

# Land and Geospatial Resilience

A World Bank Project on:  
**Improving Resilience and Resilience Impact of National Land and Geospatial Systems**

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November 21, 2018

# Project Team



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## COUNTRY CASE STUDIES



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Lillethum  
Norway**



**Angelica  
Muñoz  
NICARAGUA**



**Muyiwa  
Agunbiade  
NIGERIA**



**Orhan Altan  
TURKEY**



**Bal Krishna  
INDIA**

**Heri Sutanta  
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# Smart Sustainable Future

Strategic role of Land and Geospatial Systems

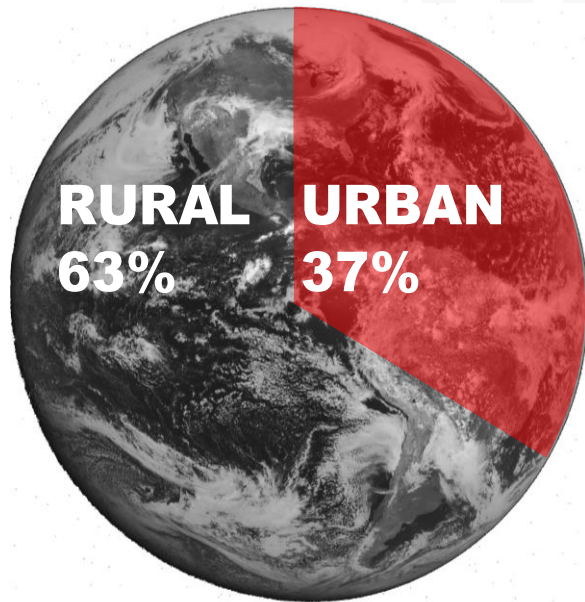


# Understanding our World

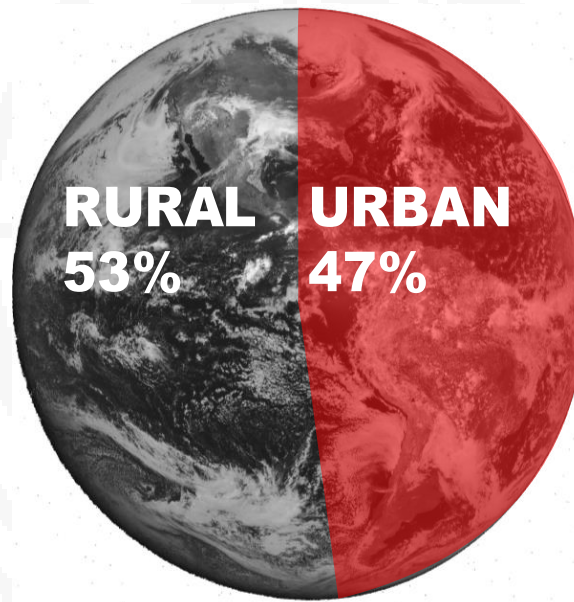
## Global Trends



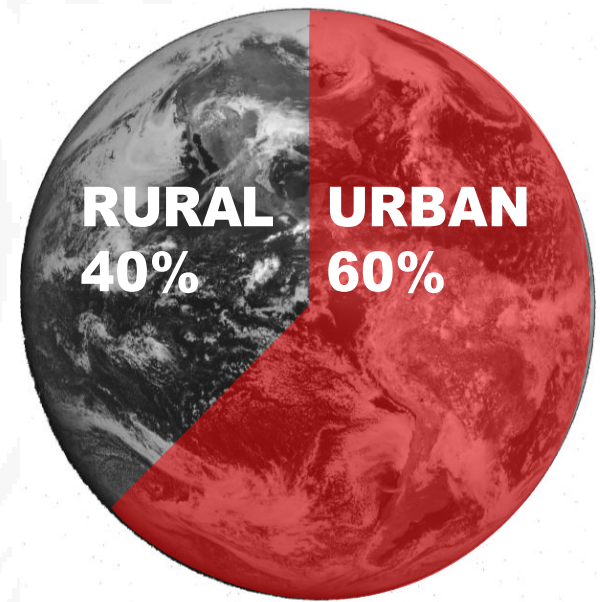
# Global Trends: The World Becomes Urban



**1970**



**2000**



**2030**



**2 billion new urban residents**  
**1.2 million new km<sup>2</sup> urban area**

The  
Economic  
and  
Human  
Impacts of  
**Disasters**  
2008-  
2017



**US\$1.65 trillion**

Total damage



**1.9 billion**

Total people affected



**0.6 million**

Total people killed



UNISDR

Disasters impact the interactions between different social, economic and environmental systems.

## Infrastructures



## Housing



## Land Coverage







**Global Trends**

**Are we prepared for what's to come?**

**Climate Change Causes More Frequent and Severe Disasters**





High levels  
of  
vulnerability  
to disasters

## Communities

Economically poor communities are pushed deeper into poverty

## Infrastructures

Infrastructure interdependencies increase risk of critical services failing

## Cities

Risk exposure is highest where major economic, social & institutional activities are centred

An aerial photograph of a residential neighborhood that has been completely inundated with floodwater. The water is a dark, murky grey, covering the streets and yards. Only the roofs of houses and some trees are visible above the water level. The houses have various colored roofs, including red, blue, and green. The trees are green and scattered throughout the area. The overall scene is one of significant destruction and displacement.

