Sustainable Cities: Sustainable Development Goal 11, Disaster Risk, Vulnerability and Resilience

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Goal 11

Make cities and human settlements inclusive, safe, resilient and sustainable

10 Targets

11.1 Housing and Slums
11.2 Sustainable Transport
11.3 Participatory Planning
11.4 Cultural Heritage
11.5 Disaster Reduction
11.6 Air Quality and Waste Management
11.7 Public spaces

11.a Rural-urban and regional planning
11.b Mitigation of Climate Change, Resilience
11.c LDCs support – buildings

11 Indicators

4 Indicators
Goal 11

Make cities and human settlements inclusive, safe, resilient and sustainable

UN-Habitat designated custodian Agency for indicators:

6 Indicators
- Slums and housing
- Public transport
- Land consumption
- Civil society participation
- Solid waste
- Public space

4 Indicators
- National Urban Policies*
- Construction Industry
Goal 11

5 Targets That relate to Disaster Risk

11.1 Housing and Slums
11.3 Participatory Planning
11.4 Cultural Heritage
11.5 Disaster Reduction
11.b Mitigation of Climate Change, Resilience
11.c LDCs support – buildings

Focus:

11.1: Upgrading urban slums
11.3: Integrated urban Planning
11.4: Strengthening efforts to protect and safeguard cultural heritage
11.5.1 & 2: Reducing social and economic impacts of disaster risk
11.b: Adopting and implementing urban policies inline with Sendai Framework
11.c: building resilient urban infrastructure
Selected indicators

### 11.1.1: Proportion of urban population living in slums, informal settlements or inadequate housing

**Main features:**
- City population
- Slums
- Informal settlements
- Inadequate housing

This indicator considers three components to be computed as follows:

- **Slum households (SH):**
  \[
  \text{Slum households (SH)} = 100 \times \frac{\text{Number of people living in slum}}{\text{City population}}
  \]

- **Informal settlements households (ISH):**
  \[
  \text{Informal settlements households (ISH)} = 100 \times \frac{\text{No. of people living in informal settlements households}}{\text{City population}}
  \]

- **Inadequate housing households (IHH):**
  \[
  \text{Inadequate housing households (IHH)} = 100 \times \frac{\text{No. of people living in inadequate housing}}{\text{City population}}
  \]

This diagram aims to show that slums, informal settlements and inadequate housing are all part of a continuum of the Right to Adequate Housing experience. Informal settlements and inadequate housing can also be slums if they lack one of the five slum deprivations in addition to affordability and lacking the building and planning permit. By adding the two additional indicators for inadequate housing and for informal settlements, the target becomes more universal and applicable to all regions in the world. At the same time, progress can be tracked and different response mechanisms assessed and developed.
Goal 11 monitoring and reporting presents major challenges that other SDGs do not necessarily confront

Countries will face serious problems:

- create a consistent set of cities for national level reporting that is representative of their territory, geography and history

<table>
<thead>
<tr>
<th>Country</th>
<th>Year of reporting 1</th>
<th>Year of reporting 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country 1</td>
<td>5 cities</td>
<td>10 cities</td>
</tr>
<tr>
<td>Country 2</td>
<td>8 cities</td>
<td>4 cities</td>
</tr>
</tbody>
</table>

- difficulties to report on national (urban) progress in a systematic manner over time
Reporting Goal 11 – Additional challenge

- How to aggregate this data at national level?
- How to create a regional balance?
- How to know where are the challenges (small, intermediate cities, coastal, border)?
- Which cities are having problems of data collection and why?

Several indicators require to be collected locally:

11.2 Public Transport
11.3 Land Consumption
11.4 Cultural heritage
11.6 Solid waste and air quality
11.7 Public Space
Modelled after the **Global Sample of Cities**, the **National Sample of Cities** can be used to harmonize urban data and indicators using an agreed number of cities that are statistically representative of the country’s urban human settlements.

**CRITERIA**

- Number of cities
- Population
- Size of the city
- Geographic location
- City functionality
- Economic and political importance

**Global Sample of Cities**

Based on 200 cities, it represents 5% of the Universe of 4,231 cities of over 100,000 inhabitants in 2010 and 70% of the world urban population.
What is the CPI?

The *City Prosperity Initiative* is the United Nation’s platform for urban data, developed to formulate evidence based decision making and monitoring for cities.
THE WHEEL OF URBAN PROSPERITY AND THE CPI

THE SIX DIMENSIONS OF PROSPERITY

Urban Governance
Productivity
Environment Sustainable
Infrastructure Development
Equality and Social Inclusion
Quality of Life
How does the CPI work?

**MEASURE** components by producing critical mass data and information using the following tools:
- Perception Survey
- City Prosperity

**UNDERSTAND** factors which generate or inhibit prosperity and as a result:
- City Profile Briefing
- State of City Report

**CHANGE** components by formulating policies, strategies and action plans through the:
- City Action Plan
- Best Practice Program

**MONITOR** the outcomes of the implementation through the use of CPI tools and methodology.
A Flexible Monitoring Framework

**CPI Dimensions and Factors**

- Contextual CPI
- Extended CPI
- Basic CPI
- Global City Ranking

**Recognition**

Using CPI’s Indicators will ensure international comparability among cities within your country, region and worldwide.
The Creation of local and national monitoring mechanisms for accountability, prioritizes the selection of key areas and relevant issues for more efficient investment planning.

