

2.8.0

SERIES 2
Understanding
Vulnerability & Risk



CONDUCTING YOUR VULNERABILITY ASSESSMENT

Contents of Set

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Over the course of this series we have presented a number of ideas, some of which may be new, and had you complete a variety of exercises. All of the information and exercises were designed to introduce techniques and ways of thinking that can be used directly to frame and populate your vulnerability assessment. In this module we explore “top-down” and “bottom-up” information generation, and describe how you can combine this type of information generation with the approaches used in the Series 2 activities to produce a vulnerability assessment.

IN THIS SET YOU WILL:

- ✓ Review what your vulnerability assessment should include; and
- ✓ Take away a sample vulnerability assessment outline.

What Your Vulnerability Assessment Should Include

Your climate vulnerability assessment should consist of five main sections. It should:

1. Introduce the vulnerability assessment by reviewing why it is being conducted, the information it needs to produce, and how that information will be used.
2. Provide a snapshot of current vulnerability and help the reader understand how and why particular groups of people and city systems are more susceptible than others to suffering harm during climate hazard events.
3. Examine the development trends of your city to understand how your city got to where it is today and how these development choices contribute to vulnerability, and briefly describe what the city could look like in the future if current development trends continue (population, density, number of highly vulnerable inhabitants, etc.).
4. Describe the historical and future climate context of your city.
 - Describe the historical climate in your city or region.
 - Discuss past climate disasters in your city.

- Discuss climate projections for your city in terms of how current climate will change, so that the potential links to climate impacts are easy to extrapolate.
 - Discuss the challenges that future climate may pose for the city as a whole and for currently vulnerable people and systems.
 - Note whether climate may create new challenges for your city—for example, many cities are not currently significantly impacted by heat stress issues, but that may change over the next few decades.
5. Combine these three sets of information—current vulnerability, development trends, and historical and potential future climate—and review what you have learned from each set alone and from the three sets together. This information should then be used to identify key entry points for addressing current and potential future climate vulnerability.

The information and activities in Sets 2.2 through 2.7 can be used directly to frame the analysis and data needed to write the first four sections.

- Section 1 will use the information and exercises in Set 2.2: Clarifying Your Vulnerability Framework.

- Section 2 will be based on Sets 2.5: Vulnerability and Poverty, 2.6: System Fragility and 2.7: Vulnerability and Institutions.
- Section 3 will be based on Set 2.3: Past Present and Future.
- Section 4 will be based on Sets 2.4: Climate Change, Exposure & Risk, 2.5: Poverty & Vulnerability, 2.6: System Fragility, and 2.7: Vulnerability & Institutions.
- Section 5 will integrate the previous sections. It will include discussion about what becomes apparent when they are all put together and will identify starting points to address vulnerability in ways that build overall city resilience.

In undertaking your full vulnerability assessment, you will complement the information and activities in the sets with additional data and analysis. How to do this is discussed below.

VULNERABILITY ASSESSMENT METHODOLOGY

Ultimately, the methods you use to conduct your Vulnerability Assessment should be methods you already have experience with. In selecting methods for conducting a vulnerability assessment, it is useful to couple 'bird's eye view' or top down information (e.g. maps, GIS data layers, global

climate projection data, socio-economic and meteorological data) with 'toad's eye view' or bottom up information (e.g. Vulnerability and Capacity Assessment information collected at the household level).

System analysis, which is a process of trying to get an overview picture of the situation, is an example of a bird's eye view method. The historical and future trend activities of Set 2.3 are the beginning of system analysis – learning about the existing data, how things are changing, and the implications of those changes both now and in the future. Those activities can be expanded on, using more detailed data, coupled with mapping or GIS analysis. In further expanding the activities, it is important to keep in mind that different systems are linked together and to look at systems in relation to other systems. For example, if transportation and roads are increasingly stressed and regularly damaged by climate events, and if increasing amounts of food are being imported, either improving transportation infrastructure or increasing local agriculture are needed to build food security resilience.

The next step is to combine the system analysis with a toad's eye view analysis, where the toad's eye view captures information about individuals and households, the actors.

This includes:

- What do people at the household level do to cope with disasters or big system shocks?

