Dhaka City Earthquake Simulation

Summary Report

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About the authors

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Urban Crises Learning Fund

IIED's Human Settlements Group

The Human Settlements Group at the International Institute for Environment and Development (IIED) works to reduce poverty and improve health and housing conditions in the urban centres of Africa, Asia and Latin America. It seeks to combine this with promoting good governance and more ecologically sustainable patterns of urban development and rural-urban linkages.

Citation

Kelly, C (2017) *Dhaka City Earthquake Simulation*. Summary Report. Urban Crises Learning Partnership (UCLP).

The Urban Crises Learning Partnership (UCLP) was a two-year (2015–17) learning initiative aimed at improving humanitarian preparedness and response in urban areas. It was a partnership between Habitat for Humanity GB, Oxfam GB, the Overseas Development Institute (ODI), and University College London (UCL). The project carried out primary research in Haiti and Bangladesh through the National Offices of Habitat for Humanity in both countries, and Oxfam in Bangladesh.

The UCLP had two primary objectives: to improve the way stakeholders in urban crises engage with each other to form new partnerships and make better decisions; and to improve disaster preparedness and response in urban areas by developing, testing, and disseminating new approaches to the formation of these relationships and systems.

The project addressed these objectives by exploring four related themes: the role of actors who are not part of the formal national or international humanitarian system; accountability to affected populations (AAP); urban systems; and coordinating urban disaster preparedness.

This paper by independent consultant Charles Kelly focuses on the last of these themes: coordinating urban disaster preparedness. The report describes the process of organising and conducting an earthquake simulation in the city of Dhaka in Bangladesh, an event that represented a key activity for the UCLP project. The simulation was conducted in order to assess the level of readiness of a range of actors for an event that occurs on average every century. The last major earthquake in Dhaka happened more than a hundred years ago, when the population was a tiny fraction of today's estimated 16–18 million people. It was intended that the simulation should illuminate gaps in coordination, delivery mechanisms, and partnerships, which in turn would aid in further planning for a large-scale event.

While the report is an excellent reflection of the simulation that took place, it also serves as a very useful guide for others who may wish to carry out similar exercises in Dhaka or elsewhere.

Alan Brouder, UCLP Coordinator
Habitat for Humanity GB
November 2017

Contents

Abbreviations and Acronyms

CaLP	Cash Learning Partnership
CBO	Community-based organisations
DAM	Dhaka Ahsania Mission
DNCC	Dhaka North City Corporation
DSCC	Dhaka South City Corporation
DWSSA	Dhaka Water Supply & Sewerage Authority
EMMA	Emergency Market Mapping Analysis
FAO	Food and Agriculture Organization
FSCD	Fire Service & Civil Defence
GOFI	Go Fix It
HFH	Habitat for Humanity
HFHGB	HFH Great Britain
IOs	International Organisations
MPCG	Multi-Purpose Cash Grant
NGOs	Non-Governmental Organisations
OCHA	Office for the Coordination of Humanitarian Affairs
SAARC	South Asian Association for Regional Cooperation
UCLP	Urban Crises Learning Partnership
WASA	Dhaka Water Supply & Sewerage Authority
WASH	Water, Sanitation, and Hygiene promotion
WFP	World Food Programme

1. Introduction

This report covers a simulation of the response to a large-scale earthquake in Dhaka, Bangladesh. The simulation took place in Dhaka at the Hotel Lake Breeze from 23 to 25 May 2017 and involved 56 participants. (An immediate, after-simulation report can be found in **Annex A.**)

The report focuses on three themes:

- The technical operation of the simulation, covering the planning, execution, results, and observations.

- The use of the simulation as a learning- and capacity-building tool.

- The insight the simulation provides into preparedness for a significant earthquake in Dhaka.

These three themes reflect the simulation objectives, which are noted below. Given that simulations can be complex events, details of the Dhaka simulation are covered in considerable detail (including annexed presentations and work results) to help guide similar events in the future. A bibliography is also provided.

The simulation was initiated under the Urban Crises Learning Partnership (UCLP) as part of an effort to improve the humanitarian response to large urban disasters (**Box 1**). UCLP, a collaboration of Habitat for Humanity (HFH), Oxfam, University College London and the Overseas Development Institute, is funded by the UK Department for International Development. Additional information is available on the project websites of Habitat for Humanity and of the International Institute for Environment and Development

Box 1. Organisations, Projects, and Key People Involved in the Dhaka Simulation

The Dhaka simulation was co-managed in Dhaka by Habitat for Humanity Bangladesh and Oxfam Bangladesh. The Dhaka Ahsania Mission (DAM) managed engagement with local stakeholders, provided direct support for simulation sessions, and arranged for neighborhood visits and the participation of local authorities. Support was also provided through Oxfam Bangladesh's Empowering Local and National Humanitarian Actors project.

People with significant on-site involvement in the simulation included:

- Afroza Haque, UCLP, HFH Bangladesh

- Alan Brouder, UCLP Project Manager, HFH Great Britain (HFHGB)

- Badrun Nahar, DAM

- Ranajit Das, UCLP, Oxfam Bangladesh

Additional off-site support was provided by Dr Jonathan Parkinson, Senior WASH Programme Development Advisor, and Larissa Pelham, Emergency Food Security & Vulnerable Livelihoods Global Advisor, both of the Oxfam Global Humanitarian Team.

