# 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**

Output

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

Process

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<br>Public transport<br>Land consumption<br>Civil society participation<br>Solid waste<br>Public space |
| 4 Indicators | National Urban Policies*<br>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

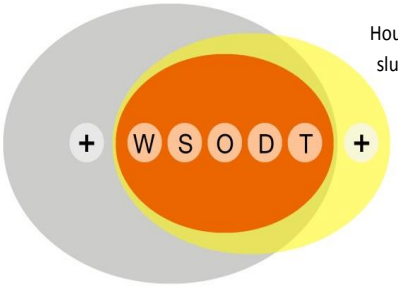
# Selected indicators

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

**Main features:**

- City population
- Slums
- Informal settlements
- Inadequate housing

The diagram below summarizes the recommendations.



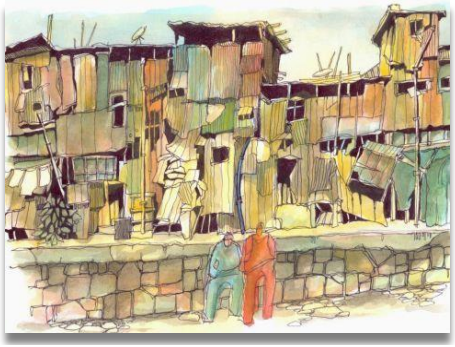

This diagram aims to show that slums, informal settlements and inadequate housing are all part of a continuum of the Right to Adequate Housing experience. Informal settlements and inadequate housing can also be slums if they lack one of the five slum deprivations in addition to affordability and lacking 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.

**This indicator considers three components to be computed as follows:**

Slum households (SH): $= 100\left[\frac{Number\ of\ people\ living\ in\ slum}{City\ population}\right]$

Informal settlements households (ISH): $= 100\left[\frac{No.of\ people\ living\ in\ informal\ settlements\ households}{City\ population}\right]$

Inadequate housing households (IHH): $= 100\left[\frac{No.\ of\ people\ living\ in\ inadequate\ housing}{City\ population}\right]$



**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
- difficulties to report on national (urban) progress in a **systematic manner over time**

| Country | Year of reporting 1 | Year of reporting 2 |
|---|---|---|
| Country 1 | 5 cities | 10 cities |
| Country 2 | 8 cities | 4 cities |

## 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, boarder)?
- Which cities are having problems of data collection and why?

Several indicators require to be collected locally:

11.2

Public Transport

11.3

Land Consuption

11.4

Cultural heritage

11.6

Solid waste and air quality

11.7

Public Space

# National Sample of Cities

**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?

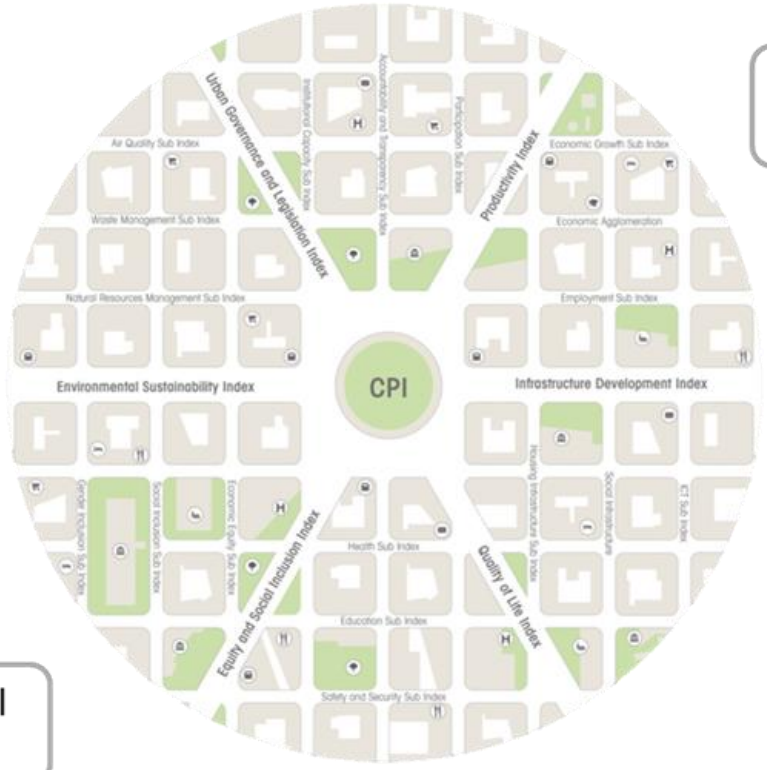
**The *City Prosperity Initiative* is the United Nation's platform for urban data, developed to formulate evidence based decision making and monitoring for cities.**

