
HI-AWARE Project Completion Report (2018)	
C4RE proposal for upscaling CFR housing (2017)	C4RE

In addition, I used the web portal of the HI-AWARE project (https://HI-AWARE.org) for further information. The secondary data in my research also focused on reviewing secondary journals from the database Web of Science core collection source under the geography field. Apart from this, I consulted and applied secondary sources, such as several Bangladesh government policy documents, websites of government organizations, international donors' reports, and global climate change and knowledge management web portals.

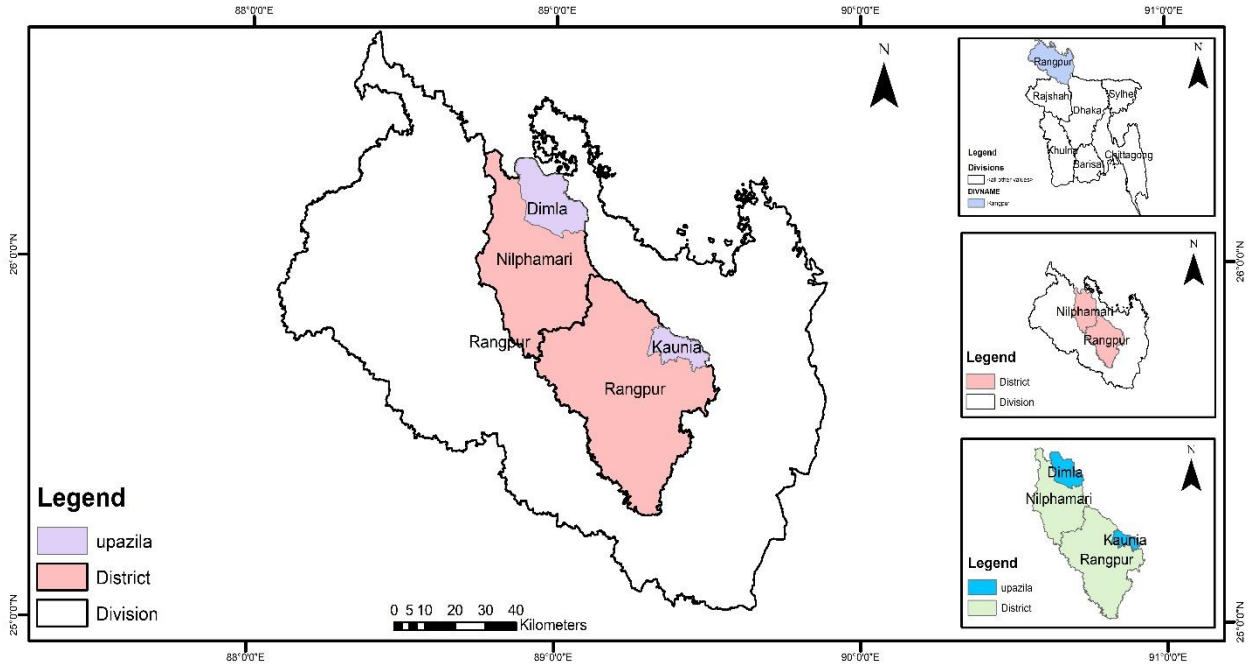
2.7 FIELDWORK IN BANGLADESH: CONDUCTING QUALITATIVE INTERVIEWS, AND FGDS

Fieldwork included interviews, project site visits, and conducting FGDs with the local community, including beneficiaries. I reached Dhaka in mid-July 2019 and conducted interviews with four officials from the organizations of BCAS and C4RE located in Dhaka. I also conducted online interviews with the two personnel of IDRC. In February 2020, I visited project sites at Kawnia and Dimla villages in the Rangpur district, the Northern part of Bangladesh (see map 1), to observe the HI-AWARE's climate intervention. I spent five days visiting the two project sites. The first day's activity included visiting the demo of climate change-resilient house; the second day included visiting Kawnia to observe the local beneficiaries' climate-resilient houses and conduct FGDs; the third day included visiting Dimla to attend the local beneficiaries' climate-resilient houses and conducting both FGDs, and the fourth-day activity included interviewing with the field-level program coordinator. On the fifth day, I compiled all field notes before returning from the field.

2.7.1 PROJECT SITES – KAUNIA AND DIMLA

The downstream sites of the Teesta basin include the villages of Kaunia and Dimla of the Rangpur district. Kaunia and Dimla face several natural hazards, including floods, riverbank erosion, reduced rainfall, and water shortages. People of those villages are often unemployed because the natural hazards during the dry and rainy seasons force them out of their agricultural and other livelihood practices. Syed et al. (2017) described the drought situation of those villages in the HI-AWARE Institutional Report 2017. This report showed that water scarcity during the dry period (March to May) is a significant problem as the river gets low flow, and farmers use groundwater for agriculture. The dry season adversely affects the supply of household water. Households use shallow tube wells for domestic purposes, but these water sources become dry

because the groundwater level drops almost 7-8m from the plane. Families also suffer from the unavailability of water for other livelihood activities, such as domestic animal rearing, pisciculture, and planting. Crop damage in the early monsoon period is prevalent as the soil gets dry and sandy, losing moisture.



Map 1: Location Map of Project Sites at Kawnia and Dimla Villages, Rangpur District, Bangladesh

The HI-AWARE Technical Report, 2017, described the flooding situation of the Kaunia and Dimla villages. This report found that floods occur yearly in the Kaunia and Dimla villages during the rainy season. Sudden floods from heavy rain and periodic floods that last longer create inundation in most areas and significantly affect the people and their livelihood activities. The months between July and September have the heaviest rainfall. Bank erosion also affects the people in the early monsoon from April to June and the post-monsoon from September to October.

The HI-AWARE Technical Report, 2017, advised that the effect of riverbank erosion in post-monsoon erosions is vast—however, heavy rainfalls cause short-duration floods in the pre-monsoon season and damage crop fields.

The HI-AWARE Technical Report 2018 showed Bangladesh's flood severity in 2017. It found that as of August 20, 2017, approximately 6.1 million people were vulnerable in 31 districts out of 64. It reported 117 deaths during the flood in 2017, which also damaged more than 530,000 houses. The Technical Report, 2018 also highlighted that on August 4, 2017, water from upstream areas began to flow into the Brahmaputra and Teesta. The villages adjacent to the Teesta basin had already received heavy monsoon rainfall, but the massive amount of transboundary water created havoc. Floods damaged key infrastructure, such as schools, colleges, roads, dams, hospitals, clinics, bridges, and culverts. The flood water inundated thousands of families, their houses, livestock, and poultry.

2.7.2 CONDUCTING QUALITATIVE INTERVIEWS WITH THE BCAS, C4RE, AND IDRC

2.7.2.1 INTERVIEWS WITH THE BCAS AND C4RE

I started my communication with BCAS in August 2019 from Dhaka. I requested an appointment over the phone to introduce my research project. Firstly, I met in person with some BCAS personnel in late August 2019, which allowed me to build up the initial communication and helped me introduce the project, select further interviewees, and set up the schedules for the interview. I learned about the number of officials involved with the HI-AWARE project. The focal person of BCAS suggested some specific people for the interview, and I selected two officials who likely would have sufficient data for my project. The first was the HI-AWARE project program coordinator, who could provide insights about the overall project coordination and fund management. The other person I selected was directly involved in conducting the action

research of the HI-AWARE project and participated in the workshops and meetings as part of that action research.

The focal person of BCAS helped me to communicate with its implementing partner, C4RE. I communicated with the C4RE organization to cover the HI-AWARE pilot program information. I arranged an appointment with the interviewee, the Director of the C4RE, in October 2019 in Dhaka. In the first meeting with the C4RE interviewee, I gained relevant information by discussing the pilot program. The C4RE interviewee later shared reliable sources, such as photographs and important documents, and the C4RE proposal for upscaling CFR housing. Developing rapport with the C4RE team allowed me to visit the project sites with them later. Similar to choosing two people from BCAS, I selected two personnel from the C4RE staff — the Director I mentioned before and the field-level coordinator at the project site in Rangpur, Bangladesh.

Before the interview, I sent the questionnaire and the proposal for my research project. I showed the ethics approval certificate and requested signatures on the participants' agreement forms and permission to record the interview (one interviewee from BCAS chose the English medium for the interview, and the other three chose the Bangla medium). Using question checklists to conduct the semi-structured interviews, I kept the questions open-ended to get more opinions and detailed descriptions. I followed the sequence of the question checklists while recording and taking notes. The interviews allowed me to elaborate on some points connected with the questionnaire that I found either interesting or where I needed more clarification.

The interview data was collected over five days of face-to-face meetings, which included introductory meetings and interviews in Bangladesh. I conducted three interviews in Dhaka and one in Rangpur. The interviews required flexible day schedules and hours for face-to-face meetings. I set up 90 minutes for conducting interviews while developing my research proposal,

but practically, the face-to-face conversation and discussions with interviewees generally exceeded 90 minutes. For example, an interviewee from BCAS used one whole day with flexible times to complete the interview with me. Another BCAS interviewee gave me a schedule of two days, but he allowed shorter periods for the face-to-face interview within that time. I contacted him over the phone three times (one of those conversations lasted around an hour). I had to discuss this through Skype to complete the interview as the COVID-19 pandemic restricted us from meeting physically. For the interview of C4RE interviewees, one interviewee spent more than two hours conducting the interview. Another allowed me only one hour to interview with the questionnaire on the project site, Kaunia, Rangpur. However, I could communicate with that interviewee later over the phone, which took four hours using a meeting schedule of two days to complete the interviews.

2.7.2.2 INTERVIEWS WITH THE IDRC

I conducted online interviews for the Canadian organization IDRC in March 2020. I communicated with the team leader of the HI-AWARE project over email. He further referred other IDRC staff located in India. The IDRC Indian staff supervised and monitored the entirety of the project activities. Moreover, this person also maintained the liaison between partners and the main office of IDRC (in Canada). I conducted interviews with these two IDRC personnel over Skype, which took four hours to complete (two hours each). After the interviews, I communicated with the interviewees further to get the necessary documents that we discussed during the interviews.

2.7.3 VISITING THE DEMONSTRATION CLIMATE CHANGE-RESILIENT HOUSE

I went to Rangpur in February 2020, with support from the C4RE, to visit the project sites. Day one of the field tours included:

- Traveling to Rangpur.
- Visiting C4RE's farmhouse to see the demo of a climate-change-resilient house.
- Reaching the guest house accommodation in Rangpur.

The farmhouse's location was about a 30-minute travel distance from the local airport, Saidpur. C4RE used the climate-resilient demo house for its temporary residence purpose. The Director of C4RE allowed me to observe the inside house—the iron sheets structure, wooden decoration, and the top floor arrangement. The house had a high foundation above ground, one balcony, and one bedroom with an attached lavatory.

Visiting the demo buildings of climate change-resilient houses before going to project sites at Kaunia and Dimla helped me to gain a sense of flood and climate-resilient houses in general, the level of protection they can provide during floods, and other uses, such as top-floor uses of that building and its capacity. It also helped me to observe a whole package of climate-resilient house interventions in project sites: for example, the complete package of such housing included foundation development, a flood-resilient house with a specified size and shape, top floor arrangement, a lavatory, and solar light, along with other livelihood services, such as homestead gardening.

I met with the field-level program coordinator in this location, who arranged for the FGDs meeting by inviting beneficiaries and local participants. In addition, he was the only field-level interviewee in my research who covered the local level information. I spent one hour observing the demo building and discussing issues related to arranging FGDs with them to carry out the fieldwork smoothly.

2.7.4 VISITING PROJECT SITE AND CONDUCTING FGD AT KAUNIA

The C4RE organization team (the Director, accountant, and field-level coordinator) hired a microbus (six-seated vehicle). The Director of C4RE took his accountant with him as a supporter. We started our journey at 10 a.m.; reaching the site area from the Rangpur district took around an hour. Our microbus dropped us at the end of the road, from where the project site began. We walked all day through the project site. The area was very sandy and muddy, with no specific access road. Most houses were kutcha (i.e., raw, generally unfinished material), made of the bay, bamboo stick, and corrugated tin, while some were muddy. Cow and coop shades were typical in the courtyards of the houses.

We reached one of the target houses (i.e., a beneficiary's house). I noticed that the beneficiary's homestead was on a comparatively higher land surface than other households. I also saw the local people waiting, arranging some chairs for sitting in a circle in the middle of the courtyard. There would be more than 50 people—some in the yard, others on the entrance side, and some inside the houses (i.e., the climate-resilient houses). I found three dwelling units on a high foundation surface. C4RE developed the dwelling units in a cluster way for the household members.

The house looked like one single bedroom, with a top part attached to the roof for storing, sleeping, or other purposes. Around 20 people could stay in a temporary shelter during a flood. The house had both side windows and doors, which was unique, as none of the houses in this area had windows. There were gender-wise bathrooms/washrooms in another part of the courtyard, which were also the project's outcome.

After observing the climate-resilient houses, I conducted the FGD in this location (Kaunia). It began with obtaining their consent after briefing my research outline and requesting their permission to run the FGD. They were well aware of such a situation and gave their support

orally. I went about the FGD in the form of an informal discussion, allowing them to speak instead of asking any questions at the start. Since the organization's team members were present, I kept the participants unidentified unless they chose to identify themselves. It was primarily an informal discussion. I picked up the words from their narratives and asked questions after listening to them. Some beneficiaries, team members, and older respected persons already sat on chairs. Most of the non-beneficiaries stood behind the chairs in that house's yard. Some other non-beneficiaries also remained standing, blocking the house's main entrance. I started to discuss with the beneficiaries first; then, I proceeded to the non-beneficiaries. The non-beneficiaries listened to the conversation between me and the beneficiaries, which helped me to observe the responses of non-beneficiaries promptly. The baseline information included the five discussion points:

- Courtyard and housing situation
- Available water sources
- Sanitation situation
- Homestead gardening
- landholding status

However, participants readily highlighted other issues such as cooking problems during the flood, water-borne diseases, women's health, and staying in a flooded home. They described the fear of living in an inundated house during a flood. The non-beneficiaries supported the problems highlighted by beneficiaries. There was a conversation regarding project benefits, the capacity of beneficiaries and non-beneficiaries to build flood-resilient houses, and the further extension of the HI-AWARE project for building houses. The C4RE Director and program coordinator participated in some discussions about the local extension of those houses. After finishing the FGD, I went inside their houses and observed the housing capacity, design, and

construction materials, which provided valuable additional information on their situation and experience. I also visited other climate-resilient houses and saw some non-beneficiaries' local dwellings.

2.7.5 VISITING PROJECT SITE AND FGD AT DIMLA

I visited the project site Dimla on the third day of the field tour. The program coordinator of C4RE hired a car to visit there while the C4RE Director and the accountant returned to Dhaka. Dimla was about 48 miles from the Rangpur district. Reaching the project site took more than one and a half hours. The journey could have been smoother; the recent flood broke the Dimla bridge, which connects the village to the Rangpur center. The locals warned that the car might be unable to navigate the road. As it was the dry season, the locals used the dry parts of the river as paths. We had to cross the river following the way under the bridge, and the experience illustrated local people's problems. Some of us stepped out of the car to minimize the load, and the driver drove following that pathway. After crossing the bridge, thick sand made driving more difficult. The sand was blowing in the air. The program coordinator had to push the car frequently. Dimla faces floods yearly, so road maintenance after the flood season must be a priority.

The roads in Dimla are poorly defined. Our car used the courtyards of many households to move. Most probably, the households' area used the roadways. As it was a Friday (Friday in Bangladesh makes up the weekend; it is a Jummah day, in which Muslims offer their prayers in the afternoon at mosques), we were worried about whether we would be able to have the local people with us for the FGD. The program coordinator tried to communicate with the locals several times to wait a bit for us because the road conditions made us late. The car arrived at the member house (a member of the local Union *Parishad*) of this village, which was the last point of the road. The program coordinator introduced me to the member, and after that, we used the

edges of corn-cultivated land to reach a beneficiary's house. Even after a delay, I found the beneficiaries and non-beneficiaries waiting for us. The location of houses arranged them in a scattered way with a long distance from one house to another. After finding one household, I observed the same pattern of the climate-resilient house(s), with the expectation that the house had a solar panel at the top and no improvement to the basement.

I started with the second FGD the same way I did for the first FGD. I considered the same discussion points (i.e., courtyard and housing, available water sources, and others), adding the problems from the previous FGD into the discussion as well, i.e., a cooking problem during the flood, water-borne diseases, women's health, and the problem related to living at inundated houses. I went inside the house after finishing the FGD and found many village women, mostly non-beneficiaries. They informed me about their challenges and painful situations during the flood. While our FGD conversations had focused on the housing project and the flooding situation—these women concentrated on other issues, such as breastfeeding. This informal discussion helped me to understand the wide range and gravity of the problems of non-beneficiaries during floods. I also had a physical visit to another beneficiary's house that day and found that the house was also without basement improvement.

2.7.6 REVIEWING FGD DATA

I visited seven climate-resilient houses. I conducted two FGDs with 15 beneficiaries who live in those houses and 30 non-beneficiaries who live in roadside houses, houses beside cultivated fields/ open spaces, or shallow land areas. I observed the following in the FGDs:

- Both FGDs included the members of two villages, local people (non-beneficiaries), beneficiaries, and NGOs personnel (Director, and program coordinator)
- The non-beneficiaries had roughly the same problems and arguments the beneficiaries faced before getting climate-resilient houses from the HI-AWARE project.

- All individuals (beneficiaries and non-beneficiaries) were minimally responsive during the FGDs. Their responses or informal discussion points frequently involved small gestures if someone raised a voice or indicated problems; others indicated agreement by showing a positive posture, keeping silent or saying 'yes,' or adding some judgment on the discussed issues.
- The participation (in case of sharing or speaking about their problems) of non-beneficiaries at Dimla was more than that of the locals in Kaunia village.
- Some non-beneficiaries insisted that the beneficiaries forward their names to the author of this thesis for getting a house. The non-beneficiary participants of the FGDs thought that the author of this thesis came to their village to distribute flood-resilient houses. They saw the FGDs as a method of prioritization. As they were sometimes reluctant to speak or answer direct questions, they asked for help from the already known beneficiaries to the organization staff.
- Some non-beneficiaries requested the author of the thesis to build a house only as they had already raised land high with the help of another organization. So, the intervention they desired was a house, not further land improvements.
- Both men and women were present, although there were primarily women. They all prioritized the problems faced during flood season, comparing social and environmental concerns before and after the project, experiences about participation in the international workshop during the project period, and idea-sharing for the wellness of the villagers.
- Beneficiaries also highlighted the problems of the non-beneficiaries. I found a mutual understanding between them. For example, the beneficiaries asked to expand climate-

resilient houses for those who were or had been the sufferers during floods in their villages.

2.8 DATA ANALYSIS: METHODS, TECHNIQUES, AND DATA PROCESSING

2.8.1 QUALITATIVE DATA ANALYSIS

For analyzing the data, this research applied a mixed-method approach. My research's first two analytical factors—knowledge creation and dissemination through projects and programs—considered qualitative data analysis. The third analytical factor was about seeing the outcome of that knowledge, and it required quantitative data analysis.

Qualitative data analysis followed Seidel's (1998) model of Qualitative Data Analysis (QDA): noticing, collecting, and thinking. Using qualitative data statements prepared during fieldwork, I apply the QDA technique that sees data and codes them, identifying interesting things and defining them in different segments and formats, such as tables, diagrams, extensive maps, plans, and synoptic tables of cases. After that, I searched coded elements through sorting and shifting to discover patterns, sequences, holes, processes, types, classes, and categories.

I used code words that fall between pure objectivist and heuristic coding to minimize the risk of avoiding any information for data analysis. Seidel (1998) explained that objectivists coded data as alternates for the text. The study can draw attention to the codes in place of the text. In this case, it is crucial to rely on a code word. Heuristic code words code things in the texts that explore things further to provide more information for in-depth analysis. Researchers must trust objectivist code words uncritically as such coding words reduce the text and tend to skip information (Seidel, 1998, p.14). In contrast, researchers can change the heuristics code words following the analysis progress, which allows researchers to go through profound data observation. However, researchers must be conscious of using objectivist and heuristic code words (Seidel, 1998, p.14).

However, starting the code words was also an important task to go further with QDA. I followed an iterative phonetic approach synthesized by Sarah J. Tracy (2019) to grow my skill for identifying the code words from the text in my research. She described the iterative phonetic analysis as an alternative to emic or etic analysis. The iterative phronetic analysis demonstrates the research problems, priorities, relevant literature, and theories that the researchers highlight in the data instead of coding every event, participants' activities, and connectivity (Tracy, 2019, p. 209).

This approach helped me code data and prepare a codebook. For processing the audio clips of six interviews, I completed the following activities:

1. I used software to convert the audio clips into transcript notes. I could do that for only those interviews I carried out in English. In this case, the communication medium for conducting interviews with the Canadian IDRC personnel and Indian IDRC personnel was English, and one of the BCAS interviewees chose to communicate in English. The other three interviewees decided to speak in Bangla. I translated those Bangla audio clips into English by myself.

2. I edited all the interviewee transcripts, which meant hearing the audio clips repeatedly.

3. For coding each transcript, I wrote code words in the text box beside the paragraphs. I focused on reading, noticing, thinking, and picking up words to do this. I synthesized the whole terms and focused again on the reading, thinking of every paragraph or the answer to each question I asked during the interviews. Furthermore, I wrote the first-level code. I prepared a document on Microsoft Word to compile the first-level codes of all six interviews and the two FGDs.

4. I divided all the HI-AWARE project activities into pre-, during, and post-phases. For example, 'pre-phase' HI-AWARE project activities included the first-level codes that provided the information regarding the scope of work and policy environment, then finding the

knowledge gap(s), writing project call(s), developing project concept(s), extending project concept(s) into the broader proposal, and budget scenario.

The 'During' project phase included the first-level code words regarding conducting action research, piloting the program, and the voice of the local people—beneficiaries and non-beneficiaries.

The 'post-phase' highlighted the information regarding external assessment, monitoring and evaluation, and donor-side recommendations for the welfare of locals in the future.

5. To prepare second-level coding, I combined first-level code words, read all the outlines of first-level code words in the paragraphs again, and chose the most suitable words as secondary-level code words that matched the discussion I wanted to highlight under each secondary code word.

6. To remove overlapping information, I reviewed all secondary-level code words, their definitions, discussion notes, and examples.

2.8.2 QUANTITATIVE DATA ANALYSIS

The quantitative analysis examined the relationship between the pre-and post-project situation (and views) of beneficiaries and, secondly, the relationship between beneficiaries and non-beneficiaries. The study used baseline information collected from C4RE. The purpose of collecting baseline information was to get an idea of the pre-project scenarios of flood-affected beneficiaries. Moreover, it helped to identify the comparable variables used to examine the condition of the local people between the before and after project periods.

The analysis followed a 1:2 trial for selecting participants randomly from the participants of FGDs. It decided on 15 beneficiaries as the treatment group involved in the pilot program and 30 local people as a control group who did not involve themselves in such a pilot project. The selection of people to be involved was conducted without bias (essentially

representing a random sample of the local population of people, beneficiaries, and non-beneficiaries) since I did not interview them regarding the topics before being included in the study.

The resulting data on pre- and post-project situations and views were summarized and presented below. Although simple descriptive statistics and presentation might be adequate for a results summary, I conducted some statistical comparisons of numerical ratings before and after.

2.8.2.1 VARIABLES

This analysis considered nine issues for comparing before and after intervention events. The variables had a definite explanation for the observation developed by reviewing the baseline document and consulting with the locals during the FGDs (see Table 4).

Table 4

Variables for the Quantitative Analysis

Variables	Explanation
Courtyard	Low-land housings inundate courtyards during floods.
Housing	When floods increase their water level, housing gets inundation.
Drinking water	Tube-well is the primary source of drinking water and other domestic usage, but flood water inundates the tube-well and pollutes the water level.
Sanitation	Toilets made with raw construction materials, such as bamboo and hay, get damaged during

	floods. When floodwater goes up, it inundates the toilets completely.
Cooking condition	Floodwater reaches a higher altitude, inundating the cooking place in the house's courtyard. Household members cook inside the house. When the water level goes up, they shift to the high bed made of wood and cook on the bed using the portable stove. Alternatively, they move to neighbors' houses on high land for cooking.
Diseases	Water-borne diseases like skin problems, diarrhea, and fever increase during and after the flood.
Women's health	Women's health worsens because they eat disproportionately less to favor the caloric intake of less food than men during floods; they have unhealthy menstrual arrangements during the flood.
Fodder for the livestock	It is difficult to arrange food for the livestock during floods; sometimes, the house owner loses the livestock because they go far away and can not return.
Staying at a flooded home	Local people with low-land housing get

	inundation during the flood. When floodwater enters the house, local people move to neighboring houses located on high lands and wait until the water level of flood goes down.

I used the Likert scale method for the measurement and rated the participants' most descriptive responses from 1 to 5 (see Table 5). For example, I put five (5) as the numeric value against the participant's response, "I always faced inundation during the flood." The qualitative rank against five numeric values showed 'completely agree.' I assigned one (1) as the numeric value of the response, "I did not face inundation at/in our courtyard after the land development from the project." The qualitative rank of one (1) numeric value showed 'completely disagree.'

Table 5

Likert Scale Measurement and Rate

Quantitative rank	1	2	3	4	5
Interviewee response	Never	Rarely	Sometimes	Often	Always
Qualitative rank	Completely disagree	Disagree	Neutral	Agree	Completely agree

2.8.2.2 MEASUREMENTS AND INTERPRETATION

I used frequency distribution to check and summarize the rating value of beneficiaries' responses to each variable. Appendix 1 shows the comparison responses of beneficiaries

regarding the before-after project intervention under each question. The data summary shows that the selected beneficiaries (15) kept rating four (4) and five (5), indicating that they suffered over the years during floods and always or often found courtyard inundation, housing inundation, toilet inundation, or tube-well inundation. They also had problems related to cooking, fodder crisis, the unhygienic environment that affected women's health, and waterborne diseases. Even all beneficiaries could not stay in flooded home and ranked this problem as one (1), showing the impossibility and difficulties of staying home during floods. However, they had reverse responses after the project situation. For example, 15 beneficiaries never saw their housing inundation and rated this improvement as one (1), and they did not move to other places for temporal shelter during floods after project intervention. There were minimal differences in responding to improvement situations after the project. For example, after the project intervention, 11 beneficiaries found no problems in cooking, sanitation, tube-well inundation, courtyard inundation, or waterborne disease. In contrast, others mentioned that they often found those problems and ranked them four (4) as they were out of base development under the project intervention. Likewise, nine beneficiaries rated two (2), informing that fodder crises are rare after the project.

However, the above summarization of the rating value of beneficiaries' responses to each variable shows that the changes in ratings differ among the questions. For example, staying at house change is different from the other questions. When staying at the house is removed, the changes in rating in the other questions do not differ very much (see Appendix 2).

There was a significant change comparing the improvement situation of beneficiaries (15) with the non-beneficiaries (30) after project development (see Appendix 3). For example, 73% of beneficiaries responded that they were free from the suffering of courtyard inundation, the drinking water crisis of inundation tube wells, cooking problems, and inundation toilets after the

project period. In the case of non-beneficiaries, 73% rated courtyard inundation as five (5) because it was familiar to them to get the courtyard flooded yearly. As the yard flooded, the function around the square, like the cooking corner, toilet, and tube well inundated—more than 50 % of non-beneficiaries rated toilet and tube well inundation as five (5) because of their regular flooding. They were also suffering from waterborne diseases (50% of non-beneficiaries). Regarding housing inundation, 47% of non-beneficiaries found frequent floods in their houses. 40 % of non-beneficiaries marked that their houses never worked as shelters during floods.

However, the responses of non-beneficiaries had significant differences under variables. For example, 47% of non-beneficiaries informed regular housing inundation, whereas 27% of non-beneficiaries never faced housing inundation problems because they had roadside house locations, which were higher than the ground level, ensuring a staying possibility during floods. Some beneficiaries' responses informed courtyard inundation during floods; even after the project, they did not get base development from the project, but all beneficiaries responded that the flood-resilient houses they got through the project were safe from flooding.

A contingency analysis of rating through the Chi-square test was applied to see the beneficiaries' after-project scenario change to the beneficiaries' before-project situation; and the change by beneficiaries versus non-beneficiaries after the project. I used JMP statistical software that presented a two-way table, mosaic plot, and two Chi-square tests (Likelihood Ratio and Pearson) of each variable using a significance level of 0.05 (with Probability<Chi-square). The result showed significant changes since the p-value was less than 0.05. The project intervention significantly impacted addressing the beneficiaries' vulnerability (see Appendix 4). There were substantial differences between beneficiaries versus non-beneficiaries (see Appendix 4).

A t-test was also used as a simple measure to compare the means of critical variables and relationships (the change from before to after). The first relationship was a comparison between

pre-project and post-project conditions of beneficiaries concerned with differences between the baseline information/state and the situation after the intervention. After the project, the second relationship between the condition of beneficiaries and non-beneficiaries required comparing the intervention-receiving group (a treatment group) and the control group (that did not receive any intervention). For these two kinds of experiments, this analysis employed the paired samples t-test (also called the dependent samples) to compare the means of the same group at two different times. I applied the t-test for testing before and after the intervention in the standard method, with the null hypothesis being no overall change. I used the independent-sample t-test to compare the average quality between the intervention group (beneficiaries) and the control group (non-beneficiaries).

The research hypothesis for the relationship between pre-and post-intervention was 'there is a significant difference between pre-and post-flood situations after plinth development and CFR housing.' I applied the t-test to assess the change (with $P<0.001$). Beneficiaries' responses through FGDs showed that they were vulnerable before the project. No change protected them from floods. It remained unchanged until the project intervention in 2017. As the pre-situation remained static, the deviation for the t-test was zero. In this sense, I applied a one-tailed t-test. Appendix 5 shows the beneficiaries' situation after getting project benefits, with the indicated changes between pre-and post-intervention. The variable differed significantly after developing the plinth and building CFR housing. Regular floods caused general troubles. There was minimal variation among beneficiaries as some still needed to get a complete package of the CFR housing program. The data demonstrated that involvement in the project improved the beneficiaries' situation, whereas the non-beneficiaries situation remained unchanged during floods.

CHAPTER THREE: REVIEW OF RELEVANT LITERATURE

3.1 INTRODUCTION

This chapter provides an overview of the Bangladesh governance system with respect to climate adaptation by reviewing the country's climate vulnerabilities and the governance pattern of non-governmental organizations (NGOs) with governmental organizations (GOs) and international donors. This review aims to observe the global collaborative partnership on climate adaptation between NGOs and donor agencies; however, it also focuses on the NGOs-GOs relationship in climate adaptation governance for two reasons. Firstly, NGOs-donors international collaborative partnerships create new and innovative governance approaches, providing monetary support and technical assistance. However, such alliances must follow a country's climate adaptation rules and other governance policies since the climate projects locate their sites within national boundaries. Second, local challenges in working with national governing bodies must be understood.

This chapter describes the physical settings of Bangladesh—its river systems, climate, climate change, and impacts- and provides background knowledge regarding flooding and its consequences in Bangladesh. Secondly, it summarizes some climate projection studies to present the future trends of floods and the country's vulnerable situation, which initiated the climate adaptation governance review to address the vulnerability. Thirdly, this chapter reviews the initiatives of the Bangladeshi government in climate governance regarding current policy connected to climate adaptation, institutional arrangements through stakeholder partnerships with non-governmental bodies and communities, and the government efforts to maintain stakeholder participation for the effectiveness of climate adaptation governance. This section recognizes the GOs-NGOs relationship as a complex one. Government bureaucracy makes the connection with

NGOs problematic, which led to seeing the partnership of NGOs with international donors as a new collaborative governance approach. The fourth section reviews the historical performance of NGOs in donor-funded development and disaster management projects and the involvement of NGOs in climate adaptation projects. It also reviews the form of NGO-donors partnerships, opportunities, and constraints in an international context. It relates to the theoretical conception of global collaborative governance on climate adaptation. Such approaches exist in climate adaptation governance elsewhere in the World. Finally, the fifth section reviews the practice of NGOs-donors international partnerships in Bangladesh, particularly on climate adaptation projects, and the research gaps.

This review utilized the database Web of Science—a core collection of studies in the geography field—via the University of Lethbridge Library. It extracted Journal articles from the period of 1999–2021. It also included vital online policy documents and web portals on climate change models and knowledge. Searching for journals related to climate adaptation governance in Bangladesh revealed that recent research papers focused on analyzing climate change vulnerability, mainly post-disaster vulnerability, and the relationship among NGOs, the state, and the community to climate governance. The findings broadly criticized the government's role in maintaining relationships that highlighted barriers to providing climate adaptation services.

On the other hand, journal articles related to the partnerships of NGOs with donors in climate governance showed that the collaboration between NGOs and international donors needed help to implement climate projects. The power imbalance in preparing project design, planning, and implementation strategies indicated a high control from donors over those activities. Nevertheless, despite this power imbalance, the dramatic growth of NGOs, rapid extension of project implementation, and foreign fund flow to adaptation and development show

that there is still room to evaluate partnerships between international donors and NGOs in Bangladesh.

