



Asian Cities Climate Resilience

WORKING PAPER SERIES 25: 2015

Urban climate resilience, water and sanitation

Improving multi-stakeholder collaboration in Dhaka, Bangladesh

BY SARDER SHAFIQU ALAM, ATM JAHANGIR ALAM AND SOWMEN RAHMAN



About the author

Sarder Shafiqul Alam, Principal Investigator, Urban Climate Change Group, International Centre for Climate Change and Development (ICCCAD). Email: sarder.shafiqul@bcas.net

ATM Jahangir Alam, Project Leader, Urban Climate Change Group, ICCCAD. Email: kallal1022@gmail.com

Sowmen Rahman, Research Assistant, Urban Climate Change Group, ICCCAD. Email: sowmenurp@gmail.com

Acknowledgements

The authors are grateful to Habitat for Humanity Bangladesh for selecting the International Centre for Climate Change and Development (ICCCAD) as a research partner and to the International Institute for Environment and Development (IIED) for supporting the study. We are grateful to the city stakeholders, community members, government officials and others who provided support during the collection of data. The authors also want to thank the reviewers of this working paper from the Asia-Pacific regional office of Habitat for Humanity International, especially Joebel Gurang and Shenard Mazengera, as well as Victoria Maynard and Diane Archer from IIED for their constructive comments and suggestions. Additional thanks go to John Armstrong, National Director of Habitat for Humanity Bangladesh and the Habitat for Humanity Bangladesh team.

Contents

Acronyms	5
Abstract	6
1 Introduction	7
1.1 Background of the study and rationale	7
1.2 Aims and objectives	8
1.3 Structure of the report	9
2 Literature review	10
2.1 Context of climate change in Dhaka city	10
2.2 Who is at risk from climate change in urban areas?	10
2.3 Current water and sanitation facilities for low-income groups in Dhaka	11
2.4 Urban climate resilience	11
2.5 Multi-stakeholder collaboration and urban climate resilience	12
3 Study area and methodology	14
3.1 Study area	14
3.2 Methodology	18
3.3 Analysis of data	18
4 Water, sanitation and climate change	19
4.1 Present status of water	19
4.2 Present status of sanitation	20
4.3 Slum-dweller perceptions of climate change	20
4.4 Impact of climatic hazards on water infrastructure and services	21
4.5 Impact of climatic hazards on sanitation infrastructure and services	21
4.6 Climatic hazards, water, sanitation and human health	22
4.7 Climatic hazards, water, sanitation and gender	22

5 Stakeholder engagement in water and sanitation	24
5.1 Overview of stakeholders	24
5.2 Trends among stakeholders in urban water and sanitation	24
5.3 Key organisations in urban water and sanitation sectors	26
5.4 Stakeholders working on water and sanitation in the study sites	27
5.5 Challenges for implementing water and sanitation projects	28
5.6 Positive impacts of implemented projects	28
5.7 Stakeholder perceptions of the likely impacts of climate change	30
6 Multi-stakeholder collaboration and climate resilience	31
6.1 Status of stakeholder collaboration	31
6.2 Positive aspects of collaboration	32
6.3 Limitations of collaboration	33
6.4 Improvements to multi-stakeholder collaboration for urban climate resilience	33
7 Conclusion	35
References	37
Annex 1. Stakeholder mapping	41
Annex 2. Stakeholder activities – locations in Dhaka city	54

List of figures and tables

Figure 1. Interrelationship of different actors in multi-stakeholder collaboration	13
Figure 2. Existing NGO WATSAN projects in Dhaka city	15
Figure 3. Location of Beguntilla slum	16
Figure 4. Location of Dhalpur slum	17
Figure 5. Overview of stakeholder types	25
Figure 6. Sectors of organisations working with low-income groups (NGOs, government and civil society)	25
Figure 7. NGOs and other organisations working in the study sites	27
Figure 8. Diagram of stakeholder collaboration for bringing resilience to the urban sector	34
Table 1. Brief description of the projects in the two study sites	29

Acronyms

BUF	Bangladesh Urban Forum
CBO	Community-based organisation
DSK	Dushtha Shasthaya Kendra
DWASA	Dhaka Water Supply and Sewerage Authority
FGDs	Focus group discussions
ICCCAD	International Centre for Climate Change and Development
IIED	International Institute for Environment and Development
KII	Key informant interviews
NAPA	Bangladesh's National Adaptation Programme of Action
NGO	Non-governmental organisation
UPPR	Urban Partnership and Poverty Reduction
WASH	Water, Sanitation and Hygiene
WATSAN	Water and sanitation sector

Abstract

This paper attempts to identify a strategy for improving collaboration between stakeholders working in Dhaka city to improve climate change resilience of the urban water and sanitation (WATSAN) sector, with a focus on the urban poor. The findings are derived from reviewing existing literature and consultations with 32 key informants and five focus group discussions (FGDs) representing both low-income groups as well as other stakeholders (NGOs, government, academics). The output of the analysis reveals that heavy rainfall, flooding, water logging and heatwaves are the major climatic impacts that affect the water supply, sanitation and health of slum dwellers. Also, women are more vulnerable than men due to the lack of water supply and adequate sanitation facilities particularly during floods and water-logging conditions. Around 35 non-governmental organisations (NGOs), along with government bodies and media, play key roles in improving the WATSAN facilities of the urban poor – which are currently inadequate. To improve the situation, NGOs sometimes collaboratively work with other partners but without considering a long-term strategy. Improving the situation will require a sustained effort from all stakeholders – including government, community members, community-based organisations (CBOs), NGOs, media, donors, researchers and academics. The national government should play the lead role by formulating a strategic action plan in consultation with advisors, key personnel and other stakeholders. It should also be the responsibility of the government to ensure that stakeholders work according to the guidelines. Following a government-devised action plan, the private sector and NGOs will be able to develop more robust and effective partnerships.

1 Introduction

1.1 Background of the study and rationale

Dhaka city is the capital of Bangladesh and one of the most populated cities in the world. From 1975 to 2000 the population of the city increased at a rate of 6.9 per cent which is the highest in the world, growing from 2.2 million in 1975 to 12.3 million in 2000 (Hossain, 2013). Of this immense population, many live without any necessary risk-reducing infrastructure, due to unplanned urbanisation and a geographical location that makes the city very susceptible to climatic disasters.

Considerable pressure has been placed on city resources and services such as water and sanitation.

Each year, Dhaka receives a large influx of migrants from rural parts of Bangladesh. Ishtiaque and Ullah (2013) defined these number as around 0.4 million/year. These migrants usually come to the city in search of work and a better life, as they typically have no means of securing a livelihood in their home districts. Their struggle continues in Dhaka as they deal with hard labour and poor living conditions, usually in slums or squatter settlements with very poor or no water and sanitation facilities where there might also be the risk of evictions as their tenure status is precarious. According to a report from the Asian Development Bank (ADB,2008:2), the impacts of climate change will be more severe during times of intense rainfall in urban areas where ‘drainage is already a serious problem, as sewers frequently backup in the wet monsoon.’

Like other cities, Dhaka is receiving attention and assistance from many donor organisations and international organisations (e.g. WaterAid, Asian Development Bank), and, with the help of local partners, these organisations are working to improve the well-being of slum dwellers. For instance, the Association for Realisation of Basic Needs (ARBAN) completed a project in the Mirpur area of Dhaka on water supply and hygiene education that ran from 1997 to 2002. The NGO BASTOB-Initiative for People’s Self-Development is creating awareness about water and sanitation among its microfinance members, and the NGO Forum for Public Health is working on improving the water and sanitation facilities of the Dhaka City Corporation. As a result of these initiatives some developments have taken place. Now, the slums which saw interventions have sanitary latrines, water points, and in some cases there are also drainage canals. Moreover, the slums’ inhabitants have become aware of health and hygiene practices. Sinthia (2013) has marked these NGOs initiatives as significant for the development of slum dwellers though their coverage is very limited. However, these interventions by the NGOs do not consider the security of land tenure – and the government or owner of the land can evict the people at any time.

In addition to these projects, academics and research organisations have also carried out research related to water and sanitation for slum dwellers (e.g. Khan, 2007; Hossain *et al.*, 2013; Biplob *et al.*, 2011; Jabeen *et al.*, 2010; Banks *et al.*, 2011; Alam and Rabbani, 2007; Sinthia, 2013). Among these researchers, Khan (2007) identified the necessity of a well-defined urban governance strategy and the need to take immediate action. A number of other researchers have undertaken similar projects in recent years. Hossain *et al.* (2013) developed tools for assessing the impact of inadequate water and sanitation facilities in a slum of Mohammadpur, Dhaka; Biplob *et al.* (2011) identified that the living standards and expectations of slum dwellers are low compared to the living standards set by the planners, even though slum dwellers

are paying charges for facilities like water supply and sanitation. Jabeen *et al.* (2010) found that the poor are victims in a two-way mechanism: firstly, their inadequate living structure exposes them more to disasters, and their limited resources prevent them from taking appropriate coping strategies. Banks *et al.* (2011) and Sinthia (2013) concluded the urgent need to develop a policy considering the basic needs of the urban poor including land ownership, water and sanitation, and housing. Alam and Rabbani (2007) saw the increasing risk of climate change impacts in other parts of the country, particularly from floods, riverbank erosion and cyclones, as increasing the number of rural to urban migrants, most of whom head for Dhaka. They also question the growing vulnerability of Dhaka with its increasing population, as it has already experienced three major floods within a period of twenty years, causing severe economic losses and infrastructure damage.

Despite the broad scope of these research projects, other than Jabeen *et al.* (2010), none have explicitly considered the issue of urban climate resilience. The process of building urban climate resilience requires increased awareness about climate change impacts in urban environments, and processes that enable cities to adapt by reducing risk (Brown *et al.*, 2012; da Silva *et al.*, 2012; Kernaghan and da Silva, 2014). At this point, it is necessary to address this research gap and include climate resilience in development activities, including the provision of water and sanitation services.

As a result of the aforementioned research and action of NGOs, some improvements have been made to Dhaka's slums. These improvements have proven insufficient, however, because most of the problems have only been identified and addressed by a single actor. As da Silva and Magara (2013) note, problems related to urban climate resilience cannot be addressed by a single actor, but require concerted efforts by several actors interacting at different levels. Many stakeholders are responsible for providing facilities in slum areas, and, without collaboration among these stakeholders, effective service provision is difficult. The Association for Progressive Communication (APC) explains this type of partnership as multi-stakeholder collaboration and notes that, in a multi-stakeholder partnership, the partners share the understanding that while different partners may play different roles and have different purposes they pursue collective goals through collaboration and common activities (Adam *et al.*, 2007). Moreover, according to Krawchuk (2013), multi-stakeholder collaborations can transform complex challenges into new possibilities.

Considering the importance of multi-stakeholder collaborations, the goal of this study is to bring stakeholders together to improve access to water and sanitation facilities for low-income groups and assess how this collaboration can bring positive impacts.

1.2 Aims and objectives

This study aims to identify a strategy for improving collaboration among organisations working in Dhaka city on development issues related to climate change, water and sanitation. To achieve this goal, the present status of water and sanitation services in the city are identified, alongside the potential impact of climate change on those services, and the organisations that are working on water and sanitation issues in Dhaka. Once the organisations have been mapped, the paper explores the most appropriate ways to improve the collaborative efforts that these organisations are currently making in this sector. The goal is not just to bring stakeholders together to discuss issues related to water and sanitation, but also to create a way in which they can share, learn and work together to improve resilience in Dhaka's urban areas.

This paper seeks to address the following research questions:

1. What is the current water and sanitation situation in informal settlements in Dhaka, Bangladesh?
 - What are the likely impacts of climate change on these settlements?
 2. Which stakeholders are working on water and sanitation in Dhaka?
 - Which individuals, groups and organisations are critical to the governance of urban water and sanitation infrastructure systems?
 - What are the relationships between these actors?
 - What are they doing and where?
-

3. How can stakeholder collaboration be improved?
 - What engagement strategies will be useful for developing a multi-stakeholder partnership process?
 - How can multi-stakeholder partnerships be applied to improve the access of low-income urban populations to water and sanitation infrastructure and to scale up service delivery?
 - How can these partnerships enable community engagement and involvement in a multi-stakeholder dialogue?
 - How can they improve the urban resilience programmes of respective partners?

1.3 Structure of the report

The report is divided into seven chapters. The second chapter reviews how climate change is considered in the context of Dhaka city. It explores which groups are subject to more risk in urban areas because of climatic disasters, the present water and sanitation status of low-income groups, and how these factors relate to urban climate resilience. Finally, the chapter describes the relationship between multi-stakeholder collaboration and building urban climate resilience.

The third chapter briefly describes the study sites and draws on fieldwork conducted in each of the slums primarily involving key informant interviews (KIIs) with community people, government and non-government officials and with significant actors in this area of work. Subsequently, the fourth chapter describes the particular risks that are faced by slum dwellers and the impacts on water and sanitation. In addition to these, the chapter also identifies WATSAN-related health and gender issues.

The fifth chapter answers the fourth research question by identifying stakeholders that play a key role in the urban water and sanitation sector, what they are doing, and where. The report also tries to identify the relationship between these actors. Chapter six describes how the engagement strategies used in multi-stakeholder collaboration can bring resilience to the urban water and sanitation sector, whilst the final section concludes the findings.

2 Literature review

Several key themes emerge from the literature on water and sanitation, climate resilience and multi-stakeholder collaboration that illustrate important shifts in thinking about how multi-stakeholder collaboration can help improve resilience in the water and sanitation sector. In this chapter, some of these themes and topics are addressed.

2.1 Context of climate change in Dhaka city

Bangladesh is vulnerable to climate variability and change in part because of its geomorphological location (Jabeen *et al.*, 2010). A good number of studies cite the climatic hazards and their associated impacts in Dhaka city (e.g. Yahya *et al.*, 2010; Mowla and Islam, 2013; Rabbani *et al.*, 2011; Alam and Rabbani, 2007). The capital city Dhaka is affected by climate change primarily in two ways: flooding caused by torrential rainfall and drainage congestion, and heat stress. Dhaka faces heat stress because the urban heat island effect means the temperature of the city is typically a few degrees higher than the surrounding areas. High levels of vehicle exhaust emissions, industrial activity in the city centre and the increased use of air conditioning are the main factors causing this heat difference in Dhaka (Alam and Rabbani, 2007). However, the most devastating impact of climate variability that Dhaka has faced in recent years is flooding, which has increased due to a combination of inadequate infrastructure and the destruction of natural water bodies (Yahya *et al.*, 2010). The city has experienced nine major floods over the last 60 years. The floods in 1988, 1998 and 2004 were particularly severe as a result of overflow from the surrounding rivers (Jabeen *et al.*, 2010). The flood proneness of the city is noted throughout the literature (Alam and Rabbani, 2007; Jabeen *et al.*, 2010; Yahya *et al.*, 2010; Hossain, 2013). In addition to flooding, waterlogging is another major problem that affects the city almost every year. In 2004, the city experienced unprecedented rainfall of 341mm in a period of 24 hours which inundated more than two thirds of the capital city (Ahasan *et al.*, 2011). Dhaka's utility services such as its sanitation system, drinking water supply and sewerage lines are victims of these kinds of extreme events. WWF (2009) ranked Dhaka city first among the eleven megacities of Asia vulnerable to the impacts of climate change, especially to flooding. The flooding situation is likely to worsen in Dhaka because of increased wetlands development by land-grabbers, which decreases the drainage capacity, a problem compounded by unpredictable heavy rainfall.

2.2 Who is at risk from climate change in urban areas?

According to Huq *et al.* (2007), the people most at risk from the impacts of climate change are those who live in hazard-prone areas and who are least able to avoid the direct and indirect impacts of climatic disasters. The people in this group typically lack good-quality homes, sanitation facilities and drainage systems. They cannot afford to access prime service land in the city as it is too expensive, cannot move to less risky places, or are unable to change their occupation if a climatic hazard threatens their livelihoods. In that sense, low-income groups are most vulnerable to climate change especially low-income residents who live in urban informal settlements, since they typically have low-quality housing and poor sanitation and drainage facilities.

Dhaka is not an exception to this rule. More than 5 million slum dwellers (DSK, 2012) in Dhaka live amidst rubbish because there are very few effective waste-disposal systems in slum areas. Slum houses ‘perch on the edges of fetid cesspools as there is inadequate sewer drainage and little access to sanitary latrines’ (UNICEF, 2008). Seasonal floods and waterlogging aggravate the unsanitary conditions which arise from the discharge of industrial waste and raw sewage into the river ponds and nearby water bodies (UNICEF, 2008). Many studies cited that lack of protective infrastructure facilities and quality services are the two major risks faced by the low-income groups who live and work in overcrowded slums and squatter settlements in hazard-prone areas. The literature also suggests the need of immediate intervention in these affected areas (Banks *et al.*, 2011; Jabeen *et al.*, 2010; Hardoy *et al.*, 2001; Satterthwaite *et al.*, 2007; IFRC, 2010; UNISDR, 2009 UN-Habitat, 2011; Baker, 2012).

2.3 Current water and sanitation facilities for low-income groups in Dhaka

Low-income groups live primarily in slums or squatter settlements. In most cases, slums lack even the most basic amenities associated with urban life, such as running water, sewage systems, toilet facilities and waste-disposal services (World Bank, 2007; Hossain, 2008; UNICEF, 2010; Ahmed, 2013). For those settlements which do have access to such services, ‘quality is low and cost can be prohibitive’ (UNICEF, 2010: 18).

