STATE OF THE ART
Disaster Risk Management

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OVERVIEW

1. Why is Disaster Risk Management (DRM) relevant to the World Bank?
2. What are key drivers that aggravate the impact of disasters?
3. What is the approach of DRM?
4. How can we boost our efforts on climate change adaptation and resilience?
5. What are key challenges to build resilience systems?
6. What are opportunities to push the envelop on DRM agenda?
7. Questions for Discussion

1. Why is Disaster Risk Management (DRM) relevant to the World Bank?

Disasters have had large and long-lasting impacts on poverty

THE WORLD BANK

End Extreme Poverty: Reduce extreme poverty in the world to less than 3 percent by 2030	**Boost Shared Prosperity:** Foster income growth of the bottom 40 percent of the population in each country

Twin Goals present an unprecedented opportunity to end extreme poverty in one generation.

Disasters hurt the poor and vulnerable the most

Villagers in Puri, Odisha, India	Damyanti Devi, Rudraprayag, Uttarakhand, India	Bimala Tamang, Kathmandu, Nepal
They had to leave their houses behind and evacuate to a nearby cyclone shelter.	Her house was completed washed away by the landslide.	Her house was demolished by the earthquake.
Cyclone Fani, May 2019	Cloudburst & Deluge in Uttarakhand, June 2013	Nepal Earthquake, April 2015

Disasters can ravage a country's development gains instantly

Ranks among the top five countries which have been hit by the most number of natural disasters in the last decade

Lost $80 Billion to Natural Disasters in last two decades

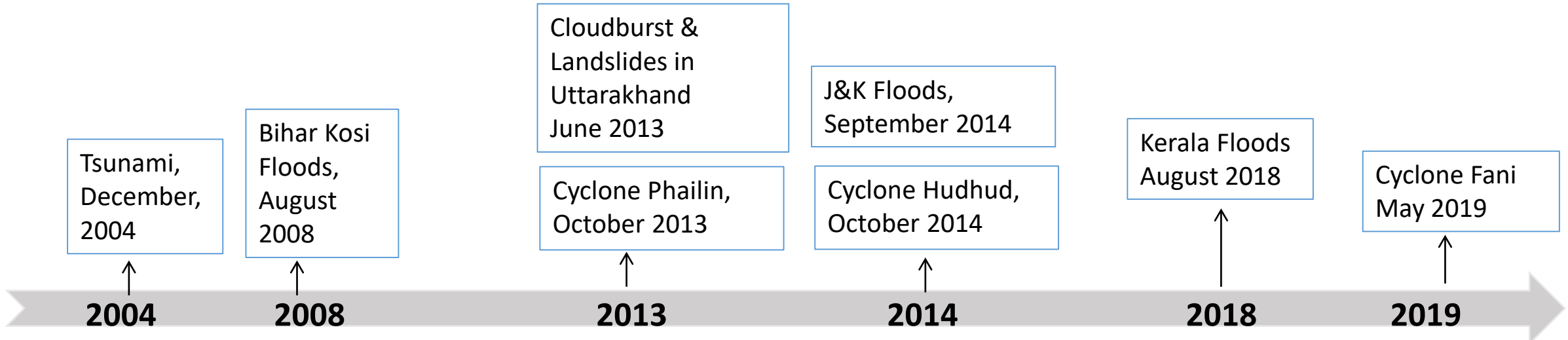Between 2000 to 2017, more than 300 natural disasters - 76,031 deaths

Top 10 countries known for fatal landslides triggered by human activity are located in Asia. India accounts for 20% of these incidents.

Monsoon Floods in 2017 & 2018 killed more than 1,000 people each across 7 states

Around 59% of the land area is vulnerable to moderate or severe seismic hazard

Tsunami, December, 2004

Bihar Kosi Floods, August 2008

Cloudburst & Landslides in Uttarakhand June 2013

Cyclone Phailin, October 2013

J&K Floods, September 2014

Cyclone Hudhud, October 2014

Kerala Floods August 2018

Cyclone Fani May 2019

2004   **2008**   **2013**   **2014**   **2018**   **2019**

Disasters can ravage a country's development gains instantly

Ranks among the top five countries at risk of disaster, according to the World Risk Report 2016.

Damage is more than $2 Billion from two cyclones (Sidr in 2007 and Aila in 2009) in recent years

Cyclones, associated storm surges and floods have led to almost all the nearly 520,000 natural disaster deaths recorded over the past 40 years.

Experienced at least 465 earthquakes of minor-to-moderate magnitudes between 1971 and 2006. 26 percent of the country is high risk.

Up to 57.6% of the total country was flooded and nearly 38 floods incidents occurred during 1954 to 2007.

Landslides; comparatively a new phenomena in the country. The south-east and south-west part are most vulnerable.
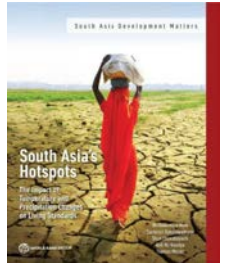
Disaster impact at the regional level varies depending on the vulnerability profile