One step  
forward, two  
steps back.



# Global Trends: Complex Urban Environments



Image source: Getty images; www.bbc.com; Jesse Marlow; Fairfax Media; www.centralequity.com; www.railway-technology.com; www.roujinlim.wordpress.com; www.streetsblog.org; City of Melbourne; www.governmentnews.com; www.racv.com.au; Tim Carrafa; News Corp.

# Disaster Management Trends

Disaster management research is **evolving** and **expanding**

driven by **policy changes** and the implementation of **strategic frameworks**

to address the **vulnerability**, **exposure** and **resilience** of **communities**.





# Disaster Management Requirements

## Disaster Risk Management Requirements

An Integrated Approach

Governance

Multi-sourced data Open Standards

Collaboration

Effective Communication

Interoperability

A **culture change** in disaster management;  
"Asking and Listening" **vs.** "Telling and Talking"

# Land and Geospatial Systems Resilience

## Land Administration Systems

provide **secure tenure** reducing vulnerability, and the baseline for estimating disaster damages and eligibility for support.

## Geospatial Framework

provides the **common location platform** for identifying the impact, directing responses, reconstituting the pre-disaster land use, identifying areas for temporary shelter, and facilitating planning and Reconstruction.



# Land and Geospatial Systems' Resilience - *Reality*

## Land Information Systems

- ✓ Land administration systems incomplete and out of date in some high disaster risk countries.
- ✓ Asset and beneficiary information not available for disaster response, prevention and mitigation.

## Geospatial Framework

- ✓ Geospatial Framework fragmented and neglected in some developing countries.
- ✓ Formal systems fail to serve disaster response, prevention and mitigation.

# Improving Resilience and Resilience Impact of National Land and Geospatial Systems

## Project Context

The project is centred on harnessing **existing national land and geospatial systems** and utilizing the available information to **improve disaster risk management practices** and overall community resilience to disasters.





# Project Objectives:

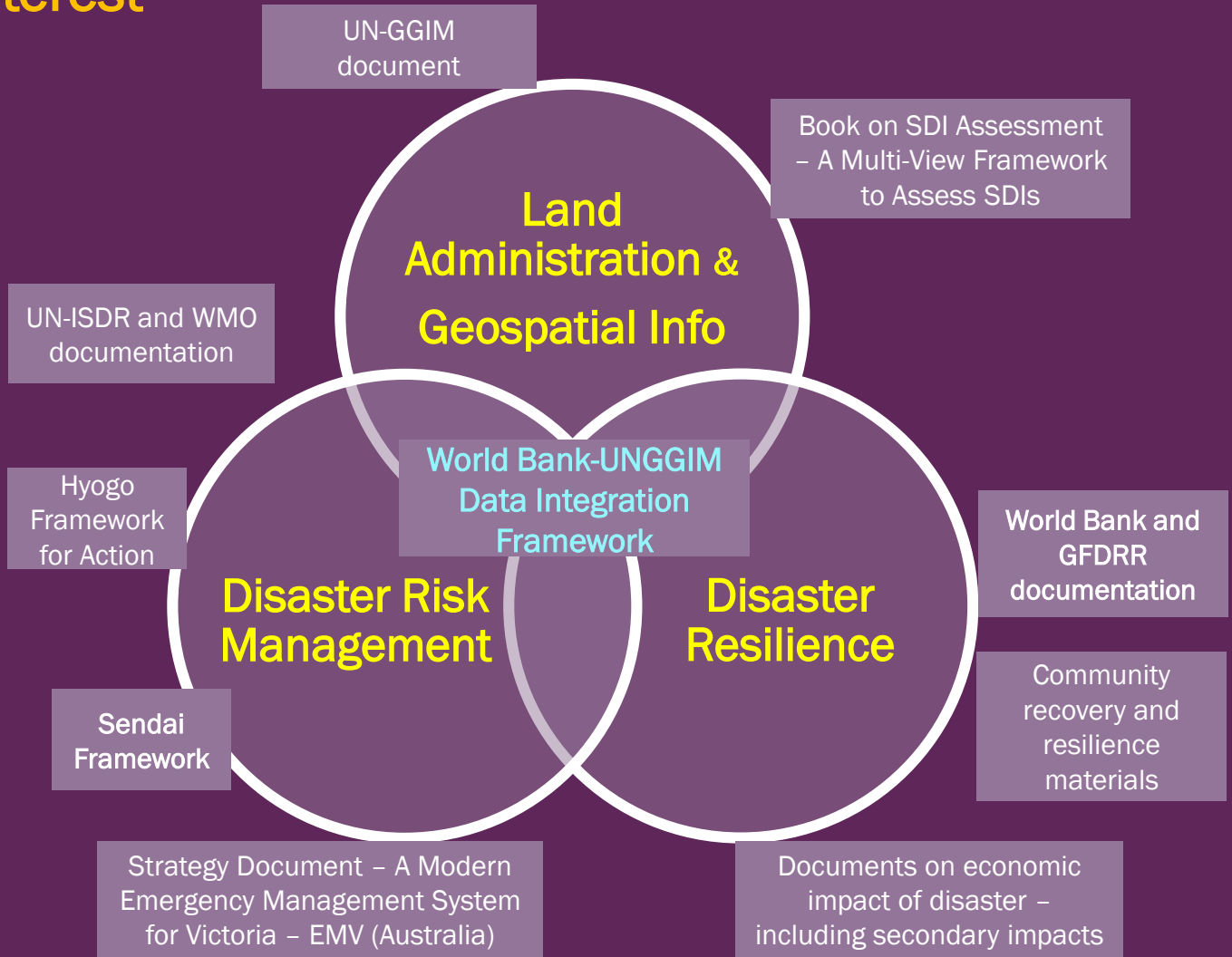
To define the rationale, approach and methodologies for **improving the resilience and resilience impact of national land administration and geospatial systems** by:



- 01** Consolidating international cross-sectoral knowledge on land administration, geospatial systems and resilience
- 02** Developing an approach to produce country-level action plans for increasing resilience and resilience impact of national land and geospatial system
- 03** Producing five country level action plans
- 04** Disseminating the results within the Bank and globally through a flagship report and an International Forum.

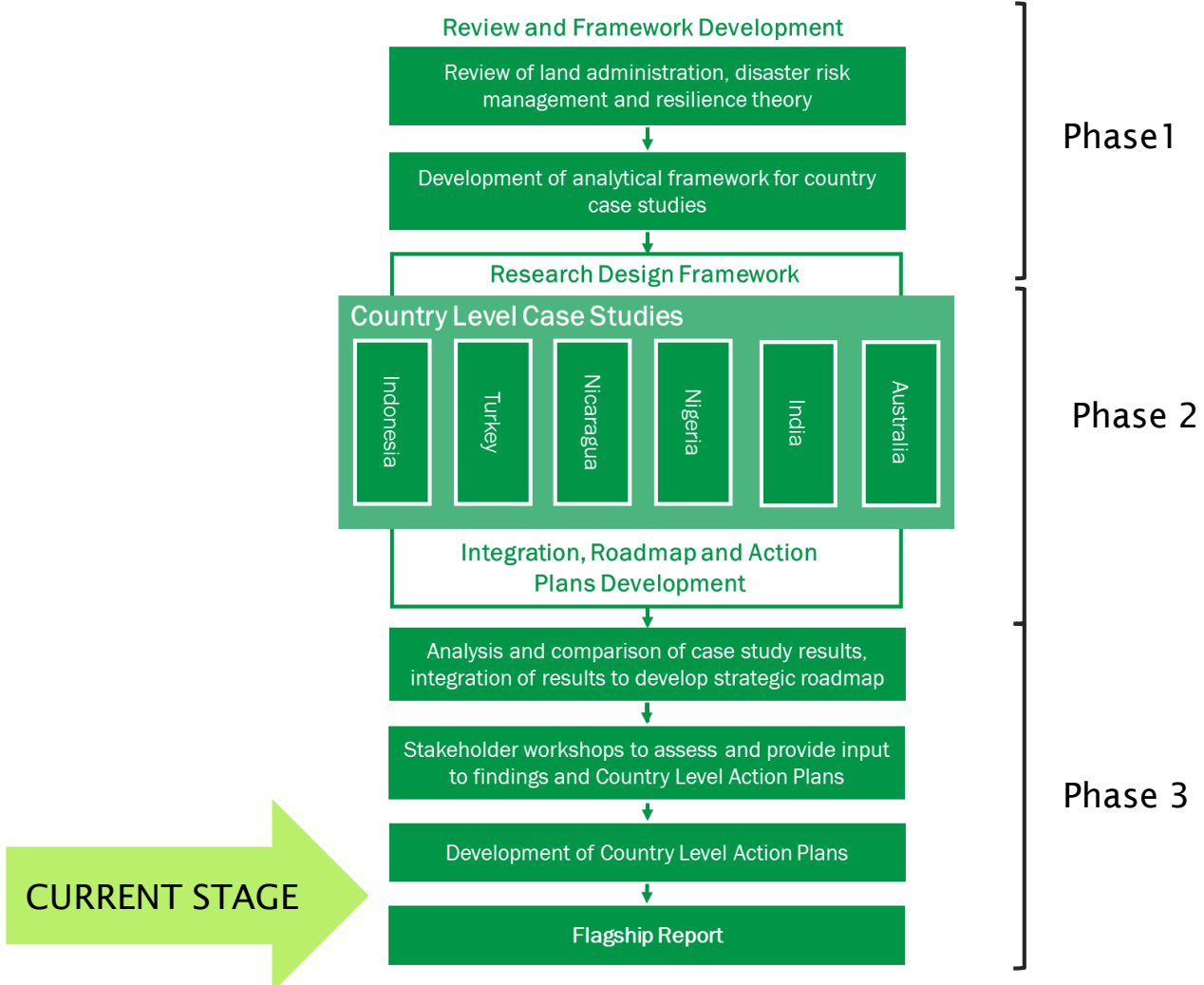
# Relevant Theory and Literature:

## Areas of Interest





# Overarching Methodology and Approach: 3 PHASES

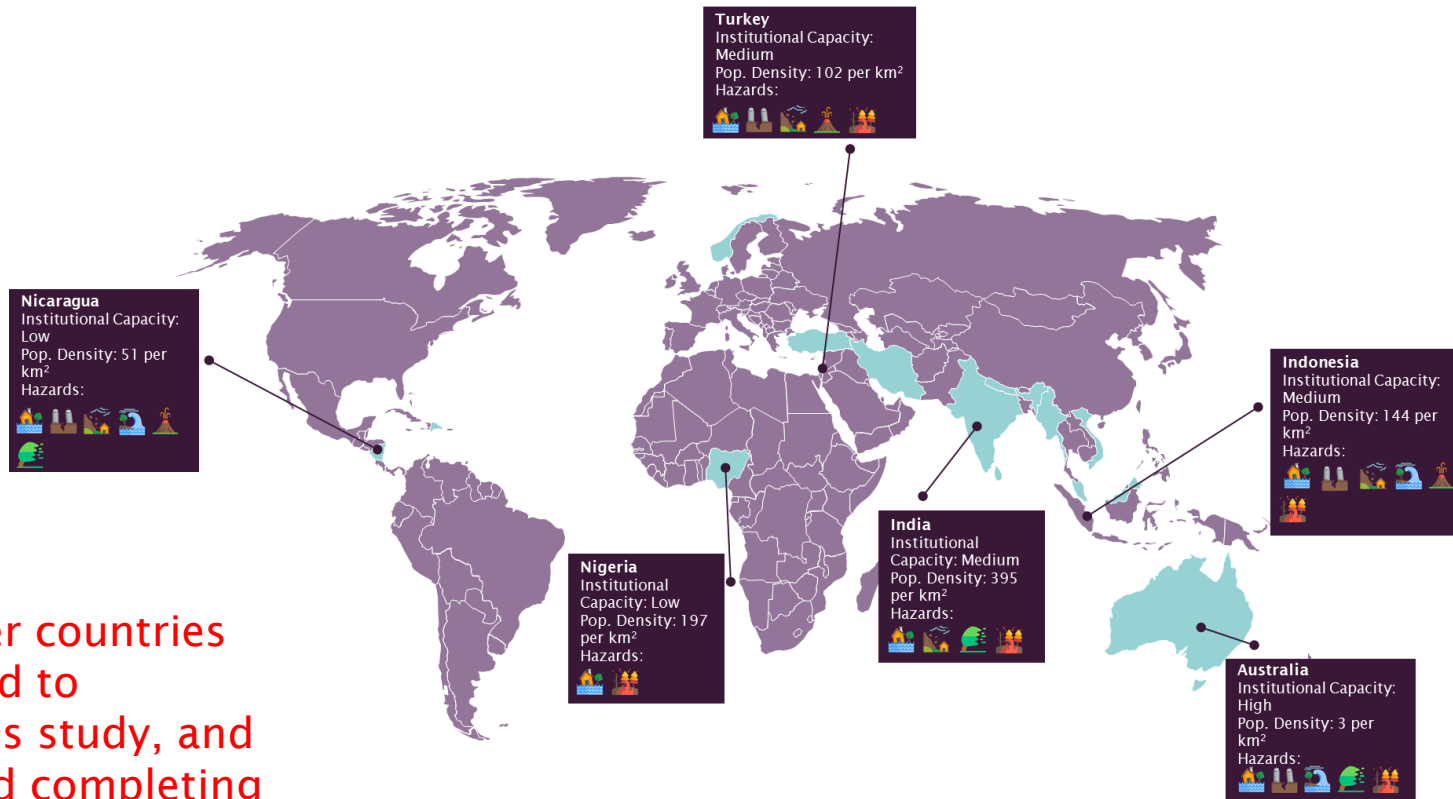


# Research Design Framework: Country Level Case Studies

So far, 10 countries have participated by completing the template:

- Turkey
- India
- Indonesia
- Nicaragua
- Nigeria
- Australia
- **Chile**
- **Colombia**
- **Malaysia**
- **Tunisia**

There are 5 other countries have been invited to participate in this study, and they have started completing the template.





# Land Resilience Maturity Matrix

- We are developing a **Land Resilience Maturity Matrix** that provides **a framework for individual countries to measure their level of development and readiness** against a number of land resilience factors.



- It provides **strategic guidance** to support the development of country-specific action plans.