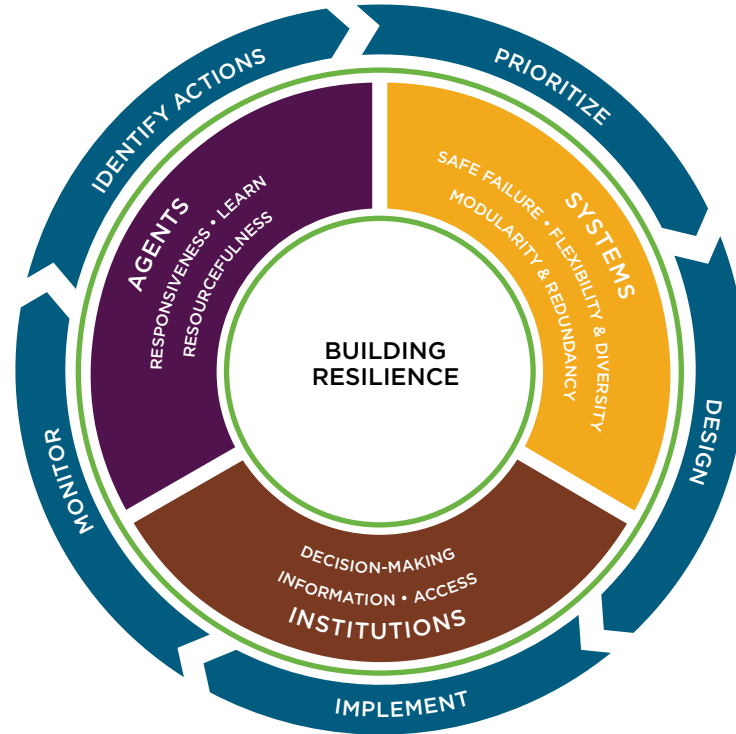
- If these shocks happen, what would it mean? How would people respond?

Trying to answer these types of questions is part of a vulnerability assessment—documenting what people do when they experience a shock or crisis. It is likely that, following the bottom-up analysis, you will want to return to your top-down toolset to assess the implications of your bottom-up information at the city scale.

By combining top-down and bottom-up information, you will achieve a simultaneously broad and detailed picture of your city vulnerability. By systematically assessing this information in terms the roles and capacities or strengths of agents, systems and institutions and how each contributes to or mitigates vulnerability, you will greatly facilitate the identification of entry points for addressing vulnerability and building resilience.

SAMPLE TOOLS FOR VULNERABILITY ANALYSIS

When selecting tools and methods for conducting a vulnerability analysis, consider which provide a bottom-up analysis, and which provide a top-down analysis. Your vulnerability assessment will be stronger if you incorporate several types of analysis that capture a couple of different perspectives. The following table illustrates some of the tools and methods can be used to do a vulnerability assessment.



Tip: The right-hand loop of the Climate Resilience Framework describes the resilience characteristics of Agents, Systems, and Institutions for you.



SYSTEMS

CHARACTERISTIC	FLEXIBILITY AND DIVERSITY	REDUNDANCY AND MODULARITY	SAFE FAILURE
Description	The system can meet service needs under a wide range of climate conditions. Key elements are spatially distributed but functionally linked.	There is spare capacity to accommodate unexpected service demand or extreme climate events. System components and pathways provide multiple options or substitutable components for service delivery.	Failure in one part of the system is unlikely to compromise the ability of the system as a whole to deliver service.
Tools and Methods	<ul style="list-style-type: none"> • Engineering system performance measures • Simulation modeling • Ecosystem assessment • Biodiversity assessment • Demand forecasts • Resource mapping • System analysis tools 	<ul style="list-style-type: none"> • System capacity assessment • Environmental Impact Assessment • Engineering Risk Assessment • Cost Benefit Analysis • System optimization analysis • Geospatial / GIS analysis • Cost Effectiveness analysis • Analytical Hierarchy process 	<ul style="list-style-type: none"> • System reliability analysis • Threshold analysis • System failure analysis • Case studies of system failure • Fault tree analysis



AGENTS

CHARACTERISTIC	RESPONSIVENESS & RE-ORGANIZATION	RESOURCEFULNESS	CAPACITY TO LEARN
Description	Agents are motivated and able to take timely action when required, including changes in organization or structure. Key functions can be restored in a timely fashion after a climate related shock or extreme event	Priority actions for adaptation are identified and the necessary resources mobilized for implementation.	Capacity exists to identify and anticipate problems. Lessons from past failures and feedback from users are internalized and system improvements implemented. Potential future risks are assessed on an ongoing basis.
Tools and Methods	<ul style="list-style-type: none"> • Agent Based Modeling and Simulation • Cultural Theory and agent roles • Organizational behaviour analysis • Hazard, Capacity and Vulnerability Analysis • Disaster Risk Assessment • Poverty studies • Socio-economic analysis 	<ul style="list-style-type: none"> • Social networks analysis • Household histories and narratives • Case studies of past climate disasters • Organizational capacity analysis • Organizational needs assessment • Community transects 	<ul style="list-style-type: none"> • Longitudinal studies of disaster response • Case study of learning mechanisms • Documentary assessment of reports, etc. • Key informant interviews • Focus group interviews