South Asia
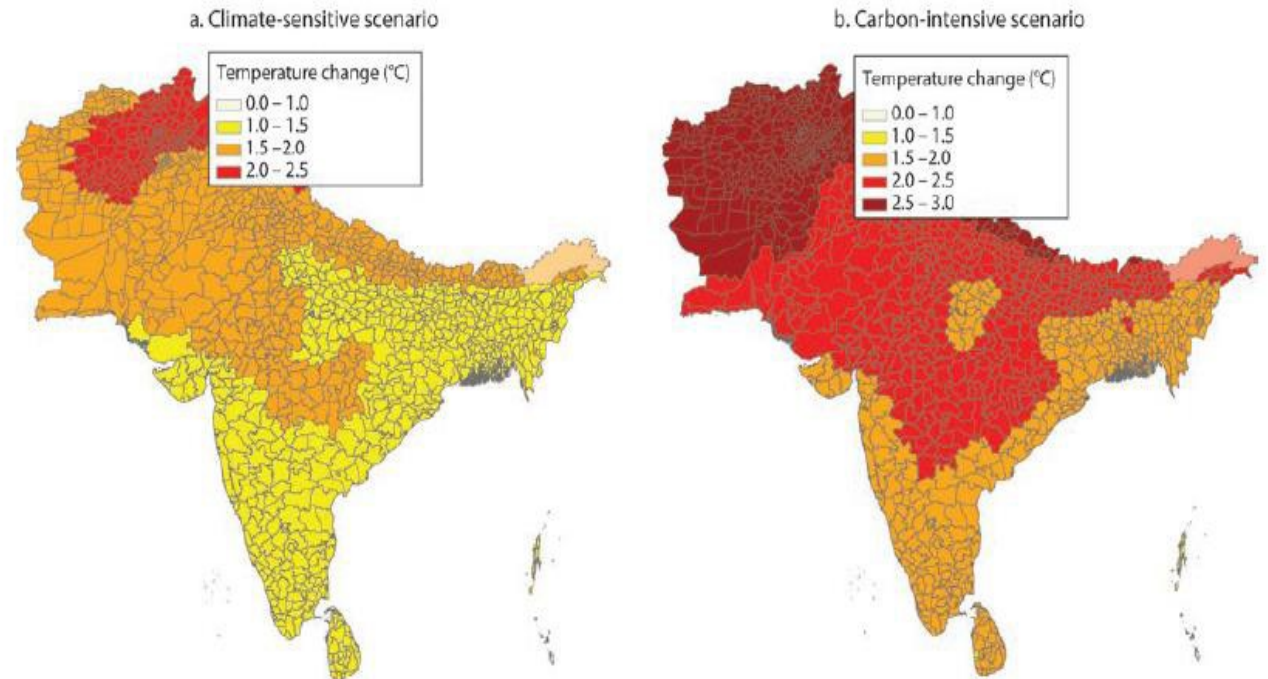
South Asia Climate Hotspots

- Faced with a range of natural hazards: floods, droughts, cyclones, earthquakes, landslides, tsunamis and sea-level rise.

- More than 800 million people – almost half of South Asia's population – currently live in areas that are projected to become moderate to severe climate hotspots by 2050 under the carbon-intensive scenario.

MAP O.2   Annual Average Temperatures Increase by 2050 Relative to 1981–2010

a. Climate-sensitive scenario
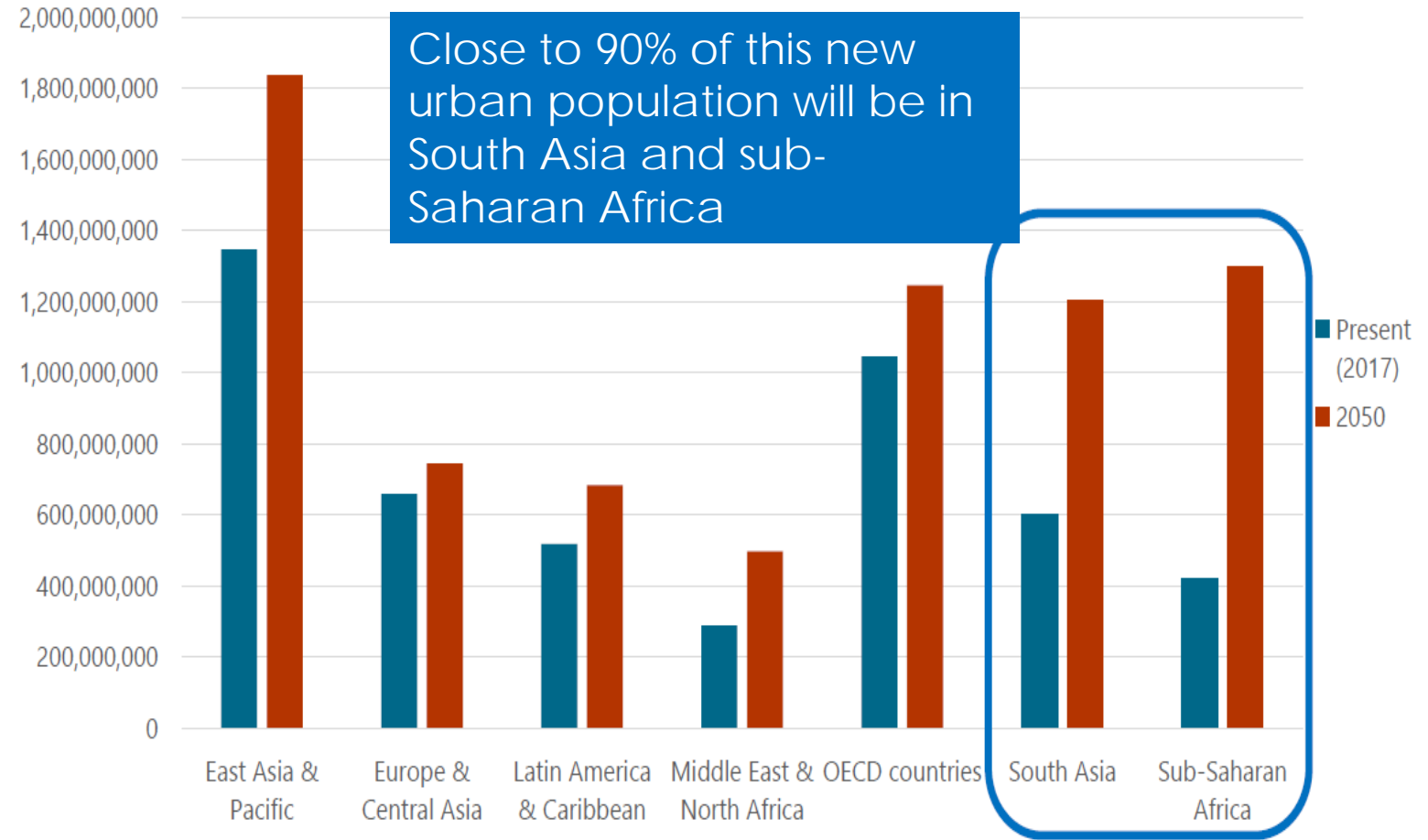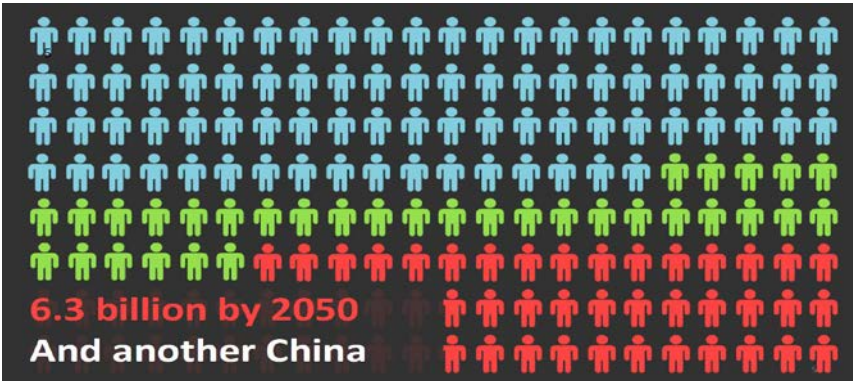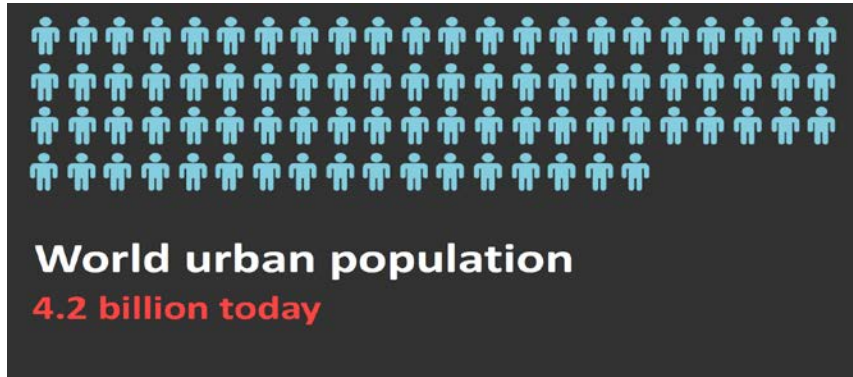
Temperature change (°C)
- 0.0 – 1.0
- 1.0 – 1.5
- 1.5 – 2.0
- 2.0 – 2.5

