

---

# Climate Change Risk Assessment Toolkit for Secondary Cities in Bangladesh and Vietnam

---

*Assessment of Climate Change Risks and Adaptation Options for Secondary  
Cities in Southwestern Bangladesh and Central Vietnam*

(A research project funded by the Asia Pacific Network (APN) for Global Change Research)

Produced by Iftekhar Ahmed and Darryn McEvoy, Climate Change Adaptation Program (CCAP)  
RMIT University, Melbourne, Australia

## Collaborating organisations

- Climate Change Adaptation Program (CCAP), RMIT University, Melbourne, Australia
- Postgraduate Programs in Disaster Management (PPDM), BRAC University, Dhaka, Bangladesh
- Institute of Water & Flood Management (IWFM), BUET, Dhaka, Bangladesh
- Centre for Social Research & Development (CSRD), Hué, Vietnam
- Southern Institute of Sustainable Development (SISD), VASS, Ho Chi Minh City, Vietnam



December 2011

# Contents

---

<b>1. Introduction</b>	2
<b>2. Key Concepts</b>	3
<b>3. Risk Assessment Process</b>	6
<b>4. Pre-Assessment Stage (Case Study City)</b>	8
4.1 Collecting secondary information	8
4.2 Local introductions and briefings	11
<i>Tool 1: Identifying key local stakeholders</i>	12
4.3 Finalising key local stakeholders	13
<i>Tool 2: Matrix for stakeholder analysis</i>	14
<b>5. Assessment Stage (Case Study City)</b>	16
5.1 City level risk analysis	16
<i>Tool 3: Hazard mapping</i>	17
<i>Tool 4: Hazard ranking</i>	18
<i>Tool 5: Transects</i>	19
<i>Tool 6: Scenarios analysis</i>	20
<i>Tool 7: Key informant interviews</i>	21
5.2 Community level participatory risk analysis	22
<i>Tool 8: Community profiling</i>	24
<i>Tool 9: Hazard mapping (community)</i>	25
<i>Tool 10: Hazard ranking (community)</i>	26
<i>Tool 11: Transect walk</i>	27
<i>Tool 12: Long term trend analysis</i>	28
<i>Tool 13: Key informant interviews (community)</i>	29
<b>6. Consolidation Stage</b>	30
6.1 Compilation of findings/draft report	30
<i>Tool 14: Indicative draft report structure</i>	32
6.2 Validation at stakeholders meeting	33
<i>Tool 15: Validation checklist</i>	34
<b>7. Future Climate Change Scenarios (Workshop, Hué)</b>	35
<i>Tool 16: Risk quadrant</i>	36
<i>Tool 17: Vulnerability/Capacity analysis of sectors/</i>	37
<b>8. Key References</b>	38

---

## 1. Introduction

This toolkit assembles a set of tools on how to conduct a climate change risk assessment in secondary cities in Bangladesh and Vietnam, focusing on the cities of Satkhira, Bangladesh and Hué, Vietnam. The risk assessment is a major element in the research project *Assessment of Climate Change Risks and Adaptation Options for Secondary Cities in Southwestern Bangladesh and Central Vietnam* funded by the Asia Pacific Network (APN) for Global Change Research, Japan. In addition to preparing this toolkit, further technical support to the risk assessment process will be provided by the Climate Change Adaptation Program (CCAP), RMIT University, Australia. The risk assessment is to be carried out by the project partners in the two countries, Bangladesh and Vietnam.

Before explaining the risk assessment process, some key concepts are discussed and relevant background information is provided in section 2. This is expected to allow the project partners to gain a common understanding and conceptual clarity. The term ‘hazard’ has been used widely in this toolkit in the context of climate change risks, but the users should be careful about interpreting the key differences between climate change impacts and disasters, as discussed in section 2. Climate variability and weather fluctuations due to climate change can lead to extreme weather events, which can result in disasters. However climate change is also gradually altering long-term seasonal patterns. Although that may not result in disasters directly, it can be a hazard in itself as it may have long-term future impacts on urban sustainability.

To understand future uncertainty, it is necessary to identify hazards that may possibly be caused by climate change and/or could increase because of climate change in the future. This is often a difficult task; climate related changes (variable rainfall, increased heat or cold, etc) are often hard to separate from other factors causing change such as deforestation, urbanisation and population growth. Significant time and effort need to be given to find out all the changes affecting the city, to review secondary information and analyse with local stakeholders and communities what the actual climate-related impacts are, or likely to be in the future.

Similarly, infrastructure development can cause environmental problems (e.g. reduced water flow in river due to a dyke). Caution is necessary so that such effects are not confused with climate change impacts. However, there could be linkages; such developments may combine with climate change and magnify impacts. The risk assessment should examine such changes that contribute to the city’s risks.

In each of the three stages of the risk assessment process in the case study cities, explained in section 3, there are activities with suggested guidelines, most of which include structured exercises. A number of tools have been provided for conducting these exercises; each tool includes a set of instructions and a relevant worksheet or illustrative example.

Although this toolkit has been written in English, it should be translated into Bengali and Vietnamese if considered necessary for better effectiveness in the local context. However care should be taken to ensure good translation.

In addition to understanding and using the toolkit, facilitating a risk assessment process requires a lot of sensitivity and understanding of the potential and challenges of the local context. Therefore significant training and experience is required. Members of the research team should have strong experience in engaging with local stakeholders and communities. Additionally understanding and knowledge of the context, as well as experience of working at the local level, are key qualities that the research team members should have.

## 2. Key Concepts<sup>1</sup>

- **Climate change**

It is important to note that the climate has always changed, and over time has shown naturally variability, however there are increasing concerns that human activity is resulting in an increase in the rate of change. For the purposes of this report, climate change is therefore used in the context of both climate variability and longer term changes in climate trends which may increase risks to human well-being.

- **Climate change impacts**

Human-induced climate change is likely to increase the frequency and intensity of different types of extreme weather events: (a) Heat and cold waves; (b) Storms; (c) High rainfall and related floods; and (d) Lack of rainfall and associated drought.

In addition to extreme weather events, climate change is anticipated to also have long term impacts such as gradually increasing temperatures, changing seasons, erratic rainfall patterns and rising sea levels. Climate change is a global phenomenon, but its impacts in the form of disasters and extreme weather events are local or regional, though in some instances can have wider, and even global, implications.

It is important to note that climate change impacts can have secondary effects, for example landslides caused by excessive rainfall, or even be caused by multi-hazard events, for example the occurrence of a cyclone combined with flooding from the associated storm surge.

- **Climate change risks in cities**

Increases in population and consequent dense settlement patterns in cities, as well as more development leading to higher value and quantity of assets, is likely to result in more pronounced climate change impacts. Rapid urbanisation and concentration of poor communities in high risk areas can heighten vulnerability. A selection of climate change impacts include disruptions to food security (due to desertification and drought in agricultural areas) and economic productivity, increased intensity and frequency of extreme weather events, rising sea levels displacing large numbers of coastal urban populations and loss of assets, and an amplification of urban heat island effects.

The concentration of infrastructure and built-up areas in cities is a key component of urban risk. Buildings and other structures face risks such as degradation and failure of foundations to soil moisture variability and increased likelihood of damage from flood, storm and coastal storm surges. Increased heat regimes can lead to swelling and contraction of building parts causing cracking and deterioration of finishes. Lightweight structures, particularly residential buildings, are vulnerable to wind impact and can experience structural failure and collapse, as well as damage by flying debris and water penetration. Impacts of increased precipitation and consequent flooding include pressure on drainage and sewerage systems, damage to building foundations and deterioration of materials due to water penetration and dampness. Transportation infrastructure (roads, bridges, rail networks, etc) also face a similar set of risks.

- **Hazard**

Event that has the **potential** for causing injuries to life and damaging property and environment.

---

<sup>1</sup> Many of these concepts are derived partly from IPCC (2001) and UNISDR (2009).

- **Vulnerability**

Conditions that **reduce people's ability** to prepare for, withstand or respond to a hazard. In a broader sense, it includes other elements at risk in the urban environment.

- **Capacity**

Positive conditions or skills which increase a group's **ability** to deal with, or respond to, hazards.

- **Risk**

The combination of the probability of an event and its negative consequences. It includes the potential sources of risk (flooding, industrial, extreme weather, etc) and the risk likelihood frequency (10% risk, 100-year flood, etc).

Climate or disaster risk is related to the magnitude of the hazard, and also to capacity and vulnerability. If the capacity in a group is high, risk is low, but if vulnerability is high, risk will also be high. Therefore risk reduction involves both increasing capacity and reducing vulnerability, shown below in Fig. 1.

$$\text{Risk} = \text{Hazard} \times \frac{\text{Vulnerability}}{\text{Capacity}}$$

Fig. 1: Relationship between risk, hazard, capacity and vulnerability

- **Risk assessment**

A methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that together could potentially harm exposed people, property, services, livelihoods and the environment on which they depend.