INSTITUTIONS

CHARACTERISTIC	ACCESS	DECISION MAKING	INFORMATION
Description	Rights and entitlements to use key resources or access urban systems are equitably distributed.	Decision-making processes, particularly in relation to urban development and urban systems management, follow widely accepted principles of good governance, chiefly: transparency, accountability and responsiveness.	Private households, businesses and other decision-making agents have ready access to accurate and meaningful information to enable judgments about risk and vulnerability and for assessing adaptation options.
Tools and Methods	<ul style="list-style-type: none"> • Social and gender analysis • Institutional analysis • Poverty studies • Case studies at household level • Participatory appraisal methods • Timelines, seasonal calendars 	<ul style="list-style-type: none"> • Governance analyses • Stakeholder analysis • Political economy • Community-based assessment tools • Conflict assessment 	<ul style="list-style-type: none"> • Communications assessment • Content analysis • Case studies • Focus group interviews

NEXT STEPS

In framing your Vulnerability Assessment, if you haven't already, you will want to conduct a Shared Learning Dialogue to provide input on the focus and content of the assessment. This will assist in directing the analysis in ways that will truly generate new, relevant knowledge.

In selecting tools and approach for the analysis, it is important to think holistically and systematically, and not to forget to include agents and institutions and governance. There are many entry points to assessing systems, agents and institutions. In your city, there are likely to be a large collections of tools and methods familiar to practitioners such as civil or environmental engineers, land use planners, resource managers, development workers or researchers. If there are areas where the climate working group has limited or no experience, consider who you can partner with to address that portion of the assessment. A key element of resilience is in building strong, diverse networks of partners. Your vulnerability assessment is the perfect place to begin.

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Vulnerability Assessment Outline

Outline 2.8.1

Below is a example outline for a Climate Vulnerability Assessment based on the information and activities presented in Series 2 of the Climate Resilience Framework: Training Materials. There are many ways to structure a vulnerability assessment; this is not necessarily the best, and certainly not the only, way to set up your assessment. This is simply provided as one possible approach.

1. INTRODUCTION

- Why this study is being undertaken
- What you hope to learn
- Who will use the study when it is complete, and what will they use it for
- What geographic area, what timeframe, and what people/communities/systems are included in the study and why
- Who did the analysis, what tools were used and why

2. CURRENT VULNERABILITY

- Identification of questions you wish to address around vulnerability and climate
- Review of existing reports and data, identification of gaps
- Summary of community surveys or other participatory techniques used to learn about people's actual experience and opinions (bottom-up information)
- Top-down analysis to explain distribution and relevance of bottom-up information at the city scale
- Summary of who or what is vulnerable, why they are vulnerable, and the implications of that vulnerability now and in the future

3. TREND ANALYSIS

- Based on the trend analysis in Set 2.3, but with additional data, more detail, and utilizing supporting tools such as GIS analysis and mapping to develop the top-down, big picture assessment of vulnerability
- Summary of how this has led to current vulnerabilities and what it would mean if current trends continue

4. CLIMATE

- Description of current climate—what are the seasons, how much rain the city typically receives and when does it fall, typical and extreme temperatures, etc.
- Description of historical climate trends: whether it has been warming, whether rainfall has changed, whether high tides or sea level have changed, etc.
- Description of current and past climate hazards. Describes both key hazard events—floods of record, significant droughts, heat waves—as well as what type of weather constitute a problem and how people respond to that problem (e.g. monsoon comes late, farmers lose crops, food prices go up, people switch to cheaper grains)

- Description of climate projections for the city, or at whatever scale is available. This should include information about where the climate data is from, what GCM models were used to produce it, what scenarios were modeled, how downscaling was done if the data was downscaled, and the results themselves, ideally with averages and ranges of uncertainty around that average.
- Discussion of what the climate projections mean. If climate changed in the ways projected, describe how this would change everyday life, how it would change disasters, who would be affected and how. In particular, note how it would impact existing vulnerable people and systems, and what new vulnerable groups or systems it might create. Include questions that need to be explored next if the impacts of climate change to your city are to be better understood.

that would reduce current vulnerability, would address potential future vulnerability, and would build resilience

- Overall, what this study has learned that is new
- What gaps does it identify for future study

5. SUMMARY AND CONCLUSIONS

- Summarize the previous sections and what was learned in each
- Discussion of what these mean when put together
- List key entry points that can be identified based on these findings—what actions could be taken