b. Carbon-intensive scenario

Temperature change (°C)
- 0.0 – 1.0
- 1.0 – 1.5
- 1.5 – 2.0
- 2.0 – 2.5
- 2.5 – 3.0

Source: Mani et al. 2018.
Note: Changes are for 2036 through 2065 relative to averages for 1981 through 2010.

2. What are key drivers that aggravate the impact of disasters?

Rapid and unplanned urbanization & urban population growth

World urban population
4.2 billion today

5 billion by 2030
Adding four Brazils

6.3 billion by 2050
And another China

Close to 90% of this new urban population will be in South Asia and sub-Saharan Africa

To safeguard development gains, cities must invest in resilience

Cities are engines of growth, and key to alleviating poverty

Cities are key to:
- alleviating poverty
- creating wealth
- fueling growth

55% of the global population lives in cities.

...but those cities are responsible for more than **80%** of global GDP

Growing cities face growing risks

By 2030...

Weather-related and other disasters will cost cities more than $314 billion (more than the GDP of South Africa) every year, threatening urban residents' homes, health, and livelihoods. Climate change may force up to

77,000,000

urban residents back into poverty.

Investing in urban resilience requires overcome 4 key barriers

We need to help cities in the developing world overcome the four major obstacles to investment in resilience.

- Lack of government capacity
- Lack of private sector confidence
- Challenges in project preparation
- Financing challenges

…socioeconomic conditions, environmental degradation, climate change are increasing the exposure to and risk from natural hazards and resulting in more frequent, intense, and costly disasters.

- Over the next 20 years, humans will build more infrastructure than the last 2,000 – locking in either risk or resilience for future generations.

- With almost 60% of the places that will be urbanized by 2030 yet to be built, there is no better time than now to invest in resilience.

- By 2030, without investment into making cities more resilient, natural disasters may cost cities worldwide approximately $300 billion each year.
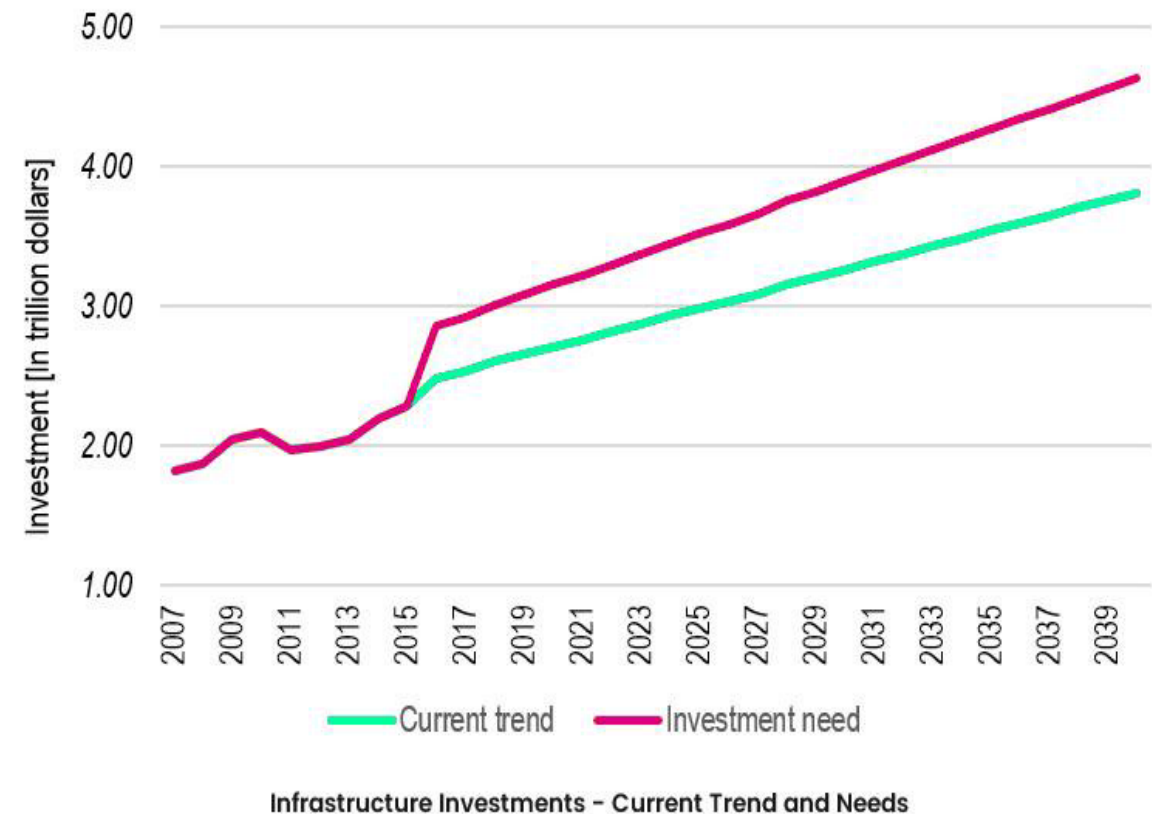
Infrastructure Investments – Current Trend and Needs