Georgia Rowe, contracted by Oxfam GB, provided off-site support on social protection issues, as well as a live presentation on the topic during the simulation. Herma Majoor, WFP Bangladesh, provided advice on social protection issues and participated in the discussion of this topic during the simulation. A.H.M. Taslima Akhter, National Consultant, FAO Bangladesh, made a presentation on food markets in Dhaka as part of the simulation. Damien Joud, Bangladesh Food Security Cluster, WFP/FAO, provided advice on the development of the simulation. Dr. A. S. M. Maksud Kamal, of the University of Dhaka, made an extensive presentation on the earthquake threat to Dhaka.

2. Simulation Context

The challenges involved in responding to disasters in urban areas are gaining attention within the international humanitarian community. This is due partly to the needs in Port-au-Prince after the 2010 earthquake in Haiti, and the scale of impact of other recent urban disasters. There has also been an increasing realisation that more people now live in urban areas than rural areas.

Many urban areas are growing at rates that far outstrip the regular and systematic provision of basic services. Populations are growing denser, forcing residents to live where they regularly experience hazardous events. Efforts to manage disasters in these areas are extraordinary both in scope and complexity.

Many international non-governmental organisations (NGOs) have shied away from working in urban areas, if only due to a historic focus on rural development to counter the rapid migration to urban areas. They now realise, however, that the urban context presents opportunities for development as well as a rights-based need to address disaster risk, among other considerations.

At the same time, local NGOs and community organisations have emerged in urban areas, focused on improving living conditions. These, often neighborhood-based, organisations can be significant sources of social and economic support, and of services to new and long-standing urban residents.

Governments, international finance institutions and some donors have long been engaged in improving urban living conditions – particularly through a sites-and-services approach and the upgrading of neighborhoods, often associated with facilitating some form of tenure for residents without housing, land, or property rights. This interest is expanding into how better to manage disasters and the urban 'riskscape'.

There are often complex, interlinked social, economic, political, and cultural systems in densely populated urban areas. Unpacking these systems to understand needs, gaps, capacities, and opportunities is complicated and can be time-consuming – but is critical for reducing urban disaster risk.

There has been a heavy focus on the immediate response to urban disasters – saving lives during and immediately afterwards, and ensuring that the survivors have food, water, shelter, and other basic needs. This presents a number of interesting challenges.

For instance, rapid physical access within an earthquake-affected city can be difficult due to the scale of infrastructure damage, which means that most rescues are done by other survivors rather than external rescue teams. Food, water, shelter and other basic needs are, unlike in rural areas, provided almost wholly through markets. That is why it is critical to provide cash and quickly reestablish access to market supply systems. These and other characteristics must form the foundation of any plan to deliver post-disaster assistance in cities.

To date, there has been limited planning of more long-term support for the survivors of urban disasters. Yet, evidence indicates that survivors need support during the long transition from immediate, life-saving aid to recovery, which can take two to five years or more. This period is when living, social, economic, and other conditions move towards what they were before – even if a disaster is not forgotten. The quicker this transition, the quicker the overall recovery process.

For an urban disaster, recovery involves reestablishing market[1] activities. This step is critical for three reasons: it promotes self-reliance; it stimulates commercial activities, putting people to work who will often then produce the goods and services needed for recovery; and it generates funds (for example from salaries or profits) with which survivors can recover by themselves, reducing their demand for external assistance and speeding the recovery process.[2]

Yet survivors cannot rely only on the market for their recovery. Not everyone has equal access to the market or derives enough benefit from it – just as was the case before the disaster. This is why formal and informal systems to provide social protection are important.

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[1] 'Markets' as used here are places where a consumer and a range of commercial activities come together to meet the consumer's needs.
[2] A large part of any disaster recovery is financed by the disaster survivors. The more financial resources they can access, the quicker the recovery.

Formally, government social welfare systems may provide monthly pension or disability payments. Informally, large family groups, social networks, or community organisations focused on vulnerable groups can share resources.

Accessing and mobilising these social protection systems after a disaster can provide a way to target aid quickly to vulnerable people whom the renewed market might leave behind. Using systems that were established before a disaster is efficient because it avoids creating new systems, and effective because the existing systems already target beneficiaries.

Linked to social protection is the issue of accountability to survivors. Humanitarian organisations, as well as public institutions, need to be accountable in terms of what types of assistance can and will be provided, how beneficiaries are selected, and how results are assessed and communicated. The urban disaster context, where large volumes of aid may be targeted to large numbers of beneficiaries at the same time, creates a challenge for accountability.

For instance, the intent of a one-off post disaster payment to pensioners, using existing social protection systems, may not be clear to those who don't receive payments ('Why is a pensioner with grown children worse off than I am with young three children?'), or may not be understood by those receiving the payment ('Why didn't the increase in pension continue?'). The complex social systems in urban areas, the range in type and number of potential beneficiaries, and the use of unconventional means to deliver aid before the earthquake present a significant challenge to assuring accountability meets good practice.

Cash payments, or credit transfers to phones and bank accounts, are increasingly popular for providing aid after a disaster. However, in an urban disaster, consideration needs to be given to the ability of banking systems to deliver funds in the face of extensive damage to the built infrastructure, including the electrical supplies critical for modern banking.

In the case of Dhaka, the government and international partners have been working for a number of years at improving the capacity for immediate disaster response. These efforts have included assessing the potential for damage, developing relief plans, training, and developing equipment stock. Key documents in these efforts include the Earthquake Contingency Plan for Dhaka City Corporation (Dhaka City Corporation), the Contingency Plan for Earthquake Response in Major Urban Centres (L3 Emergency Bangladesh) (Humanitarian Coordination Task Team) and the Earthquake Contingency Plan for Dhaka Water Supply & Sewerage Authority (DWSSA). However, these efforts do not plan for the extended relief and recovery phases following a major earthquake, or issues such as market recovery and social protection.

