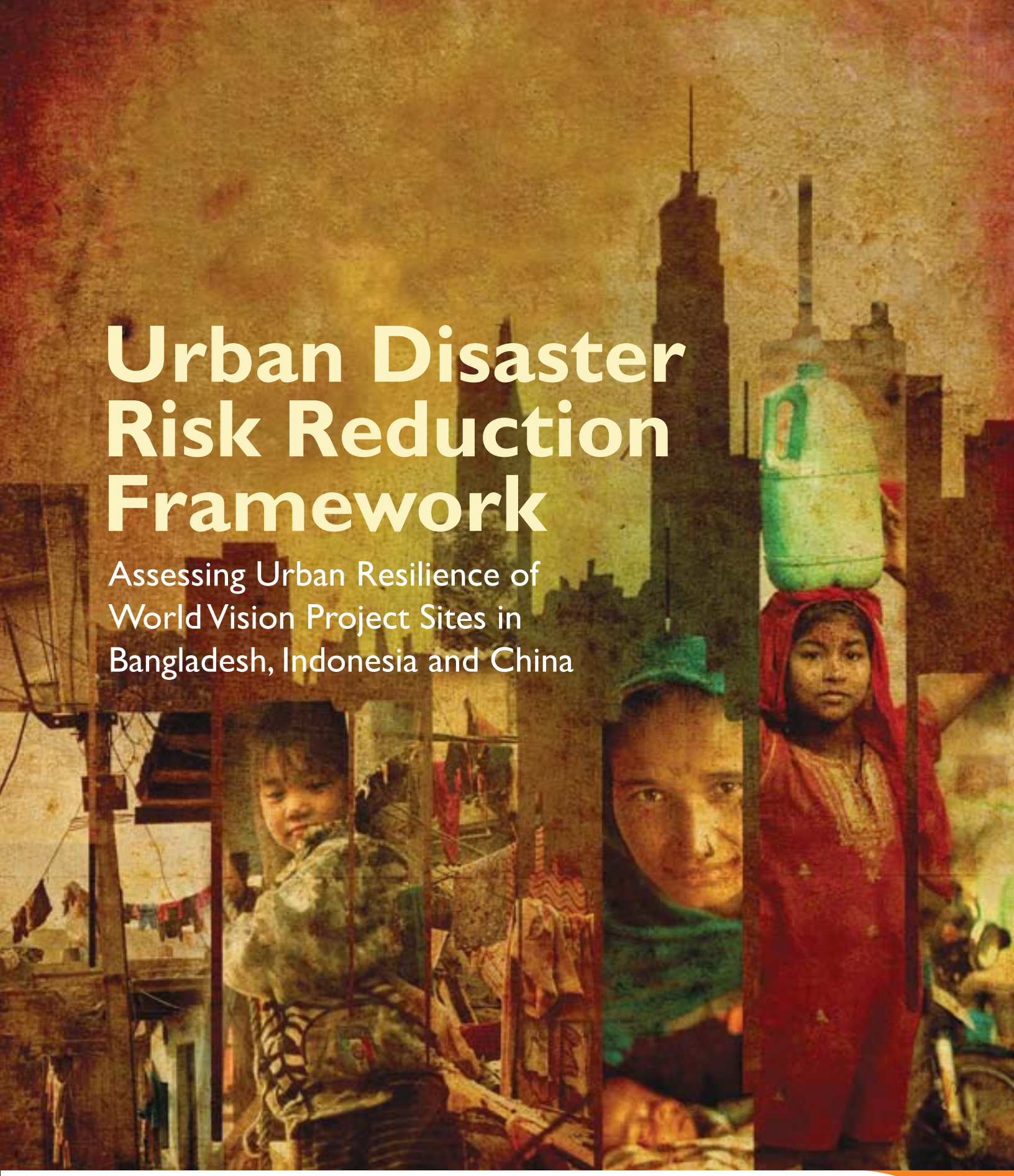

Urban Disaster Risk Reduction Framework

Assessing Urban Resilience of World Vision Project Sites in Bangladesh, Indonesia and China

Final Report – February 2014

World Vision®

The Urban DRR Framework enabled us to have better clarity of our priorities and how well we work with stakeholders. It was what we needed to move forward to develop a new Urban DRR Program. Assessment and training resulted in better knowledge and skills of both staff and the community. This positively contributed to capacity building, greater partnership, and programme integration. Our strategic thrust is to demonstrate citywide programming using DRR as a springboard.

World Vision Bangladesh

The process was important, it was interesting to look at our work from the many perspectives as various priorities and parameters were discussed and measured. We gained good insights into where our strengths are and where we can do better. We are excited to take the next steps to use the assessment results to develop a comprehensive integrated Urban DRR Programme.

World Vision Indonesia

The Urban DRR Framework and going through the process helped us uncover possibilities for innovation and directing focus on outcome, output and activities that will contribute to the well-being of migrant workers' children including developing appropriate and relevant school materials, structure for school-community interaction and collaboration.

World Vision China

Urban Disaster Risk Reduction Framework:

Assessing Urban Resilience in World Vision Project Sites in Bangladesh, Indonesia and China

Final Report – February 2014

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Foreword

The Urban Disaster Risk Reduction (DRR) Framework offers a systematic and pragmatic approach to assessing urban resilience. It enables practitioners and development partners to measure and document their priorities, abilities and strengths. This enables fruitful conversations that lead to better understanding of common areas that need focus and attention. In addition, the process itself gives value because as participants go through it, fresh insights and light dawns on an otherwise complex and convoluted route to urban programming.

This Framework is part of a critical body of DRR work that is continually being developed and which is much needed given the looming threat of rising risks of disasters in the region. Never before has such comprehensive effort been undertaken to assess urban resilience and to demonstrate how with a few well-selected methods of measurement, these can be practically implemented to permit scrutiny of existing situations and potentials on a city level, community level and right down to project areas such as in schools. It also untangles and facilitates discussions and understanding by categorizing critical areas of work and proposes parameters that can be used by leaders and practitioners alike, as performance indicators that will help shape programs and focus efforts.

The reader of this report is encouraged to consider each parameter that has been used and as you go along reading the scores of each participating country; think about how you would score in your own country. We urge you to consider implementing this framework for assessment with your colleagues so that you too can understand your true position in preparedness for urban disasters, and gain insights to take your first steps to develop a holistic urban development programme which takes the complex urban context into consideration, and strengthens the resilience of key stakeholders.

Acknowledgement

This work required the participation and support of many passionate persons. Thank you for your generous help and contribution!

Professor Rajib Shaw, Kyoto University and his Team

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Wilfred Sikukula
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World Vision Center of Expertise for Urban Programming
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World Vision Australia
We wish to acknowledge your generous financial support

Editing, Design and Layout
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Contents

Acronyms

ADP	Area Development Programme
AoRA	Action-oriented Resilience Assessment
CBSO	Community-based support organization
CCA	Climate Change Adaptation
CDRI	Climate and Disaster Resilience Index
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management
GAR	Global Assessment Report on Disaster Risk Reduction
HEA	Humanitarian and Emergency Affairs
HFA	Hyogo Framework for Action
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-Governmental Organizations
NO	National Office
SDRA	School Disaster Resilience Assessment
TD	Transformational Development
UNISDR	United Nations International Strategy for Disaster Reduction
URR	Urban Risk Reduction
WASH	Water, Sanitation and Hygiene
WV	World Vision

Executive Summary

Asia is among the most disaster prone regions in the world. The region is also home to half of the world's urban population. It constitutes one of the world's most rapidly urbanizing regions. Sixty six out of the 100 fastest-growing urban areas are in Asia (Children in an Urban World, The State of the World's Children 2012, UNICEF). As disasters have been increasing, cities have become hotspots of disaster risk. Most cities in the developing world, including cities in this region, are located in areas where earthquakes, floods, landslides and other disasters are likely to happen. Over the last 10 years, climate related disasters have also increased by more than 40%, magnifying the risks that cities are already confronted with; particularly those associated with poverty, lack of basic services, slum formation, unplanned and unstable buildings, houses and infrastructures located in hazard prone areas, pollution and environmental degradation.

"66 out of the **100** fastest-growing urban areas are in Asia"

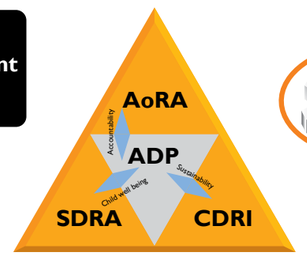
(Children in an Urban World, The State of the World's Children 2012, UNICEF)

Clearly, it is imperative to build and strengthen the resilience of the urban populace, particularly the vulnerable groups, to reduce disaster risk. And as cities serve as economic hubs and provide a vast array of opportunities, it is equally important to address the resilience of urban systems such as water, food and energy. Lastly, the interaction of the populace with urban systems are defined and enabled or limited by institutions, i.e. authority, legal, regulatory, policy frameworks and processes. Reducing vulnerability to disasters and increasing resilience would necessitate reforms and innovations in critical institutions such as land tenure.

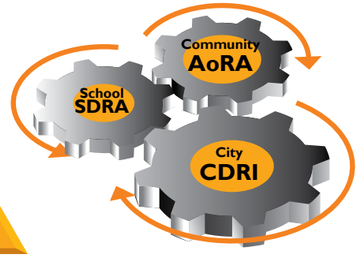
Urban Disaster Risk Reduction (DRR) is complex; nonetheless, it is critical as a means to strengthen the resilience of cities, therefore the Asia-Pacific Community Resilience Project (ACRP), under its urban DRR component, initiated an assessment of selected cities and urban sites. This was done in collaboration with the WV National Offices (NOs) of Bangladesh, China, and Indonesia. This assessment of urban resilience aims to help clarify the priorities of the NOs, show how they work with stakeholders and the kinds of resilience they have or have not achieved. It is hoped that NOs armed with the results of the assessment will be encouraged to develop their own urban DRR programmes. Developing an urban DRR programme requires considering the urban complexities of density, diversity and dynamism. Furthermore, resilience needs will have to be framed with these urban realities calling for innovative and adaptive approaches.

The assessment framework used in this study presents an integrated approach in assessing urban resilience. It is characterized by an understanding of how child well-being can be better addressed given the risks they face in urban settings; as well as how accountability to communities can be improved; and how to foster sustainable development in the lives of vulnerable families and children. It combines four existing frameworks or tools and methodologies. The Hyogo Framework for Action (HFA) was used to understand the National Office's disaster risk reduction priorities. To understand disaster resilience at the city or sub-city level, the Climate and Disaster Resilience Index (CDRI) was used to link resilience to different city services. To assess community resilience, the Action-oriented Resilience Assessment (AoRA) and the School Disaster Resilience Assessment (SDRA) were used. The AoRA aims to understand the collective voices of the community; while the SDRA was utilized to assess school resilience and its linkages with the community. The CDRI, AoRA, and SDRA are connected to five dimensions of resilience analysis, namely, physical, social, economic, institutional, and natural.

Urban DRR/ Resilience Assessment Framework



Disaster Development Linkages in Urban Areas



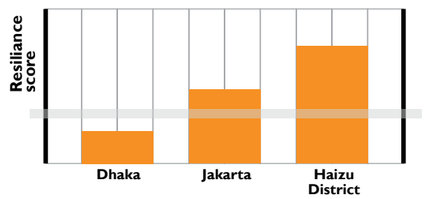
Links to HFA

The pilot NOs selected the following cities for the assessment: Dhaka, Jakarta and Guangzhou. In each of the cities, WV Bangladesh and Indonesia zoomed into administrative units where urban Area Development Programme (ADP)s are being implemented. An ADP is a cluster of households within a geographical unit, e.g. district or province. The typical lifespan of an ADP is 15 years. For WV China, the urban site selected for the assessment is not an ADP but a project-based area.

Key Findings

Climate & Disaster Resilience Index (CDRI): Zonal/Ward/District Level

* The overall resilience scores of the selected zones in Dhaka are below average; while that of the pilot wards in Jakarta are relatively low. China's Haizhu District has higher resilience that is above average.



* The CDRI analysis shows a lower resilience in the physical and institutional dimensions of the selected zones in Dhaka. Social resilience is higher in the two pilot wards in Jakarta. There is higher resilience in Haizhu District in terms of physical, economic and institutional dimensions.

Action-oriented Resilience Assessment (AoRA) : Ward/Neighborhood/Sub-district Level

* Of the 63 resilience-related actions, none has been fully implemented in the pilot wards and neighborhoods in Dhaka and Jakarta. For the Sub-districts of Fengyang and Ruibao in Haizhu, most of the actions are fully implemented, except a few under the physical and social dimensions.

Resilience-related Actions that are Important:		
Bangladesh	Indonesia	China
Training for communities and health sector staff to manage disasters	Provision of post-disaster assistance	Population control measures
Creation of evacuation plans	Provision of alternative back-up generators	Awareness campaign on potential diseases
Development of multi-hazard disaster management plans	Implementation of water harvesting facilities	Skills training for urban peoples
Development of awareness materials	Pre-disaster maps	Training communities to manage disasters

Resilience-related Actions that are Important: (continued)		
Bangladesh	Indonesia	China
Provision of alternative back-up generators	Community assistance packages for disaster prevention	Incorporation of DRR and CCA in all development plans
	Development of disaster awareness material	Incorporation of disaster education in syllabus
	Awareness campaign to reduce air pollution	Reducing discharge of untreated waste into water bodies
	Development of facilities to treat all types of waste	
	Stronger involvement of community in decision-making processes	
	Development of long-term slum removal strategy	

School Disaster Resilience Assessment (SDRA): Schools

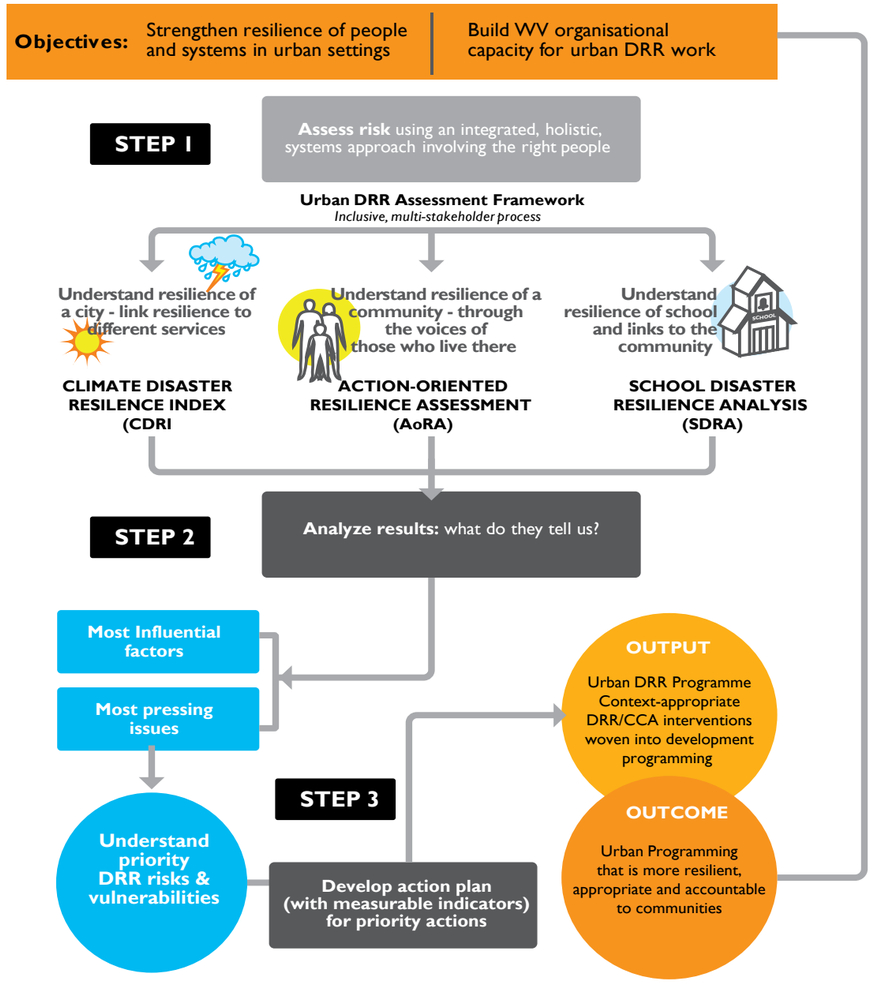
* For pilot schools in Bangladesh, human resources and external relationship are higher in the secondary schools than in the primary schools. Also, natural resilience, e.g. safer school location and surrounding, does not always contribute to a higher overall resilience for the school. On the other hand, pilot schools in Indonesia demonstrate that the location of schools contribute to vulnerability. There is also a higher social relationship with communities, increasing the overall resilience of the school. For China, there is a lack of community involvement with local schools.

* SDRA analysis shows that those with higher social resilience in the CDRI have higher school-community linkages in the SDRA.

Developing Urban DRR Programmes

* Using the results of the assessment, WV Bangladesh has taken another step forward to develop their own urban DRR programme. During an initial workshop in Dec 12, facilitated by Asia-Pacific Resilience Project (ACRP) staff and the regional urban advisor, it was noted the identified priority areas of the various ADPs were similar. This made possible the development of a citywide, Dhaka Urban DRR. Citywide programming using DRR as the springboard, can achieve better integration and effective use of resource.

Urban DRR Assessment & Integration Process



* WV Indonesia has expressed desire to run with the assessment results to develop a comprehensive integrated urban DRR programme.

* WV China will move forward in the direction of articulating focused outcomes, outputs and activities that will contribute to the well-being of migrant workers' children.

Implications for World Vision Operations

* **Recognise ADP work as risk reduction measures and include preparedness**
  Actions associated with HFA 4 (Reduce the Underlying Risk Factors) came out relatively low with HEA staff, both at national and divisional level. This result suggests a lack of integration between the development work carried out by the ADPs and HEA work. As the ADP is a long-term development programme, recognizing ADP work as risk reduction measures and expanding it to include preparedness (risk assessment, monitoring and early warning), response, and adaptation as well as institutional and community education and capacity building, would advance the construct of an integrated urban programming.

* **Child-focused activities of WV also have strong linkages to urban risk reduction**
  Child-focused activities enable the creation and strengthening of linkages with the family, community, state, etc. The SDRA exemplifies an integrated risk analysis approach of the school and establishes the linkages among school, community, city and state. These linkages, when institutionalized, can serve as a platform for an integrated school-community based DRR. Child-focused DRR can also build on basic services such as water, sanitation, electricity, school building and teachers' capacity building.

* **Accountability must be linked with AoRA**
  Accountability issue needs to be linked with the AoRA analysis, where community needs and priorities are surveyed and linked to the city or sub-city priorities. The voices of communities must be reflected in the implementation of risk reduction or urban resilience programs. Another aspect of accountability is the link with local governance to enhance sustainability.

* **Tools to identify target areas, prioritise actions and measure progress**
  CDRI should be conducted in urban areas (either at city or sub-city level) to identify potential target areas for implementation of ADP. The HFA can be used to enhance understanding and capacity of the HEA as well as ADP officers and to establish linkage between the ADP investment and urban disaster risk reduction approaches. CDRI can be used as a yardstick to measure the progress of investment in ADP at regular intervals. The AoRA can be used to prioritise actions in the target area, and initiate community-led implementation as well as to link with other development initiatives being implemented by related stakeholders and to establish an accountability system. The SDRA can be used to identify and prioritise child-focused activities, and can also be a yardstick for measuring the progress in the sector as well as a means to establish school-community relations to foster integrated urban programming.

PART I Research Framework

1. Context: Understanding Underlying Risks within the Urban Growth Process

2. Research Framework

1. Context: Understanding Underlying Risks within the Urban Growth Process

Mainstreaming of risk reduction within the urban planning and development process is non-negotiable since the emergence of risk is engrained in a city's very foundation. When populations migrate to a new location due to economic reasons and settle in unfamiliar atmosphere, their physical as well as social risk levels rise. Such settlements take place in areas not inhabited and are often in locations of high hazard exposure, such as river banks, transportation interchanges, mining or industrial hubs or other such centers of high turnover, high traffic and high risks. Removed from their traditional social safety nets, the urban settlers do not have much to fall back upon in times of crisis. This is particularly true for the urban poor, who live in marginal settlements and sub-standard housing, with limited infrastructure and services, and with very little assets. Given the high population density in urban areas, including high concentrations of vulnerable people, increasing urban disaster risks are key concerns in discussions on the adverse impacts of climate change (Sluis and Aalst, 2006).

In its 2013 World Economic and Social Survey, the UN notes that as "urbanization is proceeding rapidly in developing countries, globalization and financialization are perpetuating inequalities, while exposing countries to greater risks of contagion from crises, and food and nutrition as well as energy security are threatened by competing demands on land and water, as well as environmental degradation."

Cities are growing naturally, through migration and through re-designation of rural and urban areas. Whichever the method, cities are growing faster than ever, and the larger a city, the faster it grows. Within this growth, insensitive or non-inclusive urban land-use planning, urban development and management, all lead to the creation of higher risk levels for some population groups. In most Asian cities, these processes are based on a master planning approach that does not pay adequate attention to the urban poor. In addition, the informal sector does not include local people in the processes and depends on projection-based planning for unrealistic horizons instead of attempting to get close to real-time planning.

Most of the world's poor live in developing countries with rapidly growing populations, where poverty and population growth are reinforcing each other (Brown, 2001). Population pressure coupled with a host of other reasons is resulting in the growth of cities at an unprecedented pace. As there is lack of space to expand, cities are getting denser and are growing vertically. People are now building, living and working on lands that were earlier unoccupied because they were hazard prone, like steep slopes, low-lying lands, floodplains, river beds and drains. At the same time, human actions especially prevailing in the developed parts of the world over the last two centuries or so are now causing global warming and creating risks in an irreversible manner to all areas in general and in particular to mountain, riverine and coastal habitations.

By its very nature of population concentration and developmental densities, urban areas give birth to risks. The informal nature of construction or density increases the risk of structures and

infrastructures. Socially, the safety nets of closely-knit communities are lost, in fact, conflicts between unrelated communities increase. Similarly, there are evidence of environmental degradation, unhealthy living conditions and other factors accumulating risks, and more importantly, weakening resilience.

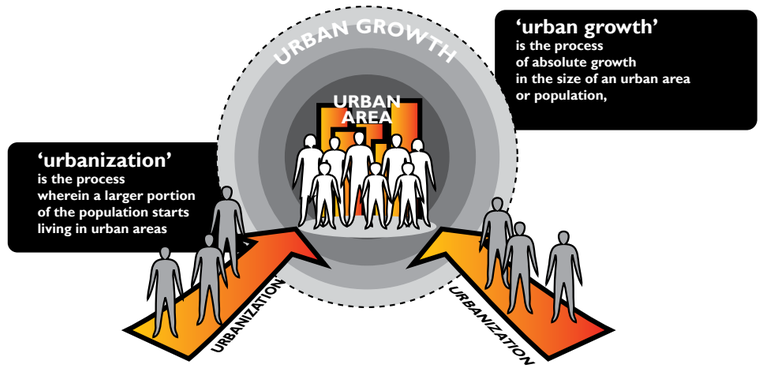
1.1 Urbanization: the Price of Gains

Slum-dwellers now number a billion, but the rush to cities continues. A billion people live in lagging areas of developing nations, remote from globalization's many benefits. Poverty and high mortality persist among the world's "bottom billion", they are trapped without access to global markets, even as others grow more prosperous and live ever longer lives.

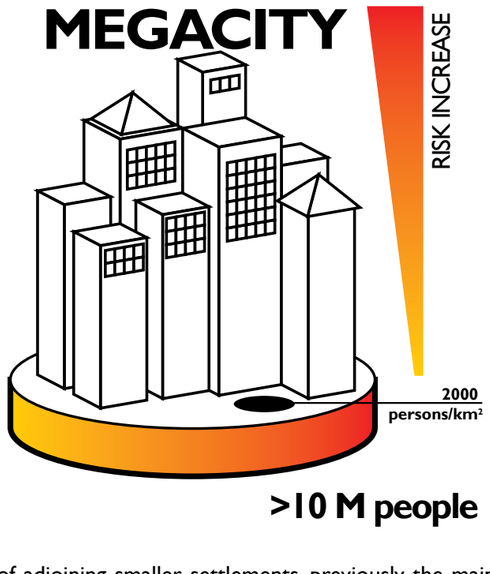
Reshaping Economic Geography reframes debates to include all the instruments of integration—spatially blind institutions, spatially connective infrastructure and spatially targeted interventions. By calibrating the blend of these instruments, today's developers can reshape their economic geography. If they do this well, their growth will still be unbalanced, but their development will be inclusive (Source: World Development Report 2009).

Cities grow throughout their life spans, growing faster as they get bigger. The city center becomes more and more densely populated and turns into a concrete jungle of chaos. The `rural-urban fringe' constantly gets consumed as the cities develop. These peri-urban areas along with small emerging towns are cause for concern since they grow in an ad-hoc manner, leading to sub-standard living conditions, eventually getting subsumed into the city. These emerging urban areas throw up many challenges for risk reduction work.

While ***'urban growth' is the process of absolute growth in the size of an urban area or population, 'urbanization' is the process wherein a larger portion of the population starts living in urban areas.*** Urbanization can be the result of natural growth of the urban population, migration from rural to urban areas and reclassification of rural settlements to urban. The result of all these processes is the accumulation of stresses, and thus risks, in various forms and at different levels.



