

## **Assessment Exercise Guide: Discovery of a “Hot Spot”**

Section 03 of the primer engages city officials in an assessment exercise to identify the city’s human and built environment characteristics, potential impacts of climate change, and natural or other hazards. Beyond that, the assessment will also identify local government prerogatives and authorities that would allow it to take action in dealing with potential climate change impacts and natural hazards.

The ultimate determination from the assessment is to identify main vulnerable and at risk areas. This knowledge is then critical for defining priority actions that move (or “cool down”) the city from becoming a “Hot Spot.” Some contributing attributes that result in a city becoming a Hot Spot include the following:

- Moderate to high level of one or more natural hazard.
- Medium or high observed vulnerability in past disasters.
- Moderate to high sectoral vulnerability of climate change.
- Poor or non-existent urban development plan or growth plan.
- Poor compliance with urban development plan or growth plan.
- Poor quality of building stock.
- High population density.
- Medium to large population or high decadal growth rate or high population density in case of low population.
- Medium or high slum density or large proportion of informal population.
- No comprehensive disaster response system.
- Either or both economic and/or political significance in regional or national context.

The exercise requires completing a City Typology and Risk Characterization Matrix. The assessment is not a quantitative tool for ranking cities nor is it intended to be a scientifically rigorous assessment. It is intended to give the following results:

- Identify major problem areas for climate change impact and disaster risk management, as a step toward identifying priorities for action;
- Generate awareness among local government officials and other stakeholders on the important contributors to climate change and disaster risk management;
- Assist the local government and other stakeholders to intuitively establish the link between climate change impact, disaster risk management, and urban governance.
- Develop programs using the examples of sound practices from other cities.
- Benchmark progress by filling it out periodically.

For several cities, prior assessment of disaster risk or climate change impact may already be available.

All such available information should be used in the exercise to establish the city’s profile. For many questions, rigorous scientific information or prior assessment reports may not be available. For these

questions, the exercise provides an opportunity to look back over several decades (the Primer recommends 50 years) to document and record events, trends, and cycles for determination of the query responses. Guidance is provided in the exercise to help differentiate annual events (like monsoon flooding) from infrequent or episodic events (such as earthquakes) for response, preparedness, mitigation, and adaptation with regard to frequency and impact. This exercise supports the idea of a local government establishing a working relationship with scientific institutes or technical bodies with expertise in natural hazard and climate change knowledge to advise on the impacts and management strategies to respond to climate change.

## **A. Completing the City Typology and Risk Characterization Matrix**

The City Typology and Risk Characterization Matrix (see Table 3.1) is completed with information and data typically available within local government, and its preparation is an important step to engage various city departments and other stakeholders in climate change programs.

### **1. Select Climate Change Team**

It is recommended that the city government identify a City Climate Change Team to prepare the Matrix. Depending on the city's ongoing activities in climate change impacts and disaster risk management, the Climate Change Team may not necessarily be a new team, and may include the expansion of scope of responsibility of an existing team such as the Disaster Risk Management Team. The team head should be an officer with sufficient authority to enable the team to implement the recommendations in the policies and programs of various departments of the government. The team members should represent those departments that deal with environment, planning, construction, transportation, and infrastructure; and other departments that impact climate change. The cities are also encouraged to include other stakeholders from the scientific and technical institutions and from civil society. The team can form the nucleus for continuing activities related to climate change impacts and disaster risk management after completing the assessment exercise. The selection of City Climate Change Team can also be used to facilitate ownership of different programs by the line departments by ensuring their participation.

### **2. Hold series of workshops**

It is recommended that a series of workshops be held that comprise a range of city stakeholders to discuss current situations and reach consensus on the assessment. The purpose of the initial workshop would be to ensure that consensus is built in terms of priorities, usable data, and other pertinent issues. As part of the workshop planning, key resource documents should be collected and provided to help in completing the City Typology and Risk Characterization Matrix. These workshops will also help officials and other participants to understand the importance of the City Information Base discussed in the Section 04.

### **3. Complete the Matrix**

Once the Climate Change Team feels it has had proper discussions and collected adequate background material, it should complete the City Typology and Risk Characterization Matrix (Table 3.1). Designed to give an overview of all important issues and activities that could affect the city, the City Typology and Risk Characterization Matrix is divided into 11 categories of attributes (A through K), in four main areas:

- City description
  - Category A identifies the geographical location of the city.
  - Category B identifies the size and main characteristics of the city area and population.
  - Category C relates to governance structure and hazard management.
  - Category D establishes the responsibilities for disaster risk management and climate change management.
  - Category E focuses on the financial resource of the city. Cities with a larger budget and those with significant financial autonomy (e.g., local taxes, levies and access to domestic markets) will find implementing new climate change programs easier.
  - Category F relates to the city's built environment.
- Political and economic impacts
  - Category G relates to the political impact of a disaster affecting some cities.
  - Category H establishes the impact of disasters on the most relevant urban economic activities of the city.
- Natural hazards
  - Category I assesses the threat of natural hazards.
  - Category J relates to the disaster response system and existence of a city's emergency response plan.
- Climate change impacts
  - Category K relates to climate change impact.