UCLP considered that an urban disaster simulation would help people learn more about urban disaster response and build local capacities for a response beyond immediate, life-saving relief. These considerations were formalised into the simulation objectives noted below. Dhaka was selected because of the factors set out in **Box 2**.

Box 2. Why Dhaka?

Dhaka, an urban area of approximately 17 million people, was chosen for the simulation because:

- It faces a near-term threat from a major earthquake under or near the city.

- This earthquake is expected to generate very high levels of destruction and loss of life.

- The complexity of the response to such a disaster has not yet been experienced in a non-conflict situation.

- HFH and Oxfam have experience and contacts in Dhaka which could broaden the scope of the simulation to include local organisations and neighbourhoods.

The simulation results were expected to have a direct impact on preparing for the anticipated earthquake, and be of use in planning for disasters in other large urban areas.

3. Simulation Objectives

The UCLP consortium set the following three objectives for the simulation:

- Provide humanitarian actors in Dhaka with an opportunity to examine their preparedness and identify where they can improve their ability to prepare for, and respond to, an earthquake. And, to provide learning about possible approaches to urban earthquakes for urban humanitarian actors outside Dhaka, based on the Bangladesh context.

- Explore ways of responding, focusing in particular on how to make use of existing social protection systems and market systems to provide cash, related to the food security, shelter, and water, sanitation, and hygiene promotion (WASH) sectors.

- Explore how simulation activities can promote learning and build capacity.

4. Simulation Planning and Execution

4.1 Planning – Off Site

Planning for the simulation began with discussions between UCLP members, HFH Bangladesh and Oxfam Bangladesh. UCLP developed a background paper (**Annex B**) and shared it with stakeholders. Plans were made to write a research paper that would map the stakeholders and the legal and policy framework for urban disaster response in Bangladesh. The UCLP core team held weekly calls with Dhaka about the preparations for the simulation, complemented by emails and the use of a DropBox to share documents.

In late April 2017, a consultant[3] was hired to lead the development and execution of the simulation. Based on discussions with the UCLP core team and HFH and Oxfam in Dhaka, a schedule for preparations for the simulation (**Annex C**) was developed, as well as a narrative plan for the event (**Annex D**) and a detailed session outline (**Annex E**). These documents were shared with the core team and Dhaka, discussed during calls and revised as needed. A tentative staffing plan for the simulation was developed (**Annex F**).

The team discussed how many participants there should be, and from which sectors they should come. Key issues in these discussions were (1) keeping the number of participants reasonable, and (2) ensuring that the private sector was represented. A flyer was drafted for the simulation (**Annex G**) but not used, as the standard process in Bangladesh is to directly invite organisations and individuals to such events.

Weekly Skype call discussions were held to cover outstanding points. However, there were technical issues with Skype that limited the value of these calls.

An issue raised during the off-site planning was whether members of the core UCLP team would be able to attend the simulation. Alan Brouder (HFH) was able to travel to Dhaka, while scheduling issues prevented either Jonathan Parkinson or Larissa Pelham (both with Oxfam) from attending. To ensure sufficient back-up on social protection issues, Oxfam hired Georgia Rowe to support the simulation development and make a presentation on the topic via Skype during the simulation.

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[3] The author of this report.

The simulation consultant also collected information on disaster management and earthquake preparedness in Dhaka and Bangladesh (see **Bibliography**). This effort included reaching out to several of the Clusters present in Bangladesh (e.g., Food Security, Shelter), the cash working group affiliated with the Cash Learning Partnership (CaLP), and the regional Office for the Coordination of Humanitarian Affairs (OCHA) in Bangkok.

4.2 Planning On-Site

The simulation lead consultant arrived in Dhaka on 21 May 2017. The two days before the simulation took place were devoted to reviewing preparations and content. As required, changes were made to the simulation plan and schedules, and presentations updated accordingly.

It was decided to use Kobo[4] for the neighborhood field survey – either as the primary data collection tool, or for use in converting paper data forms into an electronic format amenable to analysis. Oxfam converted the survey form (**Annex H**) into Kobo with considerable ease.

On-site work also included interaction with the Shelter and Recovery Cluster and with Herma Majoor, of World Food Programme (WFP) Bangladesh, about social protection issues. Several simulation review meetings were held at Oxfam with HFH and DAM.

4.3 Execution[5]

Daily schedules for the simulation can be found in **Annex I**. These schedules were generally followed, but, as in any simulation, adjustments were made based on the tempo and direction of different sessions. The sub-sections below provide a summary of each of the major segments of the simulation, including results of group work.

A list of the 56 registered participants can be found in **Annex J**.[6] The presentations are available in **Annex K**[7], with originals available from HFH Great Britain. Note that there are master presentations for each day and additional topical presentations as indicated in the daily schedules.

4.3.1 Day One – Opening and Background

The first quarter of Day One was devoted to opening ceremonies and background to the simulation, as well as a presentation about the UCLP by Alan Brouder (see **Annex K**).

The opening of the simulation included a *Why am I here?* exercise. In this exercise, participants wrote down why they were attending the simulation and what they expected to gain from the event. The responses are presented in **Annex L**. They were reviewed during the simulation and used to adjust the content and focus of the event.

4.3.2 Day One – Community Assessment

Half the morning of Day One was devoted to preparations for the field survey, including dividing the participants into teams, working out how data would be collected, and learning how to use Kobo. One team travelled to Nawabpur, an older, well established, neighbourhood. The other team went to South Paikpara, a newer neighborhood. In each case the visit was hosted by a local official.