3.2 BANGLADESH, FLOODS, AND CLIMATE CHANGE

Bangladesh is a South Asian country located at the base of the Himalayas. The area of Bangladesh is about 147570 sq. km. India almost borders the country in all directions except the south and southeast. Another neighbor, Myanmar, surrounds the southeast part of Bangladesh, and the flow of the Bay of Bengal encloses the southern region. There are 405 rivers with 57 transboundary rivers in Bangladesh. The three significant transboundary rivers, the Ganges, Brahmaputra, and Meghna (GMB), enter Bangladesh from India and spread out with large branches and distributaries all over the country, creating floodplains (Flood Forecasting & Warning Centre, 2018). According to the annual report of Bangladesh Flood Forecasting & Warning Centre 2018, the GMB river system alone drains off the overflow water caused by heavy rain. This report highlighted that the GBM river system typically passes 1009000 million cubic meters of water flow during monsoon (Flood Forecasting & Warning Centre, 2018). Bangladesh has three main seasons:

a) *Summer* contains high temperatures that can go beyond 40°C. The heavy rainfall begins from March to June.

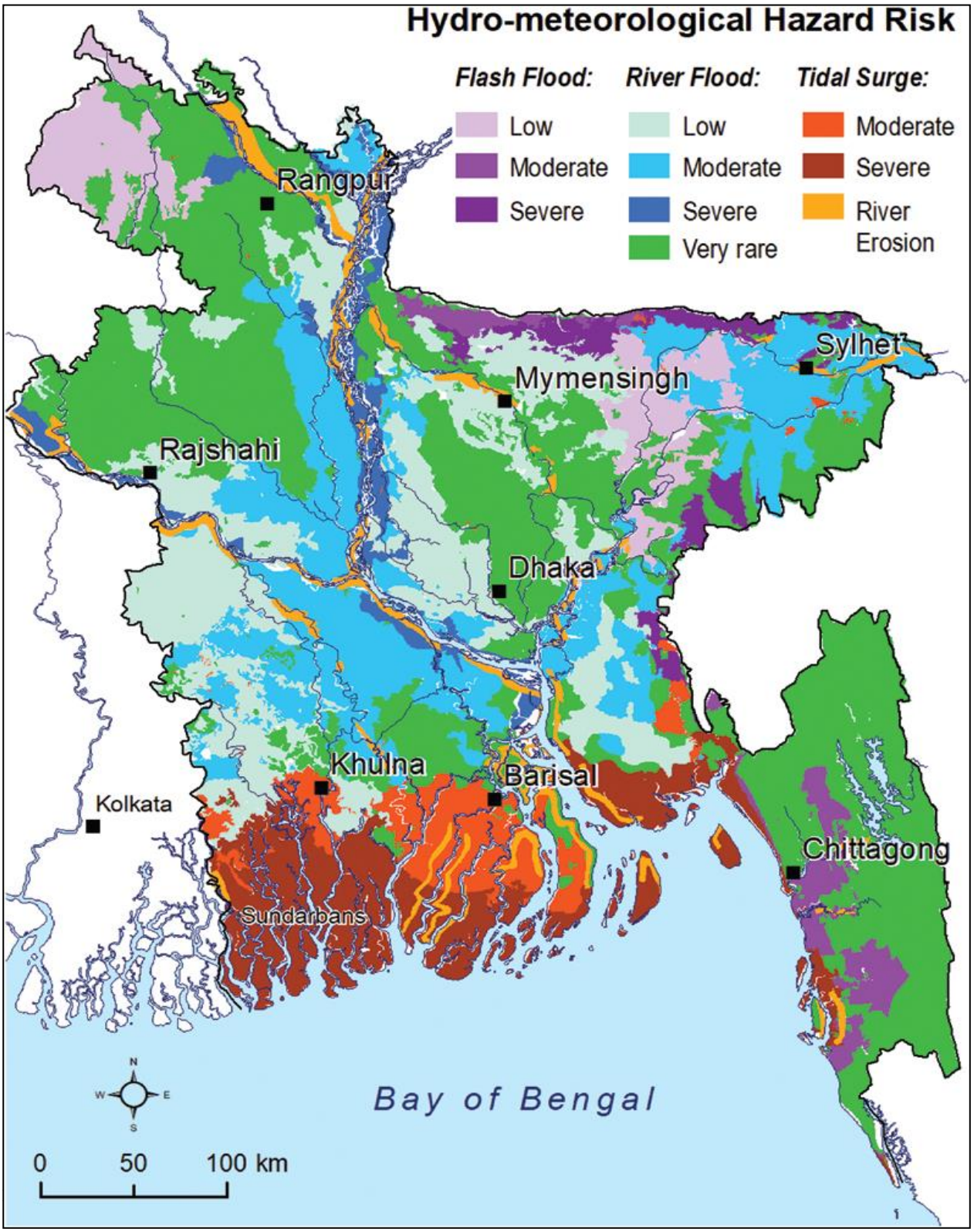
b) *Monsoon* shows comparatively medium temperatures (20°C-36°C). The heavy rainfall in this season starts in June and continues to October, and

c) *Winter* has low temperatures (8°C-15°C) from November to March (Huq & Ayers, 2008).

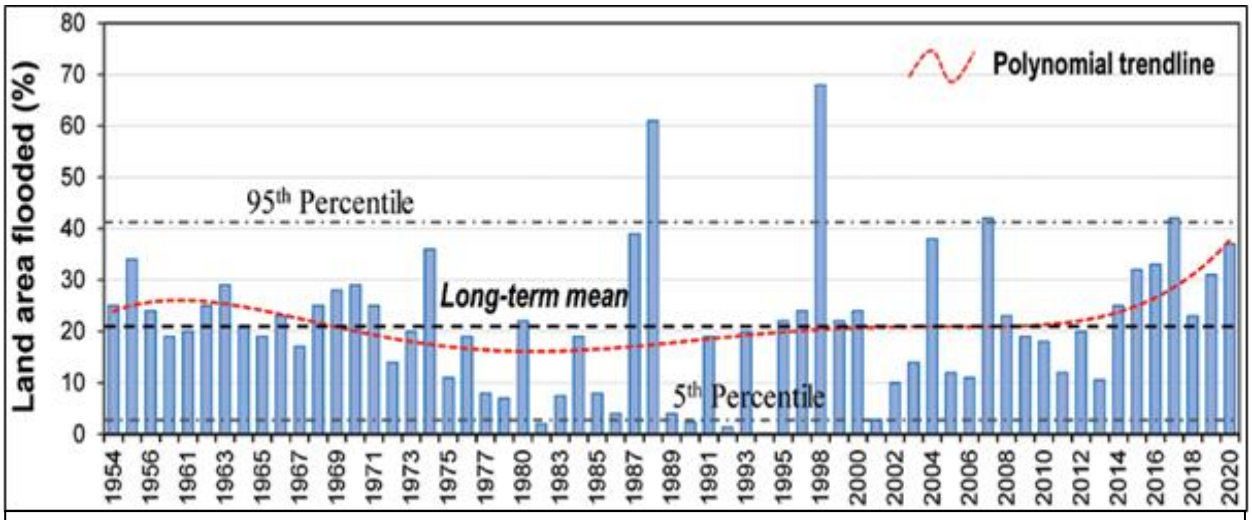
The sub-tropical monsoon season includes an annual average precipitation of 2,300 mm. The annual report of Bangladesh Flood Forecasting & Warning Centre 2018 emphasized the monsoon season because of heavy rainfall and reported that the monsoon season contains more than 80% rainfall. This season includes more extended periods of rain, but there are often shorter

periods of heavy rainfall. The spring tides of the Bay of Bengal slow down the drainage of heavy rainfall water off to the sea and creates flooding during this season. Flood inundation during monsoon season is advantageous to the land for agriculture and other crops if the flood covers approximately 20 % to 25 % of the area of the country; however, flood inundation at more than that level makes local people vulnerable, causing damage to their daily life and livelihood activities (Flood Forecasting & Warning Centre, 2018).

The geographical location, river systems, and climate conditions show Bangladesh is naturally flood-prone. Sammonds et al. (2021) worked on identifying the areas based on the severities of flash floods, river floods, and tidal surges in Bangladesh. They showed that flash floods during the early monsoon season affect the southern and northern hilly territories. River floods usually affect western areas of the country under the Brahmaputra river basin during monsoon time. The coastal regions of the northern part of Bangladesh are vulnerable because of the tidal surges generated by storms in the Bay of Bengal (Sammonds et al., 2021). (See Map 2 for the hydro-meteorological hazard risk in Bangladesh). Concerning the frequency of flooding, Sammonds et al. (2021) also studied flood-affected areas from 1954 to 2020. Using the Bangladesh Flood Forecasting and Warning Centre data, they found a long-term polynomial trend line. It showed that Bangladesh resisted major devastating floods after its independence in 1971. The floods in 1974, 1987, 1988, 1998, 2004, 2007, 2017, and 2020 were significant. Figure 1, adopted from the study by Sammonds et al. (2021), showed that the average land area flooded from 1954 to 2020 in Bangladesh was about 20 % of the total land area, except for the floods in 1988 and 1998. However, the long-term polynomial trend covering the periods (1954-2020) showed that flooded areas were generally below 40 % of the total land area apart from 1988 and 1998. This trend indicated that there would be an increasing trend (Sammonds et al., 2021).



Map 2: Hydro-meteorological hazard risk in Bangladesh (Sammond *et al.*, 2021)



The long-term (1954-2020) polynomial trend of flood-affected areas in Bangladesh

(Sammond et al., 2021)

The United Nations Office for Disaster Risk (UNDRR) study showed the frequency of major floods from 2000 to 2019. It found that the frequency of floods doubled from 1400 to 3200, while the storms increased their frequencies from 1500 to 2000 across the World from 2000 through 2019. UNDRR data revealed that China and the United States were the major flood-affected countries throughout the study periods; however, Bangladesh was on the list of the top ten flood-affected countries with over 100 disastrous calamities between 2000 and 2019 (UNDRR, 2020).

The history of flooding scenarios shows that floods are increasing globally. Bangladesh receives special attention because of its flood frequency, severity, and lack of infrastructure to reduce flood impacts. It faces floods almost yearly. Moreover, floods often happen multiple times yearly, such as the flood in 2017 in Bangladesh (Flood Forecasting & Warning Centre, 2018).

Over time, the increasing trends of flood frequency and land inundation coverage indicate that Bangladesh will probably be more vulnerable to flooding. The United States Environmental Protection Agency states climate change could increase river flooding since the changes in heavy

precipitation, stream flow, snowmelt, and the amount of snowpack affect flood patterns (United States Environmental Protection Agency, 2022). For example, global warming is increasing environmental heat, which increases melting of glaciers and ice sheets that increase ocean water volume, influencing the size and frequency of river flooding (Lindsey, 2022). The Coordination of Humanitarian Affairs (OCHA) highlights deforestation in hilly about fast and overflow flash floods (OCHA, 2022).

In the case of Bangladesh, the actual causes of river floods are monsoon precipitation and sea level rising. Increases in regional and global temperature have increased the glacier ice melt of the Himalayas, and the overflow from the Himalayas goes to the Ganges and Brahmaputra Rivers (Hossain et al., 2020). On the other hand, sea level rise is backing up more runoff water to the GBM river system along the channel. As a result, higher water levels, river siltation, and riverbed levels increase drainage blockage, affecting river flooding (Huq & Ayers, 2008). In Bangladesh, the sea level rises over 3 mm per year, higher than the global mean sea level rise over 100 years (Huq & Ayers, 2008). Scientists anticipate that Bangladesh will lose up to 15600 sq. km if the sea level climbs by 45 cm. There is another assumption that if the sea level increases by one meter and there is no river management, the floods will permanently cover 14000 to 30000 sq. km of the total land of Bangladesh, i.e., over one-fifth of the area of Bangladesh will be sunk (Butzengeiger & Horstmann, 2004, p.6).

Therefore, it is essential to project the consequences of flood risk and analyze the impact of floods and their effect on the country's socio-economy. Moreover, it demands observing the governance pattern on adaptation issues to understand how the governing actors work to address vulnerability caused by devastating floods in Bangladesh.

3.3 PROJECTION OF FLOOD RISK AND VULNERABILITY IN BANGLADESH

The assessment report prepared by the Intergovernmental Panel on Climate Change (IPCC) states that forecasting weather and climate change projections are different. Predicting how the environment, like temperature, will change over the next 100 years and beyond is difficult. Experts could assume the occurrence of natural threats with a probabilistic medium-range weather forecast. There are many reasons that climate change projections are indeterminable; for example, the explanations focus on scenarios of future anthropogenic and natural forces. It is unknown how exactly human activities will release greenhouse gases to the environment and how the impact of greenhouse gases will change over periods (IPCC, 2014).

Different climate models for projecting climate change exist, such as Atmosphere-Ocean General Circulation Models, Earth System Models of Intermediate Complexity, and Simple Climate Models. Based on mathematical equations, these models show how greenhouse gas emissions interact with several parts of the ocean, atmosphere, and land. The computing system of climate models includes identifying and quantifying earth's systems, determining variables for introducing background conditions, and observing significant changes. IPCC prepared a special report to predict future climate situations. This report focused on aerosol emissions scenarios interacting with greenhouse gases and predicted the rise of the emission level during 2100. In 2013, there was a new emission scenario known as the Representative Concentration Pathways (RCPs). RCPs focused on predicting the level of greenhouse gases in the atmosphere during 2100. Each RCP specifies the amount of climate forcing in watts per sq. m.; the forcing rate is the pathway. Scientists use those values for calculating climate models (NOAA, n.d.; IPCC, 2014).

Scientists use four different RCPs. For example, RCP (8.5, 6.0, 4.5. 2.6) indicates global average warming levels of 3.7°C, 2.2°C, 1.8°C, and 1°C by 2100, respectively. Following RCP 8.5 pathway means more adaptation needs high costs. On the other hand, following RCP 2.6

pathway indicates less adaptation need (National Climate Change Adaptation Research Facility (NCCARF), 2017).

Climate models divide the earth into large grid cells to compute the climate change scenarios. Computing Global Climate Models (GCMs) requires globe grid cells measured larger than 100 km. Analyzing the local climate change impacts, vulnerability, and adaptation studies, the climate models need data from grid cells smaller than 100 km. Computing Regional Climate Models (RCMs), known as downscaled models, use grid cells of 10 to 50 km (Canadian Centre for Climate Services, 2018). Downscaled models use local climate variables (such as precipitation) and large-scale variables (such as atmospheric pressure) to develop regional climates (Canadian Centre for Climate Services, 2018, Climate models and projections, para. 4).

Climate models show different projections using different methods, even with the same RCP. Therefore, scientists combined the results generated from other climate models and grouped them as a multi-model ensemble to minimize the uncertainty in climate projections. Then, scientists use percentiles figures to summarize the different results from that group. A percentile represents the highest rate of a ratio of all developments. The 25th and 75th percentiles commonly review various results. For example, using the 25th percentile for projecting temperature rise implies that 25% of individual model results show comparable or fewer results of temperature rising (Canadian Centre for Climate Services, 2018, Managing uncertainty in climate projections, para. 3).

Regarding the projected flood risks in Bangladesh, most studies focus on South Asian Summer Monsoon scenarios. Rao et al. (2020) projected that aerosol and carbon dioxide (CO2) emissions during 2100 will strengthen the South Asian Summer Monsoon. The result is an expected overflow in the GBM river system of Bangladesh that would cause flooding in GMB river basin areas.

To predict the flood risk, Sharma et al. (2021) assessed annual monsoon precipitation change caused by anthropogenic activities in the GMB river basins. To do this, they considered the existing climate signals in all seasons. They tried to find the relationship with the greenhouse gas emissions in the change using the Coupled Model Inter-comparison Project Phase 5 (CMIP5) GCMs. This model measured climate change detection, estimated change points, and studied attribution. The findings showed a significant climate change signal detection after 1980 in most central and north-western regions.

Uhe et al. (2019) projected the flood risk at global warming of 1.5°C and 2°C over the GBM river system. They linked the global climate model with the flood hazard model. Methods and data sets include atmospheric simulation, low warming simulations, climate data analysis, flood hazard model simulations, and scaling discharge from future scenarios. Intense warming simulation covers 2006–2100, high warming simulations cover 2006–2015 as the current climate scenario, and analyzing the plan covers the 2090–2099 decade. This study also conducted a case study on the 2017 flood for comparison. The findings showed an increasing trend in precipitation and consequent flood hazard over the GBM basin comparing the current climate scenario.

Sciance & Nooner (2018) assessed the depth of flood and water level over the GMB basins. They considered eight years of data (2002-2010) from the river and groundwater levels recorded under the Bangladesh Water Development Board (BWDB). They examined the weekly water level data from 304 river stations and over 1200 groundwater stations. The findings showed an increased trend in precipitation over the GMB basins throughout the periods. However, there was a decreased trend typically in the flood inundation depth and water level.

Mohsenipour et al. (2020) examined rainfall distribution changes during the monsoon seasons in Bangladesh. They used quantile regression for measuring rainfall data considering the period of 1961–2014 and recorded the rainfall data every month at 18 locations throughout the

country. The findings showed a decreased trend in many rainfall quantiles from June to August, but there was an increased trend in September, indicating the probability of more floods.

Rao et al. (2020) assessed tree-ring reconstruction of the monsoon season in the Brahmaputra river basin, focusing on the flood risks in Bangladesh. They used tree-ring reconstructions of river flow to evaluate the severity of past droughts and pluvials. They considered the data from the seven past centuries, 1309–2004 CE, that helped to understand present climate severity. This study developed a monsoon season reconstruction of the mean Brahmaputra river flow using the data recorded at the Bahadurabad river gauge, Bangladesh. It also used historical data on monsoon flood events to examine the relationship between Brahmaputra discharge and monsoon flooding. Finally, they projected Brahmaputra discharge from climate model simulations. The findings showed that the years from 1956–1986 CE faced the most severe droughts. Therefore, it is insufficient to understand flood hazard risk in the region based on natural variability and climate change.

Hasan et al. (2020) projected inundation risk by 2100 in Bangladesh's coastal zone because of the rising sea level. They focused on the increase in temperature using 28 Global Climate Models and considered 1986–2005 as the base year. The study showed a temperature increase by 2100 from 1.7°C at the RCP4.5 pathway to 4.4°C at the RCP8.5 path compared to the base year (25.89°C) and sea level rise by 2100 from 0.77 m to 1.15 m. The sea level rise over temperature from 1980 to 2100 was 2.13 to 3.75 mm/year/°C. This study stated that if the sea level rises 1 m, 2098 sq. km of Bangladesh will go underwater.

Reviewing the literature regarding the projection of flood hazards in Bangladesh showed that researchers use two different sources to predict future climate hazards, particularly the flooding scenarios of Bangladesh. One is the weather forecast database. For example, Mohsenipour et al. (2020) examined rainfall distribution changes using monthly recorded rainfall

data to predict flood risks. Sciance & Nooner (2018) also investigated the spatial and temporal changes in flood depth and extent using weekly water level data from BWDB. The other studies used climate models that anticipated areas having the possibility of either warmer, more relaxed, wetter, or drier than in the past. Both sources show there are significant changes in future climate change scenarios using several climate change indicators, such as temperature, rainfall, precipitation, sea level rise, and inundation depth and level, despite some limitations in the dataset, like the use of shorter time data or some uncertainty in the findings of the study. There will be an enormous effect on agriculture, infrastructure, health, and other sectors. The review by Sciance & Nooner (2018) suggests that Bangladesh needs adaptation to challenge that flood risk; otherwise, the country will fall into higher poverty rates.

One study on predicting future climate change vulnerability showed that Bangladesh is the most vulnerable country regarding floods from the Asian climate security perspective (Busby et al., 2018). Considering the period of 2013 - 2050, climate change will increase the vulnerability in the future, and that will have a vast impact on the agricultural land of the coastal zone in Bangladesh (Uddin et al., 2019). Under extreme climate scenarios, crop production, particularly the yield of Boro rice, will decline by 55–62%. In a moderate climate scenario, the other major crops, like Aus, will be reduced by 27%, and wheat production will decrease by 61%. This reduction in production will negatively affect food availability, rural people's livelihoods, and the economy of Bangladesh (Mojid, 2020). A study by Alamgir et al. (2018) showed that the impact of devastating floods could sustain poverty in the riverine areas in the western part of the country, such as Rangpur, Mymensingh, and Khulna. The northeastern regions of the country face flash floods. For example, Kishoreganj is one of the most vulnerable areas in the northeast side of the country, where poverty levels may increase by 8.8% if sudden flash floods occur. Therefore, climate change, floods, and poverty threaten Bangladesh and will significantly impact

food security, poverty reduction, and sustainable development. There is a need to focus on adaptation intervention, particularly in the agriculture, infrastructure, and health sector (Rahman & Mori, 2020; Uddin et al., 2019).

Several studies showed flood vulnerabilities in people, particularly the poor communities living in the flood plains. Floods in those areas make local people jobless with little or no resources to overcome the situation. Males of households migrate to other sites, either temporarily or permanently, to find jobs and leave women in their houses (Ingham et al., 2019; Khalil et al., 2019). Women then continue to seek employment to raise income, involve themselves in agriculture work or handicraft activities, and borrow money or take loans to maintain their families. However, such autonomous adaptation rarely helps to build capacities against floods; moreover, families become more vulnerable to bearing debts (Parvin et al., 2016; Shammi, 2021). Since households face floods every year, families become poorer and poorer. In this situation, autonomous adaptation does not ensure long-term transformation in coping with floods (Fenton et al., 2017; Ferdous et al., 2019; Mondal et al., 2020, 2021). The Government of Bangladesh (GoB) and NGOs/CSOs are focusing on post-flood management and working with those community women to provide training and share local knowledge. However, such planned adaptation (Pokrant, 2019) needs building social capital and trust between communities and governing actors (Khalil et al., 2019).

3.4 GOVERNMENT AND CLIMATE ADAPTATION GOVERNANCE

3.4.1 LINKING ADAPTATION POLICIES WITH DISASTER MANAGEMENT

A review of key literature (Haque & Uddin, 2013; Islam et al., 2020; Ministry of Disaster Management and Relief, 2020) indicates that Bangladesh developed several laws and policies on disaster management and adaptation. The Bangladesh Government emphasized disaster management in the national development plan after the flood in 1988 and the cyclone in 1991.

Disaster management came through the strategies of mitigation, preparedness, recovery, and rehabilitation into the national disaster management plan, apart from relief and rehabilitation activities promoted in the early 1970s to address the vulnerability of the flood in 1971. In 2005, following the guidelines of the International Hyogo Framework, disaster management came into significant concern by preparing a comprehensive disaster management plan (2005–2010) that emphasized the institution involving different stakeholders from the national to the local level. Later, following the international Sendai Framework of 2015, a comprehensive disaster management plan (2010–2015, 2016–2020) drew attention to disaster management in four ways:

a) understanding disaster risk through a knowledge management process emphasizes doing research, exchanging ideas, and disseminating knowledge;

b) strengthening the governance system at the policymaking phase and implementing phase through enhancing coordination between ministerial bodies, building partnerships involving different stakeholders, and focusing joint ventures at the international and regional levels;

c) investments for growing resilience to reduce disaster risk through action plans that address the flood and cyclone hazard; and

d) enhancing disaster preparedness for effective response, recovery, rehabilitation, and reconstruction through strengthening forecasting and early warning systems, sector-wise preparedness, and preparing recovery strategies managing various hazards.

Alongside the national disaster management plan, the Bangladesh Government passed several acts, policies, and guidelines to reduce the vulnerabilities. They included Standing Orders on Disasters in 2010, the Cyclone/Flood Shelter Construction and Management Policy in 2011, the Disaster Management Act in 2012, the Food for Work Program Policy in 2014, the National Disaster Management Policy in 2015, the Employment Generation Program for the Poorest Implementation Guidelines in 2013, and the Test Relief Guidelines in 2013.

Climate change adaptation received action from the Bangladesh Government through the signing of several environmental treaties, including Agenda 21, the Bali Action Plan (BAP), the Kyoto Protocol (KP), and the United Nations Framework Convention on Climate Change (UNFCCC). The Bangladesh Government enacted and updated several laws and policies emphasizing disaster management and adaptation by signing international treaties, notably the Kyoto Protocol, and adopting the Sendai Framework. These treaties demonstrated the political will of the Bangladesh government to reduce disaster risk and integrate adaptation with disaster management. The laws, policies, and guidelines included the National Adaptation Program of Action (NAPA) 2005, the Bangladesh Climate Change Strategies and Action Plan (BCCSAP) 2009, the Bangladesh Climate Change Trust Fund Act (BCCTF) 2010, the National Sustainable Development Strategy in 2013, the Bangladesh Environment, Forestry, and Climate Change Country Investment Plan in 2017, the Climate Budget Report in 2018–2019, the Bangladesh Disaster Management Policy Delta Plan (BDP) 2100, Vision 2041, and the National Plan for Disaster Management (2021-2025).

To focus on the linkage between disaster risk and climate adaptation, the National Plan of Disaster Management showed its connection with Vision 2041. Vision 2041 focused on prevention from impacts, and it connects with the BCCSAP. The BCCSAP focused on adaptation linking climate change vulnerabilities and disaster risks. The Sustainable Development Goals (SDGs) join the disaster management plan. SDGs prioritized disaster management as the foundation for ensuring sustainable development.

Therefore, the above discussion shows that Bangladesh is moving forward to reduce climate-induced disaster risks using several policies and guidelines following several international environmental frameworks.

3.4.2 INSTITUTIONAL FRAMEWORK FOR CLIMATE POLICIES FORMULATION AND IMPLEMENTATION

The Bangladesh Government started strengthening institutional capacity in the 1990s, moving away from relief and rehabilitation activities in the early 1970s (Luxbacher & Uddin, n.d.). The main reason behind this shift was to grow awareness, prepare the sufferers against disaster, and reduce the need for relief and rehabilitation (Ministry of Disaster Management and Relief, 2020).

After the flood of 1998 and the cyclone of 1991, the Bangladesh government created a national disaster management plan. The government updated that plan over periods (2005–2009, 2010–2015, 2016–2020, and 2021–2025). Each project focused on the need for mitigation and preparedness under several strategies. For example, it included prevention strategies, emergency actions, and recovery measurement during post-flood events. There were non-structural mitigation strategies, such as flood forecasting, early warning system, and evacuation and shelter management. This plan emphasized the incorporation of those non-structural measurements with structural development. Those strategies aimed to forward actions towards resilience comprehensively. The sub-program of this plan included capacity-building, partnership development, community empowerment, and research and response management. The partnership development focused on a multi-agency approach that targeted collaboration among government institutions focusing on the role of local government bodies, NGOs, CSOs, and the private sectors. The institutions managing disaster risk and its impact also drew attention to involving local people with other stakeholders. Such a collaboration aimed to ensure knowledge management through information-sharing and coordination among partners to reduce the risk effectively. On the contrary, the community empowerment sub-program focused on the community's capacity building through awareness and skill development training programs that

included local people's involvement and staff training. Moreover, this plan also involved academic disaster management studies (Ministry of Disaster Management and Relief, 2020).

3.4.3 THE GOVERNMENT'S PRACTICE ON CLIMATE CHANGE ADAPTATION

Over four decades, the GoB developed significant infrastructure in response to disaster risk reduction by constructing cyclone centers, embankments, and roads. For example, the country's cyclone centers increased from 42 to over 12000 to accommodate approximately 5 million people from the 1970s to the present (Hadi et al., 2021). After independence, the country constructed thousands of kilometers of roads to protect around 35 million coastal people against floods (Adnan et al., 2019). There was a reduction in deaths considering the cyclone over periods (Sammonds et al., 2021). There was also a decreasing trend of country-wide average flood inundation depth and water level because of disaster management (Sciance & Nooner, 2018).

Besides these achievements, Bangladesh completed many climate change adaptation projects, but there were challenges in governing those projects (Rahman et al., 2021). There is still room to develop successful partnerships in governance systems to reduce climate vulnerability and disaster management (Haque & Uddin, 2013). For example, the challenges included a lack of coordination and bureaucracy, power dominance of national level-based organizations (Ishtiaque et al., 2021; Islam et al., 2020; Rahman et al., 2021; Rahman & Tosun, 2018); and reluctancy of local government to build up cooperation involving local people in designing project (Ingham et al., 2019; Islam et al., 2020; Karim & Thiel, 2017).

Islam et al. (2020) observed challenges in combining disaster management and adaptation and found a need for coordination in ministry-level organizations. The study found that organizations and institutes working on disaster management and climate change adaptation work separately. For example, the disaster management ministry (Ministry of Disaster Management and Relief) implements disaster-related projects. In contrast, the environmental ministry

(Ministry of Environment, Forest, and Climate Change) implements climate adaptation projects. Although both ministries work separately, they deal with reducing disaster risks. However, the GoB established the national disaster management committee, national environment committee, and climate change unit to support how all relevant organizations will work together on the issues of disaster risks and climate adaptation. This study also found that each organization had different interests and was competitive in decision-making. For example, the Ministry of Disaster Management and Relief competed with the Ministry of Environment, Forest, and Climate Change. They needed help deciding who provides leadership to distribute funds and to what level of disaster management or climate adaptation they must focus. However, the proper arrangement, including role delineation of relevant organizations and distribution of responsibilities, helps coordinate disaster risk and climate change adaptation activities (Islam et al., 2020, p. 5).

Ishtiaque et al. (2021) investigated the power dominance of ministry-level organizations over adaptation governance. Rahman et al. (2021) also observed the bureaucracy and control over the adaptation project fund. They studied 573 climate adaptation projects of the Bangladesh government. The findings showed more interference of the general administration officers than technical officers over funding. The administration employees expanded their power, keeping positions as project directors and sanctioned funds centrally and locally in every phase of the big adaptation projects. Rahman et al. (2021) criticized that such power influences the administration cadre's behavior, which rarely meets participation and collective decision norms. The study by Rahman & Tosun (2018) had the same findings about the appointment of directors and their power dominance to conduct climate change adaptation projects when they studied the management of climate change adaptation projects in Bangladesh from 2009 to 2015.

Although the comprehensive disaster management plan ensures community involvement in disaster management and adaptation projects, Islam et al. (2020) reported that some adaptation

projects did not involve local people in implementing the projects. For example, BWDB implemented a large dam through the adaptation fund in Bangladesh's Chattogram division without consulting with the local community. There also needed to be more participation from the local government. This dam was different from the local-level planning and created terrible water logging problems, which damaged the crop fields and changed the livelihood of local people. Dependency on government funds, a lack of community involvement, and the choice of not harnessing local knowledge ultimately led to the project's failure.

Ingham et al. (2019) showed the local government's need for initiatives to develop flood warning systems. Although there is a progressive cyclone warning system in the coastal areas for flood warnings, there need to be more initiatives to have the message reach the rural poor. The local government sends the flood warning message orally, but it rarely goes to rural women. Also, it suffers from a lack of leadership (Haque & Jahid, 2021) in speeding up warming systems and other adaptation projects to grow the resilience of local people, such as livelihood development projects and flood embankment projects, building cooperation with local people and other NPOs (Karim & Thiel, 2017).

3.5 NON-GOVERNMENT, CLIMATE ADAPTATION, AND INTERNATIONAL DEVELOPMENT

3.5.1 NGOS, CSOS, AND THEIR IDENTIFICATION IN GOVERNMENT LAW

The Foreign Donations Regulation Ordinance 1978 specifies the organizations involved in voluntary activities supported by foreign donations. It identifies all non-state and voluntary organizations like NGOs and CSOs, besides government organizations, that can do voluntary activities with foreign support, such as agricultural development, relief works, and others (Ahmad, 2001, para 3 under the section of Legal status of NGOs, Past and Present). NORAD (2008) tried to distinguish between CSO and NGOs. It explained that CSOs focus on advocacy

work to influence the government to enact new policies or reform policies for betterment facilities. In contrast, NGOs focus on project implementation in the field with donor or government support (NORAD, 2008). Though their purposes differ, it is challenging to differentiate between NGOs and CSOs in Bangladesh. Bangladesh saw the activities of CSOs in 1952 against the Pakistani ruling class. NGOs came as implementing agencies for delivering services, a sub-sector under the CSOs to build a robust civil society. During this period, several multilateral aid agencies, such as the World Bank, the European Union, and the United Nations Development Programme, determined the role and responsibilities of CSOs and emphasized their involvement in democratization at the local level, raising voices regarding protecting the environment in a sustainable way, and growing awareness for reducing poverty. The aid agencies wanted CSOs to do such advocacy by making associations. However, in Bangladesh, the role and responsibilities of CSOs overlapped with service delivery activities since some foreign donors saw the advocacy and delivery services as a strong base for sustainable development, which influenced the CSOs to expand their participation in service delivery activities (Shakil, 2011). On the other hand, NGOs in Bangladesh became aware of doing local-level advocacy seeing its benefit to service delivery long-lasting. Moreover, implementing many advocacy programs alongside providing services helps NGOs to move towards ensuring development in Bangladesh (Rahman, 2003).