Hossain *et al.* (2013) mention two major problems with water supply in Dhaka slums: the poor quality of the water supplied and the low quantity of the supply. This is caused by problems in the collection points of Dhaka Water Supply and Sewerage Authority (DWASA) and leaks in the pipe. The seasonal occurrence of electricity load shedding¹ also hampers the pumping of water which decreases the water supply. According to Islam (2013) though 83 per cent of the area of Dhaka city is covered by piped water supply, water scarcity is a very common scenario in the urban slums, where about 35 per cent of the people of Dhaka live in only 4 per cent of the city. He also compared per capita consumption of water among the low-and high-income groups. In the urban slums, per capita consumption is about 20 litres per day, whereas in high-income areas it is about 400 litres per day.

The lack of water also hurts the sanitation conditions of the urban poor. Only 8.5 per cent of slum dwellers in Dhaka have access to improved sanitation facilities, compared with a national average of around 54 per cent (UNICEF, 2011). Hoque *et al.* (2013) observe in their study that hygienic latrines are not being used because of their high installation cost. They report that the lack of space within Dhaka’s slums does not allow for wells and pit latrines to be built an adequate distance away from each other, ‘which allows micro-organisms to migrate from fecal contents into the underground water sources’ (Hoque *et al.*, 2013:98). Hanging latrines contaminate ponds, ditches and lakes and causes serious hazards to human health. Hoque *et al.* (2013) also reported that sanitation conditions become worse during the rainy season due to higher water levels and leeching. The outbreak of different water-borne diseases such as cholera and typhoid is also observed more when the areas are waterlogged (Hossain *et al.*, 2013).

2.4 Urban climate resilience

The process of building urban climate resilience requires an increased awareness of climate change impacts in urban environments and initiates processes that enable cities to adapt by reducing risk (Brown *et al.*, 2012; da Silva *et al.*, 2012; Kernaghan and da Silva, 2014). In the context of natural disasters, urban climate resilience is a way to build the systematic capacity of an urban centre, so that infrastructural development and land-use management reduces the impact of particular hazards (Revi *et al.*, 2014).

¹ Load shedding is the deliberate shutdown of part of a power-distribution system, generally to prevent the failure of the entire system when demand exceeds its capacity.

In recent years, a number of studies have emerged discussing resilience to climate change for urban centres and the factors that contribute to resilience (Muller, 2007; Leichenko, 2011; Moench *et al.*, 2011; Pelling 2011; Brown *et al.*, 2012; da Silva *et al.*, 2012). These authors highlight the importance of a city's complex and interconnected infrastructure and institutional systems which make it challenging to achieve urban climate resilience– including 'inter-dependences between multiple sectors, levels and risks in a dynamic physical, economic, institutional and socio-political environment'(Kirshen *et al.*, 2008; Gasper *et al.*, 2011; Revi *et al.*, 2014: 548).

Several systematic characteristics were found in the literature that contribute to a city's resilience. They are: 'flexibility, redundancy, responsiveness, capacity to learn and safe failure' (Tyler *et al.*, 2010; Moench *et al.*, 2011, Brown *et al.*, 2012; da Silva *et al.*, 2012 and Revi *et al.*, 2014: 548). So a climate-resilient city not only has the ability to recover from the impact of climate change, but also the ability to avoid unexpected or unpredicted changes, or the capacity to withstand them. Resilient cities also require coordinated actions by institutions working in the same area or higher levels of government, for example, reducing the risk of flooding by managing watersheds upstream (Brown *et al.*, 2012; Revi *et al.*, 2014).

2.5 Multi-stakeholder collaboration and urban climate resilience

Collaboration between multiple stakeholders has become an integral part of sustainable development activities. According to Karner *et al.* (2008:1) in a multi-stakeholder process,

[T]he convened group will bring its collective wisdom to bear on a truly difficult problem, with the intention of producing innovative or transformative solutions that genuinely reflect the varied needs and interests of the participating stakeholders.

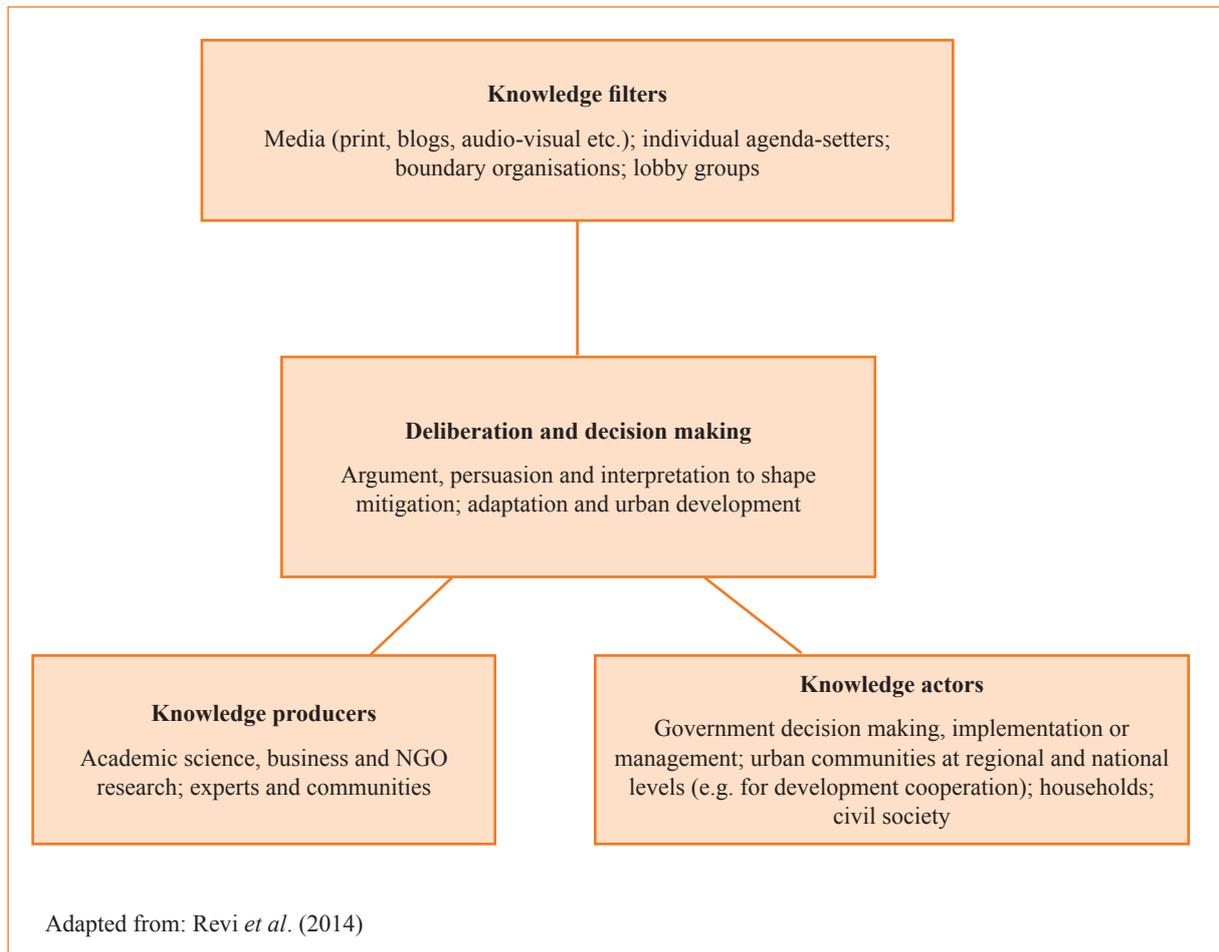
It is believed that decisions and agreements produced by multi-stakeholder groups are widely supportable as they consider the opinions of different groups of people and are therefore sustainable (Karner *et al.*, 2008). To improve resilience in the water sanitation sector it is necessary to have multilevel collaboration. Since many different actors – including community members and government and non-government agencies – are responsible, a concerted effort among these actors interacting at different levels is required (da Silva and Magara, 2013).

Several authors express their views about barriers to successful multi-stakeholder processes. For example, four broad areas of concern include power, democratic process, efficiency and political culture. These may limit the success of collaboration (Meadowcroft, 1999; Melhus and Paton, 2012). In terms of power, these authors argue that not all participants can have a similar level of influence on outcomes or decision making. Moreover, they found that participants are often chosen on the basis of personal relationships, which does not represent democratic legitimacy. In addition, it might mean that a person's role may change, which may reduce their efficiency. Fadeeva (2004) argues that collaborative processes can sometimes make significant achievements in environmental decision making. However, such processes can be lengthy and may require capacity building of participants.

Hanleybrown *et al.* (2012) identified three conditions required to develop a collaborative effort: influential people, adequate financial resources and a sense of urgency for change. Revi *et al.* (2014), in their description of multilevel cooperation for bringing resilience to an urban area, define the actors of multi-stakeholder groups as (see also Figure 1):

- Knowledge producers (academics, community members, businesses and non-governmental organisations or NGOs),
- Knowledge actors or implementation agencies (most important here are local and central government bodies, sometimes in collaboration with partners such as local agencies or donor bodies),
- Knowledge filters: groups who can intervene between knowledge production and action (the media, lobby groups etc. that assistance in translation) (Revi *et al.*, 2014; also Carvalho and Burgess, 2005; Leiserowitz, 2006; Ashley *et al.*, 2012).

Figure 1. Interrelationship of different actors in multi-stakeholder collaboration



The above discussions make it clear that recent changing patterns in the climate along with the infrastructural pattern of Dhaka make the city more vulnerable to climatic disasters, especially flooding caused by torrential rainfall, waterlogging and heatwaves. As a result of these disasters the poor who live in informal settlements are more at risk. These disasters affect water and sanitation services, the quality of which is already very poor. Collaboration between multi-stakeholders should ensure an all-round effort by existing stakeholders to overcome the impacts of climate change. There are also some preconditions which need to be met before any collaborative effort has an impact. If these preconditions are met, a multi-stakeholder collaboration should ensure a successful process of achieving climate resilience in urban water and sanitation sectors.

3 Study area and methodology

3.1 Study area

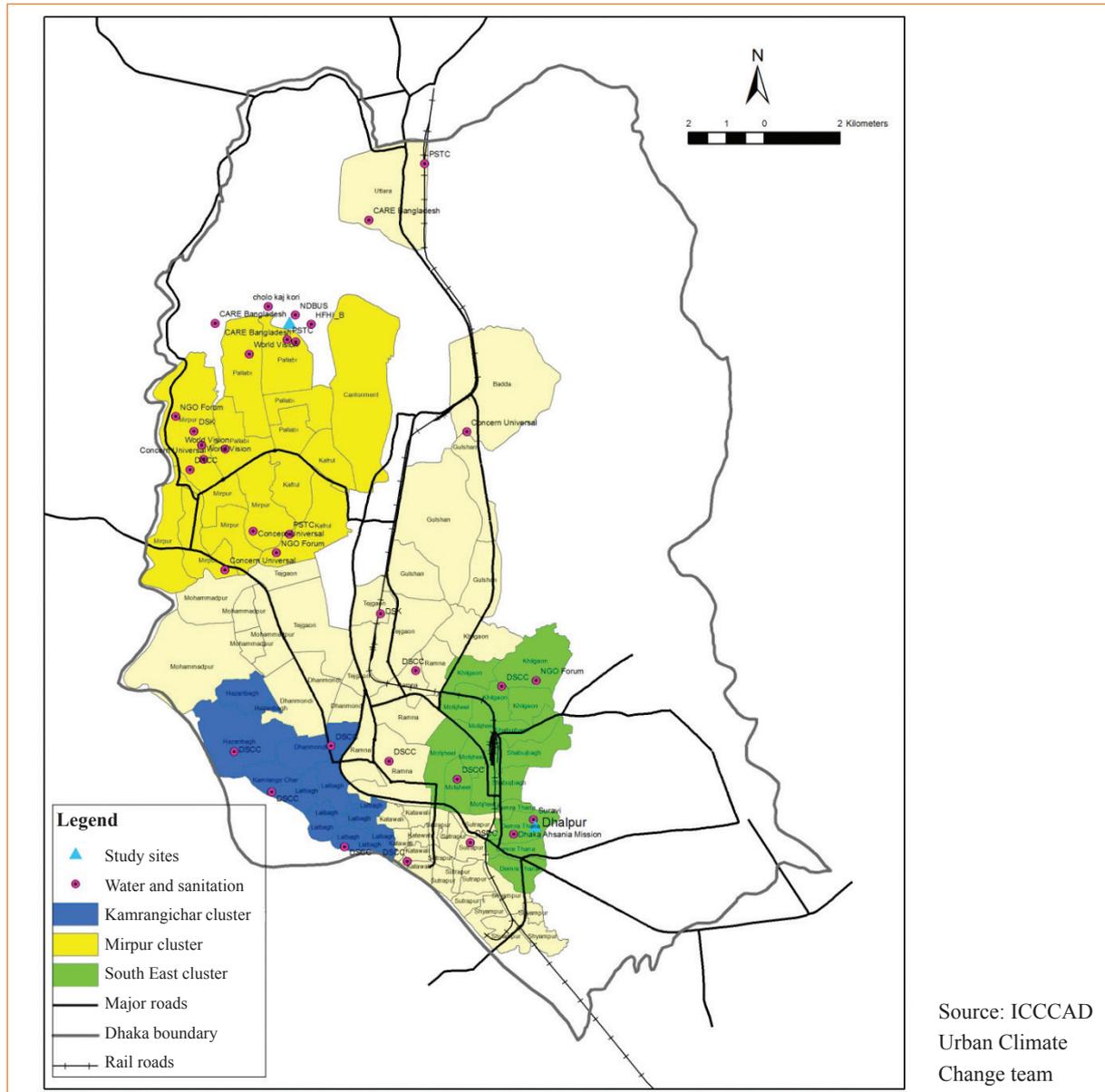
HFHB engaged ICCCAD to conduct the study. The ICCCAD study team conducted the study during the period November, 2014 to May 2015 under the project “Improving multi stakeholder collaboration for water and sanitation sector to contribute to positive impact on urban climate resilience in Dhaka city, Bangladesh”. The study team prepared a map of stakeholders working to improve water and sanitation facilities for people living in informal settlements of Dhaka city (see Annex 1). The mapping of the stakeholders makes it clear that there are three clusters of slums where NGOs give more priority in the water and sanitation sector: the greater Mirpur area of Dhaka city under the North City Corporation; the southeast area under the South City Corporation; and the greater Kamrangi Char area (Figure 2). The study team carried out an exploratory survey by visiting those sites and selected two clusters situated within the two city corporation areas of Dhaka city. After selecting the clusters the research team selected the study sites.

3.1.1 Selection of study sites

For the purposes of carrying out this research, two slums from different clusters were selected. The criteria for selection of these clusters were:

- Multiple stakeholders are working in these clusters to improve the water and sanitation situation in informal settlements,
 - Residents are highly vulnerable to climatic disasters, particularly flooding and waterlogging,
 - Low-income groups (slums, squatter settlements and others) live in these areas, and
 - A contact person (NGO representative) is present in the area.
-

Figure 2. Existing NGO WATSAN projects in Dhaka city



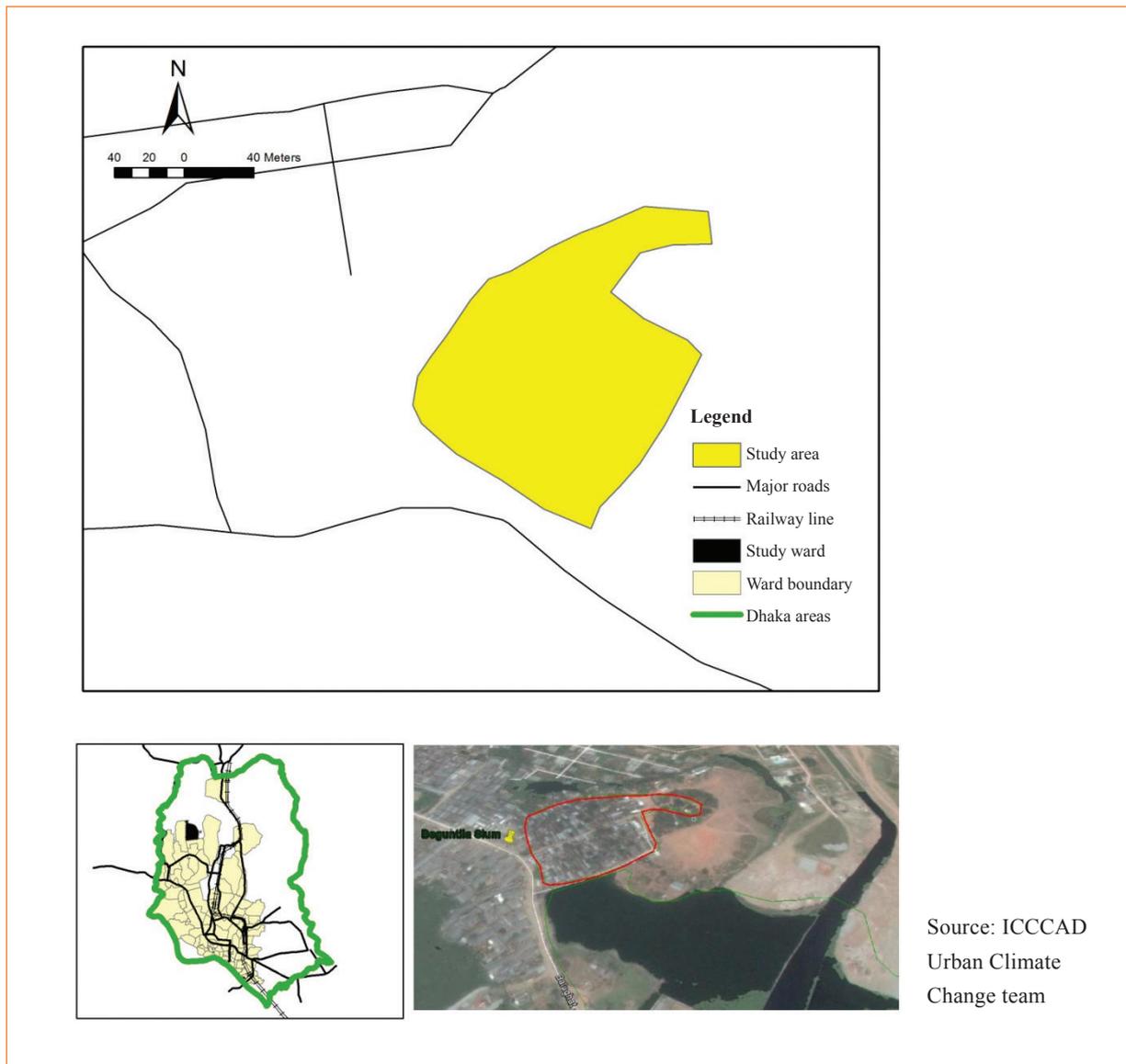
3.1.2 Location and description of Beguntila slum

Beguntila slum is situated under the jurisdiction of Pallabi Thana, Mirpur and Section 12, Block D of Ward 2 of Dhaka City Corporation area (Figure 3). Rahman (2012) provides a detailed description of Beguntila slum in his PhD thesis. The slum evolved in 1999 after slum dwellers evicted or relocated from different slums of Dhaka city were sent to Beguntila by the government. The slum dwellers explained that they came from the different slums – after their eviction from those slums they went to the high court to seek rehabilitation. According to the verdict, the government temporarily rehabilitated them on this section of government land by assuring them they would be soon provided with a permanent residence. The slum dwellers are still in fear of eviction as the government has the right to evict them at any time. The place is called *kalapani* (meaning ‘black water’ because dirty water from Dhaka city is dumped here in the eastern lake). The slum area is surrounded by Bihari camp to the south, Kalshi-Mirpur DOHS (Defense Officers Housing Society) highway to the west, and a lake to the east. The northern side of the slum is occupied by Mirpur DOHS area.