1.2 Megacities: Bursting at the Seams



A megacity is defined by the United Nations as a metropolitan area with a total population of more than 10 million people. Some definitions also set a minimum level for population density (at least 2,000 persons/square km). A megacity can be a single metropolitan area or two or more metropolitan areas, which have grown to such an extent, that they now form one urban area.
(http://webs.schule.at/website/megacities/definition_en.htm)

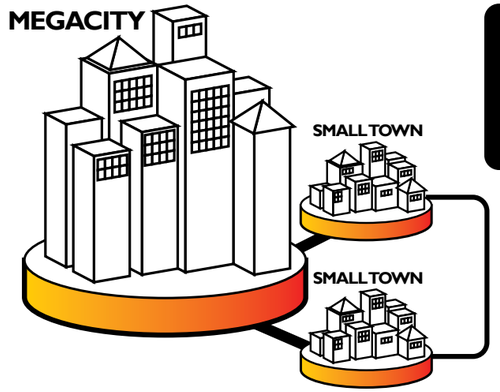
The megacities in the region with a population of more than ten million are the most visible hotspots of risk. They have mostly emerged from metropolitan cities with high economic momentum, thereby leading to a wide-range of economic-base and land use patterns. Most megacities exist in the form of urban agglomerations, wherein a number of adjoining smaller settlements, previously the main city's satellite towns, are now part of the large urban continuum.

1.3 Small Towns: Below the Radar, but Ticking

Though small and medium towns constitute a very large percentage of the total number of urban settlements in the region, a major portion of investments in cities is hogged by the megacities and metropolitan cities, leaving small towns with meager resources to plan, develop and maintain their infrastructure.

An indicator of the dismal status of planning for small and medium towns is the status of their development plans. The Master Plan is the core document that guides the development of a city in the urban planning system. Yet a large number of cities in the region do not have any Master Plans, and base maps. Due to the emergence of satellite imagery, physical attributes can now be mapped for these towns, but the ground verification and usage data is of dismally low quantity and quality. Where Master Plans do exist, they have proved grossly inadequate to guide urban development since they are largely limited to land-use planning and oblivious to the socio-economic and geo-political realities of cities. They are also for unmanageably long horizon periods, usually 20 years, within which many ground realities will change drastically. In addition, they are prone to hijacking and abuse by political and commercial vested interests. In slums, this is of particular concern - dense and often unsafe, there is little awareness of the physical dimensions or how to plan for physical needs that would enhance a neighbourhood's prospects for resilience.

In such realities, the citizens of small towns live a life that is full of allurements of urban jobs and lifestyles, but deprived of locally available opportunities. Towns are riddled with poor roads, power supply, public health and hygiene and also lacking in other physical and social infrastructure. One of the most critical problems faced by these settlements is of water and sanitation as rapid urbanization has not been matched with improvement in infrastructures and service delivery.



Towns are riddled with poor roads, power supply, public health and hygiene and also lacking in other physical and social infrastructure.

1.4 Peri-Urban: the 'Fringe'

Peri-Urban literally means on the fringe of a city. As a city grows, it consumes rural lands around it. Land that is on the outskirts of a growing city undergoes significant transformation, and so do the lives of the people living in such areas. While some of the transformations are beneficial and bring the conveniences and wealth of urban life, others can be equally detrimental to the quality of life. Such areas, earlier also known as the rural-urban fringe, are called peri-urban areas.

While city governments are unable to provide for this surge of population, the rural areas just outside the city start cashing in on the demand for products, services and land for the growing informal economy. Given that most of the thousands of cities in the region are undergoing such growths, the magnitude of peri-urban lands and populations undergoing transformation is phenomenal. Unfortunately, almost all of this transformation falls under the category of 'growth' and not 'development'. It is random, ad-hoc, unplanned, highly polluting, based on economic opportunities that are unequally distributed and irreversible.

1.5 Shocks and Stresses

A city is exposed to different types of risks, which can be classified into shocks and stresses (Figure1). ***Shock is an unusual event for which an urban community, or a household, does not have the resources to withstand.*** This ranges in scale and nature; it may be natural or a manmade hazard. Natural hazards include earthquakes, tsunamis (hydro-meteorological events), cyclones/typhoons and floods (climate related events). A manmade hazard can be a fire, bomb blast or accident that is not immediately expected, strikes with a suddenness and rapid onset, which has devastating impact.

Stresses erode assets and increase vulnerability in a slow creeping manner, often not making headlines. They may include unsanitary conditions that lead to poor health and resultant loss of daily wages. At a deeper level, they may include hyper-inflation diminishing purchasing power and destroying savings.

In the IPCC (Intergovernmental Panel on Climate Change) definition, the key elements determining vulnerability are exposure, risk and adaptive capacity. It is important to make a conceptual distinction between risk and vulnerability. Risk is conventionally understood as the likelihood or probability of occurrence of an adverse exogenous event - in this case climate shocks or stresses. This impact-oriented or risk-oriented approach focuses largely on the physical processes underlying vulnerability to climate change and disasters (Brooks 2003).

Figure 1

Shocks:

Low probability but rapid onset and high impact events that cause immediate and visible damage to lives, property and environment:
- Earthquakes
- Cyclones
- Tsunami
- Fires
- Epidemics
- Conflict & terror

Stresses:

Slow onset and low impact processes that are of high probability, particularly in the context of the urban poor, and showcase a day-to-day continuum of hardships:
- Poverty
- Slumming
- Water-sanitation & public health
- Poor drainage
- Water shortage/drought
- Rising sea level

The concept of urban resilience is based on the inherent capacity of cities to bounce back or recover after disasters. The concept of resilience is closely related to risk reduction and it is useful to understand risk reduction tools in order to be able to build resilience in cities.

"Because urban and rural areas are, in fact, interdependent, policies based on the traditional separation of rural and urban economies can inhibit economic growth and damage spatial planning. In reality, a continuum links all settlements and their economies—from isolated farms, through villages, to market towns and regional centers that are surrounded by farmland, on to large urban centers and even megacities, and beyond to their ever-

growing suburbs and sprawling peri-urban areas. Coordinating the growth of urban and hinterland economies, and strengthening economic linkages between the city and surrounding areas, are likely to foster improved opportunities for both urban and rural development, particularly for the poor. Building on and improving these links, including transport and communications infrastructure, should be a priority". (ADB, 2008, pp III-IV)

Asia's share in the world GDP has risen noticeably since 1980 (WB, 2009), which is largely contributed by the Asian urban agglomerations. Migration from villages and hinterlands to cities remains lucrative. Both 'push and pull factor', the magnetic appeal of cities to offer opportunities at the cost of marginalized living, have been at the center of this movement in Asia. Despite serious concerns and a few attempts by various governments to discourage migration to cities, the success has been abysmal. This trend will be aggravated by climate induced changes; some academics refer to such migrants as 'Climate or Environmental Refugees' and this trend is going to raise serious consequences. Estimates suggest that there will be 200 million 'climate refugees' over the world by 2050 (IOM, 2008).

A study on climate change commissioned by Greenpeace India discloses that rising sea level could force about 75 million people from low-lying Bangladesh and another 50 million from India's densely populated coastal regions to migrate to interior towns and cities. This may generate severe tensions and instability in the context of already dwindling urban resources (Greenpeace, 2008). IPCC informed in 2007 that India's glaciers are melting fast and if steps are not taken to mitigate this, there will be likelihood of water shortage in rivers and flooding of coastal regions.

2. Research Framework

2.1 Background

This research, under the Asia Pacific Community Resilience Project (ACRP), intends to support national offices (NOs) to address rapid urbanization and increasing disaster risk in the region, in line with World Vision Asia Pacific's strategy. The research was conducted in close collaboration with the national offices (NO) of World Vision (WV). In most cases, the Humanitarian and Emergency Affairs (HEA) NO staffs and ADP managers were requested to facilitate the survey. Pilot studies were conducted in Bangladesh (Dhaka), Indonesia (Jakarta) and China (Guangzhou). To understand the perspectives and priorities of the HEA on disaster risk reduction tasks, a HFA (Hyogo Framework for Action) questionnaire containing 20 related tasks at city/local level was used as a measurement tool.

Currently, the study focuses primarily on climate-related disasters like flood, typhoon or cyclone, water scarcity, heat waves and flood-induced landslides. However, with small modifications, the framework can also be used for geological hazards like earthquakes and tsunamis.

2.2 Hyogo Framework for Action (HFA) adopted for urban areas

Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters (HFA) was formulated as a comprehensive, action-oriented response of international concern about the growing impacts of disasters on individuals, communities and national development. The HFA was adopted by 168 Governments at the United Nations World Conference on Disaster Reduction (January 2005 in Kobe, Hyogo, Japan) and was endorsed unanimously by all the United Nations Member States at the United Nations General Assembly in the same year (Matsuoka, Sharma & Shaw 2011).

The expected outcome of the HFA is substantive reduction of losses in lives and social, economic and environment assets of communities and countries due to disasters. The HFA provides comprehensive action-oriented policy guidance based on a broad understanding of disaster risks, which arise from human vulnerability to natural hazards. It consists of three strategic goals and five priority areas that assist states to systematically monitor their efforts in DRR. UN Member States are required to report biennially on their progress of HFA implementation to the United Nations International Strategy for Disaster Reduction (UNISDR).

The "Global Assessment Report on Disaster Risk Reduction (GAR) 2011: Revealing Risk, Redefining Development" is the second edition of a global resource and analysis compiled by the UNISDR, which was issued at the mid-point of the HFA 2005-2015. During the year 2010, the mid-term review of the HFA implementation was conducted by UNISDR. While certain progress has been made in HFA implementation by national governments with support from international and regional agencies, the need for implementation at local level has been strongly recognized. In addition, GAR 2011 acknowledges the central role of local governments in Disaster Risk Reduction and Management (DRRM). It also

highlighted that a failure to strengthen local governments and make progress in community participation means that the gap between rhetoric and reality is widening (UNISDR 2011). Such a gap is being addressed through international initiatives such as the UNISDR World Campaign on "Making Cities Resilient 2010-2015" which promotes local governments from around the world to take action in implementing DRR activities.

To support local government to undertake comprehensive actions to reduce disaster risks, the HFA implementation guideline for local governments called "A Guide for Implementing the Hyogo Framework for Action by Local Stakeholders" was developed by UNISDR in partnership with Kyoto University (Matsuoka, Sharma and Shaw, 2011). The Guide is for local governments and other local stakeholders and provides tools for DRR implementation, evaluation, and monitoring at a local level. It consists of 20 tasks (Table 1) which have been adapted from the 22 tasks of "Words into Action", the implementing guide of the HFA five priorities for action which was developed in 2007 by UNISDR and partners.

Table 1: Guide for Implementing the HFA: 20 Tasks drawn from HFA five priorities for local governments and stakeholders

Local/city governance (HFA Priority 1 related): Make DRR a priority	
Task 1.	Engage in multi-stakeholder dialogue to establish foundations for disaster risk reduction.
Task 2.	Create or strengthen mechanisms for systematic coordination for DRR.
Task 3.	Assess and develop the institutional basis for disaster risk reduction.
Task 4.	Prioritise disaster risk reduction and allocate appropriate resources.
Risk assessment and early warning (HFA Priority 2 related): Know the risks and take action	
Task 5.	Establish an initiative for community risk assessment to combine with country assessments.
Task 6.	Review the availability of risk-related information and the capacities for data collection and use.
Task 7.	Assess capacities and strengthen early warning systems.
Task 8.	Develop communication and dissemination mechanisms for disaster risk information and early warning.
Knowledge management (HFA Priority 3 related): Build understanding and awareness	
Task 9.	Raise awareness of disaster risk reduction and develop education program on DRR in schools and local communities.
Task 10.	Develop or utilize DRR training for key sectors based on identified priorities.
Task 11.	Enhance the compilation, dissemination and use of disaster risk reduction information.
Vulnerability reduction (HFA Priority 4 related): Reduce risk	
Task 12.	Environment: Incorporate DRR in environmental management.
Task 13.	Social needs: Establish mechanisms for increasing resilience of the poor and the most vulnerable.
Task 14.	Physical planning: Establish measures to incorporate disaster risk reduction in urban and land-use planning.
Task 15.	Structure: Strengthen mechanisms for improved building safety and protection of critical facilities.
Task 16.	Economic development: Stimulate DRR activities in production and service sectors.
Task 17.	Financial/economic instruments: Create opportunities for private sector involvement in DRR.
Task 18.	Emergency and public safety; disaster recovery: Develop a recovery planning process that incorporates DRR.
Disaster preparedness (HFA Priority 5 related): Be prepared and ready to act	
Task 19.	Review disaster preparedness capacities and mechanisms, and develop a common understanding.
Task 20.	Strengthen planning and programming for disaster preparedness.

2.3 Climate and Disaster Resilience Index (CDRI)

To address city level resilience, the CDRI tool was developed; it provides a comprehensive baseline assessment and addresses the linkages between the physical-, social-, economic-, institutional-aspects and natural components of a city or urban area. Accordingly, the CDRI is a planning tool, which has the objective to disclose the sectors that are least resilient or not capable to respond adequately in the event of a climate-related disaster. Table 2 shows the five dimensions and 25 parameters/indicators shaping the overall content of the latest CDRI questionnaire.

Table 2: Content of CDRI questionnaire, 5x5 matrix (dimensions and parameters)

Physical	Social	Economic	Institutional	Natural
Electricity	Population	Income	Mainstreaming of DRR and CCA	Intensity/severity of natural hazards
Water	Health	Employment	Effectiveness of zone's crisis management framework	Frequency of natural hazards
Sanitation and solid waste disposal	Education and awareness	Household assets	Knowledge dissemination and management	Ecosystem services
Accessibility of roads	Social capital	Finance and savings	Institutional collaboration with other organisations and stakeholders	Land-use in natural terms
Housing and land-use	Community preparedness during disaster	Budget and subsidy	Good governance	Environmental policies

The various modifications of the CDRI over time and at different urban level (cluster-, city-, or micro-level) led to the current version (Table 3) where different aspects of resilience define the CDRI parameters.

Table 3: Dimensions, Parameters, and Variables of CDRI questionnaire

ECONOMIC	**Electricity** - access, availability, supply capacity, alternative capacity **Water** - access, availability, supply capacity, alternative capacity **Sanitation and solid waste disposal** - access to sanitation, collection of waste: treated, recycled, collection of solid waste after a disaster **Accessibility of roads** - % of land transportation network, paved roads, accessibility during flooding, status of interruption after intense rainfall, roadside covered drain **Housing and land-use** - building code, buildings with non-permanent structure, buildings above water logging, ownership, population living in proximity to polluted industries
SOCIAL	**Population** - population growth, population under 14 and above 64, population informal settlers, population density at day and night **Health** - population suffering from waterborne/vector-borne diseases, population suffering from waterborne diseases after a disaster, access to primary health facilities, capacity of health facilities during a disaster **Education and awareness** - literacy rate, population's awareness about disasters, availability of public awareness programmes/disaster drills, access to internet, functionality of schools after disaster **Social Capital** - population participating in community activities/clubs, acceptance level of community leader (in ward), ability of communities to build consensus and to participate in city's decision-making process (level of democracy), level of ethnic segregation **Community preparedness during a disaster** - logistics, materials and management, provision of shelter for affected people, support from NGOs/CBOs, population evacuating voluntarily, population participating in relief works

ECONOMIC	**Income** - population below poverty line, number of income sources per household, income derived in informal sector, % of households having reduced income due to a disaster **Employment** - formal sector: % of labour unemployed, % of youth unemployed, % of women employed, % of employees coming from outside the city; % of child labour in zone **Household assets** - households having: television, mobile phone, motorized vehicle, non-motorized vehicle, basic furniture **Finance and savings** - availability of credit facility to prevent disaster, accessibility to credits, accessibility to credits for urban poor, saving practice of households, household's properties insured **Budget and subsidy** - funding of DRM, sufficiency of budget for DRR, availability of subsidies/incentives for residents to rebuild houses, alternative livelihood, health care after a disaster
INSTITUTIONAL	**Mainstreaming of DRR and CCA** - mainstreaming in: zone's development plans, ability (manpower) and capacity (technical) to produce development plans, extent of community participation in development plan preparation process, implementation of disaster management plan **Effectiveness of zone's crisis management framework** - existence and effectiveness of an emergency team during a disaster: leadership, availability of evacuation centres, efficiency of trained emergency workers during a disaster, existence of alternative decision-making personnel **Knowledge dissemination and management** - effectiveness to learn from previous disasters, availability of disaster training programmes for emergency workers, existence of disaster awareness programmes for communities, capacity - books, leaflets, etc. to disseminate disaster awareness programmes (disaster education), extent of community satisfaction from disaster awareness programmes

	Institutional collaboration with other organisations and stakeholders, during a disaster - zone's dependency on external institutions/support, collaboration and interconnectedness with neighbouring zones, zone's cooperation with (support from) central corporation department for emergency management, cooperation with zone's ward officials for emergency management, zone's institutional with collaboration with NGOs and private organisations **Good governance** - effectiveness of early warning systems, existence of disaster drills, promptness of zone body to disseminate emergency information during a disaster to communities and transparency of zone body to disseminate accurate emergency information, capability of zone body to lead recovery process
NATURAL	**Intensity/severity of natural hazards** - floods, cyclones, heat waves, droughts (water scarcity), tornados **Frequency of natural hazards** - floods, cyclones, heat waves, droughts (water scarcity), tornados **Ecosystem services** - quality of city's: biodiversity, soils, air, water bodies, urban salinity **Land-use in natural terms** - area vulnerable to climate-related hazards, urban morphology, settlements on hazardous ground, amount of Urban Green Space (UGS), loss of UGS **Environmental policies** - use of zone level hazard maps in development activities, extent of environmental conservation regulations reflected in development plans, extent of implementation of environmental conservation policies, implementation of efficient waste management system e.g. Reduce, Reuse, Recycle (RRR), implementation of mitigation policies to reduce air pollution

How the CDRI questionnaire is completed depends on the context. In general, the methodology consists of having different departments within a local government, mainly the planning department, to provide the answers. Answers can be drawn either from secondary data for quantitative questions or through evaluation and estimation (best possible answer) for qualitative questions and also for those quantitative questions where no data is available. Since the context for data collection varies from study to study, methodologies are also changing (Shaw and Sharma 2011).

Once the data is collected, it is inserted into spreadsheets (for example, Microsoft Excel) and the weighted mean is calculated in a simple analysis to deliver the results. Further analysis is then sought out of the 125 variables and numerous weightings to understand the resilience of each dimension and parameters and identify where risk reduction can be built or strengthened.

Various examples are given in the following chapters where the results of CDRI studies are presented. Spider diagrams are used to show the varying conditions of different dimensions and parameters for a selected type of urban area. Besides the mapping out of results, correlations between dimensions, parameters, and variables have the potential to develop connections between different aspects. For instance, in the study from Gulsan et al. (2011), high correlations are shown between parameters of income and household assets emphasizing that there is a clear connection between availability of money (income) and its transformation into wealth (household assets). Accordingly, context-based analyses allow drawing the right solutions for the effective development of sound solutions and practices in those sectors where the condition is lowest. This is also discussed later in this chapter.

The range of scores of the CDRI results is between 1 (low) and 5 (high); however numerical value is not the most important aspect in understanding the overall CDRI or dimension-wise results. What is more important in interpreting the scores is to evaluate which dimensions, parameters, or variables are particularly low or high in order to take action in those sectors. The reasons for this more qualitative interpretation of the results are as follows: firstly, a standardization of CDRI scores is not yet available and would be too premature at this stage due to the limited number of case studies; secondly, the context of each city or part of a city is varying with regards to topographical and geographical aspects; thirdly, the key aims of the CDRI are to reduce the risks and to make urban more prepared and capable to withstand climate-related disasters which means that qualitative interpretation of the weaker and stronger sectors of a city is sufficient to spur this process of risk reduction by planning ahead.

2.4 Action-oriented Resilience Assessment (AoRA)

AoRA (Action-oriented Resilience Assessment) adopts the same five dimensions and 21 out of the 25 parameters from the CDRI (see Table 4). According to the findings from the initial CDRI assessment, three action measures for each parameter are defined to understand the current level of implementation of these selected actions. The practical approach of this assessment aims to find out to what extent different actions require multi-stakeholder engagement or if a top-down, governmental-led planning is sufficient.

Through a questionnaire, respondents are requested to tick whether or not an action is already fully implemented, available or functioning in their neighborhood. In a second step, respondents rank the three actions in each parameter according to their priority from 1 to 3, except for actions that are already fully implemented.

Table 4: Considered dimensions and parameters of AoRA from Climate Disaster Resilience Index (CDRI)

	Dimensions				
	Physical	**Social**	**Economic**	**Institutional**	**Natural**
Parameters	Electricity	Population	Employment	Mainstreaming of DRR and CCA	Ecosystem services
	Water	Health	Finance and savings	Effectiveness of zone's crisis management framework	Land-use in natural terms
	Sanitation and solid waste disposal	Education and awareness	Budget and subsidy	Knowledge dissemination and management	Environmental policies
	Accessibility of roads	Social capital		Institutional collaboration with other organisations and stakeholders	
				Good governance	
	Housing and land-use	Community preparedness during disaster			
Remaining parameters not considered in AoRA			Income		Intensity/ severity of natural hazards
			Household assets		Frequency of natural hazards

A total of 63 actions (equally divided into 21 parameters) were identified based on results from the previously conducted CDRI and literature review on how resilient communities are understood. In addition to the results from this initial assessment, the actions formulated in the AoRA have been derived from various on-site visits, extensive desktop studies focusing on lessons learned from previous disasters and other guidance (Joerin et al., 2012).

Instead of entering into a discussion on how each of the 63 actions is defined, the following key points, for each dimension, emphasize on the importance of the selected 21 parameters to be available and functioning in a disaster resilient urban community:

Physical: studies (Cannon et al., 2003; Gaillard et al., 2008; Twigg, 2007) on post-disaster livelihood assessments emphasize, for example, on the need for people to have secure electricity and water supply to recover quickly from a disaster. In other words, a solid physical infrastructure is crucial for urban areas to absorb a disaster. Thus, apart from functioning urban services, the built environment (e.g. houses) needs to meet the highest building and engineering standards.

Social: various scholars (Cannon et al., 2003; Paton, 2003; Murphy, 2007) stress the beneficial support of strong social capital, social networks and disaster awareness among communities; not only to withstand a disaster, but also to better respond to it. Furthermore, Tobin and Whiteford (2002) point out that intact and well-functioning health capacities (facilities, networks) during situations of disaster manifestly reduce avoidable losses of human lives.

Economic: Rose (2004, 2007) emphasizes the adequate allocation of financial resources and effective organization of the economic sector to support and develop incentives to reduce losses from disasters. Available insurance schemes and financial systems have the potential to provide pre- and after-disaster funding (public and private) which are beneficial to provide economic sustainability against disaster.

Institutional: the mainstreaming of climate change adaptation (Trohanis et al., 2009) alongside effective emergency management (McEntire, 2001) are two aspects which require a strong institutional setup to ensure their implementation or functioning before and after a disaster.

Natural: the protection of the natural environment (ecosystems, urban green space) is crucial to reduce the probability of disasters occurrence and to uphold its coping capacity during times of disasters.

From the above, it can be seen that the term "resilience" in the field of disaster risk management involves extremely multi-disciplinary applications. Hence, the AoRA proposes a set of actions for all the five dimensions and identified key parameters to understand community priorities in enhancing or building their resilience. The selection of actions aims to correspond to the needs of a particular urban area in relation to enhancing its resilience to climate-related disasters. The detailed description of the actions is shown in the results from the applied case study. Four parameters (income, household assets, the severity and frequency of climate-related hazards) from the CDRI are not considered and are not associated with actions due to their complex nature, for example, the amount of available household assets depends on the available income of a household (Parvin et al., 2011) and also on their members' employment situation. Thus, specific actions to increase income depend on the availability and quality of employment. Equally difficult to take action is to limit the severity and frequency of climate-related hazards as their occurrence and strength depend on processes which are only indirectly related to human activities and are difficult to predict precisely (IPCC, 2007).

To briefly conclude, the AoRA has as its key aim to understand the priorities of communities. Knowing the communities' resilience enhancing actions has the potential to ease the actual implementation of the actions and potentially offers more participatory-led development. Accordingly, processes that enhance the resilience of an urban area are expected to become more widely accepted among communities. (http://webs.schule.at/website/megacities/definition_en.htm)

2.5 School Disaster Resilience Assessment (SDRA)

DRR in education is a multifaceted issue which encompasses far more than school curriculum, it also includes school safety, risk assessment, availability of human resources, collaboration, network among stakeholders, etc. Therefore, in this part, the physical conditions, human resources and external relationships are taken generally and are applicable to other vicinities, while the institutional issues and natural conditions are specific to the local context. The institutional issues are embedded within school context, thus reflecting how a school manages itself in improving its disaster resilience under the local context of culture, history and development. This also enhances the natural condition of that particular area.

Table 5 (Thi et al., 2012) shows the set of indicators including the five dimensions of human resources, institutional issues, external relationships and natural conditions. Each of them is further explained by 3 parameters and 15 variables (Table 5).