Risk assessments include: (a) Review of the technical characteristics of hazards such as their location, intensity, frequency and probability; (b) Analysis of exposure and vulnerability including the physical social, health, economic and environmental dimensions; and (c) Evaluation of the effectiveness of prevailing and alternative coping capacities with respect to likely risk scenarios.

- **Climate change adaptation (CCA)**

The adjustment in natural or human systems in response to actual or expected forces or their effects, which reduces harm and/or **exploits beneficial opportunities**.

- **Climate change mitigation (CCM)**

An activity to reduce the drivers of climate change, such as through **reducing emissions of greenhouse gases** to the atmosphere. *In the context of disasters, "mitigation" means the measures taken before the impact of a disaster to minimise its effects.*

- **Resilience**

The ability of a system or community to **resist, absorb, accommodate to and recover from** the effects of a hazard in a timely and efficient way.

Toolkits suitable for urban climate change risk assessment, particularly for secondary cities in Asia, remain lacking. One notable example is the toolkit developed by UN-Habitat (2008; 2011) for vulnerability and adaptation assessment in Sorsogon City, Philippines. This toolkit draws on UN-Habitat's activity, adapting it to the context of this project. Focusing on vulnerability, the analytical framework is structured according to the three factors below.

- **Exposure**

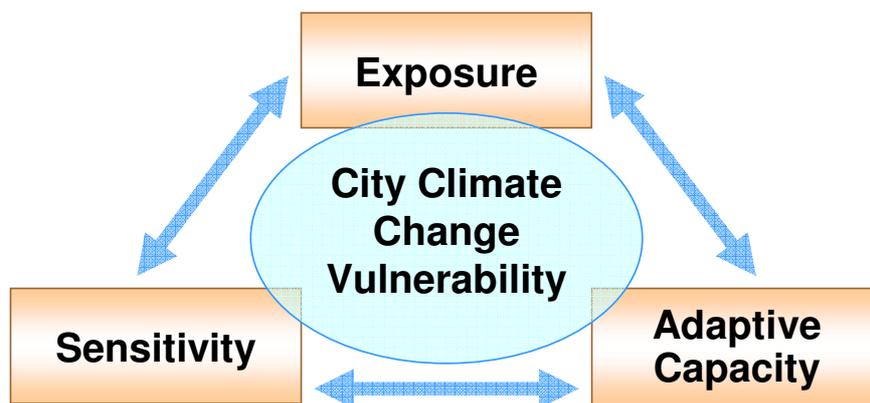
The nature and degree to which a system (in this case a city) is exposed to climatic variations and impacts, and hazards. Measures of exposure can include the number of people or types of assets in an area. These can be combined with the specific vulnerability of the exposed elements to any particular hazard to estimate the quantitative risks associated with that hazard in the area of interest.

- **Sensitivity**

The degree to which a system (e.g. city) is affected or liable to be affected by climate-related hazards. The effect may be direct (e.g. change in building materials due to temperature variability) or indirect (e.g. damages caused by an increase in the frequency of coastal flooding due to sea level rise).

- **Adaptive capacity**

This is linked to the broader definition of capacity above. In the context of climate change, it is the ability of a system (e.g. a city or parts of a city) to adjust to climate variability and extremes to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.



*Fig. 2: Vulnerability assessment framework of UN-Habitat (2008)*

### 3. Risk Assessment Process

There are two main steps in the risk assessment process:

- a. **Local assessments and context-setting:** Partners in each country will conduct assessments in respective case study cities (Satkhira and Hué) during January-March 2012. This document provides details primarily on this step.
- b. **Future risk analysis and evaluation:** Partners from all the three countries (Australia, Bangladesh and Vietnam) will get together at a two-day workshop in Hué in mid-April 2012, where the findings from the country level assessments will be presented and compared, and climate change risk analysis and evaluation will be carried out together with a small group of key stakeholders. Detailed guidance material will be provided before the workshop.

#### 3.1 Local assessments and context-setting

This step should aim to derive findings from local knowledge at institutional and community levels in the case study cities. That would then provide the context and serve as the basis for examining climate change scenarios to analyse and evaluate future risk. The risk assessment in each city should be conducted according to the following three main stages (see the flowchart in Fig. 3):

1. **Pre-Assessment Stage:** Three main activities need to be carried out by the research team before beginning the actual risk assessment:
  - Collecting secondary information;
  - Local introductions and briefings;
  - Selecting the key local stakeholders to be involved.
2. **Assessment Stage:** The research team should work with the key local stakeholders identified in the pre-assessment stage on a series of structured risk assessment exercises to analyse climate change risks at the city level. Through these exercises, at-risk communities in the city should be identified. Then a sample at-risk community should be selected, where a series of community level risk analysis exercises should be carried out.
3. **Consolidation Stage:** The findings from the risk analysis exercises should be compiled and a draft report prepared. A meeting with the local stakeholders and key community representatives should be organised to present the assessment findings in order to validate them. The feedback received at the meeting should be incorporated into the risk assessment report.

The following sections provide guidance and details on the risk assessment process in each city and include tools for the suggested risk analysis exercises.

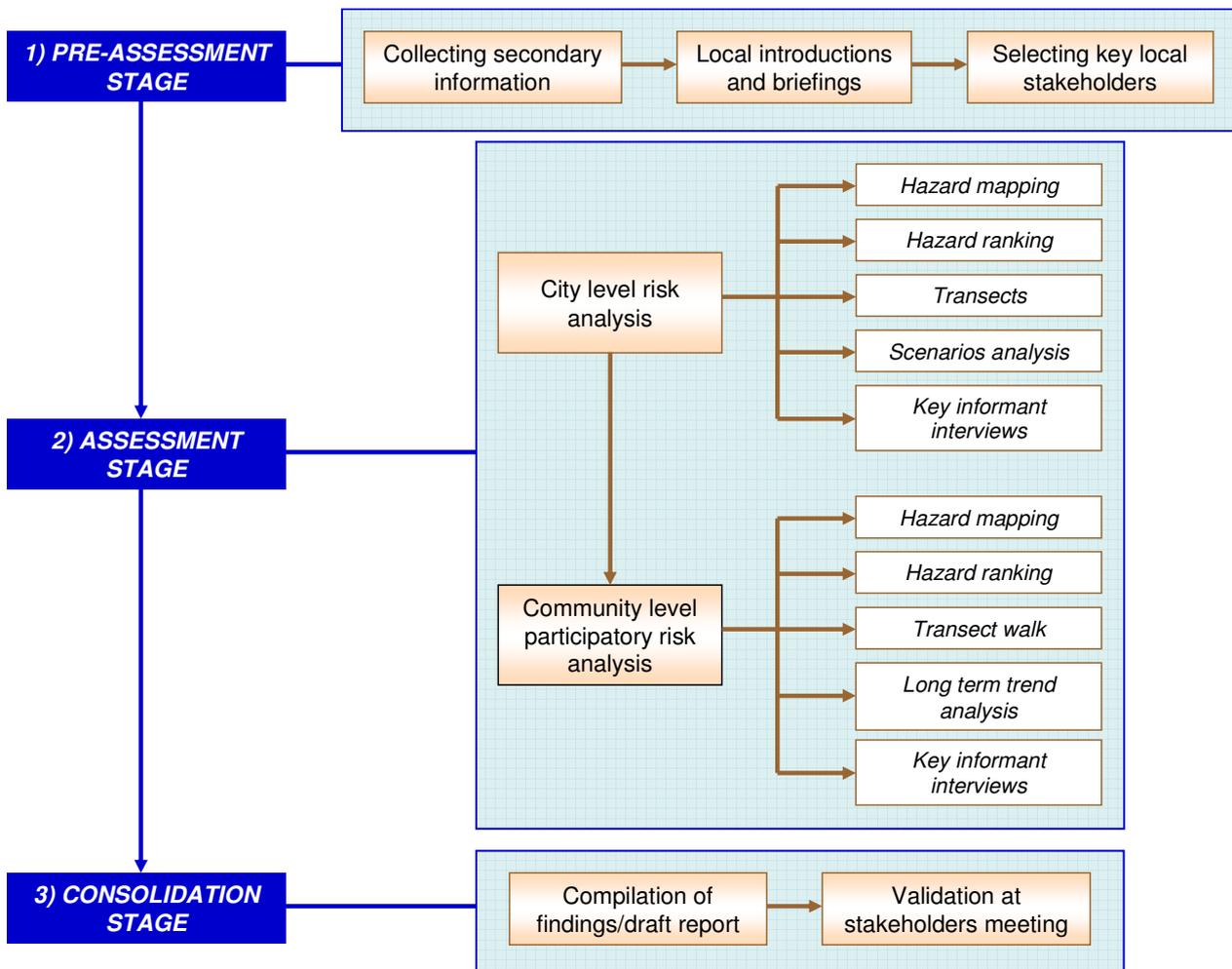


Fig. 3: Salient aspects of the climate change risk assessment process in each city

### 3.2 Future risk analysis and evaluation

While the assessments in each case study city are expected to draw on local knowledge, which often generally tends to focus on the history of hazards and recent impacts, the second step of the risk assessment process will use that as a stepping stone to analyse and evaluate climate change risk in terms of future scenarios. This will be done at a two-day workshop in Hué with representatives from all the project partners and a small group of key stakeholders. An in-depth comparative review of the findings from each case study country will be done, as well as relating and synthesising local knowledge based findings with scientific knowledge.