According to local people, there are around 800 households living here of whom about 200 are extended families. Most houses in this slum are made of corrugated iron sheets, bamboo walls and clay or cement floors. People of all castes are living here, though the majority are Muslims. During the field visit the research team found that some slum dwellers are cultivating vegetables in open spaces near their homes.

The slum dwellers depend on a variety of occupations to earn their livelihood. According to Rahman (2012) there are rickshaw pullers, garments workers, small-business owners, handicrafts makers, street beggars and day labourers living in the slums. A few people are also employed in government and other private sectors.

Figure 3. Location of Beguntila slum

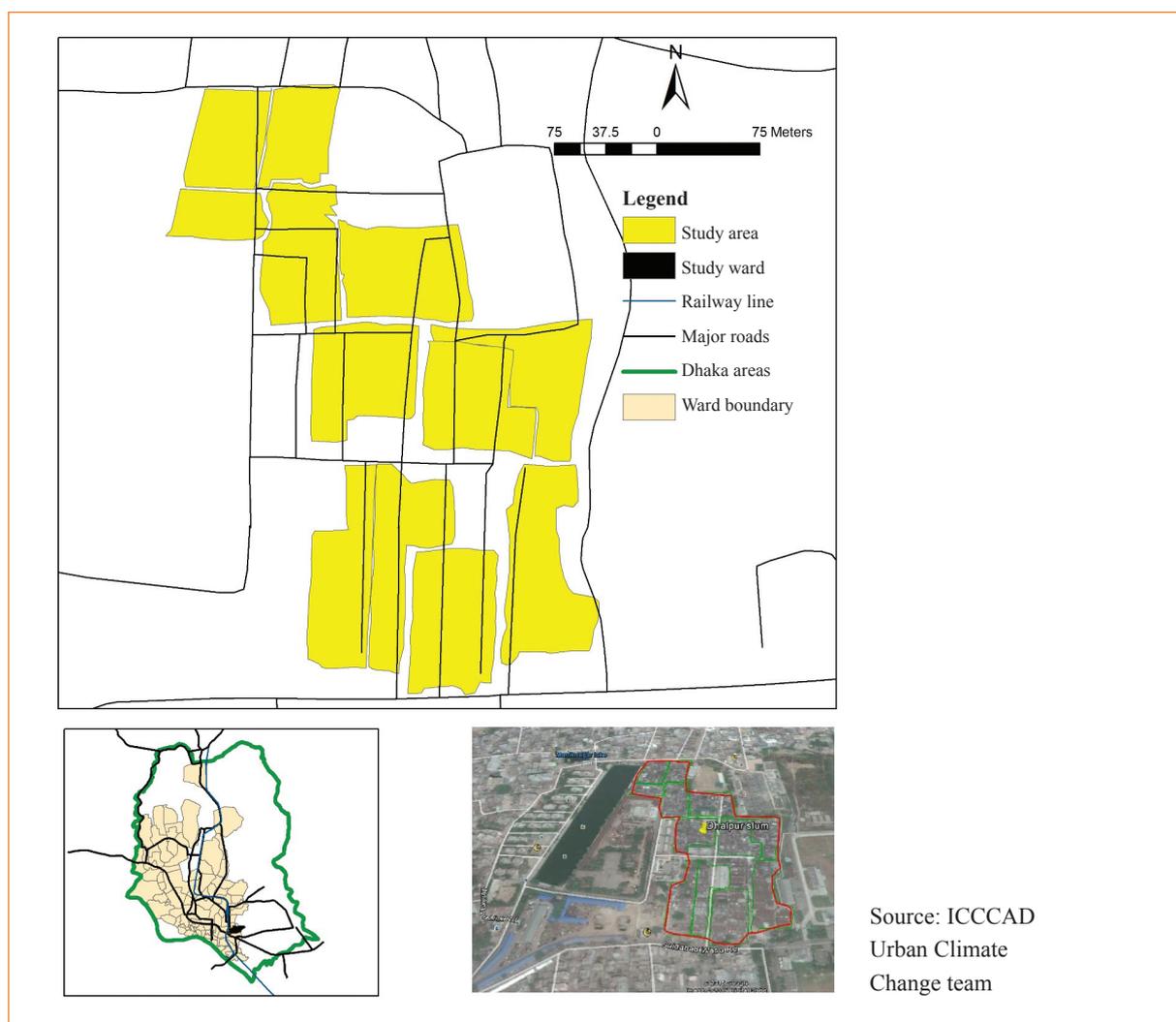


3.1.3 Location and description of Dhalpur slum

Dhalpur slum is located just near the Sayedabad Bus Terminal and beside the Maniknagar Model High School. The area is in Ward 49 of Dhaka South City Corporation (Figure 4). To the north of Dhalpur slum is Maniknagar, to the south is Dhalpur, to the east is Maniknagar Power House and to the west is the City Corporation staff quarter's pond. There are a total of 12 individual smaller slums defined by community development committees within the Dhalpur slum and according to the local community around 3,500 families live there. People from different low-income settlements of Dhaka city and different districts of Bangladesh have chosen to live here for its cheap and affordable rent. According to local residents, cleaners working for the Dhaka City Corporation moved here first and after sometime they started to rent outhouses to other people. Like the Beguntilla slum, the Dhalpur slum is also situated on government land (all of Dhalpur is owned by Dhaka City Corporation) and there is no specific tenure for the dwellers in this slum i.e. this is a temporary residence only and the government has the right to use this land at any time for any development purpose. Most houses in this area are made of corrugated iron sheets and bamboo. Houses are very compact with little space, sunlight or ventilation. The lanes within the slum are very narrow but most are made of concrete.

Most of the slum dwellers are cleaners for the Dhaka City Corporation and work on a daily basis. However, there are also small businessmen, rickshaw pullers, scrap-business owners and day labourers. Unlike Beguntilla, the Dhalpur slum is located in the central part of the city, offering greater working opportunities for women here than in Beguntilla slum.

Figure 4. Location of Dhalpur slum



3.2 Methodology

The current study employed a two-step methodology. To begin with, a literature review of secondary literature (books, journal articles and reports from different government and non-government organisations) helped to conceptualise terms such as ‘multi-stakeholder collaboration’ and ‘climate resilience’ and to develop the tools for primary data collection. These involved gathering primary qualitative data through a mixture of research techniques such as key informant interviews (KII) and focus group discussions (FGDs), lesson-sharing workshop and roundtable discussions.

Individuals from the local communities and organisational representatives of Beguntila and Dhalpur slums were selected as respondents for this research. Participants of both sexes were selected for the key informant interviews with 17 male respondents and 15 female respondents in the range of 18–80 years of age from both Beguntila and Dhalpur slums. There were 10 and 11 KII community group respondents from Beguntila and Dhalpur respectively.

Key informants were selected based on the following criteria: those with knowledge of the slum community and of climate change impacts on the slum and water and sanitation situation. A list of potential key informants was prepared, and a diverse set of representatives with different backgrounds and from different groups were listed. One or two respondents from each selected background and group were interviewed. A total of 11 others – experts and representatives from NGOs, government – were also interviewed.

Community KII respondents from Beguntila slum came from different districts of Bangladesh. However, these people did not come to Beguntila directly from their home districts. After coming to Dhaka their destinations were to different places within the city. The people of Beguntila moved to the slum after being evicted from different slums across Dhaka city by the government in 1998. The people of Dhalpur slum came from other areas of Dhaka city because of rent-free government land. Respondents who migrated from outside of Dhaka city were forced to do so by riverbank erosion, financial insolvency or to seek livelihood opportunities.

A total of five focus group discussions (FGD) were carried out. Two FGDs were done in each of the selected study sites consisting of separate male and female groups. In addition, another focus group discussion was carried out among NGOs and government bodies. A comprehensive FGD checklist prepared based on the research questions was used to facilitate the discussion among the participants. The discussions of the FGDs were recorded using an audio recorder and handwritten notes were also taken to prepare the report.

The purpose of the key informant interviews and FGDs was to answer the following research questions using an open-ended checklist:

- What is the current water and sanitation situation of the area?
- What are likely impacts of climate change?
- Which stakeholders are working in water and sanitation?
- How can we improve stakeholder collaboration? and
- What engagement strategies will be useful for developing a multi-stakeholder partnership process?

3.3 Analysis of data

The qualitative data generated by the focus group discussions and key informant interviews with stakeholders were analysed using the ‘reflexive iteration’ method (Srivastava and Hopwood, 2009) whereby the data were continuously revisited during the study to identify and refine emerging themes from the two selected sites. The findings of this analysis are presented in chapters four, five and six.

4 Water, sanitation and climate change

4.1 Present status of water

The field data collection revealed that in both study sites, people do not have equal access to water. The water connections are situated close to the community leaders' residences. The community people collect water from only three or four points and have to pay DWASA. However, people perceive the quality of the DWASA water supply to be good and consider it safe for drinking. The participants of FGD stated that they form queues for collecting water when it is available. Water is unavailable during the day on some occasions, as a result of which people must store water for cooking and other domestic uses. In both of the slum areas some people have water businesses— they supply water to the community in exchange for money. But in general, people collectively pay their water bills to DWASA.

Water scarcity is higher in Beguntilla slum in comparison to Dhalpur, where only about 30 to 40 percent of their basic needs are met by the current supply of water. Most families use the supply water for cooking and drinking purposes only. Most people use water from a nearby polluted lake to serve their washing and bathing needs. Similar findings have been made by Islam (2013) where the water consumption in the slums per capita per day is only 20 litres compared to 400 litres in high-income areas.

Previously, people had no legal rights for the provision of a water supply in slum areas. But very recently, this situation has changed and the government has developed a new wing for supplying water to slum dwellers, having considered the suffering of those living in urban slums. However, this is not a permanent solution and the government or land owners still have the right to evict people at any time. According to key informant Ms Khondker Rebaka Sun-Yat, Executive Director of Coalition for the Urban Poor,

Government of Bangladesh never recognised the right of urban poor in terms of water supply and sanitation. From 1996, we have been perusing them to ponder about these crucial issues. After signing an international treaty in 2010, the government of Bangladesh incorporated and approved the WATSAN rights of urban poor into their policy and budget. Recently, the government has developed a special wing for the low-income group (LIC).

After this intervention, some water infrastructure has been and is being developed in the slum areas. However, it is somewhat inadequate as most slums are located a long distance from the city centre and slum dwellers have to bear the cost of installing a new pipeline. Since slum dwellers are a low-income group, they cannot afford to. Moreover, they are unaware of this facility.

Different organisations are intervening in these slum areas. For example, very recently Habitat for Humanity Bangladesh constructed a water reservoir in the Beguntilla slum in partnership with World Vision. But the reservoir is still not in operation due to a lack of water connection. At present, the NGO Forum for Public Health is collaborating with DWASA to propose installing a water connection to the slum using a six-inch pipe, but it is yet to be established. Similarly, under the Urban Partnership for Poverty Reduction (UPPR) project of the government, 19 water tanks have been constructed

in the Dhalpur area. But although project activities have been completed, a water connection to the area has not been established yet due to lack of funding.

A poor drainage system is another major problem faced by Dhalpur slum. The current system can only accommodate the drainage of their daily water use. During periods of rainfall, the drain is clogged easily and the area is inundated.

4.2 Present status of sanitation

The number of toilets is inadequate in both the study sites. In Beguntila there is only a single toilet for every ten families whereas in Dhalpur the number of families sharing a single toilet is lower. Moreover, very few better-off families have their own toilet in both of the sites. Because of the inadequate number of toilets, people have to queue during the peak hours, especially in the morning.

Rahman (2012) stated that when the Beguntila slum was established people had to depend on hanging latrines.² The first intervention was made by the government and the United Nations Children's Fund (UNICEF) but it was inadequate. In 2004, Dushtha Shasthaya Kendra (DSK) started their intervention and constructed several sanitary latrines for the slum dwellers. World Vision helped in the construction of six toilets. Habitat for Humanity Bangladesh assisted in constructing toilets as well. At present there are nineteen community latrines in the Beguntila slum but some of them are not functioning due to a lack of water. In contrast, during the FGDs, participants claimed that almost every house in Dhalpur slum has access to toilet facilities through community-based latrines. However, the Beguntila key informants expressed opposing opinions. Seven respondents out of eleven stated that the number of toilets is not adequate. Poor construction of septic tanks in Beguntila and the poor sewerage system in Dhalpur have exacerbated the sufferings of the slum habitans. Sewage leaks out and spoils the whole surrounding environment during periods of heavy rainfall.

Sanitation services are almost non-existent in informal settlements. Up until now, most interventions in slum areas have been conducted by NGOs. The NGOs work on the basis of particular projects and leave the place after completion of their project. The existing situation is similar in the study sites. A key informant from the Beguntila slum said,

We are responsible for cleaning and maintenance of our own toilets. There is a fixed date for every household for cleaning the toilet and we clean on our assigned dates. In case of any maintenance or cleaning the septic tank we hire sweepers from outside.

4.3 Slum-dweller perceptions of climate change

While carrying out field data collection, key informants from the community and other stakeholders identified several climatic hazards that affect the low-income groups living in the informal settlements. The hazards are floods, torrential rain, waterlogging, heatwaves, coldwaves and storms. Regarding the question of climate change, out of 21 respondents, 15 mentioned that they had noticed a change in weather patterns, especially in the occurrence of rainfall and commencement of winter. Among the respondents, four had no knowledge of this transformation and two suggested that weather patterns had not changed. Nowadays, heat stress is worse than it used to be and is increasing day by day. Moreover, they observed winter that winters were shorter but more intense. According to the respondents, extreme temperatures are now being experienced all year round in contrast to the past and there is less rainfall during the rainy seasons. But although rainfall has decreased, even a small amount of rain now leads to waterlogging.

Though the community respondents have very little knowledge about the likely impacts of climate change, they are aware of large flood and storm events. They told field visitors that if flood events like 1998 or 2004 occurred again all of their belongings would be submerged and damaged.

² A hanging latrine is one which is suspended over a pond, lake, river or other water source.

Existing literature provides scientific evidence to back up their opinions. In 2014, Dhaka recorded its highest temperature (40.7°C) for 54 years (The Daily Star, 2014). Rabbani *et al.* (2011) cited that in 2009, Bangladesh was affected by a severe and prolonged heatwave in April while a coldwave hit the country during the last week of December and first week of January 2010. Similarly, patterns of rainfall have changed in recent years with no change in the annual average. This indicates that there has been a change in the number of rainy days or variation has taken place with seasonality.

4.4 Impact of climatic hazards on water infrastructure and services

For slum dwellers, their suffering in the water sector starts with rainfall. Generally, Dhaka city has a poor drainage system and in the case of the slum areas, the drainage capacity is either very poor or non-existent. According to one key informant, a representative of Dhalpur slum,

The present drainage system can runoff our everyday use water slowly but surely. But it cannot run out the water if there is a small amount of rainfall and the area becomes waterlogged and it takes at least three to four days to drain off the water.