The Matrix has been divided into discrete tables for easier review and completion. Here is a detailed description of each category that will help in identifying the information requested for completing the Matrix:

### **City Description**

**Category A** identifies the geographical location of the city. This helps in identification of impacts of climate change and the likely natural hazards that are of concern to the city. Section 02 of the Primer can help in determining how climate change impacts and disaster risks management are linked to city geography, (e.g., coastal cities and sea-level rise).

**Category B** identifies the size and main characteristics of the city area and population. Resident population (i.e., night population) and floating population (i.e. migrant day-workers), density, and growth rate are important indicators of the concentration of problems and their rate of increase over time. In general, larger, denser or rapidly growing cities have higher vulnerability to climate

change impacts and disaster risk. Moreover, if not properly accounted for in disaster preparation and response plans, the floating population enhances the risks and vulnerabilities of a city.<sup>38</sup> Where large numbers of migrants cannot be fully integrated into the permanent urban population and formal housing settlements, increases in informal settlements and pressure on the city's infrastructures is likely, consequently making the city even more vulnerable to the impacts of climate change and natural hazards. Moreover the larger the area a city occupies and the more dense a city is also impact the resources required to adequately protect the population against climatic events and natural hazards.

## **Governance and Management**

*Category C* relates to governance structure and hazard management. Whether by appointment or by election,<sup>39</sup> excessively short terms in the government office may inhibit long-term planning. Appointed governments should prioritize stakeholder consultation and engagement to counter any misperceptions that they are not accountable to an electorate; stakeholder consultation is, of course, as important for an elected government. The existence of departments for disaster risk and climate change impact management indirectly verifies the level of city preparedness. If disaster risks and climate change impacts are managed by the same department, chances to develop linked plans and programs increases. The existence of disaster risk management and climate change departments at provincial and national levels is also an important indicator of the level of their integration with other departments of the local government.

*Category D* establishes the responsibilities for disaster risk management and climate change management. Responsibilities are clearly identified when someone is appointed to a specific activity (related to climate change and disaster risk management) and this well communicated and known by other departments. This exercise also helps to establish the level of decentralization depending on whether the city has an established system to contract for services.

*Category E* focuses on the financial resource of the city. Cities with a larger budget and those with significant financial autonomy (e.g. local taxes, levies and access to domestic markets) will find implementing new climate change programs easier. The total budget should be viewed in light of actual needs for climate change and disaster management programs. Cities with large budgets may have even larger needs and conducting this assessment up front will provide a clearer picture as to the resources that need to be raised.

## **Built Environment**

*Category F* relates to the city's built environment. This information is useful for establishing the physical vulnerabilities of the city. Existing programming and planning capabilities are inferred by verifying the presence of master plans and urban development plans. The presence of building codes and the level of compliance is a good proxy of regulating capacity in this field, which may be upgraded to include climate change impact and additional disaster risk management measures. High proportions of informal settlements are likely to indicate higher vulnerability of the city. Good

insight comes from the level of dispersion of informal population: concentrated informal settlements could further increase its vulnerability and risks to natural hazards. Older tenements and historical structures are likely to be highly vulnerable, and the proportion of total population in these buildings is a useful indicator of the city's risk profile. Information on observed vulnerability (in terms of extent of disruption of building's functionality) during past disasters acts as an indication of structural vulnerability. In general, for new and formal settlements, the vulnerability can be assigned based on the quality of building codes and its compliance level. If more than five percent of such buildings are vulnerable, the vulnerability can be assigned as high. Medium vulnerability of new and formal buildings implies that one to five percent of buildings are vulnerable, while low vulnerability implies less than one percent of vulnerable buildings. The corresponding ranges for informal building types, in terms of percentage that are vulnerable, are low, less than five percent; medium, between five percent and 15 percent; and high, greater than 15 percent. The same percentages are given for historic buildings, which are already more vulnerable and often more valuable.

### **Political and Economic Impacts**

*Category G* relates to the political impact of a disaster affecting some cities. Political impact can be high if the city is an administrative center, a financial and economic pole for the area, or an important service provider to the area. These cities should be identified as "hotter" Hot Spots on the basis of the impact of a disaster on these activities and capacities.

*Category H* establishes the impact of disasters on the most relevant urban economic activities of the city. The word "major" means that those specific sectors are present in the city and account for at least 10 percent of local employment or at least 15 percent of income generation, each. A city with high economic significance is generally a "hotter" Hot Spot due to the widespread indirect adverse consequences of disasters or adverse climate change impacts affecting the city.

### **Natural Hazards**

*Category I* assesses the threat of natural hazards. For most hazards, the information will be available from building regulations and from the past meteorological records (approximately for last 50 years). Seismic, tsunami, and volcanic hazards are very important since they occur after long intervals and may not have occurred during the last 50 years. These hazards should be considered in case they are identified as a specific hazard for the city in its master plan or in building code specifications. These hazards, if present, must be considered for all disaster management plans and in identification of the city as a Hot Spot since their occurrences often result in significant casualties and loss of property. The threat of other hazards is a useful indicator of their recurrence rate since climate change is likely to increase the frequency of these hazards.