The secondary information collected during the pre-assessment stage in each country, particularly local and/or regional downscaled climate change scenarios will be utilised during the workshop.

A detailed document providing guidance and tools for this step will be provided closer to the date of the workshop. Nonetheless towards the end of this document, an indicative outline is provided in section 7.

## 4. Pre-Assessment Stage (Case Study City)

### 4.1 Collecting secondary information

#### Instructions/Requirements:

- Before starting the risk assessment, an extensive and thorough review of locally relevant secondary information will allow the research team to gain the necessary background knowledge. The secondary information will also allow cross-checking and comparing the information collected in the risk assessment process.
- **It is important that the research team collects IPCC and/or other regional climate change scenarios information relevant to each country.** This will be used in the assessments, particularly at the interim workshop in Hué.
- A comprehensive list is provided below, but **not all the information might be available or even exist. Attempt to collect as much as possible within the limitations of the situation.**
- On a cautionary note, do not collect too much information such that it leads to overload. Keep a focus on the project at hand and manage the level of information and detail required. Use judgement to screen information so that it relates directly to the context and the community selected.
- Collate the information under a few key groupings: (a) Demographic, social and economic; (b) Environment and resources; (c) Climate change; (d) Disasters and hazards; (e) Urban planning and development.
- A system for collating, organising and filing information will need to be developed based on the groupings above. Decide who will be responsible for doing this and managing the system.
- Interpreting the information will be linked to how it relates to the city. Wider national level data will need to be interpreted at the scale of the city and at-risk communities.
- The information might be in various forms – books, reports, policy documents, maps, etc. Each of these will have to be reviewed and interpreted differently, but with the common objective of understanding how it relates to the city.
- Establish key contact points at sources of secondary information. Use local knowledge and networks to identify the right people and sources. Make arrangements for getting permission if necessary to access and use the information.
- Delegate from the research team who will collect what and from whom.
- Decide how much time this activity is likely to take. Do not spend a significant amount of time; roughly a couple of weeks should be adequate. More time should be allocated for the actual risk assessment.
- At the end of this activity, the research team should have a good understanding of the local context and how key issues relate to the city.
- Although it is best to get the bulk of the work done before moving on to the next activities, the collection and review of secondary information can be expected to continue during the next stages while the assessment process progresses.

Activity	Purpose	Tasks	Tools and Resources
<p><b>Collecting secondary information.</b></p>	<p>To collect and review secondary information to gain an understanding of issues and the context before the risk assessment.</p>	<p>Collect, compare and review information about urban, regional and national level issues, such as:</p> <ul style="list-style-type: none"> <li>▪ <b>Climate projections: Downscaled local climate change models, and national and local climate studies.</b></li> <li>▪ Urban demographic aspects, e.g. population density and growth trends.</li> <li>▪ Environment: Both natural (topography, elevation, water bodies, etc) and man-made (land-use patterns, settlement patterns, infrastructure, etc).</li> <li>▪ Changes in weather patterns: Local weather data and historical trends, and whether these have amplified recently. Pay particular attention to rainfall, heat, cold and dryness and extreme events.</li> <li>▪ Disaster profile: Hazard types, frequency and intensity. Focus primarily on hydro-meteorological disasters, but if other disasters are significant in the area, those would also need to be taken into consideration.</li> <li>▪ Development plans, policies and strategies: National poverty reduction strategy papers, climate change strategies, disaster risk reduction</li> </ul>	<p>Data sources may include:</p> <ul style="list-style-type: none"> <li>▪ National census and statistics offices.</li> <li>▪ Municipal and district government offices.</li> <li>▪ Resource centres of NGOs and UN agencies.</li> <li>▪ Local urban and regional development planning offices.</li> <li>▪ GIS and cartography offices for maps.</li> <li>▪ Remote sensing offices for satellite photos and maps.</li> <li>▪ Meteorological offices and weather stations.</li> <li>▪ National and local libraries.</li> <li>▪ Civil sector forums.</li> </ul> <p>Key policy and strategy documents may include:</p> <ul style="list-style-type: none"> <li>▪ National development plan, poverty reduction strategy paper.</li> <li>▪ National Adaptation Program of Action (NAPA), climate change target program or strategy paper.</li> <li>▪ National DRR platform.</li> <li>▪ Hyogo Framework of Action monitoring reports.</li> <li>▪ UNFCCC national communications.</li> <li>▪ Intergovernmental Panel on Climate Change (IPCC) assessment reports – regional chapters.</li> <li>▪ UNISDR campaigns.</li> </ul>

		<p>policies, and urban and regional planning policy frameworks.</p> <ul style="list-style-type: none"><li>▪ Organisations working on climate change and disasters: Dedicated national line ministries and departments, key bi/multi-lateral programs, INGOs, local NGOs and CBOs. Focus on the most active ones in the city.</li></ul>	<ul style="list-style-type: none"><li>▪ UNDP, UNOCHA or UN country office journal articles.</li></ul>
--	--	--	---

## 4.2 Local introductions and briefings

### Instructions/Requirements:

- Identify key officials at the urban planning/management agencies (*Pourashavya* in Bangladesh; City People’s Committee in Vietnam) and meet them personally to brief them about the project. Inform them that they would be invited to the stakeholders meeting to be held as part of the next activity.
- During collection of secondary information, some of the key local agencies including NGOs would have been contacted. Identify which of these agencies, and their staff members, could play a significant role in the risk assessment and subsequent stages of the project.
- Although some of these agencies would have been briefed about the project when collecting information, others may be suggested during the process. These will need to be visited, key staff identified and briefed.
- Identify agencies that have strong links to local communities and are able to provide the necessary introductions for the community level risk analysis during the assessment stage.

Activity	Purpose	Tasks	Tools
<b>Local introductions and briefings.</b>	<ul style="list-style-type: none"> <li>▪ For local agencies to understand the relevance and importance of the project.</li> <li>▪ To get the support of local agencies in the risk assessment process and subsequent steps.</li> <li>▪ To get an idea which agencies can play a key role.</li> </ul>	<ul style="list-style-type: none"> <li>▪ At the initial stage meet and brief important officials at key urban agencies:               <ul style="list-style-type: none"> <li>– Pourashavya Chairman/ Leader of City People’s Committee.</li> <li>– Deputy officials of these agencies.</li> <li>– Heads of prominent local government agencies and NGOs.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <a href="#">Tool 1: Identifying key local stakeholders.</a></li> </ul>

### **Tool 1: Identifying key local stakeholders**

Use the worksheet below to record findings of the activity 4.2 (Local introduction and briefings).

KEY QUESTIONS	NOTES
Who should be included because of their relevant formal position (e.g. government authority)?	
Who should be included because of their experience and knowledge (e.g. local community-based organisations)?	
Who should be included because they have control over relevant resources (e.g. money, expertise)?	
Who has power to promote, hinder or block the assessment process (e.g. lobby groups, vested interest groups or individuals)?	
COMMENTS:	

### 4.3 Selecting key local stakeholders

#### Instructions/Requirements:

- Organise a half-day meeting, inviting the key local stakeholders identified during the activity discussed above in section 4.2.
- Make sure that the timing is suitable for the main stakeholders.
- Organise a suitable venue. If possible, find an in-kind venue.
- Allocate a small budget for tea/snacks.
- Limit the number of participants to 10-15. Otherwise it might be difficult to manage.
- Make it clear that there would be no payment or monetary benefit for involvement in the project; it would have to be voluntary. Use the worksheet below to record findings of the activity 4.2 (Local introduction and briefings).