Very recently the Dhaka City Corporation constructed a drain in the Beguntilla slum which has improved the situation of waterlogging in the area to a small extent. As a result of a heavy rainfall event the first problem that the slum dwellers face is water inflow into their houses, which causes severe damage to their household goods. When water inundates the area, there is also an acute scarcity of fresh water. Secondly, the poor drainage capacity cannot hold the water and it spills out into the roads with the sewage and waste water. This both hinders people's freedom of movement and smells very bad. Generally, in a waterlogged situation the tube wells are not submerged as they are constructed at a high elevation. But sometimes waterlogging creates leakages into the pipeline and waste water and sewage gets mixed up with the pipeline water.

During flooding, people in the community generally take shelter in the shelter centre. In Beguntilla, during 2009, the water levels decreased after the Mirpur sluice gate was opened. During the flood of 2004, some Dhalpur inhabitants took shelter in the shelter centre and others used bamboo to raise their beds above the flood level. As a result of the floods there was an acute scarcity of safe water that affected their everyday use of water. During the floods generally, the water reservoir and tube wells are submerged below the water level which causes the scarcity of water.

Heatwaves are another factor that directly affects slum dwellers. The impact is aggravated because of the housing materials used and the high density of population living in a very small area. During the summer, consumption of electricity also increases and sometimes this disrupts the electricity supply. As the water supply is directly related to pumping water, there is an increasing severity of water scarcity during load shedding. The slum dwellers claimed that they are unable to get sufficient water during heatwaves.

4.5 Impact of climatic hazards on sanitation infrastructure and services

Sanitation infrastructure systems and services in the capital city are badly affected due to the occurrence of climatic hazards. Reports suggest that only 18 per cent of the population of Dhaka city is connected to a sanitary sewerage system, 40 per cent to un-sewered septic tanks and 15 per cent to sanitary septic tanks. The remaining 27 per cent of the population who live mainly in urban slums or informal settlements do not have access to a sanitary system (Ahmed and Ashfaque, 2002). As a result of these circumstances, the inhabitants of informal settlements are victims of the impacts of having poor or no sewerage systems— and the situation only becomes harsher during climatic hazards.

In the Beguntila study site there is no sewerage system. During a rainfall event the septic tank overflows and livelihoods become impossible. Moreover, when water remains for several days, the waste spreads across the area. During such conditions the people have severe problems finding spaces to defecate, and sometimes have to defecate in the open, reinforcing the unhygienic living conditions. Khan (2010) states that during flood events affected people go to nearby water bodies to defecate, causing a severe environmental hazard. Those who go to the shelters have to queue to use a toilet. Although there is a sewerage system in the Dhalpur slum, the sufferings of the inhabitants do not differ from their counterparts in Beguntila. According to a female FGD participant of Dhalpur site:

The major problem is the poor sewerage system, if there is a small rainfall the system becomes clogged and the waste material comes out into the street and in times of waterlogging and flood the strictness knows no bounds. At that time we have to clean the sewerage line by ourselves.

4.6 Climatic hazards, water, sanitation and human health

The poor water and sanitation systems in combination with different climatic hazards cause different types of health-related problems for the inhabitants of the informal settlements in Dhaka city. During the rainy season or after rainfall, water becomes polluted and spreads waterborne diseases such as diarrhoea, cholera and dysentery, affecting children and women severely. Children are often found playing in this dirty and polluted water causing many of them to develop skin diseases.

During heatwaves, people become sick more frequently and different diseases including diarrhoea and coughs become prevalent. One of the key informants from Dhalpur slum identified incidences of death caused by heat stroke due to rising temperatures. Moreover, sudden falls in temperature also cause pneumonia in children.

According to respondents, the incidences of higher temperatures during the summer and cooler temperatures during the winter have increased. This statement is also validated by Murshed *et al.* (2011) and Mohiuddin *et al.* (2014) who suggest that in recent years there has been a change in seasonal temperatures and rainfall patterns. During the winter, temperatures are decreasing, whereas summer temperatures are increasing on average. The common diseases the community suffers from are fevers, colds, pneumonia and diarrhoea etc. Such incidences of health problems are also supported by the literature. Hashizume *et al.* (2007) state that the threshold value of rainfall was playing an important role in the number of cases of non-cholera diarrheal diseases. They observed that on average during a period of eight weeks every 10mm of increase in rainfall above the threshold value of 52mm causes a 5 per cent increase in the number of cases of diarrhoea and every 10mm reduction below that threshold value increases the rate of the same diseases by 4 per cent. Moreover, Esrey *et al.* (1991) suggest that improvements in water quality alone do not reduce the number of diarrhoea diseases if the supply of water is inadequate.

4.7 Climatic hazards, water, sanitation and gender

The outcome of the interviews and FGDs shows that women are the most vulnerable to the effects of climatic hazards. Women are mainly responsible for household activities like cooking, washing, cleaning and storage of water. In the Dhalpur slum, the sewerage pipe often becomes clogged and leaks out waste, which mixes with the inundated water over a large area creating a very bad smell. At these times, women have to perform extra cleaning duties which often cause skin diseases. In addition, children fall sick more frequently and women are responsible for looking after them. During times of acute water crises, women spend most of their time in water collection and management such as purifying. In some areas, women have to collect drinking water from the mosque. However, the mosque authorities only allow them to collect water between 12am and 4am which causes serious sleep disturbance.

In the absence of adequate toilet facilities women and adolescent girls become more vulnerable. There are no separate toilets or bathrooms for women in the slum areas. Generally, men from the community shower during the day and women have to wait for the evening to bathe, which increases their vulnerability to catching cold-related diseases. Sometimes the lack of free space and inadequate supply of water in the toilets make menstrual hygiene difficult.

Children and the disabled also suffer due to a lack of adequate water and sanitation facilities. Disabled and elderly people always need help from others to reach the community toilets. At times, the unavailability of helpers increases their suffering. Similar findings have also been observed by Rahman (2012). He described the situation as embarrassing for the women who, when using the toilets, have a queue of people waiting outside. Women feel very uncomfortable in such a situation and therefore tend to go to the latrine after 10 o'clock in the morning when the men have finished and gone to work.

It is clear from the above that the present water supply and sanitation infrastructure systems are inadequate and highly vulnerable to climate change impacts in the slum areas of Dhaka city. The inadequate supply of water and poor sanitation systems also affect human health, food consumption patterns and gender equity. However, people in these communities struggle to think about future impacts when their daily lives are already challenging.

5 Stakeholder engagement in water and sanitation

5.1 Overview of stakeholders

There was a fruitful discussion among the key experts in the water and sanitation sectors regarding the selection of key stakeholders and identifying their role in bringing resilience to the urban water and sanitation sector. The participants of the discussion agreed that the government should be the key organisation for facilitating any activities regarding urban water and sanitation improvements. To achieve sustainable results in this sector there should be two wings; one to work on policy formulation and the other to work on project implementation. As all of the proposed work would be to improve conditions for low-income groups, they should be the primary stakeholders in both wings. Also, many community-based organisations (CBOs) play a vital role in the development of informal settlements by representing their communities. CBOs should therefore also be considered as primary stakeholders.

The key findings of the discussion are presented in Figure 5. Research organisations and policymakers are secondary stakeholders whereas the media and advocacy institutions are tertiary stakeholders who will help in policy formulation. On the other hand, in the project implementation wing, project implementations agencies such as NGOs are secondary stakeholders and the private sector, donors or funding bodies are tertiary stakeholders.

5.2 Trends among stakeholders in urban water and sanitation

The research team prepared a list of stakeholders by visiting the website of the NGOs to assess which organisations are involved in water and sanitation projects and to identify who is doing what, where. There are 57 organisations working for the development of low-income groups in the capital city of Dhaka, ranging from local-level NGOs to government bodies and large international organisations. However, as the details of activities or focusing area of the organisations is not always publicly available on their websites, the mapping was not comprehensive and it was not possible to identify the details of every project and activity of those organisations. However, it was evident from the mapping that more than 60 per cent of the organisations work in the water and sanitation sector (Figure 6). However, WATSAN might not be their principle focus but they include this area as a part of livelihood development and some of the NGOs work in more than one sector. Urban WATSAN is a relatively new territory for these organisations to focus on compared to rural areas. The stakeholder consultation meeting suggested that this area has received more focus since the flood of 1988. One key informant, the representative of DSK, stated that they first began work on urban water and sanitation in 1992 in the Tejgaon industrial area of Dhaka city.

Figure 5. Overview of stakeholder types

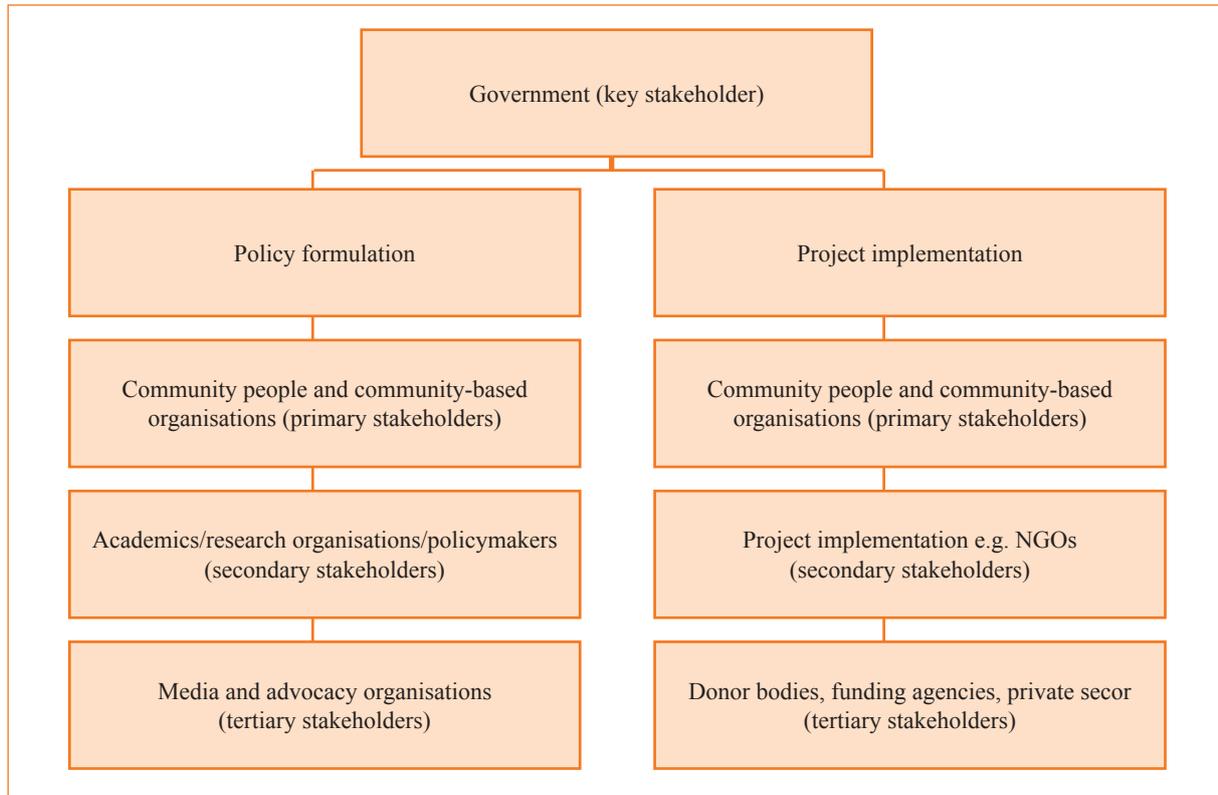
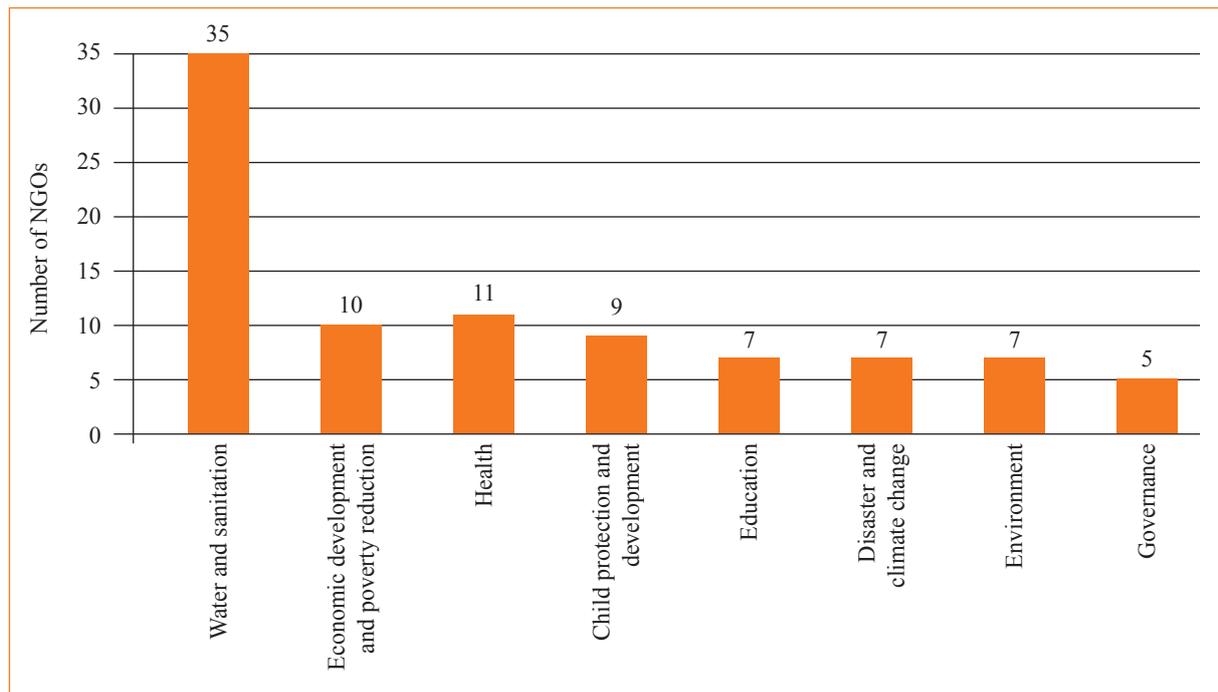


Figure 6. Sectors of organisations working with low-income groups (NGOs, government and civil society)



Apart from these, a good number of CBOs are working on water and sanitation in slums. These CBOs maintain close contact with NGOs and government organisations. Very recently, DWASA has started to provide water connections to slums through the CBOs. The CBOs are responsible for collecting the water bills from the community members. Nurul and Mohammad (2014) have identified the positive impact of these CBOs. Through them, communities are now identifying their needs and NGOs are helping them to implement the projects by themselves.

Although a large number of organisations are working on urban water and sanitation, these organisations largely focus on improving the current situation. It is evident that the population of Dhaka city is increasing rapidly as everyday people migrate here from other parts of the country to seek employment (Hossain, 2008; Sinthia, 2013). Most migrants are from lower-income groups and their destinations are informal settlements. As a result of this overpopulation, interventions by NGOs and other government bodies are seen by slumdwellers as unfruitful. Moreover, to bring resilience to the urban sector it is necessary to have a long-term plan considering population growth and the frequency of severe natural disasters.

5.3 Key organisations in urban water and sanitation sectors

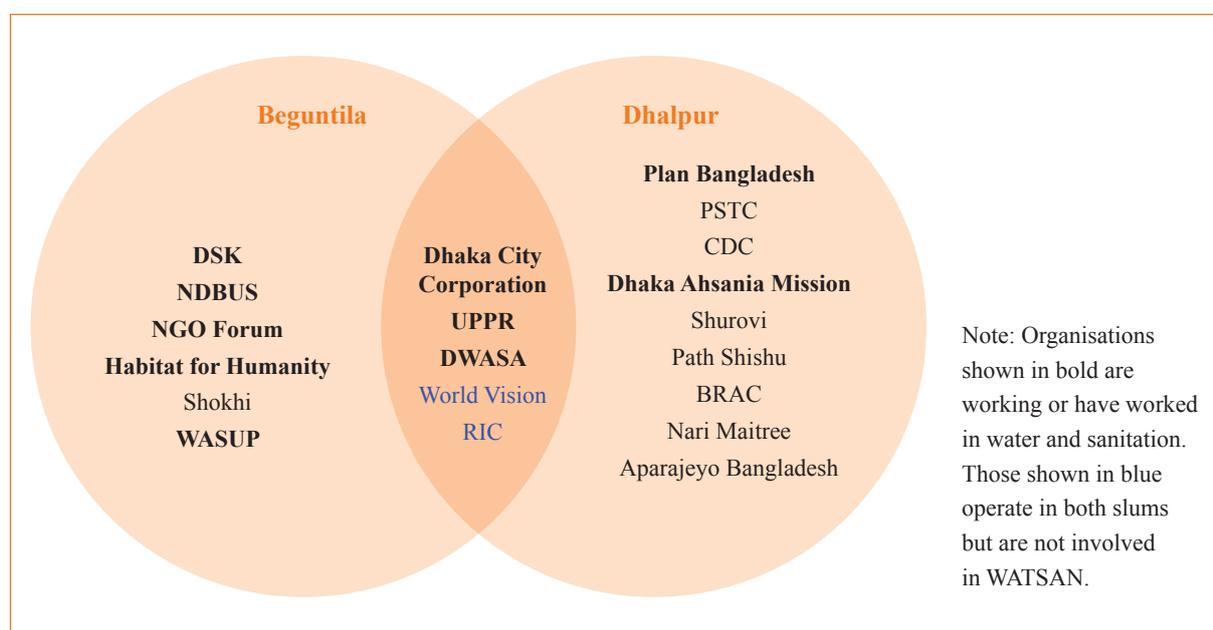
There are three organisations that are responsible for ensuring water supply and sanitation for the inhabitants of Dhaka city. They are DWASA, the Dhaka City Corporation and the Ministry of Housing and Public Works. DWASA is a semi-autonomous body responsible for ensuring the supply of safe water to its consumers, disposal of sewerage and drainage of storm water in the Dhaka city (ADB, 2008; DWASA, 2013). The Dhaka City Corporation is responsible for providing infrastructure support for water supply, sanitation and drainage facilities. In slums, it supports efforts to increase the supply of potable water for slum dwellers. It also assists in improving sanitary conditions, drainage systems and garbage disposal systems in the slums of Dhaka South City Corporation. The Ministry of Housing and Public Works initiate any policy regarding housing and land ownership. This government body is also responsible for providing low-cost housing to low- and middle-income groups. But although government is responsible and accountable, it lacks the financial and physical capacity to address water and sanitation issues. Unfortunately, it is the most marginalised low-income settlements that bear the blunt of this failure.