As anticipated, travel times from the simulation site to the field sites were long. The Nawabpur team did not return until late in the afternoon. As a result, there was no review of the fieldwork on the first day, as called for in the schedule. Note that video recordings were made of the field visit to Nawabpur, to be used in future trainings and simulations.

At the end of the fieldwork, Oxfam collected the Kobo-registered data and combined it with data that had been recorded on paper and transferred to Kobo. The data was then processed overnight and provided to the simulation as a worksheet on the morning of Day Two.

Observations and reports indicated that the fieldwork went largely as planned (except for travel delays for one team), the people interviewed were willing to participate, and the locations provided a good snapshot of living conditions in different parts of Dhaka. One unanticipated result of the visit to Nawabpur was that local participants wanted additional information on earthquakes and earthquake safety.

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[4] Kobo is a software package which can be used to collect and process survey data, and is adapted for use on hand-held devices, including smartphones and tablets.
[5] This section should be read in combination with the immediate post-simulation report found in **Annex A**.
[6] Some drop-off of participants was noted, with approximately 25 to 30 people attending on Day Three.
[7] Originals are available from the UCLP website at www.urbancrisis.org

Figure 1: Project teams conducting interviews in Nawabpur

4.3.3 Day Two – Earthquake Background

The first quarter of Day Two was allocated to providing the participants with background on the threat that earthquakes pose to Dhaka (presented by Maksud Kamal, **Annex K**), on disaster management systems in Bangladesh (presented by Murshida Akhter, Oxfam, **Annex K**), and experiences to date on food security and the use of cash for relief and recovery (presented by Atwar Rahman, Oxfam, **Annex K**).

4.3.4 Day Two – Earthquake Simulation Scenario

During the second quarter of Day Two, an earthquake scenario was presented (**Annex M**). There was also a group assignment for teams to use the data collected from the field survey to identify and assess who was affected. This assignment was followed by a review of results.

4.3.5 Day Two – Market Mapping

The third quarter of Day Two included a presentation on food markets in Dhaka (by Arifeen Akhter, Annex K) followed by a group exercise for mapping markets in Dhaka. The mapping covered the city's vegetable oil, rice, labour, sanitation, water, and cement markets. An example of the mapping can be found on the right, with additional images in **Annex N**. Each team was asked to explain its mapping and the results were discussed.

Figure 2 Example of market mapping exercise
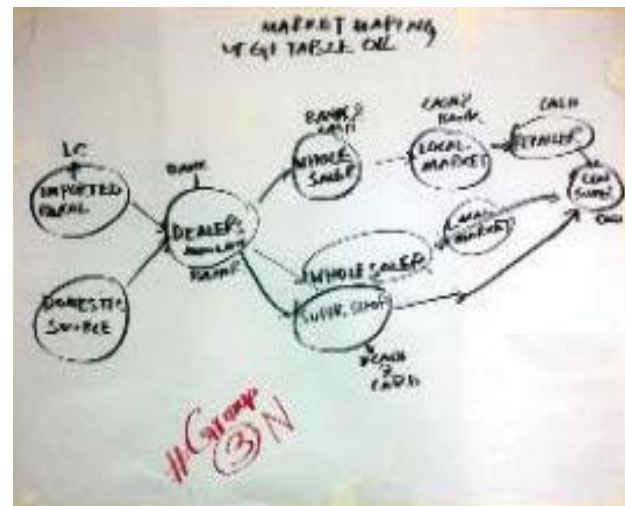
4.3.6 Day Two – Social Protection

The final quarter of Day Two focused on social protection. This was done with a presentation over Skype by Georgia Rowe (see **Annex K**), followed by a question-and-answer session and expanded comments, as well as discussion involving Herma Majoor, WFP Bangladesh. Then there was group work to identify who would be vulnerable to earthquake impacts and how social protection systems could be used to address these vulnerabilities.

4.3.7 Day Three – Identifying Solutions

The first half of Day Three was devoted to a series of group exercises focused on identifying solutions to a number of the challenges identified as arising from a major earthquake in Dhaka. The process involved each working group being designated as a 'Go Fix It' (GOFI) team, and presented with one of each of the three challenges identified in the simulation: water, food security, and shelter.

After the working groups developed their list of proposed solutions (**Box 3**), they presented them to participants, who played the role of neighbourhood residents offering feedback.

4.3.8 Day Three – Summary of Key Points

Several participants led a session summarising key points (**Box 4**).

4.3.9 Day Three – Review and Closing

The third quarter of Day Three was allocated to a review of the simulation (see below). A closing ceremony took place in the final quarter (**Figure 3**).

Box 3. List of Proposed Solutions Developed by Working Groups

Water Options

- Bottled water from DWSSA
- Surface water treatment in Dhaka
- Using hosepipes to distribute water
- Using underground reservoirs in buildings for immediate water, and restocking
- Repairing the water network
- Expanding water vending network ('water ATM')
- Water trucking
- Household water storage
- Boreholes
- Rainwater harvesting
- Bringing in water in boats

Shelter

- No one solution
- Community shelter approach
- Transition camps using local materials
- Containers
- Houseboats
- Semi-concrete houses
- Housing loans (50 per cent)
- Housing grants (50 per cent)