Table 5. Parameters and Variables used to measure Disaster Resilience of Schools

Dimensions	Parameter	Variables
Physical conditions	School buildings	Regular checks on school buildings
		Safety building codes
		Emergency exit door
		Evacuation shelter
		Damage of infrastructure by disaster
	Facilities and equipment	Regular checks on facilities and equipment
		Damage of facilities and equipment by disaster
		Emergency supplies (emergency bag, storage food, water...)
		Renovation/repair of damaged facilities and equipment
		Eco-facilities/equipment system
	Hygienic and environmental conditions of school	Environmental protection campaign
		Regular checks on hazardous materials
		Food safety conditions
		Collected garbage
		Recycle system
Human resources	Teachers and staff	Affected by disaster
		Knowledge about disaster
		Disaster preparedness training programme for teachers & staff
		Participation in disaster management programme
		Sharing of disaster preparedness plan for teachers and staff

	Students	Affected by disaster
		Knowledge about disaster
		Disaster management training programme for students
		Participation in disaster management programme
		Sharing of disaster preparedness plan for students
	Parents / Guardians	Parent-Teacher Association meeting
		Disaster management training programme for parents
		School-home emergency notification
		Sharing of disaster preparedness plan for parents
		Involvement of parents in disaster management activities
Institutional issues	Planning	Incorporation of disaster management into school planning
		Incorporation of disaster components into school regulation
		Incorporation of disaster components into school syllabus
		Preparedness and emergency management plan
		Recovery management plan
	Management	School early warning system
		Disaster information
		Disaster management activities
		Disaster management groups
		Training for disaster management groups
	Budget	Budget allocated for disaster management training activities
		Budget allocated for disaster preparedness and response
		Budget allocated for renovation/repair/rebuilding after disaster
		Budget allocated for monitoring disaster
		Budget allocated for supporting students with special needs
External relationships	Collaboration	Meeting with local Department of Education and Training (DoET)
		Meeting with local people committee
		Communication system
		Early warning from local government
		Collaboration with local government
	Relationship of school with community	Location of school in local community
		School used as evacuation shelter for local community
		Participation of school in disaster management activities held by local community
		Support from local community
		School involvement in disaster management plan of local community
	Mobilizing funds	Funding from local government
		Funding from parents association
		Funding from local community
		Funding from other organizations
		Shifting budget
Human resources	Severity of natural hazards	Floods
		Storms (strong winds)
		Heat waves
		Sea intrusion
		Drought (water scarcity)
	Frequency of natural hazards	Floods
		Storms (strong winds)
		Heat waves
		Sea intrusion
		Drought (water scarcity)
	Surrounding environment	Location of school in high risk area
		Distance to nearest river/stream/sea
		Distance to local government office
		Distance to police station
		Distance to hospital/health center

Similarly to the CDRI, data for the SDRA is collected using a questionnaire which covers five dimensions with each dimension consisting of three parameters. Furthermore, each of the parameter has five variables to measure the resilience of schools. A scale of 1 to 5 is used to weigh each variable, with the score of 1 being the worst ranking, poor or not available/non-existent and a score of 5 being the best. After each variable is scored, it is graded against the other variables within the same parameter. In this way, the parameters are weighed according to their importance within the school's context between 1 (not important) and 3 (very important).

PART II Urban Risk Reduction (URR) Analysis

Acronyms

ADP	Area Development Programme
AoRA	Action-oriented Resilience Assessment
CBSO	Community-based support organization
CCA	Climate Change Adaptation
CDRI	Climate and Disaster Resilience Index
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DRRM	Disaster Risk Reduction and Management
GAR	Global Assessment Report on Disaster Risk Reduction
HEA	Humanitarian and Emergency Affairs
HFA	Hyogo Framework for Action
IPCC	Intergovernmental Panel on Climate Change
NGO	Non-Governmental Organizations
NO	National Office
SDRA	School Disaster Resilience Assessment
TD	Transformational Development
UNISDR	United Nations International Strategy for Disaster Reduction
URR	Urban Risk Reduction
WASH	Water, Sanitation and Hygiene
WV	World Vision

3. URR Analysis of Sites in Bangladesh

Overview

Bangladesh is one of the most hazard-prone countries in South Asia. It is vulnerable to cyclones, floods, droughts, and earthquakes. Furthermore, climate change poses a great risk for Bangladesh, with projected impacts on the country including rising sea levels, higher temperatures and increase in cyclone intensity.

Disasters brought about by hazards, including climate change impacts, are heightened by the country's rapid urbanization. Dhaka, one of the world's megacities, carries the distinction of being the fastest growing according to the World Bank. Rapid urbanization, not only in Dhaka but in the other metropolitan cities of the country – Chittagong, Khulna, and Rajshahi – has witnessed the growing formation of informal settlements, unplanned and unstable buildings, severe shortage of basic urban services and facilities, pollution and the disappearance of water bodies and greeneries. All these add to the vulnerability of Bangladesh's urban residents to natural disasters. In Dhaka, almost 30% of the city's population lives in slums along the water's edge, exposing them to flooding, water logging, and water-related diseases.

The following assessment of **two ADPs**, namely, **Kamalapur** which is under the Dhaka South City Corporation (DSCC), and **Dhaka East**, a peri-urban which belongs to Zone 9 and under the jurisdiction of the Union Parishad, illustrate the multiple and complex risks that the city is exposed to. The CDRI questionnaire was administered at the zonal level; Zone 5 for Kamalapur and Zone 9 for Dhaka East. Respondents to the survey include the zonal executive officer, ward secretary, the chairman, and the secretary of the union council. To obtain evidence-based information, the respondents had three days to fill-up the CDRI.

For the AoRA, four wards were selected for focus group discussions (FGDs). In each ward, residents from slums where WV works in were invited for the FGD. For Kamalapur ADP in Zone 5-DSCC, 20 residents representing two slums - the 14 Outfall and the Telegue Sweeper Colony, joined the FGD. The ward secretary and a representative from the union council also participated in the FGD which was facilitated by the disaster management point person. For Dhaka East ADP, there were 113 participants, including residents of the slums of Sonakatra & Moynarbag, upper middle class residents within the ward, public representatives and teachers. Of these, there were 99 female and 14 male.

Lastly, for the SDRA questionnaire, a key informant's interview was conducted with the school headmaster, teachers and school management committee members. Two schools in each ADP, one primary and one secondary, were selected for the SDRA. Both schools in the Dhaka East ADP, Anandanagar Adarsha High School and Shahid Tujo Rej Primary School are semi-government schools, i.e. school authorities receive some benefits and the school facilities are from the government. For Kamalapur, the primary school, Mugdapar, is a government school, while City Corporation Adarsha High School is a private school.

3.1 HFA Bangladesh

A group of six people responded to the HFA for local stakeholder questionnaires. They included the director of HEA, two HEA officers in the national office and three HEA officers at divisional offices.

The results show a clear difference at the NO based on level of responsibilities: The director of HEA has given more importance on institutional issues [HFA priority 1] and information dissemination and capacity building [HFA 3] as the key priority areas of activities. For their part, the HEA officers put more emphasis on risk assessment and disaster education, awareness raising and capacity building activities [HFA 2 and 3] as the key areas. In general, the underlying causes of risk reduction [HFA 4] get relatively lower priority at the national level. This is rather significant given that many of WV activities especially at the ADP level focuses on poverty, health and basic human needs issues, which are closely related to the vulnerability and underlying risk factors. Emergency preparedness and response [HFA 5], for natural reasons get higher priority at the national level.

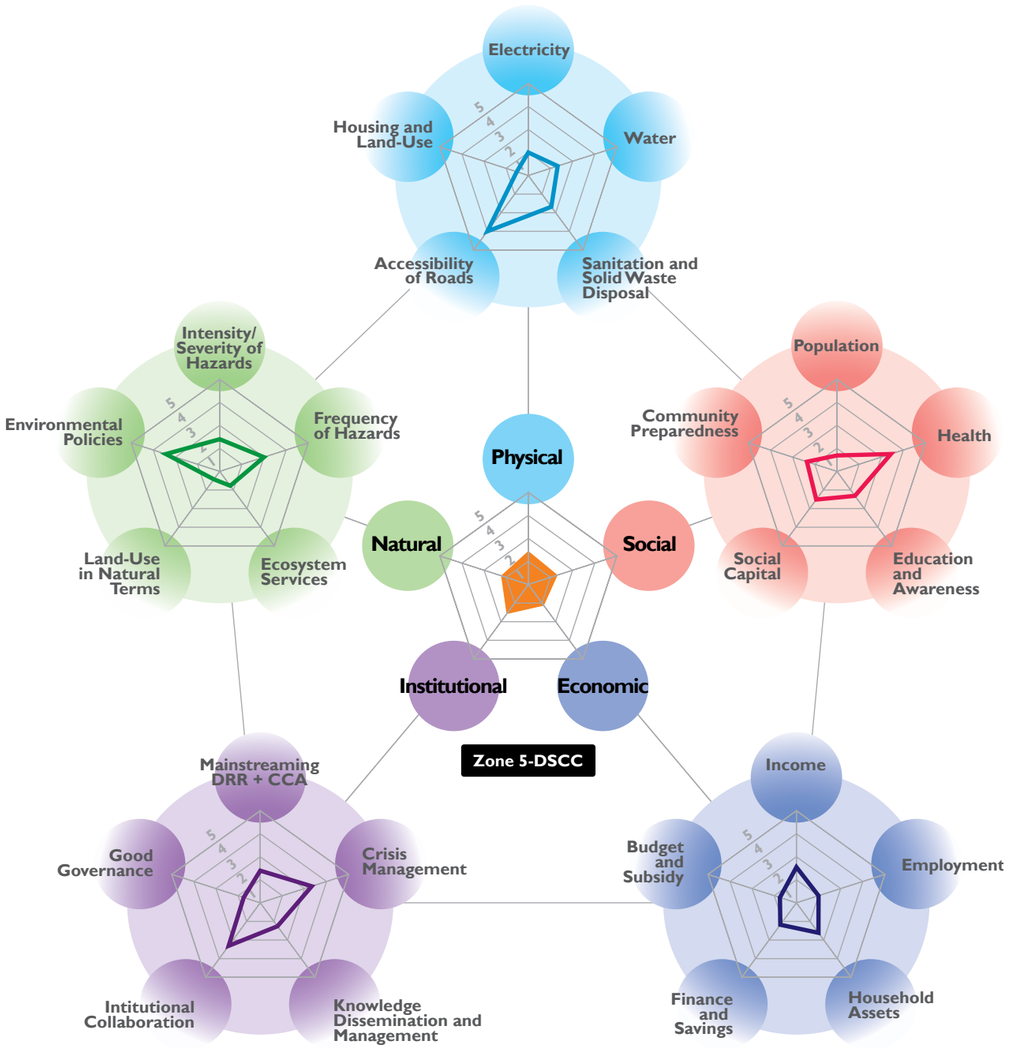
At the divisional level, the responses from the three HEA officers are rather uniform as they put equal emphasis on HFA 1, 2 and 3. Not all the tasks are relevant to them, but at least more than half of the designated tasks for HFA 1, 2 and 3 get higher priority. The HFA 4 has a mixed response, similar to the NO response. As mentioned in the previous paragraph, this has a strong significance and needs to be looked at carefully to integrate the risk reduction activities in ADP programmes. HFA 5 is given unanimous high priority, which is close to the HEA mandate.

HFA Priorities	Survey Results		
	HEA Director (NO)	HEA Officers (NO)	HEA Officers (Division)
HFA 1: **Institutionalization**	**High Priority**	Low Priority	**High Priority**
HFA 2: **Risk Assessment**	Low Priority	**High Priority**	**High Priority**
HFA 3: **Education, Training**	**High Priority**	**High Priority**	**High Priority**
HFA 4: **Underlying Risk Factors**	Low Priority	Low Priority	Low Priority
HFA 5: **Emergency Response**	**High Priority**	**High Priority**	**High Priority**

HFA priorities from HEA survey respondents

3.2 CDRI Bangladesh

CDRI MAPPING: Zone 5-DSCC



CDRI DIMENSION: Dhaka South City Corporation (DSCC) - Zone 5

Physical
In this zone, almost all the people have access to electricity; however, potable water is accessible for only up to 50% of the population and is only available for 3-5 hours every day. More than 60% of the people have access to hygienic sanitation, while only up to 60% of the waste is collected, none of which is treated before dumping. All of the roads in this zone are paved and remain accessible during normal flooding in affected areas. However, during heavy rainfall, up to 70% of all roads in affected areas are interrupted over a period of 12 hours. Up to 60% of the roads have roadside covered drain. Buildings constructed following the building code is less than 10%, hazardously, more than 30% are of non-permanent structure and less than 50% are above normal/flood water logging.

Social
This zone is experiencing urbanization trends due to high population growth per year (more than 6%) and a rather young demographic structure with up to 44% below 14. The number of people suffering from vector-borne disease is higher (more than 24%) than waterborne disease (up to 17%). During times of disaster, this trend is likely to increase, since only 50% of the people have access to health facilities and most are economically poor. In terms of education and awareness, some people have knowledge of the threats and impacts of disasters, but their participation in the zone's decision-making process is weak. Some religious groups have difficulties in connecting with other groups from other religions and most of the households are not prepared for disaster.

Economic
Income level in this zone is rather low; up to 40% of the population lives below the poverty line and most households depend on only one income source. In addition, many people are unemployed, especially young people (more than 25%). Household assets like television or mobile phones are available for most households, but only less than 20% own a motorized-vehicle. There is no availability and accessibility to credit facility to help overcome disasters and guard against future disasters; only less than 10% have insurance. There is neither annual budget for disaster risk management nor risk reduction measures in this zone. However, there are some subsidies/incentives available for residents to receive health care after a disaster.

Institutional
The zone's institutional resilience is just average, mainly because people are not well-informed about disasters. This gap is due to the lack of public awareness programs, disaster education and disaster drills. On the other hand, the crisis management framework is strong due to the presence of an effective emergency team with good leadership and competence. However, there is no availability of training for emergency workers, thus leading to a more ad hoc disaster management team. DRR and CCA are poorly incorporated in zone development plans. In terms of governance, the zone authority's transparency, ability during disaster to disseminate accurate emergency information to communities and its capability to lead recovery process, is poor.

CDRI DIMENSION: Dhaka South City Corporation (DSCC) - Zone 5 (continued)

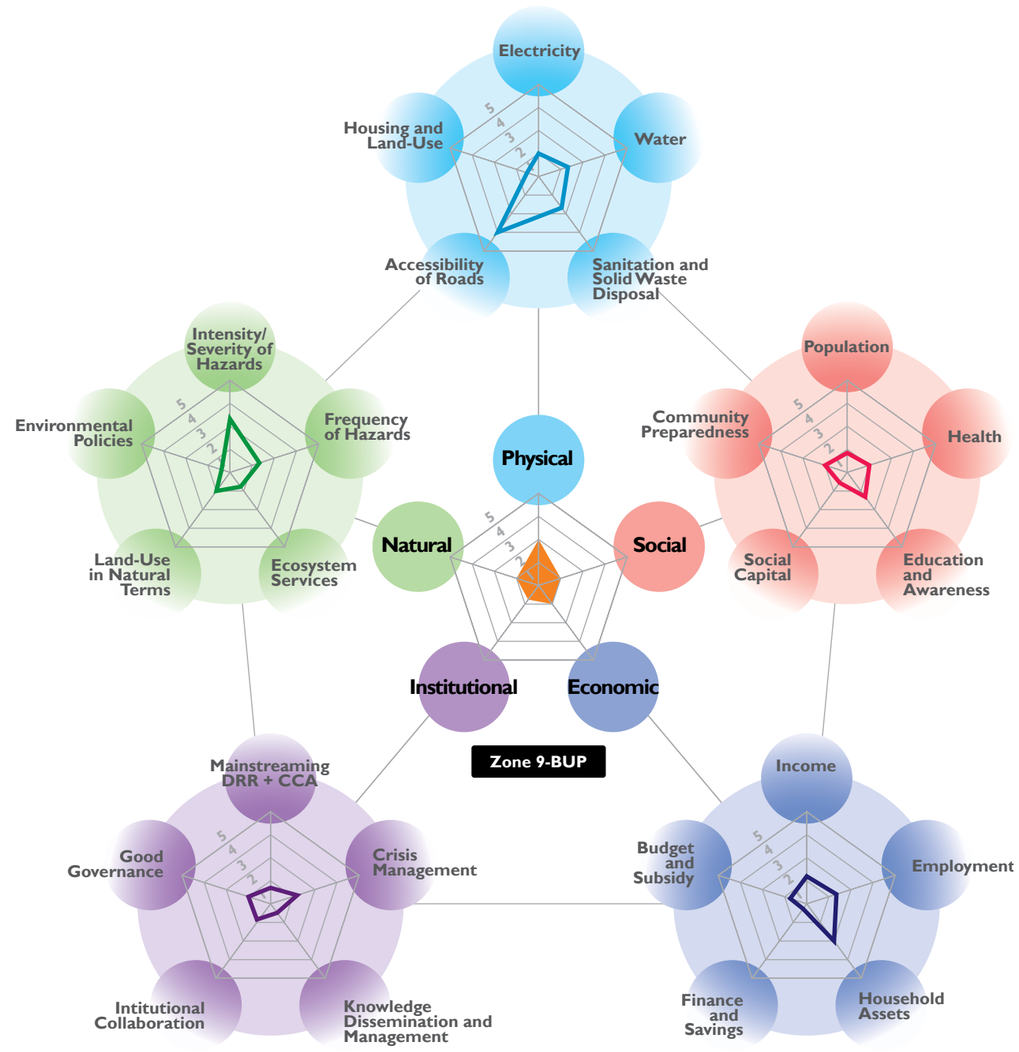
Natural

The natural resilience of this zone is affected by the very severe cyclones and tornados that occur more than once per year. In terms of ecosystem services, the urban soil and water quality in this zone is very poor and affected by high level of salinity. In terms of land-use, the zone area is vulnerable to climate-related hazards. The area has lost more than 40% of green areas and has less than 1% of urban green space. However, the extent of implementation of efficient waste management system is good.

Overall

In summary, Zone 5-DSSC has a resilience score of 2.33 (5 being very good and 1 being very poor). All resilience dimensions score below the average, with the exception of the institutional dimension, which is just above the average (physical= 2.48, social= 2.32, income= 2.08, institutional= 2.57, and natural= 2.21). The 3 highest average parameters scores are in: accessibility of roads, education and awareness, and institutional collaboration, while the 3 lowest average parameters scores are in: population, land-use in natural terms, and housing and land-use.

CDRI MAPPING: Zone 9-BUP



CDRI DIMENSION: Zone 9 - Badda Union Parishad (BUP)

Physical
Close to 100% of the people have access to electricity, but only 66-80% has safe water that is available for a period of up to 5 hours per day. Less than 75% of the zone's population has access to hygienic sanitation. Up to 60% of the waste is collected and treated before dumping. Most roads are paved and only half of them are accessible during normal flooding in the affected areas, which are likely to be interrupted for a maximum of 8 hours after heavy rainfall. Almost 60% of the roads are equipped with roadside covered drain. In terms of housing and land-use, more than 50% of the houses are constructed following the building code. Only less than 30% of the houses are of non-permanent structure and less than 30% above plinth level. Around one third of the population lives in proximity to polluted sites.

Social
The population growth per year in this zone is high (more than 6%), but still more than 40% of the people live in slum areas and the demographic structure is unfavorable due to loss of lives during disasters, resulting in up to 40% of people being below 14 or above 64. The population density per square km is high with more than 15,000 people. Many people suffer from waterborne disease (more than 24%), but only few from vector-borne disease. Capacities of primary health facilities are limited before and during a disaster. In terms of education and awareness, the literacy and awareness of people about disasters is poor, which is due to the zone authority's infrequency in organizing public awareness programs and drills (once every five years or less). To some extent, the social capital is also poor and none of the households are prepared for disaster.

Economic
The economic situation for many people and households is difficult, with up to 40% of all people living below the poverty line. More than 75% depend on income from the informal sector and usually experience reduced incomes in the aftermath of a disaster. Furthermore, most households depend on only one income source. Unemployment rates are high with more than 25% of people unemployed. Households do have assets such as television, but less than 20% have a non-motorized vehicle; this reflects limited opportunities for wealth accumulation. There is no provision of credit facility for residents to take precautionary measures against future potential disasters as well as subsidies to rebuild houses after a disaster. There is also no zone budget for risk reduction measures.

Institutional
The institutional capacity to deal with disaster situations is low. In particular, the zone does not have the ability and the capacity to produce development plans, and the existence and effectiveness of the emergency team during a disaster is poor. There is even no decision-making personnel who is available during a disaster. Knowledge dissemination and management is also weak because there are no disaster programmes and capacity for dissemination of disaster awareness. Collaboration with neighboring zones for emergency management during a disaster is also nonexistent. Additionally, there are no early warning systems led by the zone authority, and promptness and transparency during a disaster, to disseminate emergency information to communities is lacking.

CDRI DIMENSION: Zone 9 - Badda Union Parishad (BUP) (continued)

Natural
The natural resilience of this zone is below average and is characterized by poor urban soil, water and air quality. In addition, the high level of urban salinity has highly affected the population in the area. In terms of land-use, more than 50% of the settlements are located on hazardous ground with almost no green spaces (less than 1%). The entire zone is suffering from more than 40% of urban green space losses. From the environmental policies aspect, the extent of environmental conservation regulations reflected in development plans is poor and hazard maps (at zone level) are only used in up to 10% of development activities.

Overall
In summary, Zone 9-BUP has the resilience score of 2.19 (5 is very good and 1 is very poor). All the resilience dimensions score below average, with the exception of the physical dimension, which is above (physical= 3.08 social= 1.95, income= 2.05, institutional= 1.90, and natural= 1.95). The 3 highest average parameters scores are in: electricity, water, and intensity/severity of natural hazards; while the 3 lowest average parameters scores are in: finance and savings, environmental policies, and community preparedness during a disaster.