During the field data collection for this study, community members stated that NGOs are playing the main role of providing water and sanitation services. It was also evident that most community toilets have been constructed by NGOs, some in collaboration with government agencies. The findings of the field survey suggest that NGOs communicate with the responsible authorities of government while facilitating services for low-income groups; they take steps to ensure the slums have a water supply which is why the slum dwellers think that the NGOs play a key role. An example of successful NGO communication is that very recently the NGO Forum for Public health ensured the connection of a new piped water supply through a six-inch pipe to Beguntila slum.

5.4 Stakeholders working on water and sanitation in the study sites

The field survey identified 20 organisations working in the study sites (Figure 7). Among them, 13 are working or have worked in the water and sanitation sector of those areas. However, some organisations working in water and sanitation sectors in one of the study sites intervene in different sectors in other areas. For example, World Vision is providing support in the water and sanitation sector in Beguntila but mainly intervene with child education at Dhalpur. Similarly, the NGO Resource Integration Centre provides water support to Dhalpur where as in Beguntila they provide microcredit support. For NGOs working in the WATSAN sector, their activities mainly range from improving water and sanitation infrastructure to creating awareness among the communities and mobilising them to pay the connection charge for water pipelines if necessary. UPPR, a project jointly implemented by the Local Government Engineering Department (LGED), the UK government's Department for International Development (DfID), United Nations Development Programme (UNDP) and the United Nations Human Settlements Programme (UN-Habitat) has coverage in both of the study areas. Moreover, the Dhaka City Corporation is also working to improve water drainage facilities in both areas. Some other national NGOs who are mainly known for providing microcredit to the poor have also some interventions in the WATSAN sector. For example, Nagar Daridra Basteebashir Unnayan Sangstha (NDBUS), an NGO mostly working on microcredit, has intervened in improving sanitation facilities.

Figure 7. NGOs and other organisations working in the study sites



5.5 Challenges for implementing water and sanitation projects

NGO and government key informants identified several challenges that they faced while implementing water and sanitation projects in slum areas. The most important of these is the slum-dwellers' fear of eviction as the government has no policies for land titling or rehabilitation of the urban poor at present. There is no security of tenure for the slum dwellers living on those lands. The landowners are either the government or individuals with the right to evict slum dwellers in favour of any development activity, with negative after-effects on those evicted (e.g. Hossain, 2008; World Bank 2007; Jabeen *et al.*, 2010; Banks *et al.*, 2011). Because of the fear of eviction, slum dwellers have little interest in developing their infrastructure themselves and the installation costs for water and sewerage infrastructure are high and not affordable. Furthermore, even with a connection from the sub-pipeline, the rate of water flow is very slow.

The second challenge faced by these stakeholders is to do with legal rights to land. According to DWASA regulations, to get a water and sewerage connection an applicant must have a holding number for the proposed place of connection, and this holding number can only be held by the landowner. However, DWASA have changed their regulations very recently in consideration of the present status of slum dwellers. The regulation states that 'along with the rules and regulation the authority can provide connection of water and sewerage line to slums considering basic needs of human health and eradication of poverty' (Government of Bangladesh, 2010). However, according to statements made by community members and other stakeholders, it is not an easy process to get a water connection despite this regulation.

The third challenge arises from the power structure of the local community. It is very difficult to manage powerful people and local 'mastans'.³ Moreover, there are some people with illegal water businesses (they sell water to the community at a very high cost), which hinders the implementation of water and sanitation projects.

5.6 Positive impacts of implemented projects

There are 13 organisations in the study sites working to improve water and sanitation and focusing on low-income groups. As a result of interventions by these organisations, much development has been taking place. According to one key informant, an official of DSK,

When we started our project in the Beguntala slum in the year 2004, there were a few un-functioning sanitary latrines and people depended mostly on the hanging latrines. We have constructed three new community-based latrines and repaired the un-functioning toilets. Now the situation is better comparing to the year 2004.

In addition to the increased number of toilets, the most positive outcome is the improved awareness of the people. People are now aware of health and hygiene and their desire for a healthier life has increased. People are now washing with soap after returning from the toilet. According to the opinion of the stakeholders, the number of incidences of water-borne disease has decreased. Mothers have more time to look after their children and know more about child healthcare.

At the time of implementing a project, the NGOs organise a committee including local people. **Water**, sanitation and hygiene (WASH) committees play a key role in managing water and sanitation in slum area. In addition to this, women have been empowered to become members of WASH committees, allowing them to describe the problems their areas face. The activities of these committees are helping to develop leadership skills among slum dwellers.

³ Mastans are organised crime syndicates similar to the Mafia.

Table 1. Brief description of the projects in the two study sites

Name of organisation	Activities	Area
Urban Partnership for Poverty Reduction (UPPR)	Construction of water reservoir	Dhalpur and Beguntila
	Construction of community-based toilets	Dhalpur and Beguntila
	Repayments of old toilets	Dhalpur
	Construction of slabs over drains	Dhalpur
Plan International Bangladesh	Water and sanitation awareness	Dhalpur
Dhaka City Corporation (North and South)	Construction of sewer line	Dhalpur
	Construction of drainage line	
	Construction of tube wells	
	Construction of six toilets	Beguntila
Population Services and Training Centre (PSTC)	Construction of water tank	Dhalpur
	Construction of community-based toilets	
	Construction of water connection line	
Dhaka Ahsania Mission	Water and sanitation awareness	Dhalpur
	Construction of community-based toilets	
Shuravi	Water and sanitation awareness	Dhalpur
Dhaka WASA	Providing a water connection	Dhalpur and Beguntila
Dushtha Shasthaya Kendra (DSK)	Construction and repair of toilets	Beguntila
	Construction of water reservoir	
Nagar Daridra Basteebashir Unnayan Sangstha (NDBUS)	Repairing drains	Beguntila
	Construction of toilet	Beguntila
World Vision and Habitat for Humanity(collaboratively)	Construction of toilets	Beguntila
	Construction of water reservoirs and roads	
NGO Forum for Public Health	Construction of water tank	Beguntila
	Establishment of water connection pipeline	
Water and Sanitation for the Urban Poor (WSUP)	Development of drainage line	Beguntila
	Construction of toilet	

Source: Field survey (2015)

5.7 Stakeholder perceptions of the likely impacts of climate change

Regarding the likely impact of climate change, the NGOs and government respondents stated that they only considered previous flood levels while constructing any new water or sanitation infrastructure. A representative from WaterAid explained that,

WaterAid is working considering their guidelines that have been formulated in the context of climate change. But the guidelines cannot be fully maintained in Dhaka city because of the lack of space. For being climate resilient it is required to have a long-term plan which is not possible in Dhaka. But we try to construct toilets in a high place considering the previous level of floods.

Several authors suggest that it is necessary to have commitment from the government to achieve progress in the water and sanitation sector especially in informal settlements (Mwangi, 2000; Newborne, 2008). This also would be true for bringing resilience measures into the urban water and sanitation sector. In the case of Dhaka, one major problem is the lack of legal land rights for urban slum dwellers. This problem is hindering stakeholders in making any long-term action plan. That is why none of the projects consider long-term impacts. According to one key informant, a representative from the Dhaka North City Corporation,

We do not perform our task considering the likely impact. To do that we need to have support from the government by including the slum dwellers in the master plan and the people have to have the legal rights of their land. The slums in Dhaka city are not legal. And the slums are not included in the master plan of RAJUK [Rajdhani Unnayan Kartipakkha, Capital Development Authority of Bangladesh].

The discussion in this chapter identifies some specific sectors of work which are important for bringing resilience. Land tenure is a key development issue for the urban poor. NGOs can play a vital advocacy role in communicating with government about this issue. Moreover, the National Adaptation Programme of Action (NAPA) of Bangladesh published by the Ministry of Environment and Forests (MoEF) in 2005 does not highlight the issue of climate resilience in urban areas. Similarly, the national policy for safe drinking water and sanitation issued in 1998, the national sanitation strategy issued in 2005, and the pro-poor strategy for the water and sanitation sector issued in 2005 do not offer any opportunities to include aspects of climate change. NGOs and other stakeholders can play an important role here by advocating for modifications to the policies or undertaking new policy initiatives.

6 Multi-stakeholder collaboration and climate resilience

6.1 Status of stakeholder collaboration

The field work identified only project-based collaborations among stakeholders and communities. When an NGO initiates any project with other partners they collaboratively maintain some steps:

- Make an assessment of the area
- Prioritise needs
- Ensure citizen voices in action (raising awareness)
- Organise stakeholder meetings
- Divide activities on the basis of the component
- Develop an action plan
- Form WASH committees, and
- Implement the project and follow up.

Collaborating with partners like this has made these projects successful and they have been completed on time. The national policy adviser for the Bangladesh Urban Forum (BUF) describes some key points of a successful collaboration (Box 1) from his experience which was implemented in the capital city after the flood in 2004.

Box 1. Key points for a successful collaboration

- BUF included all the project partners and implementing agencies from the starting phase of the project. The stakeholders took part from the design phase of the project which is why they were aware of every component and activity of the project.
- When the project was initiated, DWASA was informed from the beginning, and this information helped them in implementing the project despite their low working capacity.
- The project team invited all local people and especially local ward commissioners to participate in the project planning and invited them to attend all meetings. As a result of this strategic planning, local leaders were very helpful.
- They distributed the work according to the management plan from the very first steps of the project.
- Though the role of Dhaka Electric Supply Company Ltd (DESCO) was to only supply power, the project team involved them from the very beginning of the project.
- They motivated community members to pay for the services.

To implement project activities, partners arranged at least monthly meetings involving community members, who submitted the status of their assigned tasks. Moreover, they also discussed and finalised work plans for the coming months. To implement projects in the water and sanitation sector it is necessary to have support from the government and especially DWASA and the city corporation. This is why they also involved representatives from those organisations. During the monthly meetings, stakeholders shared their experiences in working with the partner organisations to smoothly run their activities to schedule. After successfully implementing the project they shared the results and their achievements with other organisations.

6.2 Positive aspects of collaboration

All the stakeholders who took part in this study expressed their positive experiences while working in collaboration with other organisations. But this type of collaboration is mostly based on partnerships between similar organisations. One of the most important benefits of stakeholder collaboration is to reduce the chance of overlapping. When multiple stakeholders work together, the representatives of the partner organisations can share their ideas, thoughts, knowledge and working procedures which ensures the maximum use of resources, enhances communication and networking and brings diversity to the work. Moreover, this collaboration also helped the NGOs in their mandate to approach government. When different organisations collectively seek to modify or change any policy it is always beneficial if the government helps them. In addition, collaborations can bring about positive policy dialogues in areas that require policy or even legal reform. Representatives can also bring evidence-based experiences to promulgate for necessary policy change. According to the representative of WaterAid Bangladesh,

When there are multiple stakeholders under the same umbrella obviously the opportunity will increase. The research organisation will perform their research, the planners will plan a sustainable way, donors will arrange the funding and implementing agencies will implement the projects. So, it is possible to have a sustainable result.

6.3 Limitations of collaboration

Sometimes working in collaboration can be time consuming because obtaining the consent of partners affects the working schedule. Differences in the financial year of partner organisations have an impact on the work. Sometimes, one organisation may achieve approval for an action but has to wait for the approval of its partners. Working procedures or the attitudes of some employees can cause problems at times, but the NGO representative also argued that these can be overlooked. In addition, inadequate accountability from some stakeholders can be a significant limitation to collaboration.

6.4 Improvements to multi-stakeholder collaboration for urban climate resilience

Since government organisations are responsible for maintaining water and sanitation services in Dhaka city, it is the responsibility of the government to play a key role in implementing resilience. To make the city climate resilient and ensure development, it is necessary to have an all-round effort from all stakeholders ranging from communities to government, NGOs, policymakers and advocacy and research institutions. Therefore, there should be policy and working guidelines formulated by the government. Participants of a recent roundtable discussion highlighted that there is no particular urban sector policy for the country.⁴ Also, the water and sanitation policy does not consider the issue of climate change. The participants also indicated that a lack of interlinkages among different policies hinders initiatives from running smoothly.

At present, NGOs are playing a vital role in intervening for the development of low-income groups. Sometimes they collaborate with other NGOs to complete a project successfully or approach the government for any necessary intervention. However, these activities are short term and based on projects. In addition to these, NGO strategies can also change rapidly with changing donor requirements. Hence, NGO activities are only successful in the short term.

One recommendation is to ensure a very positive collaboration between different government agencies. Different sources and the FGDs identified that a lack of coordination among the three government bodies (Dhaka City Corporation, DWASA and the Ministry of Housing and Public Works) is also hindering the process of achieving climate resilience and urban development. The recommended project cycle is given in Figure 8.

To ensure climate resilience in the urban water and sanitation sector, the following steps should be followed:

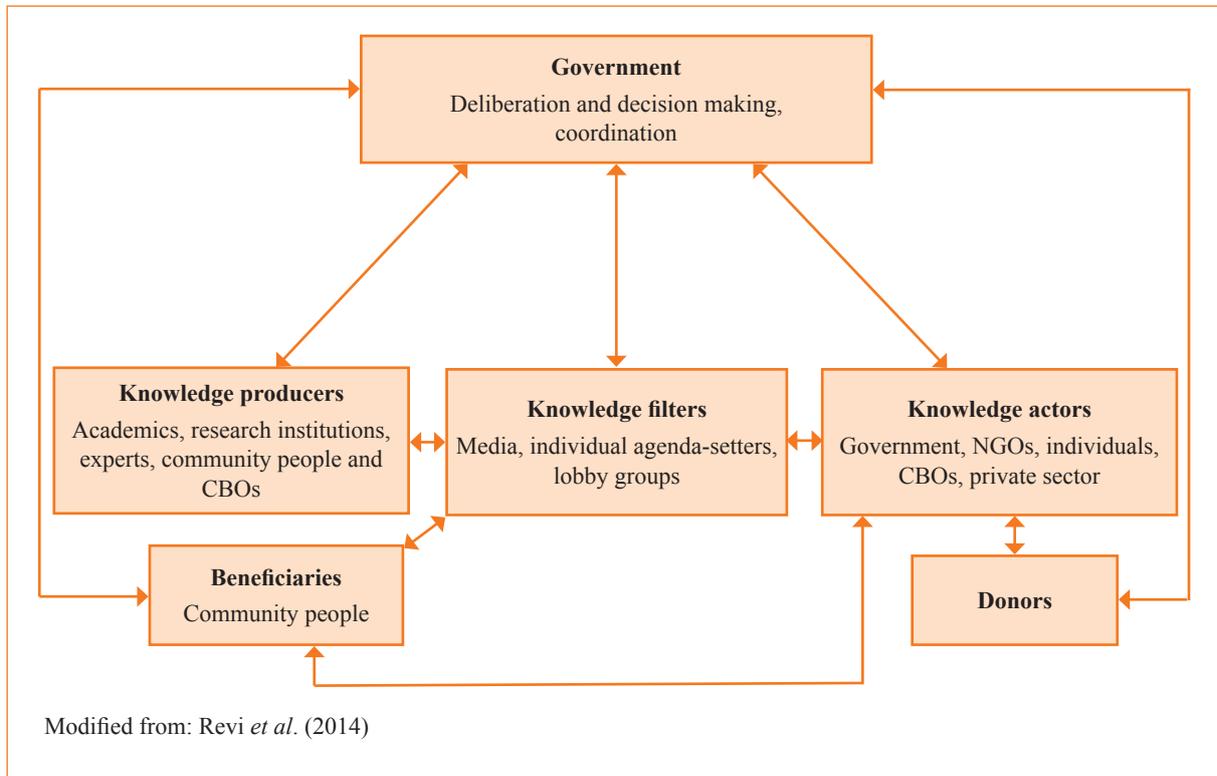
Firstly, **national government** must formulate a group to coordinate the work where the responsibilities of every actor should be outlined. This coordinating group should act as the backbone organisation to determine the responsibility of all the stakeholders. By the actions of this group, coordination among the key government agencies (DWASA, Dhaka City Corporation, Ministry of Housing and Public Works etc.) will be increased. Resilience also means retrospective maintenance of existing infrastructure and this group must ensure this point also. **Government policymakers** and other stakeholders should develop a policy with long- and short-term strategic action plans by consulting with all relevant stakeholders, experts and advisors etc. This group should ensure interlinkages between different policies by revising them. Policymakers are also responsible for addressing the issue of climate change in all policies.