Activity	Purpose	Tasks	Tools
<b>Finalising key local stakeholders.</b>	<ul style="list-style-type: none"> <li>▪ To discuss with local stakeholders who will be involved in the risk assessment process, and to what extent.</li> <li>▪ Develop agreements of the involvement.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Organise a meeting with key stakeholders.</li> <li>▪ Discuss and consult with them on their interest and level of participation.</li> <li>▪ Arrive at informal agreements, and if necessary sign formal agreements.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <a href="#">Tool 2: Matrix for stakeholder analysis.</a></li> </ul>

## Tool 2: Matrix for stakeholder analysis

**Time: 2 hours** (60 minutes for group work and 60 minutes for presentations and discussion)

- Break the participants into small groups (government, NGO, private sector, etc).
- Ask each group to discuss among themselves and fill out the worksheet below.
- Ask each group to present its outputs in 8-10 minutes.
- Compare the different outputs and have an open discussion to build consensus and finalise the stakeholders that will participate in the research.
- Use both a flipchart and worksheet to record group responses.
- The worksheet below may need to be expanded if more space for writing is needed.

STAKEHOLDER	DESCRIPTION OF KEY INTEREST	DESCRIPTION OF KEY POTENTIAL CONTRIBUTIONS	PARTNERSHIP ASSESSMENT*	
			Current	Potential
<b>GOVERNMENT</b>				
<b>NGO and CBO</b>				

STAKEHOLDER	DESCRIPTION OF KEY INTEREST	DESCRIPTION OF KEY POTENTIAL CONTRIBUTIONS	PARTNERSHIP ASSESSMENT*	
			Current	Potential
<b>BUSINESS</b>				
<b>OTHER</b>				

\* Consider the following when assessing the stakeholders:

- Their formal position (e.g. government authority);
- Their experience and knowledge (e.g. NGOs, CBOs);
- Their control over relevant resources (e.g. money, expertise);
- Their power to promote, hinder or block the process (e.g. lobby groups, vested interest groups or individuals).

## 5. Assessment Stage (Case Study City)

### 5.1 City level risk analysis

#### Instructions/Requirements:

- In this activity work with the key local stakeholders identified and finalised in the previous pre-assessment stage.
- Use the tools below for a series of structured risk assessment exercises to be conducted with the stakeholder participants in a workshop.
- Schedule the workshop according to the convenience of the participants. It is best if a workshop is organised over two consecutive days. However adopt other schedules according to the situation and availability of participants.
- Identify a suitable venue, and if possible use an in-kind venue.
- Allocate a small budget for tea/snacks.
- Note that the findings at this stage will be based on local experience and knowledge, and may not have a scientific basis. The research team will have to review the findings in the light of scientific information collected in the pre-assessment stage, and thereby produce the final risk assessment output.
- Maintain a record of digital photos of key aspects of the city and the risk analysis process.

Activity	Purpose	Tasks	Tools
<b>City level risk analysis.</b>	To assess climate change risks at the city scale.	<ul style="list-style-type: none"> <li>▪ Organise a workshop (or a series of mini-workshops, as appropriate) with key local stakeholders.</li> <li>▪ Conduct a series of structured exercises for urban risk analysis.</li> <li>▪ Review the workshop findings in the light of scientific literature.</li> <li>▪ Identify at-risk areas and communities in the city.</li> <li>▪ Assess which at-risk community could be selected as a sample for the next activity in this stage.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <a href="#">Tool 3: Hazard mapping.</a></li> <li>▪ <a href="#">Tool 4: Hazard ranking.</a></li> <li>▪ <a href="#">Tool 5: Transects.</a></li> <li>▪ <a href="#">Tool 6: Scenarios Analysis.</a></li> <li>▪ <a href="#">Tool 7: Key informant interviews.</a></li> </ul>

### **Tool 3: Hazard mapping**

**Time: 1 ¼ hours** (45 minutes for group work and 30 minutes for presentations and discussion)

- A hazard map allows recording information about different types of climatic hazards affecting a city.
- Obtain a city map and make a number of A3 (or larger) size copies.
- Continue working with the same groups as before (government, NGOs, business, etc) and provide each group with a copy of the map.
- Ask each group to highlight areas in the map with different colours for each hazard, using colour marker pens. Some hazards may affect the same areas, so use different colours in overlapping patterns for such areas.
- Consider exposure to hazards as a key criterion.
- Do not look for high accuracy; the main idea is to identify the hazard-prone areas.
- Ask each group to present its hazard map in 3-5 minutes.
- Compare the different maps, identify commonalities and differences, and discuss with the whole group to build consensus.
- Keep a record (digital photos) and/or store all the hazard maps for future reference.

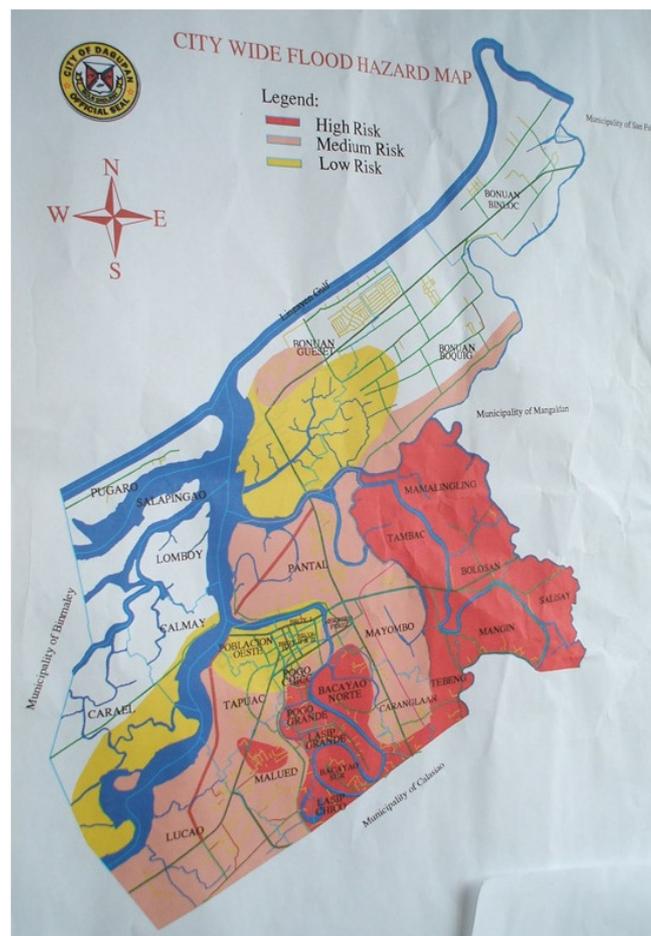


Fig. 4: Example of a Hazard Map for flooding in Dagupan city, Philippines (City of Dagupan 2006)

### **Tool 4: Hazard ranking**

**Time: 50 minutes** (20 minutes for group work and 30 minutes for presentations and discussion)

- Ranking the hazards affecting a city allows prioritising which hazards to focus on during the assessment process and subsequent adaptation planning.
- Continue working with the same groups as before (government, NGO, private sector, etc) and ask each group to fill out the worksheet below.
- Ask the participants to list the main hazards that the city faces in the extreme left column, as discussed earlier when working with [Tool 3](#).
- Ask them to then rank the hazards, using tick marks or crosses in the next three columns.
- Explain that the hazards should be ranked not only in terms of their frequency and intensity, but also the sensitivity of the areas and communities affected.
- Ask each group to present its hazard ranking in 3-5 minutes.
- Compare the outputs of the different groups, identify commonalities and differences, and discuss with the whole group to build consensus.
- Use both a flipchart and worksheet to record group responses, and preserve the outputs for future reference (digital photos and/or hard copies).

Hazard	High Risk	Medium Risk	Low Risk

## Tool 5: Transects

**Time: 1½ hours** (1 hour for group work and 30 minutes for presentations and discussion); time for fieldwork as appropriate to the context – generally half a day.

- A transect is a good way to understand risks at the city scale.
- Based on the hazard mapping ([Tool 3](#)) determine 2-3 main transect routes through the city, if possible from one end to another. Ensure that the routes include the most at-risk areas.
- Working in the same groups as before (government, NGO, private sector, etc) and ask each group to arrange transport to travel along the selected transect routes. All the groups should follow the same routes separately.
- Provide briefing using this tool so that the participants can take appropriate notes when they carry out their transect journeys.
- After returning, ask each group to prepare transects, for example, as shown below in Fig. 5. Make sure that the participants do not follow this figure mechanically, but consider issues and aspects that are relevant to their city; this is just a hypothetical guide.
- Ask each group to present the transects in 5 minutes.
- Compare the outputs of the different groups, identify commonalities and differences, and discuss with the whole group to build consensus.
- Keep a record (digital photos) and/or store all the transect diagrams for future reference.