3.3 AoRA Bangladesh

Figure 2a. Action-oriented Resilience Assessment (AoRA) – Implementation levels in Wards, Bangladesh

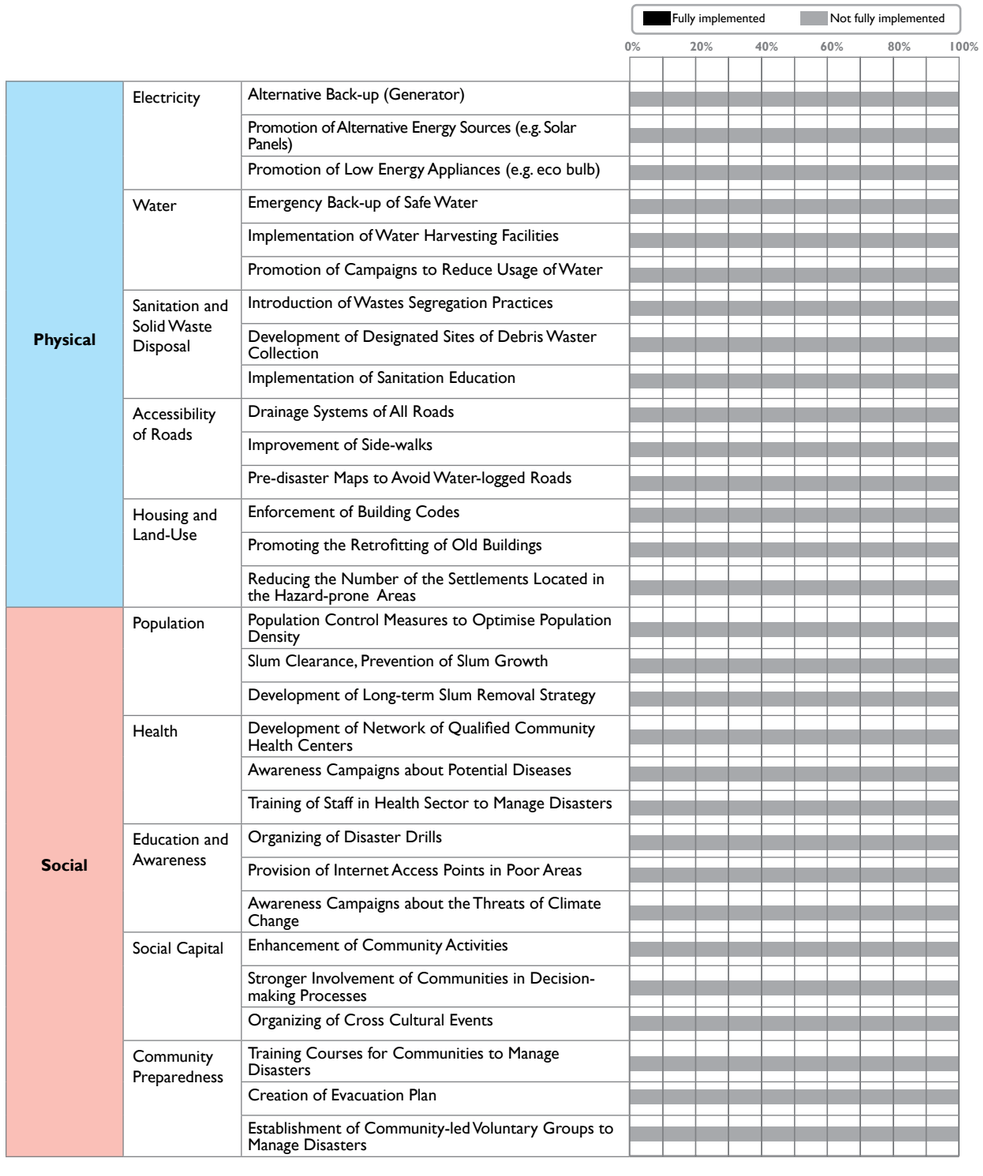


Figure 2b. Action-oriented Resilience Assessment (AoRA) – Implementation levels in Wards, Bangladesh (continued)

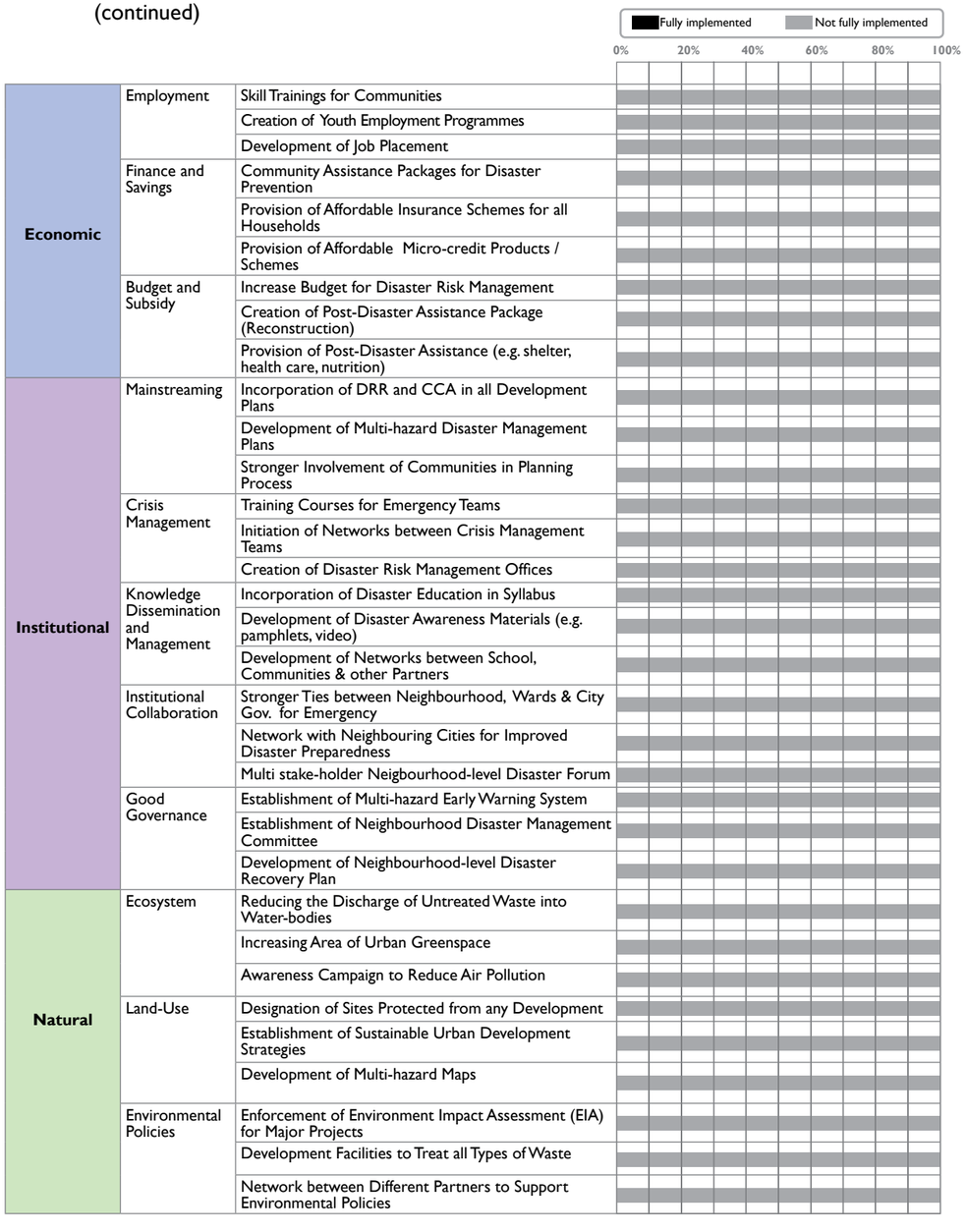
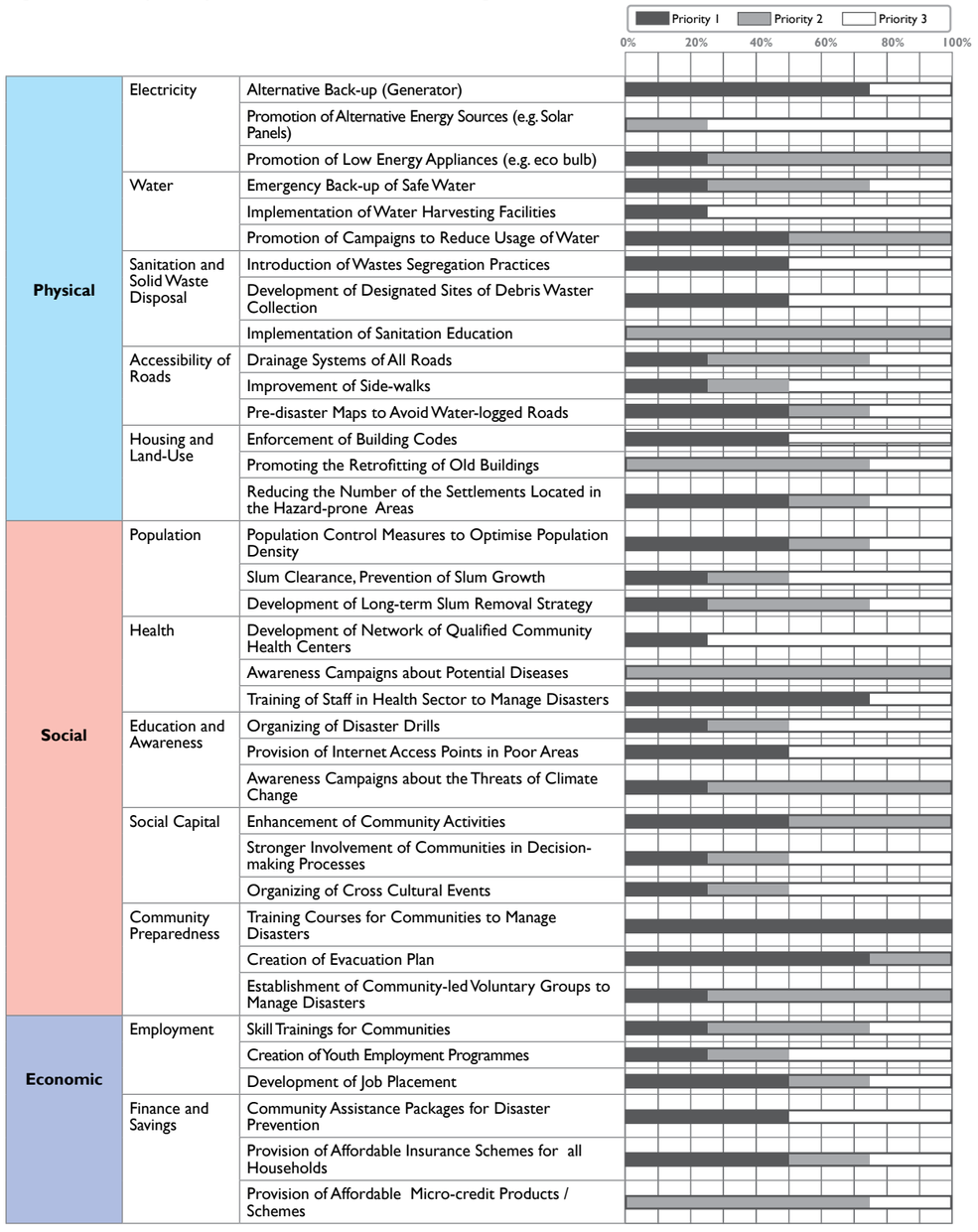
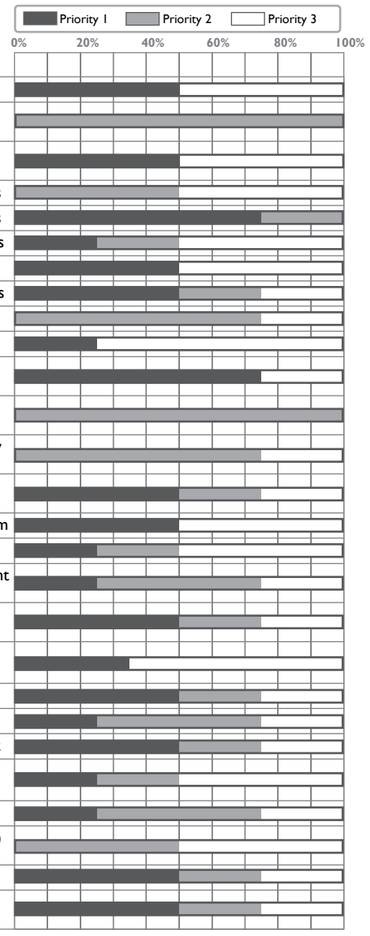


Figure 3a. The priority level of AoRA in Wards, Bangladesh



Physical	Electricity	Alternative Back-up (Generator)
		Promotion of Alternative Energy Sources (e.g. Solar Panels)
		Promotion of Low Energy Appliances (e.g. eco bulb)
	Water	Emergency Back-up of Safe Water
		Implementation of Water Harvesting Facilities
		Promotion of Campaigns to Reduce Usage of Water
	Sanitation and Solid Waste Disposal	Introduction of Wastes Segregation Practices
		Development of Designated Sites of Debris Waster Collection
		Implementation of Sanitation Education
	Accessibility of Roads	Drainage Systems of All Roads
		Improvement of Side-walks
		Pre-disaster Maps to Avoid Water-logged Roads
	Housing and Land-Use	Enforcement of Building Codes
		Promoting the Retrofitting of Old Buildings
		Reducing the Number of the Settlements Located in the Hazard-prone Areas
Social	Population	Population Control Measures to Optimise Population Density
		Slum Clearance, Prevention of Slum Growth
		Development of Long-term Slum Removal Strategy
	Health	Development of Network of Qualified Community Health Centers
		Awareness Campaigns about Potential Diseases
		Training of Staff in Health Sector to Manage Disasters
	Education and Awareness	Organizing of Disaster Drills
		Provision of Internet Access Points in Poor Areas
		Awareness Campaigns about the Threats of Climate Change
	Social Capital	Enhancement of Community Activities
		Stronger Involvement of Communities in Decision-making Processes
		Organizing of Cross Cultural Events
	Community Preparedness	Training Courses for Communities to Manage Disasters
		Creation of Evacuation Plan
		Establishment of Community-led Voluntary Groups to Manage Disasters
Economic	Employment	Skill Trainings for Communities
		Creation of Youth Employment Programmes
		Development of Job Placement
	Finance and Savings	Community Assistance Packages for Disaster Prevention
		Provision of Affordable Insurance Schemes for all Households
		Provision of Affordable Micro-credit Products / Schemes

Figure 3b. The priority level of AoRA in Wards, Bangladesh (continued)



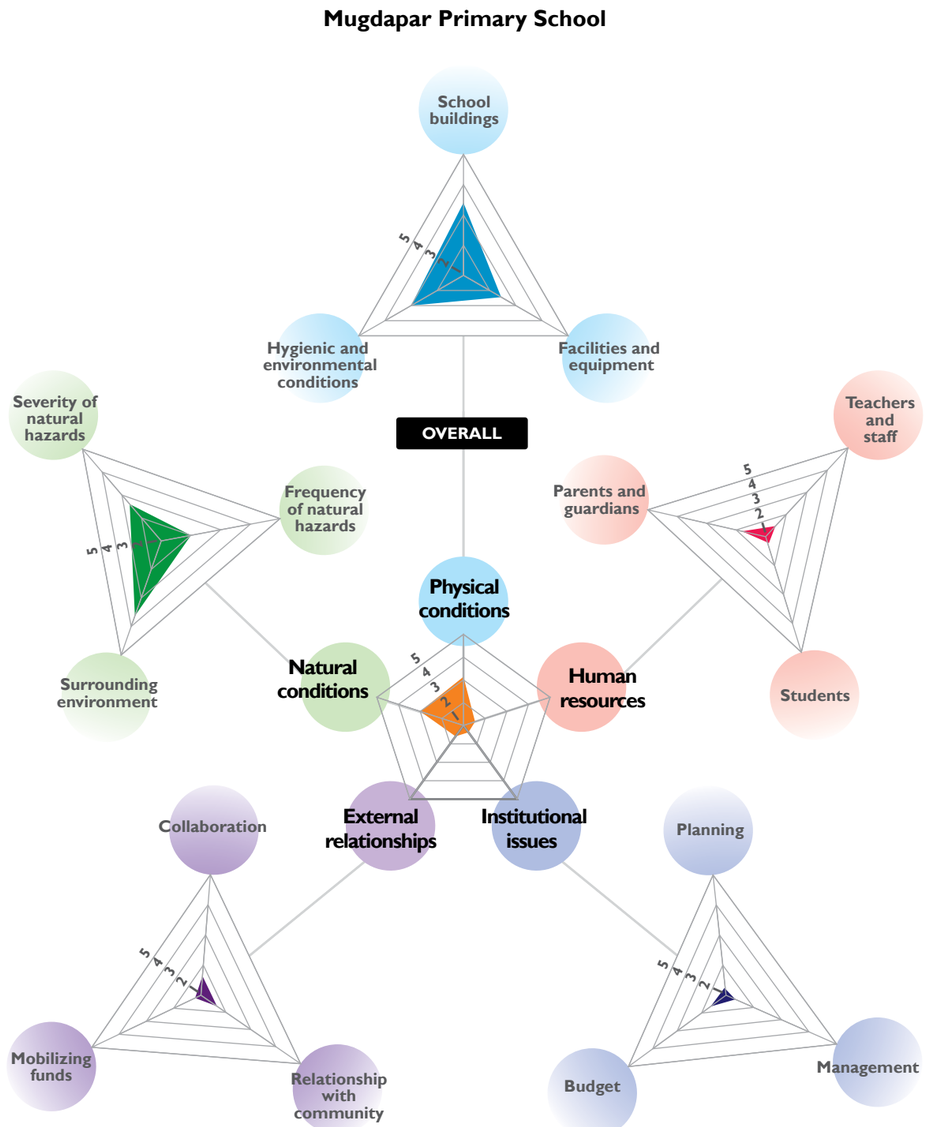
Economic	Budget and Subsidy	Increase Budget for Disaster Risk Management
		Creation of Post-Disaster Assistance Package (Reconstruction)
		Provision of Post-Disaster Assistance (e.g. shelter, health care, nutrition)
Institutional	Mainstreaming	Incorporation of DRR and CCA in all Development Plans
		Development of Multi-hazard Disaster Management Plans
		Stronger Involvement of Communities in Planning Process
	Crisis Management	Training Courses for Emergency Teams
		Initiation of Networks between Crisis Management Teams
		Creation of Disaster Risk Management Offices
	Knowledge Dissemination and Management	Incorporation of Disaster Education in Syllabus
		Development of Disaster Awareness Materials (e.g. pamphlets, video)
		Development of Networks between School, Communities & other Partners
	Institutional Collaboration	Stronger Ties between Neighbourhood, Wards & City Gov. for Emergency
		Network with Neighbouring Cities for Improved Disaster Preparedness
		Multi stake-holder Neigbourhood-level Disaster Forum
	Good Governance	Establishment of Multi-hazard Early Warning System
		Establishment of Neighbourhood Disaster Management Committee
		Development of Neighbourhood-level Disaster Recovery Plan
Natural	Ecosystem	Reducing the Discharge of Untreated Waste into Water-bodies
		Increasing Area of Urban Greenspace
		Awareness Campaign to Reduce Air Pollution
	Land-Use	Designation of Sites Protected from any Development
		Establishment of Sustainable Urban Development Strategies
		Development of Multi-hazard Maps
	Environmental Policies	Enforcement of Environment Impact Assessment (EIA) for Major Projects
		Development Facilities to Treat all Types of Waste
		Network between Different Partners to Support Environmental Policies

Findings

The AoRA questionnaire was completed by the leaders, in consultation with community members of wards 49-1 and 49-2 in Zone 5-DSCC and wards 3 and 7 in Zone 9-BUP. The results of this AoRA carried out in Bangladesh show that all actions are not yet fully implemented (see Figure 2).

The priority level for each action in AoRA is shown in Figure 3. The actions with the highest priority (more than 50%) chosen by the ward leaders and community members are: training courses for communities and staff in health sector to manage disasters, creation of evacuation plans, and development of multi-hazard disaster management plans and disaster awareness materials (e.g. pamphlets, video), and alternative back-up generators.

3.4 SDRA Bangladesh



SDRA DIMENSION: Mugdapar Primary School

Physical conditions
For this government primary school, physical conditions score highest, with high scores for both school buildings and hygienic conditions, although the score for facilities was quite low. The provision of emergency supplies is inadequate, as only a first aid box and loudspeakers are available. In addition, not more than half of damaged equipment and facilities have been repaired or replaced after disaster had occurred.

Human resources
The score for human resources is quite low. Among the three factors that contribute to human resource resilience, students contribute the least. This is likely because the role of students in disaster risk reduction activities has not been fully recognized. Also, there is no disaster training course designed for students.

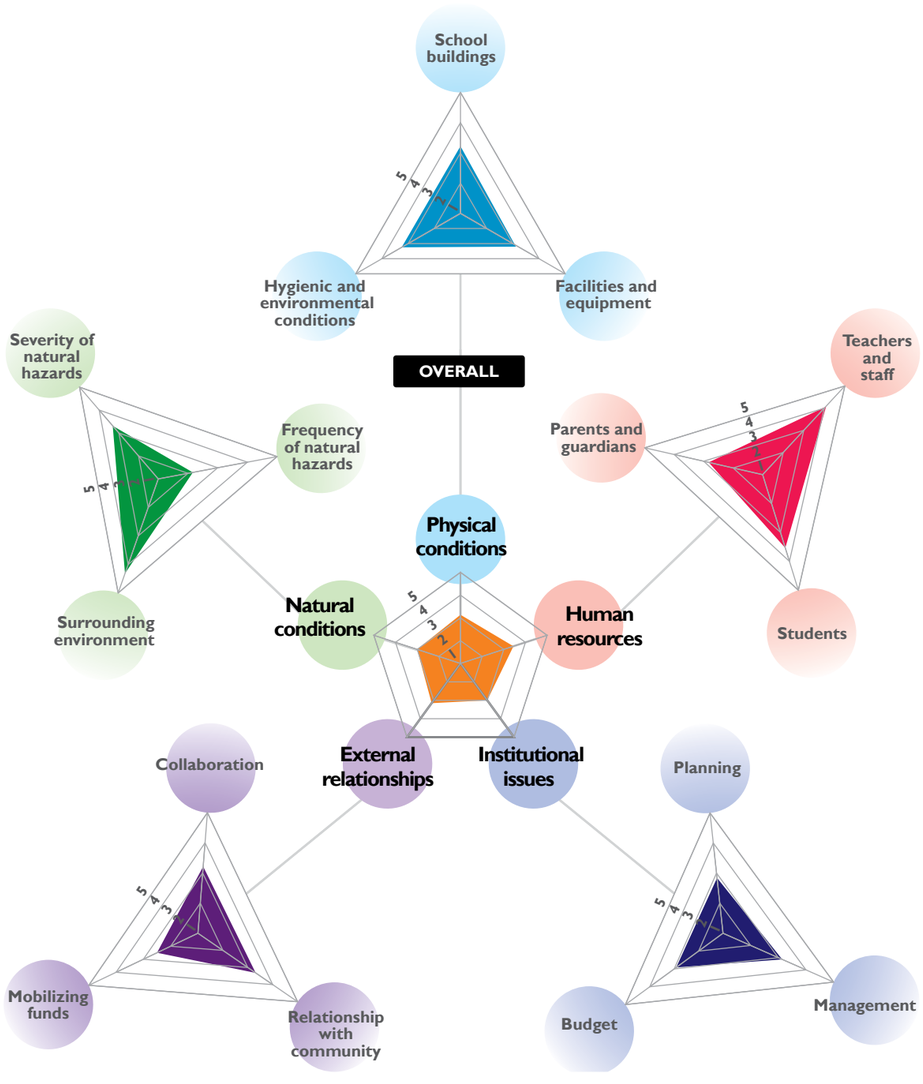
Institutional issues
There is no implementation of disaster related activities, disaster management plan or evacuation map, thus limiting the school's capacity in responding to disaster. A low mark in planning further reduces the institutional resilience score of the school.

External relationships
The score for the external relationships dimension illustrates a shortage of funds for disaster activities. It is difficult to raise funds from external sources, such as local government, communities and other organizations because they have limited funds. Moreover, most of the people in Zone 5 DSCC belong to the medium to low-income bracket, all suffering from the burden of covering daily expenditures for their family.

Natural conditions
The average resilience score for natural conditions is comparatively high among the four dimensions other than physical conditions that rank highest. This is due largely to the surrounding environment of the school with the school building located in a safe area and within 5 km of the local people committee office, police station and health center.

Overall
The overall resilience level of the government's Mugdapar Primary School is below average due to the very low scores in human resources, institutional issues and external relationship. However, the other dimensions- physical, and natural conditions, are performing above average.

City Corporation Adarsha High school



SDRA DIMENSION: City Corporation Adarsha High School

Physical conditions
This private school has a relatively high score in physical conditions. The school was initially designed to be an evacuation shelter in case of emergency; it has an exit door separated from the main entrance. Moreover, the hygienic conditions in the school are superior, for example, 100% of garbage are collected daily and disposed in a proper location.

Human resources
The average resilience score for human resources is the highest among the five dimensions. More than 75% of teachers and students participate in disaster management training and awareness campaigns held annually in the school. Furthermore, the involvement of parents/guardians in disaster management activities is high and their role is clearly defined in the school emergency plan. The high score for human resources in the school implies that DRR has been integrated into the school curriculum.

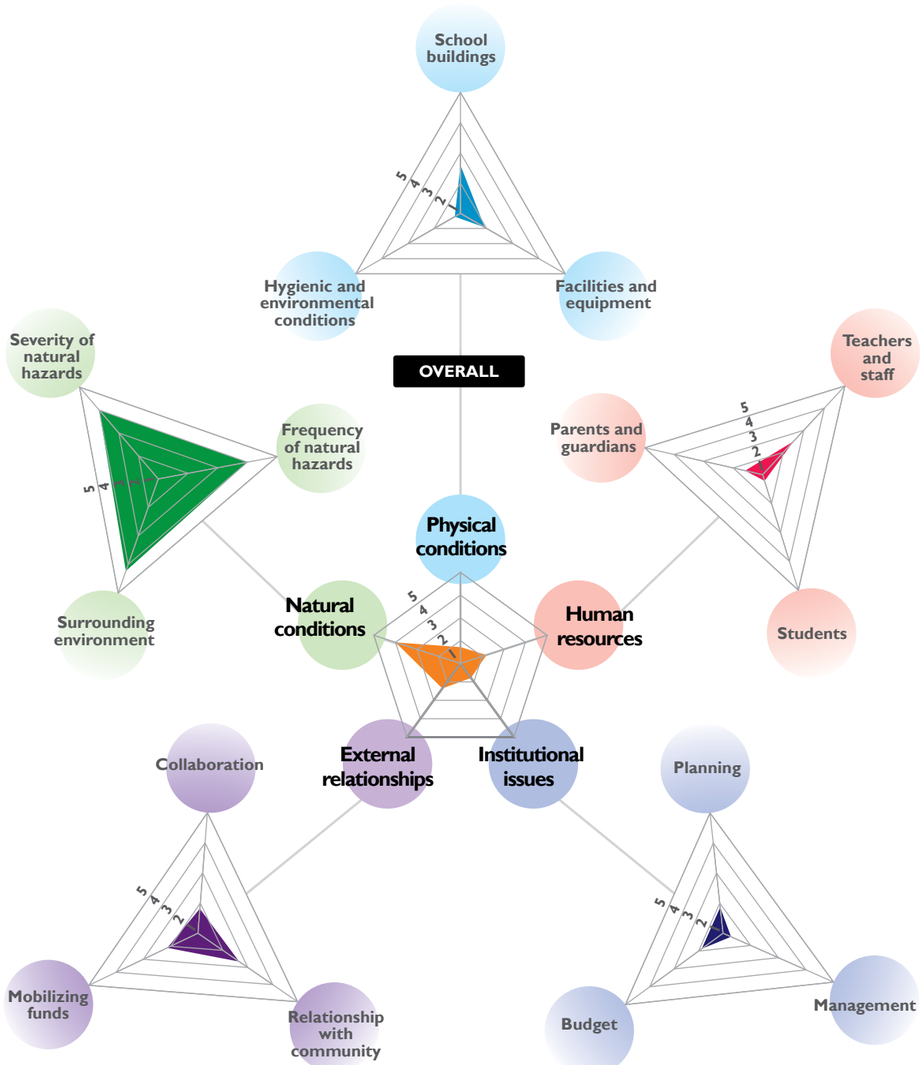
Institutional issues
The school obtains a high score in institutional issues due to the strong awareness of its Management Board on the importance of disaster preparedness and recovery plan in minimizing losses from disasters. Disaster related contents are integrated in almost every class of all grades. In addition, the availability of an emergency plan reflects the school's ability to efficiently handle a crisis situation.