Food Security

- W4 – who, where, what, when
- Delivery systems/logistics important
- Payment system needs to work
- Market assessment – before and after
- Accessibility – roads
- Stocks available – in and outside Dhaka
- Assess food availability
- Assess social protection system
- Attention to fuel and cooking supplies (Shelter/Non-food items Cluster)
- Consider/assess/monitor the supply chain
- Monitor donations – private sector, chain(super) stores, market conditions
- Monitor/set standards for food consumption
- Assess human resources to load/unload food supplies
- Map consumers
- Bring in food: aircraft, train, boats
- Link traders and suppliers
- Logistics issues
- Provide power to food processors.
- Reach out to those in camp
- Consider role of the South Asian Association for Regional Cooperation (SAARC)
- Quality assurance
- Who needs what assessment
- Financial Transfers – US dollars, vouchers
- Multi-purpose cash grants (MPCG), but for urban areas

Box 4. Key Considerations/Points of Concern

- Sectoral issues after earthquakes
- Mind-mapping about earthquakes
- Mapping of different resources – markets
- Working in collaboration/collective effort
- Need specific standard packages for specific areas
- Scope of work
- Data/information availability and accessibility
- Pre-Crisis Market Mapping and Analysis – market assessment
- MPCG – package for urban areas
- Contingency-planning for responsible government institutions, city, International NGOs, local NGOs, community-based Organisations (CBO), private sector
- Capacity analysis of government, NGOs/CBOs and others
- Vulnerability assessment: Dhaka North City Corporation (DNCC), Dhaka South City Corporation (DSCC), ward level
- Dhaka Water Supply & Sewerage Authority (WASA)– other sources of water
- Food storage and warehouses – Ministry of Food
- Law and order sector – Ministry of Home Affairs
- Fire Service & Civil Defence (FSCD) – ward level, base/operations centre
- WASA
  - Shift dependency from ground water to surface water
  - Management system for crisis by WASA
  - Sanitation – DNCC, DSCC and wards
- Shelter – Government institution and international/local NGO and private sector
- Post-early recovery – Housing & Building Research institute
- Health
- Social protection

Recovery Problems

- Lifeline/Utility services damaged
- Disruption of communications
- Health and medical services inactive
- Waste management (huge garbage)
- Livelihoods (affected)

Action Points

- Orienting colleagues about earthquake simulation
- Area-based/ward-based simulations regularly
- Integrating simulations into organisations
- Food security

Figure 3. Closing speech by the Director of Oxfam Bangladesh, Md. Badi Akhter

4.4 Results and Observations

The following sub-sections provide a summary of the results of the simulation. Broader issues related to simulations, learning, building capacity, and Dhaka earthquake preparedness are discussed after this.

4.4.1 Participant Review

Participants completed a review of the simulation. The review form can be found in **Annex O** and observations on the facilities and organisation are in **Annex P**.

The participants were asked to indicate whether they (1) fully agreed, (2) somewhat agreed, (3) somewhat disagreed, or (4) disagreed with the following statements:

- The simulation improved my understanding of the earthquake threat to Dhaka.
- The simulation improved my understanding of how markets could be affected by an earthquake in Dhaka.
- The simulation improved my understanding of the use of social protection in responding to disasters.
- The simulation improved my understanding of how financial transfers can be used to recover after a disaster in Dhaka.
- The simulation should have been shorter.
- The simulation should have been longer.
- The simulation should have been more focused on one topic or theme.
- The simulation should have covered more topics.
- This should have been a workshop and not a simulation.
- More training and background on the themes of cash, markets and social protection in urban areas should have been provided.
- The simulation rounds were too short.
- The simulation rounds were too long.
- The field assessment was a useful experience.
- I enjoyed the simulation.
- I might consider using the simulation approach in the future.

The results (**Figure 4**) indicate that the simulation was largely successful in improving the understanding of the overall context of a major earthquake affecting Dhaka, as well as the potential role of expanding social protection systems, financial transfers, and market aspects of such an event. Views were somewhat divergent on whether (1) the simulation should have been shorter or longer, (2) more or fewer topics should have been covered (see Too Many Topics, Section 4.4.12) or (3) the event should have been a workshop and not a simulation.

Participants fully or somewhat agreed with the statement that more background was needed on cash, markets, and social protection (see Too Many Topics, Section 4.4.12). There was general, but not total, enjoyment of the simulation, and the majority of participants expected to use the process in the future.

Figure 4. Results of a review by participants
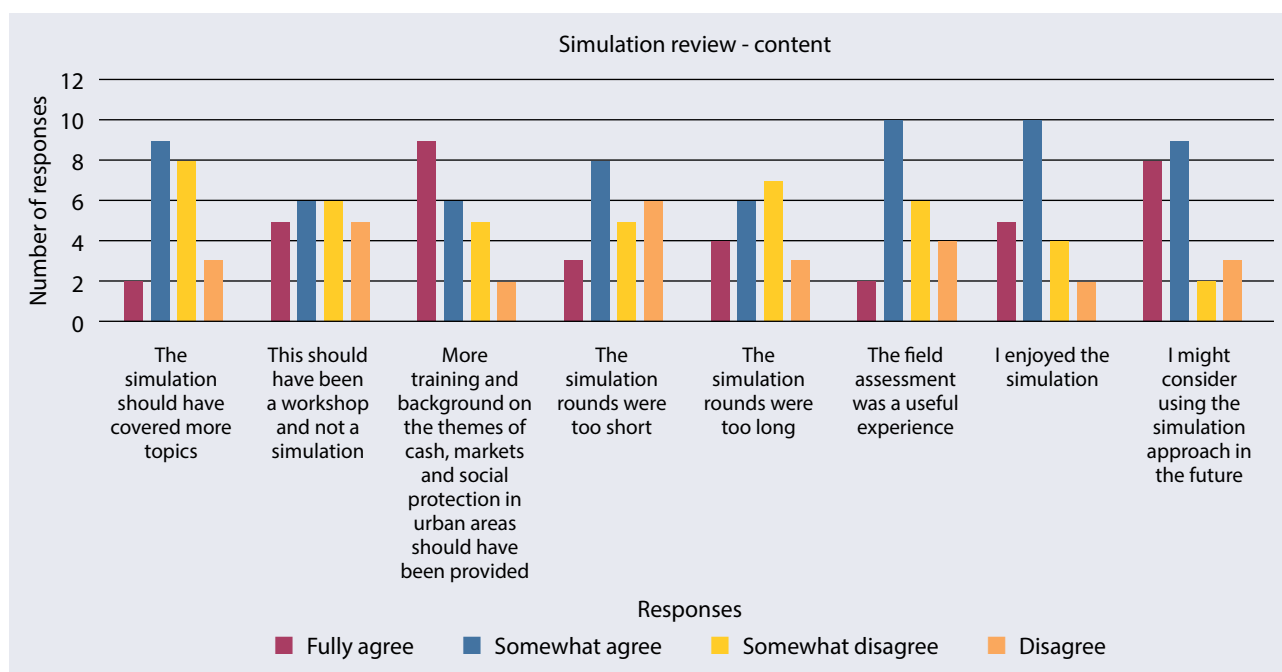
4.4.2 Lessons for Simulation Preparation