# Land Resilience Maturity Matrix

- The Matrix presents a series of maturity factors associated with six different maturity levels which correspond with the maturity indicators used in the assessment.



Land  
Governance  
Factors



Legal and Land  
Policy Factors



Organizational  
Factors



Technological  
Factors  
Land administration &  
technological factors



Societal  
Factors  
People to land  
relationships

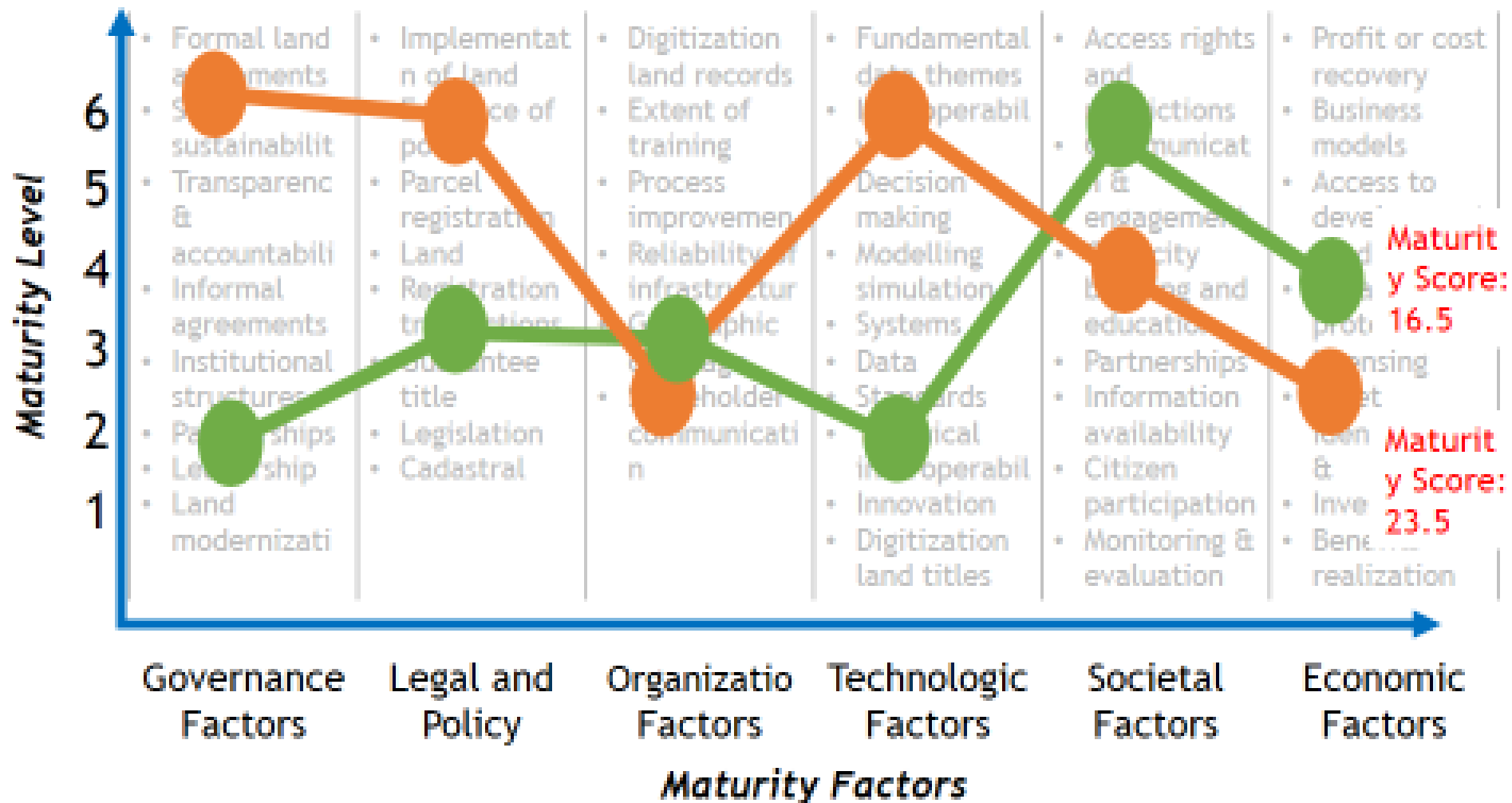


Economic  
Factors



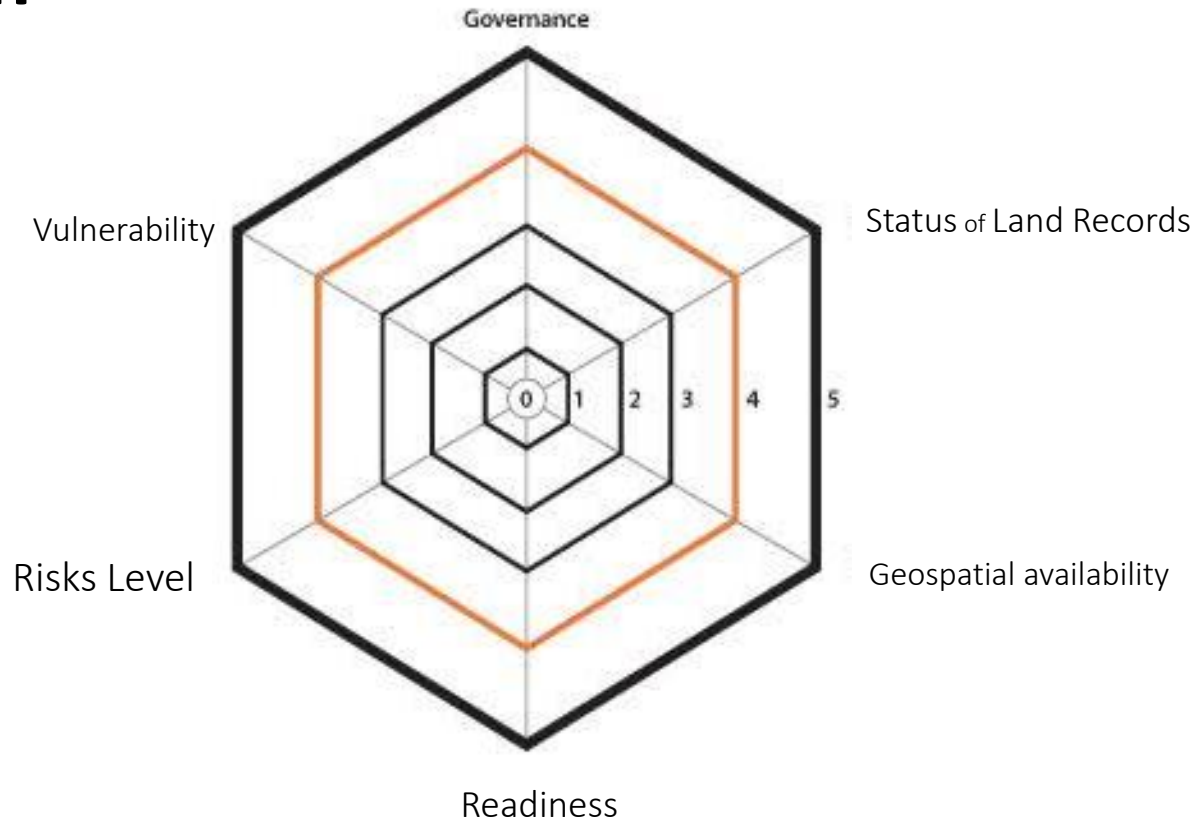
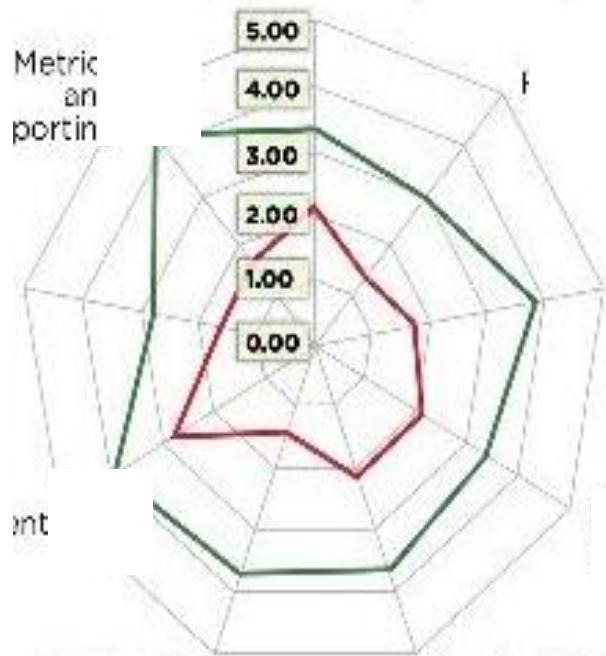