External relationships
The school has a perfect score for relationship with community but gets a low score in mobilizing funds. Institutional collaboration with the local government and community during disaster is effective; both an early warning system as well as an emergency response team is available at the local level. After a disaster, ability to mobilize funds is good with NGOs and private organizations, but less with the local government and community because available funds are limited.

Natural conditions
The resilience score for natural conditions is quite high, with the surrounding environment parameter scoring the highest. The frequency of floods and droughts is high, but their impacts on the school are minimal. In addition, the school is located in a safe area, far from the river and less than 5 km from the health centre.

Overall
The overall resilience level of City Corporation Adarsha High School is above average with high resilience scores in all five dimensions.

Anandanagar Adarsha High school



SDRA DIMENSION: Anandanagar Adarsha High school

Physical conditions
Anandanagar Adarsha High school has the lowest score in physical conditions, especially in the hygienic conditions parameter. There is a lack of annual assessment on school buildings, equipment and facilities. Regular checks on hazardous materials to ensure safety against disasters are also missing. The situation is aggravated by the fact that the school was built in 1989, prior to the Year 2004's flood that strongly impacted most buildings. In addition, the school has no emergency exit door. It is likely that not more than 50% of garbage is collected daily and disposed in a proper place.

Human resources
The 'students' parameter score is the lowest among the 3 parameters for human resources resilience. This stems from a lack of disaster training program designed for students, and not more than 10% of the students are equipped with knowledge and awareness about risks and impacts of disasters. In addition, a weak school-home emergency notification system also reflects a low ability to protect students in case of disaster.

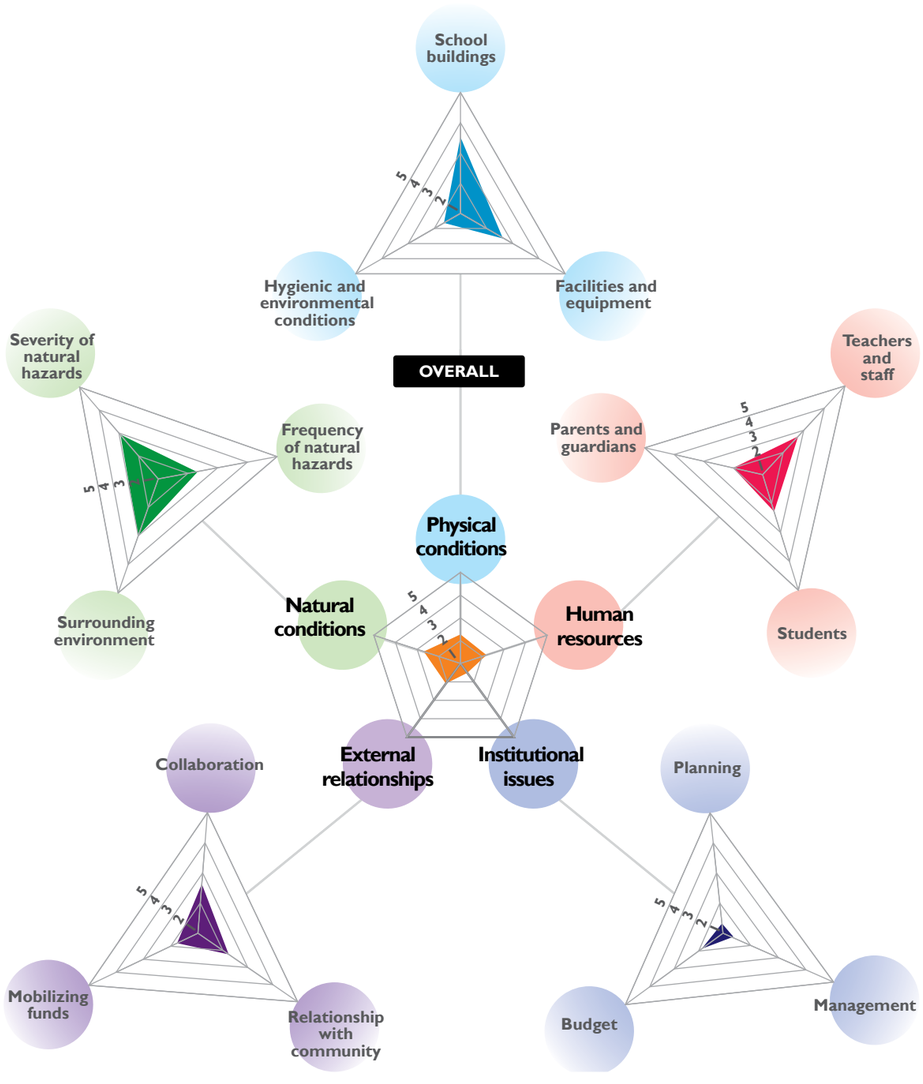
Institutional issues
Here the school has the second lowest resilience score among the five dimensions, with a low score for management. The school has not dedicated any group for disaster preparedness and response. Incorporation of disaster risk reduction into planning is inadequate. There is a school recovery plan but it is not well organized. In addition, there is limited provision for disaster related materials as well as disaster preparedness activities.

External relationships
According to the School Management Board, the collaboration between the school and community is not so strong. This results in a collaboration score that is the lowest among the 3 parameters of the external relationships dimension. There is no regular meeting between the school and the local government to specifically discuss disaster risk reduction. Furthermore, the school does not participate in disaster preparedness activities held in its community or is not involved in any community disaster management plan.

Natural conditions
The school scores well in all three parameters- severity of natural hazards, frequency of natural hazards and surrounding environment. This results in a very high score for natural resilience. For example, the fact that the school is located within 5 km from places providing basic social services does facilitate external help in responding to disaster in a timely manner.

Overall
The overall resilience of Anandanagar Adarsha High School is average, with a medium score in human resources and external relationship, and while it had a very high score in natural conditions, it had with a very low score in physical conditions.

Shahid Tujo Rej Primary school



SDRA DIMENSION: Shahid Tujo Rej Primary school

Physical conditions
Shahid Tujo Rej Primary school has a relatively high score in physical conditions. It scores very high in school buildings but very low in hygienic conditions, in regard to food safety, garbage collection and recycling system. Poor hygienic conditions aggravate the impact of disasters on the health of teachers and students. Also, the school does not carry out regular checks on hazardous materials to ensure safety and reduce loss from disaster.

Human resources
Among the three factors that compose human resource resilience, parents/guardians contribute the least. This is partially due to a lack of training programs that are designed for parents/guardians and their low involvement in disaster management activities in schools. In addition, there are signs that the school-home notification system is not well organized, which can limit the school's capability to protect students in case of disaster.

Institutional issues
The school has a very low score in the planning and management parameters. This makes institutional resilience the weakest among the five dimensions. This is mainly due to the fact that incorporation of disaster risk reduction components into the school planning and syllabus is not sufficiently recognized. In addition, there is no disaster related content integrated into either the school's curriculum or extra-curriculum.

External relationships
The external relationships dimension of the school is characterized by a very low score in mobilizing funds. Besides limited contributions from the Parent-Teacher Association, the school seems not capable of mobilizing funds from local government, community and other organizations.

Natural conditions
The school has experienced a large number of floods and cyclone in 1991, 1994, 1998, 1999, 2001, 2004, and recently in 2008. This explains the low score in natural conditions, in particular the frequency of natural hazards parameter.

Overall
The overall resilience level of Shahid Tujo Rej Primary School is below average, mainly due to a very low score in institutional issues. The other four dimensions are below average, but to a lesser extent.

4. URR Analysis of Sites in Indonesia

Overview

Indonesia is vulnerable to multiple hazards – earthquakes, tsunami, volcanic eruptions, floods, landslides and fire. And with a growing population, the country finds itself increasingly at risk to these hazards. As one of the most urbanized country in Southeast Asia, about half of its population resides in urban areas. With pollution and continuing degradation of the environment, inadequate basic services and facilities, poor waste management, and poor urban planning, residents have become highly vulnerable to natural disasters.

Jakarta, one of the biggest cities in the region, lies below sea level and is surrounded by 13 rivers. As such, 10 million inhabitants are at risk to floods. Urban poverty in the city has pushed people to live along the river banks where risk is highest. The city's high population density, averaging 14,000 people per square kilometer, a significant portion of whom are slum-dwellers, increases the potential damage following a disaster. The vulnerability of Jakarta was evident during the February 2007 Jakarta Flood which inundated 70,000 houses, displaced 420,440 people, killed 69 people with losses of Rp 4.1 trillion (US$ 450 million) (WHO, 2007).

Among climate change projections for Indonesia is an increase in the annual precipitation across the majority of the country. Likely impacts include increased rainfall during already wet times of the year. This would mean higher flood risk for the city's residents. As sea level has been rising in coastal areas of Asia, Jakarta may witness increasing disasters brought about by flood.

The resilience assessments in the subsequent sections cover two ADPs, namely, Cawang which belongs to the Kramatjati sub-district of East Jakarta District; and Cilincing which is part of Cilincing sub-district in the North Jakarta District. The CDRI survey was administered to government officials at the ward level (Kelurahan). For the AoRA, leaders at the neighborhood level (Rukun Warga) responded to the survey questionnaire. Three RWs/neighborhoods were selected in each ADP. Principals from a Madrasah school and a government primary school were interviewed for the SDRA survey questionnaire.

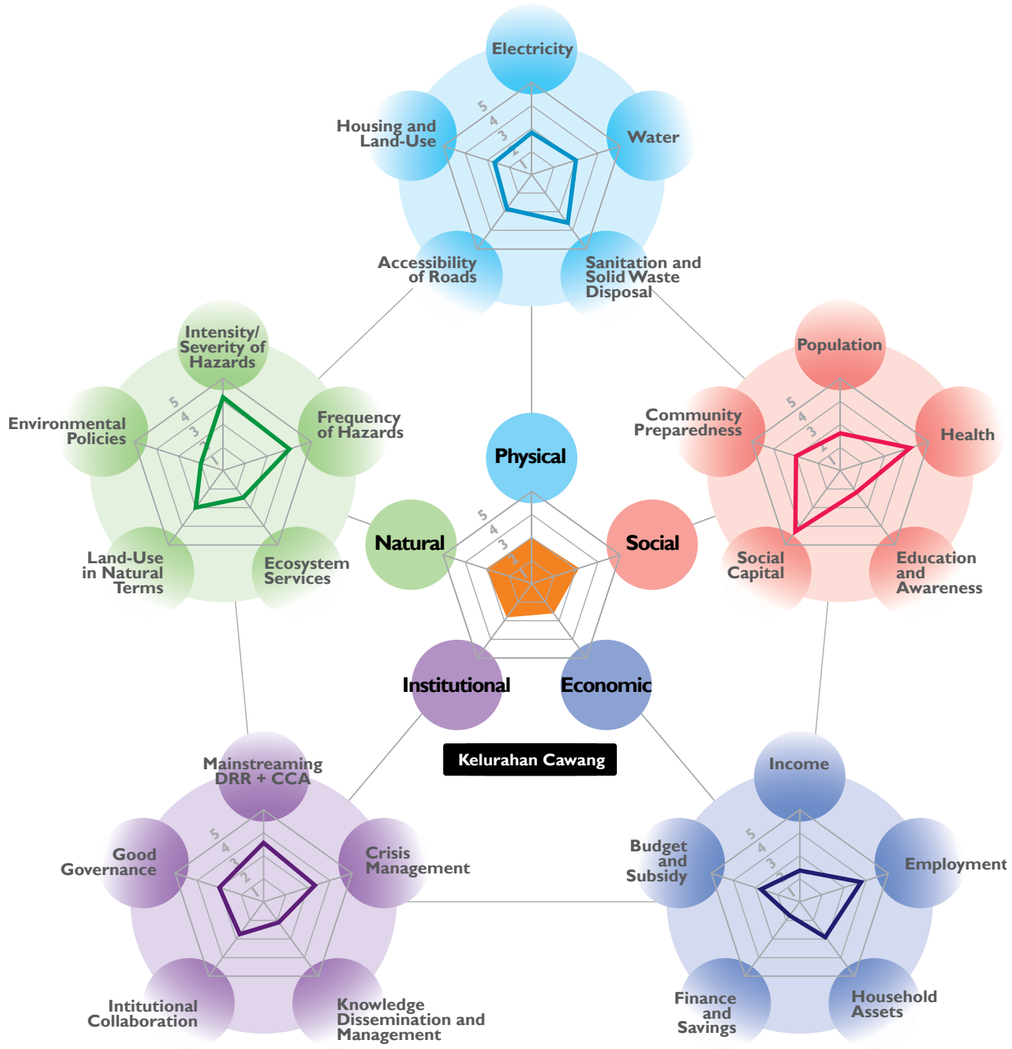
4.1 HFA Indonesia

The national HEA officer from Indonesia responded to the HFA questionnaire. Like Bangladesh and China, institutionalization (HFA priority 1) is not high priority. Out of the first four tasks, prioritize DRR and allocate appropriate resources (Task 4), is highest in relevance to the current mandate and responsibility of HEA. There were mixed results from risk assessment (HFA 2) with two actions being given higher priority, while the remaining two given low priority. Similar to China, higher relevance to the HEA activities is assigned to community risk assessment (Task 5). Education and training (HFA 3) also has relatively higher relevance, with two out of three tasks marked as high priority. Similar to Bangladesh and China, the response of Indonesia for underlying risk factors (HFA 4) placed all tasks in low priority. Tasks for the emergency response priority (HFA 5) have all higher relevance, which also reflects the result of the other countries. Among all 20 tasks, the highest priority was given to Task 19, which is the review of disaster preparedness capacity and mechanism.

HFA Priorities	Survey Results
	HEA Team (NO)
HFA 1: **Institutionalization**	Low Priority
HFA 2: **Risk Assessment**	**High Priority**
HFA 3: **Education, Training**	**High Priority**
HFA 4: **Underlying Risk Factors**	Low Priority
HFA 5: **Emergency Response**	**High Priority**

4.2 CDRI Indonesia

CDRI MAPPING: Kelurahan Cawang



CDRI DIMENSION: Kelurahan Cawang

Physical
Most of the population in the kelurahan (more than 80%) has access to electricity and potable water supply. Although the supply of these commodities is run by a government agency, interruptions are frequent and overall provision is poor, with an availability of up to 4 hours per day. Almost half of the population has access to hygienic sanitation, and up to 60% of solid waste is collected every day. Only a small portion of the waste is treated before disposal. Most of the roads within the kelurahan (ward) are paved, but only half of them remain accessible during normal flooding. The few roads that are affected by heavy rainfall remain impracticable for up to 12 hours during such times. This is despite the fact that almost half of the roads are equipped with drainage system. Only up to 30% of the buildings are constructed following a building code and more than 30% are made of non-permanent structure. Only half of the total houses in the kelurahan are fully owned. More than 25% of the population is living in proximity to polluted sites.

Social
Although the population density per square km is lower than the city level, 1.9% of population growth per year indicates that urbanization in the kelurahan is occurring at a high rate. Up to 50% of the population in the kelurahan is living in the poor areas. Every year or after a disaster, few people (less than 11%) suffer from either water or vector-borne diseases. Almost the whole population (up to 95%) has access to primary health care facilities and even the capacity of the kelurahan's health facilities alone is fairly sufficient to face emergency/disaster situations. Disaster awareness is poor, with training/ awareness camps occurring once every five years only. Although the social capital is good, the community preparedness during a disaster is poor, due to weak support from NGOs/ CBOs or religious organizations after a disaster. It could also be that residents of the kelurahan are mostly laborers and traders in the informal sector. In this case, their social time to meet and get involved in community preparedness activities is limited. On the other hand, the extent of participation by the kelurahan community members in relief work after a disaster is good. Ordinarily, when flood inundates their area they will stop their routine activities and volunteer for relief work.

Economic
Only up to 30% of the population lives below the poverty line and almost all the households depend only on a single source of income. Unemployment rate, including unemployed youth in the formal sector, is low (up to 12%). Half of the women in the kelurahan are working in the formal sector. Most of the households (up to 80%) have television. No households are under any sort of insurance scheme and the availability of credit facility in the kelurahan is poor. There is no credit facility for low income groups, and for people to turn to in the event of disaster. The community budget for climate change and risk reduction measures is poor. However, households have access to subsidies for health care provided after a disaster.

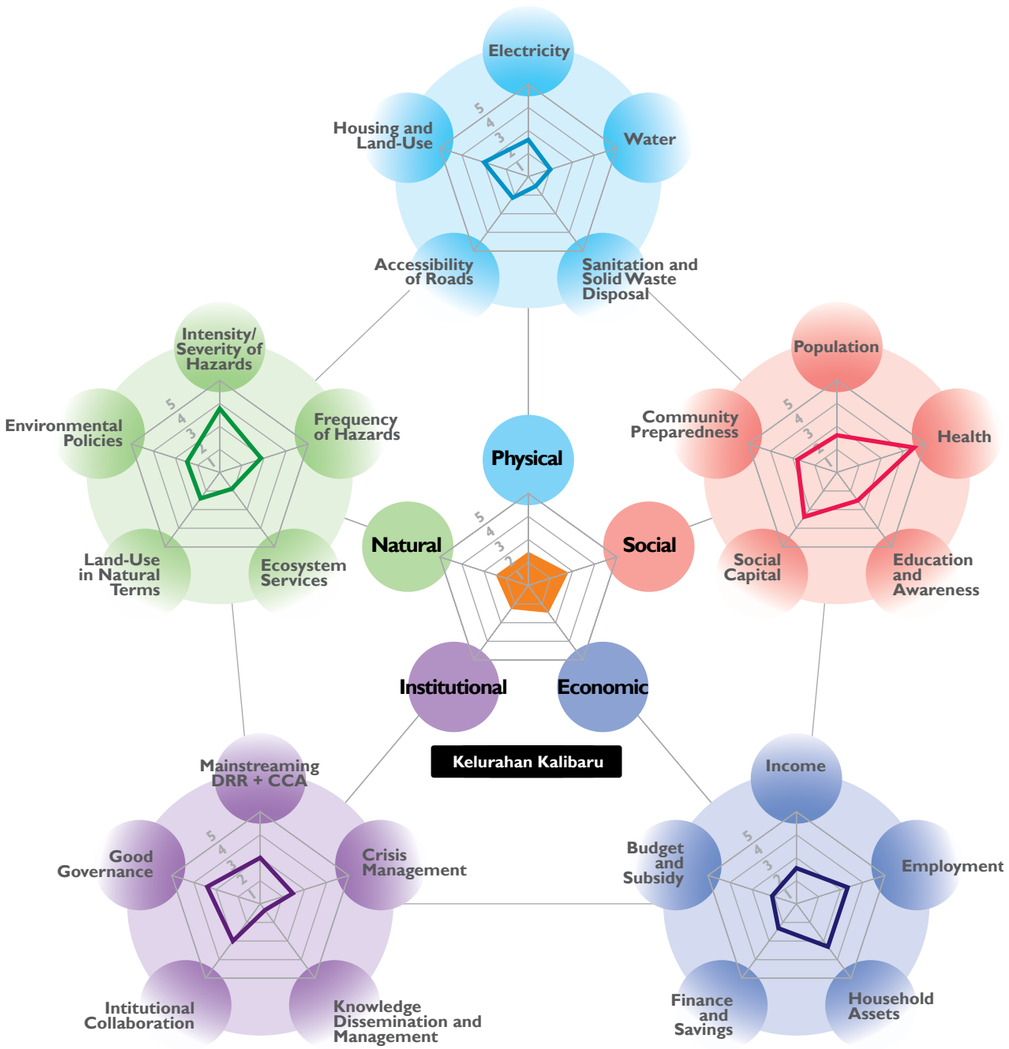
CDRI DIMENSION: Kelurahan Cawang (continued)

Institutional
In terms of mainstreaming DRR and CCA, the kelurahan performs well, especially concerning community participation in the development plan and the incorporation of disaster management plan. The disaster emergency team is fully functional. However, there are no disaster related education and awareness programs, or resources (book, manpower, campaigns, etc.). Institutional collaboration with NGOs and private organizations (during a disaster) as well as the capability of the kelurahan to lead the recovery process (relief work, reconstruction, and rehabilitation) are poor. In addition to collaboration, overall knowledge dissemination and management are poor.

Natural
For the natural dimension, the resilience of the kelurahan is only around average. Other than floods occurring more than once per year, there are no additional climate-related disasters. The water quality in the urban area is poor and only less than 15% of the area is covered with green spaces. In addition, there is little use of hazard maps in developmental activities and the implementation of efficient waste management system (Reduce, Reuse, and Recycle) is weak. Mitigation policies to reduce air pollution from traffic or household emissions are not implemented.

Overall
Kelurahan Cawang has a resilience score of 2.94 (5 being very good and 1 being very poor). All its dimensions score above average (physical= 3.0, social= 3.16, economic= 2.65, institutional= 2.91, and natural= 2.54). The 3 highest average parameters scores are in: social capital, health, and intensity/severity of natural hazards, while the 3 lowest average parameters scores are in: finance and savings, environmental policies, and knowledge dissemination and management.

CDRI MAPPING: Kelurahan Kalibaru



CDRI DIMENSION: Kelurahan Kalibaru

Physical
Close to 100% of the population have access to electricity and safe water. However, supply of the two commodities is very poor, with an availability of only 1 to 2 hours per day. This despite the electricity and water supplies being run by a government agency. Only up to 60% of the population has access to hygienic sanitation. Up to 50% of solid waste is collected every day but only a small portion of it is treated before disposal. Almost all the roads within the kelurahan are paved and the majority (up to 80%) of them remains accessible during normal flooding. However, a limited number of roads (less than 30%) are equipped with drainage system, and the few roads that are affected during heavy rainfall become impracticable for up to 12 hours during such events. Only up to 30% of the buildings are constructed following a building code and 19% are made of non-permanent structure. Up to 50% of the total houses in the kelurahan are fully owned. Almost half of the population is living in proximity to polluted sites.

Social
Population growth is quite high (3.9% per year) and only less than 40% of the population live in poor areas. With almost 40% of people being below 14, or above 64, the demographic profile is considered unfavorable for dealing with disaster. The population density is lower than the city level with less than 5,000 people per sq/km. Every year or following disaster, few people (less than 5%) suffer from either water or vector-borne diseases. Almost the whole population (up to 95%) has access to primary health care facilities and even the capacity of kelurahan's health facilities alone is fairly sufficient to face emergency/hazardous situation. However, education and disaster awareness is very poor and, in part, due to the low level of literacy among the population. Social capital on the average is very poor (less than 10%), although community participation in activities exists. Additionally, the households are not prepared for a disaster (in terms of logistics, materials, etc).

Economic
The economic situation for many households is difficult; up to 30% of all people live below the poverty line. More than 75% of the households depend on only one source of revenue and up to 40% depend on income provided by the informal sector. Most of them usually experience reduced income in the aftermath of a disaster. Unemployment rate, including unemployed youth in the formal sector, is quite high (up to 24%). Half of the women in the kelurahan are working in the formal sector and child labor is marginal. Almost all the households (more than 80%) have television but less than 50% have collateral to secure key items (emergency food, money, etc.) during a disaster. The provision of credit facility to finance prevention measures against potential disasters is limited and there is no access at all to such facility for low-income groups. However, residents have access to subsidies for health care provided after a disaster.

CDRI DIMENSION: Kelurahan Kalibaru (continued)

Institutional
This dimension shows quite a high institutional capacity to deal with disaster situations, with the exception of incorporation of disaster management plan and the availability of sufficient evacuation centers. In addition, knowledge dissemination and management is very poor and particularly lacking of disaster-related education and awareness programs or resources (books, manpower, campaigns, etc). There is also no networking with neighboring areas (other kelurahan/kecamatan) for emergency management during a disaster. However, the cooperation of the kelurahan officials for emergency management during a disaster is very strong and the early warning systems led by kelurahan authorities are efficient, providing good dissemination of information through communities during a disaster.

Natural
The natural resilience of this kelurahan is poor in terms of ecosystem services and especially in regard to urban water quality and the level of urban salinity. The intensity of land-use (built area) and the total green space are poor. In addition, mitigation policies to reduce air pollution from traffic or household emissions are poorly implemented and the environmental conservation regulations are insufficiently reflected in the development plans.

Overall
In summary, Kelurahan Kalibaru has an overall resilience score of 2.54 (5 being very good and 1 being very poor), with the scores of 3 dimensions below average, (physical= 2.39, social=2.89, economic= 2.61, institutional= 2.29, and natural= 2.54). The 3 highest average parameters scores are in: health, intensity/severity of the natural hazards, and household assets, while the 3 lowest average parameters scores are in: knowledge dissemination and management, sanitation and solid waste disposal, and ecosystem services.