Approximately one month was available for the practical preparations for the simulation, with two days in the country before the event and one day afterwards. The preparation documentation was ambitious and many proposed elements of the simulation were not implemented.

Some details of the simulation needed to be worked out immediately before the event or through adjustments while it was going on. Some of these adjustments became necessary as a result of the scope and complexity of the simulation, but some could have been avoided with more time to prepare. A more focused simulation would have been easier to plan and prepare.

The experience and documentation of this simulation will make it easier to prepare for similar events in the future, and particularly for more topically focused simulations. For future simulations of similar complexity, it would be useful to begin actual preparations for the simulation further in advance. It would also be useful to hold a meeting in the country early in the planning process to ensure that objectives, expectations and approaches are harmonised.

Although an extra visit may sound excessive for a simulation of only three days, it seems more reasonable when it is viewed as a prototype for multiple simulations reaching as broad an audience as possible.

Developing a simulation should not be seen as a one-off event, but as an investment in developing capacity. This investment should be commensurate with the challenges the simulation is intended to address.

4.4.3 Simulation as Simulation Training

One of the objectives of the simulation, and one of the expressed interests of some of the participants, was to see how the simulation approach worked with an eye towards using the approach in the future. On Day One, a view was expressed that the simulation process and content needed better explanation. This need was addressed by providing side comments during the simulation to explain what was happening.

However, there was not time before, during, or after the simulation to provide more detailed and technique-focused guidance (e.g., why one appoach was used and not another). One solution might have been to adopt a 'training-of-trainers' approach, offering an extra day prior to the event for those participants who expressed an interest in future use of simulations.

4.4.4 Simulation versus Workshop

Bangladesh has considerable experience with workshops, and some experience with simulations. They can be similar in process, particularly if the simulation uses a desktop approach (as did most of the Dhaka event). A real-time field simulation would clearly be different from a workshop.

The overlap between a desktop simulation and a workshop appears to have created some confusion in the planning (see Community Assessment, Section 4.4.6) and during the actual simulation. A simulation generally involves asking participants to complete an assignment with less than full knowledge. This is intended to simulate the real-life lack of information, confusion and frustrations following a disaster – but it can also lead to frustration amongst the participants.

In future simulations, a short explanation about this approach might help reduce confusion between workshop and simulation formats.

4.4.5 Agenda Options

The agenda was organised over three standard working days, from the normal start to the normal end of the work day. With the typical opening and introduction sessions, this meant that the fieldwork occupied the major part of Day One, but that useful background, for instance on earthquakes, was not provided until Day Two. This structure was used so that work and discussions could be referenced back to the fieldwork, which should be the logical baseline for working with communities after a disaster.

An alternative would have been to start Day One with lunch and the opening and introduction sessions, followed by the background. This would then have been followed by preparations for the fieldwork, which would have taken place the next morning. The remainder of Day Two, Day Three and the first half of Day Four would have focused on using the field data and considering the topical issues at the heart of the simulation. (Also see Too Many Topics?, Section 4.4.12)

4.4.6 Community Assessment

A point raised in during the planning was that many participants already knew how to conduct community-level surveys. Following a disaster, the assessment is a complicated and demanding task, on which much of the subsequent asistance process depends. Using the assessment information to work out what needed to be done was a critical part of the overall simulation process.

Three different ways of simulating the assessment and analysis were considered:

1. Provide participants with a prepared field assessment report. This would have been relatively easy, but participants would have missed learning from simulating the information collection process. In this case, the experience of testing Kobo, both as a real-time tool and a component of a simulation, would have been foregone. This approach can be problematic also because participants have to quickly extract and synthesise the data from long reports.

2. Simulate the field data collection process at the primary simulation venue (in this case at the hotel). A cast of more than 40 people would have been necessary to play the roles of neighbourhood residents to be interviewed, and considerably more space would have been required. Participants would have missed the experience of actually being in a Dhaka neighbourhood, which added atmosphere and hands-on familiarity.

3. Conduct the field data collection in actual neighbourhoods using a real-time approach. This would more closely simulate the challenges of collecting data and managing field work, as well as demonstrating the use of Kobo (discussed below, in Section 4.4.7).