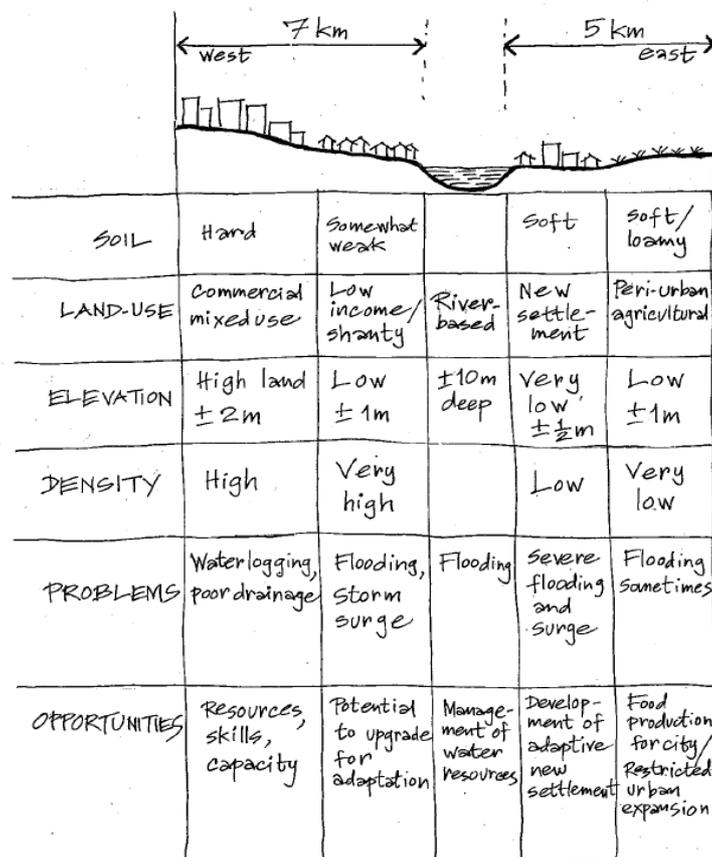


Fig. 5: Example of an urban Transect (hypothetical)

**Tool 6: Scenarios analysis**

**Time: 1 ¼ hours** (45 minutes for group work and 30 minutes for presentations and discussion)

- The research team should have IPCC or other regional climate change scenarios information available, and key projections should be inputted into the extreme left column of the worksheet below.
- Continue working with the same groups as before (government, NGO, private sector, etc) and ask each group to fill out the remaining columns of the worksheet below.
- Ask them to consider and list the possible impacts of each of the projected aspects of climate change on the three main elements at risk in the city – people, built environment (buildings and infrastructure) and economy.
- Consider the effects of the different climatic changes: for example, flooding or drought from increased or reduced rainfall respectively; salinity from sea level rise (for example, affecting foundations of buildings); more fire incidents due to increase in temperature; etc.
- Ask each group to present its rough scenarios in 5 minutes.
- Compare the outputs of the different groups, identify commonalities and differences, and

KEY PROJECTED CLIMATIC CHANGES	POSSIBLE IMPACTS			
	People	Built Environment	Economy	COMMENTS
Heat				
Rainfall				
Sea level rise				
Storms				
Seasonal change				

## **Tool 7: Key informant interviews**

**Time: 1-1½ hours per interview**

- This activity is to be done by the research team.
- At the pre-assessment stage, identify key informants in the city – people who have deep knowledge of the local context and are networked to a wide set of links.
- Some of the key informants may also be participants in the city level risk analysis exercises. Nonetheless arrange separate meetings with them.
- The key informant interviews should be conducted after a few exercises have been carried out. This will allow triangulating (verifying; validating) some of the information obtained and also provide directions for subsequent activities.
- Local government officials can often be useful key informants. Sometimes approval by local authorities for conducting the risk assessment might be required; involving them in the risk assessment activities, or as key informants, can ensure their cooperation and support.
- Local NGOs/CBOs often have strong connections with at-risk communities. Seek to involve them in the risk assessment process, and some of their staff members as key informants. This would allow gaining access and establishing links with at-risk communities in the next activity for risk analysis at the community level.
- Before beginning the interview, explain the project and provide any clarifications asked for. Explain that this is a research project and is not linked to any forthcoming development funding.
- Conduct semi-structured interviews, using a checklist of questions as below to steer the discussion. However do not follow the checklist below mechanically. Decide what is relevant for the context and circumstances, and improvise as necessary.
- If possible, audio-record the interviews for future reference with permission of the respondents.

### **Interview Checklist**

- 1) To start, it would be good if you say a little about your work and/or yourself.
- 2) Can you recall any extreme weather events or disasters that impacted this city?
- 3) What has been your experience of those events?
  - The weather itself;
  - Impacts on the city, particularly in relation to your responsibility;
  - In dealing with those events, what worked well? Why?
  - Was there anything that didn't go so well?
- 4) Do you think anything has changed in the way things happen in the city because of those experiences? Why or why not?
- 5) What do you think should be done to deal with such events?
- 6) Anything else you would like to mention?

## 5.2 Community level participatory risk analysis

### Instructions/Requirements:

- Based on the city level risk analysis, identify an at-risk community in the city as a sample group for this activity.
- Seek the support of local NGOs/CBOs involved in the city level risk analysis for getting introduced and accessing the community.
- Working and conducting analyses at the community level requires a 'participatory' approach, following related methods and techniques. There is substantial literature in this field; see for example Chambers (2002), Mukherjee (2002), Oxfam GB (2010), Regmi et al (2010), Turvill and Dios (2009).
- If not familiar with the community, make a few initial visits to establish contacts. Identify key members or leaders of the community who may act as focal points. Always be open about the purpose of the risk assessment and take care that no expectations are created of forthcoming funds or other material inputs.
- Arrange a preliminary meeting with the community to discuss the project and the risk assessment. Seek agreement and decide who will participate in the workshops.
- Ask the community to nominate 20-30 participants and also use judgement to ensure adequate representation of different groups within the community (e.g. women, elderly, poor, disabled, etc).
- Choose venues that are most preferable to the community. Find out if there is a community meeting hall or communal building (e.g. school). If not, conduct meetings in houses, homesteads, courtyards, etc.
- Find out about the work schedules of the community members and plan the meetings as per their availability. In marginal communities, people usually have heavy workloads, so do not place undue demands on their time. Discuss with them to what extent they are able to participate and adjust the scope and schedule of the work accordingly.
- While noting the exercise outcomes on paper is ideal, it might be necessary to instead draw or write on the ground with sticks, or use other local materials. In such cases, take photos to have a record for future reference.
- If most community members are partly or not literate, use pictures and symbols that are locally used. Even where communities are literate, pictures/symbols can be used to communicate information and ideas; be open to using such techniques.
- Avoid a purely extractive outlook. Explain to the community that although this is not a development project, it has the possibility of informing adaptation and risk reduction initiatives for their city, and thus their contribution would be valuable.
- Seek and ensure the participation of diverse members of the community: women, men, children, elderly, etc. If it proves difficult to involve them all in the exercises, identify key informants and seek their contributions separately.
- Maintain a record of digital photos of the area and settlement, and the risk analysis process.

Activity	Purpose	Tasks	Tools
<b>Community level participatory risk analysis.</b>	To assess climate change risks at the community scale.	<ul style="list-style-type: none"> <li>▪ Note the profile of the community including its key characteristics.</li> <li>▪ Organise a meeting/ workshop (or a series of mini-workshops, as appropriate) with community members.</li> <li>▪ Conduct a series of structured exercises for community risk assessment.</li> <li>▪ Review the workshop findings in the light of scientific literature and the city level risk analysis.</li> <li>▪ Identify key aspects of risk within the community.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <a href="#">Tool 8: Community profiling.</a></li> <li>▪ <a href="#">Tool 9: Hazard mapping. (community).</a></li> <li>▪ <a href="#">Tool 10: Hazard ranking (community).</a></li> <li>▪ <a href="#">Tool 11: Transect walk.</a></li> <li>▪ <a href="#">Tool 12: Long term trend analysis.</a></li> <li>▪ <a href="#">Tool 13: Key informant interviews (community).</a></li> </ul>

### **Tool 8: Community profiling**

- Use the worksheet below to record the profile of the sample at-risk community.
- Do not follow the worksheet mechanically. Observe local circumstances and characteristics and revise and/or add to the list as relevant.
- Do not go into great detail. Consider aspects that are relevant to the particular concerns of this project and the risk assessment. Use rough estimates if accurate data is not available.