4.3 AoRA Indonesia

Figure 4a. Implementation level of Action-oriented Resilience Assessment (AoRA)

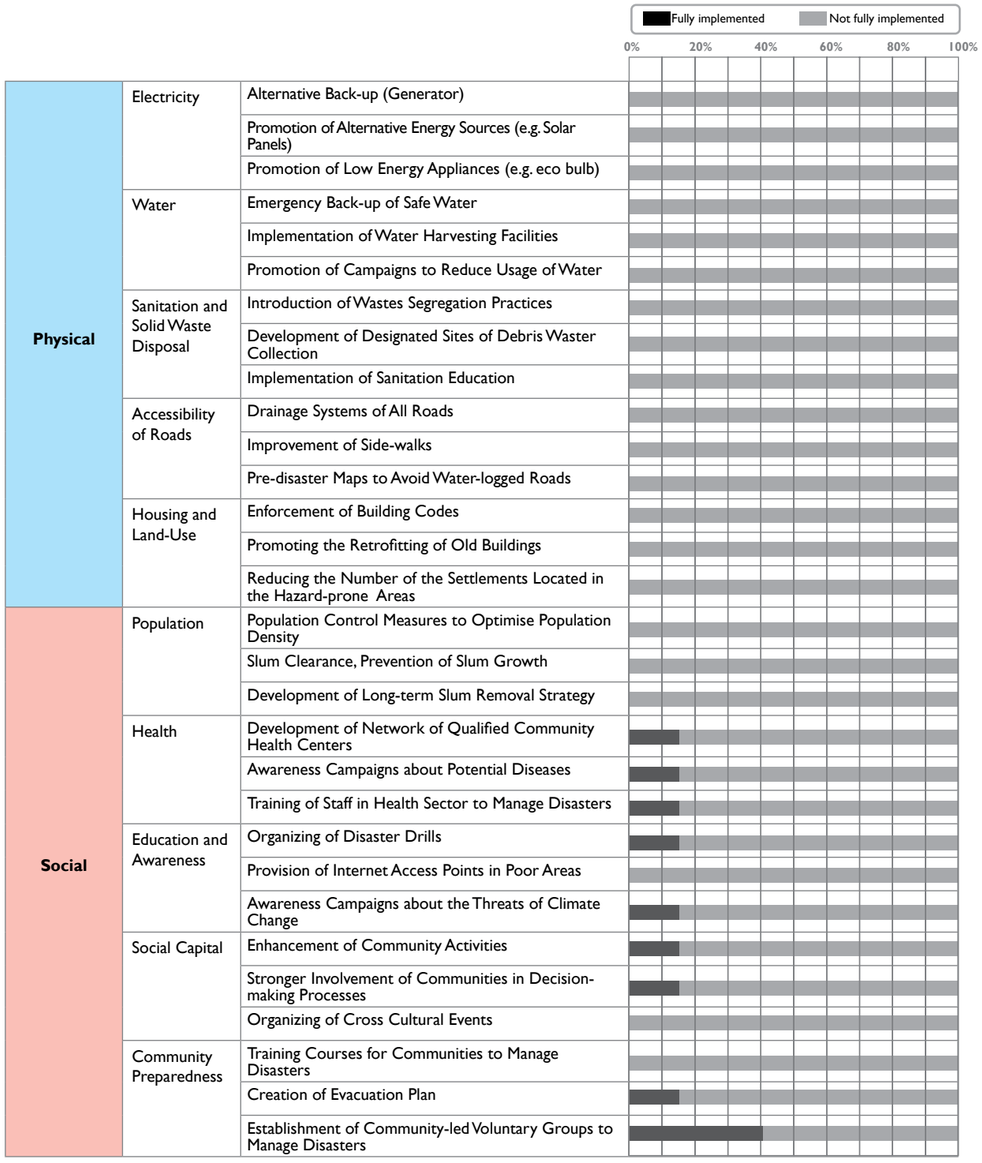


Figure 4b. Implementation level of Action-oriented Resilience Assessment (AoRA) (continued)

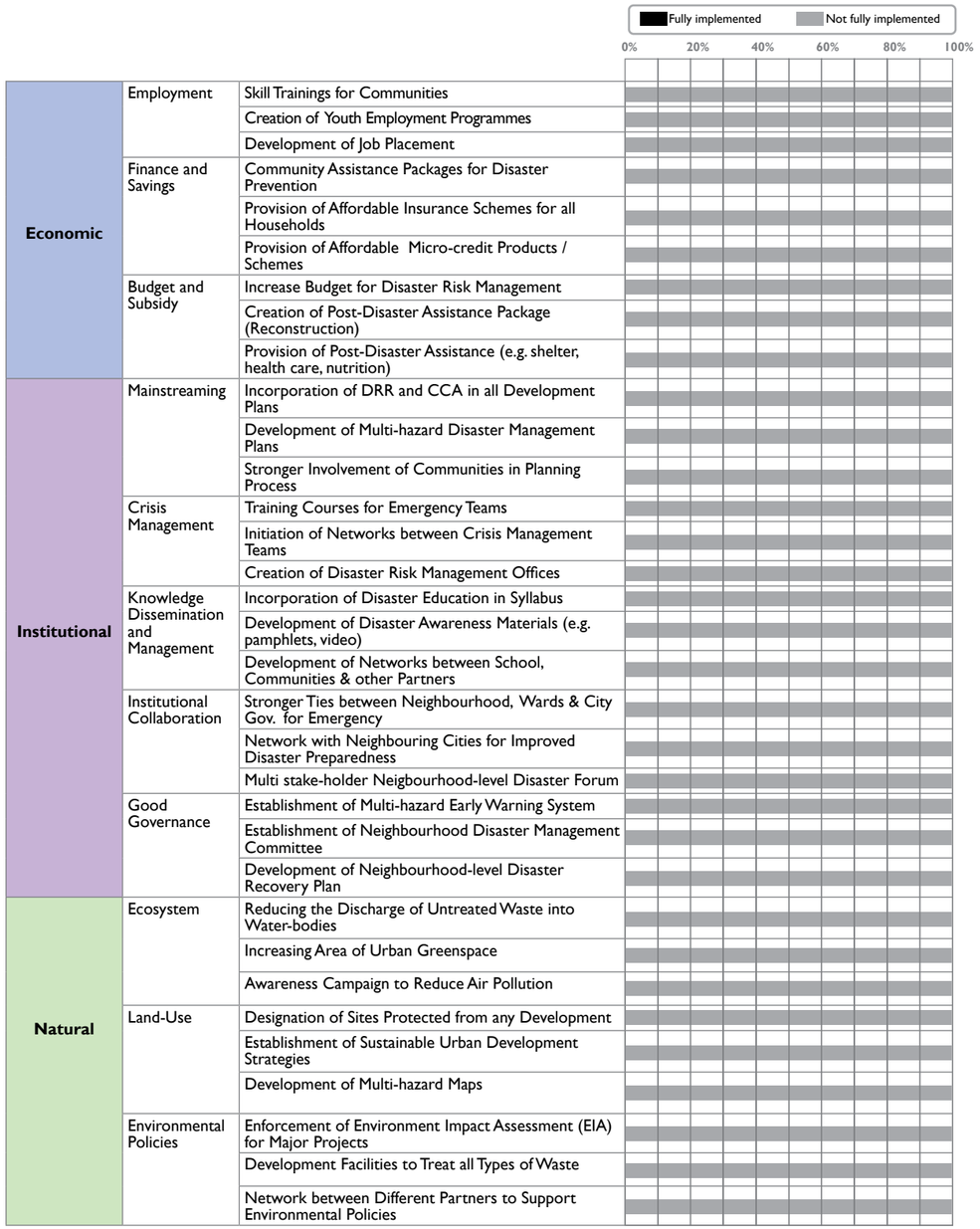


Figure 5a. The priority level of AoRA in Indonesia

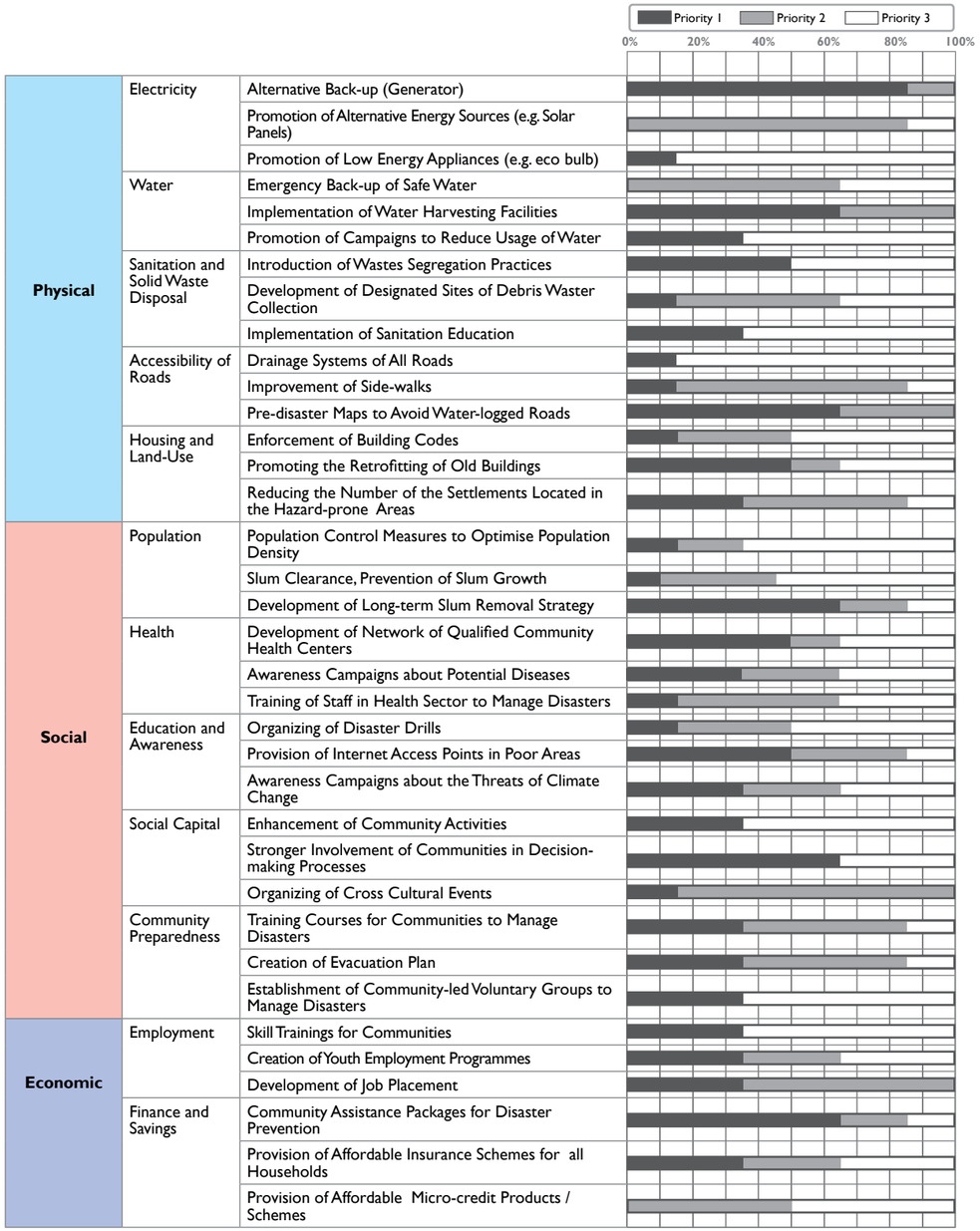
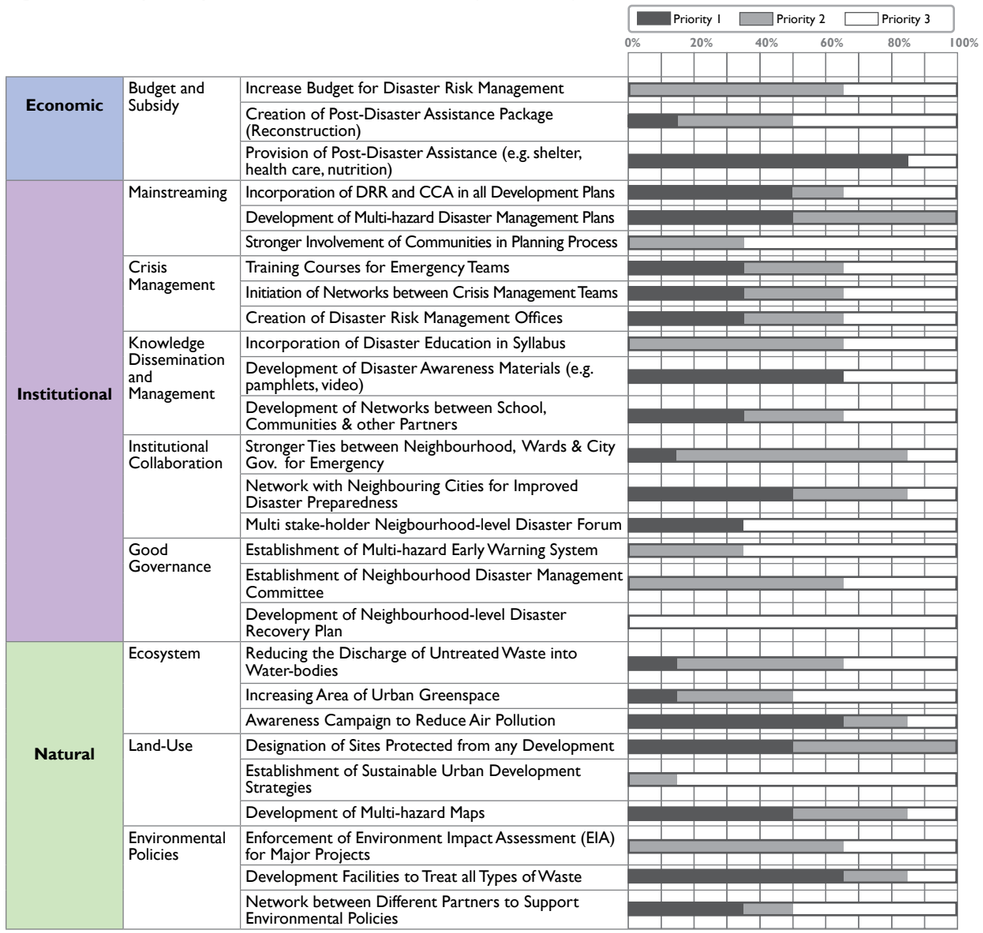


Figure 5b. The priority level of AoRA in Indonesia (continued)



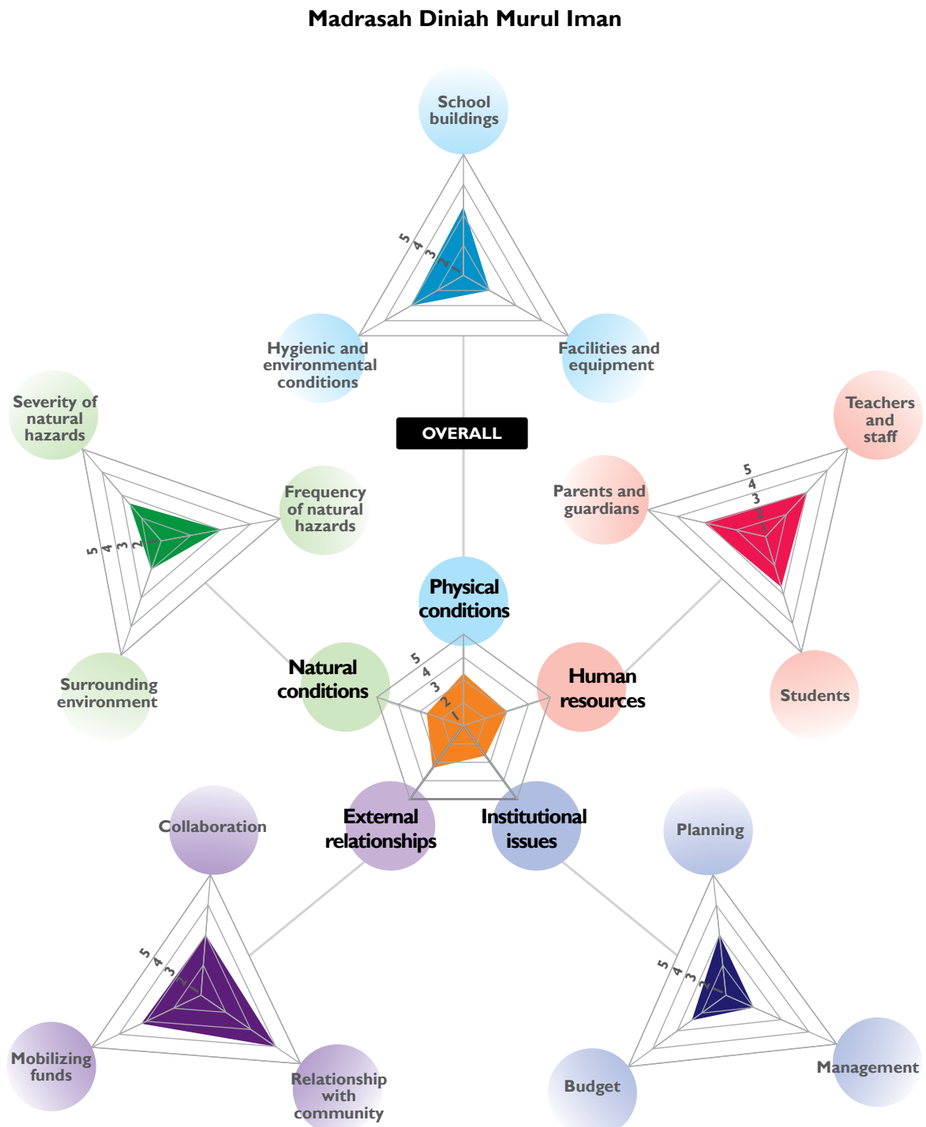
Findings

The AoRA questionnaire was completed by the neighborhood leaders in 2 kelurahan (Rukun Warga/ RW 3, 5, and 8 in Kelurahan Cawang and RW 1, 4, and 13 in Kelurahan Kalibaru). The questionnaire requested the neighborhood leaders to tick whether or not a resilience-related action was already fully implemented, available or functioning in their neighborhood. In a second step, if an action was not yet fully implemented, the respondents have to decide on the role and responsibility of all the five stakeholders in the implementation of that particular action. A range beginning from 1 (very low) to 4 (very high) defined the level of responsibility and had to be decided for each stakeholder. If an action was perceived to be already fully implemented, the second step of deciding on the role of different stakeholders was not required.

The results of the AoRA carried out in Indonesia show that most actions are not yet fully implemented (Figure 4). Only a few of the neighborhoods (RW 3 and RW 8, Kelurahan Cawang) have already implemented actions related to health, education and awareness, social capital, and community preparedness. These actions include development of network of qualified community health centers, awareness campaign about potential diseases and threats of climate change, training of staff in health sector to manage disasters, conducting drills, enhancement of community activities, stronger involvement of community decision-making process, creation of evacuation plans, and establishment of community-led voluntary groups to manage disasters.

Figure 5 shows the priority level for each action in AoRA. The actions with the highest priority (more than 60%) chosen by the neighborhood leaders are: alternative back-up (generator), implementation of water harvesting facilities, pre-disaster maps to avoid water-logged roads, development of long-term slum removal strategy, stronger involvement of communities in decision-making processes, community assistance packages for disaster prevention, provision of post-disaster assistance (e.g. shelter, health care, nutrition), development of disaster awareness materials (e.g. pamphlets, video), awareness campaign to reduce air pollution, and development facilities to treat all types of waste.

4.4 SDRA Indonesia



SDRA DIMENSION: Madrasah Diniah Murul Iman

Physical conditions
Madrasah Diniah Nurul Iman School has a relative high score for the physical conditions dimension; school buildings obtain the highest mark. Although the school was built in 1984, it was refitted in 2004. It has an emergency exit door that is well located. The school shows evidence of high attention to hygienic conditions, with regard to enhancement of food safety and ensuring that garbage is collected and disposed in a proper place. In particular, environmental campaigns are held more than four times a year to strengthen students' capacity and awareness of environmental protection issues.

Human resources
The school has a very high score for the teachers and parents/guardians parameters. More than 75% of the teachers are aware and equipped with proper knowledge about risks and impacts of disaster. Frequent disaster preparedness training is provided for teachers and students. Furthermore, the number of students in each class is only around 12-13. This helps the school to maximize the support given to every student in case of disaster.

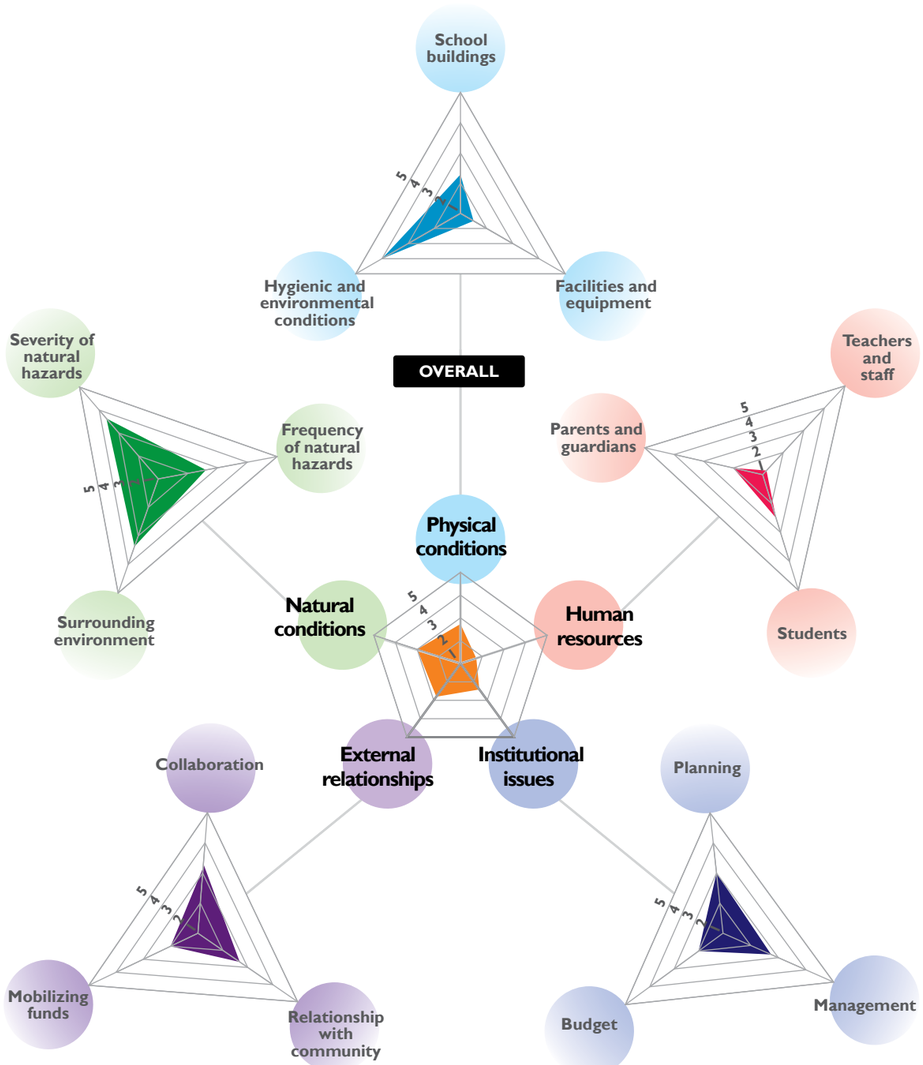
Institutional issues
The school's low score in management causes institutional issues to have the lowest resilience among the five dimensions. There is limited provision of disaster related activities and materials. In addition, the school has not fully incorporated a disaster risk reduction component in its planning and syllabus. In addition, funding allocated for disaster activities exists but is inadequate.

External relationships
The school has had strong cooperation with the local government and community during disasters. This explains the highest score obtained for external relationships among the five dimensions. The school supports the local community by providing evacuation shelter. On its part the local government supports both the school and community in relief works.

Natural conditions
The score for the surrounding environment parameter is the lowest in this dimension. This is due to the location of the school in a high risk area and far from places providing basic social services. These can greatly contribute to aggravating the impacts of a disaster.

Overall
The overall resilience level of the government's Mugdapar Primary School is below average due to the very low scores in human resources, institutional issues and external relationship. However, the other dimensions- physical, and natural conditions, are performing above average.

SDN Kalibaru 09 Pagi



SDRA DIMENSION: SDN Kalibaru 09 Pagi

Physical conditions
SDN Kalibaru 09 Pagi School scores very high in hygienic conditions but improvements are needed for the school buildings and facilities. The school was built in 1972 and is one storey, with 25 classrooms, and excluding function rooms. The assessment of the school buildings is carried out only once in five years or more. Besides, provision of emergency supplies during disaster is limited.

Human resources
The human resources dimension scores high in the following two parameters: students and parents/guardians. However, there is a need to strengthen the leadership role of teachers in disaster related programs held in school.

Institutional issues
A low score in the budget parameter causes the institutional issues to have the second lowest resilience score among the five dimensions. Comprising less than 1% of the school's total budget, the funds allocated for disaster activities are insufficient. Of the total budget, about 70 to 80% is spent on the salary of teachers and staff working in the school.

External relationships
The score for the external relationships dimension also illustrates a shortage of budget for disaster activities. The school is limited in its ability to mobilize funds from external sources such as local government, communities and other organizations. Furthermore, the involvement of the school in the local community's disaster management plan is limited and its participation in disaster related activities held in the community is less than once per year.