3. What is the approach of DRM?

Drivers of disaster risks
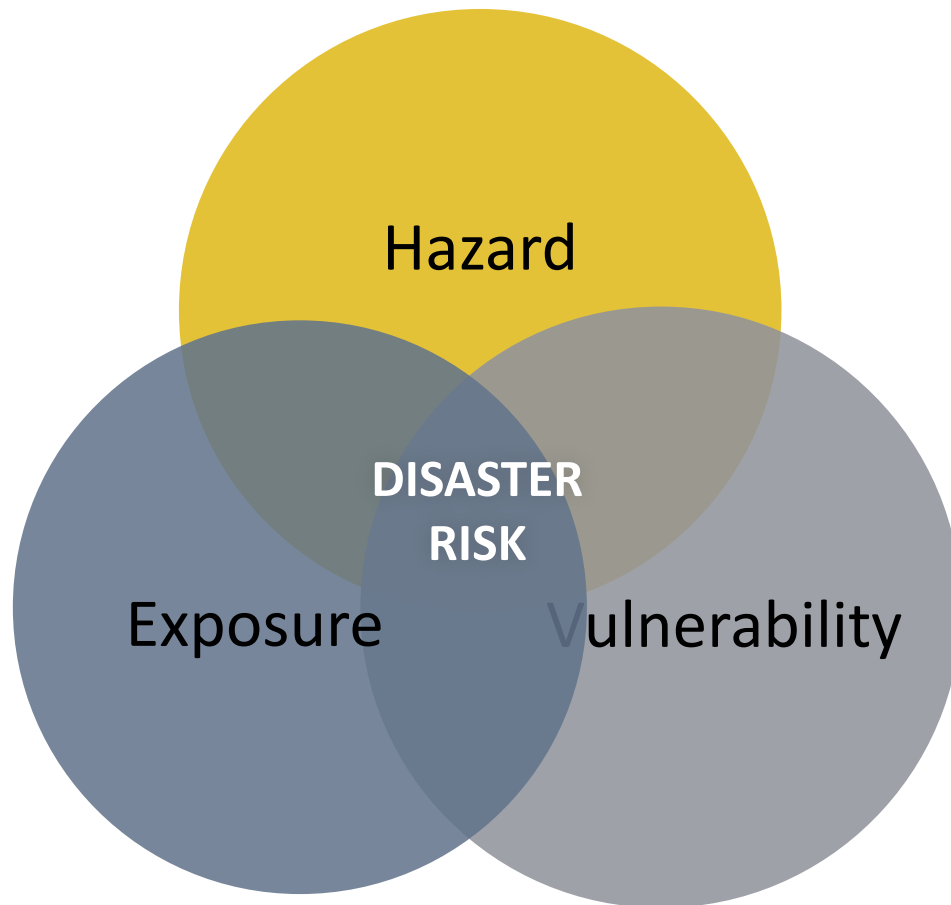
HAZARD

Population pressures and poor natural resource management, such as uncontrolled deforestation and urban expansion, create environmental stress that can lead to more floods, landslides, and other hazards. Hydro-meteorological hazards are also likely to increase due to climate change.
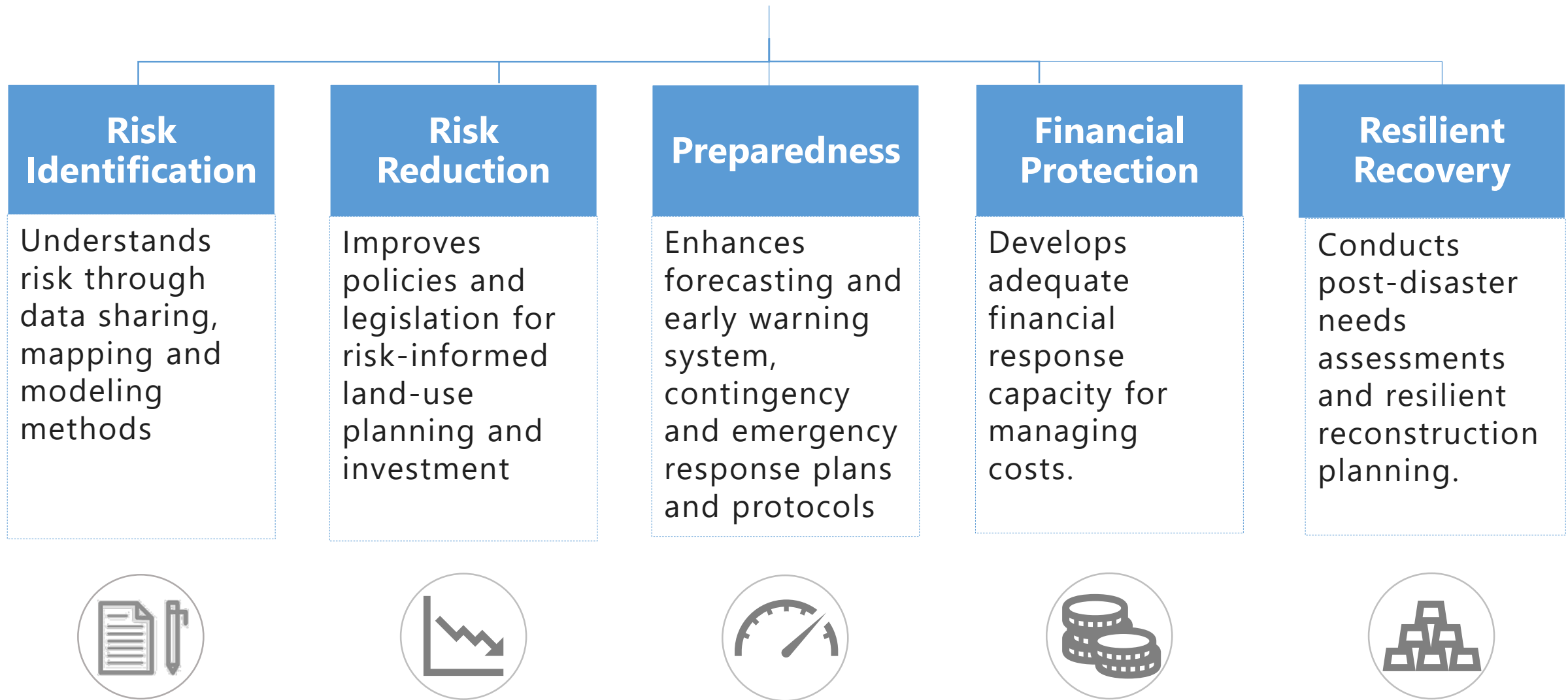
EXPOSURE

Population and economic growth have been the main drivers for increasing exposure of people and assets, pushing up the potential for loss every day.

VULNERABILITY

Although it is difficult to measure how vulnerability is changing globally, it is clear that the poorest in society are more vulnerable to unplanned development.

DRM Approach

| Risk Identification	Risk Reduction	Preparedness	Financial Protection	Resilient Recovery
Understands risk through data sharing, mapping and modeling methods	Improves policies and legislation for risk-informed land-use planning and investment	Enhances forecasting and early warning system, contingency and emergency response plans and protocols	Develops adequate financial response capacity for managing costs.	Conducts post-disaster needs assessments and resilient reconstruction planning.