KEY ASPECTS	NOTES
Population	
Area (size of the area)	
Age of settlement (take into account stages of growth)	
Typical incomes	
Typical livelihoods	
Location	
Environment	
Settlement characteristics: Typical housing, roads, infrastructure, services, etc	
COMMENTS:	

### **Tool 9: Hazard mapping (community)**

**Time: 1 ¼ hours** (45 minutes for group work and 30 minutes for presentations and discussion)

- Refer to [Tool 3](#) for hazard mapping at the city level.
- Form break-out groups of 4-5 participants in each group. Ensure that each group has a mix of different types of people (e.g. women, men, elderly, etc).
- Ask each group to plot on a flipchart the main features of the area such as houses, community buildings, roads, natural features, etc. Exact details are not necessary; for example, not all the houses have to be mapped, only the area where houses are located, using a symbol for housing.
- Then ask each group to identify the hazards and which areas and resources are most affected, highlighting areas in the map with different colours for each hazard, using colour marker pens. Some hazards may affect the same areas, so use different colours in overlapping patterns for such areas.
- Consider exposure to hazards as a key criterion.
- Ask each group to present its hazard map in 3-5 minutes.
- Compare the different maps, identify commonalities and differences, and discuss with the whole group to build consensus.
- Keep a record (digital photos) and/or store all the hazard maps for future reference.

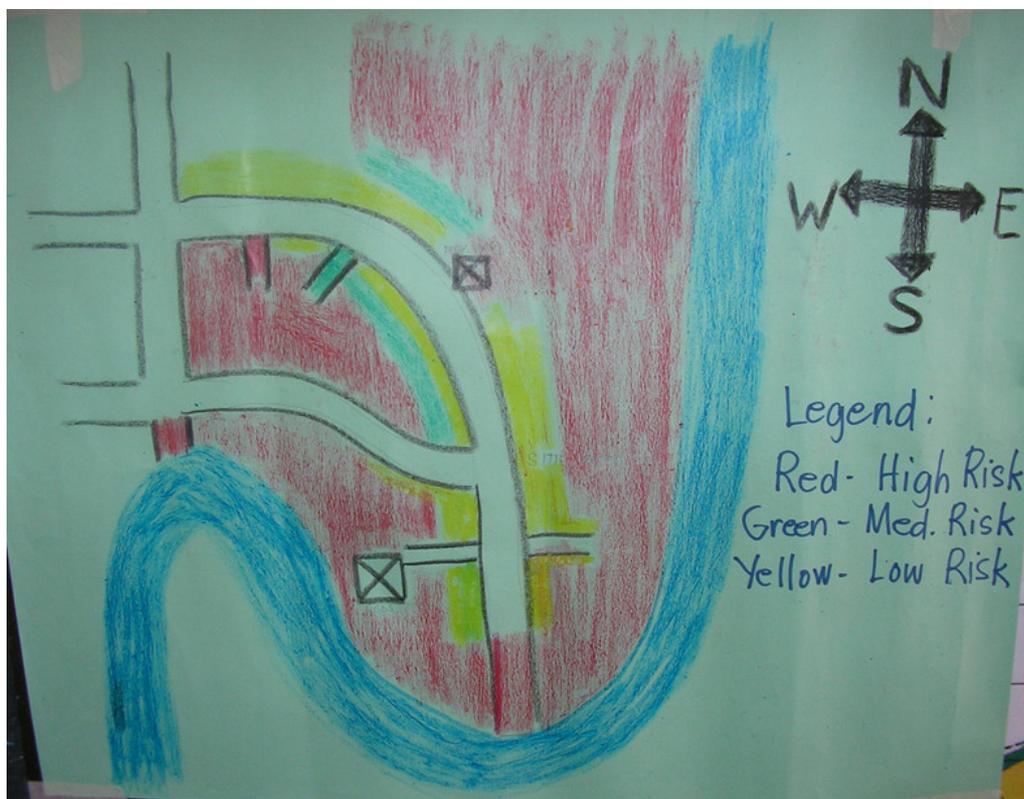


Fig. 6: Example of a Hazard Map for flooding in a 'barangay' (neighbourhood) in Dagupan city, Philippines

**Tool 10: Hazard ranking (community)**

**Time: 50 minutes** (20 minutes for group work and 30 minutes for presentations and discussion)

- Continue working with the same groups as before and ask each group to fill out the worksheet below.
- In case the participants are partly or not literate, the research team members and others should assist in the writing task.
- Ask the participants to list the main hazards that the community faces in the extreme left column, as discussed earlier when working with [Tool 10](#).
- Ask them to then rank the hazards, using tick marks or crosses in the next three columns.
- Explain that the hazards should be ranked not only in terms of their frequency and intensity, but also the sensitivity of the areas and people affected.
- Ask each group to present its hazard ranking in 3-5 minutes.
- Compare the outputs of the different groups, identify commonalities and differences, and discuss with the whole group to build consensus.
- Use both a flipchart and worksheet to record group responses, and preserve the outputs for future reference (digital photos and/or hard copies).

Hazard	High Risk	Medium Risk	Low Risk

## Tool 11: Transect walk

**Time: 1½ hours** (1 hour for group work and 30 minutes for presentations and discussion); time for walk as appropriate to the context – generally half a day.

- A transect walk is a diagram of main land-use zones in an area. It can be used to complement the [hazard map](#).
- Provide briefing using this tool so that the participants can take appropriate notes when they carry out the transect walk.
- Walk with community participants through their area and surroundings, and discuss the characteristics of each zone.
- After returning from the walk, participants should break out into the same groups as before and prepare the transect walk diagram, as shown in below in Fig. 7.
- Make sure that the participants do not follow this figure mechanically, but consider issues and aspects that are relevant to their community; this is just an example.
- Ask participants to use symbols that they are familiar with.
- Ask each group to present its outputs in 5 minutes.
- Compare the outputs of the different groups, identify commonalities and differences, and discuss with the whole group to build consensus.
- Keep a record (digital photos) and/or store all the transect walk diagrams for future reference.

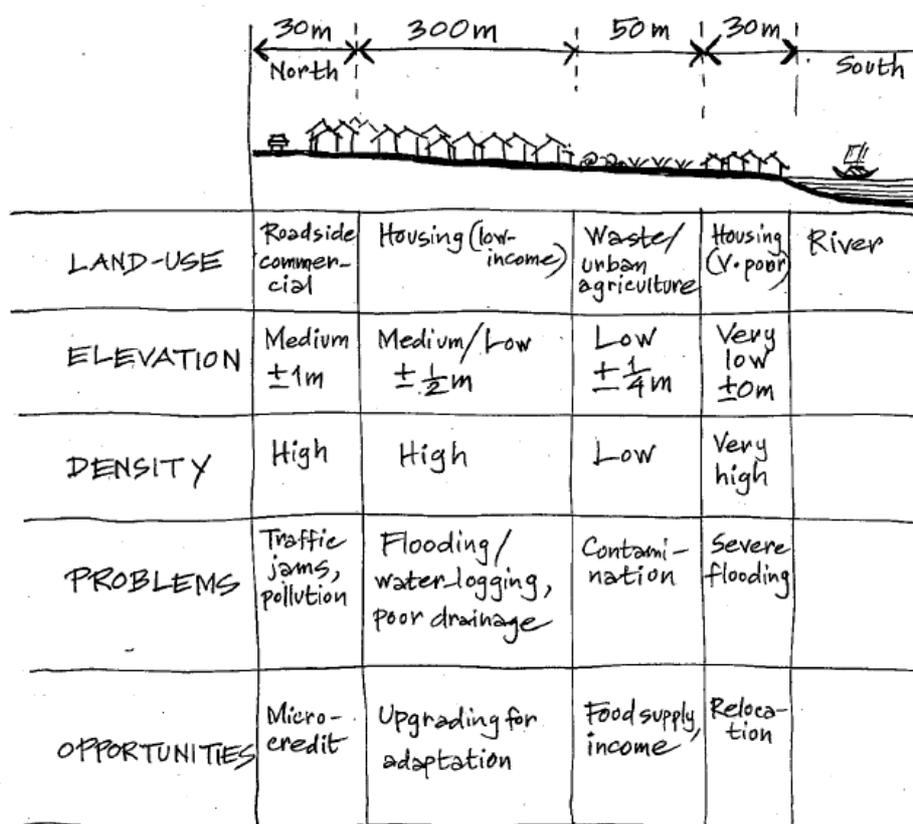


Fig. 7: Example of a Transect Walk in a community (hypothetical)

## Tool 12: Long term trend analysis

**Time: 1½ hours** (1 hour for group work and 30 minutes for presentations and discussion)

- This tool is used to understand future uncertainty, particularly climate change, based on past trends.
- The results of this exercise should be compared with interview responses of elderly [key informants](#) from the community.
- Working in the same groups as before, participants should be asked to first identify the changes in weather and climate as far back as they can recall.
- Then ask them to analyse what the root causes of the changes are and how they vary between different wealth/social groups and areas within the community.
- Having analysed important historical climatic trends, participants can then be asked what changes they expect to take place over the next 10-15 years or so.
- Using familiar symbols, the analysis can be compiled into a diagram as a series of pictures showing the nature of change, shown below in the example in Fig. 8.
- Make sure that the participants do not follow this figure mechanically, but consider issues and aspects that are relevant to their community; this is just an example.
- Ask each group to present its outputs in 5 minutes.
- Compare the outputs of the different groups, identify commonalities and differences, and discuss with the whole group to build consensus.
- Keep a record (digital photos) and/or store all the trend diagrams for future reference.