Natural conditions
The school has frequently experienced climate related disasters, such as flood and drought. In addition, the location of school is quite far from the places providing basic social services, which limits the relief works in times of disaster. All these contributed to a low score for the school's natural resilience.

Overall
The overall resilience level of SDN Kalibaru 09 Pagi School is relatively above average, with the least contribution from human resources followed by institutional issues. The other 3 dimensions are above average.

5. URR Analysis of Sites in China

Overview

China is one of the most disaster-prone countries in the world. Floods, landslides, drought, earthquakes and fire affect millions of people every year in the country. Over the last decade, China, United States, Philippines, India and Indonesia, constitute the top 5 countries that are most frequently hit by natural disasters. In 2011, 66.8% of global hydrological disaster victims were from floods and wet mass movements in China.
(http://reliefweb.int/sites/reliefweb.int/files/resources/2012.07.05.ADSR_2011.pdf)

Given these trends and the number of disasters is expected to continue to rise, the impact from disasters will be greater and greater because of urbanisation. Prospects for the future is even more grave as the country's urbanization continues at an unprecedented rate. Unless measures are taken now, the expected outcome can only be will cause increases in loss of human lives and further restrictions on economic and social development due to the occurrence of disasters. The massive migration of the rural populace to urban areas poses a significant challenge for the country's leaders in providing basic social services and infrastructures, as well as managing pressures on land and the environment. Already, national and local leaders face this ordeal as China's urban population has surpassed that of the rural areas. In 2011, urban population reached 690.79 million compared to the rural population of 656.56 million. Sixty-six out of the 100 fastest growing urban areas are in Asia; and 33 of which are in China alone. Out of the 21 megacities in Asia, two are in China namely, Shanghai and Beijing.

Guangzhou, the third most populous city, and leading industrial and commercial centre of Southern China, is witness to hundreds of migrant workers coming from the countryside. The resilience assessment in the subsequent sections focuses on Guangzhou City. The CDRI survey was administered at the district level, with the Urban Management Official as respondent. The selected district, Haizhu, has a population of 1,237,300.

For the AoRA, respondents include clothes manufacturers from the sub-districts of Fengyang and Ruibao. Fengyang is the site of WV China's ongoing "Guangdong Migrant Children Project" (GMCP). It consists of 20 communities. Eighty percent (80%) of these communities are "urban villages". The "Hukou" or residency system in China places migrants at a disadvantage. Migrants often do not qualify for residency in a city and as such, do not have access to all the services and amenities, such as education and healthcare, which a resident of the city would normally enjoy. Most live in tenement housing which is often subdivided to house several families. The main economic activity is in textile and clothing accessories which can contribute to fire. Migrants mostly work in one of the 30,000 small workshops scattered throughout Fengyang.

The SDRA survey questionnaire was completed by school officials in two selected schools, Tonshin and Boai. Both schools are in the Haizhu District, one of which is in Fengyang Jiedao. Neither school is government-run; they both cater to children of migrants. Clearly, building the resilience of urban residents would need to consider migrant workers and their children.

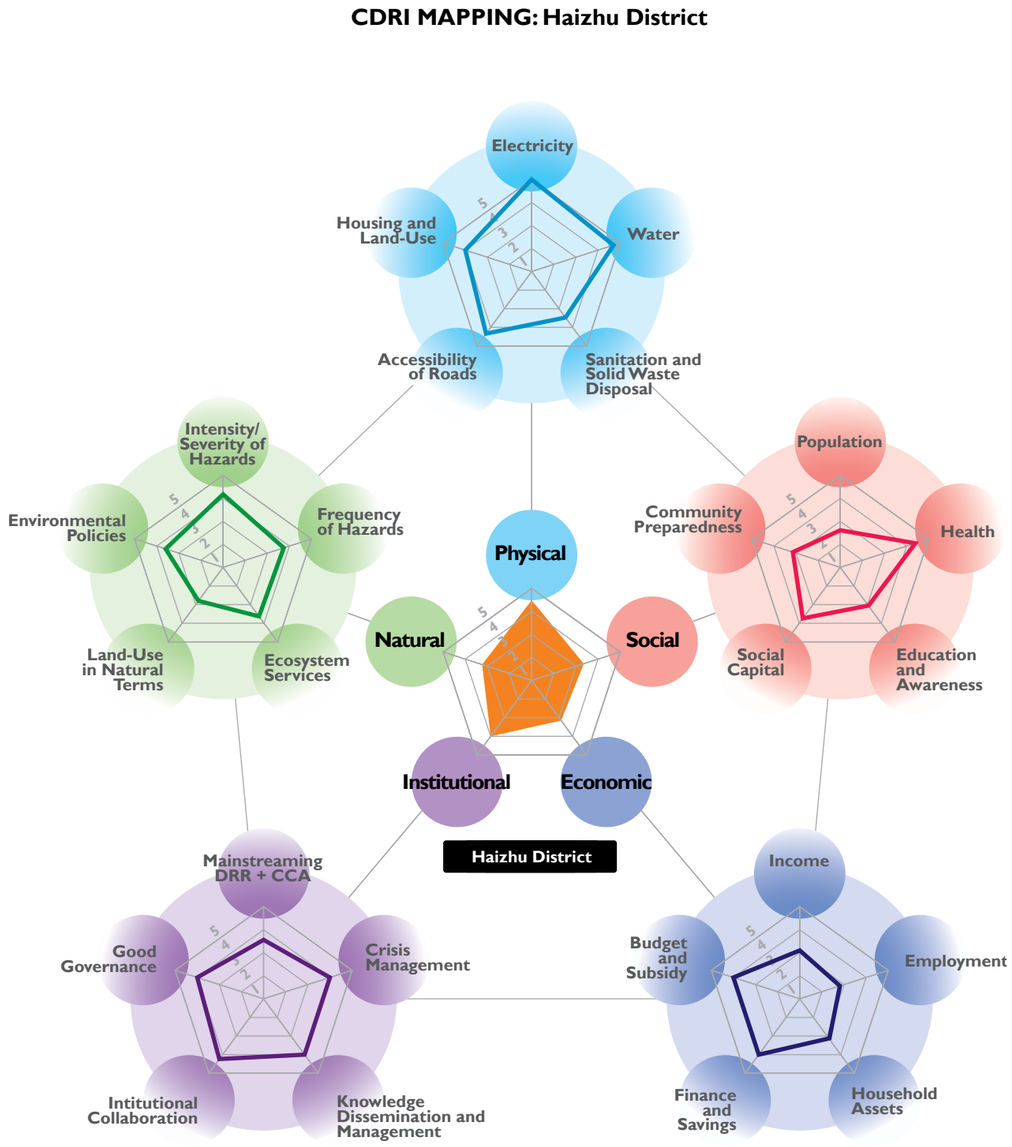
5.1 HFA China

There was only one response to HFA from China, this was provided by the HEA Director. A first-hand look at the priority sees that HFA 1 has the highest priority in the work program, with all the tasks very relevant to the current responsibility of the HEA officer. Among institutionalization tasks (HFA 1), the task to prioritize DRR and allocate resource is highest in importance. Risk Assessment (HFA 2) has a mixed response with two tasks with higher priority and two with relatively lower priority. Community risk assessment has the highest priority among HFA 2 tasks. All the tasks of education and training (HFA 3), which focus on education, awareness and capacity building, got higher priority. Similar to the results from Bangladesh's URR analysis, underlying risk factors (HFA 4) have relatively lower priority in China. This can be explained by the fact that some of the tasks of HFA 4 are under the responsibility of the local governments. Finally, emergency response (HFA 5) has high priority, probably due to the mandate of HEA leadership.

HFA Priorities	Survey Results
	HEA Director (NO)
HFA 1: **Institutionalization**	**High Priority**
HFA 2: **Risk Assessment**	**High Priority**
HFA 3: **Education, Training**	**High Priority**
HFA 4: **Underlying Risk Factors**	Low Priority
HFA 5: **Emergency Response**	**High Priority**

HFA priorities from HEA survey respondents

5.2 CDRI China



CDRI DIMENSION: Haizhu District

Physical
The physical resilience of this district is strong. Up to 75% of the population in the district has access to safe water without interruption and to hygienic sanitation. Most of the waste is collected every day, although only half of it is treated before disposal. Almost all roads are paved and can be accessed when normal flooding occurs. More than 60% of the roads are equipped with roadside covered drains. More than 50% of the buildings in the district are built according to building code, with only a few of them constructed with non-permanent structure. Almost no population groups are living on hazardous areas or in proximity to polluted sites.

Social
The population density in this district during day and night is very high, with more than 12,000 people per sq/km. The percentage of the district's population growth per year is small (up to 0.9%) and the percentage of the people who are under 14 and above 65 years also represent a small part (less than 17%). However, the number of people living in informal settlements is high (more than 50%). In terms of health, few people suffer from water and vector-borne diseases, but the capacity of the district's health facilities to face emergency situation is limited. The awareness of the people about hazard is poor, but people tend to participate in community activities. This shows their social cohesion with each other. However, community preparedness is, to some extent, rather low. This is especially reflected by the low number of households that are prepared for a disaster in terms of logistics and materials.

Economic
In this district more than 30% of the people are living below the poverty line, although the average number of sources of income per household is more than one. The percentage of employment is small (less than 6%) and most of the households have assets, such as television and mobile phone devices. However, only up to 30% of people have motorized vehicle and less than 50% of the district's households have collateral to secure key items (i.e. emergency foods, money, etc.). In addition, almost all households are under some sort of insurance scheme. This district has not been impacted by disaster so far and a moderate budget for climate-related disaster risk reduction is available in the eventuality of an adverse event. Subsidies or incentives provided to residents for alternative livelihood after a disaster will also be given.

CDRI DIMENSION: Haizhu District (continued)

Institutional
The institutional resilience of this district is good. This is reflected in almost all the parameters, such as institutional collaboration, effectiveness of the district's crisis management framework and governance. The district's institutional collaboration with private organizations and national government is strong. In addition, personnel dedicated to alternative decision-making during a disaster exist and are fully prepared. However, the incorporation of disaster risk reduction and climate change adaptation measures in the district's development plans and the effectiveness of early warning systems led by the district authority are limited.

Natural
The frequency of the floods occurring in this district is once per year and the intensity or severity of the hazard is low. Almost all the ecosystem services in the district are good, with the exception of the air (during the day) in the urban zone and the water quality which are rather low. Additionally, the proportion of the district area vulnerable to climate-related hazards is close to 50%. Almost 90% of the district is constructed and the loss of urban green space (parks, trees, forests, etc.), due to development of infrastructures (housing, etc.) over the last 50 years, is severe.

Overall
In summary, Haizhu District has a resilience score of 3.66 (5 being very good and 1 very poor). All the dimensions have a resilience score of above average (physical=4.53, social=3.42, economic=3.18, institutional=3.94, and natural=3.21). For the parameters, the 3 highest scores are in electricity, water, and accessibility of roads. The 3 lowest parameters scores are in population, employment, and land-use in natural terms.

5.3 AoRA China

Figure 6a. Implementation level of Action-oriented Resilience Assessment (AoRA) in Sub-districts, China

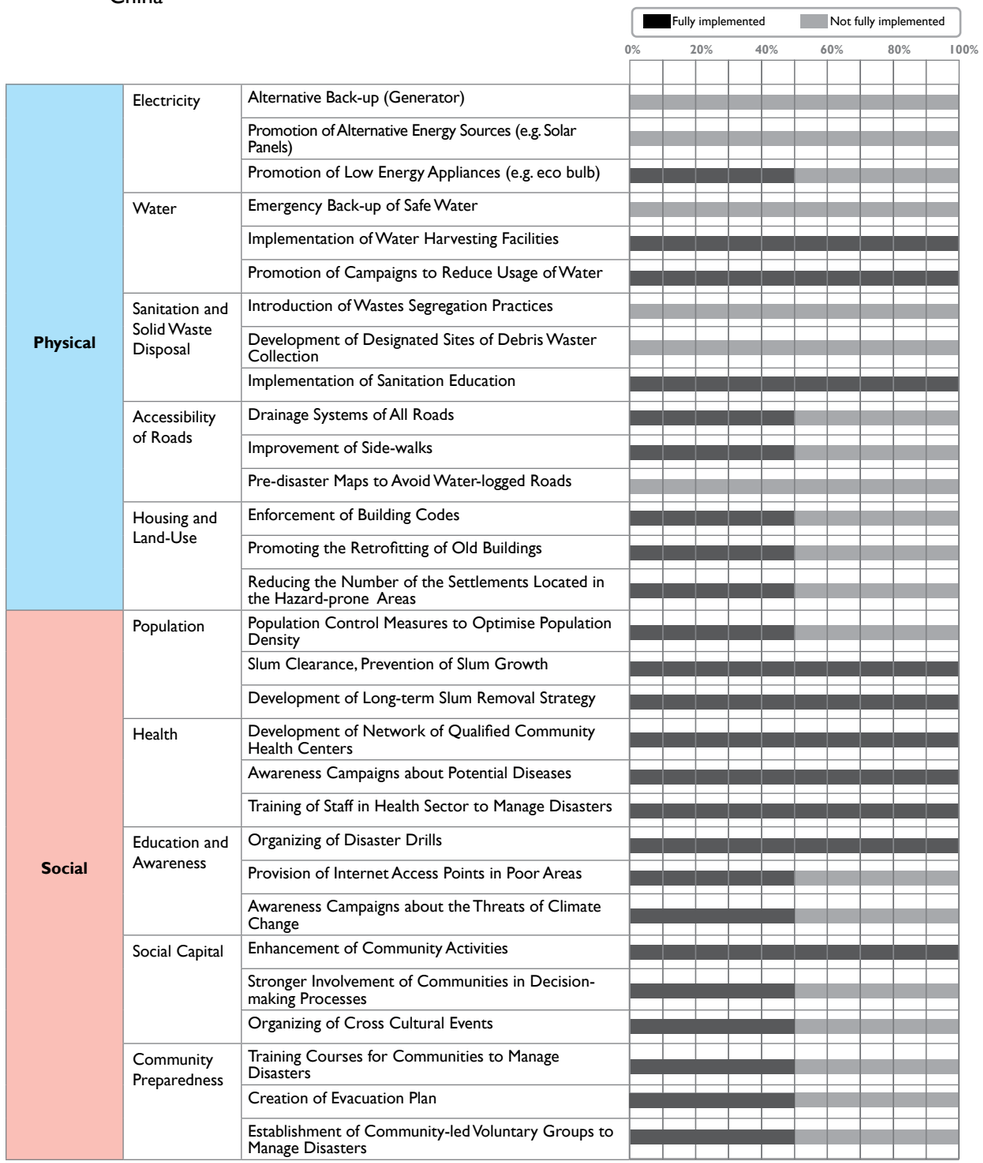


Figure 6b. Implementation level of Action-oriented Resilience Assessment (AoRA) in Sub-districts, China (continued)

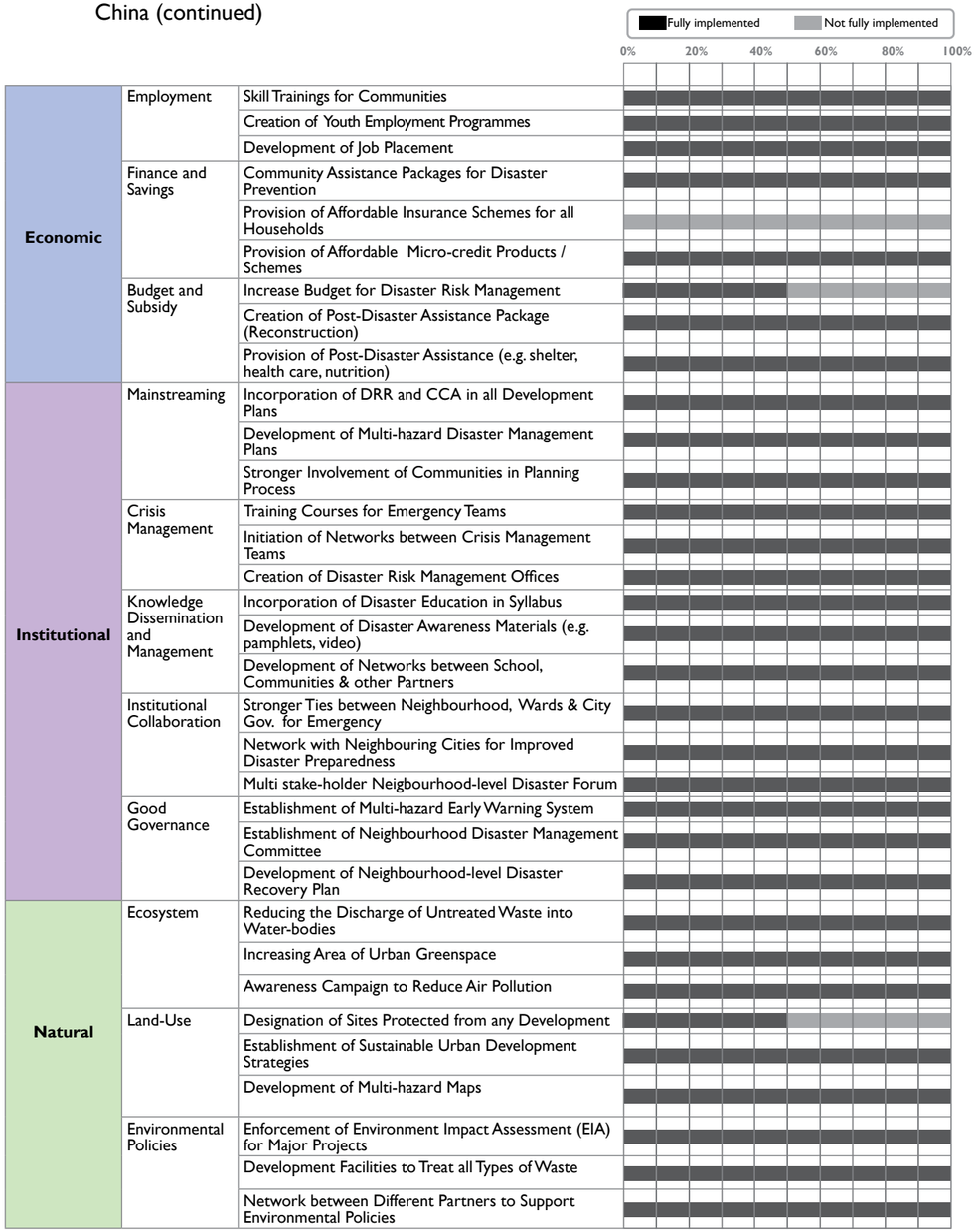
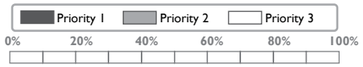
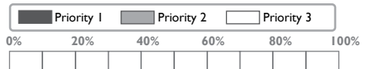


Figure 7a. The priority level of AoRA in Districts, China



Physical	Electricity	Alternative Back-up (Generator)	
		Promotion of Alternative Energy Sources (e.g. Solar Panels)	
		Promotion of Low Energy Appliances (e.g. eco bulb)	
	Water	Emergency Back-up of Safe Water	
		Implementation of Water Harvesting Facilities	
		Promotion of Campaigns to Reduce Usage of Water	
	Sanitation and Solid Waste Disposal	Introduction of Wastes Segregation Practices	
		Development of Designated Sites of Debris Waster Collection	
		Implementation of Sanitation Education	
	Accessibility of Roads	Drainage Systems of All Roads	
		Improvement of Side-walks	
		Pre-disaster Maps to Avoid Water-logged Roads	
	Housing and Land-Use	Enforcement of Building Codes	
		Promoting the Retrofitting of Old Buildings	
		Reducing the Number of the Settlements Located in the Hazard-prone Areas	
Social	Population	Population Control Measures to Optimise Population Density	
		Slum Clearance, Prevention of Slum Growth	
		Development of Long-term Slum Removal Strategy	
	Health	Development of Network of Qualified Community Health Centers	
		Awareness Campaigns about Potential Diseases	
		Training of Staff in Health Sector to Manage Disasters	
	Education and Awareness	Organizing of Disaster Drills	
		Provision of Internet Access Points in Poor Areas	
		Awareness Campaigns about the Threats of Climate Change	
	Social Capital	Enhancement of Community Activities	
		Stronger Involvement of Communities in Decision-making Processes	
		Organizing of Cross Cultural Events	
	Community Preparedness	Training Courses for Communities to Manage Disasters	
		Creation of Evacuation Plan	
		Establishment of Community-led Voluntary Groups to Manage Disasters	
Economic	Employment	Skill Trainings for Communities	
		Creation of Youth Employment Programmes	
		Development of Job Placement	
	Finance and Savings	Community Assistance Packages for Disaster Prevention	
		Provision of Affordable Insurance Schemes for all Households	
		Provision of Affordable Micro-credit Products / Schemes	
	Budget and Subsidy	Increase Budget for Disaster Risk Management	
		Creation of Post-Disaster Assistance Package (Reconstruction)	
		Provision of Post-Disaster Assistance (e.g. shelter, health care, nutrition)	

Figure 7b. The priority level of AoRA in Indonesia (continued)



Institutional	Mainstreaming	Incorporation of DRR and CCA in all Development Plans	
		Development of Multi-hazard Disaster Management Plans	
		Stronger Involvement of Communities in Planning Process	
	Crisis Management	Training Courses for Emergency Teams	
		Initiation of Networks between Crisis Management Teams	
		Creation of Disaster Risk Management Offices	
	Knowledge Dissemination and Management	Incorporation of Disaster Education in Syllabus	
		Development of Disaster Awareness Materials (e.g. pamphlets, video)	
		Development of Networks between School, Communities & other Partners	
	Institutional Collaboration	Stronger Ties between Neighbourhood, Wards & City Gov. for Emergency	
		Network with Neighbouring Cities for Improved Disaster Preparedness	
		Multi stake-holder Neigbourhood-level Disaster Forum	
	Good Governance	Establishment of Multi-hazard Early Warning System	
		Establishment of Neighbourhood Disaster Management Committee	
		Development of Neighbourhood-level Disaster Recovery Plan	
Natural	Ecosystem	Reducing the Discharge of Untreated Waste into Water-bodies	
		Increasing Area of Urban Greenspace	
		Awareness Campaign to Reduce Air Pollution	
	Land-Use	Designation of Sites Protected from any Development	
		Establishment of Sustainable Urban Development Strategies	
		Development of Multi-hazard Maps	
	Environmental Policies	Enforcement of Environment Impact Assessment (EIA) for Major Projects	
		Development Facilities to Treat all Types of Waste	
		Network between Different Partners to Support Environmental Policies	

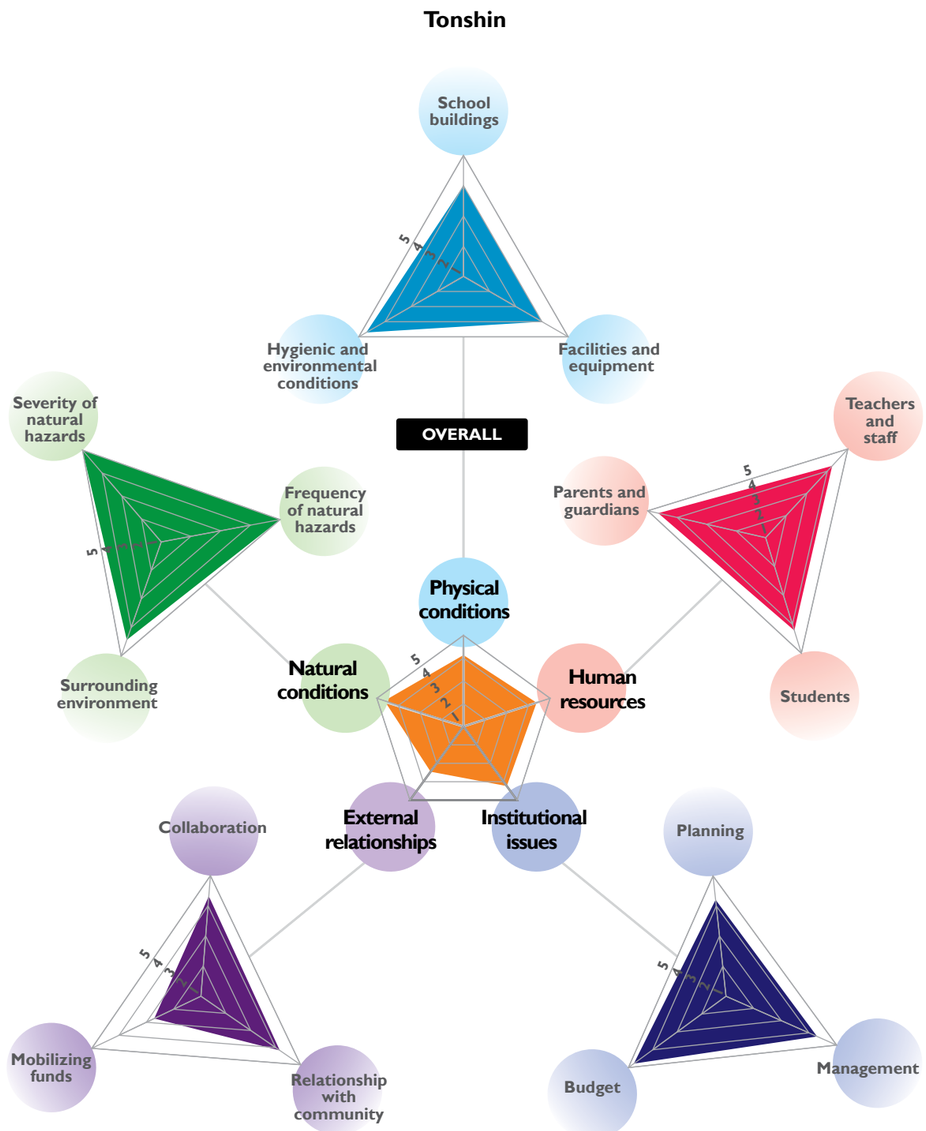
Findings

The AoRA was completed through the collective response of communities (Sub-district Fengyang and Sub-district Ruibao) in 2 sub-districts. The questionnaire requested the representatives to tick whether or not a resilience-related action was already fully implemented, available or functioning in their neighborhood.