# THE WHEEL OF URBAN PROSPERITY AND THE CPI

**THE SIX DIMENSIONS OF PROSPERITY**

Urban Governance

Productivity




Environment Sustainable

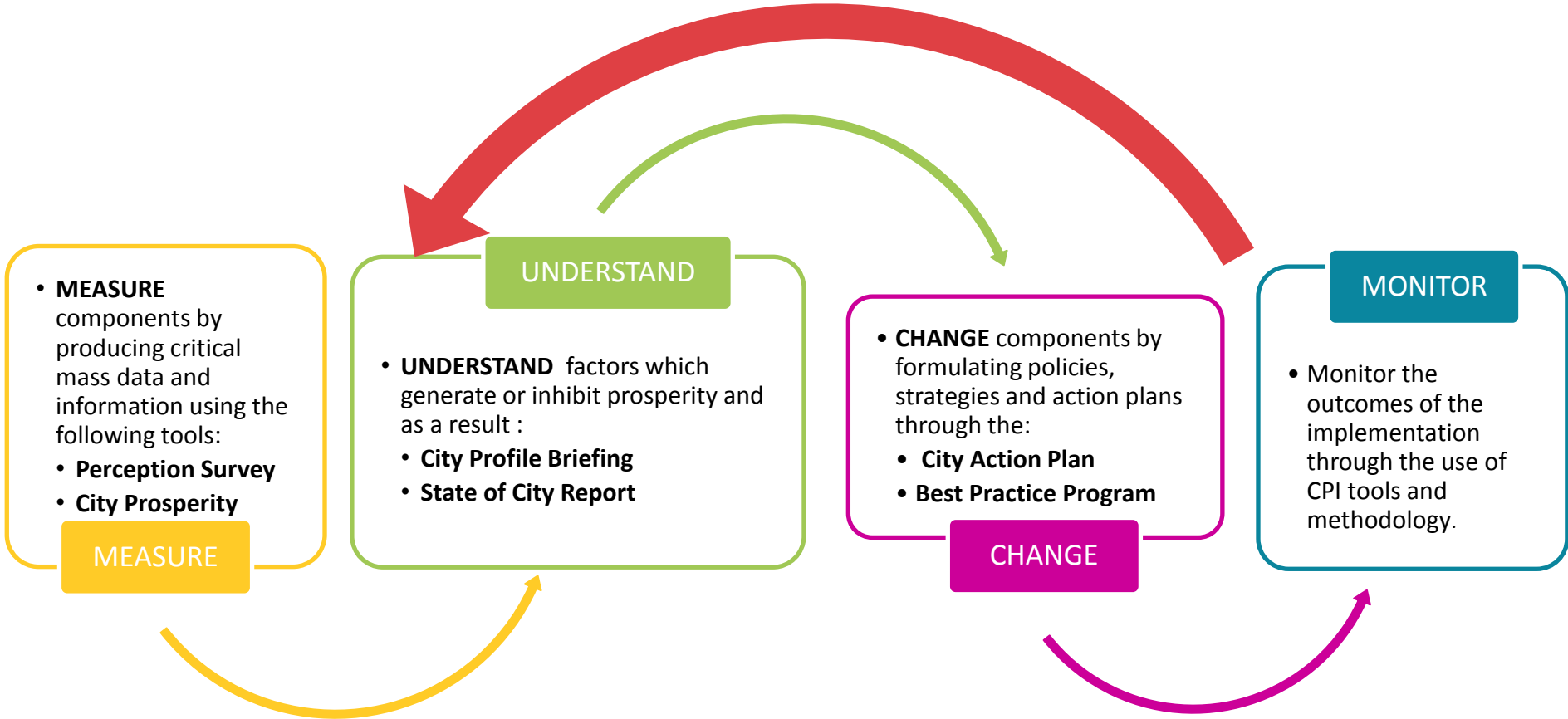
Infrastructure Development

Equality and Social Inclusion

Quality of Life

# The Process of the CPI

## How does the CPI work?

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# CPI Dimensions and Factors

## A Flexible Monitoring Framework

- 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.