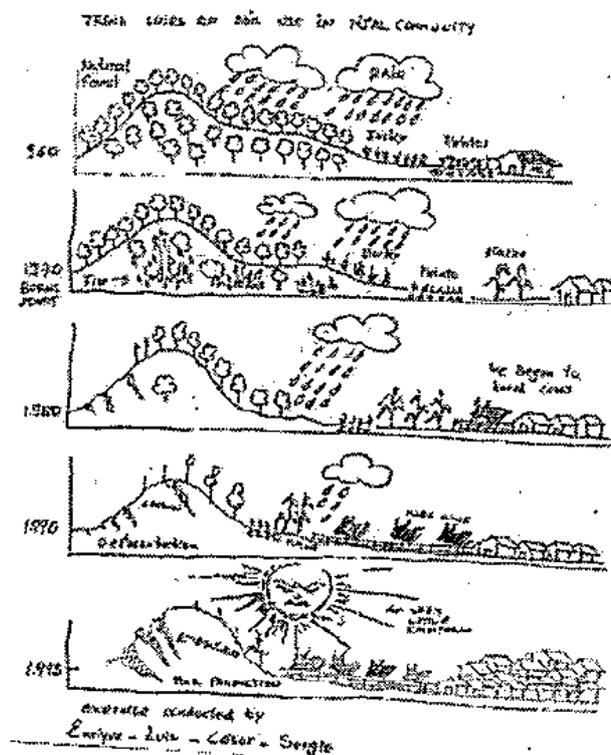


Fig. 8: Example of a Long Term Trend Analysis (CIDT 2001)

### **Tool 13: Key informant interviews (community)**

**Time: 1-1½ hours per interview**

- This activity is to be done by the research team.
- At the initial stage of establishing contact with the community, identify key informants within the community – people who have deep knowledge of the local context and are networked to a wide set of links.
- The key informant interviews should be conducted after a few exercises have been carried out. This will allow triangulating (verifying; validating) some of the information obtained and also provide directions for subsequent activities.
- Some of the key informants may also be participants in the community level risk analysis exercises. Nonetheless arrange separate meetings with them.
- Specific members of the community may have better knowledge on local issues (e.g. elderly persons) than the community members taking part in the risk analysis. Seek the help of such people as key informants.
- Local community leaders can often be useful key informants. Involving them in the can facilitate the cooperation of the community.
- In many cases, it might be unavoidable that other community members want to be present during the interview. Treat this as positive, as it would allow validating the information, as in a focus group discussion.
- Before beginning the interview, explain the project and provide any required clarifications. Explain clearly that this is a research project and is not linked to any forthcoming development funding.
- Conduct semi-structured interviews, using a checklist of questions as below to steer the discussion. However do not follow the checklist below mechanically. Decide what is relevant for the context and circumstances, and improvise as necessary.
- If possible, audio-record the interviews for future reference with permission of the respondents.

#### **Interview Checklist**

- 1) To start, it would be good if you say a little about yourself.
- 2) Can you recall any extreme weather events or disasters that impacted this community?
- 3) What has been your experience of those events?
  - The weather itself;
  - Impacts on the community;
  - In dealing with those events, what worked well? Why?
  - Was there anything that didn't go so well?
- 4) Do you think anything has changed in the way things happen in the community because of those experiences? Why or why not?
- 5) What do you think should be done to deal with such events?
- 6) Anything else you would like to mention?

## 6. Consolidation Stage (Case Study City)

### 6.1 Compilation of findings/ draft report

#### Instructions/Requirements:

- Do not wait until the end of the Assessment Stage for compiling the findings. For each of the activities and related exercises, the findings and data should be collated and stored in a systematic way.
- By the time the middle part of the assessment has been reached, begin to formulate a preliminary structure for the draft report.
- Although a lot of data might be amassed from secondary sources and the assessment exercises, review and screen the data to select the findings most relevant to the concerns of this project.
- Remember that if the draft report is too large, it might not be very effective in communicating the outcomes of the assessment to stakeholders and project partners. Look for a right balance between the contents and volume of the report.
- As a rough guide follow the structure of this toolkit: Three stages, each with a series of activities; a number of exercises (using suggested tools) under the activities.
- At this stage, it is important to compare the findings of the city and community level risk analyses with scientific data from secondary sources. Any similarities and differences should be analysed and interpreted, and discussed in the draft report.
- Remember that this toolkit has been designed to test it in the case study cities. After using it, gaps might be identified and requirements and circumstances in the two cities might prove to be different. Therefore the draft report should provide recommendations for contextualising and adapting the toolkit to make it more relevant and applicable for secondary cities in Bangladesh and Vietnam; a different set of recommendations can be expected for each country.
- Think forward to the next stage of the project on how the findings of the risk assessment may inform climate change adaptation guidance for the case study cities.

Activity	Purpose	Tasks	Tools
<p><b>Compilation of findings/ draft report.</b></p>	<p>To compile the findings of the previous stages of the risk assessment process into a draft report.</p>	<ul style="list-style-type: none"> <li>▪ Collate and review the findings of the Pre-Assessment and Assessment Stages.</li> <li>▪ Compare the assessment findings with scientific information and analyse similarities and differences.</li> <li>▪ Compile the most relevant findings into a draft report.</li> <li>▪ Provide recommendations in the draft report for improving and/or contextualising this toolkit.</li> <li>▪ Indicate how the risk assessment may inform climate change adaptation guidance in the case study city.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <a href="#">Tool 14: Indicative draft report structure.</a></li> </ul>

## Tool 14: Indicative draft report structure

- Note that the structure below is indicative. The specific findings of the risk assessment may require revising it, or even following a different structure.
- Revising the structure may also depend on recommendations for contextualising and adapting the toolkit for the specific case study city context.
- Only the main sections and sub-sections are suggested here. Additional sections and/or sub-sections can be included according to the assessment findings.

SECTION NO.	SECTION HEADING
1.	<b>Introduction</b>
2.	<b>Risk Assessment Process</b>
3.	<b>Pre-Assessment Stage</b>
3.1	Review of secondary information
3.2	Initiating contact and finalising key local stakeholders
4.	<b>Assessment Stage</b>
4.1	City level risk analysis
4.1.1	<i>Hazard mapping</i>
4.1.2	<i>Hazard ranking</i>
4.1.3	<i>Transects</i>
4.1.4	<i>Key informant interviews</i>
4.1.5	<i>Risk quadrant</i>
4.1.6	<i>Vulnerability/Capacity of sectors</i>
4.2	Community level participatory risk analysis
4.2.1	<i>Hazard mapping</i>
4.2.2	<i>Hazard ranking</i>
4.2.3	<i>Key informant interviews</i>
4.2.4	<i>Transect walk</i>
4.2.5	<i>Long term trends</i>
5.	<b>Consolidation Stage</b>
5.1	Key findings
5.2	Recommendations for contextualising toolkit
5.3	Feedback from stakeholders
6.	<b>Future Directions for Climate Change Adaptation Guidance in Satkhira/ Hué</b>

## 6.1 Validation at stakeholders meeting

### Instructions/Requirements:

- When the draft report is ready, contact the key city level stakeholders and community representatives to decide a suitable date for a validation meeting.
- Organise a two-hour meeting at a suitable date and time.
- As in previous stages, organise a suitable venue, in-kind if possible.
- Allocate a small budget for tea/snacks.
- Limit the number of participants to 10-15. Otherwise it might be difficult to manage.
- At the beginning of the meeting, reiterate that this project is not linked to any forthcoming development assistance and it is intended to assist the city to develop its climate change adaptation guidance.
- Incorporate the feedback received at the meeting into the draft report afterwards (section 5.3; see [Tool 15](#)). While all the feedback should be documented, use careful judgement to decide what is useful and of more value.