Risk Identification

- **India:** Tamil Nadu and Puducherry Coastal Disaster Risk Reduction Project

TNSMART
Tamil Nadu System for Multi-hazard Potential Impact Assessment, Alert, Emergency Response Planning and Tracking

Descriptive Analytics (understand risk)

Predictive Analytics (model risk)

Prescriptive Analytics (Impact forecast and management)
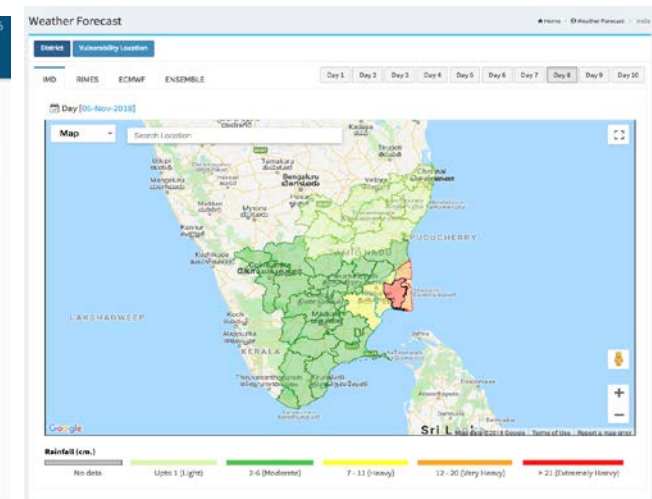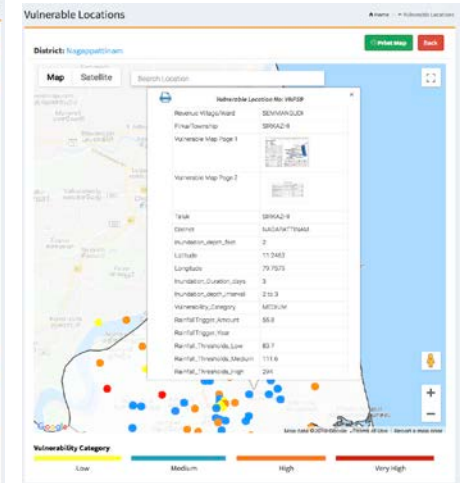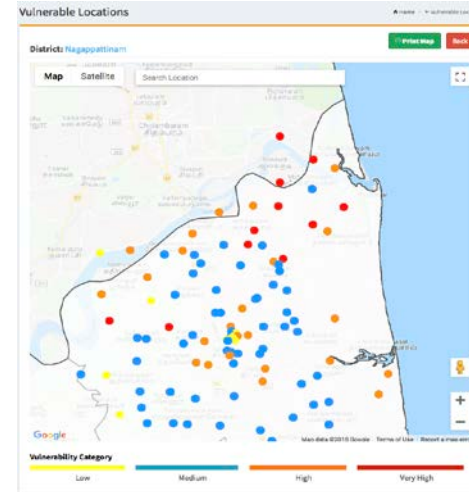
Risk Reduction

EXAMPLES

- **India:** Uttarakhand Disaster Recovery Project

    Strengthening of the Uttarakhand State Disaster Management Authority (USDMA): Developing the institutional set up & capacity development of the USDMA to influence policies and legislations on DRM

For officers of Incident Response System

- Magnitude of the hazard and its likely impacts
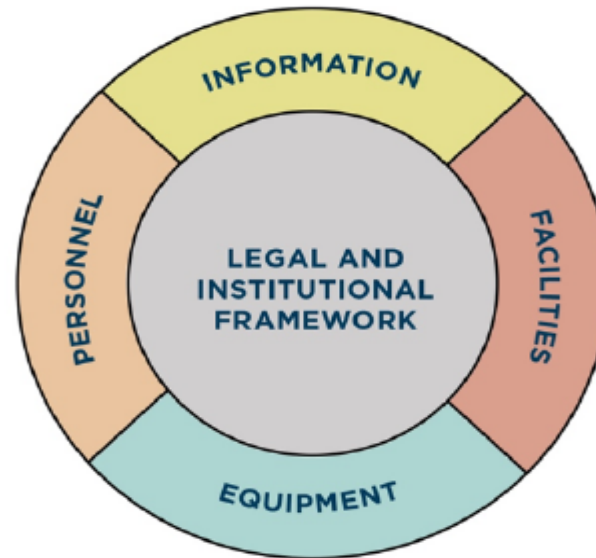- Likely affected villages and population
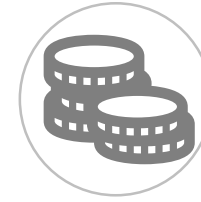- Dos and Don'ts

Preparedness

- **India:** Early warning system, contingency and emergency response plans and protocols development in several projects