The CPI has the potential and the characteristics to be the Global Monitoring Framework for the New Urban Agenda and SDGs.

- Cities and countries that join the CPI will be able to identify, quantify, and evaluate the progress on these agendas, avoiding duplication and systematizing the monitoring and reporting process.

- The CPI is an ad-hoc tool for coordination, implementation and monitoring of Sustainable Development Goals and New Urban Agenda at local level.
The existing City Prosperity Index (CPI) has six dimensions:

- Each index is comprised of multiple variables
  - Each variable is standardized to a 0 to 100 scale to allow easier computations and comparisons

Based on feedback it was decided to explore adding a seventh dimension -- human vulnerability -- to the CPI:

**Project goal** is to explore models of human vulnerability, and select one that could add another dimension to the CPI (Pro - Bono Analytics).

The project goal is to define a measure of human vulnerability that can be added to an existing “City Prosperity Index”
A WorldRiskIndex, which includes a measure of vulnerability, is calculated for 171 countries (but not cities)

\[ \text{WorldRiskIndex} = \text{Exposure} \times \text{Vulnerability} \]

\[ \text{Vulnerability} = \left( \frac{1}{3} \times \text{Susceptibility} \right) \times \left( \frac{1}{3} \times \text{Lack of Coping Capacity} \right) \times \left( \frac{1}{3} \times \text{Lack Adaptability Capacity} \right) \]

United Nations University publishes an annual WorldRiskReport

The World Risk Index includes the following nature disasters in “exposure”:
- Earthquake
- Cyclone
- Floods
- Droughts
- Sea-level-rise

The World Risk Index does not include other types of events, such as:
- HIV/AIDS and other contagious diseases
- Other health epidemics
- Wars, violence and terrorists activities
- Economic recessions and depressions
- Food shortages / famine

Vulnerability
- An estimate of the conditions which impact the ability of a community to manage an event, such as an earthquake, flood, or disease outbreak.

Exposure
- A measure of the likelihood that a region or population could experience an event within a given time period.

Risk
- A quantitative estimate of the potential for loss or injury to occur. Loss can entail life and/or property.
- World Risk Index is a relative measure of the countries most likely to incur loss during a negative event.
  - Risk = Vulnerability * Exposure

For the City Prosperity Index, should “vulnerability” or “risk” be added as a new dimension?

World Risk Report Definitions:

Vulnerability

Exposure

Risk


UN-Habitat
For a Better Urban Future
Risk vs. Vulnerability (2 of 2)
It is recommended the “vulnerability” be added to the CPI, rather than “risk.” This is more consistent with the six other indices in the CPI.

• The UN World Risk Report provides a robust metric for defining vulnerability at a country level
  – Most of the metrics used can be converted to a city level
  – A proposed mapping from country to city is contained in this report
  – Comparison of a slightly modified version of the vulnerability metric yields a strong correlation (coefficient = -0.888) when compared with a WHO estimate of life expectancy
  – Further model refinement and calibration could achieve an even stronger correlation

• Risk, as defined in the World Risk Report, only considers natural disasters
  – By including exposure to only natural disasters, a weak correlation (coefficient = -0.303) with life expectancy is obtained
  – Exposure rates for natural disasters, man-made disasters, diseases and other health epidemics, etc. is difficult to obtain at a city level

Correlations:

<table>
<thead>
<tr>
<th>Category 1</th>
<th>Category 2</th>
<th>Correlation(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WorldRiskIndex</td>
<td>Life Expectancy</td>
<td>-0.303</td>
</tr>
<tr>
<td>WorldRiskReport Vulnerability(2)</td>
<td>Life Expectancy</td>
<td>-0.882</td>
</tr>
<tr>
<td>Modified Vulnerability(3)</td>
<td>Life Expectancy</td>
<td>-0.888</td>
</tr>
</tbody>
</table>

(1) Used the “correl” function in Microsoft Excel, which calculates the Pearson product-moment correlation coefficient.
(2) WorldRiskReport weights vulnerability as 1/3 of the susceptibility value, 1/3 of the lack of short-term coping capacity, and 1/3 of the lack of long-term adaptability capacity.
(3) In the modified vulnerability, susceptibility was given a weight of 0.5, while coping and adaptability were each given a weight of 0.25. This assigned the combination of short-term coping and long-term adaptability the same weight as susceptibility.

Note: the adaptability component of both the WorldRiskIndex and vulnerability contains a life expectancy estimate, however, this variable is a small percentage of the overall metric.
Human Vulnerability Index that can be included in the City Prosperity Index

A Human Vulnerability Index can be divided into three components: susceptibility; lack of coping capacity; and, lack of adaptability capacity

- **Susceptibility** reflects how exposed individuals are to external factors. This is driven by variables such as:
  - Age dependency (young, old)
  - Shelter access
  - Clean water and nutrition access
  - Poverty rate
  - Improved sanitation
  - Etc.

- **Inability to cope** reflects short-term ability of a population to manage adverse conditions
  - Disaster preparedness
  - Physician and hospital bed access
  - Corruption
  - Social network / communication
  - Insurance coverage
  - Etc.

- **Lack of adaptability** reflects long-term planning ability to reduce impacts of negative events
  - Years of school, literacy rate
  - Equitable treatment of women
  - Land use management
  - Public and private health expense
  - Etc.