The results of the AoRA carried out in China show that most actions are already fully implemented (Figure 6), with the exception of the actions in alternative back-up (generator), promotion of alternative energy sources (e.g. solar panels), emergency back-up of safe water, introduction of waste segregation practices, development of designated sites for debris waste collection, pre-disaster maps to avoid water-logged roads, and provision of affordable insurance schemes for all houses.

Figure 7 shows the priority level for each action in AoRA. The actions of first priority chosen by the representatives are: population control measures to optimize population density, awareness campaigns about potential diseases, training courses for communities to manage disasters, skills trainings for urban people, incorporation of DRR and CCA in all development plans, incorporation of disaster education in syllabus, and reducing the discharge of untreated waste into water bodies.

5.4 SDRA China



SDRA DIMENSION: Tonshin

Physical conditions
Tonshin School ranks very high in the physical conditions dimension, with hygienic conditions contributing the most to the score. Regular check on the school buildings and facilities is carried out by teachers and students in the beginning of every academic year. Besides, the concrete structure of the buildings minimizes the impacts of disaster on the school and its facilities.

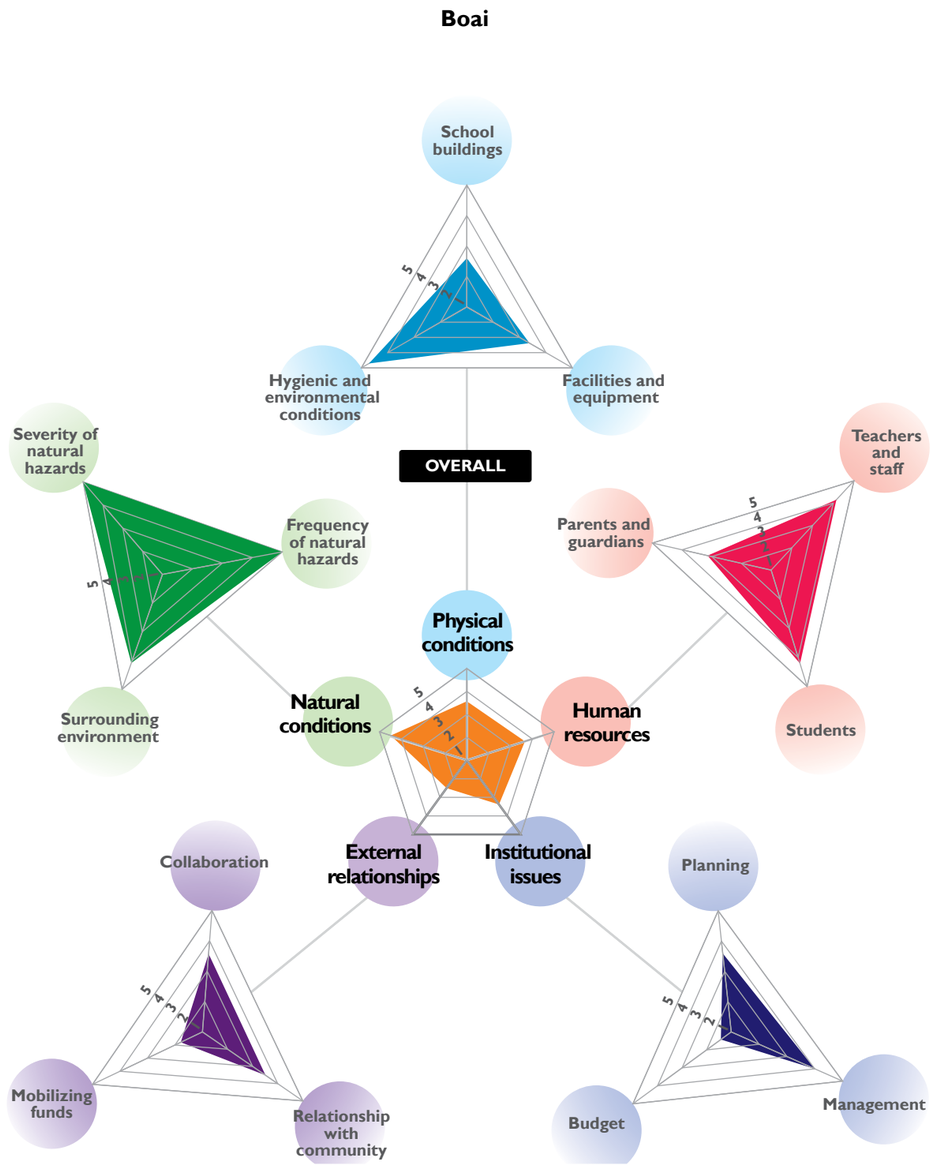
Human resources
The school scores high in all 3 parameters of human resource, namely teachers, students and parents/guardians, making this dimension the second highest resilience score among the five dimensions. More than 75% of teachers and students are equipped with proper knowledge and awareness about risks and impacts of disaster. Annual disaster training is provided for teachers and students. The high participation of parents/guardians is also one of the most important factors that contribute to the effective disaster preparedness activities held in the school.

Institutional issues
The high institutional score of the school is a result of very high marks in budget, planning and management. More than 3% of the total budget is originally allocated for disaster related concerns in the school and between 2.1% and 3% is allocated to various uses in time of disaster. This reflects the high awareness of the school management board on the importance of disaster prevention and preparedness.

External relationships
The external relationships dimension scores very high for the parameters of collaboration and relationship to communities, but very low for budget. Strong collaboration with local government and local community is revealed, especially with regard to interaction during times of disaster. However, it is found that the ability to mobilize funds from the local government is limited, and especially from the local community. However, there is a higher potential to receive financial support from NGOs and other organizations.

Natural conditions
The natural dimension of the school is ranked high and is characterized by a very high score due to very low severity and frequency of natural disaster. This is because the school is located in safe area and within 5km of the police station and health center.

Overall
The overall resilience level of Tonshin School is very high, as reflected in the high scores for all five dimensions.



SDRA DIMENSION: Boai

Physical conditions
Boai School scores very high in facilities and hygienic conditions. The school gives high attention to enhancement of food safety and proper garbage disposal. However, there is a lack of focus on the school buildings to prevent the structures from collapsing in case of disaster.

Human resources
The high number of trained teachers and students on disaster related issues results in the school obtaining high scores for the 'teachers' and 'students' parameters. The school runs disaster preparedness training for teachers and students more than once per year. However, there is no training for parents/guardians regarding disaster related issues. Although the involvement of parents/guardians in disaster management activities in the school is good, the school-home notification system in time of disaster is not fully implemented.

Institutional issues
The school's low score in the budget parameter brings down the score of its institutional dimension, which becomes the second lowest among the five dimensions. Less than 1% of the total budget is allocated to disaster related issues, which appears to be insufficient. Besides, there is no budget made available for supporting students with special needs.

External relationships
A very low score in budget causes external relationships to have the lowest score among the five dimensions. Although the school is able to mobilize funds from the local government, obtaining financial support from local community and other organizations, such as NGOs and private sectors, appear to be very limited.

Natural conditions
The natural conditions dimension is characterized by a very high score in all 3 parameters - severity of natural hazards, frequency of natural hazards and surrounding environment. The school is located in a safe area and rarely experiences climate related disasters such as flood or cyclone. Moreover, it is within 1 km from the local government office, the police station and the health centre.

Overall
The overall resilience level of Boai School is relatively high, with high scores in all dimensions, excluding external relationships.

PART III Country Analysis and Implications for World Vision

6. Summary of country analysis

6.1 Bangladesh URR

In Bangladesh, the city-level CDRI mapping was done in Dhaka for two Zones, namely Zone 5 and Zone 9. The overall CDRI for both zones are below average. Zone 5 has the overall CDRI score of 2.33 and Zone 9 has the overall score of 2.19. For both zones, the physical dimension is found to be of the highest resilience. The lowest resilience for Zone 5 is in the natural dimension, for Zone 9 it is in the institutional dimension. Unlike in Indonesia, the social resilience dimension in both zones is very low. For both zones, there are differences in the top 3 highest and lowest resilience parameters. The top 3 highest resilience parameters for Zone 5 are accessibility of roads, education and awareness, and institutional collaboration. For Zone 9, most resilience lies in electricity, water, and intensity/severity of the natural hazards. Meanwhile, the top 3 lowest resilience parameters for Zone 5 are population, land-use in natural terms, and housing and land-use. Similarly for Zone 9, the top 3 lowest resilience parameters are in finance and savings, environmental policies and community preparedness during a disaster (see individual CDRI description for more details).

Following the CDRI assessment, the AoRA, a community level assessment was carried out in 4 wards within Zone 5-DSCC and Zone 9-BUP. Some interesting findings show that all the proposed actions in AoRA are not yet fully implemented. As for the AoRA priority levels, there is little variation among the wards. The most outstanding result unanimously (100%) rated as the first priority, is training courses for communities to manage disasters. Other resilience-related actions which scored high as the first priority include: training of staff in health-sector to manage disasters, creation of evacuation plans, development of multi-hazard disaster management plans and disaster awareness materials (e.g. pamphlets, video, etc.), and provision of alternative back-up (generator).

The school assessment in the form of the SDRA in Dhaka was carried out with the headmaster, teachers, and school management committee as the main respondents. Four schools were involved in the SDRA - two primary schools and two secondary schools in each zone. The SDRA score for the secondary schools is higher than that of the elementary schools in each zone. In particular, the human resources, institutional and external relationships resilience dimensions are much higher than the other dimensions. However, physical and natural resilience are higher in primary schools than in secondary schools. The following show the differences in the resilience level of the schools resulting from the SDRA:

- The institutional issues for both primary and secondary schools in Zone 9 are lower than in Zone 5. This is reflected in the low SDRA parameter score for planning, management,and budget that also coincides with the low CDRI score on institutional resilience in Zone 9, particularly in mainstreaming DRR and CCA, knowledge dissemination and management, as well as budget and subsidy.

- The external relationships resilience of the high school in Zone 5 is distinctively higher than the primary school within the same zone as well as higher than the other schools in Zone 9. This difference contributed to the high CDRI score in the social and institutional dimensions in Zone 5.

The SDRA score of physical conditions in Zone 5 is higher than in Zone 9. This coincides with most of the scores under the CDRI physical parameters in Zone 5, such as sanitation and solid waste, and accessibility of roads which are higher than Zone 9. High scores for these parameters imply better facilities and hygienic conditions of the schools in Zone 5 compared to Zone 9.

6.2 Indonesia URR

The CDRI mapping was carried out at the ward/local city government level, represented by two kelurahan (Kelurahan Cawang and Kelurahan Kalibaru) in Jakarta, Indonesia. The overall CDRI score of Kelurahan Cawang is relatively low (2.94), with all the resilience scores of the five dimensions above the average (above 2.50). The social dimension shows the highest resilience and the lowest is exhibited by natural dimension. There are differences in the top 3 highest and lowest resilience parameters (see individual CDRI description) for both kelurahan. In addition, Kelurahan Kalibaru has even lower overall resilience (2.54) compared to Kelurahan Cawang, with the social dimension having the highest resilience and institutional as the lowest. Both kelurahans have one thing in common, i.e. social being the highest dimension of resilience.

The AoRA questionnaire was filled-up by neighborhood associations (Rukun Warga/RW) in both the kelurahans. It can be said from the RWs (total 6 RWs) in both the kelurahans, only actions in the social dimension have been implemented. There are some variations in the implementation of AoRA at several RWs in the areas of health, education and awareness, social capital, and community preparedness (see individual AoRA description). These reflect the current strong social resilience dimension in the CDRI for both kelurahans; although, there are micro-variations within the kelurahans. Priority actions chosen by the neighborhood leaders are: alternative back-up (generator), implementation of water harvesting facilities, pre-disaster maps to avoid water-logged roads, development of long-term slum removal strategy, stronger involvement of communities in decision-making processes, community assistance packages for disaster prevention, provision of post-disaster assistance (e.g. shelter, health care, nutrition), development of disaster awareness materials (e.g. pamphlets, video), awareness campaign to reduce air pollution, and development facilities to treat all types of waste.

The SDRA results or school resilience for Kelurahan Cawang is slightly above the average (3.01); and for Kelurahan Kalibaru, it is lower than Cawang (2.74). The school in Kelurahan Cawang has the highest resilience dimension in external relationship, which corresponds with the high social resilience score in the CDRI, especially on social capital that describes the strong linkage between school and community. On the contrary, the lowest school resilience dimension in Kelurahan Cawang is in institutional issues, which matches the low institutional resilience score in the CDRI. Significantly, the human resources score in Kelurahan Cawang is higher than in Kelurahan Kalibaru (3.11 and 1.80, respectively). This coincides with the better condition of teachers and students in Cawang, which confirms the assumption that external relationship determines human resources resilience and vice-versa. The SDRA scores also revealed that natural conditions, especially the surroundings, do not necessarily affect overall resilience. For example, the school location score is lower in Cawang than in Kalibaru, but overall resilience of the former is higher. This means that other resilience dimensions contributed differently to the overall strength of SDRA in each location.

6.3 China URR

The CDRI mapping conducted at the city level with the local government as the focal point in Haizhu District, China provided the following results:

(i) Haizhu District has an overall resilience score of 3.66, with all five resilience dimensions scoring above average.
(ii) Physical resilience is the highest; and economic resilience, the lowest.
(iii) The top 3 parameters were physical conditions, such as electricity, water, and accessibility of roads, whereas the 3 lowest parameters were in population, employment, and land-use in natural terms.

It also can be said that among the three countries, China has the highest CDRI score. Population parameter (2.6) which is the lowest among 24 parameters is the contributing factor to a low resilience index for the social dimension. This low population index score is reflected in the high population density of Haizhu District (12,000 people/sq.km).

AoRA respondents were communities from two sub-districts in Haizhu District, namely Sub-district Fengyang and Sub-district Ruibao. Unlike in Indonesia and Bangladesh, all proposed AoRA actions are almost fully implemented, except a few actions in the physical dimension (electricity, sanitation, solid waste disposal, and provision of pre-disaster maps to avoid water-logged roads) and the economic dimension (provision of affordable insurance schemes for all houses). Priorities, of course, vary. Key priorities are in areas of population control, awareness campaigns about potential diseases, disaster management training courses, skill trainings for urban communities, incorporation of DRR and CCA in all development plans, incorporation of disaster education in syllabus, and reducing the discharge of untreated waste into water bodies.

As for the assessment at the school level, the SDRA in Haizhu District was carried out in two private-run schools catering to children of migrants. All the SDRA dimensions and parameters have high scores, except the external relationships dimension, which encompasses issues like collaboration, relationship with communities, and funds mobilization. The lack of external relationships in SDRA is addressed in the AoRA which encourages school-community relationship. Possibly, this type of relationship between the school and the community can be shaped in the form of collaboration in developing pre-disaster maps that are not yet fully implemented in the AoRA. Activities such as town watching are examples of how school and community can work together. Such activities will build relationship and collaboration. In addition, a low score in funds mobilization in the SDRA coincides with the results under the economic dimension in AoRA which are not fully implemented yet, such as the provision of insurance schemes for households.

7. Link with World Vision Work

7.1 Implications to World Vision Operations

The three case study countries have different contexts in terms of WV operation. While Bangladesh and Indonesia have urban ADPs, China has special projects in urban areas. A few points have emerged from the analysis:

Prioritising Actions
Actions related to HFA 5 (Preparedness and Response) received the highest priority by all HEA team in the pilot NOs. This is followed by actions related to HFA 3, 1, 2 respectively. Actions associated with HFA 4 (Reduce the Underlying Risk Factors) came out relatively low with the HEA staff, both at national and divisional level. This result apparently shows a lack of integration between the development work carried out by the ADPs and the HEA work. While ADP projects have strong components of basic urban services, the HEA team does not seem to view these as risk reduction interventions. As the ADP is a long-term development program, with a focus on economic benefits, HIV-AIDS, nutrition, and child protection, it is important to visualize the link between the ADP operation and its contribution to urban disaster risk reduction, especially HFA 4 (reduce underlying risk). Recognizing ADP work as contributing to risk reduction and expanding it to embrace preparedness (including risk assessment, monitoring, and early warning), adaptation, as well as institutional and community education and capacity building would enable the emergence of an integrated urban programming.

Child-focused activities in URR
Child-focused activities of WV also have strong linkages to urban risk reduction. Child-focused activities enable the creation and strengthening of linkages with the family, community, state, etc. The SDRA exemplifies an integrated risk analysis approach of the school, and establishes the linkages among school, community, city, and state. These linkages, when institutionalized, can serve as a platform for an integrated school-community based DRR. Child-focused DRR too can build on basic services such as water, sanitation, electricity, school building, and teachers' capacity building. Sustaining the integration of DRR measures and activities in the school and linking these to community-based DRR requires strengthening the institutional dimensions of the school (planning, management, and budget). Even if current partnership with schools are confined to development work (e.g. nutrition, WASH), strengthening the institutional dimension is critical not only in sustaining the current work but also in broadening it into an integrated school-community based DRR.

Accountability must be linked with AoRA
Accountability issue needs to be linked with the AoRA analysis, where community needs and priorities are surveyed and linked to the city or sub-city priorities. Communities' voices need to be reflected in the implementation of risk reduction or urban resilience programs. Another aspect of accountability is the link with the local governance mechanism to enhance sustainability.

Finally, the current analysis recommends that CDRI should be conducted in urban areas (either at city or sub-city level) to identify potential target areas for implementation of ADP. CDRI can be used as a yardstick to measure the progress of investment in ADP at regular intervals (after 3 years, 5 years, and so on). The AoRA can be used to prioritize actions in the target area, and initiate community-led implementation; as well as to link with other development initiatives being implemented by related stakeholders, and to establish an accountability system. The SDRA can be used to identify and prioritize child-focused activities, and can also be a yardstick for measuring the progress in the sector; as well as a means to establish school-community relations to foster an integrated urban programming. Finally, the HFA can be used to enhance understanding and capacity of the HEA as well as ADP officers, and to establish linkage between the ADP investment and urban disaster risk reduction approaches.

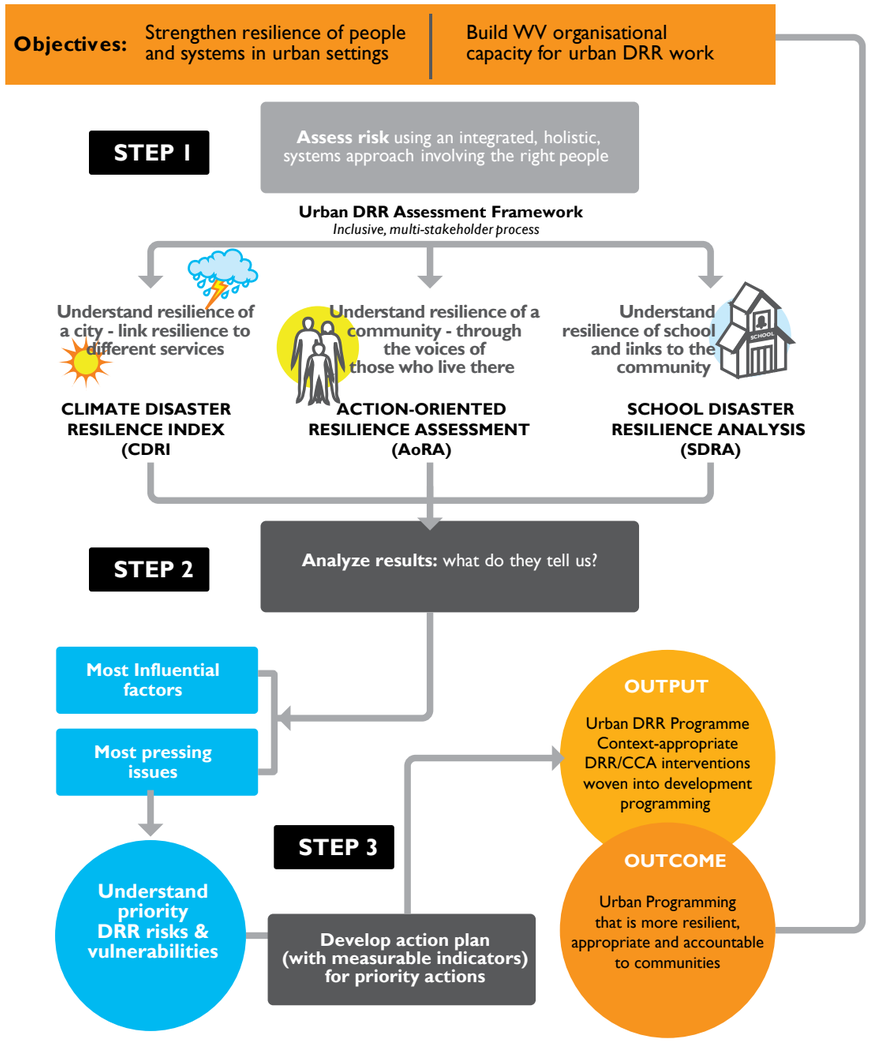
7.2 From resilience assessment to an urban DRR programme

Based on the results of the assessment, WV Bangladesh proceeded to conduct a stakeholder mapping. The stakeholder mapping will enhance and inform their urban DRR program which was initially developed based on the assessment results. The stakeholder mapping/study which focuses on Dhaka examines initiatives undertaken by the government, academic, private sector, and NGOs in addressing DRR. Using the results of the assessment and the stakeholder mapping/study, opportunities for collaboration in addressing DRR-related concerns will more effectively guide the urban DRR program of WV Bangladesh.

The stakeholder mapping questionnaire was initially part of the AORA assessment tool. However, its administration in all three countries was weak as respondents were limited in their understanding of who among the stakeholders are responsible for a certain DRR action. In addition, follow-up questions to allow the respondents justify or explain their answers were not collected. Thus, to enable WV Bangladesh to complete its development of an urban DRR program, a comprehensive stakeholder mapping/study was commissioned and completed in March 2014. It can be downloaded from the World Vision Asia Pacific website: http://www.wvi.org/asia-pacific/publication/disaster-risk-reduction-dhaka-city.

During the initial workshop in December 2012 which was facilitated by ACRP staff and the regional urban advisor, the priority areas identified by the ADPs were similar; as such the program logframe that each ADP developed was combined into one citywide Dhaka Urban DRR Program, during the workshop last April 2013. "Citywide" means the enhanced programming will encompass both Dhaka ADPs, rather than have two separate programmes. World Vision Bangladesh's assessment process results and initial development of an urban DRR program is illustrated below.

Urban DRR Assessment & Integration Process



The overall goal of the initial 3-year program is ***"Resilient urban stakeholders able to mitigate, adapt to, & recover from shocks & stresses and foster their well-being".***

The program covers five major outcomes, namely:

- Citywide network and collaboration in implementing urban DRR is functional
- Community capacity to adapt and mitigate, prepare for, and respond to disasters have been strengthened
- Increased community participation on WASH and garbage management in order to reduce urban environmental risk
- Increased income and better well-being of households
- School capacity to reduce disaster risk for students and personnel has been enhanced

The initial urban DRR program covers Dhaka; implementation of community/neighborhood and school-based activities will be within the wards and zone or union where Kamalapur and Dhaka East ADP operate, but networks and collaboration will be citywide to pave the way for an eventual citywide implementation of activities through partnerships. A full landscape review with stakeholder mapping was completed in January 2014, and will be used to enhance the program's outcomes and activities; focused partnerships with relevant government agencies and NGOs and other relevant stakeholders will be part of any programming and initiatives.

The on-going development of the World Vision city-wide Dhaka urban DRR program is the work of many brains and hands. A broad range of staff contributed actively; indeed, such a program requires experience, expertise and diversity of skills and perspective to be successful. For this Dhaka program, this group of people included ADP staff, design, monitoring & evaluation specialists, sector specialists, the TD Coordinator, HEA Director, Advocacy officer and the Disability Program officer. All were involved in fine tuning the program logframe and implementation plan. The program hopes to demonstrate how to undertake citywide programming using DRR as the springboard.

For our other two research locations, Indonesia has expressed interest in following the lead of Bangladesh - that is, to translate the assessment results into a comprehensive integrated urban DRR program. China's direction is articulated into enhancements of their current Guangdong Migrant Children Project. A focused outcome, outputs and activities related to ensuring the well-being of migrant workers' children are priorities. This includes the development of school materials which are appropriate and relevant for children of migrant workers; the development of mechanisms for school-community interaction and more dynamic collaboration.

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