3.5.2 NGOS AND HISTORICAL INVOLVEMENT IN DEVELOPMENT ACTIVITIES

NGOs and CSOs began their relief and rehabilitation activities in 1971 to support the vulnerability of rural people that grew from the war of independence that year. Such non-governmental bodies attracted the attention of external donors as they reached out to remote areas to provide the support that the government could not do. The government also showed its reluctance to provide support in peripheral regions. The large Bangladeshi NGOs, such as BRAC

(Bangladesh Rural Advancement Committee), Grameen Bank, and Proshika, grew from 1972 to 1976. (The Proshika promotes self-reliance of the population in areas of agriculture, forestry, health, literacy, and disaster management.) Over the 1980s, the NGOs moved to work with relief and rehabilitation after the disastrous floods of 1988. The external donors' fund increased the operational budget of the large NGOs, in which 55–60% of the total budget came from donors. A World Bank Report (Alamgir et al., 2006) indicated that non-government bodies received 34.1% of international donors' funds ($379.4 million) from 2003 to 2004. Non-government bodies became largely autonomous in Bangladesh. They began competing with the government because of their available donor funds, employment generation, and institution-building programs with the community, such as the BRAC villages or the Grameen villages (Kennedy, 1999; White, 1999). BRAC became the second largest employer in Bangladesh after the GoB: it had its employees of 93,843 people until June 2006 (Asian Development Bank, 2008; Mohinuddin, 2017; Transparency International Bangladesh, 2007).

Through the mid-1980s, based on the long-term foreign assistance availability, non-governmental bodies increasingly shifted to the economic development of vulnerable groups through micro-credit programs, along with other social services, particularly health and education. Microfinance programs became more concerned about the financial sustainability of the poor facing frequent disasters and losing livelihoods and assets (Feldman, 1999). Before commencing the micro-credit, the rural people in Bangladesh used to borrow money from the rich, paying a high interest against their loans. However, micro-credit solved that problem and offered poor people opportunities to do business with that money. After earning a profit, they can return their loans to micro-credit-providing organizations (Meade, 2001).

Micro-credit, with no collateral, not only supported the poor people in rural areas but also supported the organizations to mature. The big NGOs operated the microcredit program to extend

their service coverage in the country. The successful operation of micro-credit programs by the NGOs made the donors find NGOs more reliable than the government. Consequently, NGOs were conducting their activities autonomously without government interruption. Nevertheless, because of the microcredit program, the NGO sector became solvent by raising its organizational revenue. Such scenarios changed the dependency on the donor fund. For example, the donor fund was 60 % of the total fund in 1996 but only 1.05% in 2016, indicating that dependency on the donor fund to the total fund decreased from 1996 to 2016 (Chowdhury et al., 2020; Microcredit Regulatory Authority, 2018).

Over the 1990s, the government established a rural financial institution to support the NGOs' microcredit program. This rural financial institute became the top provider of micro-credit funds. The government started to work with NGOs because NGOs had already become popular with the poor (Chowdhury et al., 2020).

During the 2000s, there were significant debates about the microcredit program, with NGOs facing criticism for their heavy-handed payment collection approach to micro-credit. Stiles (2002) claimed that the large NGOs diverted funds and focused on organizational development, not development for the rural poor. Transparency International Bangladesh (TIB) (2007) reported on internal governance issues of non-governmental bodies. That report showed they needed help managing quality and internal governance issues: there was a lack of transparency, and the autocratic attitude of the NGO chiefs resembled corruption. The criticism of NGOs' governance pattern drew the government's attention, which later established the Microcredit Regulatory Authority (MRA) in 2006 to monitor the micro-credit program. Any organization that wants to operate a microcredit program must get an MRA permit. The MRA has the power to cancel that permit for micro-credit-operated organizations. Currently, 118 NGOs lost their licenses due to failing to meet the regulations of MRA (Chowdhury et al., 2020).

3.5.3 NGOS-GOS PARTNERSHIP, ADAPTATION, AND INTERNATIONAL INFLUENCE

Irish & Simon (2005) found that the Bangladesh government established relationships with NGOs and CSOs through the NGO Affair Bureau (NGOAB). NGOAB is a Bangladesh government bureau that observes foreign funds activities of non-profit organizations. This authority can issue registration and restrict the registration of those organizations (http://ngoab.portal.gov.bd).

Partnerships with NGOs and CSOs, involving other stakeholders increased attention to strengthening the institutional capacity of disaster management policy and planning. It did so with a sense that such organizations could share the cost of disaster management with government agencies. However, government agencies moved to work without partnerships with NGOs/CSOs. For example, the government handled the massive flood in 2004 without partnerships with NGOs/CSOs. As a result, such projects needed more coordination of disaster management activities. On the other hand, to avoid the Government, NGOs/CSOs moved ahead with relief and rehabilitation activities through international partnerships (Haque & Uddin, 2013).

Collaborative programs at the international level, including the government and non-government bodies, such as the project between Norad (Norwegian Agency for Development Cooperation), ADB (Asian Development Bank), and the Bangladesh government, focused on the participation of NGOs/CSOs in climate change programs. For example, Bjerknes Centre for Climate Research (BCCR), the Norwegian Met Office, and the Bangladesh Meteorological Department (BMD) made a partnership with Bangladesh Centre for Advanced Studies (BCAS) under the project on climate model development and projections. Norad's other program involved the Ministry of Environment, Forest and Climate Change (MoEFCC) and non-government

bodies. The non-government bodies, particularly the NGOs/CSOs, contributed significantly to Bangladesh's climate and forestry development. This project measured strategies against corruption, such as cutting hills or trees illegally. ADB had another strategic program on building climate resilience. This program ensured the engagement of government bodies, such as the state minister and the secretary of MoEFCC, NGOs/CSOs, and other stakeholders in workshops that emphasized the incorporation of climate resilience into the national development planning along with poverty alleviation and sustainable development goals (USAID, 2011; Royal Norwegian Embassy in Dhaka, 2012).

Regarding political activities, the Bangladesh government does not clarify the participation of NGOs/CSOs in advocating or lobbying either at the national level or field-level activities; however, the official documents forbid NGOs/CSOs from doing partisan political activities (Irish & Simon, 2005).

Reid et al. (2012) observed the environmental policy in Bangladesh and the engagement of the NGOs/CSOs in the policymaking process. They found that the Bangladesh government signed several international treaties, including Agenda 21, UNFCC, Kyoto Protocol, and Bali Action plan, that required the Bangladesh government to keep non-government bodies in all ministerial environmental steering committees. The participation of NGOs/CSOs in environmental steering meetings did not recognize them as observers; instead, NGOs/CSOs participated as technical professionals in preparing the draft of policy documents. Their participation contributed to formulating Bangladesh's environmental policy in 1992, national ecological management plan in 1995, national adaptation plan in 2005, and climate change policy in 2008.

For example, in the case of NGOs/CSOs' advocacy work on policy reform, they protested the flood action plan in 1994. This plan proposed the construction of river embankments and

other engineering works. The NGOs/CSOs came up with several research studies and warned that if the government built those embankments, there would be substantial environmental damage, displacement of poor people, and flooding. Moreover, the association of environmental NGOs and the other association of development agencies arranged a conference on open talk regarding the flood action plan 1994 dated 27 November 1995 in Dhaka. The meeting finally drew attention positively to the Bangladesh government and donor World Bank (Haggart, 1994).

However, the participation of the CSOs/NGOs in Bangladesh's climate policy-making process in 2008 was more substantive than the other environmental policies in Bangladesh from 1992 to 2005. The case study on Bangladesh climate policy 2008 showed that the NGOs/CSOs participating in ministerial committees were very close to ministerial bodies, so government members often co-opted NGOs/CSOs in decision-making. CSOs/NGOs rarely spoke out strongly against the government bodies because they wanted to avoid losing attention and funds if they did not follow them. Even in the climate project implementation phase, ministerial bodies worked only with those NGOs/CSOs that provided bribes; often, 20% of a project's cost was a bribe to the relevant officials/politicians for securing projects (Lopa & Ahmad, 2016).

The Review on the participation of non-government bodies showed that mainly NGOs and CSOs in climate change policy formulation and project implementation in partnership with the government took place through accepting the donors' rules, policies, and guidelines and signing several international agreements. The Bangladesh government involved CSOs/NGOs with other non-government bodies in ministerial committees to follow a participatory approach. The selected NGOs and CSOs contributed to drafting policy documents as technical resources. However, NGOs/CSOs' involvement was arbitrary by the government.

While the NGOs/CSOs participated in policy formulation and project implementation using the support of donor policies and the institutional framework guidelines of international

treaties, they lacked the high standards of authorized and governing structures from the government that would have allowed them to work on development activities on a large scale. The government watches out for the foreign fund activities of the NGOs/CSOs through NGOAB, implying that the relationship between the Government and NGOs/CSOs is one of sovereignty rather than cooperation.

While NGOs/CSOs get primarily disadvantaged by government control and internal governance systems, they continue to press for relief activities, climate-induced disaster management, poverty alleviation, micro-credit, and other social services using their revenue generated from the micro-credit program and available foreign funds. Moreover, the NGOs/CSOs promote a community development approach involving local people in either disaster management or micro-credit programs for the welfare of local people. Their activities and approach to working with locals help them hold a position between the government and the community (Asian Development Bank, 2008). As of February 2020, there were 2505 registered NGOs/CSOs with the NGOAB (www.ngoab.bd.org), indicating a dramatic growth in the NGO sector. NGOs/CSOs play an essential role in bringing foreign funds to the country through international partnerships for addressing the country's disasters, like flood events. Chowdhury et al. (2020), using data from the Ministry of Finance in 2015, reported that foreign aid received by the NGOs/CSOs raised from 11.4% in 1990–1991 to 51.37% in 2013–2014. The study also highlighted that foreign fund allocation through NGOs in 2015 was comparatively higher in environmental management than in health services and education facilitation.

Nevertheless, high fund flow from foreign donors to the NGO sector through international partnerships shows a new collaborative partnership approach in governance systems apart from a critical government-NGOs relationship in disaster and adaptation governance in Bangladesh.

3.6 NGOS-INTERNATIONAL DONOR PARTNERSHIP AND NEW COLLABORATIVE GOVERNANCE APPROACHES

Bodin (2017) discussed the issues of cross-boundary environmental governance. He mentioned that rivers and mountains expand territories, sometimes crossing local political demarcation. Human settlement in the river basins and mountain basement suffers from several natural hazards and rarely gets facilities and services from the government. Bodin (2017) emphasized institutional collaboration crossing scales or borders to improve resource governance. He explained that understanding the diversity of the ecosystem of natural resources needs continuous learning through the collaboration of transboundary governing actors. Integrating inputs by balancing the interest of several actors enrich the learning system that generates new knowledge for environmental resource management. However, Bodin (2017) also focused on the power imbalance of different actors in such collaborative governance. The power imbalance of actors may create conflict that rarely helps to find measurements or solutions to environmental crises (Bodin, 2017, p. 8).

Ansell & Gash (2008) also focused on the importance of collaborative governance, highlighting collaborative management as an alternative to the adversarial nature of interest group pluralism and managerialism's accountability failures. Since knowledge accelerates and focuses on specification and sharing, it demands collaborative arrangements (Ansell & Gash, 2008, p. 544).

There are several participatory approaches to collaborative governance in the international development process. For example, International Joint Ventures (IJVs), multi-level partnerships, Joint Knowledge Production (JKP) for conducting action research, and Community-Based Approach (CBA) engage the participation of local people. Every participatory process should meet the following criteria to be effective:

a) understanding participants' needs, perceptions, and situations

b) gathering information and its application

c) recognizing various determinants and potentials

d) generating knowledge or proposing measurements (De Bremond et al., 2014: Swartling et al., 2019, p. 98).

However, a theoretical assumption of such collaborative governance approaches and the challenges of such approaches during implementation are essential to discuss for conceptualizing governance approaches further.

3.6.1 INTERNATIONAL JOINT VENTURES (IJVS)

Kandimir & Hult (2005) discussed the procedure of IJVs or international partnerships as a strategy in the global collaborative governance system on climate change. Working together through IJVs towards achieving climate change knowledge information, developing new technology, and implementing climate change development projects became trends in addressing climate change vulnerability. However, there are also several challenges when organizations from different countries unite to work in the climate change decision-making process. The author highlighted a general norm and value of IJVs. Moreover, the author shows the knowledge management procedure through IJVs, and the difficulties faced in a real-life situation in climate change policymaking and implementing climate change development projects (Kandimir & Hult (2005).

According to Kandimir & Hult (2005), IJVs try to develop new technology through joint ventures in research and development (R&D), in which partner organizations share technical knowledge. The IJVs include a four-stage process to follow for an organization to create new technology:

1. First stage shows acquiring knowledge through working directly with partners, and learning strategies, techniques, and other management issues from partners.
2. The second stage shows the information dissemination and distribution among employees or members at different levels of an organization to ensure the accessibility of available resources. This situation builds coordination and cooperation among members that neutralize power dominance and hierarchy.
3. Third stage involves sharing direct knowledge gathered from partners through interpreting and explaining several terms, challenges, and potentials to ensure organizational members' or employees' learning and skill capacity.
4. The last stage emphasizes storing knowledge through developing a knowledge hub for further benefits.

Kandimir & Hult (2005) add that applying decentralization, openness, and trust among members is essential to conducting knowledge management through the four stages. Decentralization allows participants to develop their ideas or plans in the planning process, reducing levels of control of centralization. Openness to sharing ideas enhances collaboration and coordination among core organization(s), reducing the differences in the specific country identity of organizations. Moreover, willingness to speak openly in the planning process reduces participant discrimination. It establishes mutuality to build standard rules and regulations that every partner needs to follow for sharing, listening, learning, and synergizing in the joint venture process. Trust is also vital in the international collaborative venture process, which depends on the ability of participants from each core partner organization to exchange ideas and integrate ideas into their knowledge (Kandimir & Hult, 2005, pp. 430–435).

3.6.2 MULTI-LEVEL PARTNERSHIP APPROACH FOR ADAPTATION

Bauer & Steurer (2014) developed an analytical framework to observe the role of partnerships that already took place in governance systems to improve social change and sustain development or to manage environmental and climate change vulnerability. In their analytical framework, they assume an ideal partnership can organize by itself without maintaining a hierarchy in the group. Different partners and stakeholders from various governing actors, such as government, academics, civil society members, NGOs, and private sectors, can cooperate in exchanging information, challenges, and knowledge. Bauer & Steurer (2014) developed five dimensions to observe the regional association or partnership based on their literature review on governance and multi-level management systems.

First, national or international partnership settings can be top-down or bottom-up.

Second, partnerships can be government-led partnerships (between government and private organizations) or private partnerships (between private organizations). Private organizations dominate the Government-led partnership. There is no involvement of the government in private partnerships.

Third, partnerships concern the coordination patterns of partnerships. The coordination patterns are vertical, horizontal, or both between different levels of governance systems. Vertical coordination can be bottom-up or top-down. Vertical bottom-up coordination leads to developing proposals by actors/organizations at the local level. Vertical top-down coordination influences local-level organizations to follow the national government's or international donors' guidelines. Horizontal coordination interconnects different policy arenas or builds communication between government and non-government actors or between varying levels of authority.

Fourth are the modes of coordination for building partnerships. Three coordination modes are generally standard in the governance system that depends on the location of authority and

interactions between actors or organizations: hierarchical, market, and network. Hierarchical coordination focuses on a few actors for making decisions. The market mode of coordination focuses on self-coordination. The network coordination mode relies on sharing and exchange in a cooperative setup.

Fifth, partnership settings and building coordination functions are not enough in a partnership scheme. Collaboration is essential, which will help to produce knowledge dissemination, institutional capacities, setting norms, lobbying, and ensuring more participation in multi-level arrangements. The fifth dimension focuses on the collaborative setup apart from hierarchical structures since collaboration allows flexibility, creativity, and innovation (Bauer & Steurer, 2014).

3.6.3 JOINT KNOWLEDGE PRODUCTION (JKP)

Hegger et al. (2012) proposed the JKP framework. He designed the framework explicitly to assess climate adaptation processes involving stakeholders for producing knowledge jointly. Swartling et al. (2019) applied Hegger's JKP to observe the co-production of understanding in the Swedish forestry project. Swartling et al. (2019) discussed that the framework has four essential dimensions to ensure participation in a knowledge management process: 1) actors' participation, 2) discourses, 3) rules and regulations, and 4) available resources.

In addition, the framework suggests seven conditions for observing the JKP to determine whether collective knowledge management is successful. The seven conditions are:

a) feasible actors' partnership

b) same interest in problems

c) stakeholders' perception

d) tasks distribution of participating actors and their analytical thoughts

e) clear role of the researchers and their knowledge

f) strategies for motivations

g) available resources (information and updated knowledge, facilities and services, and competencies (Swartling et al., 2019, p. 99).

3.6.4 COMMUNITY-BASED APPROACH (CBA)

Community-based approach (CBA) is a new governance tool in the international development process to work with local people (beneficiaries) in the field (McNamara et al., 2020: Westoby et al., 2020; Westoby et al., 2021).

Masud-All-Kamal & Nursey-Bray (2021) referred to this approach as a community development model that prioritizes the needs and capacities of the local community and involves them in the planning process for a development project, thus helping the local community to be empowered and build adaptability against any environmental impact, like floods. They also discussed that in the case of adaptation planning and implementation, this process provides opportunities to get resources like financing, livelihood skills, or the development of infrastructure that the local beneficiaries need over the project period. CBA identifies existing and feasible adaptation techniques and disseminates those adaptation technologies to the relevant local-level authorities and non-government organizations. Moreover, CBA focuses on local or indigenous knowledge and inspires collective action involving the community, researchers, and practitioners; it also blends scientific information with local expertise and includes an assessment to identify risks for a long-term evaluation (Masud-All-Kamal & Nursey-Bray, 2021).

However, while the above discussion on collaborative governance and knowledge management through IJV, JKP, or partnership governance is theoretically sound, the partnership approaches face several challenges in practice. True partnerships differ widely regarding actor involvement patterns and relations, government structures and management, spatial diversities, and funding equity between developed and developing countries. Moreover, it is tough to

coordinate different partners, ensure communication and cooperation and build trust among partners in international development projects. There is a broad assumption that partnership is an advanced tool for solving environmental crises (McQuaid, 2010; Pattberg et al., 2012; Van Huijstee et al., 2007), but development actors and social groups face limitations in bringing climate adaptation into the mainstream of society. In this case, the Institute for Global Environmental Strategies (IGES) (2009) pointed out that no ideal institutional arrangement guides the different actors dealing with climate change. Bauer & Steurer (2014) noted that adaptation partnerships show relatively weak political status, which needs formal norm-setting and rule-making. The partners cooperate voluntarily or arbitrarily, and they could face various internal and external difficulties regarding the governance of collaborative partnerships, which may negatively impact development. For example, in a collaborative partnership, if a project member does not complete the project activities on schedule or prepare their assigned project documents and reports within deadlines, it can adversely affect the entire team's effort. This situation may cause frustration and mistrust among partners, decreasing their work efficiency. On the other hand, the global financial crisis on adaptation and the involvement of multiple stakeholders in adaptation partnerships with numerous opinions and personal attitudes might challenge partnership effectiveness (Bauer & Steurer, 2014).

To recognize the challenges around adaptation partnerships, IPCC (2018) stated several problems involving different stakeholders at different governance levels. In this regard, the IPCC (2018) mentioned that involving other stakeholders in the lawmaking process provides opportunities to discuss the agenda of reducing GHG emissions and possible adaptation options. However, it is difficult because not everybody has the same interests and agreements. Power dominance, individual ego, the co-opting attitude of political parties or leaders, hierarchy, and bureaucratic politics in decision-making often need to be revised to shape policies correctly.

International knowledge management starts with the donor's policies, then turns to transformation by agendas, interests, and interactions of the donor and recipient representatives at each stage of implementation and interfaces, that create several dichotomies, such as state vs. private, local vs. national and global, top-down vs. bottom-up, senior vs. junior, modernization vs. local culture and belief, and others (Wedel et al., 2005). Some studies identified specific constraints to climate change adaptation projects: for example, Ernst et al. (2019) identified challenges that the different stakeholders faced in their partnership to produce adaptation knowledge in Sweden. Ernst et al. (2019) 's research findings showed that stakeholders faced constraints in producing adaptation knowledge in different stages like researching, maintaining communication and establishing coordination, and disseminating the adaptation knowledge. Other problems included measuring equitable funding, the professionalism of stakeholders, and organizational management. These are similar to the constraints faced in other donor-driven, internationally-developed projects (Ernst et al., 2019).

Crewe & Harrison (1999) observed donor-funded international development projects in their study. Their findings showed that people of multiple nationalities often need more openness in planning when they work together to share knowledge because there is often a hierarchy among participants. The participation sometimes depends partly on the participants' identity (such as gender, age, class, nationality, and race) and partly on the participants' institutional position (such as junior/senior, donor/recipient, governmental/CSO) within the partnerships. For example, in a donor/recipient relationship, funds transferring from donors of developed countries to developing countries is not an equal exchange. Many donors force recipients to employ large numbers of consultants. Recipient countries often try to please their donors by hiring consultants. The laptop-toting consultants who fly in and produce dozens of recommendations sometimes force policies and undermine the recipient's priority of bottom-up and decentralized approach.

Furthermore, recipients fear losing funds, which shows compromising their relationships with the donors. Hence, they try to obey the donor's project rules and guidelines to implement the projects or programs, avoiding their sociocultural norms, beliefs, customs, or values (Crewe & Harrison, 1999). On the other hand, Dodman & Mitlin (2013), Forsyth (2013), Dewan et al. (2015), and McNamara et al. (2020) also pointed out that CBA is imperfect, as their studies identified constraints like inefficient organizational management, fund crisis, insufficient knowledge, lack of communication and physical distance delayed CBA project implementation in developing countries. Also, there needed to be more local people's involvement and local government support. Moreover, local government and community people needed more interest in the climate change project.

Dewan et al. (2015), Roy et al. (2016), and Rezaul Islam (2017) also stated the impact of western ideologies in the local context. For example, western ideologies and management impacted project design and implementation. There was criticism of the concept of the word community, which differed from the local sense of community. In this regard, CBA development projects are grouping communities as homogeneous units ignoring socioeconomic diversities, grouping complexities, and personal power relations (Buggy & McNamara, 2015; Dewan et al., 2015; McNamara & Buggy, 2017; Westoby et al., 2021).

When the criticisms around collaborative partnerships, either top-down or bottom-up, show limits, the study of Bauer & Steurer (2014) showed that both approaches facilitate adaptation programs, despite having limitations. They conducted a study comparing government-led partnerships and stakeholder-led partnerships in the adaptation area. Their study analyzed the process of adaptation partnerships at the regional level in Canada and England. It compared each country's growth, group of members, governance rules and regulations, level of interaction and society, and adaptation programs and results. Although both countries follow collaboration in

partnership schemes, they have different origins and governance structures. Canada follows government-led collaborative partnerships, which are top-down governance structures. On the other hand, English collaborative partnerships follow a more stakeholder-led governance approach. The commonality is that both methods enhance public and private collaboration in the government system to build capacities for adaptation work that influence adaptation policies (Bauer & Steurer, 2014).

Ishtiaque et al. (2020) explained further that the adaptation governance processes need to be more inclusive. A small group of people or organizations conducting the adaptation governance show a power imbalance that weakens the collaboration system. Adaptation governance depends on how the organizations rule their authority concerning different organizational perceptions, knowledge, and the relationship among corporate bodies at the different governance levels. Moreover, adaptation governance mostly depends on innovative knowledge management strategies that will maneuver the other actors to show the same interest or agreements for achieving common goals (Ishtiaque et al., 2020).

3.7 THE PRACTICES OF NGOs ON INTERNATIONAL CLIMATE ADAPTATION PROJECTS IN BANGLADESH

The foreign fund flow to Bangladeshi NGOs and increasing sectoral fund flow from donors to environment protection allow Bangladeshi NGOs to gain additional money to implement climate-related projects through international partnerships. Such international partnerships between donors and Bangladeshi NGOs maintain a relationship involving international NGOs (INGOs). The success of adaptation projects and the partnerships under adaptation projects depends on the dynamic relationship of donors, INGOs, and Bangladeshi NGOs (Banks et al., 2015; Masud-All-Kamal & Nursey-Bray, 2021; Wallace et al., 2007).

However, international partnerships struggle through power dominance and inequity (Edwards, 1999; Fowler, 2000). For example, Ahmad (2006) found that donors prefer the INGOs since INGOs have a comparatively higher institutional capacity in terms of technical and operational skills than the local NGOs for distributing funds. As the INGOs control that funding, Bangladeshi partner NGOs feel less power in conducting project activities. As local partners, this situation stresses Bangladeshi NGOs in delivering services to the beneficiaries. Moreover, such local NGOs concern more to develop their organizational growth instead of devoting themselves to working for the people (Tortajada, 2016). Banks et al. (2015) also questioned NGOs' ethical and moral commitments to the local communities. They criticized that NGOs implement community projects without prioritizing the agenda and objectives of the targeted communities. NGOs emphasize donor wishes and ideologies in project design and planning, which compromises the situation in the international partnership, ultimately leading to losing the local NGOs' innovation, autonomy, and legitimacy as partners (Banks & Hulme, 2012). Since such international partnerships focus on project implementation through a specified period and maintaining deadlines to complete the project activities, NGOs cannot follow the process approach to meet the deadlines and targets imposed by donors (Tortajada, 2016).

Masud-All-Kamal & Nursey-Bray (2021) recently studied the CBA project through international partnerships in Bangladesh. They observed the funding situation, planning stage, and implementation of the CBA project. Their findings showed that the dynamic relationship between international donors, INGOs, and local NGOs needs to follow the theoretical assumption of partnerships in Bangladesh. There was a hierarchy in the partnerships where INGOs played a principal role in designing and operating the CBA project activities. The INGOs negotiated the project priorities with donors before the project initiation, and the donor had considerable interference in project priorities. Later, INGOs had to follow donors' preferences without

considering the INGOs' interests and local people's needs. The CBA projects the authors investigated could have performed better in practice because the donors interfered in all project activities from design to implementation. The authors' findings also showed that NGOs implemented CBA programs like other community-based projects requiring reform to grow adaptability against climate vulnerability (Masud-All-Kamal & Nursey-Bray, 2021, pp. 1103–1104). Another study by Rezaul Islam (2017) focused on the donor-driven CBA project by NGOs to see the involvement of communities in international development partnerships. The author's findings show that Bangladeshi NGOs must listen to local people's voices; instead, they work on following Western concepts. There were various challenges. The socioeconomic situation of the local people was deplorable, and they lived in diverse cultures. In this sense, bringing them under the same interest was challenging. The development tools needed to be more familiar to the NGOs and local people. Also, there needed to be more consultations with the local community. These challenges acted as barriers to ensuring the CBA approach in the field.

Masud-All-Kamal & Nursey-Bray (2021) and Rezaul Islam (2017) covered the recent history of the participation of NGOs/CSOs through a partnership with foreign donors. However, their studies should have discussed the partnership activities between donors and partners in detail. For example, they should have discussed how they established their partnership in decision-making or worked together from the project inception phase through budget preparation and equity principles and collaboration techniques to the implementation phase.

Even though Bangladeshi NGOs receive criticism for their international partnerships, several studies suggest that they are credible in working with communities and more trustworthy than the government (Islam, 2017). For example, the study by Islam (2017) focused on the performance of NGOs to ensure community development. The author researched two NGOs working with indigenous communities. The findings showed that NGOs could build trust with

those communities, which helped to improve local participation in the planning process. In this case, NGOs followed the community-based approach to get access to work with local people (Islam, 2017).

To support the NGOs' work with locals, Edwards (1999) and Banks et al. (2015) said that NGOs could work flexibly on a low budget with community people. Working with the local community ensures participation that makes NGOs attractive to international donors for delivering development services, whether micro-credit, social service, grassroots advocacy, or climate adaptation. Moreover, NGOs' growth and capacity to build partnerships with foreign donors increased community-oriented adaptation projects in Bangladesh (Edwards, 1999; Banks et al., 2015).

The scenario shows NGOs as the most significant actors in climate adaptation governance, which demands further research to see their participatory activities in climate adaptation projects.

Haris et al. (2020) reviewed the literature, showing that research on NGOs' impact on adaptation governance in Southeastern Asian countries is insufficient; however, their review shows that Southeastern Asian NGOs mainly participate in project implementation compared to policy formulation. There is also substantial research, particularly on how NGOs operate and how the partnership works in countries like Bangladesh through building the coordination of stakeholders from the international to local level (Lister, 2000).

3.8 CONCLUSION

Bangladesh is the most climate-vulnerable country, based on Asian vulnerable security perspectives, facing frequent climate hazards, such as floods. Flood projection in Bangladesh shows an increased vulnerability. International treaties and guidelines emphasize enacting climate adaptation policies and conducting more climate adaptation projects through multi-level

stakeholder partnerships such as GOs-NGOs, NGOs-INGOs, and donors that are praiseworthy. However, the partnership of NGOs with the GoB, especially in the climate adaptation area, is complex because of state bureaucracy and controlling attitudes. Apart from state partnerships, NGOs are moving to build partnerships with international donors to address climate vulnerability. In such global development processes, NGOs hold a debatable position. Some studies show that the community-based approaches of NGOs to work with locals are incredible, while other studies question the work of the NGOs and argue that they are no longer accountable to locals; instead, they are more responsive to the donors' implementing projects, thus avoiding local needs and cultures. For donors, NGOs play an intermediary role and are a convertor of adaptation principles for local communities facing frequent disasters in Bangladesh. Studies showed that NGOs based on donor-driven development, involved in microcredit lending, and delivered social services as contractors to remote areas are currently working on climate adaptation projects. Studies also show that NGOs' previous business-driven community development ideas must be fit to provide adequate climate adaptation services.

Considering this issue, it is essential to observe the NGOs' partnership in international development to provide climate adaptation services through an effective governance system. There is still the opportunity to understand the relationships between NGOs and donors regarding opportunities or barriers. Therefore, more research should focus on the NGOs' participation in the decision-making process, and asking the following questions are necessary:

1. How do NGOs in Bangladesh partner with international donors to develop climate adaptation principles?
2. How do their partnerships work through converting the adaptation knowledge into projects and programs, and what is the effectiveness of such adaptation projects in the field?

The following research focuses its attention on finding answers to these questions.

CHAPTER FOUR: TRACING THE ESTABLISHMENT OF INTERNATIONAL PARTNERSHIPS THROUGH THE LENS OF THE HI-AWARE PROJECT

4.1 INTRODUCTION

This chapter traces how the Bangladeshi non-profit organization, Bangladesh Centre for Advanced Studies (BCAS), collaborated with other southern partner organizations to generate climate adaptation knowledge within an international partnership governance system under the HI-AWARE action research project funded by northern donors. In doing so, it identifies forms of collaborative partnership in the HI-AWARE project. Moreover, it observes the coordination patterns among partners and donors in such international collaborative partnership projects.

This chapter describes the project design, management, and activities, such as the HI-AWARE selection criteria and procedures. Following this description, this chapter observes techniques of collaborative partnership and budget preparation, participation of project partners in project research activities, relationship with donors and between partners, and the local people's participation in constructing climate-resilient houses as an adaptation option through the pilot program. Secondly, the chapter focuses on empirical results showing the forms of collaborative partnership and coordination patterns found in the HI-AWARE project using the analytical framework for observing the adaptation partnership developed by Bauer and Seurer (2014).

4.2 THE HI-AWARE PARTNERSHIP TO FACILITATE ADAPTATION KNOWLEDGE

4.2.1 GUIDING DOCUMENTS BEHIND THE ADAPTATION PROGRAM DESIGN

The study of the HI-AWARE collaborative partnership project showed that several international treaties and environmental policy documents had influenced the building of this collaborative partnership for carrying out adaptation work worldwide. For example, IDRC

interviewees suggested that IDRC's work on international development and climate change adaptation followed the 2030 Agenda, the Paris Agreement, the Canadian feminist international assistance policy, the Canadian international development plan in 2020 and onwards, and Canada's commitments to international agreements.

IDRC donors thought that adaptation needed to be adequately covered by climate finance. Therefore, IDRC focused on investing money in the adaptation sector, as climate finance in the global scheme needed to address adaptation issues. In doing so, IDRC considered IPCC documents and guidance as a climate change knowledge base, which described and listed the most vulnerable regions, glacier-dependent regions, basins, river deltas, and semi-arid lands with significant populations of poor and vulnerable people. For example, the IDRC donors referred to the IPCC documents, which described a data gap regarding what is happening to the snowpack and the glaciers in the Hindu Kush Himalaya and questioned the downstream implications of changing water availability that affects all of Bangladesh, a good part of south Asia. Referring to the IPCC documents further, the IDRC donors discussed that in the Himalaya Hindu Kush region, the melting of glaciers has led to significant changes in the number of occurrences and severe conditions of floods, droughts, and the long-term water security for the region, which has tended to rely on meltwater as carrying part of the base and through dry spells. In this case, what will that be like in another three to 30 years, as the region's hydrology changes due to climate change? Those factors drove IDRC to the program design and the hydro project in the hot spots, areas of particular risk and need, identifying some of those across Africa and Asia. Moreover, the HI-AWARE collaborative partnership project was one of the action research projects focused on building climate adaptation knowledge in the Himalaya Hindu Kush region under the IDRC's Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) program (HI-AWARE, 2018).