The third option was chosen for this simulation. In practice, the clear downside of this was the travel time (considerably more than planned for the Nawabpur site). Furture simulations should balance the advantages and disadvantages of each option with a preference for field activities.

4.4.7 Kobo

Kobo proved to be a useful tool for collecting and rapidly processing field data (see **Annex A**, and **Annex B** for the tabulated data results). Kobo also proved to be useful for combining hard copy forms and soft copy data collection into a single set of results. The process of converting the draft questionnaire into Kobo format also brought the twin advantages that the survey form was checked for consistency, and the original English was checked against the translation of the document.

This success was likely due to (1) good existing Kobo use capacity within Oxfam, and (2) the availability of appropriate electronic devices, such as web-enabled tablets or phones, among the simulation participants. It would likely be difficult to mobilise 30 organisation-owned tablets for use in a simulation.

The only issues noted were that (1) there was insufficient time between the data collection and use of the data in processed form (12 hours) to correct any mistakes or inappropriate data, and (2) participants received limited training in Kobo, and in the use of the questionnaire, which allowed no time to correct mistakes or demonstrate how to avoid them.

At the same time, these opportunities and challenges could be expected in a real disaster. A solution, for both simulations and real disasters, is to develop, test and train on standardised questionnaires.

4.4.8 Skills and Knowledge

No identification of the skills or knowledge of the participants was undertaken before the simulation. As a result, it was not clear how capable they were of undertaking the tasks. It is therefore difficult to assess whether they performed well. (Also see **Simulation for Learning and Capacity Building**, Section 5.)

The simulation needed participants with skills in a range of topics, including assessment, food security, shelter, WASH, markets, social protection, relief management, recovery management, engineering, and communications. While the topical presentations, for instance on markets, provided some common knowledge to all participants, these sessions were unlikely to have been sufficient for the average participant.

The need to work together to solve challenges is something for which simulations are designed. However, building working groups to which each participant brings different skills and knowledge is difficult without an initial identification or assessment to identify them.

Future simulations should pay more attention to the mix and level of skills and knowledge required to complete the tasks. This is to ensure both the learning and testing components of the simulation are fair and accurate. This is not to exclude individuals without specific skills or knowledge, as the sharing which goes on in a simulation is an important learning process. But it is unfair to expect participants in a simulated disaster to accomplish tasks for which they have no skills or knowledge.

4.4.9 Analysis Tasking

Collecting and analysing data to understand needs and justify assistance is a key part of disaster response. The data collection process was a core element of the simulation, as discussed above. However, the analysis exercise at the beginning of Day Two was relatively unsuccessful, with most working groups facing challenges in completing the task.

There were four reasons for this: (1) insufficient guidance on the task (see below), (2) task complexity (see below), (3) insufficient time (see below) and (4) poor analytical skills and experience amongst some participants (see above).

Analytical skills are an important part of any simulation – whether in direct problem-solving (e.g. how to get from point A to B with blocked roads) or, more generally, in taking often-incomplete information and datasets and making them coherent and useful in defining assistance needs. Future simulations need to compare the complexity of the analysis required with participants' skills and knowledge, and adjust the content, instruction and timing of each analytical session accordingly.

In contrast, the market mapping task was relatively successful, with working groups able to pool knowledge and present coherent analysis of key elements of market segments in Dhaka. This is likely due to (1) the recent focus on cash aid in Bangladesh and the related development of market analysis skills (via Emergency Market Mapping Analysis – EMMA), (2) working with topics with which participants were familiar, and (3) the presentation on markets which covered the mapping of familiar products.

4.4.10 Language and Clarity of Instruction

The simulation was designed for participants with good English language skills. It appeared that not all the participants had these skills. This was compensated for, as is usually the case, by some participants helping to explain presentations and tasks to others. In many ways, this process of having some participants helping other participants is a normal part of a simulation. However, it can slow group work and sideline those participants who cannot fully understand the language.

Sometimes, even when all the participants are fluent in the same language, they may not understand the instructions fully because they have been delivered so quickly. This can slow group work (as discussions are needed within the group to clarify tasks) and cause frustration.

In future simulations, participants' language skills should be assessed. Solutions include: (1) designating members of each working group to explain tasks and session content to those who may not understand; (2) providing written translations of instructions and presentation materials; and (3) using a native-language presenter.

4.4.11 Session Timing

During simulations, the amount of time available for a task is often deliberately limited; this is to, for example, create the stressful situation of a disaster. Nevertheless, most sessions in this simulation were too short, which sometimes led to incomplete group work and to participants not fully understanding what they were doing.

4.4.12 Too Many Topics?

The simulation likely tried to cover too many topics of too complex a nature to fully meet its objectives. The need to pack a lot into a short period generally led to insufficient time for exploring the skills or knowledge of the participants, or developing them.

Future simulations should focus on one topic area (e.g. markets) and a limited range of relief or recovery activities. This will enable participants to learn in more concrete and practical ways. While simulations covering a range of topics may look impressive in a report, the actual result is that little value is added in reducing the impact of disasters. Holding several linked but focused simulations is better.

4.4.13 The Right Mix of Participants?

The broad nature of the simulation, and the focus on markets and social protection, meant that the participant mix should have included government officials involved in social protection and other aspects of responding to an earthquake in Dhaka, as well as the private sector. It had also been the intention to involve participants from the two neighborhoods where the fieldwork took place.

While there were some government and neighbourhood participants, most were from local NGOs or international organisations (IOs). This is not necessarily bad in terms of the skills and knowledge-building outcome. But it could promote a division between NGO or IO staff versed in, for instance, using markets to respond to a major urban earthquake, and government officials who focus on direct relief distributions.