# Land Resilience Maturity Matrix



# Flagship Report: Country Case Studies

## Comparative analysis between countries

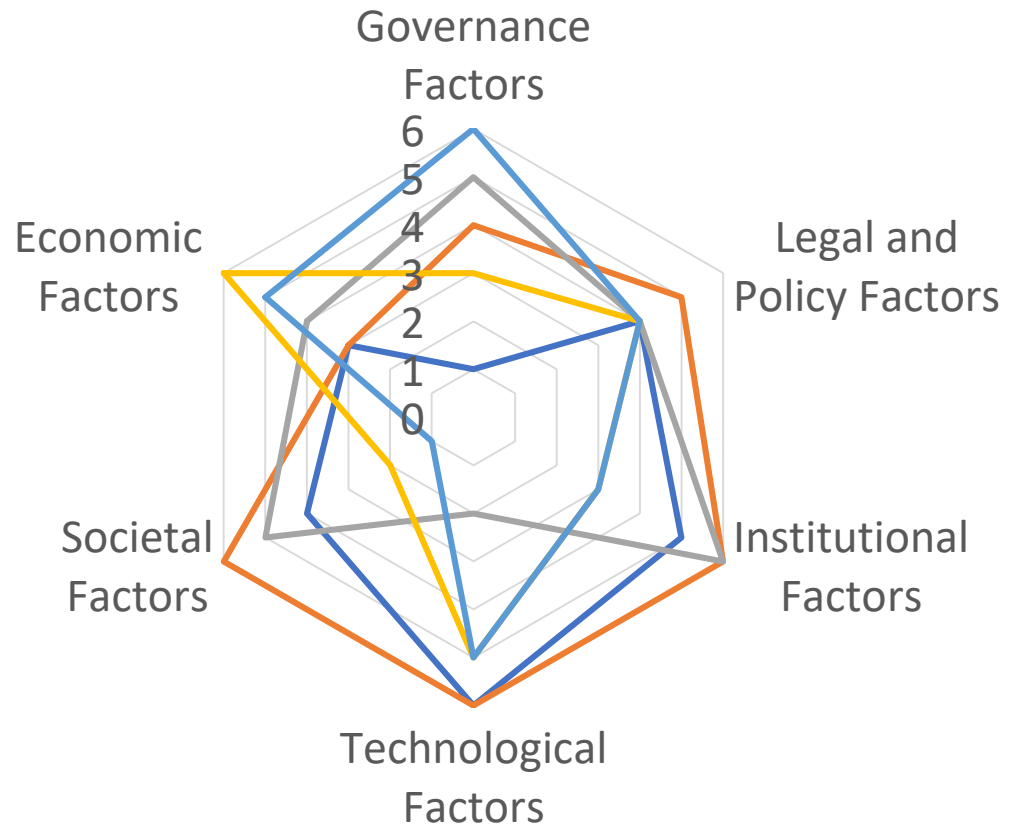




# Flagship Report: Country Case Studies

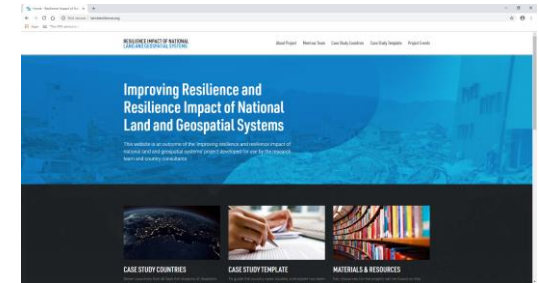
## Comparative analysis between countries

### Land Resilience Maturity



# Project Product Outputs

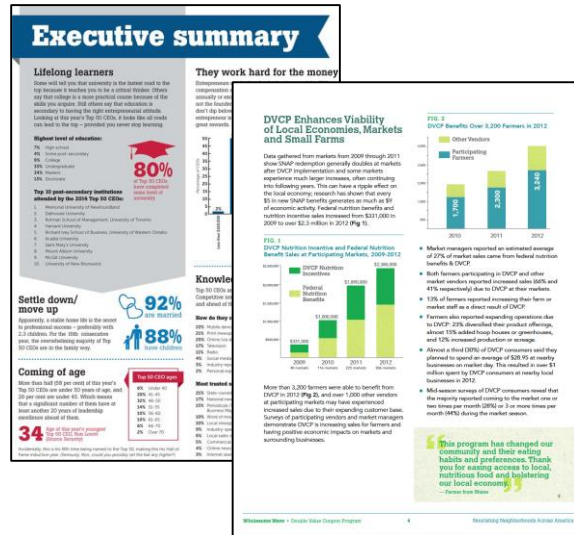
## Website Channel



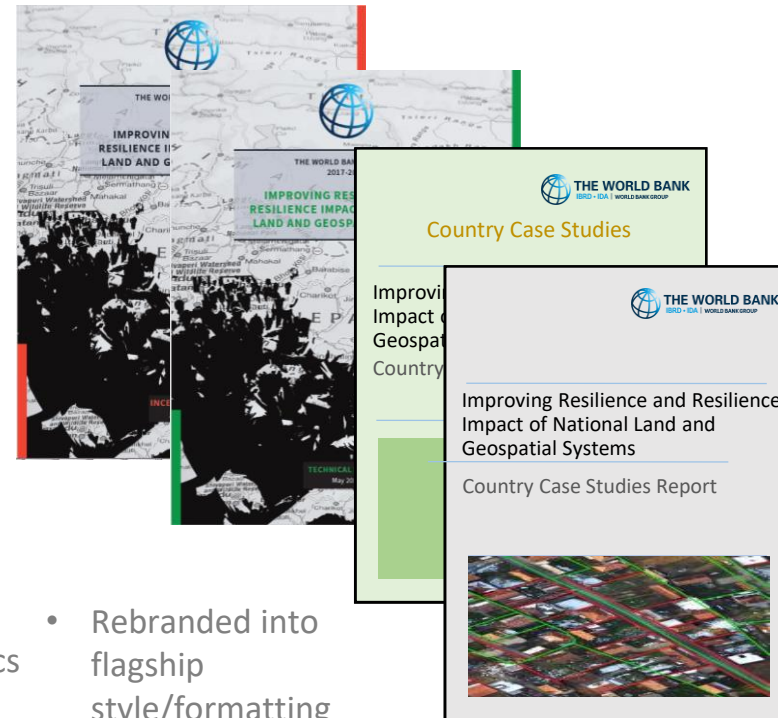
### 1. Flagship Report



### 2. One Page Summary Report



### 3. Associated Report Volumes



- Highlights of the Flagship Report
- Combination of short text and infographics
- Rebranded into flagship style/formatting