4.2.2 HI-AWARE PROJECT DESIGN AND BUDGET PREPARATION

There was an open call for proposals under the CARIAA program funded by the northern donors of IDRC, including other donors, such as the UK's Foreign, Commonwealth & Development Office (FCDO) (HI-AWARE, 2018). The research program aimed "to build the resilience of vulnerable populations and their livelihoods in climate change hot spots in Africa and Asia" (HI-AWARE, 2018). The IDRC donors focused on three hot spots in 14 countries across Africa and Asia. The three hot spots were Semi-arid regions in Africa and parts of South and Central Asia, Deltas in Africa and South Asia, and Glacier- and snowpack-dependent river basins in the Himalayas (HI-AWARE, 2018).

The interview with the IDRC donors showed that the donors set criteria for preparing the proposals, which included several points. First, the partner organizations must focus on one of those identified hot spots. Second, the partner organizations must follow the consortium model approach for conducting a collaborative research project on climate change adaptation. Third, the consortium team requires four to five partners. There are no restrictions regarding types of research activities and partners in such consortium research groups.

In the case of building a coalition, interviews of BCAS personnel showed that the Bangladeshi project partner, i.e., BCAS, made a coalition with other southern partner organizations. The southern partners were former project partners of BCAS, who had good climate adaptation experiences through previous projects, and a good understanding among themselves through the previous partnership.

While the partner organizations enjoyed the flexibility to develop project ideas independently and the opportunity to choose partners, there was an internal procedure for selecting projects for funding from the donor side. For example, the internal selection process of IDRC applied different analyses to the research project proposals received under the call for

proposals. The selection board focused on three elements. These were: research quality based on the proposed strength of the team, collaborative activities, and potential for the results from the action research to make a meaningful difference. There were clear evaluative criteria applied across the board. The eligibility criteria were not based only on geography but also considered scientific and development merits. The IDRC had multiple independent reviewers who assessed the proposals against those criteria. They assigned a grade categorized as very strong, strong, and moderate. Furthermore, the task was to compile them into an overall ranking table to determine the more robust proposals.

The interview with IDRC personnel reviewed the quality of the proposal for selecting the HI-AWARE project based on the above evaluation criteria. The HI-AWARE proposal focused on hotspots and had a sound consortium approach for choosing partners and organizing them to make the team. Proposed project activities were a positive feature, including the pilot program designed by project partners. The piloting climate-resilient house was exceptional because it was not seen elsewhere in the CARIAA program. At the same time, the IDRC donors allowed all proposals to make a compare-and-contrast at the management level. The budget was another vital criterion for selecting the HI-AWARE. The IDRC placed criteria on budget evaluation of collaborative research proposals and adjusted the budget before finalizing the project proposal for funding. In this regard, the interviewee (IDRC staff) located in India said,

> "In general, the human resources of the proposed research project do not exceed 25%, but as the collaborative research projects included different organizations with different salary level structures, it set the limit at 40% to ensure budget equity. If we do not limit, the Nepal and Netherlands partner organizations will take more money for human resources, and we do not want that to happen" (Personnel Communication, March, 2020).

The statement highlighted the donors' effort to bring fairness in budget preparation and share it among the five partners with different salary structures. For example, the employees of the partner organization in Nepal were primarily European and American, so the salary structure

was higher than other Asian countries' organizations, such as BCAS. There was also a Dutch organization with a high salary structure for consultancy. Initially, the five partners had a pre-agreement about budget sharing in which they collectively fixed their budget before submitting the proposal. Although the donors did not prescribe the budget amount for sharing in the preliminary stage, they reviewed the budget after getting the proposal and contributed to adjusting the allocation among the five partners. For example, the donor IDRC found that some partner organizations of the HI-AWARE allocated more human resources, such as the Nepali and Dutch organizations, based on their salary structures. They cut that amount to ensure everyone would stay up to 40% of the total budget. The partners accepted the adjustments by the donors to get the project, even though the partners with high-salary-structured organizations (the Nepali and Dutch organizations) knew that there would be a problem adjusting their employees' salaries.

Furthermore, after sanctioning the HI-AWARE project, the partners had to legalize the partnership agreement paper showing the acceptance of the budget adjustments that the IDRC broadly observed. The partners handed over that paper to the IDRC once the partnership existed.

The above discussion shows that the donor created the funding program within which the partner organizations got an opportunity to develop a partnership scheme, finding partners independently and designing the adaptation project idea, budget, and activities jointly. It found that donors' partnership criteria and research conditions encouraged the partner organizations to form a coalition towards working together on climate adaptation through the HI-AWARE project. Though the HI-AWARE project's collaborative approach to building partnerships and project design strengthened the project selection process for funding, the donors had a deep evaluation of the HI-AWARE project budget, making some adjustments to the proposed budget. This situation included adjustments to the partners' budget preparation from the donors' side to obtain the

funding for this project. Donors took this initiative from an equal perspective to reduce the differences between the salary structures of the five partner organizations.

4.2.3 IMPLEMENTING THE HI-AWARE: COMMUNICATION PROTOCOL AND KNOWLEDGE MANAGEMENT STRATEGIES

The study of the HI-AWARE showed that preparing communication and knowledge management strategies were crucial components in developing a partnership. The IDRC had a knowledge management and communication committee within the CARIAA program that brought communication experts from different consortia to co-manage the program and maintain a common internal platform for knowledge management. However, when it came down to communication protocols and mechanisms, every partner organization decided those entirely.

The IDRC developed a guidebook of communication and knowledge management strategies for the HI-AWARE project that took one year or more to perform. The guidebook focused on how the partners would communicate among themselves and with the donors to develop communication strategies. In this regard, the interviewee from IDRC India highlighted,

> "We developed communication and knowledge management strategies for the entire consortium that the organizations followed. Of course, some people never responded to emails or broke this communication. Such communication took more time to establish. However, everybody started looking at it" (Personal Communication, March, 2020).

This statement showed the donor's guidance which focused on developing coordination within partners and between the donor and partners. Other coordination strategies included each country having direct discussions every month. Workshops and group discussions were held every three months. To enhance communication, one person from each organization had to dedicate himself/herself to maintaining coordination among the partners.

In addition to the communication strategies, the study of the HI-AWARE found that the knowledge management strategies prepared by IDRC included how many policy documents

would need to be completed, how many workshops would be completed through action research of the HI-AWARE project, and how the project would conduct those workshops through local-level organizations, such as BCAS and its partners; how many workshops would focus on the knowledge transfer mechanism; how many publications would be completed; and how each of the organizations would carry out the acknowledgment. According to the interview with IDRC India, there were 20 peer-reviewed publications from 2018 to 2020 February, and at least 40–50 workshops for knowledge transfer across the partners' countries, with financial support from the IDRC.

The above discussion on HI-AWARE's communication protocol and knowledge management guidance shows that the donor IDRC played a supervisory role. Communication modes included meetings, workshops, and conferences for knowledge sharing and transfer. Such approaches allowed face-to-face communication between the partners and donors and provided spaces for sitting together for knowledge sharing and transfer.

4.2.4 PARTICIPATION OF BCAS IN DETERMINING HI-AWARE RESEARCH ACTIVITIES

The interviews of BCAS personnel showed that in the project planning phase, the BCAS and other consortium team members had the opportunity to participate in several meetings with IDRC expert teams over one week in Nepal to convert the project ideas into research activities. The research activities of the HI-AWARE project included target goals, methods, input and output analysis, knowledge products, and the impact. The BCAS and other consortium team members jointly prepared a Table of Contents (ToC), a detailed Expertise, Measures, and Environment (EME) feature that guided what activities will have what target, impact, and output. Through the planning meetings, every country's team had to preliminarily prepare their strategies

and methodologies. Then, the consortium members provided the necessary input to enrich that work.

Later, the IDRC team's experts provided their support and specific comments. Sometimes, the IDRC team sent the experts, who mainly oversaw whether the activities met the plan or adjusted their ToC. The interviewee from the BCAS research section highlighted that the IDRC team experts especially led the broader aspect, but BCAS and its partners led the project-specific activities. The BCAS interviewee from the research section shared his experiences,

> "We (the HI-AWARE consortium members) got valuable support from IDRC team experts, especially in the area of adaptation and gender, which we led from the Bangladesh side. It was not from one side participation. The work was very interactive to edit and polish those activities" (Personal Communication, August, 2019).

With the support of the IDRC, BCAS had ample opportunity to work with its partners in conducting research activities. For example, there were different levels of workshops under five research components for conducting HI-AWARE research on climate adaptation that provided in-depth knowledge of the subject matter of those consultations to consortium team members. The HI-AWARE project had three work programs with five research components under each work program. There were workshops, seminars, and meetings under those work programs and research components at the community, regional, and international levels.

The outlines of work programs are below:

1. The first research component was the physical aspect of climate change. Of concern was the bio-physical change due to temperature rise, the melting of ice, the hydrological pattern, the occurrence of floods, and how that would likely affect agriculture, water use, food and health, and sanitation at the household level. BCAS and its partners from the four southern countries had to conduct their research to find the impacts at the four river basins in the Hindu Kush Himalaya region.

In the case of The Teesta River basin, BCAS observed the activities regarding the change of hydrological patterns at the sub-district levels and worked out what to do in the future. BCAS conducted participatory research at the community level by involving people within the community. Also, there were several meetings and workshops with relevant government officials, like the Bangladesh Water Development Board, Bangladesh Department of Agriculture Extension, and Bangladesh Water supply and Sewerage Authorities.

2. The second component was social and gender vulnerability analysis in the areas of river basins. For this, there were many local meetings, consultations, and FGDs. For example, the BCAS organizational research team considered the lower part of The Teesta River basin on the Bangladesh side for community consultations, FGDs, inter-group meetings, meetings with farmers, women, local government officials (such as those working in water, health, and women empowerment), and other non-government officials (such as those have working experiences around women empowerment).

3. The third component was adaptation options and effectiveness. BCAS and its partners investigated adaptation options, particularly agriculture, water, and livelihood in the four countries' river basin areas at the community and sectoral levels. For example, in Bangladesh, the BCAS organizational research team conducted separate meetings with different officials at the sectoral level (such as the Bangladesh Water Development Board and Bangladesh Department of Agriculture Extension) to see the adaptation options on those issues and discuss whether the adaptation options were suitable, effective, or functional. Completing the sub-district consultations from three different places in The Teesta River basin, the BCAS research team focused on regional/divisional-level consultation meetings with relevant organizations (such as the Ministry of Water Resources and the Ministry of Agriculture).

After investigating all options, the research team applied a multi-criteria strategy to prioritize them through several meetings in different places. The interview of the BCAS staff showed that every partner had to complete this type of work in their countries. For example, the Nepal research team conducted their research in the Gandaki river basin, and the Indian counterpart carried out their research in the upper area (or region) of the Ganges, as it is a long river that flows into Bangladesh. The Indian team chose some district areas in the upper Ganges river basin area. The Pakistani team did that in the Indus river basin. Multiple stakeholder consultations were also at the community, sub-district, and regional levels.

Based on the interviews with the BCAS and IDRC personnel, there were regional-level workshops in India, Pakistan, and Nepal. BCAS and its partners had a predetermined role in the regional workshop for carrying out the research. Through the predetermined leadership role, some members would act as leaders for a specific research component; others would listen, synthesize, and go for exercises in their own country. To do justice to the predetermined role, each organization had to send the country report to the leading members, who observed and provided an informed/polished/expert opinion; the Pakistani organization, for example, led the adaptation and mitigation research component, while BCAS and other partners synthesized and investigated those in their countries. Similarly, BCAS led social and gender vulnerability analyses where other partners synthesized and investigated those in their countries.

At the national level, BCAS and partners from other southern countries had several 'science-policy advocacy' workshops on adaptation and climate change, particularly those about water and livelihood under the HI-AWARE project. The central theme was disseminating the research output based on field data and the review of policy documents. For example, in the case of Bangladesh, there were workshops for various government agencies and the community, focusing on the use of a particular adaptation technique, such as the early warning system, during

the event of a flood and how the flood warning will reach local people, particularly the women. Most men in flood-affected areas go to other cities to find jobs to earn money, while women remain home to care for children and elderly family members. Women face hardships during floods since they stay home and involve themselves in daily family maintenance activities. The flood warnings information rarely reaches them in time, in some cases because of inadequate communication from the local government. The IDRC team members, and those in BCAS, communicated with the local government personnel through workshops and discussed how local government could reach local people, especially women, to provide flood warnings information.

Similarly, at the national level, they shared the experiences of pilot programs regarding the construction and use of flood-resilient houses. Workshops also focused on environmental issues, such as river channelization. With the help of the IDRC, workshops on knowledge transfer occurred across Bangladesh, India, Nepal, and Pakistan, where the IDRC, BCAS, and other southern organizations attended actively.

The IDRC interviewee, located in India, described the IDRC's training arrangement on adaptation practice. There were various hands-on training programs on adaptation practices for local people and researchers in Bangladesh, India, Nepal, and Pakistan. For example, the Dutch consultant digitized the map of the entire Himalayan region for climate change, which informed whether an area gets inundation and how much the area gets flooded. People in this area can also get information about their adaptation practices. There were seven training sessions on digitization in Nepal (covering at least two districts), the Rangpur district in Bangladesh, Pakistan, and some of India's Himalayan districts. This training helped people optimize what is best for carrying out adaptation practices.

While attending the events internationally, the IDRC also provided monetary support to all partners to participate in international workshops/conferences alongside those at the national

level. According to the interviewee of the IDRC India, all participants under the CARIAA program, including the HI-AWARE, participated in the workshops and conferences. The project members could share their findings with others even when IDRC (the head office) did not participate in the United Nations Environment Program (UNEP) program in Nepal and Sri Lanka, for example. The UNEP wanted IDRC to showcase its experiences on climate change and adaptation. Every organization under the HI-AWARE project showed more than five innovations at the UNEP conferences.

From the above discussion on research and knowledge sharing, it is apparent that the HI-AWARE project showed that BCAS and its partner organizations followed those meetings, consultations, and workshops for conducting research at all levels, sub-district and divisional level to the national level; and vice-versa. Every organization worked jointly on a specific research component. There were many interactive ways in which some members led, and others listened, learned, and built capacity. So, all members of the HI-AWARE project had scope for participation in every research component. Besides, the financial assistance from the donor agency for participating in workshops and conferences, both nationally and internationally, allowed the BCAS and other partner organizations to share their ideas and views through research outputs and to learn from others.

4.2.5 PILOTING CLIMATE-RESILIENT HOUSES IN BANGLADESH UNDER THE HI-AWARE PROJECT

4.2.5.1 THE INTERVENTIONS – CLIMATE-RESILIENT HOUSES

The secondary documents supplied by the Centre for Resource Environment (C4RE) implementing agency in Bangladesh showed that the intervention was to build climate-resilient houses. The intervention included a complete package of working activities—plinth (house support base) raising, traditional house reconstruction, removable wooden houses imported from

other places, homestead gardens, poultry, and livestock, hedgerow and tree plantations, solar panels, improved cooking stoves, sanitary toilets, tube-wells, and, lastly, provision of skill development training program(s). The C4RE developed flood-resilient houses in two phases. The first phase included reconstructing the traditional house after the plinth raising. The organization used corrugated tin sheets and covered a certain height with coal tar from the bottom of each tin sheet to protect its durability if it floods. However, the organization noticed heat waves inside the houses during Bangladesh's monsoon and summer periods. The corrugated iron sheets in the rooftop and surrounding corrugated iron sheets walls of the flood-resilient houses absorb heat during the day, and they can not release that heat at night, making the houses hottest. In the second phase, the organization removed those houses and fixed up wooden sheets imported from Dhaka. Such houses have storage parts on the rooftop that segregate the house from getting direct heat from the sun. The wooden flood-resilient houses kept houses cool besides protecting them from floods. However, the houses' technical challenge was that sandy soil washed away in each flood. The strategy focused on putting silty topsoil from nearby places at the slope or toe of the homestead cluster premise and protecting slop with natural hedgerows and tree plantation. Upscaling such a house included training local masons and carpenters and developing local entrepreneurship. The C4RE proposal for upscaling CFR housing (2017) document highlighted river erosion that may affect climate-resilient houses. However, houses are quickly portable to be safe from erosion.

4.2.5.2 IDENTIFYING A VILLAGE FOR PILOTING THE HOUSES

The C4RE proposal for upscaling CFR housing (2017) document showed many consultations to select the villages to pilot and demonstrate climate and flood-resilient houses. Dilma, Kaunia, and Patgram *upazilas* (sub-districts) were pre-selected from Nilphamari, Rangpur, and Lalmonirhat districts, respectively, for the HI-AWARE piloting in the Teesta

floodplains. The BCAS selected Patgram in Kurigram for research, an upstream region of Teesta floodplains where the Dohogram union was the most vulnerable to regular flash flooding. The organization chose Dimla as a controlled and mid-stream site, where an embankment protected most of the area. Furthermore, the BCAS chose Kaunia as a downstream floodplain with vulnerable char lands that face regular seasonal floods, bank erosion, and drought. Dilma, Kaunia, and Patgram were the sub-districts with different geophysical, socioeconomic, and environmental characteristics that helped the implementing agency analyze the flooding situation comparatively among those areas. For a demonstration of climate-resilient houses, the BCAS selected the Kaunia sub-district as the study site because of its severe vulnerability to regular floods. The Char Dhushmara village on the left bank of The Teesta River and Char Haibatkha village on the right bank got a final selection under the sub-district of Kaunia for constructing the climate-resilient houses (The C4RE proposal for upscaling CFR housing, 2017).

4.2.5.3 LOCAL PEOPLE'S PARTICIPATION IN SELECTING THE BENEFICIARIES

Interviews with the C4RE personnel revealed that the local government member and chairman helped introduce the project to villagers. They selected beneficiaries through the door-to-door survey and focus group discussion techniques. They followed three significant criteria for selecting beneficiaries:

1) Very needy—who had poor housing conditions during the flood;

2) Divorced/widowed or deserted women, and

3) Land ownership (those who had less than 1 acre of land).

C4RE also targeted poor women with dependent children and school-aged children. In addition, the organizer considered social problems, alongside the three conditions above, for selecting a beneficiary.

The field visit in 2019 found that the organization selected two sisters as beneficiaries, who were deserted women and worked in a garment factory. These two beneficiaries did not have a suitable and comfortable house, but they had land that helped the C4RE to select them. The interviewee of the field coordinator, C4RE, highlighted,

> "If they (two sisters as beneficiaries) stayed on the other body's land, there might be a chance to break the house after providing a house. We had other poor villagers compared to them, but we selected them considering their social problem." (Personal Communication, February, 2020).

The above statement indicated that land ownership is essential to receive climate-resilient houses, as the house needs legal land to avoid a possession by someone else. In the case of land ownership, they also avoided male-owned land because of the assumption that while men often sell the house, women are more trustworthy in the promise not to sell. Though the land belongs to the beneficiaries, there are some obligations that beneficiaries must follow. The beneficiaries should not sell the project house because it might be used for further research, and the house is a shelter for villagers during floods. In this regard, here is what the C4RE director said in an interview:

> "Beneficiaries can sell those houses as they are the owners. Since such houses benefit villagers and particular families, they should not sell them. If the owners try to sell those houses, the village chairman/members will restrict them from selling them as those houses already benefit the flood victims" (Personal Communication, October, 2020).

However, C4RE conducted several meetings through FGDs to select the beneficiaries, ensuring a participatory approach. Preliminary, local newspapers broadcast the news about building the project house. Some villagers knew about climate-resilient housing through other people. The organization listed the disadvantaged villagers' names and situations in the initial meeting. The villagers assumed that everyone would be getting a house. Around 100 villagers were present in the initial meetings. In the second meeting, the organization asked villagers to select ten disadvantaged persons out of 100. Villagers understood the impossibility of providing

houses for all and helped select needy households who would get a house first. C4RE also consulted openly with village leaders and local government members. The interviewee field co-coordinator, C4RE, added,

> "…it is difficult to avoid local people as everyone is generally needy during the rainy season, but the project has limitations. Villagers were very open-minded. Villagers helped to select beneficiaries. Sometimes, local members and leaders requested to select their chosen villagers, but we did not hear them. We listen to general villagers' voices to select beneficiaries." (Personal Communication, February, 2020).

The C4RE organization received help to introduce the project to the local members. However, they avoided the arbitrary selection process requested by the local members and focused on a participatory approach to selecting beneficiaries. It indicated that all levels of villagers actively participated in piloting climate-resilient houses, and villagers could choose the neediest beneficiaries among themselves.

The field visit in 2019 showed that though the goal was to deliver a complete package of climate-resilient houses (see the section interventions–climate-resilient houses), the organization could not provide a complete accommodation package for all beneficiaries. For example, some houses in Kaunia and Dimla had no raised plinth; and very few houses had a toilet and tube-well development from the project. As the project period was going to end, the organization had to close all activities, as highlighted by the interviewee of the IDRC director. Nevertheless, those who got housing first had an improved plinth, a developed toilet, and a tubewell for drinking water facilities.

4.2.5.4 TRAINING LOCAL PEOPLE ON BUILDING CLIMATE-RESILIENT HOUSES

BCAS and C4RE interviews outlined that HI-AWARE received training on building a climate-resilient house. BCAS, in collaboration with the local partner C4RE, organized community-level training workshops at the climate-resilient house, Haibatkha of Kaunia, in Rangpur, Bangladesh. This training focused on two objectives—firstly, to enhance awareness and

the construction skills of the carpenters, sawmill operators, local leaders, and building material enterprises in the Teesta area, and secondly, to increase interest in the housing project.
The people in the selected areas welcomed the design of the house, especially after seeing how it performs during floods. The demand for climate-resilient housing increased in the communities, especially among masons, carpenters, and other business people. A total of 30 local masons, including women, received training on building the demonstrated houses and slope protection activities under the piloting initiatives. Carpenters received training on wood and bamboo preservation, focusing on protection from termite attacks and other pests. Experts from the Bangladesh Forest Research Institute (BFRI) on wood seasoning and preservation served as trainers and considered this housing model for further development. This preservation training and new houses raised great interest among households in the villages and surrounding areas.

Interviews with the BCAS and C4RE personnel also showed that the organizations needed to enhance local knowledge and provide training for practical experience on processing wood and cutting wood to fit the shape of climate- and flood-resilient houses. Notably, the sawmills' batten/timber size needed to match the climate and flood-resilient house construction requirements. Hence, the BCAS and C4RE teams worked with sawmill operators to oversee the timber for climate-resilient houses. Participants who were neighbors demanded climate-resilient housing. Moreover, participants from areas like Lalmonirhat, Hatibandha sub-district, and Dimla of Nilphamari district requested to expand these cluster houses at their locations specified by the Director of C4RE.

The above discussions of piloting the climate-resilient house show how BCAS, and its local partner C4RE, were able to ensure community participation at a local level through a participatory process. The local people also got training on building climate-resilient houses for further expansion of climate-resilient housing in the neighborhood. However, the activities of the

piloting process brought a significant change to the villagers, either as beneficiaries benefitting from the climate-resilient houses or as non-beneficiaries who had greater awareness of climate- and flood-resilient houses, thus creating a demand for more.

4.3 THE FORM AND COORDINATION OF THE HI-AWARE PARTNERSHIP

This study applied the five dimensions of the adaptation partnerships developed by Bauer and Seurer (2014) to review the form of the HI-AWARE partnership and the coordination pattern in the collaborative arrangement. The five dimensions of the adaptation partnership are concerned with the following:

1. the genesis of partnership;
2. stakeholder arrangement and partnership governance;
3. the governance of vertical and horizontal coordination;
4. modes of governance; and
5. the roles of the collaborative partnership in adaptation to climate change (Bauer & Seurer, 2014).

4.3.1 PARTNERSHIP SETUP OF THE HI-AWARE PROJECT

The HI-AWARE collaborative partnership came out under the call for proposals originated by the IDRC. Although the IDRC provided funds to the HI-AWARE project based on some settled objectives, partnership-building criteria, and funds adjustment, the donor IDRC allowed the project partners to independently ensure stakeholder management, such as identifying partners and their engagement in project design and planning.

The interviews revealed clearly that the local partner, BCAS, had the opportunity to select other southern partners who were primarily well-known to each other through previous projects. Moreover, BCAS and the southern partners showed interest in creating a coalition for the HI-AWARE project. During the project design and planning phase, all the partners worked together

to identify the appropriate partnership scheme for a consortium model. For example, they decided on the HI-AWARE project's thematic areas, determined the project's institutional arrangement focusing on the people leading particular thematic areas for research, and discussed the leadership role in synthesizing the research findings from all thematic areas before submitting the project concept. To focus on the partnership mechanism and project ideas in designing the HI-AWARE project, the interviewee from IDRC Canada mentioned,

> "… It was the reverse; we selected the HI-AWARE project; more specifically, the southern partners of the HI-AWARE project selected us as putting forward their ideas in project designing and stakeholder coordination. It turned out that we got a proposal amongst the most vital ideas" (Personal Communication, March, 2020).

In the case of project design, the statement from the donor showed a liberal attitude toward partners. Also, it found the project partners to use the advantages of the bottom-up approach that provided scope for choosing partners and working jointly on project design and influenced the donor to fund the HI-AWARE project building the north-south collaborative partnership.

4.3.2 STAKEHOLDER ARRANGEMENT AND THE HI-AWARE PARTNERSHIP GOVERNANCE

The HI-AWARE project positions itself as a multi-stakeholder-led partnership project through the IDRC's support to its southern partners. These partners included international research organizations (e.g., the Nepali organization), government research organizations (e.g., the Pakistani organization), and civil society organizations (e.g., the ones from Bangladesh and India). Although it found the project call by IDRC was designed preliminary as a tool of Canadian foreign affairs and development policy, the HI-AWARE project partnership governance showed self-regulated multi-stakeholder governance at the international level. The IDRC project call criteria encouraged partners from different nationalities as core partners and

engaged them in designing and implementing the project activities. For example, the HI-AWARE project brought multiple stakeholders. The involvement of various stakeholders was not only to design the project idea but also to participate in several conversation sessions, to determine decisions, and to respond to the implementing activities jointly. Local people also participated in selecting beneficiaries and constructing the flood-resilient house under the pilot program. These activities, from project design to implementation, showed that the HI-AWARE project could build coordination among multi-stakeholders from different southern locations to obtain ample information to make the decision more legitimate in the participatory process. The HI-AWARE project established a more well-adjusted partnership between public and private organizations to implement the international project effectively.

4.3.3 COORDINATION PATTERNS OF THE HI-AWARE PARTNERSHIP

The HI-AWARE partnership facilitated both vertical and horizontal coordination. The vertical coordination between donors and partners was top-down. Project monitoring activities such as reporting and communication maintained a hierarchy from consortia to core partners to strategic. While the project monitoring activities emphasized the top-down pattern, there was also a mutual understanding between the donors and partners in many cases during the phase of implementing project research. It included project budget adjustment among partners and other initiatives from the donor side, such as technical assistance, field testing, and the undertaking of several strategies for consolidating the partnership and building trust. The horizontal coordination among southern partners showed mutual understanding that helped to create not only a consortium for this project but also their active participation helped carry out the predetermined leadership role of each partner to complete the research activities.

4.3.4 MODE OF COORDINATION OF THE HI-AWARE PARTNERSHIP GOVERNANCE

Observing the partnership governance pattern of the HI-AWARE project, the coordination mode focused on collaborative governance that included collaborative research, spaces, and management. As the core members, the Bangladeshi partner, BCAS, and the other four southern partners collaboratively worked to generate climate adaptation knowledge that surpassed their institutional mandates. Interviews with the IDRC and the BCAS officials showed that the five organizations completed the collaborative research by exchanging information, experiences, and ideas that enhanced the individual partners' skills. The relationship among them went well beyond the partnership scheme toward learning. The interviews of BCAS personnel also indicated that the BCAS, as one of the project partners, not only developed their knowledge on climate adaptation from each other but their learning and contributions to project research activities also helped build the organizational capacity.

On the other hand, besides funding, the IDRC's initiative to develop communication protocol, knowledge management strategies, and mid-term learning review proved beneficial to the partner organizations to carry out the partnership jointly (discussed in chapter five). Moreover, the IDRC created collaborative spaces regarding opportunity projects and responsive funds. These spaces brought multiple organizations together and created dual linkages along the way. One of those was sitting together in own country, in which all the Bangladeshi organizations focused on river deltas and a glacier-dependent basin in the HI-AWARE project and created learning opportunities collectively, the collaborative spaces, across different parts of Bangladesh.

Moreover, another was the interest in understanding environmental climate change in adaptation across South Asia, a common concern across the consortium under the HI-AWARE project. Furthermore, bringing the consortium members together and engaging researchers from

outside the consortium members, such as Ph.D. and master's students under the HI-AWARE research project, in conversation tables also created collaborative spaces.

Interviews with BCAS personnel showed that IDRC's collaborative management through supervision was mainly about providing technical assistantship in research design that did not significantly impact the HI-AWARE research methods/activities. Moreover, it suggested some points for a better outcome, facilitating field tests, ensuring budget equity and adjustment, and observing reporting. The interview with the BCAS found that the reporting schedules and paperwork were strict. These activities were substantial tasks alongside research. However, the IDRC's monitoring activities, incentive strategies for enhancing partnership, and communication strategies for better coordination allowed the partners to meet the deadlines of project activities.

Also, several meetings and knowledge-and-experience-sharing conferences and workshops not only helped to grow mutual understanding between the IDRC and project partners, but such actions were also able to build trust among partners throughout the project period towards creating new adaptation knowledge without donor domination and any hierarchical interference among the southern team members.

This scenario showed that the HI-AWARE project had strong coordination efforts from both parties to carry out this collaborative partnership governance. Moreover, the coordination efforts of the HI-AWARE project made that project distinguishable from a traditional command and control partnership project in which donors interfere with project ideas, budget preparation, stakeholder mechanism, and implementation guidance.

4.3.5 ROLES IN DETERMINING CLIMATE ADAPTATION KNOWLEDGE

4.3.5.1 FACILITATE CLIMATE ACTION

The study of the HI-AWARE project showed that it was not just about retaining some elements, not just a product of research or the capacity to do research, but also the ability to have

that engagement with the user groups, being able to be clear with what it means to underpin climate action.

The interviewee of the IRDC Canada stated that when the HI-AWARE project started in 2014, the IPCC had identified knowledge gaps. In 2014, the HI-AWARE project activities still focused on the importance of hotspots, and research concentrated on findings about what was going on there. However, over the project period, the HI-AWARE had the opportunity to enhance its scope to work on climate adaptation under several international policies, such as the SDGs and the global stocktake of the Paris Agreement, which focused on the taking stock of the implementation process not only in the sector of mitigation, but it is also concerned with adaptation through the world's collective progress rather than individual countries. Such international policies led the HI-AWARE project to move embedded research into implementation actions. When implemented, the HI-AWARE project did not limit the research activities; instead, the collaborative partnership and coordination contributed to the actual adaptation activities. For example, the actual adaptation activities included building capacities to work with user groups, exercising adaptation knowledge through a pilot program, following up on the benefit of the project before ending the project, lobbying with government organizations to disseminate that pilot intervention- the flood resilient house, supporting national adaptation plan through implementing the project and focusing on adaptation in the national program, such as Bangladesh's Delta Plan 2100.

4.3.5.2 LEARNING

The core partners and members of the HI-AWARE project were the key target groups to become learners. Regarding the donor side of learning, the IDRC personnel's interview showed that this project's evaluation process helped evaluate project strengths and weaknesses. Their interviews focused on the positive output, which was the value of the collaborative model.

However, there was a realization regarding the need for better human resource collaborative management. In response, an interview with IDRC staff in Canada highlighted that the following initiatives, after the HI-AWARE project, would focus on observing the application of the collaborative model. In the future, the IDRC would like to join other sister programs outside the CARIAA and see how cross-program learning can happen, for example, the cross-consortium programming they were doing within CARIAA, but with some remedies to move forward.

Focusing on the issue of the HI-AWARE collaborative management, the IDRC Canada interviewee identified the workload of a coordinator who was based in the cabinet but had only one person in a junior post. The coordinator had to convene the steering committee and management group to oversee the consortium. In this regard, the learning of the IDRC staff focused on the need for more robust funding and the need to ensure multiple coordinators with a lot of time and skillset.

There was another concern with the evaluation system of the HI-AWARE project. For example, the IDRC staff in India stated that the HI-AWARE evaluation process considered one country under the cross-countries consortium as a sample for external assessment. However, he stressed that the external evaluation should include all countries under the consortium as different countries had different adaptation knowledge products.

Discussions with the IDRC personnel showed that learnings from the HI-AWARE project would contribute to the next program design. Observing cross-consortium programs rather than just looking back at how the IDRC may want to do things differently would be substantial or comprehensive. 'What else' and 'What next' would be noted instead of just what to replicate in the HI-AWARE project. On the other hand, an interview with the BCAS staff stated that BCAS used the consortium model technique to develop its other projects. Apart from critical learners, this

project contributed to growing awareness in the public and private domain through several project meetings, workshops, and conferences to disseminate the adaptation knowledge product.