*Category J* relates to the disaster response system and existence of a city's emergency response plan. It also assesses if the plan is comprehensive (such as with detailed plans and standard operating procedures for the most important hazards, and involving other stakeholders other than the government),

regularly practiced and regularly updated so that they can be effective after a disaster occurs.

## **Climate Change Impacts**

*Category K* relates to climate change impact. *Does the city know what are the impacts of climate change?*

To know means that the city has enough background and knowledge resources to address actions and measures in the field, including the impact on several urban sectors. The impact may be known from detailed scientific investigations or from empirical data and field observations. Moreover, the Matrix response relies on the existence of a climate change policy (and/or a strategy) and of climate change programs, specifically addressing the issues of mitigation, adaptation and resilience as discussed in the preceding Section 02. This information will also help prepare for climate change events by climateproofing certain sectors (e.g. beach tourism to have sea walls and clear evacuation plans) or by diversifying a city economic base. Table 3.1(f) reflects the existence or presence of these climate change programs; more details on disaster risk management preparedness will be reflected in Tables 3.2 and 3.3. If climate models are available at regional, local and national level comparison and more effective scenario evaluation is possible, climate change programs will then be developed consistently.

### **B. Additional Testing for a Hot Spot**

A clearer link between climate change impacts and the city vulnerability assessment can be established by completing Table 3.2, in which cities are asked to evaluate the consequences of specific climate factors, such as temperature rise, precipitation change and sea-level rise on the main sectors in their city.

If the vulnerability to a specific climate impact in a sector is not known or poorly understood, the City Climate Change Team can refer to the information provided in Section 02 and review the materials and downscaling methods listed in the Annex D, Resource Guide. If the City Climate Change Team is able to define the most important threats by using Table 3.2, they will better understand the extent to which their city is a Hot Spot, and the factors that contribute to this determination, simply by the attributes rated at medium and high vulnerability levels. With this knowledge, they can use Section 05 to build on it and gain insight from relevant international sound practices.

A benchmark evaluation of risks is can also be helpful in motivating the city to understand where the main gaps and difficulties lay in preparing for disasters and natural hazards. To establish a benchmark evaluation on Disaster Preparedness and Response in specific sectors for specific natural hazards, the city officials and their Climate Change Team should complete Table 3.3. The latter could be further specified and detailed by the team itself.

To fill out Table 3.2, experience from past disasters, or information from global studies, such as those included in the IPCC reports or in UN/ ISDR documents, should be used to assess the risks. The attributes are also intended to motivate the city to carry out this risk assessment based on local scientific models so

that the impact is assessed with greater accuracy. Since mitigation measures are essential for better response to natural hazards and resilience is essential to improve the capacity of a city to respond to any disaster, these factors are explicitly included in the Sound Practices Section for the reference of the City Climate Change Team. If these risks in the specific sectors are not known, the City Climate Change Team should refer to the information provided at Section 02 and/or the materials and downscaling methods from the Annex D, Resource Guide.

### C. Is Your City a “Hot Spot”?

Being a Hot Spot means that the city has a high level of vulnerability to climate change impacts (at least in some sectors, activities, and areas) and is at high risk of being affected by natural disasters. After completing the matrices, the Climate Change Team should be able to determine whether some conditions and threats are present in the city. To define whether these conditions and threats make the city a Hot Spot, some attributes should be verified more in depth.

Based on the completed City Typology and Risk Characterization Matrix and rating levels, the city government and Climate Change Team should determine their vulnerability assessment that leads to a Hot Spot characterization: the higher a city’s vulnerability, the “hotter” the city is as a Hot Spot.



The greater the number of adverse conditions that are satisfied (ratings of High and Medium and Yes responses), the “hotter” the city’s categorization is as a Hot Spot. Some conditions that determine a Hot Spot are considered static or given. Static conditions include the existing political structure, disasters history, and the city geography — conditions that are not influenced by city policies. All others can be influenced by the city policies. City policies on climate change and disaster risks management should focus on the influentiable elements.

The level of “hotness” can be used by the city to prioritize its activities and to motivate integration of development plans considering climate change impacts and disaster risk management. When cities take proactive actions to respond to disaster risk and climate change impacts, “cooling” the Hot Spot will be reflected in the City Typology and Risk Characterization Matrix since it will reduce the number of adverse conditions.

The evaluation of a city as a Hot Spot from climate change impacts and disaster risk management considerations [Tables 3.1(e) and (f), Categories I-K] can be also assessed based on indicators specified in Table 3.4, as proposed by UN/ ISDR. Each indicator needs to be examined in the city context to

determine its relevance and importance when evaluating a city as a Hot Spot. The city officials and the Climate Change Team could use the recommended indicators as a checklist to evaluate their level of preparedness and the ability of their city climate change impact and disaster management systems to reduce vulnerability and risks.