One possible reason the simulation was unable to attract sufficient government and private sector participants was that social protection and markets were not allocated enough time. Following the suggestion above, having more focused simulations could also lead to more sector-specific participation. For instance, a whole three-day simulation focused on markets would be of more interest to the private sector (and would generate more useful results) than two to three hours on the topic within a broader three-day simulation.

4.4.14 Simulating Recovery, not Relief

It did not appear to be clear to all stakeholders that the simulation focused on post-disaster recovery, rather than the immediate relief phase generally considered to run up to three weeks after a disaster.[8] The initial relief phase shifts to a recovery phase when the people affected start to rebuild their lives and return to near-normal conditions, although relief aid can continue for some time during this phase.

Using markets to support food security, or water supplies, or government social protection systems presumes that these systems are in operation. Particularly for a disaster of the scale of the anticipated Dhaka earthquake, these and other systems will take months, if not years, to return to normal operation.

Many participants initially shifted to the more familiar relief focus in the exercises. This is typical of simulations which focus on recovery-related activities, but can limit what participants learn about recovery challenges, which tend to be more complex and diverse.

Future simulations need to include a session on the different phases of disaster relief and recovery – and continually distinguish between them. Again, single focus simulations would be more useful.

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[8] An exception is the water supply system, where an assessment of likely recovery needs has been completed.

5. Simulation for Learning and Capacity-Building

A simulation generally puts participants in situations where they need to use skills and knowledge they have gained from training, experience, self-directed learning, or other means. In this sense, a simulation is a test.

At the same time, simulations can promote learning-by-doing. The concept is that participants will use the experience of undertaking tasks to adjust their knowledge based on what seemed to work or not work. This approach can be strengthened by advice dispensed during the tasks – for instance, an advisor stopping the work of a group to discuss what they are doing, and how it could be done better.

Simulations can, as in the case of Dhaka, be used to assess skill and knowledge levels. But there is a risk here: if the participants are not capable, or only minimally capable, of performing the tasks, an exercise can be seen as a failure – even as the lesson is that more learning is needed (see above on Analysis Tasking, Section 4.4.9, for this type of result).

Most of the Dhaka earthquake simulation participants could have not been expected to have many of the skills and knowledge needed to deal with all the tasks presented. Thus, the Dhaka simulation focused most directly on gaps in skills and knowledge.

Where skills and knowledge were demonstrated, as in the market mapping, there was insufficient time to go into the topic in more depth, which would have helped to assess whether participants had the skills and knowledge to actually solve (rather than just define) the market problem. The same can be said for social protection, food security, WASH, shelter, and other topics raised in the simulation.

The simulation review indicated that many of the participants felt they benefited from the event, and the process identified a number of capacities and gaps in skills and knowledge. But it would have been more effective to assess gaps through focus groups and interviews.

A simulation or, more practically, a series of focused simulations, could be used after a series of training workshops to understand how well this education process had worked, and where additional attention would be needed. This role for a simulation highlights its strengths in defining what participants know, but also that skills and knowledge need to already exist at a level which is commensurate with the challenges the participants will face.

6. Insight into Dhaka Earthquake Preparedness

The simulation provided a useful opportunity, predominantly for NGO and IO staff, to explore the challenges of, and possible solutions to, providing relief and recovery aid following a major earthquake in Dhaka (see Sections 4.3.7 and 4.3.8 above, and Learning Points in **Annex A**). Ideas such as boating water to Dhaka, or using houseboats to shelter displaced populations, are worth investigation – particularly given the expectation that full-steam recovery will not occur until two or more years down the line. This means that long-term, but still interim, solutions across a range of sectors will be needed.

For those participating, the simulation also began the process of differentiating between what should be done as part of immediate relief and what will need to be done as part of the longer transition to full recovery. But, clearly, more planning and capacity development is needed in this area – particularly to define where NGOs and IOs should expect to intervene, where the private sector should be left to its own devices, and where the government needs to take a lead role.

For instance, while the simulation looked at social protection as a relief and recovery opportunity, it is unlikely that a donor will provide US$100 million to an NGO to administer through a government programme. But NGOs may find a major role in housing finance or small-scale loans to reestablish market systems. This division of sectors and recovery tasks needs additional attention, as it will define where NGOs, IOs, and government should focus planning, skill and knowledge-building, and preparedness.

In fact, most of the recovery options identified in the simulation require some level of government engagement, preferably before the disaster, as they represent changes from current practices. An example is how to provide shelter to the 80 per cent of earthquake-affected people who are tenants.

While the simulation generated practical and interesting ideas on how to deal with the challenges of a post-earthquake Dhaka, there was insufficient time to explore them in any depth. The simulation opened the door to post-earthquake planning, but there is considerably more that needs to be done to take the results to any level of practical applicability. For a three-day event, this is probably the best that could be expected.

This paper by independent consultant Charles Kelly focuses on the last of these themes: coordinating urban disaster preparedness. The report describes the process of organising and conducting an earthquake simulation in the city of Dhaka in Bangladesh, an event that represented a key activity for the UCLP project. The simulation was conducted in order to assess the level of readiness of a range of actors for an event that occurs on average every century. The last major earthquake in Dhaka happened more than a hundred years ago, when the population was a tiny fraction of today's estimated 16–18 million people. It was intended that the simulation should illuminate gaps in coordination, delivery mechanisms, and partnerships, which in turn would aid in further planning for a large-scale event.

While the report is an excellent reflection of the simulation that took place, it also serves as a very useful guide for others who may wish to carry out similar exercises in Dhaka or elsewhere.