- **Bangladesh:** Multi-purpose Disaster Shelter Project

Emergency Preparedness and Response System Key Elements
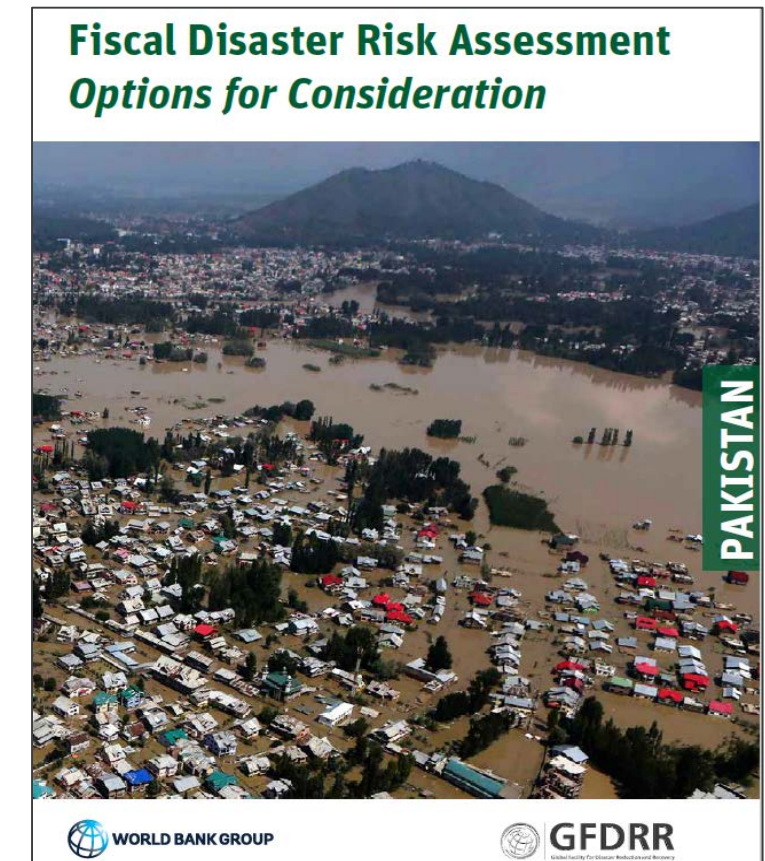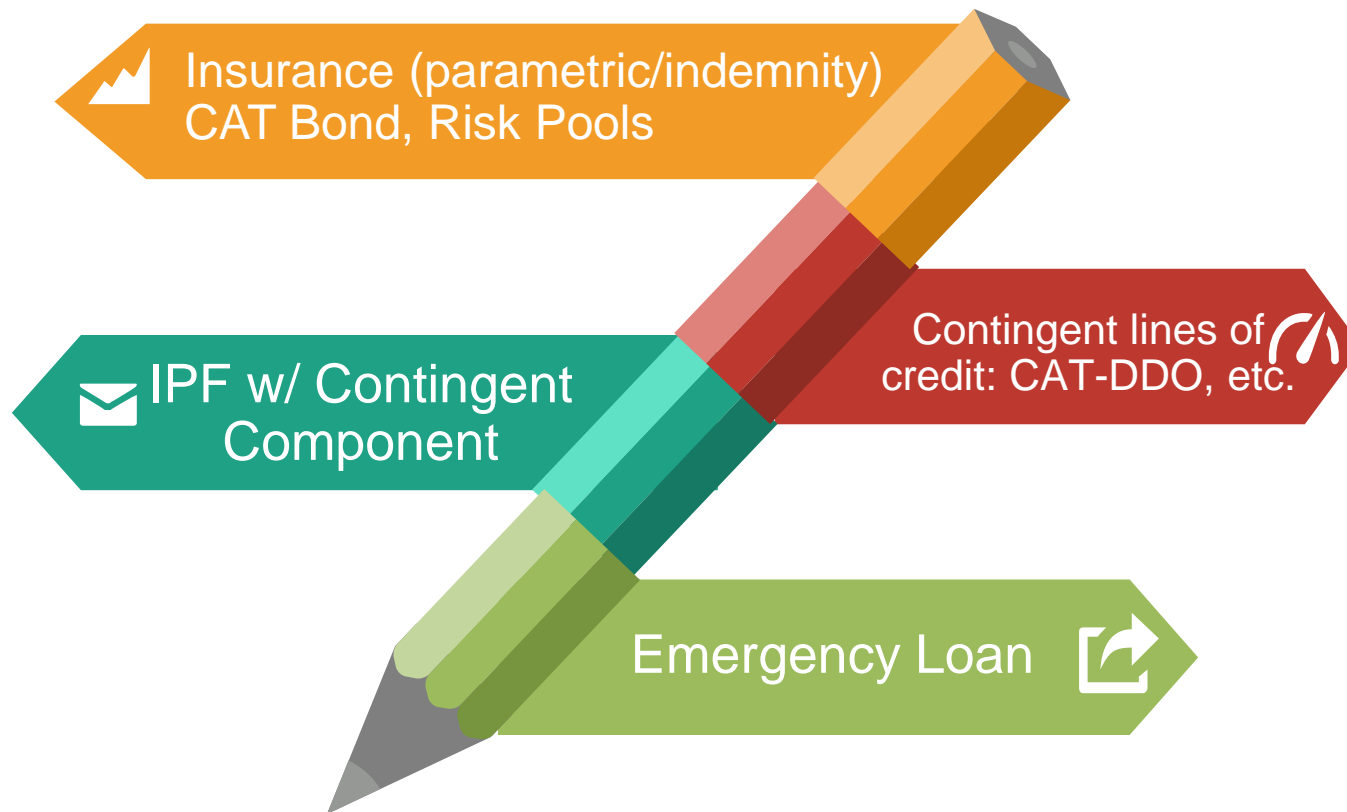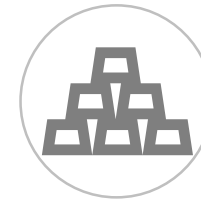
Financial Protection

EXAMPLES

- **Pakistan, Nepal and Maldives:** Catastrophe Deferred Drawdown (Cat DDO)
- **Pakistan:** Fiscal Disaster Risk Assessment Options for Consideration

Insurance (parametric/indemnity) CAT Bond, Risk Pools

IPF w/ Contingent Component

Contingent lines of credit: CAT-DDO, etc.

Emergency Loan

Fiscal Disaster Risk Assessment Options for Consideration

PAKISTAN

WORLD BANK GROUP   GFDRR

Resilient Recovery

- **Nepal:** Safer housing reconstruction at scale
- **India:** Several post-disaster reconstruction projects to strengthen resilience to disaster risk