Activity	Purpose	Tasks	Tools
<b>Validation of the risk assessment findings through a stakeholders meeting.</b>	<ul style="list-style-type: none"> <li>▪ To present the risk assessment findings to local stakeholders and community representatives who were involved in the assessment process.</li> <li>▪ Incorporate feedback from the meeting into the draft report.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Organise a meeting with key stakeholders and community representatives.</li> <li>▪ Present to them the key findings of the risk assessment.</li> <li>▪ Solicit feedback in terms of identifying gaps and suggestions for improvement.</li> </ul>	<ul style="list-style-type: none"> <li>▪ <a href="#">Tool 15: Validation checklist.</a></li> </ul>

### Tool 15: Validation checklist

**Time: 2 hours** (40 minutes for group work and 80 minutes for presentations and discussion)

- Break the participants into small groups (government, NGO, private sector, community, etc).
- Ask each group to discuss among themselves and fill out the worksheet below.
- Ask each group to present its outputs in 8-10 minutes.
- Compare the different outputs and have an open discussion to build consensus and consolidate the feedback.
- Use both a flipchart and worksheet to record group responses.

KEY ISSUES	COMMENTS/ SUGGESTIONS
What did the risk assessment achieve adequately?	1.
	2.
	3.
	etc
How can these achievements be strengthened?	1.
	2.
	3.
	etc
What didn't the assessment achieve? What are its shortcomings?	1.
	2.
	3.
	etc
How can these shortcomings be overcome?	1.
	2.
	3.
	etc
How can the assessment inform and support climate change adaptation guidance for Satkhira/ Hué?	1.
	2.
	3.
	etc
ANY FURTHER COMMENTS:	

## 7. Future Climate Change Scenarios (Workshop, Hué)

### Instructions/Requirements:

- As discussed above in section 3, this is an important step in bringing together the assessments conducted at the two case study cities, and comparatively sharing the lessons and experiences.
- A two-day workshop will be organised in Hué in mid-April 2012, serving also as an event for an interim review of the project.
- The workshop will be attended by two participants from CCAP, and key project partner and stakeholder representatives from Bangladesh and Vietnam.
- At the pre-assessment stage, it is expected that scientific information on future climate change scenarios relevant to each case study country based on IPCC and/or other studies will be collected (see section 4.1). This will be utilised to analyse the case study city assessments and evaluate climate change risks.
- While it can be expected that the city assessments will tend to focus largely on the history of hazards and recent weather-related impacts, this workshop will aim to extend those findings to delineate future climate change risks and long term trends that may affect the two cities.
- The workshop will also begin to flesh out adaptation options, as an exploratory step towards the next stage of the project on developing adaptation guidance.
- As mentioned earlier in section 3, a detailed guidance document for this step will be provided before the workshop. Nonetheless some indicative tools ([Tool 16](#) and [Tool 17](#)) are included below to allow reflecting on how the city assessments may link to this stage of the risk assessment process.

## Tool 16: Risk quadrant

**Time: 50 minutes** (20 minutes for group work and 30 minutes for presentations and discussion)

- The risk quadrant allows rating risks with a view to guide prioritisation in future adaptation planning.
- Use information on climate change scenarios available from scientific literature.
- The climate change impacts that may affect the case study cities can be displayed in a Risk Quadrant or Matrix to understand risk in terms of impact and probability. Complete a risk quadrant for each city.
- Form two break-out groups as per country with one CCAP researcher in each group.
- Ask each group to draw a four-quadrant matrix on a flipchart as shown below in Fig. 9. Remember that this is a hypothetical example; the impacts in the case study city might be different and receive different ratings.
- Ask the participants to list the changes that are most likely and can have the most impact in the top right box.
- Changes that can have high impact, but low likelihood should be listed in the top left box.
- Less likely and low impact changes should be listed in the bottom left box.
- Changes that are very likely, but having low impact should be listed in the bottom right box.
- Ask each group to present the quadrant in 5 minutes.

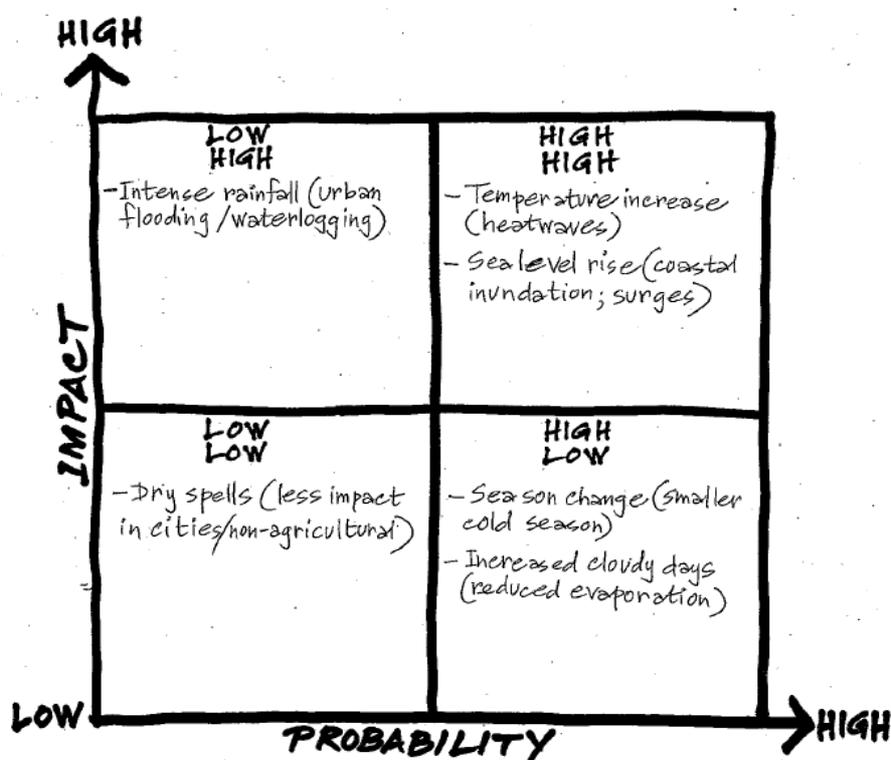


Fig. 9: Example of a Risk Quadrant

**Tool 17: Vulnerability/Capacity analysis of sectors**

**Time: 1¼ hours** (45 minutes for group work and 30 minutes for presentations and discussion)

- Continue working in the break-out groups as before when using Tool 17..
- Ask each group to draw the worksheet below on a flipchart.
- Ask them to list the sectors (e.g. transport, industry, housing, retail, health, education, energy, etc) at risk from climate change impacts in the extreme left column, beginning from the most vulnerable. More rows can be added if necessary.
- In the next column, the elements at risk in each sector (e.g. roads, buildings, services, etc) should be identified.
- Then for each sector and its elements at risk, the key vulnerabilities in terms of exposure and sensitivity should be listed.
- In the final column, the key (adaptive and other) capacities in each sector should be listed.
- Ask each group to present its output in 5 minutes.
- Have an open discussion and analyse risk for each sector by taking into account vulnerabilities and capacities.
- Compare the outputs of the different groups, identify commonalities and differences.

Sector	Elements at Risk	Vulnerabilities (Sensitivity & Exposure)	Capacities

## 8. Key References

- Chambers, R. (2002) *Participatory Workshops: A Sourcebook of 21 Sets of Ideas and Activities*. Sussex (UK), Institute of Development Studies.
- IPCC (2001) *Climate Change 2001: Synthesis Report*. Cambridge (UK), Cambridge University Press.
- Mukherjee, N. (2002) *Participatory Learning and Action: With 100 Field Methods*. New Delhi, Concept Publishing.
- Oxfam GB (2010) *Oxfam Participatory Capacity and Vulnerability Analysis: A Practitioner's Guide*. Oxford, Oxfam.
- Regmi, B.R. et al (2010) *Participatory Tools and Techniques for Assessing Climate Change Impacts and Exploring Adaptation Options: A Community Based Tool Kit for Practitioners*. London, DFID (Department for International development) and Kathmandu, LFP (Livelihoods and Forestry Programme).  
<http://www.forestrynepal.org/publications/reports/4667> (accessed: September 2011).
- Theis, J. and Grady. H.M. (1991) *Participatory Rapid Appraisal for Community Development*. London, International Institute for Environment and Development (IIED).  
<http://pubs.iied.org/8282IIED.html> (accessed: September 2011).
- Turvill, E. and Dios, H.B.D. (2009) *Participatory Capacity and Vulnerability Analysis Training Pack*. Oxford, Oxfam.  
[http://disastermanagementbangladesh.org/oxfam\\_tools/index.php](http://disastermanagementbangladesh.org/oxfam_tools/index.php) (accessed: September 2011).
- UN-Habitat (2008) *Sorsogon City climate change vulnerability and adaptation assessment*. Fukuoka (Japan), UN-Habitat.
- UN-Habitat (2011) *Planning for Climate Change: A Strategic Value-Based Approach for Urban Planners*. Nairobi, UN-Habitat.
- UNISDR (2009) *Terminology on DRR*. Geneva, UNISDR (United Nations International Strategy for Disaster Reduction). <http://www.unisdr.org/we/inform/terminology> (accessed: December, 2011).