# A Flexible Monitoring Platform- Connecting Universal Indicators

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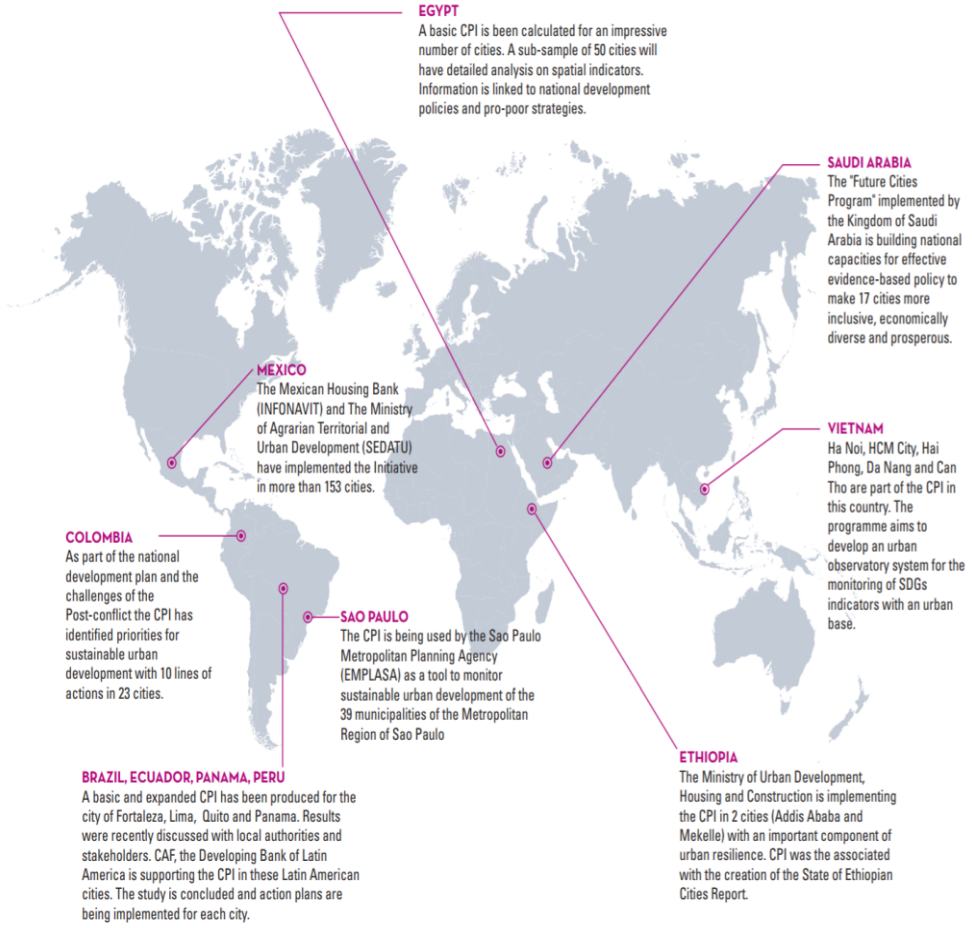
CITY PROSPERITY INITIATIVE

The Creation of local and national monitoring mechanisms for accountability, **prioritizes the selection of key areas and relevant issues for more efficient investment planning**

IMPLEMENTING THE NEW URBAN AGENDA

THE GLOBAL GOALS
For Sustainable Development




**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**

# HUMAN VULNERABILITY INDEX FOR INCLUSION IN THE CPI

The project goal is to define a measure of human vulnerability that can be added to an existing “City Prosperity Index”

- 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

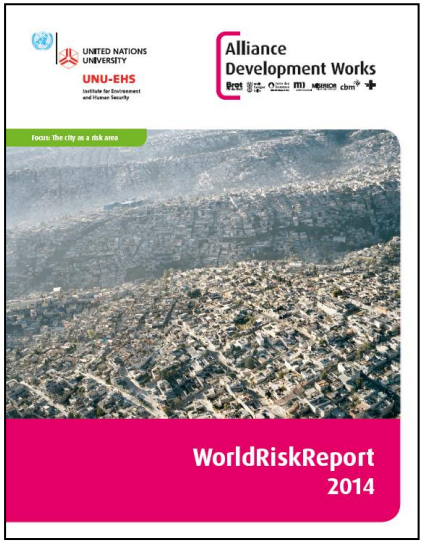
- Based on feedback it was decided to explore adding a seventh dimension -- human vulnerability – to the CPI