Secondly, **research organisations and academics** should conduct research, including understanding the potential future impact of climate change by considering historical and projected data and considering the present infrastructure and coping capacities of low-income groups. **Media and lobbying groups** have a role to play in communicating scientific findings to local communities, policymakers and other stakeholders.

Thirdly, the **private sector** should play a key role in the development of Bangladesh. They should be included as stakeholders as industrial waste is disposed into rivers and then spreads during flooding or waterlogging. Also,

⁴ The roundtable discussion took place 17 May 2015 at The Daily Star Bhaban with representatives from government, NGOs, IIED, ICCCAD and participants of the urban climate change training programme organised by IIED and ICCCAD.

Figure 8. Diagram of stakeholder collaboration for bringing resilience to the urban sector



the private sector employs people living in informal settlements as labour, so it is important for those people to be healthy. Furthermore, a good number of projects for the improvement of water and sanitation have been completed but development has not yet happened. Analysis of those implemented projects might provide quality information which will provide guidance on how to plan successful project initiatives.

Fourthly, to play a key role in urban climate resilience **NGOs** must have a long-term strategic plan. By initiating a long-term strategic plan they can form a platform in collaboration with other NGOs who are working in different sectors. This platform of NGOs should lobby government about different demands for improving plans with time to ensure the flexibility of resilience planning. Representation in urban policy dialogues could ensure the process is run smoothly. Government can be supported by researchers and academics. NGOs also have the capacity to mobilise slum dwellers quickly and efficiently. Urban climate resilience could be achieved within the short term if the capacity of CBOs was also developed quickly. Here, NGOs can play a vital role in building CBO capacity through proper mobilisation and training until the CBOs are able to arrange their finance themselves. They can also act as a bridge between the communities and policymakers.

Lastly, monitoring and evaluation is a very important part of project cycle management. The coordination group should be able to evaluate the limitations and successes of every activity. This could be done by NGOs or donors can monitor directly. This action will be helpful for developing the strategic action plan further.

After formulation of the guidelines and plans, NGOs can develop collaborations among themselves in the usual way but they would have to report their every activity to the coordinator so that follow-up can be ensured. Moreover, this will also reduce the chance of duplicity. A representative from WaterAid suggested some key points for developing collaboration among project partners:

The project should have clear objectives. Areas of interest should be the same. All partners should be involved from the early stage of the project. If possible include all the partners from the designing phase of the project. It is even better to design the project jointly.

7 Conclusion

The findings of the study make it clear that the inhabitants of the slums in Dhaka are living below government standards for water and sanitation although the situation does vary from slum to slum. Their suffering is enhanced during periods of climatic disaster like waterlogging, flooding and heatwaves. As a result of these disasters, women and children become more vulnerable and disease spreads due to the lack of adequate drainage and sewerage facilities.

Most slum dwellers are aware of climate change, mentioning that they have observed changes in current weather patterns, for example, or variations in temperature compared to the past, or a shift in rainfall occurrences. There is a fear that extreme events like the floods of 1998 and 2004 could reoccur and would damage their homes and other infrastructure in their community.

Various organisations like NGOs and government bodies are working for the betterment of slum dwellers, but their efforts are inadequate. The present study identifies 35 organisations working for the improvement in water and sanitation conditions for slum dwellers in Dhaka city. Sometimes, the NGOs work collaboratively between themselves and even with government. Although a large number of organisations are working in the urban water and sanitation sector, these organisations largely focus on improving the current situation. Yet the population of Dhaka city is increasing rapidly as everyday people migrate from other parts of the country to seek employment. Most migrants are from lower-income groups and their destination is the informal settlements. As a result of this over population, the interventions undertaken by NGOs and other government bodies are seen as inadequate.

In addition, to bring resilience to the urban sector it is necessary to have a long-term plan considering population growth and the frequency of severe natural disasters. There is a need for proper urban climate resilience policies, as sometimes the hard work put in can count for nothing. The slums are not part of the government's master plan; whether the landowner is the government or a private owner, they have the right to evict the slums at any time. This is the one of the main obstacles to having and implementing any long-term plan for developing water and sanitation infrastructure. At present, all the organisations are only working to improve the present situation. To make a resilience plan work, it is necessary to lobby for land tenure security, citywide mitigation against flooding, and urban planning tools to stop land grabbing.

According to the current policy of the government of Bangladesh, three government organisations are responsible for ensuring water and sanitation for the inhabitants of Dhaka city. But lack of coordination among those organisations and lack of finance and manpower have hindered their activities. And although different NGOs have come forward to fill the gaps, most of their work is project based and they terminate their intervention after completion of a project. After a disaster situation like waterlogging or floods, slum infrastructures become dysfunctional due to the absence of any proper maintenance.

One major way to improve these situations is to take action involving all stakeholders in a sustained collaborative process. At present, the NGOs maintain project-based partnerships with other NGOs and government. Very rarely do other key organisations like research instituted or the media become involved in these collaborations. To develop the water and sanitation facilities for low-income groups, keeping in mind the future impacts of climate change, it is necessary to have multi-stakeholder collaborations. In these types of collaboration, the government needs to play a key role by formulating policies, guidelines and taking strategic action to bring resilience to urban areas. Research organisations should identify the needs and actions to prioritise. The media and advocacy groups should translate scientific information for local communities and the government. NGOs can also advocate for policy amendment or new policy initiatives.

It has been clear that due to the lack of infrastructure and financial capacity, the government is not currently able to play a key role. That is where the private sector and NGOs can help. NGOs have to change their current policies and must have a long-term strategy. They can further strengthen and evolve current NGO platforms or government-formed management groups to bring resilience issues closer to the government's attention and garner its support. NGOs can build on relationships that they have built through project-based collaborations and convert them into a more comprehensive, focused and sustained platform. When any organisations or NGOs begin an intervention they need to follow the guidelines outlined by the government. Finally, focusing on only low-income groups will not make a city resilient. An integrated approach is required, covering all groups, for building climate-resilient cities.

References

- Adam, L., James T. and Wanjira, A.M. (2007) Frequently asked questions about multi-stakeholder partnerships in ICTs for development: a guide for national ICT policy animators. Association for Progressive Communication. See: www.apc.org/en/system/files/catia_ms_guide_EN-1.pdf
- Ahasan, M.N., Chowdhury, M.A.M. and Quadir, D.A. (2011) Simulation of a heavy rainfall event on 14 September 2004 over Dhaka, Bangladesh using MM5 model. *Journal of Scientific Research* 3(2) 261–270.
- Ahmed, M.F and Ashfaque, K.N. (2002) Sanitation and solid waste management in Dhaka city during the 1998 flood. In: Ali *et al.* (eds) Engineering concerns of flood. Bangladesh University of Engineering Technology (BUET), Dhaka, Bangladesh, 1–13. See: <http://salekseraj.com/Page1-Feroze-Paper.pdf>
- Ahmed Sinthia, S. (2013) Sustainable urban development of slum prone area of Dhaka City. *World Academy of Science, Engineering and Technology* 7. See: <http://waset.org/publications/9759/sustainable-urban-development-of-slum-prone-area-of-dhaka-city>
- Alam, M. and Rabbani, M.D.G. (2007) Vulnerabilities and responses to climate change for Dhaka. *Environment and Urbanization* 19(1), 81–97. See: <http://eau.sagepub.com/content/19/1/81>
- Ashley, R., Blanksby, J., Newman, R., Gersonius, B., Poole, A., Lindley, G., Smith, S., Ogden, S. and Nowell, R. (2012) Learning and action alliances to build capacity for flood resilience. *Journal of Flood Risk Management* 5(1), 14–22.
- ADB (2008) People’s Republic of Bangladesh: strengthening the resilience of the water sector in Khulna to climate change. Technical Assistance Report, project number 42469, Asian Development Bank.
- ADB (2011) People’s Republic of Bangladesh: strengthening the resilience of the urban water supply, drainage, and sanitation to climate change in coastal towns. Technical Assistance Report, project number 45519, Asian Development Bank. See: www.adb.org/sites/default/files/project-document/60695/45519-001-ban-tar.pdf
- Baker, J.L. (2012) Climate change, disaster risk and the urban poor: cities building resilience for a changing world. Urban Development Series, Washington: World Bank.
- Banks, N., Roy, M., and Hulme, D. (2011) Neglecting the urban poor in Bangladesh: research, policy and action in the context of climate change. *Environment and Urbanization* 23(2), 487–502. See: <http://eau.sagepub.com/content/23/2/487>
- Biplob, P., Sarker, D.C. and Sarker, R.C. (2011). Assessment of water supply and sanitation facilities for Korail Slum in Dhaka City. *International Journal of Civil and Environmental Engineering (IJCEE-IJENS)* 11(05), 100–106.
- Brown, A., Dayal, A. and Rumbaitis, C. (2012) From practice to theory: emerging lessons from Asia for building urban climate change resilience. *Environment and Urbanization* 24(2), 531–556. See: <http://eau.sagepub.com/content/24/2/531.abstract>
- Carvalho, A. and Burgess, J. (2005) Cultural circuits of climate change in UK broadsheet newspapers, 1985–2003. *Risk Analysis* 25(6), 1457–1469.
-

- Da Silva, C.W. and Magara, P. (2013) Interview: from project-based to institutionalised multi-stakeholder learning in the water sanitation and hygiene sector: experience from Uganda. *Knowledge Management for Development Journal* 9(3), 167–173.
- Da Silva, J., Kernaghan, S. and Luque, A. (2012) A systems approach to meeting the challenges of urban climate change. *International Journal of Urban Sustainable Development* 4(2), 125–145.
- DWASA (2013) 50 years of Dhaka WASA: annual report 2012–13, Dhaka Water Supply and Sewerage Authority.
- DSK (2012) Evidence towards eradication of extreme poverty at the slums in Dhaka city. Dushtha Shasthya Kendra. See: www.dskbangladesh.org/shiree/Evidance_DSK_Shiree.pdf
- Esrey, S.A., Potash, J.B., Roberts, L. and Shiff, C. (1991) Effects of improved water supply and sanitation on ascariasis, diarrhea, dracunculiasis, hookworm infection, schistosomiasis and trachoma. *Bulletin of the World Health Organization* 69(5), 609–621.
- Fadeeva, Z. (2004) Promise of sustainable collaboration– potential fulfilled. *Journal of Cleaner Production* 13, 165–174.
- Gasper, R., Blohm, A. and Ruth, M. (2011) Social and economic impacts of climate change on the urban environment. *Current Opinion in Environmental Sustainability* 3(3), 150–157.
- Government of Bangladesh (2010) Gazette for the Dhaka Water Supply and Sewerage Authority, Published on July 27, 2010.
- Hanelybrown, F., Kania, J., Kramer, M. (26 January 2012) Channeling change: making collective impact work. *Stanford Social Innovation Review*, 1–8. See: <http://tinyurl.com/hanelybrown-et-al-2012>
- Hardoy, J.E., Mitlin, D. and Satterthwaite, D. (2001) Environmental problems in an urbanizing world. London: Earthscan.
- Hashizume, M., Armstrong, B., Hajat, S., Wagatsuma, Y., Faruwu, A.S. and Hayashi, Y. (2007) Associations between climate variability and hospital visits for non-cholera diarrhea in Bangladesh: effects and vulnerable groups. *International Journal of Epidemiology* 36(5), 1030–1037.
- Hoque, S., Tasmiah, S., Ferdous, T., Karim, U. and Khan, F.J. (2013) Condition of basic services, water supply, sanitation and waste management in slums of Dhaka city: an assessment. Undergraduate thesis submitted to the Department of Civil Engineering, Ahsanullah University of Science and Technology, Dhaka, Bangladesh.
- Hossain, D., Jahan, N., Hossain, M.I., Akhter, K., Islam, I. and Sharmeen, N. (2013) PRA: a tool to address WatSan issues and achieve the standard in low-income settlements– an empirical study on a Dhaka slum. *Journal of Bangladesh Institute of Planners* 6, 73–85.
- Hossain, H. (2008) Rapid urban growth and poverty in Dhaka city. *Bangladesh e-Journal of Sociology* 5(1), 1–24.
- Hossain, S. (2013) Migration, urbanization and poverty in Dhaka, Bangladesh. *Journal of the Asiatic Society of Bangladesh (Hum.)*, 58(2), 369–382. See: www.asiaticsociety.org.bd/journal/10ShahadatHossain.pdf
- Huq, S., Kovats, S., Reid, H. and Satterthwaite, D. (2007) Editorial: reducing risks to cities from disasters and climate change. *Environment and Urbanization* 19(1), 3–15. See: <http://eau.sagepub.com/content/19/1/3.full.pdf>
- IFRC (2010) World disasters report 2010: focus on urban risk. Geneva: International Federation of Red Cross and Red Crescent Societies. See: www.ifrc.org/en/publications-and-reports/world-disasters-report/wdr2010
- Ishtiaque, A. and Ullah, M.S. (2013) The influence of factors of migration on the migration status of rural-urban migrants in Dhaka, Bangladesh. *Journal of Studies and Research in Human Geography* 7(2), 45–52.
- Islam, R. (2013) Dhaka’s coming water crisis. NRC National Resource Centre. See: www.ngof.org/nrc/page/latestnews294.php
- Jabeen, H., Johnson, C. and Allen, A. (2010) Built-in resilience: learning from grassroots coping strategies for climate variability. *Environment and Urbanization* 22(2), 415–431. See: <http://eau.sagepub.com/content/22/2/415>
-

- Karner, S., Watts, J. and Frison, E. (2008) Participatory decision-making: the core of multi-stakeholder collaboration. Institutional Learning and Change (ILAC) brief. See: www.cgiar-ilac.org/files/ILAC_Brief19_Participatory_decision.pdf
- Kernaghan, S. and Da Silva, J. (2014) Initiating and sustaining action: experiences building resilience to climate change in Asian cities. *Urban Climate* 7, 47–63.
- Khan, A.N.M.M. (2010) Impact of climate change on the livelihood of the urban poor: a case study of Dhaka city. Master's thesis submitted to the Department of General and Continuing Education, North South University, Bangladesh.
- Khan, S.P. (2007) An exploratory study of slum development projects in Dhaka city: a case study of UBSDP and WATSAN. Master's thesis submitted to the BRAC Development Institute, BRAC University.
- Kirshen, P., Ruth, M. and Anderson, W. (2008) Interdependencies of urban climate change impacts and adaptation strategies: a case study of Metropolitan Boston USA. *Climatic Change* 86(1), 105–122.
- Krawchuk, F. (2013) Multi-stakeholder collaboration how government, business and non-government leaders transform complex challenges into new possibilities. A One Earth Future research report. See: <http://tinyurl.com/krawchuk-2013>
- Leichenko, R. (2011) Climate change and urban resilience. *Current Opinion in Environmental Sustainability* 3(3), 164–168.
- Leiserowitz, A. (2006). Climate change risk perception and policy preferences: the role of affect, imagery, and values. *Climatic Change* 77(1) 45-72. See: <http://environment.yale.edu/climate-communication/files/LeiserowitzClimaticChange.pdf>
- Meadowcroft, J. (1999) Cooperative management regimes: collaboration problem solving to implement sustainable development. *International Negotiation* 4, 225–254.
- Melhus, P. and Paton, B. (2012) The paradox of multi-stakeholder collaborations: insights from sustainable Silicon Valley's regional CO₂ emissions reducing program. *Journal of Environmental Sustainability* 2(2), 29–44.
- MoEF (2005) National Adaptation Programme of Action (NAPA). Ministry of Environment and Forests, Government of Bangladesh. See: <http://unfccc.int/resource/docs/napa/ban01.pdf>
- Moench, M., Tyler, S. and Lage, J. (2011) Catalyzing urban climate resilience: applying resilience concepts to planning practice in the ACCCRN Program (2009–2011). Institute for Social and Environmental Transition, International (ISET-International). See: <http://i-s-e-t.org/resources/major-program-reports/catalyzing-urban-climate-resilience.html>
- Mohiuddin, H., Bhuiya, M.M.R. and Al Mamun, M.M. (2014) An analysis of the temperature change of Dhaka city. Proceedings of 5th International Conference on Environmental Aspects of Bangladesh (ICAEB, 2014), BUET, Dhaka, September 5-6, 2014. See: www.academia.edu/9461618/An_Analysis_of_the_Temperature_Change_of_Dhaka_City
- Mowla, Q.A. and Islam, M.S. (2013) Natural drainage system and water logging in Dhaka: measures to address the problems. *Journal of Bangladesh Institute of Planners* 6, 23–33. See: www.bip.org.bd/SharingFiles/journal_book/20140918130707.pdf
- Muller, M. (2007) Adapting to climate change: water management for urban resilience. *Environment and Urbanization* 19(1), 99–113. See: <http://eau.sagepub.com/content/19/1/99>
- Murshed, S.B., Islam, A.K.M.S. and Khan, M.S.A. (2011) Impact of climate change on rainfall intensity in Bangladesh. Third International Conference on Water and Flood Management (ICWFM2011, BUET, Dhaka, 8–10 January 2011. See: <http://tinyurl.com/murshed-et-al-2011>
- Mwangi, S.W. (2000) Partnerships in urban environmental management: an approach to solving environmental problems in Nakuru, Kenya. *Environment and Urbanization* 12(2), 77–92. See: <http://eau.sagepub.com/content/12/2/77.abstract>
- Newborne, P. (2008) Sanitation and the MDGs: making the politics work. ODI Opinions 109 (September 2008). Overseas Development Institute, UK. See: www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/2746.pdf
- Nurul, S. H., Mohammad, I.T., (2014) State of water governance in Dhaka Metropolitan city of Bangladesh: Evidence from three selected slums. *International Journal of Interdisciplinary and Multidisciplinary Studies* Vol 1(2), 19-38