Moving forward  
towards the

# *Sustainable Development Goals*



# Understanding **SDG Connections** in the Context of DRR

## How the Sustainable Development Goals contribute to the Sendai Framework

In September 2015, more than 190 world leaders committed to the 17 Sustainable Development Goals to help end extreme poverty, fight inequality, combat climate change, and build resilience to disasters. While all the Sustainable Development Goals are relevant for building a sustainable and resilient world, a number of them have targets directly or indirectly related to disaster risk reduction. Implementing the Sustainable Development Goals also contributes to achieving the goal of the Sendai Framework to prevent new and reduce existing disaster risk, and strengthen resilience.

**TARGET 1.5** By 2030, build resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters.

**TARGET 6.6** By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.

**TARGET 11.5** By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to GDP caused by disasters, including water-related disasters, with focus on protecting the poor and people in vulnerable situations.

**TARGET 11.8** By 2020 substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion resources efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels.

**TARGET 15.3** By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world.

**TARGET 2.4** By 2030, ensure sustainable food production systems to implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality.

**TARGET 3.D** Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks.

**TARGET 4.A** Build and upgrade educational facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective environment for all.

**TARGET 9.1** Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access to all.

**TARGET 9.A** Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States.

**TARGET 13.1** Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries.

**TARGET 13.3** Improve education, awareness raising and human and institutional capacity on climate change, mitigation, adaptation, impact reduction and early warning.

**TARGET 14.3** By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans.



# A Blueprint for Disaster Management RD&D Supporting the SDGs

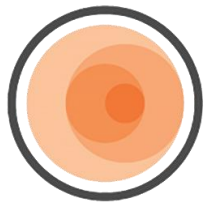




# A Blueprint for Disaster Management RD&D Supporting the **SDGs**



Intensive mapping of the links between disaster management and **resilience** research themes with the UN' **Sustainable Development Goals** and supporting **transdisciplinary research** to overcome real-world challenges.



**CSDILA**

CENTRE FOR SPATIAL  
DATA INFRASTRUCTURES  
& LAND ADMINISTRATION



**UN-GGIM**  
ACADEMIC NETWORK

# A Sustainable and Resilient Future for All

Sustainable  
Development



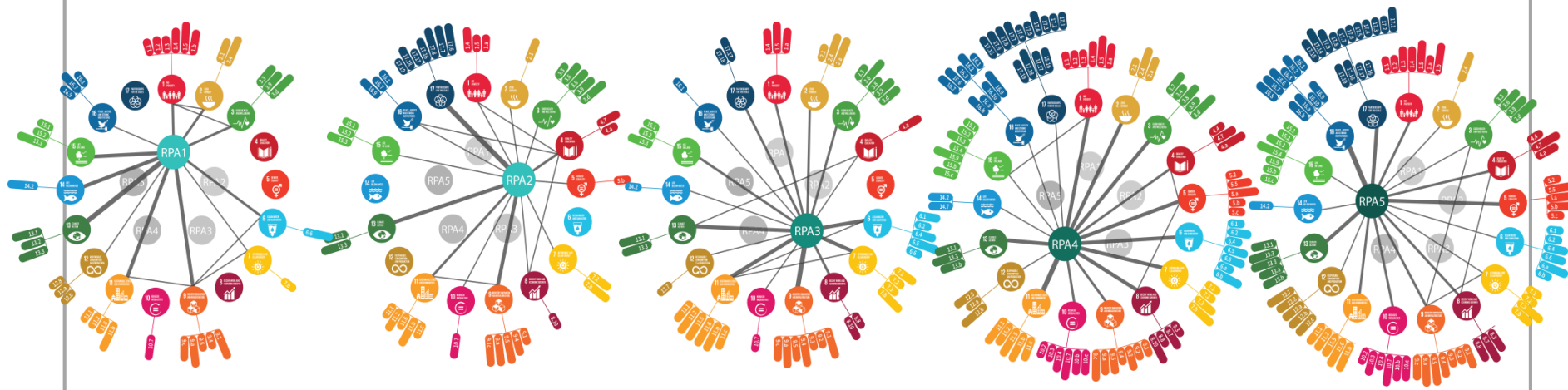
*“Leave no one  
behind”*



Resilience  
Thinking



*“Building back  
stronger”*



# Blueprint Digital Copy

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Link:

[https://www.unimelb.edu.au/  
cdmeps/home#sdg-blueprint](https://www.unimelb.edu.au/cdmeps/home#sdg-blueprint)





# THANK YOU

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