4.3.5.3 INVENTION KNOWLEDGE OF ADAPTATION

The collaborative partnership of the HI-AWARE project enhanced the knowledge base for climate adaptation through action research. It analyzed the climate change impact, vulnerability, and policy support for the Hindu Kush Himalaya region, including The Teesta River basin in Bangladesh. It identified the need to construct climate-resilient houses to allow for adaptation during floods. The construction of climate-resilient houses created a considerable demand for more such houses within the project sites and the surrounding areas. When the C4RE provided training for scaling up the climate-resilient houses, the neighbors attended and asked C4RE to build them. However, based on the interviews of IDRC and BCAS personnel, it was found that the evaluation of the HI-AWARE project led the IDRC to focus on the promising results for the continued investment before closing the project in 2019. The IDRC provided funds for another eighteen months to take those results to the next level.

Moreover, this follow-up initiative from the IDRC donor side was more about scaling up or something more related to achievements from the results generated up to 2018 and 2020 into 2021. The IDRC staff in Canada identified that the entire logic of the transitional grant was that the IDRC could not walk away from the excellent work. Also, it was an opportunity with some small-scale budgets over eighteen months to continue getting good work out of these results.

The following table shows the summarized findings in partnership and coordination of the HI-AWARE project, using the framework developed by Bauer and Steurer (2014).

Table 6

The Summary of Findings in the Form of Partnership and Coordination of the HI-AWARE Project

Five Dimensions for Adaptation Partnership, by Bauer & Steurer (2014)	Findings from the Case Study of the HI-AWARE Project
Partnership set up: top-down by government, bottom-up by business, or societal actors	Bottom-up by social actors
Institutional arrangement in partnership: the public-private partnership, private-private partnership, or tripartite partnership	Multi-stakeholder-led governance focusing on public and private partnerships under a consortium.
Coordination pattern of partnership: - vertical coordination (bottom-up, top-down, or reciprocal) - horizontal coordination (relation of policy arena, relation between public and private organization, relation among local authorities)	Both vertical and horizontal coordination pattern
The mode of coordination in partnership: hierarchical, market, network mode of governance or collaborative governance	Collaborative governance
Role of partnership in solving societal problems: more participation with standard rules and regulations, lobbying, knowledge exchange, production, dissemination, and capacity building	The HI-AWARE project produced new knowledge and built the capacity of key partners and stakeholders. The climate-resilient houses in Bangladesh were a positive addition to improving the lives of flood-affected people in the region.

Nevertheless, the practical results of the HI-AWARE partnership, the demonstration of better adaptation research through the construction of flood-resistant habitations in Bangladesh, and the follow-up funding for the continued investment in building a few more climate-resilient houses were able to prove a significant contribution to adaptation research and action. There was a question regarding the future development of climate-resilient houses in project sites in Bangladesh. The interview of the IDRC staff in India mentioned that there was no debate about the effectiveness of such dwellings as community people found them helpful. However, despite the donor and consortium members being productive through the collaborative partnership project to generate adaptation knowledge, the problem of scaling up these houses in the future was raised. In this regard, the interviewee from IDRC India highlighted that money is an issue to ensure the further scale-up of such knowledge products (Chapter six discusses the issues for further development of climate-resilient houses).

4.4 CONCLUSION

This chapter traced the form of partnership and coordination patterns of an international partnership project on climate adaptation employing a case study of the HI-AWARE project. The study of the HI-AWARE project shows a collaborative opportunity to determine climate adaptation knowledge in the international development arena. The HI-AWARE project used the power of experiments to enhance the capacity of international climate action research knotting the North-South relationship. Here, international development practices in Canada act as an opportunity for how much Canada can contribute to foreign aid and climate change adaptation. Moreover, the IDRC donors see the HI-AWARE collaborative action research as a form of science diplomacy regarding how the Canadian government works. Cooperation between countries in the Global South, particularly the South Asian countries including Bangladesh, India, Nepal, and Pakistan within the HI-AWARE project, has been found, in a sense, a kind of science

diplomacy in the true meaning of collaboration between countries, but on a level of more equitable participation. In other words, it is more than just Canada, as a funder, for something happening only in Bangladesh. Canada connects a consortium with multiple countries working together on climate adaptation, surpassing national boundaries.

CHAPTER FIVE: NON-PROFIT ORGANIZATIONS AND THE CHALLENGES IN THE COLLABORATIVE PARTNERSHIP OF THE HI-AWARE PROJECT

5.1 INTRODUCTION

This chapter seeks to understand the challenges faced during climate adaptation implementation by examining the collaborative partnership of the HI-AWARE project. Specifically, this chapter aims to outline the challenges the Bangladeshi partner faced in producing adaptation knowledge in the decision-making process and to identify initiatives to tackle challenges for maintaining a collaborative relationship. This chapter reviews the challenges regarding reporting and communication protocol, determining the role of donors and partners, professionalism and attitudes among partners, tensions regarding expectations and traditions, and the leadership role of partners. It also summarizes cross-country issues, like traveling, fund transfer, and budget equity. For discussing the initiatives to manage the challenges, this chapter overviews several steps undertaken by donors and partners, including a mid-term external learning review report that suggested enriching collaboration management, reviewing the HI-AWARE risk register and follow-up initiative, the ways to reduce the controversy among different experts during research activities, the ways to reduce meeting fatigue, planning for synthesizing the HI-AWARE outcomes and learning, and innovative ideas on budget adjustment and fund availability. Analysis of these variables and relationships identified key lessons for a future collaborative partnership in climate adaptation projects. Key lessons include a coalition of expertise actors or institutions and holding commitments for climate adaptation, operating in a conducive, participatory manner, and openness for joint activities, ensuring a flexible and renovated governance structure for reporting to the donor, mutuality and trust-building in donor-partner partnership, and prospects for gaining knowledge and building organizational capacity.

5.2 CHALLENGES FOR GENERATING CLIMATE ADAPTATION KNOWLEDGE THROUGH THE HI-AWARE PARTNERSHIP

5.2.1 ISSUES WITH REPORTING AND COMMUNICATING PROTOCOLS

Reviewing documents of the HI-AWARE Mid-Term Learning Review supplied by IDRC (the interviewee) and interviewing BCAS personnel showed many challenges in maintaining reporting and communication with the donor. Firstly, there was the issue of frequent and time-consuming reporting and overloaded communication, especially over emails. The requirements were to populate a dashboard every three months, covering areas such as delivering outputs and stakeholder engagement. The donor, IDRC, requested consortium members to update a process tracking stoplight system against detailed work plans. IDRC used the information to report to the principal donor, DFID. For the half-yearly reporting, the lead organization of consortium members is responsible for delivering reports from each consortium member (five in total). The lead organization is also liable for preparing a synthesis report after receiving records from the consortium team members. The time allocation for preparing a synthesis report by the lead organization was only one and a half days per week. Besides, each consortium member also had a direct reporting line on finance to the donor. IDRC originally released funding after receipt and scrutiny of these.

The above-stated governing system by the donor IDRC shows that the dual reporting lines created an ambiguity in the design and governance of the HI-AWARE project. This situation placed the consortium members in a challenging position. For example, a BCAS official involved in project coordination and fund management stressed that there were problems releasing the fund to BCAS until the lead partner, the Nepali organization, submitted the integrated program report to the donor. In such situations, there might be delays in releasing funds due to late delivery of reports of one or more partners, creating tension in the donor-partner relationship.

There was also a question regarding quality time for research activities, as the HI-AWARE project sought to translate its research learning into policy and practice. However, bundles of reporting created pressure on the consortium members. It is, therefore, evident that such a situation created tensions among the team members about the uncertainty of funds and kept them in fear of dropping out of the joint venture. From the management viewpoint of the HI-AWARE project, IDRC played a strict, scheduled monitoring role in reporting and communicating protocols. The rule regarding releasing funds based on the report from the lead partner showed that the partners could not rely on the funder to secure their positions in the process.

5.2.2 UNCLEAR ROLES OF DONORS AND PARTNERS DURING RESEARCH ACTIVITIES

The interviewees of BCAS discussed the participation scenario of all members, including donors and partners, in the decision-making process. It found that the donor team, combined with the personnel from the head office of IDRC in Canada and the branch office in India, participated with the consortium team members when preparing the research agenda and methods. For example, the IDRC Canada team mainly attended the orientation and planning meetings. In contrast, the IDRC India team continuously observed project research activities by attending several meetings, such as project orientation, planning, and thematic consultation meetings (but not all meetings and consultations throughout the projects). The entire IDRC donor team attended the thematic consultation meetings with partners to develop research tools/methodologies and test those in the field. It had observations when the partners shared their views and experiences. While the IDRC team did not recommend using new tools or another tool, it commented on the techniques the consortium team members followed. For example, whether the mechanisms are user-friendly, whether there are any limitations to the techniques in the field, or whether the result is sound after the modifications. The consortium team members had to share the guidelines and

the detailed methodologies with the IDRC experts to get opinions so that the process could be more comprehensive and result-oriented.

However, although the participation of donors intended to improve the research tools, bring out good knowledge or products from the research, and provide a helping hand to enrich the research capacity of partners, secondary documents like the HI-AWARE Mid-Term Learning Review reveal that initially, the participation of donors and partners suffered from the lack of clear roles, including the donor's responsibilities. For example, the IDRC was an active participant in many meetings. Their participation in decision-making played a less conventional role, seeing it as providing central technical advice and guidance. Still, the need for more clarity over the role of donors confused the consortium members and the lead partners, who saw this role as one for the consortium lead.

Apart from the lack of donors' role clarification in decision-making, there needed to be more explicit guidance for the participation of consortium team members under the HI-AWARE knowledge management strategies. These members required help for a smooth operation of partnership among themselves. For example, an interview with the donor (IDRC Canada) showed some tensions in the partnership among consortium team members. The HI-AWARE included not just Bangladeshi, Indian, Pakistani, and Nepali institutions but also a European partner as a consultant. As a result, there were differences among the institutions and national cultures of South Asian participants, such as tensions over what types of work would be recognized and valued within each organization, who would decide on work plans and budgets, what purpose each forum served, who should attend (and why), how they would conduct meetings and prepare the documents.

Moreover, there needed to be more clarity over the roles of implementing partners, strategic partners, consortium members, and the lead partner during the period of program design.

The issue of role clarity was the crux of many of the irritations and misunderstandings, raising several questions about the efficiency of the partnership highlighted in the project review document. For example, there was an issue regarding the implementation partners' involvement in conducting the pilot program in the field. Should the participation of implementation partners be like other partners, or should their involvement be more about service delivery partners, or should they play both roles? Do the implementation partners as service delivery partners contribute to ensuring collaborative partnership, or do they underestimate the partnership scheme?

However, from these scenarios, consortium team members faced challenges regarding their roles throughout the project activities and problems with the relative positions of South Asian and European researchers in such a collaborative partnership. While it did not impede the project from continuing, this likely caused inefficient meetings during the implementation phase, causing anxiety among partners.

5.2.3 THE LACK OF TRUST AMONG PARTNERS AND THEIR PROFESSIONALISM

There were also question marks regarding the trust and professionalism of the consortium team members. In the HI-AWARE project, team members faced gossiping and undermining, both professionally and in private spheres; the secondary document of the HI-AWARE Mid-Term Learning Review highlighted this issue. While the interviewee of BCAS personnel suggested that the coalition of BCAS and its partners followed previous experiences, the HI-AWARE project completion report in 2018 showed a different result about the alliance of BCAS and its partners. It highlighted that when the donor-driven consortium model was rolled out and tested, it found that some had collaboration experience with each other in the past. They needed to be more familiar with each of the institutions and their agendas. This situation created an unprofessional attitude among partners and focused on the importance of the previous experience of each partner

for a coalition. However, though some of them were new in this coalition, they had an agreement to work together.

5.2.4 TENSION REGARDING EXPECTATIONS AND TRADITIONS

The interviewee with IDRC Canada shared that the HI-AWARE project experienced some tensions in the partnership, and one source of these tensions was expectations and traditions. For example, there was a problem with authorship concerning expectations (who will perform as authors in research outputs?) The other problem was the differences in training in the professional traditions. There were some differences regarding the methods used in one science versus another; some academic trainings, career incentives, and best practices in academia in one country versus another and one culture versus another. For example, there was a criticism of the IDRC's training arrangement on adaptation practice. A Dutch consultant had devised digitized maps of the entire Himalayan region for climate change, which showed whether an area gets inundated and how much the area gets flooded. Such training on digitization covered several regions of Nepal, Bangladesh, India, and Pakistan. While such training aims at helping people to optimize what is best for them for adaptation practice, there are different opinions about the applications of such developed countries' ideas in developing countries. To focus on this issue, the donor IDRC, India, had the following statement:

> "The donor support system in the international arena needs to understand which problem should get priority. Most international organization groups support developing countries and understand their views or perspectives. The idea/knowledge of a developed country is suitable for a country like India or Bangladesh, but that ideology needs to be different. Donors should focus on the aspiration of the Bangladeshi community than the practices in America or Canada or how the UK thinks about this. If a Dutch person comes and talks about adaptation practices in Nepal, Bangladesh, and Pakistan, how do the people accept those adaptation practices? Because people of those countries, living there for thousands of years, will try and understand what strategies they should consider for their upcoming adaptation practices. The ideas of the Dutch organization are good, but how can those ideas gel well within the context of Nepal, Bangladesh, and Pakistan? They must understand the rural setting of Bangladesh, Pakistan, or India for this purpose.

> These so-called developed country nationals should keep up their hands in trying to solve the problems of the developing world because they only have to support their (developing countries) ideas rather than the ideas of the Netherlands and the UK. I do not think this will change within the next two years, maybe a decade" (Personal Communication, March 2020).

The above transcript showed that as the HI-AWARE focused on multi-disciplinary research, there were tensions among partners regarding which theories and research ideas were getting a share of the budget and which were not. Moreover, there was a donor bias about sharing the ideas of developed countries with developing countries connected to international development. Such donor bias is not new in international research and development projects. It shows donor power implementing such knowledge-sharing ideologies by hiring from developed countries. However, the challenge is reducing such favoritism and focusing on local people's values, culture, and society to adopt new technology from developed countries. More particularly, how these unfamiliar ideas incorporate within the local context and how these ideas will get access to local people will become the main challenge under the international development projects.

5.2.5 THE PROBLEM WITH LEADERSHIP ROLES AMONG CONSORTIUM MEMBERS

An interview with BCAS staff (research section) showed that the consortium team members followed a participatory process when they shared their ideas or opinions in the meetings. Their conversation and sharing focused on converting project ideas into programs, developing tools or techniques for action research, and developing the principles of a leadership role in the thematic component of HI-AWARE action research activities. For example, the team members pre-determined who would lead thematic research components during proposal preparation. The handover of leadership to a specific organization depended on the capacity and expertise of that organization. For this, the role was to develop methods, share those with other

teams, and observe the reports of the other partners. Before submitting the proposal, the HI-AWARE team sat together two times in Nepal; first, for orientation, and second, for project development. For leadership in the HI-AWARE research components, the consortium team selected the Pakistani organization to lead the research component, 'Physical impact by climate change'; BCAS to lead 'social and gender vulnerability,' and they assigned the leadership role to other organizations in this way.

However, such a leadership system was only one form of collaboration among southern partners. More specifically, the partnership was the logic of the consortium model to get technical assistance from south-to-south team members. For example, BCAS contributed technical assistance to other Asian partners and vice versa, allowing them to tap into expertise beyond that. A set of researchers beyond the HI-AWARE team members could also tap into and be a part of that collaborative space, returning to those methods. It is familiar that in such participatory meetings, there might be disagreements or debates at the time of view exchange among members and other participants besides the contribution(s). To draw on this issue, the BCAS staff research section interviewee shared the leadership role of BCAS—how they played and what they faced sharing their ideologies. For example, multi-disciplinary team members were in some gender discourse consultation meetings. Some members were social science, natural science, and human rights experts, while others were adept in adaptation, mitigation, and climate change. Though every stream had a different focus, some led, and others listened to and utilized the ideas. BCAS led the gender and social vulnerability research component. In the gender discourse consultation meeting, BCAS prepared the participatory tools and methods that showed how social factors relate to people and climate vulnerability. BCAS got some criticisms on those participatory tools and methods from other partners under the research component gender and social vulnerability.

To focus on the criticism (on that particular research component), the interviewee of BCAS, research section highlighted,

> "When we shared that method, some team members contributed to it. For example, the Nepali organization showed some limitations of our method; the Pakistani organization criticized some parts and provided opinions to improve others. We recognized and took everything with an open mind. Since we are researchers, it is important to accept the views of others to enrich and standardize" (Personal Communication, August, 2019).

Following the statements above, there was another question in the interview session about whether there was any country dominance or humiliation of the Bangladeshi organization, particularly from the Pakistani organization. The interviewee of the BCAS research section extended, "It was not like that. We created the consortium team in the phase of the pre-project period. All were scholars, and BCAS had previous experiences of working with the Pakistani organization and others" (Personal Communication, August, 2019).

The above statements of the interviewee showed there was consideration to hear from each other. Moreover, it moved with a mutual understanding toward working together. When the question about the country dominance from the Pakistan organization came, it found that the relationship between southern partners was out of country dominance, as the southern partners continued with pre-determined roles. They had work experiences with others, especially with the Pakistani organization indicating that they already trusted each other. The interview question particularly emphasized the Pakistani organization to examine their relationship as Bangladesh was formerly known as East Pakistan, a part of West Pakistan. In 1971, East Pakistan became Bangladesh after gaining independence from West Pakistan. However, pre-determined leadership agreements and past working experiences indicated that the members of both Bangladeshi and Pakistani organizations demonstrated their professionalism as researchers. Such a partnership in the international development arena went beyond the historical collision between Bangladesh and Pakistan.

There was another example in which the Bangladeshi organization, BCAS, worked jointly with the Pakistani organization to prepare a document to identify critical moments of the community facing problems with climate hazards and risk. HI-AWARE Consortium Final Technical Report 2018 showed that the Pakistani and Bangladeshi organizations cooperatively developed a literature review analyzing critical climate stress moments of 12 project sites. They reviewed related literature and developed a resource kit titled 'Critical climate-stress moments: Resource kit' (Groot et al., 2018). Their participation in the research tasks also showed that they established cooperation for working together despite their bloody history. Their joint work also got criticism, however, from other partners. In this regard, the HI-AWARE Technical Report, 2017, showed that cultural diversity and sensitivities in ways of communication, inference of acceptance, and differing perceptions came to play strongly during the preparation of the critical moment methodology. For example, the HI-AWARE Monitoring Report 2017 reported a significant complaint: the suggestions provided by some researchers with experience in those subjects needed to incorporate those into the revised concepts and methods. The lead principal investigator was not responsible enough to resolve these thematic concerns.

Apart from the criticism from other partners during the preparation of methods and tools, the southern partners' leadership role also needed help applying leadership skills in the scientific community associated with HI-AWARE. For example, the project review document, such as the Mid-Term Review Learning Report and the HI-AWARE technical reports of 2017 and 2018, showed concern about the need for strong senior leadership. Thematic leads or senior social scientists needed to have all their time budgeted in the program. Consequently, mid-level researchers (ones with recent PhDs, for example) needed adequate mentoring support. It led to delays in decisions on methods to adopt and in the deliverables outline for research components. There was also a need for coordination among consortium team members; mainly, there needed

to be more cooperative behavior from the northern team members towards the suggestion of the southern team members. This situation delayed synergy among all research components under the HI-AWARE project, which led to a delay in delivering research outputs.

The above discussion on how southern partners worked together to carry out research activities showed that although the southern team members faced disagreements on their ideologies and their partnerships seemed to be loosely knit since the northern researchers dominated and influenced the southern research agenda, they carried out the leadership role through the joint activities. However, when facing such difficulties in this process, the most significant challenge was ensuring full accountability for their agreements; for example, responding in time, which became a common thread of concern amongst partners to deliver research outputs.

5.2.6 FACING THE CROSS-COUNTRY ISSUES OF TRAVELING AND FUND TRANSFER

There were logistical challenges associated with internal permissions to travel, time distances, and flight schedules for engaging effectively. Interviews with BCAS and IDRC officials showed that engagement with Pakistan took effort for the researchers from India and Bangladesh because these two countries face restrictions on entering each other's countries. For example, the restriction led to the non-participation of Pakistani participants in the HI-AWARE conferences held in India and Bangladesh, and vice-versa. The members from Bangladesh did not get visas the first time to attend the workshop in Pakistan. However, some of them got visas after applying again.

In the same way, many Pakistani team members could not attend the advocacy workshop in India. HI-AWARE had difficulties getting visas for South Asian partners to travel to northern countries. Country clearance problems for the members of Bangladesh were also an issue. IDRC

wanted to take HI-AWARE members for training purposes to the UK, but some of them (six or seven people) could not attend. There were diplomatic issues between countries. The interviewee of IDRC India shared his experience in this matter:

> "The UK visa sees the position and income of the applicant equivalent to the UK. For example, a Bangladeshi citizen might get 50000 or 60,000 taka, around 600 pounds. So, a Bangladeshi traveler might think this is an opportunity for them to migrate. These are all internal issues. We will never be able to understand what exactly followed, but these are all the issues we faced generally" (Personal Communication, March, 2020).

The above discussion showed that traveling to a particular country for meetings and workshops for engaging in face-to-face interactions and conversations, or knowledge-sharing through participating in conferences, becomes a barrier in the realm of an international collaborative partnership project. There are issues related to visa approvals that affect such engagement. This situation rarely facilitates the North-South relationship or South-South partnership. In the case of the HI-AWARE project, when the interview question was about the cause of visa rejection, the interviewee from IDRC India highlighted the border collision between India and Pakistan and the extensive history of the independence of Bangladesh against Pakistan in 1971, which are well-known in the south-Asian context. There were diplomatic reasons behind getting visa approvals from developed countries that restricted engaging the partners and working together in the HI-AWARE North-South partnership project. However, while facing such travel challenges with the UK visa, the IDRC brought all members to other training programs in South Africa, Abu Dhabi in the United Arab Emirates, Indonesia, Malaysia, South Korea, the Netherlands, and Nepal.

The HI-AWARE North-South partnership also faced a significant challenge in transferring funds from North to South. For example, all fund transfers were smooth in the HI-AWARE project, but there were issues with India, Bangladesh, and Pakistan. The country clearance took at least six months to complete in India. It took work to transfer funds in Pakistan, as they needed to

open various bank accounts. Pakistan does not allow transferring of funds to individual accounts. The sending country must first transfer funds to the State Bank of Pakistan. The government agencies need a different treasury account, which, unlike other banks, cannot provide instant accounts and is quite time-consuming. Apart from India and Pakistan, Bangladesh had a complex procedure to sanction funds to the partner organization BCAS. It found issues while transferring funds from Canada to Bangladesh, involving various intermediary banks from time to time, which made the host country suspicious about the use of funds.

Focusing on the distrust about using the fund, the IDRC finance team visited the BCAS three times and sat together to discuss the issue related to transferring funds. BCAS explained the detailed procedures for releasing funds through face-to-face meetings. In this case, the interviewee of BCAS elaborated on the situation,

> "We did not face any problem with getting the sanction for the project because we applied independently and as the consortium lead. Furthermore, as a collaborating institution, we had a separate contract with the ideas, and we received funds as usual through bank transfer, but there were issues with the bank transfer. Getting the bank transfer holder process approved by NGO Affairs Bureau took almost six months to get a fund released from the bank. So, it was a bureaucratic process taking time because it needed clearances from the free-level offices, like district offices, and getting all these approvals. Again, we had to submit a government template for NGO Affairs Bureau and all these field-level clearances. So, once we offer all these, they take one to two months to get the fund clear and a clearance certificate. Then we have the summit decided and get to the bank and our admin. And then again, it took almost one and a half months. Sometimes our bank gets clearance from the HSBC Bank, where IDRC usually sends the funds. That was the difficulty in getting the funds clearance. It had always been communicated to IDRC at different points in time. The IDRC finance team visited us, and we explained why it took time to release funds. We gave all the details about the procedures. The IDRC finance team tried to get it done quickly but could not do anything on this" (Personal Communication, August, 2019).

The above statements show that the bureaucratic process of international fund transfer in Bangladesh was a barrier to the smooth transfer of foreign aid. That system caused worry and doubts about using the fund in an international partnership project. Furthermore, there was approval from the NGO Affair Bureau, which showed that the Government of Bangladesh (GoB)

monitored the non-government bodies' foreign funds. However, in the case of the HI-AWARE project, the interviewee of BCAS highlighted that they need to learn why IDRC did not send funds directly to the organizational account. On the other side, the interviewee of IDRC India said they do not have any problem sending the funds directly to the organizational account, but it is all about country clearance and the procedures. Their statements showed that there needed to be more understanding of the relationship between BCAS and IDRC that affected the partnership. Although there needed to be more trust from the donor to the recipient, one point is clear: IDRC followed the legal country clearance procedures for transferring funds. However, they needed to be aware of the bureaucratic problem of transferring the funds into Bangladesh.

5.2.7 ISSUE WITH BUDGET EQUITY

The HI-AWARE project had principles of budget sharing in terms of equity. For example, the human resources budget would be less than 40% of the total budget, but the project budget did not bear the equity norm when the fund distributions among consortium members were unequal. The HI-AWARE project completion report, 2018, showed that the three institutions from Bangladesh, India, and Pakistan received only about one-half of the total consortium budget compared to the lead organization, the Nepali organization, which received half of the budget. In an interview with IDRC India, the interviewee informed us that it happened because the employees of the leading institution (the Nepali organization) were European and American. Their salaries were high, which did not seem to be likewise reflected in the South Asian context, leading to tensions among the other consortia members. It also questioned transparency, the value for money by the lead organization, and work coordination. The study found that the Nepali organization as a lead organization was comparatively more powerful than others within the consortium, creating an imbalance among the southern participants.

5.3 INITIATIVES TO TACKLE THE CHALLENGES

All partners recognized the challenges listed above, and in response, there were some initiatives the HI-AWARE project followed to minimize the challenges the partners faced.

5.3.1 CONDUCTING A MID-TERM EXTERNAL LEARNING REVIEW REPORT TO ENRICH COLLABORATION MANAGEMENT

The study found that the HI-AWARE had an early document of partnership agreements in the project inception phase, which had great value in participatory research activities. However, several initiatives from the donor side were to improve the governance and collaboration management among consortium members. Conducting the mid-term external learning review after one and half years was a significant initiative to help the HI-AWARE project identify the steps to best achieve its goals by the end of the program by taking stock and learning from progress to date. For preparing this report, the external team members followed the methodology of key informant interviews, field visits, and reviewing program reports and outputs. Fifty participants participated in the learning review, representing the core and strategic partners from the four program countries. This report facilitated self-reflection among the HI-AWARE staff to identify strategies and strengths to build on and necessary progress corrections to better achieve its goals. The report provided 32 recommendations; however, the HI-AWARE steering committee members prioritized the recommendations of this report and highlighted the most important ones from their perspectives.

5.3.2 REVIEWING THE HI-AWARE RISK REGISTER AND FOLLOW-UP

The mid-term external learning review report thoroughly reviewed the HI-AWARE risk register. It included several risks regarding research activities, implementation and management, and partnership. This report also provided mitigation strategies. The technical report HI-AWARE for March 2017 highlighted that the HI-AWARE followed the learning review report's mitigation

strategies, which worked well. The management kept observations over the project periods on the risk register of the project activities. The risk registers measured risks as high, moderate, and low; identified barriers or constraints; and provided treatment to minimize the risks.

5.3.3 REDUCING THE CONTROVERSY AMONG DIFFERENT EXPERTS DURING RESEARCH ACTIVITIES

Consortium team members faced common challenges in conducting research activities. The team members got several criticisms on preparing methods and tools for each research component under the HI-AWARE research project. Though sharing the views of different stakeholders in the HI-AWARE knowledge management process seemed challenging, the process offered opportunities for communication among multiple experts with different epistemologies. Moreover, it made them accessible and enabled them to operationalize the concept of several research components under the HI-AWARE project based on their insights and judgments. Furthermore, there was a recognition of other perspectives, as the interviewee of BCAS, research section, said that, as researchers, it is essential to accept the views of others to enrich and standardize.

However, to build up such communication and acknowledgments among consortium research team members, the technical report 2017 highlighted that IDRC had to put more emphasis on active knowledge management and communication protocols; it had to do so not just among team members but also between donors and team members. For example, the donor explored web and face-to-face meetings as alternatives. It also followed guidelines developed in the Mid-Term Learning Review Report in its partnership review section, including some activities to grow partner interaction. For example, this review report emphasized informal gatherings and fun activities. The donor also followed the team concept and clarified the role of consortium research team members to avoid redundancies. Donors distributed the responsibilities

of the partners to carry out the project planning activities on the ground. Donors categorized the project activities on who needs to do what, which activities will focus on joint work, time duration, and location to implement those works.

Besides such initiatives, the vital knowledge management strategy by the donor in this regard was setting up the site visit to the areas under the HI-AWARE study and field tests of those methods and tools in Nepal before the project implementation phase.

While it found that not all the partners were well-known, and not all had working experiences with each other before the HI-AWARE project, such joint work—building a communication chain with other partners through planning meetings and thematic workshops, informal chatting, the IDRC's mediating role to enrich the stakeholders' concepts and views through site visits and field tests—indicated that the HI-AWARE project was a stakeholder-led, participation-based collaborative project. In this stakeholder-led participatory approach, the team members could engage with each other, build trust, share ideologies, and nurture the knowledge they acquired. It allowed negotiations to reduce controversies among participants and helped strengthen the climate adaptation policies.

5.3.4 REDUCING MEETING FATIGUE

The interview showed that the consortium research management team and core partner members needed to communicate through online meetings (google hangouts) every three months to discuss the project activities focusing on updates and management issues, which also emphasized building coordination among them. However, following a recommendation of the mid-term external learning review, it decided to hold smaller meetings with only the co-principal investigators and principal investigator every month to reduce meeting fatigue. The technical report 2017 highlighted that this decision worked well and managed coordination problems among partners. There were recordings and a follow-up system of monthly meetings for

necessary action. They posted all updated meetings on the knowledge management platform for sharing with all.

5.3.5 PLANNING FOR SYNTHESIZING THE HI-AWARE OUTCOMES AND LEARNING

It found that there needed to be more coordination among partners to synthesize program outcomes. The technical report 2017 showed that the IDRC organized a synthesis meeting to meet that challenge. They prepared an excellent synthesis plan after this received attention in the Mid-Term Learning Review Report. The synthesis plan included further initiatives, such as forming a synthesis working group consisting of the principal investigators, the co-principal investigators, and the HI-AWARE research component leaders, who played a leadership role. The synthesis working team participated in a synthesis planning workshop to work together. They refined the plan, included the synthesis indicator in the Log Frame, and shared it with the donor (IDRC) team. The donor IDRC clarified the role of consortium coordinators to speed up the synthesis activities. Cross-learning between pilots also focused on working together with pilot working groups. The final technical report 2018 showed that such initiatives reduced the challenges to implementing the synthesis plan, which started in the middle of the 3rd year of the project period. It was able to synthesize the outcomes and learning of the HI-AWARE project.

5.3.6 BUDGET ADJUSTMENT AND FUND AVAILABILITY

Foreign exchange fluctuations reduced funds availability. For example, the HI-AWARE monitoring report 2017 showed that currency exchange loss by the lead organization of the HI-AWARE was a significant concern that resulted in being unable to complete the planned work. To overcome this issue, the lead organization, from Nepal, followed the agreed approach discussing with IDRC to spend from its resources to reduce the financial difficulties.

The study found that the HI-AWARE project faced a fund transfer problem with southern partners. It took three months or longer for IDRC-remitted resources to be available to BCAS and another partner, such as the Pakistani organization, in their respective bank accounts. It happened due to lengthy governmental/bureaucratic procedures beyond the control of BCAS, the Pakistani organization, and IDRC. There was a recommendation in the HI-AWARE technical report in March 2017 that it should discuss how the fund transfer process can be more efficient. The recommendation also said that IDRC should make an emergency transfer of 50% of the half-yearly budget of BCAS and the Pakistani organization on a priority basis as an advance to cope with the uncertain delays.

Though the interview of the officials of IDRC and BCAS did not make it clear whether there was an advance emergency transfer, the interviewees of BCAS and IDRC stated that there was enough funding support from the donor. This situation indicated some initiatives to solve the fund-transferring issue.

5.4 KEY LEARNING

Supporting international development, the northern donor—IDRC—proved that it could work with partner countries of South Asia, a complex region, engaging with each country's government system for project clearance, transfer of funds, and policy dialogue.

Despite the challenges, the HI-AWARE project successfully built coordination among partners, overcoming the uncertainties and tensions in partnership through day-to-day operational activities (e.g., workshops, meetings, consultations) and taking initiatives to improve governance and management during implementation. This happened by passing through several revisions and sustaining outcome stages. Furthermore, the constraints could not stop the partners from continuing the HI-AWARE international joint venture (IJV) work; instead, the partnership

worked well with the availability of foreign funds, and technical assistance contributed to enhancing climate knowledge and adaptation practices.