NEPAL HOUSING RECONSTRUCTION

ANDHRA PRADESH UNDERGROUND CABLING
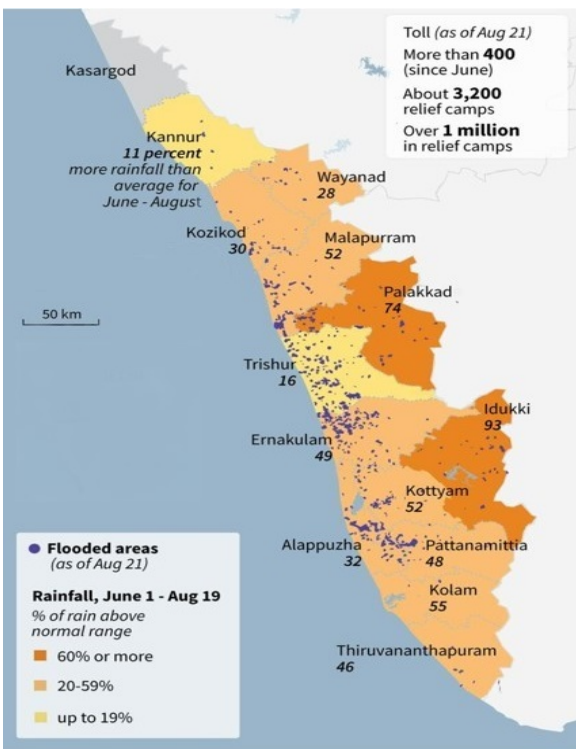

UTTARAKHAND RESILIENT HOUSING

Building Safer Houses in Northern India

4. How can we boost our efforts on climate change adaptation and resilience?
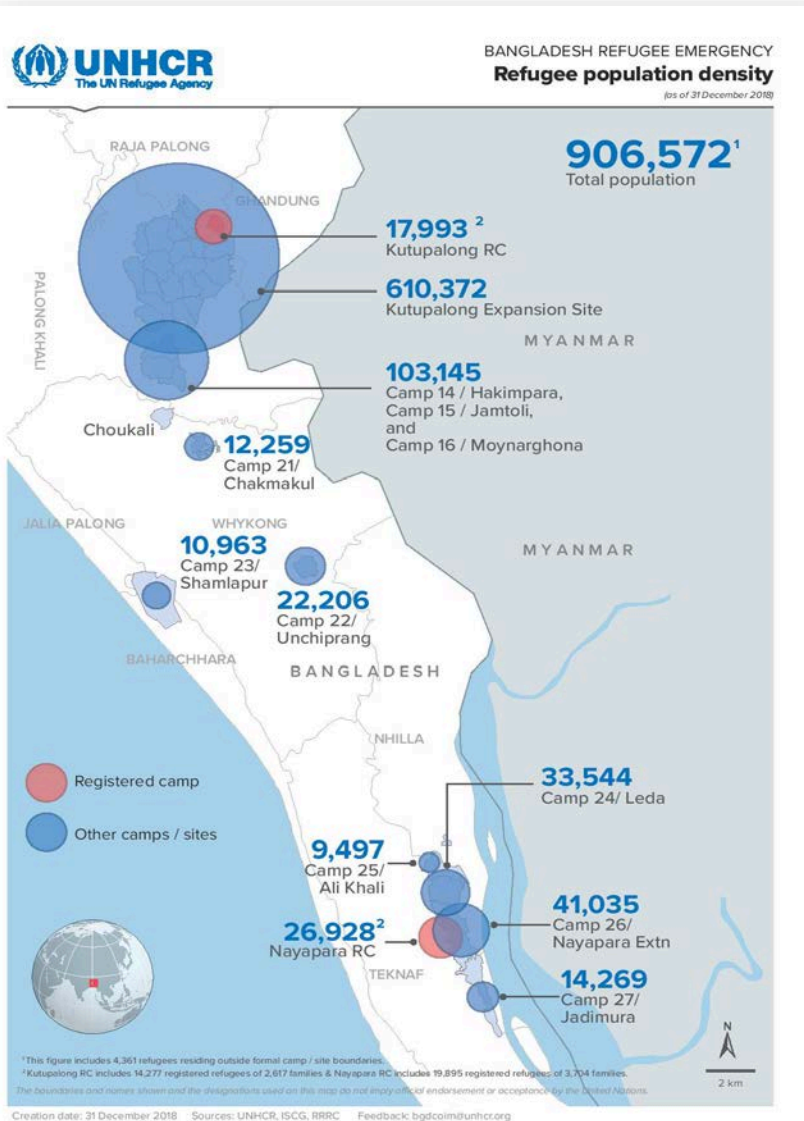
India: Resilient Kerala Initiative

Example of work which concurrently addresses disaster risk and the impact of climate change to deliver both immediate and longer term development gains across different sectors through forming State Partnership

Development Partners — THE WORLD BANK — Rebuild Kerala

Rebuild Kerala Initiative (RKI)

Toll (as of Aug 21)
More than **400** (since June)
About **3,200** relief camps
Over **1 million** in relief camps

Kasargod

Kannur
11 percent more rainfall than average for June - August

Wayanad
28

Kozikod
30

Malapurram
52

Palakkad
74

Trishur
16

Idukki
93

Ernakulam
49

Kottyam
52

Alappuzha
32

Pattanamittia
48

Kolam
55

Thiruvananthapuram
46

50 km

• **Flooded areas** (as of Aug 21)

Rainfall, June 1 - Aug 19
% of rain above normal range
60% or more
20-59%
up to 19%

Source : IMD/keralarescue.in   © AFP

WB - GoK State Partnership

Programmatic Series of DPLs

+

Strategic Sector Programs

Rebuild Kerala Development Program (RKDP)

The RKI, with World Bank support, has developed RKDP, which constitutes GoK's vision and roadmap towards building a **Green and Resilient Kerala.**

DRM	Environment	Public Invest Management	Open Data
Agriculture	Fisheries	Livelihoods	Water Resource Mgnt	Forestry
Land	Animal Husbandry	Urban Services	Water Supply & Sanitation	Transport & Roads

Bangladesh: Emergency Multi-Sector Rohingya Crisis Response Project

Example of work at the intersection of fragility, DRM, resilience and climate change adaptation

- Around 900,000 Rohingya living in makeshift shelters in congested camps in former forest areas.

- Almost all daily needs are covered by humanitarian agencies.

- Area highly prone to disasters: floods and landslides during monsoon (June-Oct) and cyclones (May and November).

Sample from Kutupalong Camp Buildup

Sri Lanka: Climate Resilience Multi-Programmatic Approach

Example of work which concurrently addresses disaster risk and the impact of climate change to deliver both immediate and longer term development gains in phased approach

- Major flood infrastructure under Phase I is flood embankment.

- Prepare multiple embankment designs to minimize the land acquisition and secure space for community space and natural water retention space where possible.

- Embankments will be designed to ensure people's connection to the river while increasing the safety of citizen.

Coalition for Disaster Resilient Infrastructure (CDRI)

Example of a multi-national collation on resilience, DRM, climate change adaptation with a focus on resilience infrastructure

- At the 2016 Asian Ministerial Conference on Disaster Risk Reduction (AMCDRR), the Indian Prime Minister Narendra Modi announced that India would work with other countries and the UN to form a coalition on disaster reliant infrastructure (CDRI).

- India has pledged $70 million for establishing the CDRI with participation of 33 countries, MDBs and UN.

- Italy, UK, Australia, South Africa and European Union have agreed to co-finance.

- The Coalition to be launched at the UN Climate Summit in September 2019.

5. What are key challenges to build resilience systems?

Definition of Resilience System

- Resilience equals the ability of people, communities, governments and systems to withstand the impacts of negative events and to continue to grow despite them.

- "Resilience" appears on every other page and is lauded at events as the focus for all. There are competing definitions.