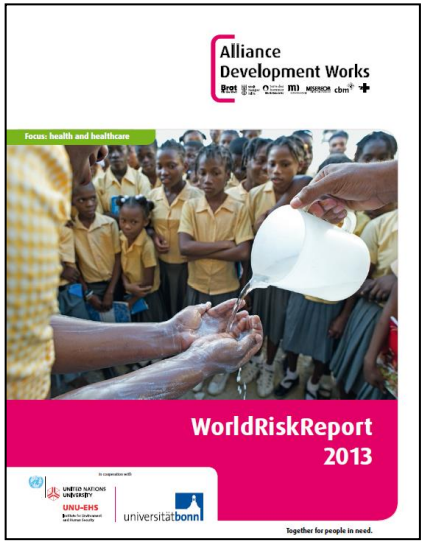
- **Project goal** is to explore models of human vulnerability, and select one that could add another dimension to the CPI (Pro –Bono Analytics)

A WorldRiskIndex, which includes a measure of vulnerability, is calculated for 171 countries (but not cities)

**WorldRiskIndex = Exposure * Vulnerability**

**Vulnerability = (1/3*Susceptibility) * (1/3*Lack of Coping Capacity) * (1/3*Lack Adaptability Capacity)**




United Nations University publishes an annual WorldRiskReport

Source: The detailed formulas used in the WorldRiskReport are available at http://www.worldriskreport.org/.

## Risk vs. Vulnerability (1 of 2)

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

**World Risk Report Definitions:**

- **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

**Exposure:**

- 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

Source: United Nations University “WorldRiskReport,” available at http://www.worldriskreport.org/.

# 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:**

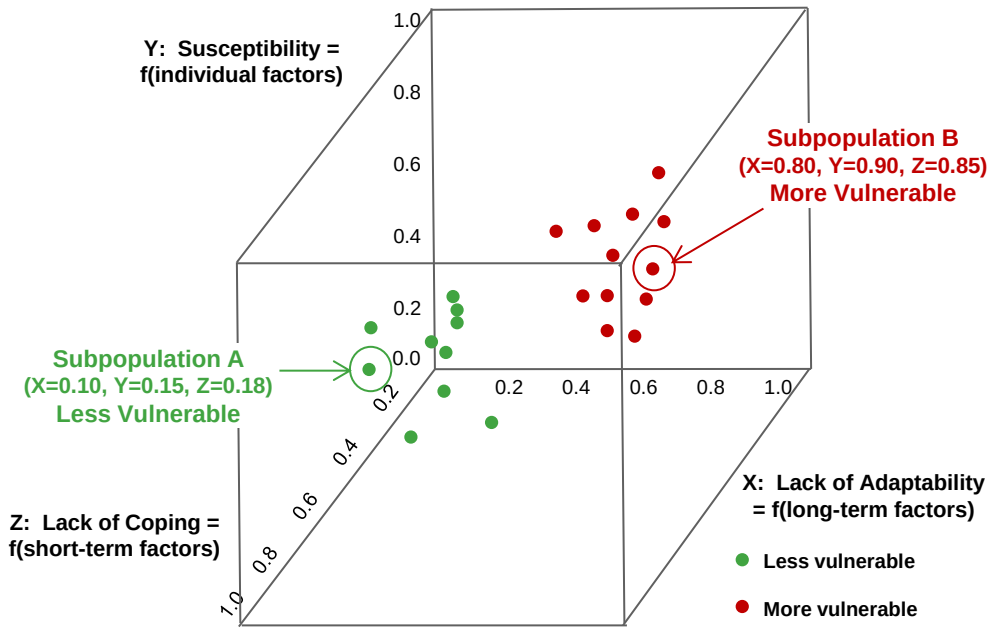
| Category 1 | Category 2 | Correlation(1) |
|---|---|---|
| WorldRIskIndex | Life Expectancy | -0.303 |
| WorldRiskReport Vulnerability(2) | Life Expectancy | -0.882 |
| Modified Vulnerability(3) | Life Expectancy | -0.888 |

(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.

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