This study highlights the key learning points from the HI-AWARE IJV knowledge management on climate change adaptation below:

- **Building a coalition of expertise actors or institutions and holding commitments for climate adaptation**

The case study of the HI-AWARE project showed that the coalition of expert partners in the IJV work is essential. International project calls, such as the HI-AWARE, consider collaborative action research in the climate hotspots to identify the vital partners from the bottom level. These partners are particularly interested in adaptation, expertise, and practical experiences. Moreover, the HI-AWARE international project call influences the coalition of regional actors or institutions with previous working experiences, leading them to develop a shared research agenda on climate adaptation. The aim of building such a coalition with previous partners is that each partner can see the benefits of creating a shared understanding and moving together throughout the long-term project period.

The HI-AWARE partners under the consortium model put enough effort into carrying out the partnership, which worked well, despite facing several challenges and uncertainties in the collaborative process. Although it showed an excellent indication of building a partnership with previous partners for making a coalition of leading future projects, it is difficult to say that a coalition principle will always work for carrying out a successful partnership. For example, an interview with the IDRC Canada informed that "Only two of the consortia never experienced a separation; HI-AWARE is one of them. Despite its tensions, HI-AWARE stayed together, but there were two consortia that did lose a core member" (IDRC Canada, Personal communication, 2019). This statement indicated a need for more commitment among partners to move forward.

Previous experience with partners is essential for future partnerships, but it is also vital to ensure willingness and commitment to stay together throughout the project.

- **Operating in a conducive, participatory manner, and openness for joint activities**

The HI-AWARE project's joint research activities among partners showed that creating a conducive environment is the key to the knowledge management process. The HI-AWARE project showed a helpful, participatory environment that depends on establishing the designed and facilitated process, allowing flexibility for the shared understanding of the project's goals and defining problems and prospects. Though the process design is a preliminary set-up in the phase of project design, several early-period actions for smoothening partnership, management, and governance system during the phase of project implementation helped to build trust among the partners, recognize the partners' or coalition members' perspectives, and expedite the project activities, targeting project goals and deadlines. Following the HI-AWARE project, the early action initiatives listed below were noteworthy for carrying out research activities jointly:

- Surveying project partners to understand the partnership process within two years of the project period and work accordingly following the findings.
- taking the initiative to involve partners or project members in informal activities to build trust and understanding among partners
- identifying the roles and responsibilities of participating actors and reshaping, which helped to organize the tasks towards output and allowed participants to support openness, which helped to recognize the participants' perspectives.
- facilitating specific resources, such as field tests, before implementing the project, enabling participants to engage actively and acquire practical knowledge.

- **Ensuring a flexible and renovated governance structure for reporting to the donor**

Though the HI-AWARE project showed a participatory environment for joint work, it had a strict monitoring and governance pattern for delivering reports to the donor. In addition, there were conditional reporting tasks for continuing to provide funding over periods, which reduced time for quality research and increased tension. The donor of the HI-AWARE project needed to be made aware, before the contract signing, of the bureaucratic problems regarding the fund transfer procedure in the recipients' countries, which delayed the sanctioning of funds. This situation risked timely completion of tasks and led to delayed reports to the donors. A situation like this sometimes leads to the growth of doubt among donor(s) and partners.

- **Mutuality and trust-building in donor-partner partnership**

Mutuality and trust-building between the donor and partners came up throughout the HI-AWARE project. There were several uncertainties and tensions between donor-partners, but several meetings, partnership agreements, and commitments of both parties helped build trust and foster mutual throughout the project. Several pieces of evidence show how both parties carried out the relationship. For example, when donors found cross-country issues, such as transferring funds to Bangladesh and Pakistan, they visited those countries to observe the funding transferring procedures, especially in Bangladesh. The donor IDRC and the Bangladeshi partner BCAS jointly discussed how to make up for the delayed time due to bureaucratic problems of funds transfers. IDRC offered an advance fund to carry out the project activities. Another cross-country issue was the foreign exchange rate with the Nepali organization. IDRC and the Nepali organization agreed that the partner organization's revenue would pay for the loss of money.

Such activities showed that the parties built a mutual understanding throughout the project, despite facing several challenges. Therefore, it is clear that understanding and trust-building between donor-partners are very important to carry out the project. Whenever the HI-AWARE

partners faced problems, the donor provided supervising support. The donor team also physically visited the partners, listened to the members of the partner organizations, and understood the issues. On the other hand, although the donors put strict reporting regulations as the condition for the continuation of funding, both parties had a positive impression of fund availability throughout the project. The situation indicated that the donor-partner relationship grew with trusting each other, not just providing available funds; it was beyond the funding contribution.

- **Prospects for gaining knowledge and building organizational capacity**

The HI-AWARE joint research activities and piloting programs showed that the consortium team members enjoyed opportunities to learn from each other and the field through piloting the adaptation options. Though there was the implementation of ideologies from the developed countries that might not fit with developing countries' culture, for example, the Dutch consultant's work on digitizing the maps of the entire Himalayan region for climate change, it indicated that there was knowledge-sharing and learning. There were challenges in synthesizing a long-term multi-nationality research work's output for adaptation pathways development across the consortia under the CARIAA program, but the HI-AWARE project members made gatherings for synthesizing every nationality's research result using the shared learning dialogue technique. This process showed a great source of learning through dissemination.

The synthesizing process allowed learning and knowledge-sharing opportunities to build research, organizational, and partnership capacity for future development. The consortium team members learned from the HI-AWARE project the importance of creating a partnership model to successfully implement any climate change research project on adaptation at the regional level to address the program objectives. They used this lesson to develop other new projects for their organizations. For example, HI-AWARE technical report 2018 showed that BCAS used this lesson to develop a new project named "WATERAPPS-Climate Information Services for Peri-

urban Agriculture." In this project, BCAS made a WATERAPPS consortium, bringing together various organizations, including universities and organizations from private and public sectors at different governance levels in Bangladesh.

It is an opportunity to compare the key findings of the HI-AWARE project with other projects that adopted knowledge management strategies for generation climate adaptation knowledge.

For example, the Swedish forest sector produced climate adaptation knowledge through joint knowledge management (Swartling et al., 2019). The knowledge management strategies of this project focused on group work in the process. There were forest excursions that helped develop interaction among them and motivated them to participate openly. In the process, this project prioritized partners' interests, needs, and opinions in the project planning phase, implying that the forest sector tried to establish collaborative exchanges among partners. In the case of reporting to donors, partners had flexible schedules within the project periods. Moreover, Swedish forest sector partners enjoyed more autonomy to collaboratively produce climate adaptation knowledge (Swartling et al., 2018).

However, although the Swedish forestry sector's knowledge management facilitated collaboration among partners, there needed support for boundary work, for example conducting co-designed participatory exercises involving implementing agencies and community people (Ernst et al., 2019). Compared with the Swedish forestry project, the HI-AWARE project attempted to emphasize boundary works by allowing the partners of the different organizations to conduct co-designed participatory exercises. It started with building a consortium, designing the project, and conducting participatory action research and a pilot program, even though the HI-AWARE project's funder followed strict monitoring and deadlines for project reporting through reporting and maintaining communication protocol.

Apart from the Swedish forest sector, many adaptation efforts failed to become adaptation actions in Sweden, where participants experienced challenges in involving stakeholders in the participatory process. For example, some projects found that stakeholder engagement activities took a comparatively long time that allocated less time to complete research writing effectively (Ernst et al., 2019).

There is limited scope to learn from adaptation projects, as such projects face problems regarding clear and specific mandates on how to implement on the ground (Bulkeley, 2010; Porter et al., 2015; Arnott et al., 2016). However, the adaptation efforts through several international/national adaptation projects are increasing towards minimizing climate vulnerability (Ernst et al., 2019). Furthermore, such adaptation efforts through projects have shown a science-society interface involving stakeholders and managing information exchange collaboratively. More particularly, collaboration efforts facilitate shared understanding and awareness among participants, which eventually benefit in shaping research, guiding decisions, and determining performance (Swartling et al., 2019; Gramberger et al., 2015; Pohl, 2008). However, the partners or organizations must carefully consider which participatory approach and management will be the most appropriate to establish interaction among participants for sharing information to generate widespread adaptation knowledge and recognize it as best practice through implementation (Swartling et al., 2018).

Several authors proposed some theoretical assumptions about carrying out such collaborative adaptation partnerships. Their theoretical frameworks focused on who will be stakeholders and how they will be involved in producing adaptation knowledge. For example, van Buuren et al. (2015) focused on project partners with experience in partnership-building may demonstrate the value of building a coalition for a collaborative partnership. Past working experiences between partners ensure the willingness and commitment of partners over time.

Gramberger et al. (2015) added that there is also the need for an effective management and governance structure of donors and partners, which can provide incentives through monetary or non-monetary activities. These incentives encourage partners to engage in participatory exercises to ensure knowledge management. Hegger et al. (2012) designed climate adaptation processes that included stakeholders in knowledge co-production. They focused on stakeholders' credibility, salience, and legitimacy thresholds in the knowledge co-production process. The authors further highlighted conditions for the success of knowledge co-production that included a feasible coalition of partners; a shared understanding of project ideas/design; acknowledgment of the participants' perception and interest; delineation of the role and responsibility of the actors and assigned tasks; the role of researchers and exchange research outputs; and innovation governance system for encouragement (p. 61).

Observing the theoretical assumption on adaptation knowledge co-production showed that there were significant contributions of project management and research activities to ensure the coordination among donors, partners, and community people to produce adaptation knowledge. In the case of innovative governance structures in the climate adaptation process, there are scopes to work on how to increase the governance system. For example, in the case of the HI-AWARE project, reporting to donors and buddle of document preparation and submission within deadlines were very strict—communicating correctly and submitting reports within deadlines impacted getting funds for the following activities. There is scope on how to make it more flexible and what kind of a renovated structure offers an improvement in the donor and partner relationship, especially in the case of reporting and communicating. In this regard, Swartling et al. (2019) highlighted that donors should acknowledge and appreciate the stakeholder-led process as such a process can adapt automatically, and the participants do not need to submit a report on a selected activity following a deadline (Swartling et al., 2019, p.101).

5.5 CONCLUSION

This chapter has investigated the challenges and opportunities for effective knowledge co-production resulting from a collaborative partnership project focusing on the science-stakeholder collaboration in the knowledge management process on climate adaptation employing a case study on the HI-AWARE project. The analysis shows that the HI-AWARE collaborative knowledge management process showed participatory, open, long-term, and donor-supportive approaches/actions to move together for climate action. Despite having challenges, the participatory activities of this project were able to show not only the benefit of making consortium, building trust, and co-exploring knowledge between cross-countries partners. Nevertheless, they also stressed the importance of local and cultural contexts by involving community people for joint knowledge production and concern with generating high-quality, more useable knowledge. Moreover, the HI-AWARE project's activities regarding overcoming the challenges through several strategies developed experiences regarding the advantages of the participatory research activities that made the collaborative knowledge management process valuable.

CHAPTER SIX: LOCAL PEOPLE'S VOICE AND THE IMPACT OF THE CLIMATE- AND FLOOD-RESILIENT HOUSE

6.1 INTRODUCTION

This chapter demonstrates how the climate- and flood-resilient houses as an output of the HI-AWARE project brought a change in everyday life of flood-affected people, through the impact of the HI-AWARE project in the Teesta basin, with Bangladesh showing the immediate benefits of such development. Secondly, this chapter documents the local people's voices showing the challenges they found for the future development of those houses. Finally, it presents the conclusion and focuses on the donors' opinions about how HI-AWARE benefited local people and provided lessons to development organizations.

6.2 THE IMPACT OF THE HI-AWARE PROJECT IN THE TEESTA BASIN, BANGLADESH

This doctoral research applied fieldwork and quantitative analysis to assess the change between pre-and post-intervention of the HI-AWARE project (see the methodology section, Chapter 2). The data results from the description and quantitative analysis showed a considerable difference between pre-and post-flood situations after the plinth development and the installation of the resilient climate housing. More specifically, such plinth and housing development activities decreased the regular floods that affected the beneficiaries, such as courtyard inundation, house inundation, toilet and tubewell inundation, and cooking problems. Based on the detailed responses of the beneficiaries as research participants in FGDs, this research found that the beneficiaries were severely vulnerable in their old poor traditional houses during floods. The building materials of old-fashioned traditional houses were corrugated iron sheet roofs with hay and bamboo walls. Some beneficiaries made their old houses with earth, hay, and bamboo. Such

poor houses were sensitive to strong wind and flood waves. The flood vulnerability of the beneficiaries living in those houses remained unchanged until the project intervention in 2017. However, developing plinths and building climate-resilient houses changed their lives. To highlight the change, for example, one beneficiary located in Kawnia village said,

> "We were almost sinking inside our house during a flood. The floodwater covered up to half of our bodies. We shifted to the bed (wooden framed bed) inside the house. In the year 2017, the flood waterlogged for up to 15 days. We stayed in other houses on high land for 15 days in the daytime, but we stayed at night in our houses. We were always in fear that some insects may be hiding somewhere. We thought snakes or insects could hide inside the hay and poor bamboo slices. The C4RE Sir visited us then, saw our worse living situation, and gave us this house" (Personal Communication, FGD, Kawnia, February, 2020).

The above statement of the beneficiary showed how the beneficiary and her household members suffered during the floods. Other beneficiaries had almost the same miserable situation during the floods. However, the beneficiaries acknowledged the HI-AWARE pilot program that significantly changed their daily lives. Based on the FGDs, this Doctoral research found the benefits of the HI-AWARE pilot program to the beneficiaries in several ways:

6.2.1 POSITIVE TRANSFORMATION TO THE BENEFICIARIES

The experiment of plinth development and climate-resilient houses through a pilot program showed a significant positive transformation for the beneficiaries. The local voices of beneficiaries in FGDs explained how the change took place after such development**.** Most beneficiaries highlighted that they did not experience floods after developing the plinth and climate-resilient houses. Though some of the beneficiaries in both villages, Kaunia and Dimla, had flood inundation in their courtyards, because those houses had no plinth development, the climate-resilient houses were free from flooding. The beneficiaries also talked about the design of unique climate-resilient houses in local areas. For example, the windows, store capacity on the rooftop, and high basements of the climate-resilient houses drew attention to the beneficiaries to get relief from floods since the traditional houses in those villages lacked such facilities. The

maintenance of climate-resilient houses depended on the beneficiaries after completing the project. Some beneficiaries with no plinth development used concrete mixers to strengthen the basements of the climate-resilient houses. Besides housing development, the beneficiaries also obtained other facilities that smoothed their daily activities, such as kitchen area improvement, toilet improvement, and handpump shallow tubewells for drinking water.

Field visits in 2019 showed that only one homestead in Kaunia village, under the experiment to develop cluster housings and plinth development, got a complete package of development activities under the pilot program of the HI-AWARE project. Houses under the scaling-up program got only climate-resilient houses without plinth development. The household members who received a complete package of housing development had two toilets with gender distinction. In FGDs, Kaunia, the members of those households, indicated that since they were a large family, two bathrooms helped them. In this case, they rarely maintained gender demarcation for using the toilet. Women beneficiaries also highlighted in FGDs that they had health benefits after the improvements resulting from this project. They informed investigators that women and children no longer faced water-borne diseases common during floods before the project.

The beneficiaries in FGDs also informed that their social status improved after getting the climate-resilient houses. For example, the HI-AWARE project supported the participation of beneficiaries in the international conference for sharing the benefit of climate-resilient houses. In the Bangladesh case, only one member of the beneficiaries who enjoyed the whole development package got that scope. However, this scope increased the participant's self-esteem and social status in the village. When the participant returned from an international conference in Nepal and shared his experiences with the villagers, he became well-known to his neighbors. Moreover, he was getting invitations to village meetings with local government members from that period.

The beneficiaries also informed that they were able to increase social bonding with neighbors after getting the climate-resilient houses. For example, the beneficiaries in Kaunia village highlighted that the villagers (non-beneficiaries) often visited them to see their new houses and requested them to tell their names to the organization to get climate-resilient houses. Moreover, the beneficiaries who got a complete package of housing development mobilized the other beneficiaries to work for their neighbors in Kaunia village. The beneficiaries listed the names of villagers still suffering rigorously from floods. They handed over the list to the field coordinator of this pilot program and hoped the organizer would first provide the climate-resilient houses in their village when there would be the next budget for the extension of that house.

In FGDs, the beneficiaries first prioritized education for their children to focus on the future planning of the beneficiaries after getting the house. Some plan to build another home later when the children grow up. Further discussions in FGDs showed that they had to invest much of their income in repairing their flood-affected houses before getting climate-resilient ones. However, the beneficiaries could save that money as homes were not flooded for two years after the project. They planned to spend that money on the education of their children.

For example, one of the beneficiaries in Kaunia village said,

> "We do not see a flood in our houses nowadays. The flood maintains a distance from our land. We have windows in new houses that provide a gentle wind. We do not use an electric fan to get wind in summer and have enough daylight in our house. We do not have cooking problems**,** and our children can study well now" (Personal Communication, FGD, Kawnia, February, 2020).

Another beneficiary in Dimla said, “My elder daughter and son can study in the top part of the house when we have guests in our house. Their father has the scope to invest more money for their education" (Personal Communication, FGD, Dimla, 2019). The above statements of the beneficiaries showed not only the benefit they got after developing the climate-resilient houses,

but also how this development allowed them to improve their lives by investing their money in their child's education.

6.2.2 CLIMATE-RESILIENT HOUSES BECOMING FLOOD SHELTERS

The climate-resilient houses became a shelter for the villagers during the flood period. FGDs found that around 20 people can stay in climate-resilient houses. These houses provided immediate support to the villagers in floods. For example, one beneficiary in FGD Kaunia described the suitability of the climate-resilient houses:

> "Some people got shelter in our new house. In the 2017 flood, my sister and her family members shifted from her flooded area for five days, and some others from the north side of this village came to our houses to get the cooking facility for two days; and some older people stayed here as they found flood inside their houses. Also, the sister was pregnant, so staying in her flooded house was difficult. We were safe, and the flood did not touch our house. So, they came for a temporary residence in our new houses. They cooked food for themselves, and we cooked our food separately. However, we stayed together" (Personal Communication, FGD, Kaunia, February, 2020).

The above statement showed that the beneficiary found her new home flood-free and welcomed the relatives who suffered during the floods. Likewise, other beneficiaries provided shelter to villagers who found flooded houses in the same village or surrounding villages. Since such riverine villages lacked enough government flood shelters, the climate-resilient houses provided that service during floods. The participants in FGD at Dimla village, particularly the local union member of Dimla village, informed that there is no flood shelter, but the government had the initiative to elevate lands in Dimla village. The local member transferred the land adjacent to his house to the government for this purpose. The field visit in 2019 found elevated land without any flood shelter. The participant in FGD at Dimla said they benefited from that elevated land. They stayed on that land during floods. When the flood went down from their houses, they went back to their houses. In this circumstance, the climate-resilient houses worked as flood shelters for local people.

6.2.3 DEMANDING SCALING-UP OF CLIMATE-RESILIENT HOUSES

The secondary documents provided by the IDRC, BCAS, and C4RE organizations and the interviews with organizational personnel showed that the HI-AWARE pilot program and scaling up a few houses through follow-up project activities could grow the demand for building climate-resilient houses against floods. The participants also demanded housing in FGDs. Moreover, FGDs found that the non-beneficiaries were more concerned about getting climate-resilient houses than the plinth development. For example, some of the non-beneficiaries in FGD at Kaunia Upazilla raised their voices and asked that climate-resilient houses be built for them. Those non-beneficiaries informed that they already had plinth development, having received such benefits from another non-government organization. The surrounding villagers found space to stay on that raised land during floods. Those non-beneficiaries suggested that if they got houses, they would help their large families and others who lived in the lowlands find more space and accommodation during floods. However, the field visit in 2019 also showed that some non-beneficiaries whose houses were in the lowlands demanded a complete package. Based on FGDs, this doctoral research found that the beneficiaries not only found this climate-resilient housing development beneficial, but the non-beneficiaries also observed the benefit of that housing development during floods. This situation demanded that climate-resilient houses scale up further.

Nevertheless, implementing plinth development and building resilient climate houses involving local people, sharing lessons learned with stakeholders and policymakers, and training local masons and carpenters to develop local entrepreneurship in those villages was able to make a change. It created demand during and after the project seeing the benefit of such development during the subsequent floods. However, the expansion of such housing development still faces

barriers after the project. Moreover, this Doctoral research found several obstacles associated with the long-term development of climate and flood-resilient housing.

6.3 CHALLENGES OF SCALABILITY OF THE CLIMATE AND FLOOD-RESILIENT HOUSING

The HI-AWARE project is an example that shows the effectiveness of experiments on climate- and flood-resilient houses in project areas at a small scale through a pilot program and follow-up project activities. However, identifying a solution through pilot or invention does not end the research; instead, there is a need to observe other options for sustaining that knowledge product, such as cost-effective options or using locally available solutions for expanding the knowledge product for getting the benefit at a large scale either in terms of area or population. However, this Doctoral research found some uncertainties based on the FGDs, organizational documents of the HI-AWARE projects, and interviews of the organizational personnel that restricted the further development of such housing programs. The following section discusses the challenges in scaling up the climate and flood-resilient houses.

6.3.1 CLIMATE AND FLOOD RESILIENT HOUSING AND RIVER MANAGEMENT ISSUES

The HI-AWARE project brought attention to the improved low-cost flood-resilient houses in Teesa basin villages, Bangladesh. However, the HI-AWARE Technical Report 2018 focused on river management with the flood-resilient house, which is essential for the sustainable development of the basin people. This report highlighted significant problems in river basin areas that reduce the upstream water carrying capacities and natural flow, such as repeated sedimentation, braiding, and delta process. However, human activity in the Teesta catchment area was another problem restricting river channelization. The national government should do regular dredging and river training to increase river navigation. On the other hand, basin-sharing

countries should prepare regional programs that focus on addressing the river management issues in basin areas. This report also recommended building embankments and other bank protection structures; otherwise, building low-cost flood-resilient houses would not contribute to the sustainable development of riverine people (HI-AWARE Technical Report, 2018).

6.3.2 REPLICATION OF THE CLIMATE AND FLOOD RESILIENT HOUSING AND COST-EFFECTIVENESS ISSUE

FGDs revealed that the beneficiaries planned to build another house but wanted to build their previous one again. The beneficiaries wanted to avoid building climate- and flood-resilient houses because of their high construction cost. For example, one of the beneficiaries in Kaunia explained that the climate- and the flood-resilient house needs 2-2.5 lac to build it (1 lac = 100,000 Taka = about $1,316 CAN). However, the old traditional house made of low-cost local materials such as corrugated tin sheets, hey, and bamboo sticks would cost around 20-30 K ($259 - $388 CAN). Since the beneficiaries already had plinth development through the project, they thought their courtyard would be free from floods. Therefore, building a house with local materials would be fine during the flood.

On the other hand, non-beneficiaries also found the climate-resilient houses costly. Moreover, the non-beneficiaries argued that it is challenging to construct climate- and flood-resilient houses, investing a large amount at once. Their income level would not support investing money at one time on this cost.

In discussions with the beneficiaries and non-beneficiaries, this Doctoral research found that although there was a demand for those new houses in the villages, building such houses was costly to the villagers. FGDs found that the jobs of the participants were not regular. Though both villages offered some seasonal agricultural work for men and women, the wage level was low. Most men needed to go to other villages or cities to search for a job to earn money. Women could

find seasonal agriculture jobs in their villages as they could not move to new villages for their families. However, the wage level of women's labor was lower than men in those villages. On the other hand, their jobless situation was very natural during floods. Though the participants in FGDs did not precisely clarify their monthly income, some guessed a range of 15-20K would be their monthly income. They spent most of this income on repairing their houses after floods. The participants also informed that tackling floods and maintaining family rarely helped them save much money for building new houses like the climate- and flood-resilient ones. Based on such discussion, this research found that building climate- and flood-resilient housing in local areas could have been more cost-effective.

6.3.3 LOCAL CARPENTER TRAINING FOR BUILDING CLIMATE-RESILIENT HOUSING AND TECHNICAL ISSUES

FGDs found technical problems with building climate and flood-resilient houses beside the incapability of finance for such housing. The beneficiaries, non-beneficiaries, and C4RE Director shared the technical issues to clarify why people did not build the climate-resilient houses.

Based on the discussion with the participants in FGDs, this Doctoral research found that though the local carpenters got training on building climate-resilient houses, there needed to be more technical issues with the traditional sawmills for shaping the wooden logs into customized sizes. For example, this type of house needs 20 square feet of wooden sheet, but the mills cannot process the logs into 20 square feet. This situation showed that building climate-resilient houses is not supportive of local infrastructure. An interview with the program coordinator of the C4RE organization informed that at the time of the pilot program, the C4RE organization brought all construction materials for building the climate-resilient houses from Dhaka city, and then the organization fixed it in local areas. Though the wooden materials for building those houses were

locally available, the problem was processing the wooden logs of the prescribed size and shape in local sawmills. Besides the income limits of the local people, this technical problem also discouraged the local inhabitants from building those houses since purchasing and shifting the construction materials from Dhaka city would make the house more costly.

6.3.4 AN ISSUE WITH LOCAL INITIATIVES FOR BUILDING CLIMATE- AND FLOOD-RESILIENT HOUSES

When FGDs found that lack of finance and old-fashioned sawmills were the issues for expanding further the climate and flood-resilient houses, the participants also suggested that building a cooperative society could help to generate savings for building that new house. In this regard, women beneficiaries in Kaunia shared information about their cooperative society in which women were the only members. This research found that village women made a committee involving 30 women, and this cooperative society meant women could save 200 takas every fifteen days. In one month, they could save 400 takas. In this way, each women member completes the 24 cycles per year, dividing the whole money between them.

For example, one woman farmer who grows nuts in the field and needs money to pay the laborers can borrow 200 taka from the cooperative society. The borrower must return that money next month with an extra 100 taka (as interest). They divide that money among them every year. Moreover, such a local cooperative society had two types of benefits. The needy farmer gets money immediately (readymade), and the lender also gets some interest that increases their money. Since villagers know each other, they trust and manage the transactions. Women members could not open an account in the bank. They thought about the flexibility of getting money, like when they need it from local people. The participants in FGDs also informed that they found such a cooperative society very helpful, and other villagers also supported such an initiative organized by village women. Focusing on the benefit of such a cooperative society

showed that the committee members get 4000-5000 taka per year to buy a cow for their livelihood, for example.

Based on the discussion with the participants in FGDs, this Doctoral research found that building a cooperative society at a local level provides the opportunity for livelihood activities. Local people can ensure daily necessities like food and other emergencies from the cooperative society. However, such initiative rarely helps to arrange a large amount of money to build climate- and flood-resilient houses against floods. After completing the pilot program, the HI-AWARE project left the villagers to hope that the villagers would find ways to build those houses as these new houses already showed benefits during floods. The HI-AWARE already had to scale up that house at a small scale, and there was sufficient training for the local carpenters. The piloting and follow-up activities of the HI-AWARE project created a demand for building those houses. However, in a real sense, the poverty of local villagers could not inspire them to prioritize climate- and flood-resilient houses. Continuously facing floods and insecurity about jobs and income meant they could not save considerable capital for meeting their family's needs, like building a climate and resilient house.

Though some of the beneficiaries in FGD, Kaunia, suggested collective action for arranging money for the new houses, they also focused on external support to build those houses. For example, one beneficiary who participated in the international conference on behalf of the Bangladesh beneficiaries said, "Everybody has a dream to build a house, but if income increases, then the dream comes true. I told it in the village meetings that we could make a joint committee and use that money to build houses. Villagers need to help each other. Also, we need help from other organizations like C4RE organization" (Personal Communication, FGD, Kawnia, 2019).

The above statement showed that villagers still thought about collective action that would help build the climate and flood-resilient houses, but it also indicated the need for help from the

outside. However, the participant of the C4RE Director in FGD, Kaunia, had a different view on supporting the villagers in this issue. He was against the dependency on the external organization to build those houses. In FGD, Kawnia, the C4RE Director, cleared their role as an external organization. For example, he said:

> "When a baby learns to walk, we need to hold her a bit so that the baby can learn to walk confidently. It will be meaningless if local people think that the governments and other organizations will build houses; local people will never feel that houses are for them from the core of their hearts. If local people show that they are doing some work to build a house, then as an organization, we can help local people" (Personal Communication, FGD, Kawnia, February, 2020).

The above statement of the C4RE Director revealed the importance of the self-help capacity for community development. However, such self-help capacity of the riverine communities would only succeed with help from the government or international donors like the HI-AWARE project.

6.3.5 AN ISSUE WITH GOVERNMENT SUPPORT FOR BUILDING CLIMATE-RESILIENT HOUSES

FGDs in Kaunia and Dimla highlighted that the government's helping hand rarely reached their communities. FGDs also informed that the government focused on the maintenance, repair, or rebuilding of the bridge that broke yearly during floods. There were opportunities to hear the local people's voices and see villagers' suffering during floods. The local government member who participated in FGD in Dimla shared his experience and informed the devastating situation of floods and their role in such circumstances. In this regard, the local union member of Dimla village explained,

> "No doubt about the benefit of this house during the rainy season. If flood water inundates the courtyards, people can stay inside the house as the house level is higher than the courtyard level. If the flood water rises and reaches inside the house, people can stay at the top of that house. As the capacity of those houses is to absorb around 20 people or more, those houses are temporarily good in this area in many ways. For this reason, if every household could get this house, at least the destitute people who could not build the house.

> The other people, who can employ the carpenter to build houses, would significantly contribute. We are local government members, but the local government rarely listens to local voices. We wrote official letters several times simply requesting to construct the concrete road connecting the village to the town as it worsens because of its muddy structures every year during the rainy season. However, there were no initiatives by the local government authority. Our member of parliament for this area always tries to bring some budgets for the development of this village, but our scope only remains in distributing relief during floods" (Personal Communication, FGD, Dimla, February, 2020).

The above paragraph demarked local government members' weakness and highlighted such villages as deprived areas, as they were bereft of a lack of basic amenities from the government. The discussion with the BCAS and C4RE personnel interviewees showed that such basin areas need more attention from the government level because of their peripheral locations and repetitively vulnerable situations during rainy seasons. It realized that the HI-AWARE team was able to provide training on the use of climate-resilient houses involving local government members with community people. However, a discussion with the interviewees of BCAS and C4RE personnel showed that such knowledge-transfer activity to build capacity was not able to grow awareness of local government bodies that will bring any change for the welfare of the people through constructing climate-resilient houses in the long run.

6.4 CONCLUSION

Non-government activities against floods, even on a small scale, helped local communities. Land development or a complete package of household development like climate and flood-resilient housing already proved that such climate adaptation strategies could address the climate hazards. However, spreading such action across households or areas needs a steady hand to ensure the actual development of flood-affected communities. Self-help or capacity building through cooperative society or even growing local entrepreneurship is difficult when local people fight natural hazards yearly. Such strategies need a particular source of income for average savings for building houses, but riverine areas do not offer a long-term income source.

Sometimes arranging daily food becomes a matter; therefore, there will always be a dependency on either government or non-government sources.

The next step of the HI-AWARE project would focus on lessons learned and apply that learning in the next project in another locale. For example, it could be another consortium involving some other parts of the southern world or focus on something different than snowpack and basins. In the long run, this situation would keep behind the welfare of the flood victims in the Teesta basin. Despite HI-AWARE's fruitful output on adaptation knowledge management, the project could not provide certainty for receiving social benefits in the future.

However, the IDRC Canada interviewee had different opinions about the benefits of the HI-AWARE project. The IDRC Canada interviewee stated that the HI-AWARE project indicated the relationship between North-South for doing international development practice rather than complain that such collaborative international partnerships could not provide social benefits. He explained the benefits of the HI-AWARE project in several ways:

- **The HI-AWARE project demonstrated the value of the pilot climate-resilient houses versus not having those**

The HI-AWARE project showed that the seven houses under the pilot program were underpowered experiments. However, is a specific number required, 'any equals five' or 'nine equals seven' pilot housing? Nevertheless, a more robust and powerful experiment would include, for example, 30 pilot houses; perhaps, 100 would have been sufficient to bring a significant change for the welfare of the flood victims. Though constructing seven houses was insufficient in Kaunia and Dimla villages compared to the flood-affected houses or families, building seven houses as part of experiments was enough to demonstrate proof of the concept of such houses using a specific experimental design. Such experimental houses provided shelter to the flood victims. They showed the benefit of design features, such as the impact of the temperature inside

a house with that type of roofing, as the IDRC Canada officer mentioned. The development of houses with such benefits was enough to generate the economic demand to shift the preferences of local people in housing. Moreover, when grants for development work in the adaptation areas are limited or arranging construction money for those houses is challenged by the community people, getting seven houses was enough to demonstrate the value of the intervention or pilot program versus not having those houses (IDRC, Canada, Personal communication, 2019).

- **The HI-AWARE project focused on successful action research, creating a demand for those houses**

When interviewed, the IDRC Canada participant focused on the high cost of climate-resilient houses and emphasized that there may be a need to get more funds to continue exercising, building, and having more demonstration sites, but there is also the need for a successful exit point. A wonderful exit moment would have been if the project had been able to get to the point where this type of housing was in demand. In the HI-AWARE case, people wanted to build houses and find the resources to create a local domestic market. The interview also emphasized that Canada's IDRC was funding the research rather than there to be building houses constantly. More specifically, HI-AWARE never intended to change the housing market in Bangladesh; as a pilot, it completed actions, which is what this work demonstrated (IDRC, Canada, Personal communication, 2019).