- Pelling, M. (2011). *Adaptation to climate change: from resilience to transformation*. Routledge.
- Rabbani, G., Rahman, A.A. and Islam, N. (2011) Climate change implication for Dhaka city: a need for immediate measures to reduce vulnerability. In: Zinnernann, K.O. (ed.) *Resilient cities: cities and adaptation to climate change-proceedings of the global forum*, Springer Netherlands, 531–541.
- Rahman, M.M. (2012) Sanitation interventions in the urban informal settlements of Bangladesh: the role of government, NGOs and the grassroots. PhD thesis submitted to the Department of Geography, Durham University.
- Revi, A., Satterthwaite, D., Aragón-Durand, F., Corfee-Morlot, J., Kiunsi, R.B.R., Pelling, M., Roberts, D.C. and Solecki, W. (2014) Urban areas. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press. See: www.ipcc.ch/report/ar5/wg2/
- Satterthwaite, D., Huq, S., Pelling, M., Reid, H. and Lankao, P.R. (2007) Adapting to climate change in urban areas: the possibilities and constraints in low-and middle-income nations. IIED. See: <http://pubs.iied.org/10549IIED.html>
- Sinthia, S.A. (2013) Sustainable urban development of slum prone area of Dhaka city. *World Academy of Science Engineering and Technology*75, 393–400.
- Srivastava, P. and Hopwood, N. (2009) A practical iterative framework for qualitative data analysis. *International Journal of Qualitative Methods*8(1), 76–84.
- The Daily Star (24 April 2014) Dhaka records highest temperature in 54 years. See: www.thedailystar.net/dhaka-records-highest-temperature-in-54-yrs-21427
- Tyler, S., Reed, S.O., Macclune, K. and Chopde, S. (2010). Planning for urban climate resilience: framework and examples from the Asian Cities Climate Change Resilience Network (ACCCRN). *Climate Resilience in Concept and Practice: ISET Working Paper 3*, ISET. See: <http://i-s-e-t.org/resources/working-papers/climate-resilience-paper-3.html>
- UN-Habitat (2011) *Cities and climate change: global report on human settlements 2011*. See: <http://unhabitat.org/books/cities-and-climate-change-global-report-on-human-settlements-2011>
- UNICEF (2008) Sanitation, hygiene and water supply in slums. See: www.unicef.org/bangladesh/URBAN_Water_Sanitation_and_Hygiene.pdf
- UNICEF (2010) Understanding urban inequalities in Bangladesh: a prerequisite for achieving Vision 2021. UNICEF, Bangladesh. See: www.unicef.org/bangladesh/Urban_paper_lowres.pdf
- UNICEF (2011) Urban water challenges in Bangladesh. See: www.unicef.org/bangladesh/Urban_water_challenges_in_Bangladesh.pdf
- UNISDR (2009) *Global assessment report on disaster risk reduction 2009 – risk and poverty in a changing climate: invest today for a safer tomorrow*. See: www.preventionweb.net/english/hyogo/gar/report/index.php?id=9413
- World Bank (2007) Dhaka: improving living conditions for the urban poor. Bangladesh Development Series 17. See: <http://documents.worldbank.org/curated/en/2007/04/7606435/bangladesh-dhaka-improving-living-conditions-urban-poor>
- WWF (2009) *Mega-stress for mega-cities: a climate vulnerability ranking of major coastal cities in Asia*. See: http://assets.panda.org/downloads/mega_cities_report.pdf
- Yahya, S.M., Shams, S., Islam, A.K.M.S. and Mahmud, K. (2010) Climate change impact on flood vulnerability for Dhaka city. *Proceedings of International Conference on Environmental Aspects of Bangladesh (ICEAB10)*, Japan, September 2010, 37–39. See: <http://benjapan.org/iceab10/7.pdf>
-

Annex 1. Stakeholder mapping

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
1.	Assistance for Slum Dwellers (ASD)	Education and employment generation	Development of Children at High Risk (DCHR) Project, Dhaka	January 2012 to December 2013	Mohammadpur, Dhaka
		Vulnerable adolescent girls' rights	Happy Home Project (Centre for Deprived and Vulnerable Adolescents Girls in DCC)	November 2006 to October 2012	Mohammedpur, Lalbagh, Sutrapur, Mughda, Karwanbazar
		Economic development	Micro Finance Programme for Urban Poor (MFPUP)	2008 onwards	Mohammadpur, Dhaka
		Health	Dhaka Urban Comprehensive Eye Care Project (DUCECP)	May 2012 to September 2013	Mohammedpur, Karwnbazar, Lalbag, Sutrapur, Mughda
		Gender Empowerment	JAGORON - Empowering Working Children to Sustain and Enjoy Their Rights	December 2012 to 30 June 2015	Kamrangirchar and Lalbagh under Dhaka City Corporation
2.	Young Power in Social Action (YPSA)	Health	HIV/AIDS Prevention Services for Street-Based Sex Workers and Their Clients, Package #SP-2	November 2012 to November 2015	Cocacola Road, Baridara, Dhaka
3.	Resource Integration Centre (RIC)	Gender and Development	Basic Education for Hard-To-Reach Urban Working Children (BEHTRUWC) Project (2nd Phase)	July 2004 to June 2009	Dhaka, Chitttagang, Shylet, Khulna, Barisal, Rajshahi
		Governance	Targeted citizen initiatives to address the identified problems relating to human security and basic services in Dhaka city	March 2005 to February 2008	25 wards of Dhaka City Corporation
4.	BRAC	Health	Manoshi	Since 2007	Dhaka City Corporation
		Water supply, sanitation and hygiene	Water Supply, Sanitation and Hygiene Programme	-	152 districts in Bangladesh

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
5.	United Nations Development Programme (UNDP)	Poverty reduction, water and sanitation	Urban Partnerships for Poverty Reduction (UPPR)	November 2007 to March 2015	Narayanganj, Gopalganj, Khulna City Corporation, Bogra, Kushtia, Barishal City Corporation, Sirajganj, Hobiganj, Chittagong City Corporation, Mymensingh, Rajshahi City Corporation, Tongi, Rangpur, Jessore, Comilla, Dinajpur, Capainawabganj, Tangail, Savar, Gazipur, Naogaon, Sylhet, Dhaka City Corporation (North and South).
			National Social Protection Strategy	August 2012 to July 2013	Bangladesh (all regions)
			Support to Inclusive and Sustainable Planning	June 2013 to December 2016	
		Democratic governance	Police Reform Programme Phase 2	October 2009 to September 2014	
			Strengthening Election Management in Bangladesh (SEMB)	April 2011 to March 2016	
			Judicial Strengthening	January 2012 to December 2014	Dhaka, Rangamati and Kishoregonj
			Bangladesh National Human Rights Commission	May 2010 to April 2015	Bangladesh
			Civil Service Change Management Programme	January 2008 to December 2014	
			Construction of Server Stations for the Electoral Database (CSSED)	November 2008 to December 2013	Bangladesh
			Union Parishad Governance Project (UPGP)	December 2011 to November 2016	7 districts in 7 divisions
			Upazila Governance Project	July 2011 to July 2016	
			Access to Information (II)	April 2012 to March 2016	Bangladesh
			Strengthening Capacity for Aid Effectiveness in Bangladesh	September 2011 to June 2015	Dhaka
			Activating Village Courts in Bangladesh	January 2009 to December 2013	Bangladesh
			Improving Democracy through Parliamentary Development	July 2010 to June 2014	
			Environment and energy	Barrier Removal to the Cost Effective Development and Implementation of Energy Standards and Labelling	July 2010 to June 2014

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location	
6.	Bangladesh Centre for Advanced Studies (BCAS)	Energy	Refuse Quantity Assessment of Dhaka City Corporation Waste to Electrical Energy Project (through biogas)	July 1997 to June 1998	Dhaka City Corporation	
		Environment	Urban Management Programme	August 1998 to November 1999		
			Dhaka City Management Reform Pilot Project	October 1997 to March 1998		
			Environmental Impact Assessment of 1998 Flood on Dhaka City	1999 to 2000	Dhaka City	
			Housing	Preparation of GIS-based Database on Five Wards of Dhaka City	1999 to 2001	5 Wards of Dhaka City Corporation
			Health	Dhaka Urban Community Health Programme (DUCHP)	January to December 1994	Dhaka City
7.	Participatory Development Action Programme (PDAP)	Education and nutrition	Education and Nutrition Support for the Orphanage	Ongoing	Slum area, Mirpur	
8.	Association for Realization of Basic Needs (ARBAN)	Water and hygiene	Water Supply and Hygiene Education Programme (WASHE)	1997 to 2002	Mirpur and Pallabi Thana, Dhaka	
		Sanitation	Sustainable Environmental Sanitation (SES)	2003 to 2009	12 slums in Mirpur and Pallabi Thana in Dhaka district	
9.	NGO Forum for Public Health	Water and sanitation	Water and Sanitation for the Urban Poor	June 2013 to December 2015	Zone 4, 5 and 10 of Dhaka City Corporation and selected schools under Dhaka Division	
10.	Dushtha Shasthya Kendra (DSK)	Water	DSK model of water supply in urban slums to provide water to slum communities	Since 1992	Slum communities (Tejgaon) of Dhaka	
11.	Manabik Shahajya Sangstha	Water and sanitation	Water and Sanitation Rehabilitation Support to the Flood Affected Slums in Dhaka city	2005	Dhaka city	
12.	Premier Consultants	Water and sanitation	A study on water supply and sanitation facilities in slum and industrial areas in Dhaka city	2004	Dhaka city	
13.	UN-Habitat	Poverty	Local Partnership for Urban Poverty Alleviation Project (LPUPAP)	2001 to 2007	Dhaka city	
14.	PROGGA	Telecommunications	Space 2014	September 2014 to February 2015	Dhaka metropolitan area	
15.	CARE Bangladesh	Water and sanitation	Water and Sanitation project for the urban poor	Since June 2010	Kalshi, Balurmath Kurmitola Relief Camp Slum in the Mirpur area of Dhaka	

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
16.	Population Services and Training Center (PSTC)	Sanitation	Decentralized Urban Total Sanitation Project (DUTS)	Since July 2005	12 wards, under zones 1, 2 and 4, Dhaka City Corporation
		Water services	Second Small Scale Water Resources Development Sector Project	Since October 2003	Kishoreganj, Rajbari, Naogaon, Dhaka and Netrokona districts
		Environment and health	Enhancing Environmental Health by Community Organizations	Ongoing	Dhaka city and Chittagong
		Health	Urban Primary Health Care Project (UPHCP-II)-DCC-PA-4	Since June 2000	Dhaka City Corporation
			Urban Community Health Care Project (UCHCP) for City Polli.	March 2004 to 2010	Zones 1 and 4 of Dhaka City Corporation
		Child development	Helping Children Living in the Street Project (HCLSP)	Since July 2004	Zones 1, 2 and 4 of Dhaka city Corporation (DCC)
			Eradication of Hazardous Child Labour in Bangladesh	Ongoing	Khilgaon in Dhaka
		Adolescent development	Strengthening Adolescents Reproductive Health in Urban Areas	Ongoing	Zones 1, 2, 3, 4 and 5 of Dhaka City Corporation
		Disaster	Mobilizing Communities for Disaster Risk Reduction Project (MCDRRP)	Since October 2007	Dhaka City Corporation
			Post Disaster Response Project	Ongoing	Different wards of DCC
17.	Centre for Services and Information on Disability (CSID)	Disability	Accessible Internet-based Disability Information Dissemination Network and Disability Resource Centre	Ongoing	Dhaka city
			Community-based Rehabilitation of Street and Working Children with Disabilities project	Ongoing	Dhanmoni, Mohammadpur, Mipur, Pallobothana area of Dhaka city
			Removing Cultural Barrier and Promoting Rights of Children with Disabilities	Ongoing	Tejgaon, Mirpur than a of Dhaka city
			Inclusion of Women with Disabilities into Mainstream Development Process project	Ongoing	Mohammadpur, Adabar, Mirpur, Shah Ali Bag and Pallobi Thana of Dhaka city
			Support Disable Beggars in Dhaka City project	Ongoing	Dhaka city
		Urban governance	Strengthening the Organization of Urban Poor Home based Workers' for Greater Viability and Participation in City Governance	Ongoing	

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
18.	Islamic Relief Bangladesh	Watershed management, water, sanitation and hygiene (WASH), solid waste management, environment, DRR and CC, garments worker, slum development, urban governance, transportation, infrastructure, livelihood (economic development), marginalised community, children involve in hazardous labour etc.	Resilience through Watershed Management, Risk Reduction and Development in Bangladesh (ReWARD)	2 years	Dhaka North City Corporation, Keraniganj, Sylhet City Corporation
			Reducing Climate and Disaster Risks in Urban Areas Through Improved Governance and Private Sector Engagement (RP3)		
			Building a disaster resilient Bangladesh (DIPECHO VII);		
			Elimination of Hazardous Child Labour		
			SUCHANA Project (livelihood project for Bihari Community)		
19.	Habitat for Humanity Bangladesh	Housing	Building Resilient Urban Slum Settlement Project, Dhaka	2014 to 2015	Baguntila and Talab Camp Slum Mirpur, Dhaka
		WASH			
		Disaster risk reduction	Improving Multi-stakeholder Collaboration for Water and Sanitation Sector to Contribute to Positive Impact on Urban Climate Resilience in Dhaka City	November 2014 to May 2015	Beguntila Slum, Mirpur and City Palli Slum, Maniknagar
		Disaster response			
		Infrastructure development			
		Urban development			
Volunteer programme					
20.	Swisscontact	Solid waste management	Value for Waste (HSWMP)	2013 to 2016	Dhaka: main activities in Baridhara (Gulshan), Bhashantek (Mirpur), plan to expand to whole of Dhaka
21.	Water and Life Bangladesh	Water for all	Water, sanitation and hygiene in slums, solid waste management, fire-fighting	2012 to 2016	Bhashantek (Mirpur, Dhaka)

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
22.	World Vision	Economic development, health, education	Dhaka Shishu ADP	October 2010 to September 2017	Wards 28, 29, 30, 31,32,33 and 34 under Dhaka North City Corporation.
		Health, education sponsorship, environment	Dhaka East ADP	October 2009 to September 2023	Wards 17, 18, 19, 20 and 21 under Dhaka North City Corporation. Badda, Bhatara, UttarkhanandDokhinkhan Union
		Health, education sponsorship, livelihoods	Kamlapur ADP	October 2010 to September 2017	Wards 4, 5, 6, 7, 39, 40, 41, 45, 46 and 49 under Dhaka South City Corporation. Dakhingaon Union
		Child protection, WASH, health, education	Mirpur ADP	February 2012 to September 2018	Wards 2, 5 and 6 under Dhaka North City Corporation
23.	Concern Universal	Disaster	A Disaster Resilient Future: Mobilizing Communities and Institutions for Effective Risk Reduction Project	March 2013 to November 2016	Dhaka North City Corporation (DNCC) and Savar Municipality At DNCC: wards 2, 3, 5, 6, 8, 9, 10, 14 and 15 At Savar: 9 wards (whole municipality coverage)
			Building a Disaster Resilience Bangladesh		
		Water, sanitation and hygiene	Water, Sanitation and Hygiene Improvements in Schools Serving Urban poor in Comilla and Dhaka	July 2010 to June 2016	Dhaka City Corporation and Comilla City Corporation Dhaka: wards 7, 11, 19, 30 and 83 Comilla: wards 2, 4, 5, 6, 10, 12, 13, 15, 16, 17 and 18
24.	Plan International Bangladesh	Disaster	Disaster Preparedness and Mitigation–Build Safe and Resilient Communities	January 2013 to December 2015	Five Wards (45, 46, 47, 49, 54) of Dhaka South City Corporation
		Education	Technical and Vocational Education	January 2000 to December 2014	Bawniabadh, Mirpur
		Youth development	Youth Micro Enterprise Development (YMED) Project	May 2014 to April 2016	Dhaka city
		Child protection	Child Protection and Participation	-	-
		Child health, nutrition, water and sanitation, and adolescent reproductive health issues	Providing health services	-	Dhaka city