- **The HI-AWARE project opened up an avenue for the following research action to create a market demand for flood-resisting housing**

The HI-AWARE case study found that though the follow-up funding of the HI-AWARE project could help grow the market demand for those houses, the high construction cost became a constraint to fostering the consumers' attention. In this regard, the interviewee IDRC, Canada, had a different explanation instead of seeing the high construction cost of those houses as a

constraint for determining the success of the HI-AWARE project. He explained that the idea of such ecological housing design already took place in international development over three decades with multiple cycles; however, the market signals are only sometimes there from consumers, which has become mainstream. At the same time, it does not mean that international development must stop conducting such adaptation action research. International development cannot change the economy, but it could conduct research and publications and build capacity like the HI-AWARE. The HI-AWARE project provided opportunities to finance a certain number of climate-resilient houses, demonstrate the concept behind these houses, and offer training by engaging with decision-makers and policymakers in partner countries. Also, the results of the HI-AWARE fed into policy and the national adaptation plans. Moreover, within the nature of international development in practice, the successful execution of the HI-AWARE project helped open up an avenue for the following research activities, in which one could come and imagine a climate program that was about creating a market demand for flood-resistant housing (IDRC, Canada, Personal Communication, 2019).

Further communication with the director of the C4RE in 2021 indicated that the IDRC plans to extend the HI-AWARE partnership, with coverage of about 800-1000 resilient climate housing provisions. Extending the HI-AWARE project was to meet the growing demand of villagers in the Teesta basin areas. Nevertheless, this initiative will contribute to the welfare of the local people in the Teesta Basin, Bangladesh, if the IDRC heads implement those plans.

CHAPTER SEVEN: SUMMARY AND CONCLUSION

This research was conducted to determine how non-profit organizations like civil society organizations (CSOs) work collaboratively on climate change knowledge management in international development. To accomplish that aim, this research reviewed the project activities of the HI-AWARE International development project (Himalayan Adaptation, Water and Resilience Research on Glacier and Snowpack Dependent River Basins for Improving Livelihoods). It investigated how the International Development Research Centre (IDRC) and Bangladesh Centre for Advanced Studies (BCAS) collaborate, including other southern partner organizations create climate knowledge through the HI-AWARE project. This research focused on six in-depth interviews of BCAS and IDRC personnel to understand the knowledge management strategies in different project phases, such as program design and budgeting, partnership scheme, communication protocol, action research, pilot program, and evaluation systems.

The study found that the HI-AWARE knowledge management and governance included ensuring equity in budgets and equal leadership positions among partners to conduct action research under the HI-AWARE project. This study also found the knowledge management strategies that fit the criteria, principles, and techniques of collaborative partnership and community participation in the field.

However, the HI-AWARE project faced uncertainties and tensions with implementing those knowledge management strategies. The partner organizations had to tackle several problems to stay together in a collaborative relationship. More specifically, the partners weaved themselves through the operational activities of the HI-AWARE partnership project.

Challenges faced by the partner organizations revealed in interviews and discussions of the donor-partner relationship included several issues. These issues relate to funding allocation,

technical assistantship from donors to partners, and the relationship among consortium team members. In this case, the study discussed the interaction of the partners in several meetings and the issues related to partners' professionalism, honesty, and attitude for ensuring equity in such collaborative partnerships. The study also discussed the cross-country issues associated with the transfer of funds and country clearance for traveling; it discussed the tradition of the professional practice framework of North-South international development and a barrier of funding from the Global North to the Global South.

The research results identified some mechanisms and recommendations for meeting the challenges in collaborative partnership, including conducting a HI-AWARE mid-term learning review survey within one and half years of the project period. The project partners and donors followed the recommendations outlined in learning review reports regarding partnership, collaboration, budget equity, action research methodology, and project management.

This research included a field visit to two project sites in Bangladesh, and it conducted two focus group discussions (FGDs) to observe the pilot program of the HI-AWARE project. The purpose was to observe the applications of climate change knowledge products of the HI-AWARE project, see the impact of such knowledge on vulnerable people, and investigate whether those knowledge products showed a long-term effect on sustainable development. More specifically, this study drew attention to the 'change' in villagers' situations and attitudes before and after installing the climate-resilient houses as a knowledge product in project sites.

The research findings also focused on how the implementing agency created the design of climate-resilient houses. It assessed the acceptance by local people through on-site interviews with recipients and their neighbors. A fundamental quantitative analysis described the impact of climate-resilient housing before and after conditions comparing the expressed views of the people affected by the climate-resilient house program. The study observed that climate-resilient houses

changed the daily lives of local people (beneficiaries) during the rainy season as those houses were free from flooding. These houses also created a demand to adopt for expansion. However, these houses could not ensure long-term sustainability because of high construction costs and lack of development of market entrepreneurship for further development.

In conclusion, this research found that the HI-AWARE project successfully built coordination among partners and overcame the uncertainties and tensions in budget equity and partnership relationships through daily operational activities such as workshops, meetings, and consultations. However, there was a concern about the future sustainability of flood-resilient houses —further monetary and technical assistantships are necessary for further expansion.

The tradition of professional practice of North-South international development projects such as HI-AWARE contributes to the theory on knowledge management and circulation in development organizations for non-profit organizations, including CSOs, and the pathways through which this knowledge shapes climate-smart development practices.

However, such projects focus on local-level developments at a small scale with the hope that the community will work for future expansion. Since riparian people are severely vulnerable and need more resources, the self-help community development strategies or the development of auto market entrepreneurship rarely work. In this case, riverine areas need help from individuals, governments, or the private sector at a large scale, either by collaborating with government organizations or international development organizations.

The trend of North-South professional practice of international development or others should include 'after-project phase' activities to assess the impact of the research output. Knowledge management strategies aim to build a platform for partner bodies to share ideas or experiences to create new knowledge under the project management cycle. Moreover, the project management cycle should continue to address the gap to develop best practices. Nevertheless,

there are many restrictions, such as lack of funds, motivation, and professional attitude on the part of development organizations. There will be debates between professional bodies and points of view on the path forward. Some will focus on non-governmental organizations (NGOs), who should take care of such development; others will hand it over to the real-estate development organizations for marketing such housing projects. Some others will focus on the government initiative to ensure development. So, the question arises: who will take care of and manage the risk reduction further?

There is still hope to ensure development through international development projects since the international development projects already do work in climate-vulnerable areas through action research, developing demonstrations of research output, and piloting programs. A project management cycle should only exit from a project cycle once it shows some market research to see development in practice. There is a need for market research in the 'after-project phase' to see the best research products in practice.

In the case of the HI-AWARE project, it attained an exit point by installing seven climate-resilient houses through the pilot program. However, there is still a need to find ways to reduce the construction costs of climate-resilient houses and how to market them. Two approaches can help: increasing the demand by modifying local infrastructure and providing hands-on training to the local carpenters and builders.

The study found that the C4RE organization is lobbying local government personnel to expand the climate-resilient houses in those areas. Such initiatives may help if C4RE Service Ltd. or BCAS can build a strong lobbying capacity with local government bodies. However, for long-term development, recent communication with the C4RE in 2021 found that the IDRC decided to extend the HI-AWARE partnership, with coverage of about 800-1,000 climate-resilient housing

provisions for the welfare of the local people in the Teesta basin, Bangladesh. It would be an essential step toward promoting resilience and sustainable development for more of the region.

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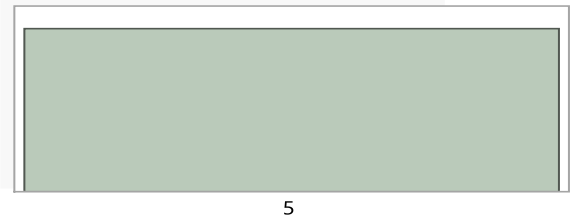
APPENDIX 1: BENEFICIARIES' RESPONSES REGARDING THE BEFORE-AFTER PROJECT INTERVENTION UNDER EACH QUESTION

1. Distributions Question: Cooking problems during floods

Beneficiaries' rating before the project

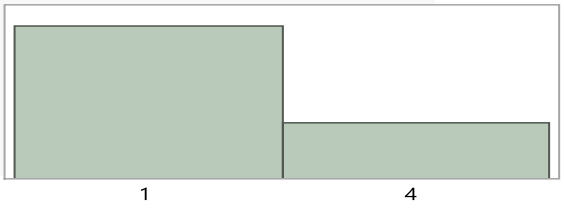


Frequencies

Level	Count	Prob
5	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Beneficiaries' rating after the project



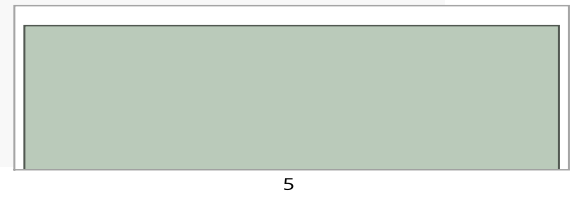
Frequencies

Level	Count	Prob
1	11	0.73333
4	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

2. Distributions Question: Crisis of fodder during floods

Beneficiaries' rating before the project

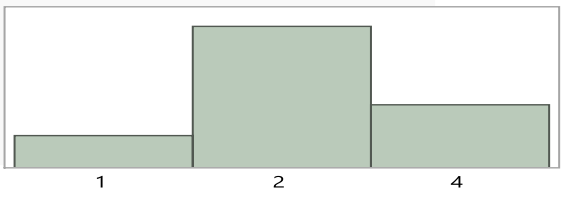


Frequencies

Level	Count	Prob
5	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Beneficiaries' rating after the project



Frequencies

Level	Count	Prob
1	2	0.13333
2	9	0.60000
4	4	0.26667
Total	15	1.00000

N Missing value 0
3 Levels

3. Distributions Question: Inundation courtyard during floods

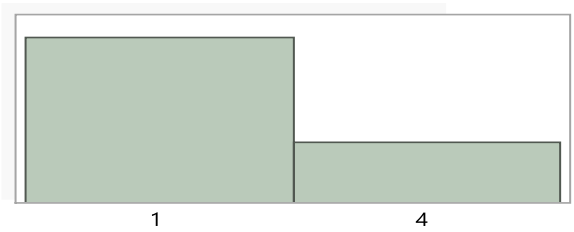
Beneficiaries' rating before the project

Frequencies

Level	Count	Prob
5	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Beneficiaries' rating after the project



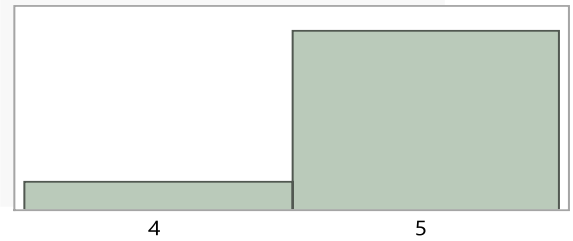
Frequencies

Level	Count	Prob
1	11	0.73333
4	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

4. Distributions Question: Inundation house during floods

Beneficiaries' rating before the project

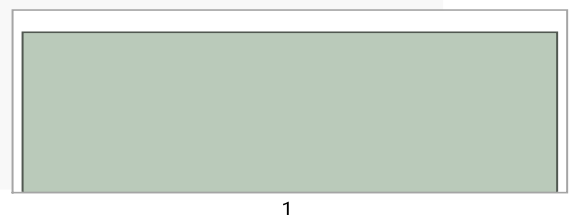


Frequencies

Level	Count	Prob
4	2	0.13333
5	13	0.86667
Total	15	1.00000

N Missing value 0
2 Levels

Beneficiaries' rating after the project



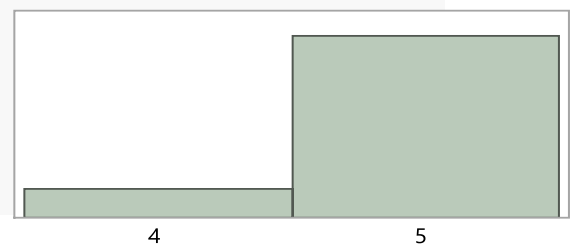
Frequencies

Level	Count	Prob
1	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

5. **Distributions Question: Inundation toilet during floods**

Beneficiaries' rating before the project

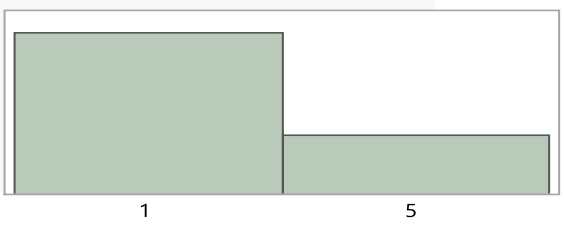


Frequencies

Level	Count	Prob
4	2	0.13333
5	13	0.86667
Total	15	1.00000

N Missing value 0
2 Levels

Beneficiaries' rating after the project



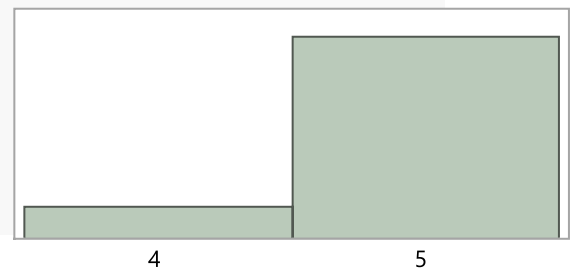
Frequencies

Level	Count	Prob
1	11	0.73333
5	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

6. **Distributions Question: Inundation tube well during floods**

Beneficiaries' rating before the project

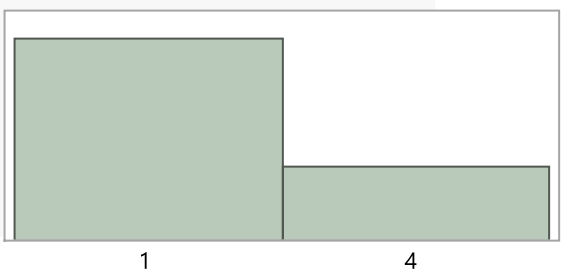


Frequencies

Level	Count	Prob
4	2	0.13333
5	13	0.86667
Total	15	1.00000

N Missing value 0
2 Levels

Beneficiaries' rating after the project



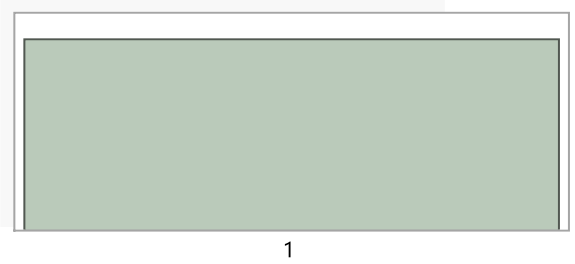
Frequencies

Level	Count	Prob
1	11	0.73333
4	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

7. Distributions Question: Staying at the flooded house during floods

Beneficiaries' rating before the project

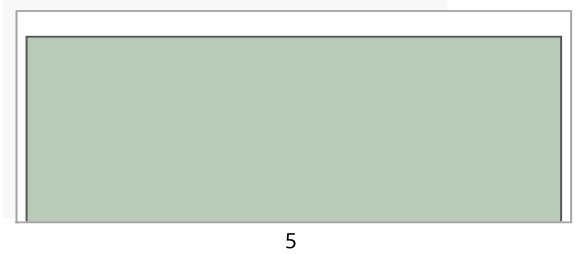


Frequencies

Level	Count	Prob
1	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Beneficiaries' rating after the project



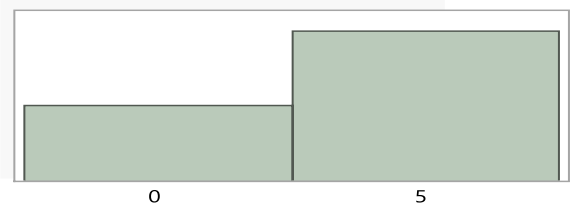
Frequencies

Level	Count	Prob
5	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

8. Distributions Question: Unhygienity (particularly for women) during floods

Beneficiaries' rating before the project

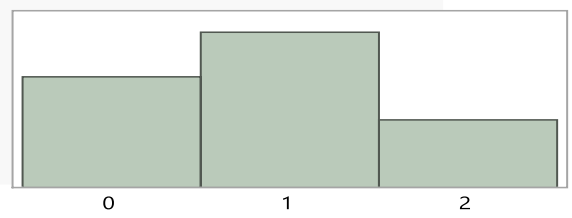


Frequencies

Level	Count	Prob
0	5	0.33333
1	7	0.46667
2	3	0.20000
Total	15	1.00000

N Missing value 0
3 Levels

Beneficiaries' rating after the project



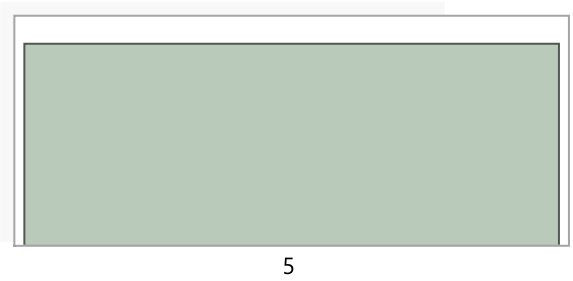
Frequencies

Level	Count	Prob
0	5	0.33333
1	7	0.46667
2	3	0.20000
Total	15	1.00000

N Missing value 0
3 Levels

9. Distributions Question: Waterborne diseases during floods

Beneficiaries' rating before the project

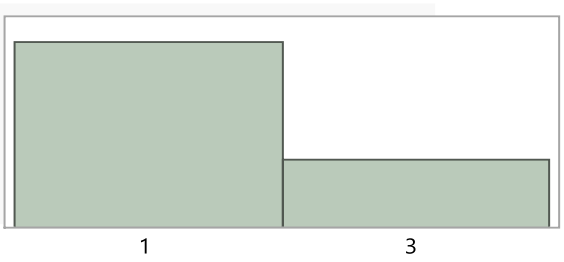


Frequencies

Level	Count	Prob
5	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Beneficiaries' rating after the project



Frequencies

Level	Count	Prob
1	11	0.73333
3	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

APPENDIX 2: DO THE CHANGES IN RATINGS DIFFER AMONG THE QUESTIONS?

1) Staying at house change is different from the other questions.

Response change

Summary of Fit

RSquare	0.776517
RSquare Adj	0.762327
Root Mean Square Error	1.256517
Mean of Response	-2.2963
Observations (or Sum Wgts)	135

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	8	691.21481	86.4019	54.7250
Error	126	198.93333	1.5788	**Prob > F**
C. Total	134	890.14815		<.0001*

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Question	8	8	691.21481	54.7250	<.0001*

Effect Details
Question
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
Cooking problems	-3.200000	0.32443140	-3.2000
Crisis of fodder	-2.600000	0.32443140	-2.6000
Inundation courtyard	-3.200000	0.32443140	-3.2000
Inundation house	-3.866667	0.32443140	-3.8667
Inundation toilet	-2.800000	0.32443140	-2.8000
Inundation tube well	-3.066667	0.32443140	-3.0667
Staying at house	4.000000	0.32443140	4.0000
Hygenity-women	-2.466667	0.32443140	-2.4667
Waterborne	-3.466667	0.32443140	-3.4667

2) When Staying at the house is removed, the changes in rating in the other questions do not differ.

Response change

Summary of Fit

RSquare	0.100528
RSquare Adj	0.04431
Root Mean Square Error	1.332738
Mean of Response	-3.08333
Observations (or Sum Wgts)	120

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	7	22.23333	3.17619	1.7882
Error	112	198.93333	1.77619	**Prob > F**
C. Total	119	221.16667		0.0965

Effect Tests

Source	Nparm	DF	Sum of Squares	F Ratio	Prob > F
Question	7	7	22.233333	1.7882	0.0965

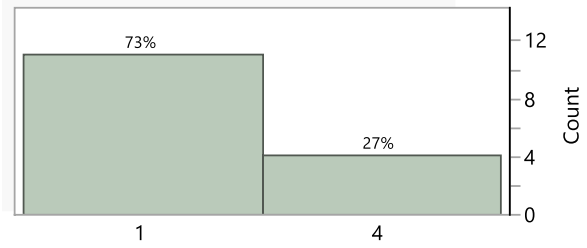
Effect Details
Question
Least Squares Means Table

Level	Least Sq Mean	Std Error	Mean
Cooking problems	-3.200000	0.34411146	-3.2000
Crisis of fodder	-2.600000	0.34411146	-2.6000
Inundation courtyard	-3.200000	0.34411146	-3.2000
Inundation house	-3.866667	0.34411146	-3.8667
Inundation toilet	-2.800000	0.34411146	-2.8000
Inundation tube well	-3.066667	0.34411146	-3.0667
Hygenity-women	-2.466667	0.34411146	-2.4667
Waterborne	-3.466667	0.34411146	-3.4667

APPENDIX 3: BENEFICIARIES' AND NON-BENEFICIARIES' RATING AFTER THE PROJECT

1. Distributions Question: Cooking problems during floods

Beneficiaries' rating after the project

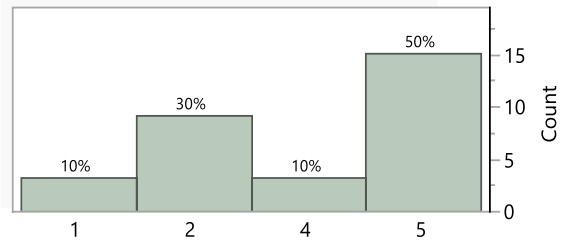


Frequencies

Level	Count	Prob
1	11	0.73333
4	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

Non-beneficiaries' rating after the project



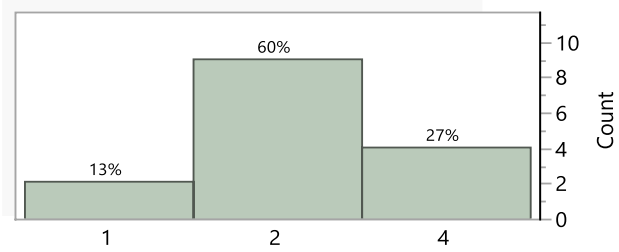
Frequencies

Level	Count	Prob
1	3	0.10000
2	9	0.30000
4	3	0.10000
5	15	0.50000
Total	30	1.00000

N Missing value 0
4 Levels

2. Distributions Question: Crisis of fodder during floods

Beneficiaries' rating after the project

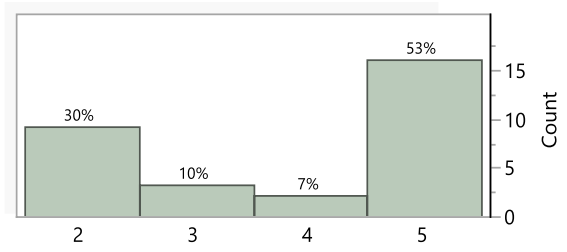


Frequencies

Level	Count	Prob
1	2	0.13333
2	9	0.60000
4	4	0.26667
Total	15	1.00000

N Missing value 0
3 Levels

Non-beneficiaries' rating after the project



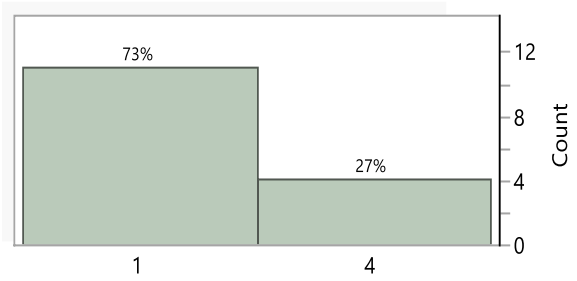
Frequencies

Level	Count	Prob
2	9	0.30000
3	3	0.10000
4	2	0.06667
5	16	0.53333
Total	30	1.00000

N Missing value 0
4 Levels

3. Distributions Question: Inundation courtyard during floods

Beneficiaries' rating after the project

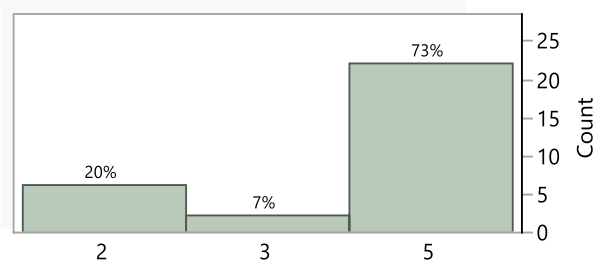


Frequencies

Level	Count	Prob
1	11	0.73333
4	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

Non-beneficiaries' rating after the project



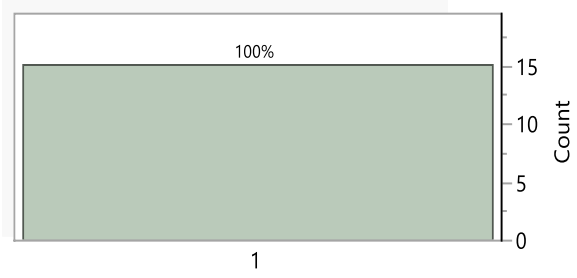
Frequencies

Level	Count	Prob
2	6	0.20000
3	2	0.06667
5	22	0.73333
Total	30	1.00000

N Missing value 0
3 Levels

4. Distributions Question=Inundation house during floods

Beneficiaries' rating after the project

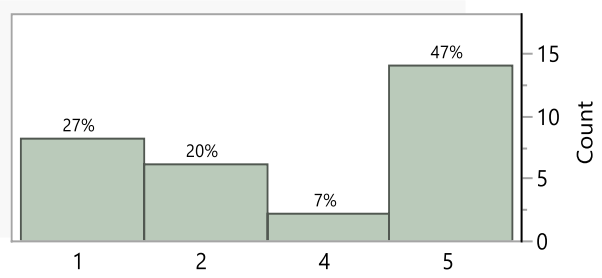


Frequencies

Level	Count	Prob
1	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Non-beneficiaries' rating after the project



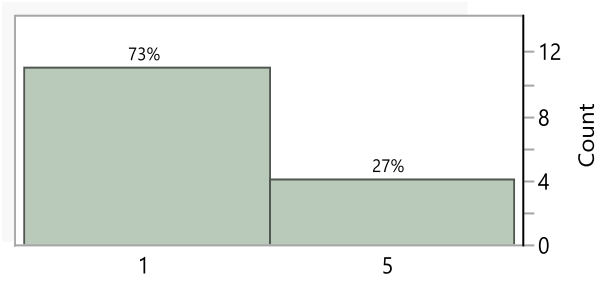
Frequencies

Level	Count	Prob
1	8	0.26667
2	6	0.20000
4	2	0.06667
5	14	0.46667
Total	30	1.00000

N Missing value 0
4 Levels

5. **Distributions Question: Inundation toilet during floods**

Beneficiaries' rating after the project

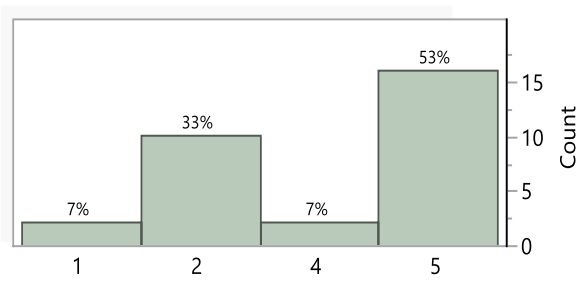


Frequencies

Level	Count	Prob
1	11	0.73333
5	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

Non-beneficiaries' rating after the project



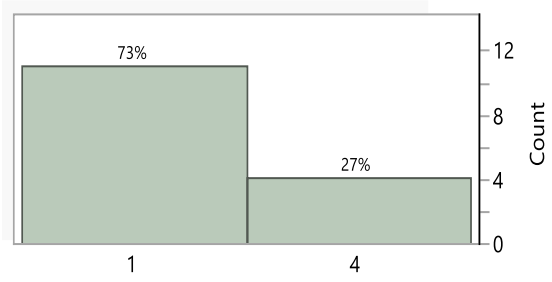
Frequencies

Level	Count	Prob
1	2	0.06667
2	10	0.33333
4	2	0.06667
5	16	0.53333
Total	30	1.00000

N Missing value 0
4 Levels

6. **Distributions Question=Inundation tube well during floods**

Beneficiaries' rating after the project

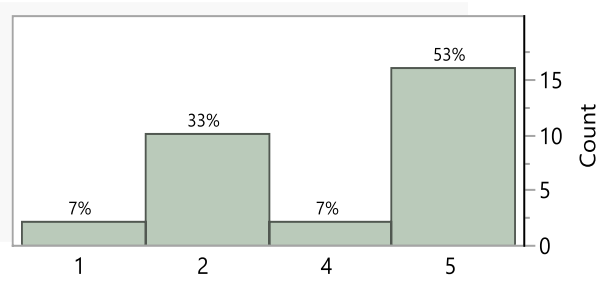


Frequencies

Level	Count	Prob
1	11	0.73333
4	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

Non-beneficiaries' rating after the project



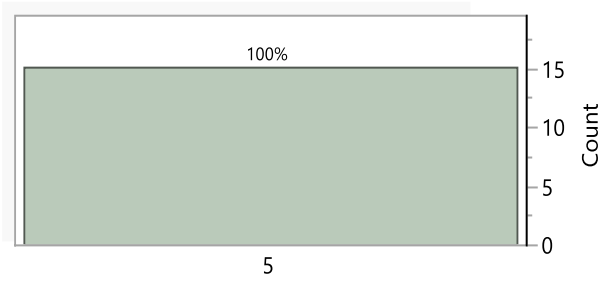
Frequencies

Level	Count	Prob
1	2	0.06667
2	10	0.33333
4	2	0.06667
5	16	0.53333
Total	30	1.00000

N Missing value 0
4 Levels

7. Distributions Question: Staying at a flooded house during floods

Beneficiaries' rating after the project

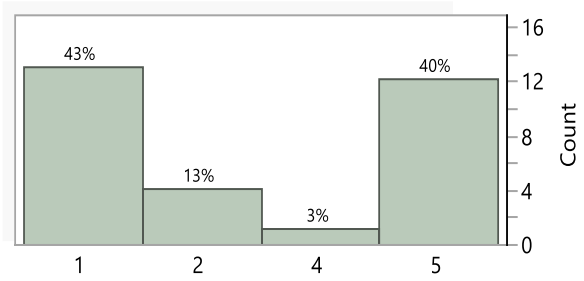


Frequencies

Level	Count	Prob
5	15	1.00000
Total	15	1.00000

N Missing value 0
1 Levels

Non-beneficiaries' rating after the project



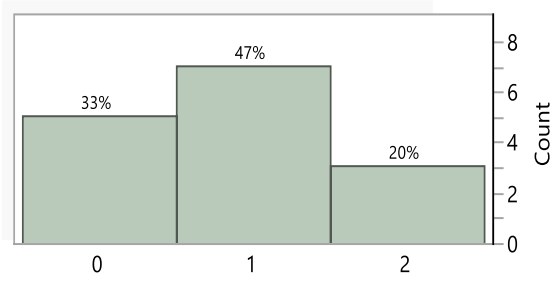
Frequencies

Level	Count	Prob
1	13	0.43333
2	4	0.13333
4	1	0.03333
5	12	0.40000
Total	30	1.00000

N Missing value 0
4 Levels

8. Distributions Question: Unhygeinity (particularly for women) during floods

Beneficiaries' rating after the project

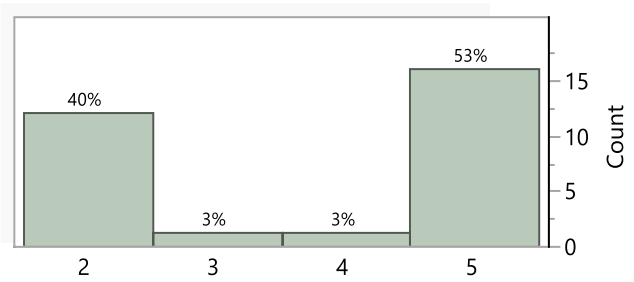


Frequencies

Level	Count	Prob
0	5	0.33333
1	7	0.46667
2	3	0.20000
Total	15	1.00000

N Missing value 0
3 Levels

Non-beneficiaries' rating after the project



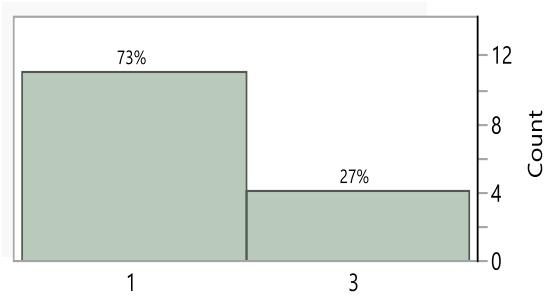
Frequencies

Level	Count	Prob
2	12	0.40000
3	1	0.03333
4	1	0.03333
5	16	0.53333
Total	30	1.00000

N Missing value 0
4 Levels

9. Distributions Question=Waterborne diseases during floods

Beneficiaries' rating after the project

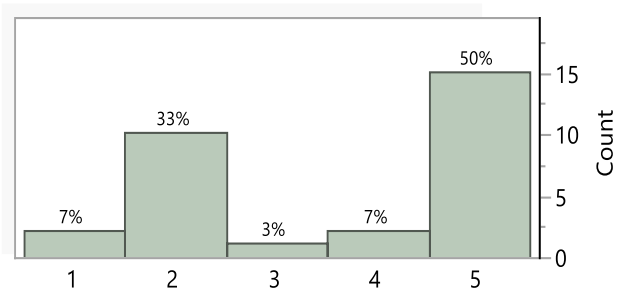


Frequencies

Level	Count	Prob
1	11	0.73333
3	4	0.26667
Total	15	1.00000

N Missing value 0
2 Levels

Non-beneficiaries' rating after the project



Frequencies

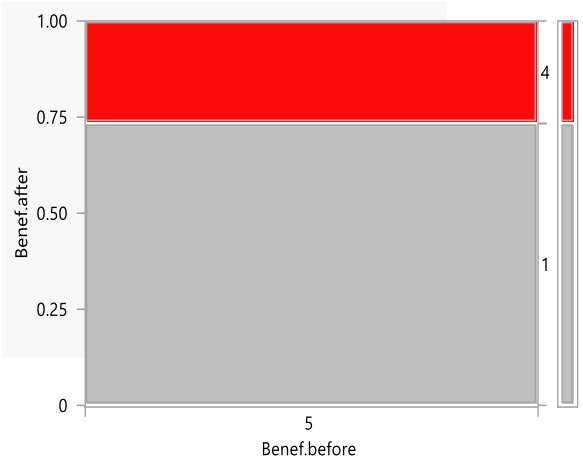
Level	Count	Prob
1	2	0.06667
2	10	0.33333
3	1	0.03333
4	2	0.06667
5	15	0.50000
Total	30	1.00000

N Missing value 0
5 Levels

APPENDIX 4: CONTINGENCY ANALYSIS OF RATING THROUGH THE CHI-SQUARE TEST BETWEEN PRE- AND POST-SCENARIOS

1. Question: Cooking problems during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Table

Benef.before By Benef.after

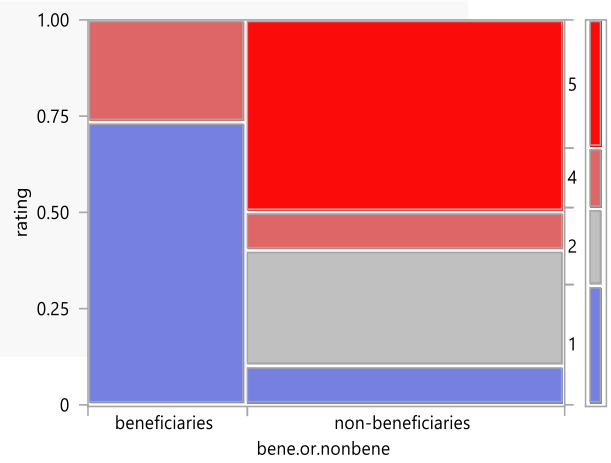
Count Total % Col % Row %	1	4	Total
5	11 73.33 100.00 73.33	4 26.67 100.00 26.67	15 100.00
Total	11 73.33	4 26.67	15

Tests

N	DF	-LogLike	RSquare (U)
15	0	0	0.0000

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	0.000	.
Pearson	0.000	.

Contingency Analysis of rating By Ben.or.nonben



Contingency Table

bene.or.nonbene By rating

Count Total % Col % Row %	1	2	4	5	Total
beneficiaries	11 24.44 78.57 73.33	0 0.00 0.00 0.00	4 8.89 57.14 26.67	0 0.00 0.00 0.00	15 33.33
non-beneficiaries	3 6.67 21.43 10.00	9 20.00 100.00 30.00	3 6.67 42.86 10.00	15 33.33 100.00 50.00	30 66.67
Total	14 31.11	9 20.00	7 15.56	15 33.33	45

Tests

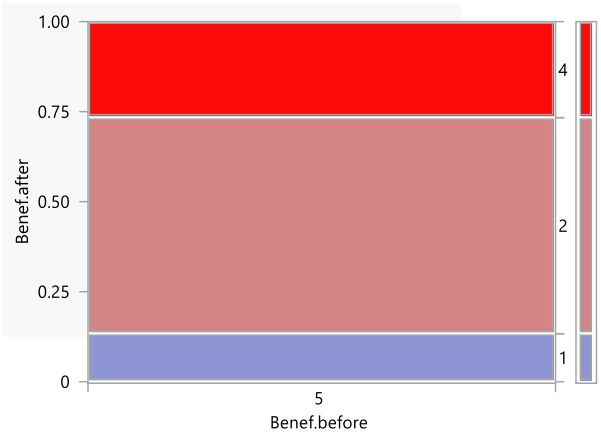
N	DF	-LogLike	RSquare (U)
45	3	16.588663	0.2749

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	33.177	<.0001*
Pearson	26.679	<.0001*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.

2. Question: Crisis of fodder during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Table
Benef.before By Benef.after

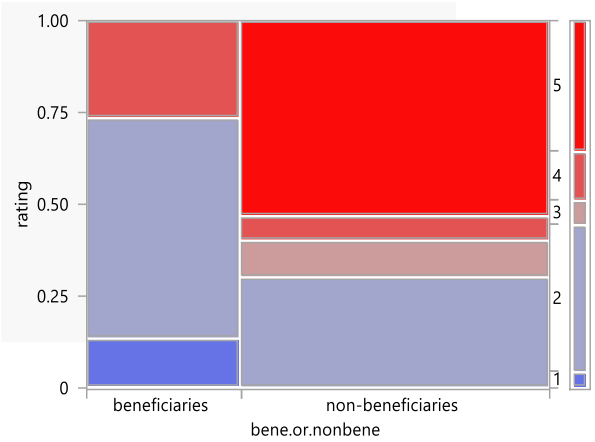
Count Total % Col % Row %	1	2	4	Total
5	2 13.33 100.00 13.33	9 60.00 100.00 60.00	4 26.67 100.00 26.67	15 100.00
Total	2 13.33	9 60.00	4 26.67	15

Tests

N	DF	-LogLike	RSquare (U)
15	0	0	0.0000

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	0.000	.
Pearson	0.000	.

Contingency Analysis of rating By bene.or.nonbene



Contingency Table
bene.or.nonbene By rating

Count Total % Col % Row %	1	2	3	4	5	Total
beneficiaries	2 4.44 100.00 13.33	9 20.00 50.00 60.00	0 0.00 0.00 0.00	4 8.89 66.67 26.67	0 0.00 0.00 0.00	15 33.33
non-beneficiaries	0 0.00 0.00 0.00	9 20.00 50.00 30.00	3 6.67 100.00 10.00	2 4.44 33.33 6.67	16 35.56 100.00 53.33	30 66.67
Total	2 4.44	18 40.00	3 6.67	6 13.33	16 35.56	45

Tests

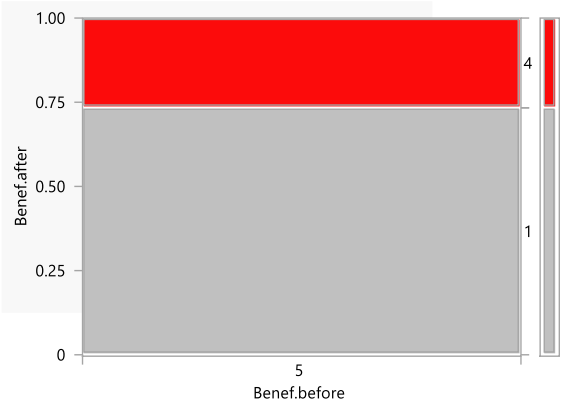
N	DF	-LogLike	RSquare (U)
45	4	12.347403	0.2076

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	24.695	<.0001*
Pearson	18.750	0.0009*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.
Warning: Average cell count less than 5, LR Chi-square suspect.

3. Question: Inundation courtyard during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Table
Benef.before By Benef.after

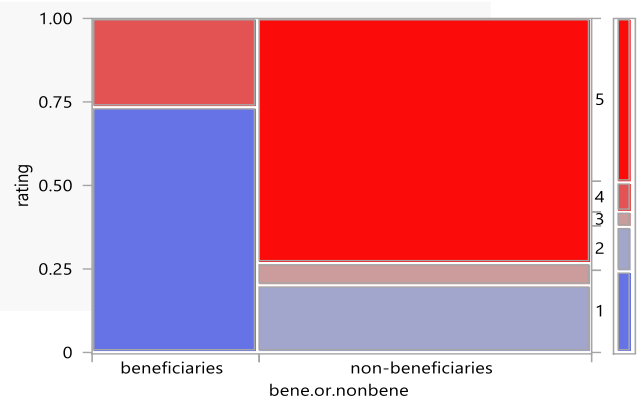
Count Total % Col % Row %	1	4	Total
5	11 73.33 100.00 73.33	4 26.67 100.00 26.67	15 100.00
Total	11 73.33	4 26.67	15

Tests

N	DF	-LogLike	RSquare (U)
15	0	0	0.0000

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	0.000	.
Pearson	0.000	.

Contingency Analysis of rating By bene.or.nonbene



Contingency Table
bene.or.nonbene By rating

Count Total % Col % Row %	1	2	3	4	5	Total
beneficiaries	11 24.44 100.00 73.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 8.89 100.0 0 26.67	0 0.00 0.00 0.00	15 33.3 3
non-beneficiaries	0 0.00 0.00 0.00	6 13.33 100.0 0 20.00	2 4.44 100.0 0 6.67	0 0.00 0.00 0.00	22 48.89 100.0 0 73.33	30 66.6 7
Total	11 24.44	6 13.33	2 4.44	4 8.89	22 48.89	45

Tests

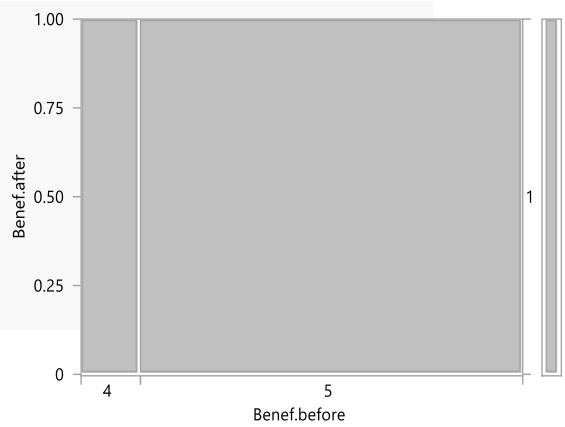
N	DF	-LogLike	RSquare (U)
45	4	28.643138	0.4835

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	57.286	<.0001*
Pearson	45.000	<.0001*

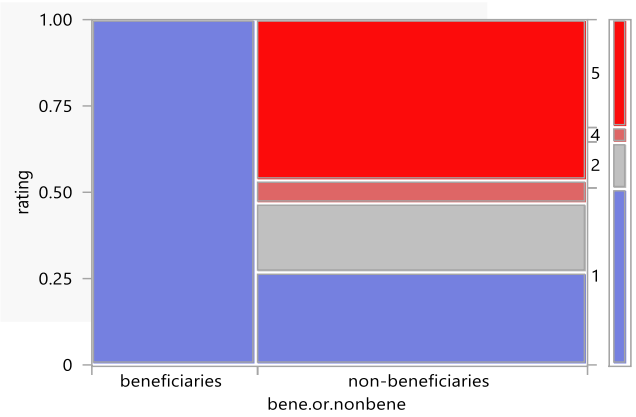
Warning: 20% of cells have expected count less than 5, ChiSquare suspect.
Warning: Average cell count less than 5, LR ChiSquare suspect.

4. Question: Inundation house during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Analysis of rating By bene.or.nonbene



Contingency Table
Benef.before By Benef.after

Count Total % Col % Row %	1	Total
4	2 13.33 13.33 100.00	2 13.33
5	13 86.67 86.67 100.00	13 86.67
Total	15 100.00	15

Tests

N	DF	-LogLike	RSquare (U)
15	0	0	.

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	0.000	.
Pearson	0.000	.

Contingency Table
bene.or.nonbene By rating

Count Total % Col % Row %	1	2	4	5	Total
beneficiaries	15 33.33 65.22 100.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 33.33
non-beneficiaries	8 17.78 34.78 26.67	6 13.33 100.00 20.00	2 4.44 100.00 6.67	14 31.11 100.00 46.67	30 66.67
Total	23 51.11	6 13.33	2 4.44	14 31.11	45

Tests

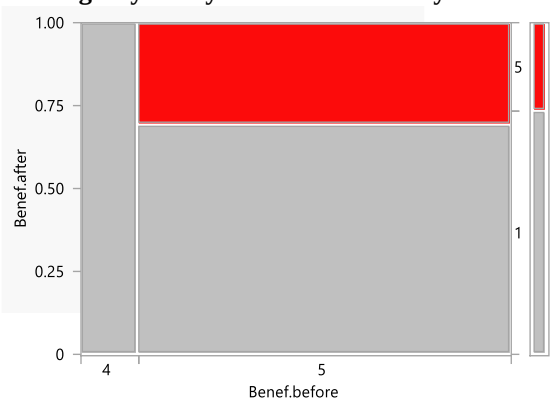
N	DF	-LogLike	RSquare (U)
45	3	13.783056	0.2751

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	27.566	<.0001*
Pearson	21.522	<.0001*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.

5. Question: Inundation toilet during flood

Contingency Analysis of Benef.after By Benef.before



Contingency Table

Benef.before By Benef.after

Count Total % Col % Row %	1	5	Total
4	2 13.33 18.18 100.00	0 0.00 0.00 0.00	2 13.33
5	9 60.00 81.82 69.23	4 26.67 100.00 30.77	13 86.67
Total	11 73.33	4 26.67	15

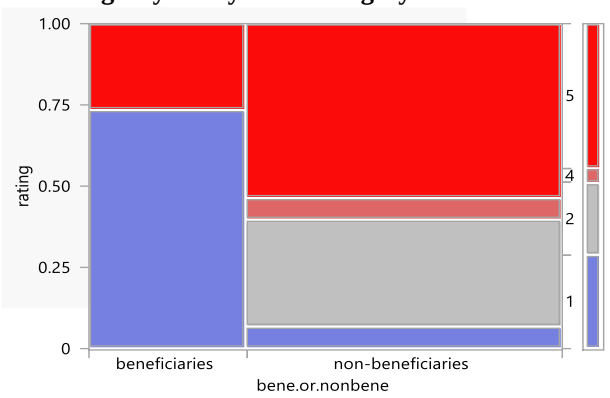
Tests

N	DF	-LogLike	RSquare (U)
15	1	0.67458456	0.0775

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	1.349	0.2454
Pearson	0.839	0.3596

Warning: Average cell count less than 5, LR Chi-square suspect.

Contingency Analysis of rating By bene.or.nonbene



Contingency Table

bene.or.nonbene By rating

Count Total % Col % Row %	1	2	4	5	Total
beneficiaries	11 24.44 84.62 73.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	4 8.89 20.00 26.67	15 33.33
non-beneficiaries	2 4.44 15.38 6.67	10 22.22 100.00 33.33	2 4.44 100.00 6.67	16 35.56 80.00 53.33	30 66.67
Total	13 28.89	10 22.22	2 4.44	20 44.44	45

Tests

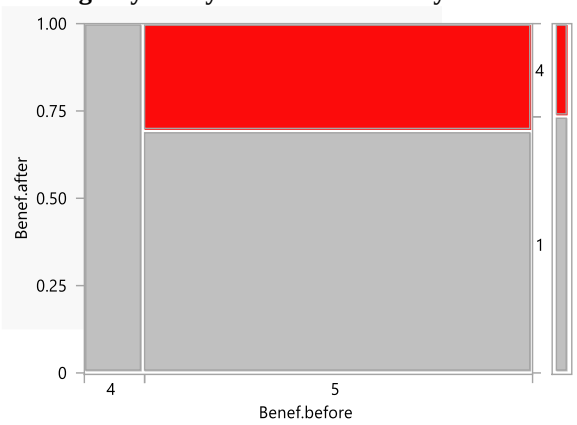
N	DF	-LogLike	RSquare (U)
45	3	13.053890	0.2434

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	26.108	<.0001*
Pearson	22.985	<.0001*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.

6. Question: Inundation tubewell during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Table

Benef.before By Benef.after

Count Total % Col % Row %	1	4	Total
4	2 13.33 18.18 100.00	0 0.00 0.00 0.00	2 13.33
5	9 60.00 81.82 69.23	4 26.67 100.00 30.77	13 86.67
Total	11 73.33	4 26.67	15

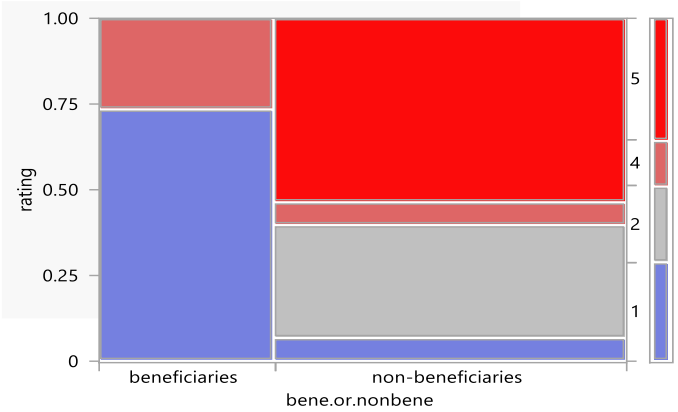
Tests

N	DF	-LogLike	RSquare (U)
15	1	0.67458456	0.0775

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	1.349	0.2454
Pearson	0.839	0.3596

Warning: Average cell count less than 5, LR Chi-square suspect.

Contingency Analysis of rating By bene.or.nonbene



Contingency Table

bene.or.nonbene By rating

Count Total % Col % Row %	1	2	4	5	Total
beneficiaries	11 24.44 84.62 73.33	0 0.00 0.00 0.00	4 8.89 66.67 26.67	0 0.00 0.00 0.00	15 33.33
non-beneficiaries	2 4.44 15.38 6.67	10 22.22 100.00 33.33	2 4.44 33.33 6.67	16 35.56 100.00 53.33	30 66.67
Total	13 28.89	10 22.22	6 13.33	16 35.56	45

Tests

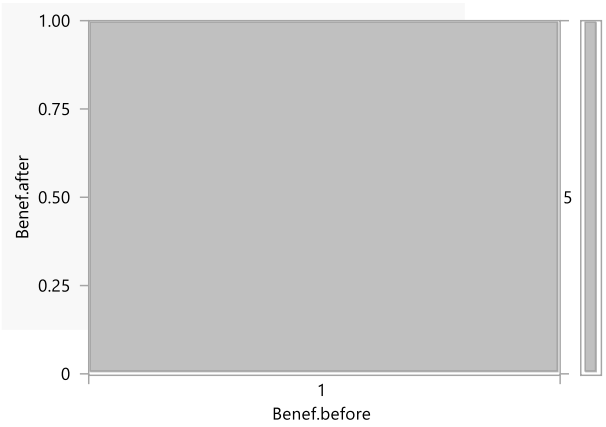
N	DF	-LogLike	RSquare (U)
45	3	19.242853	0.3217

Test	ChiSquare	Prob>ChiSq
Likelihood Ratio	38.486	<.0001*
Pearson	31.385	<.0001*

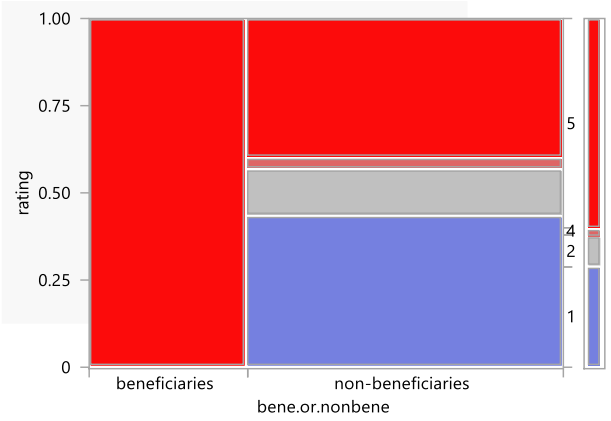
Warning: 20% of cells have an expected count less than 5, Chi-square suspect.

7. Question: Staying at a flooded house during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Analysis of rating By bene.or.nonbene



Contingency Table
Benef.before By Benef.after

Count Total % Col % Row %	5	Total
1	15 100.00 100.00 100.00	15 100.00
Total	15 100.00	15

Tests

N	DF	-LogLike	RSquare (U)
15	0	0	.

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	0.000	.
Pearson	0.000	.

Contingency Table
bene.or.nonbene By rating

Count Total % Col % Row %	1	2	4	5	Total
beneficiaries	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 33.33 55.56 100.00	15 33.33
non-beneficiaries	13 28.89 100.00 43.33	4 8.89 100.00 13.33	1 2.22 100.00 3.33	12 26.67 44.44 40.00	30 66.67
Total	13 28.89	4 8.89	1 2.22	27 60.00	45

Tests

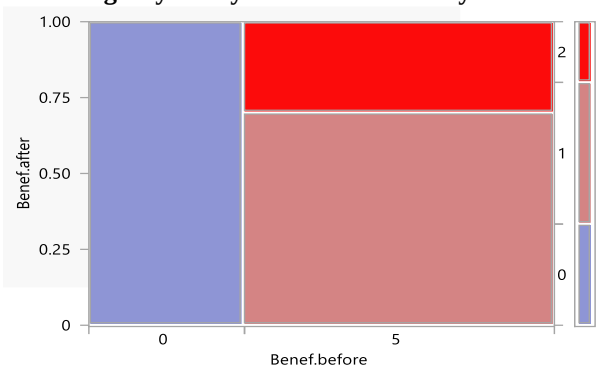
N	DF	-LogLike	RSquare (U)
45	3	10.095175	0.2325

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	20.190	0.0002*
Pearson	15.000	0.0018*

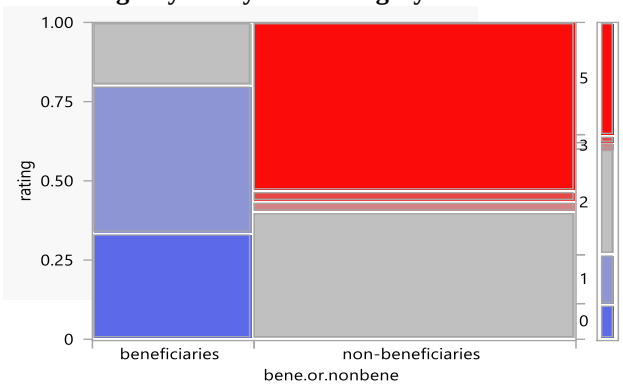
Warning: 20% of cells have an expected count less than 5, Chi-square suspect.

8. Question: Unhygeinity (particularly for women) during floods

Contingency Analysis of Benef.after By Benef.before



Contingency Analysis of rating By bene.or.nonben



Contingency Table
Benef.before By Benef.after

Count Total % Col % Row %	0	1	2	Total
0	5 33.33 100.0 0 100.0 0	0 0.00 0.00 0.00	0 0.00 0.00 0.00	5 33.33
5	0 0.00 0.00 0.00	7 46.67 100.00 70.00	3 20.00 100.00 30.00	10 66.67
Total	5 33.33	7 46.67	3 20.00	15

Tests

N	DF	-LogLike	RSquare (U)
15	2	9.5477125	0.6098

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	19.095	<.0001*
Pearson	15.000	0.0006*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.
Warning: Average cell count less than 5, LR Chi-square suspect.

Contingency Table
bene.or.nonbene By rating

Count Total % Col % Row %	0	1	2	3	4	5	Total
beneficiaries	5 11.11 100.00 33.33	7 15.56 100.00 46.67	3 6.67 20.00 20.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 33.33
non-beneficiaries	0 0.00 0.00 0.00	0 0.00 0.00 0.00	12 26.67 80.00 40.00	1 2.22 100.00 3.33	1 2.22 100.00 3.33	16 35.56 100.00 53.33	30 66.67
Total	5 11.11	7 15.56	15 33.33	1 2.22	1 2.22	16 35.56	45

Tests

N	DF	-LogLike	RSquare (U)
45	5	21.137101	0.3270

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	42.274	<.0001*
Pearson	34.200	<.0001*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.
Warning: Average cell count less than 5, LR Chi-square suspect.

9. Question: Waterborne diseases during floods

Contingency Analysis of Benef.after By Benef.before

Contingency Table
Benef.before By Benef.after

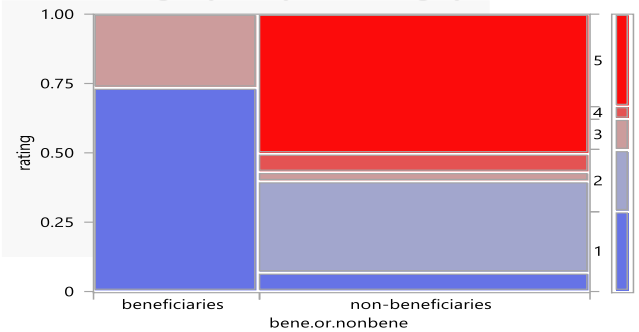
Count Total % Col % Row %	1	3	Total
5	11 73.33 100.00 73.33	4 26.67 100.00 26.67	15 100.00
Total	11 73.33	4 26.67	15

Tests

N	DF	-LogLike	RSquare (U)
15	0	0	0.0000

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	0.000	.
Pearson	0.000	.

Contingency Analysis of rating By bene.or.nonbene



Contingency Table
bene.or.nonbene By rating

Count Total % Col % Row %	1	2	3	4	5	Total
beneficiaries	11 24.44 84.62 73.33	0 0.00 0.00 0.00	4 8.89 80.00 26.67	0 0.00 0.00 0.00	0 0.00 0.00 0.00	15 33.33
non-beneficiaries	2 4.44 15.38 6.67	10 22.22 100.00 33.33	1 2.22 20.00 3.33	2 4.44 100.00 6.67	15 33.33 100.00 50.00	30 66.67
Total	13 28.89	10 22.22	5 11.11	2 4.44	15 33.33	45

Tests

N	DF	-LogLike	RSquare (U)
45	4	20.559926	0.3169

Test	Chi-square	Prob>ChiSq
Likelihood Ratio	41.120	<.0001*
Pearson	33.785	<.0001*

Warning: 20% of cells have an expected count less than 5, Chi-square suspect.
Warning: Average cell count less than 5, LR Chi-square suspect.

APPENDIX 5: COMPARISONS OF AVERAGE RATINGS BEFORE AND AFTER SCENARIOS OF BENEFICIARIES AND NON-BENEFICIARIES

Comparison of opinion ratings between pre- and post-scenario of plinth development and CFR housing

Project beneficiaries' response to problems due to flooding (after the project)	Mean	Standard Deviation	Std. Error Mean	t = (sample mean - hypothesized mean) / SEM
Inundation courtyard	1.8	1.373	0.355	-9.014
Inundation house	1	0	0	N/A
Inundation toilet	2.07	1.831	0.473	-6.195
Inundation tube well	1.8	1.373	0.355	-9.014
Cooking problem during flood time	1.8	1.373	0.355	-9.014
Unhygienity (women's health)	0.87	0.743	0.192	-21.510
Water-borne diseases	1.53	0.915	0.236	-14.703
Crisis of fodder for the livestock	2.4	1.056	0.273	-9.524
Possibility of staying at own house during the flood	5	0	0	N/A

Comparisons of opinion ratings between beneficiaries and non-beneficiaries after the project

non-beneficiaries respond after the project	Mean	Standard Deviation	Std. Error Mean	t = (sample mean - hypothesize mean) / SEM
Inundation courtyard	4.36	1.186	0.237	-2.700
Inundation house	3.28	1.86	0.372	-4.624
Inundation toilet	3.64	1.578	0.316	-4.304
Inundation tube-well	3.64	1.578	0.316	-4.304
Cooking problem during flood time	3.56	1.609	0.322	-4.472
Unhygienity (women's health)	3.68	1.464	0.293	-4.505
Water-borne diseases	3.56	1.557	0.311	-4.630
Crisis of fodder for the livestock	3.84	1.344	0.269	-4.312
Possibility of staying at own house during the flood	2.64	1.912	0.382	-6.178

APPENDIX 6: QUESTIONNAIRE

[All information for this questionnaire will be used for research only]

Date:……
Name of Respondent:.....
Name of position:…….

Part A: General information on IDRC, BCAS, and the HI-AWARE project

General information of BCAS and IDRC

Historical Background:……
Establishment Year:……..
Membership Status:……...
Total Employees:……
No. of Programs/ Projects:……
The subject of work:……
Main Location of Programs/ Projects:……
Main Donors:……
Major project activities in the following area -
a) Environmental Management:……
b) Climate Change:……
c) Others:……...
Ongoing programs/projects -
a) Environmental Management:……
b) Climate Change:……
c) Others:……...
Completed projects -
a) Environmental Management:.....
b) Climate Change:……
c) Others:……...

General Information of HI-AWARE project

Goal:……...
Objective:.....
Activities:.....
Stakeholders (donors, partnered org., government, and others):……
Project budget &duration:.....
Current implementing status:.....
Outcomes:.....
Present no. of employee:.....
Lists of Project documents:.....

Part B: Questions for an interview with IRDC staff

1. How are Canadian organizations working on international development? What are the Canadian government policies that facilitate international development work? Please describe the process you followed to sanction HI-AWARE project. Also, highlight the facilitation and barriers of the procedure you faced to work on international development.
2. What collaboration techniques do you follow for the HI-AWARE project? Describe the specific name of methods and their mechanism.
3. What are the factors which drive you to take this project? How is funding mechanism established for this collaboration? Do you think the fund for this project is sufficient?
4. How do you fit your project in line with other countries development policies? Please describe in case of the HI-AWARE project.
5. How do you select partnered organizations for this project? Is there any specific tool for the selection partnered organizations?
6. How do you prepare research project of HI-WARE? What phases did you follow to develop this project? What is your role and partnered organizations' role to prepare HI-AWARE project?
7. How do you establish communication protocols with implementing partners and counterparts covering the dissemination of information including mechanisms and assignment of roles?
8. What sources/materials do you use to prepare this research project? Which sources influenced most to get information on climate change for this project? Why and how?
9. Did you attend any international conference/ workshop? If yes how many international conferences/workshops have you participated in climate change? Please specify. Did you find them useful? If yes, how? Or, If no, why? Please clarify.
10. What technical assistantship did you provide to BCAS? Did you face any problem in project implementation? If yes, please use a separate sheet and write it gives an example of the HI-AWARE project.
11. How does your organization assess or evaluate the HI-AWARE project? Is there any external assessment by your government or donor partners?
12. How do you feel about assessment or evaluation of the project? Is it favorable or unfavorable condition? What are the factors responsible if it shows unfavorable situation?
13. How do you measure your organizational performance on climate change work including HI-AWARE project? Please put tick mark and write the reason why you select it for measuring organizational performance.

criteria	**Specification**	**Put tick (√)**
Cost	a) Cost sufficiency for Implementation as anticipated	
	b) extra cost for modification	
Effectiveness	a) Immediate Benefits/mitigated and lives saved /costs avoided b) damages	
Ease of implementation	a) Implementation according to plan	
	b) need to adjust other policies	
timeframe	a) Completed within schedule	
	b) Extend project period	
Institutional capacity	a) Knowledge transferred	
	b) Failure to transfer	
Size of beneficiaries' groups	a) Target group as anticipated	
	b) Fewer group	

Part C: Questions for BCAS staff

1. What is your opinion about climate change impact in Bangladesh? Why do you work on climate change?
2. Do you have any opinion on Government-civil participation to work on international development? What are barriers and facilitating factors on that issue?
3. Did you face any problem to sanction HI-AWARE project fund? Please brief it with an example.
4. How do you corporate domestic and international fund to implement climate change project?
5. Do you think climate change cost comparatively high than other projects? If yes, please brief it in the context of the HI-AWARE project.
6. Which sources do you suggest getting information regarding climate change? Can government climate change cell come forward to ensure climate change knowledge?
7. Do you think media information enough to climate change and science? Give opinion.
8. How do you convert the climate change information in climate change project and program?
   Please brief it in the context of the HI-AWARE project.

    a. Which climate change area you try to focus on developing and why and how?
    b. What are the short and long-term adaptation strategies you develop?
    c. How do you ensure the participation of community people and other project stakeholders in the decision-making process of climate change adaptation strategies? What mechanism do you follow to select beneficiaries for pilot intervention? Do you have baseline survey of your chosen recipients?
    d. How do you decide to declare 'climate change knowledge'? What adaptations have been made to the ‘original' concept, programming and institutionalization of the climate change package used in BCAS?
9. What considerations have gone into deciding which ‘climate change knowledge’ (among several) packages get transferred and why?
10. What activities your organization follows to sharing knowledge with partnered organizations?
11. How easy or difficult is it to implement the project? How does this compare to what was expected in the implementation plan?
12. Has the project produced immediate benefits? How do you measure it?
13. Has the project or activity caused adverse impacts, e.g., environmental impacts? Were these anticipated? How can they be expected? If unanticipated, do these adverse impacts outweigh the realized or potential benefits of the project?
14. Are there known legal, political, institutional, and financial barrier to implementing the project? Give reasons for the example.