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
25.	Centre for the Rehabilitation of the Paralyzed (CRP)	Health	CRP-Interprofessional Project on Disability, Maternal and Child Health (IPODMCH)	Since December 2011	Dhaka, Chittagong, Moulvibazar, Rajshahi and Barisal districts
		Health and education	Access to Health and Education for all Children and Youth with Disabilities (AHEAD)	2012 to 2017	13 locations within Bangladesh including Dhaka, Manikganj, Narayonganj, Gazipur, Barisal, Sylhet, Moulvibazar, Comilla, Chittagong, Khulna, Mymensing, Tangail and Rajshahi
26.	SAP-Bangladesh	Economic	Micro-Finance Programme	Since 1989	Bagerhat, Patuakhali, Dhaka and Sirajganj
27.	Centre for Integrated Social Development (CISD)	Education	Hard To Reach Project	Ongoing	Mohammadpur, Dhanmondi, Lalbag area of Dhaka City Corporation
28.	Heed Bangladesh	Sanitation, hygiene education and water supply sector	Sanitation, Hygiene Education and Water Supply in Bangladesh (SHEWA-B)	Since April 2009	Moulvibazar and Dhaka
29.	Dhaka Ahsania Mission	Disaster	Building a Disaster Resilient Bangladesh (DIPECHO-VII) Project	Since March 2013	7 wards of Mirpur, Dhaka city
			Disaster Preparedness and Mitigation: Build Safe and Resilient Communities	January 2013 – December 2015	5 wards of Zone-5 Dhaka South City Corporation
		Social development	Oxfam Humanitarian Capacity Building (OHCB) Project	July 2011 – June 2014	Dhaka and Dewangong Upazilla of Jamalpur district
30.	Institute of Water Modelling (IWM)	Drainage improvement	Segunbagicha - Dholaikhal Link Project	March to June 1997	Dhaka city
31.	Prodipan	Capacity development	Strengthening Non-State Actors (NSAs) and Local Bodies (LBs) to Reduce Child Poverty and Promote Rights of Vulnerable Children (VC)	February 2010 to January 2013	Wards 60, 61, 62, 63, 64, 65, 66, 67 and 69 of Dhaka City Corporation (DCC)
32.	Underprivileged Children's Educational Programs (UCEP) Bangladesh	Child rights	Let Children Speak	March 2004 to May 2007	Dhaka, Narayonganj, Jessore, Khulna, Rajshahi, Bogra, Noakhali, Chittagong district
33.	Water Resources Planning Organization (WARPO)	Water	Institutionalization of Integrated Water Resources Management (IWRM) process in Compliance with Bangladesh Water Act, 2013	November 2013 to October 2016	Throughout Bangladesh

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
34.	Waste Concern	Waste management	Value for Waste	December 2012 to June 2013	Gulshan, Banani and Baridhara area of Dhaka city
		Solid waste management	International Workshop on Community Based Solid Waste Management	December 1999 to February 2000	Dhaka city
			Identification of Potential Sites for Community-Based Composting in Dhaka	April 1999 to August 1999	
			Low-Cost Pilot Solid Waste Management Programme in Two Slums of Dhaka city	April 2000 to March 2001	
		Environment	Preparation of Environmental Plan for CAD Production Ltd	September 2006 to October 2006	Roopganj, Bulta, Dhaka, Bangladesh
		Economic and environment	Technical Support to the Staff of Better Business to Improve Physical and Environmental Condition of Small and Medium Size Enterprises (SMEs)	April 2007 to April 2011	
		Disaster management	Initial Environmental Examination (IEE) Report for CDM Based Compost Project located at Roopganj, Bulta, Dhaka	June 2007 to July 2007	
35.	Manusher Jonno Foundation (MJF)	Rights of marginalised population	Ensuring Rights of the Marginalized Population	Since 2008	Total divisions: 7; Total districts: 44
		Women's rights	Combating violence against women	2013 to 2016	46 districts of Bangladesh
		Child labour	Protection of Working Children and Vulnerable Workers	-	Total of 16 districts including Dhaka
		Governance	Ensuring Responsiveness of Public Institutions	-	6 divisions, 31 districts, 236 Thanas, 499 unions/wards
36.	Water and Sanitation for the Urban Poor (WSUP)	Water and sanitation	-	-	-

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
37.	Bangladesh Legal Aid and Services Trust (BLAST)	Safety and reproductive health of adolescent girls, young women, and older women and men	Growing Up Safe and Healthy (SAFE): Addressing Sexual and Reproductive Rights and Violence Against Adolescent Girls and Women in Urban Bangladesh	-	Mohammadpur, Mohakhali and Jatrabari
		Occupational health and safety	Rights to Workers Safety Project	-	-
		Violence against children	Ending Corporal Punishment	-	Bangladesh
		Women's health, rights, and choices	SHOKHI Project	December 2013 to November 2017	Mohakhali, Mirpur and Mohammadpur
		Equal opportunity for women judges and other women legal professionals	Women in Justice	19 Jan 2014 – 18 Jan 2016	Dhaka, Chittagong, Rajshahi, Sylhet, Rangpur
38.	Nagar Daridra Basteebashir Unnayan Shangstha (NDBUS)	Settlements, water and sanitation	-	-	-
39.	Bangladesh Urban Forum (BUF)	Stakeholder platform for dialogue and action to address urban issues	-	-	-
40.	Dhaka South City Corporation	Health, solid waste management, urban planning, transport, social welfare, slum improvement etc. associated with the task of running the affairs of the city of Dhaka	-	-	56 wards covering the thanas of Dhaka Kotwali, Motijheel, Sutrapur, Ramna, Bangsal, Wari, Gendaria, Chwokbazar, Lalbagh, Hazaribagh, Dhanmondi, Shahbagh, New Market, Khilgaon, Kamrangirchar and some others
41.	Dhaka North City Corporation	Public toilets	Gabtohi Inter-District Bus Terminal Public Toilet	-	Gabtohi
		Waste management	Sunya – Towards Zero Waste in South Asia	January 2013 to December 2013	Dhaka

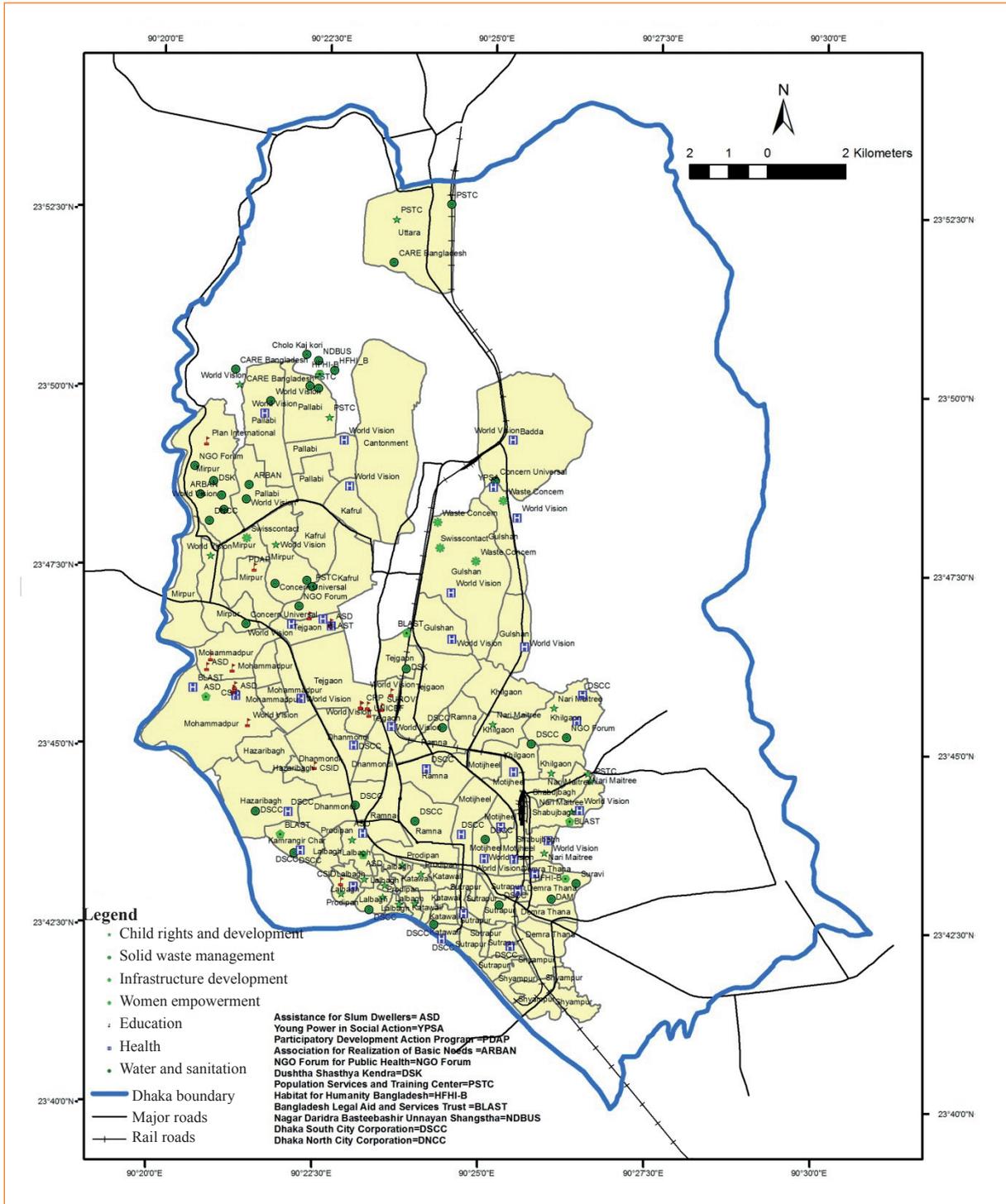
Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
42.	Aparajeyo Bangladesh	Child education	INCLUDED Bangladesh	3 March 2014 to 2017	Dhaka City
		Child protection	Community Actions for Child Protection from Violence	Since December 2013	Dhaka and Khulna Metropolitan City
		Girls' rights	Girl Power Project	-	Bangladesh
		Child protection	Child Sensitive Social Protection in Bangladesh (CSPB)	Since 2008	3 divisional cities in Bangladesh
		Child rights	Child Help Line Bangladesh (CHL-BD) '1098'	Since 2010	Bangladesh
			Developing a Conducive Environment for Urban Disadvantaged Children–SAD Project in Dhaka	-	Dhaka city
		Street children	Developing a Conducive Environment for Children in Street Situations in Dhaka City	-	Bangladesh
		Education, health and legal support for urban marginalised disadvantaged children	Developing a Safety Net for Urban Marginalized and Disadvantaged Children	-	Slums of Dhaka Metropolitan Area
		Complete development and successful rehabilitation of vulnerable street children	Community Support System to Improve the Life of Street Children	Since 2009	Sayedabad and Jatrabari
43.	Save the Children Bangladesh				
44.	Nari Maitree	Health and rights of pavement dwellers	Linkup SRHR Project	November 2013 to October 2015	Dhalpur, Sutrapur, Komlapur, Sydabad, Jatrabari, Sadarghat, Stadium market, BaitulMokarram, Waiseghat, Court Kachari, Babubazar, Banglabazar, English Road, Mitford, Shambazar, Gabtoli and Mirpur
		Women and adolescents including city cleaners	Empowering Women and Adolescents for Social Change Project	January 2013 to December 2015	Gabtoli and Sutrapur
		Urban working children or children at risk of becoming working children	Support Urban Slum Children to Access Inclusive Non-formal Education (SUSTAIN)	December 2011 to December 2017	Wards 23, 25, 26, 27, 28 and 29 of Dhaka City Corporation

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
		Men, women adolescents and children	Urban Primary Health Care Service Delivery Project	January 2013 to December 2015	Mogbazar, Modhubag, Noyatola, ShegunBagicha, Topkhana Road, Elephant Road, Shahbag
		Pavement dwellers of Dhaka city	Amrao Manush Project (Improving the Lives of Pavement Dwellers)	March 2008 to February 2015	Bangabondu Stadium yard, High Court yard and Osmani Uddyan of Dhaka city
		Women	Let Her Decide and Participate (LHDP) Project	Since October 2012	Mirpur, Maghbazer, Dhalpur, Shahjahanpur and Goran
		Child domestic workers	Development Opportunity for Child Domestic Workers in Dhaka City	July 2010 to June 2011	Rayerbazar, Mohammadpur, Kalyanpur and Kafrul under Zones 3, 6, 7 and 8 of Dhaka City Corporation
		Street dwellers	Investment for Economic Empowerment of Street Dwellers	January 2011 to December 2014	Dhaka City Corporation area
		Adult domestic workers	Establish Rights of the Female Domestic Worker	Since April 2011	Wards 5,6,7 and 8 under Dhaka City Corporation
		Livelihoods of men and women	Financial Service Initiative for Better Livelihood of Extreme Poor (FISIBLE)	Since 2006	Reajbag, Dhalpur and Jurain
		Girls working on the street	Super Sister on the Savage Street (Targeting Girls Working on the Street)	Since January 2008	Nakhalpara, Korail and Shahjahanpur of Dhaka city
		Working children	Community Interventions Towards the Development of Urban Working Children	Since 2010	Lalbag and Kamrangir Char of Dhaka City Corporation
		Children and youth labourers	Social and Economic Empowerment Programme for Street-based Child and Youth Labourers	Since 2011	Goran, Bashaboo, Razarbagh and Lalbagh
		Adolescents	Growing Up Safe and Healthy Addressing Sexual and Reproductive Rights and Violence Against Adolescent Girls and Women In Urban Bangladesh	Since 2010	Bashabo, Mohammadpur and Mohakhali
		Male and female	Income Generating Project	Since 1996	Dhaka Metropolitan City
			Human Rights and Empowerment Project	Since 1995	Ward No 25, 27, 28 (Goran, Mohtertek and Bashabo)
45.	Centre for Urban Studies (CUS), Dhaka	Research on urban and regional issues	-	-	-

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
46.	WaterAid Bangladesh	Cleaner production	Bangladesh Water PaCT: Partnership for Cleaner Textiles	January 2013 to December 2016	Dhaka and Chittagong
		Raising awareness of water crises	Save Water, Save the World	Since September 2013	Bangladesh
		Equitable access to safe water, sanitation and hygiene education (WASH)	Wateraid Bangladesh	Since January 1986	Bandarban, Chittagong, Cox's Bazar, Dhaka, Jamalpur, Khulna, Kurigram, Mehepur, Mymensingh, Naogaon, Narail, Narayongang, Narshingdi, Nilphamari, Pabna, Rajshahi, Rangamati, Rangpur, Satkhira, Shariapur, Sherpur, Sirajgani, Sylhet, Tangali and Thakurgaon
47.	Dhaka Water and Sewerage Authority (DWASA)	Construction, operation, improvement and maintenance of the necessary infrastructures for water supply, sewerage and drainage facilities	-	-	-
48.	Rajdhani Unnayan Kartipakkha (RAJUK)	Coordinating urban development	-	-	-
49.	Dhaka Electric Supply Company Limited (DESCO)	Electricity distribution	-	-	-
50.	Bangladesh Institute of Planners (BIP)	Organising activities for planned and orderly development of cities and regions	-	-	-
51.	Practical Action	Waste management and sanitation of socially excluded urban slum dwellers	Urban WASH and Waste Management Services	2012 to 2017	7 locations: Dhaka and Gazipur cities; Faridpur, Jessore, Satkhira, Gaibandha and Bagerhat towns

Serial no.	Name of organisation	Working sector	Project name	Project duration	Project location
52.	Local Government Engineering Department (LGED)	Road and drain improvement	City Region Development Project	July 2011 to December 2016	Dhaka, Gajipur and Khulna
		Accommodation for cleaners	Construction of Cleaners' Colony of Dhaka City Corporation Project (CCCP)	July 2013 to June 2017	Dayagonj, Dhalpur and Sutrapur areas of Dhaka
		Urban poverty reduction	Urban Partnerships for Poverty Reduction (UPPR)	July 2007 to March 2015	Narayanganj, Gopalganj, Khulna City Corporation, Bogra, Kushtia, Barishal City Corporation, Sirajganj, Hobiganj, Chittagong City Corporation, Mymensingh, Rajshahi City Corporation, Tongi, Rangpur, Jessore, Comilla, Dinajpur, Capainawabganj, Tangail, Savar, Gazipur, Naogaon, Sylhet, Dhaka City Corporation (North and South)
53.	Bangladesh Association for Social Advancement (BASA)	Water and sanitation	Case Study: Water	-	-
			Water, Sanitation and Hygiene	-	-
			WSP – 4S	-	-
		Environment	-	-	-
		Health	-	-	-
		Microfinance	-	-	-
54.	United Nations International Children's Emergency Fund (UNICEF)	Education	Basic Education for Hard-to-Reach Urban Working Children (BEHTRUWC) project	-	Dhaka, Chittagong, Khulna, Rajshahi, Barisal and Sylhet
		Sanitation and hygiene	Sanitation, Hygiene Education and Water Supply in Bangladesh (SHEWA-B) Project	-	19 districts of Bangladesh
55.	ChaloKajkori	Water and sanitation	-	-	Dhaka
56.	Shurovi	Child education	Education Equity for Out-of-School Children	Since 1991	Dhaka
57.	Nagar Seba	Water and sanitation	Mobile Toilet Service in Dhaka	-	Dhaka city

Annex 2. Stakeholder activities – locations in Dhaka city



Urban climate resilience, water and sanitation: improving multi-stakeholder collaboration in Dhaka, Bangladesh

Asian Cities Climate Resilience Working Paper Series

This working paper series aims to present research outputs around the common theme of urban climate resilience in Asia. It serves as a forum for dialogue and to encourage strong intellectual debate over concepts relating to urban resilience, results from the ground, and future directions. The series is also intended to encourage the development of local research capacity and to ensure local ownership of outputs.

The series has arisen out of the Asian Cities Climate Change Resilience Network (ACCCRN, www.acccrn.org), an initiative funded by the Rockefeller Foundation.

The series is intended to present research in a preliminary form for feedback and discussion. Readers are encouraged to provide comments to the authors whose contact details are included in each publication.

Published by IIED September, 2015

IIED order no: 10748IIED
<http://pubs.iied.org/10748IIED.html>
ISBN 978-1-78431-253-4

80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
email: humans@iied.org
www.iied.org