Lack of Resilience Indicators

Complexity & uncertainty of resilience and climate change adaptation

Socio-political dimension challenges

Global goods with local-level impact

6. What are opportunities to push the envelop on DRM agenda?

Disruptive technologies applications to DRM:
Drone Technology

Drone Technology

Msimbazi River Basin, Tanzania
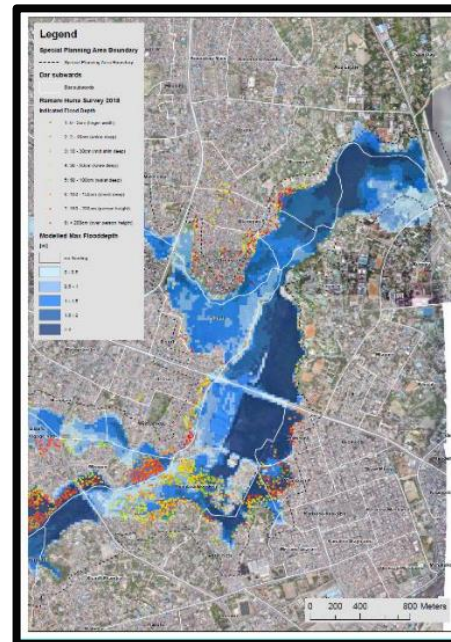
1 Flood Data
2 Household feedback
3 Participatory design

Disruptive technologies applications to DRM:
Predictive Analytics
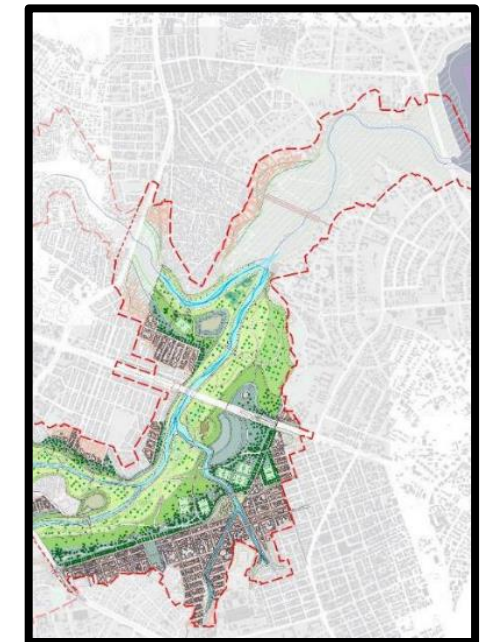
Predictive Analytics

India: **T**amil **N**adu **S**ystem for **M**ulti-hazard Potential Impact Assessment, Alert, Emergency Response Planning and Tracking (TNSMART)

Descriptive Analytics (understand risk)

Predictive Analytics (model risk)

Prescriptive Analytics (Impact forecast and management)

Using historical data to **describe what occurred.**

Linking static and dynamic data to **predict forecast-based risks and future probabilities and trends**

Presenting options for impact management to **facilitate decision-making**
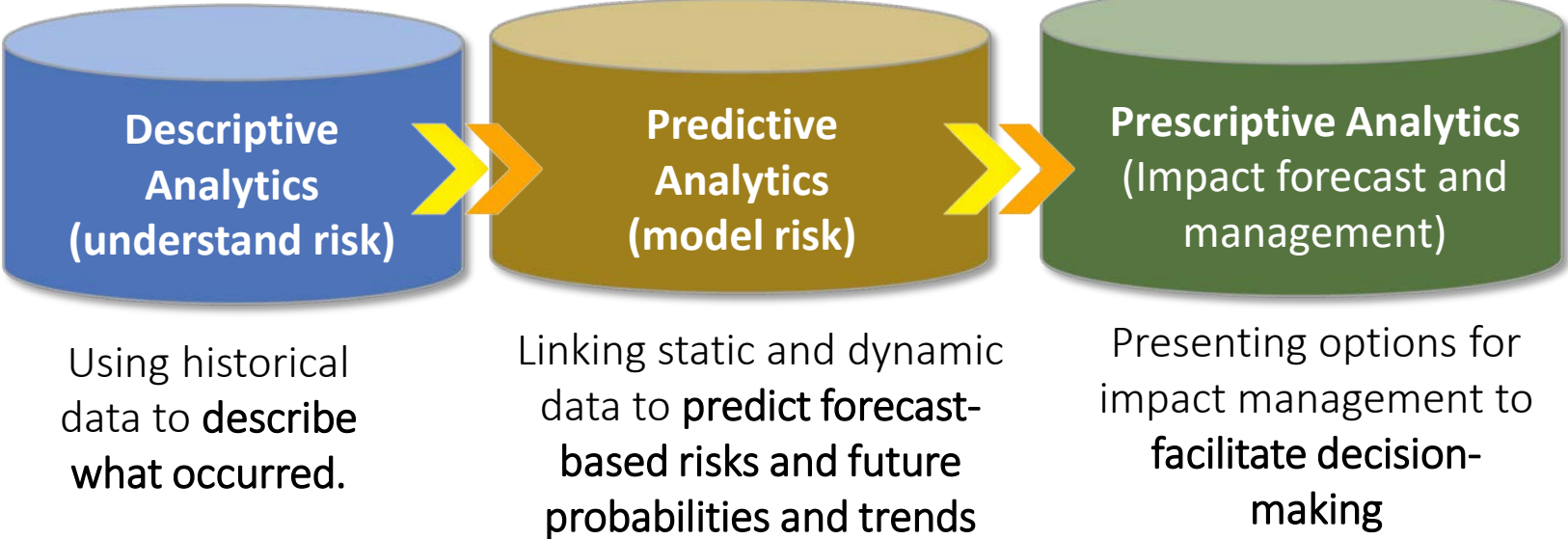
Disruptive technologies applications to DRM:
Predictive Analytics + Drone Technology

Predictive Analytics

- Single Story
- Two Story
- >Two Stories

- One Story (<3m).
- Two Story (3-7m).
- More than Two Stories (>7m).
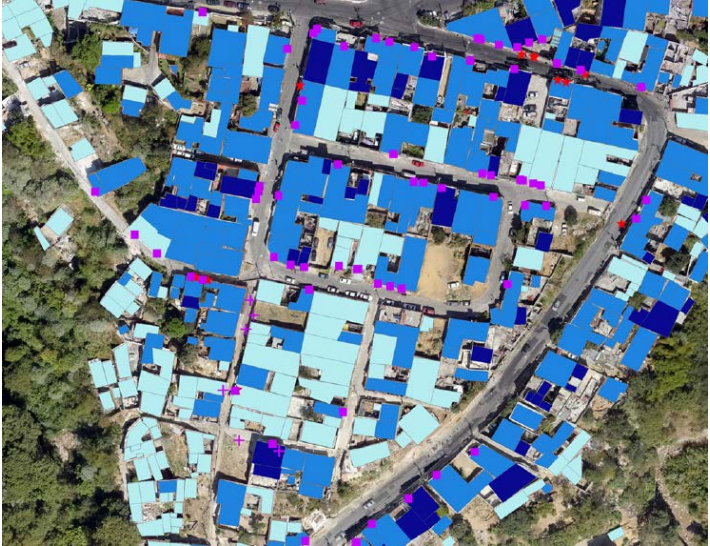
Drone
Slope
Average Slope

- Less than 10 degrees.
- 10-15 degrees.
- 15-20 degrees.
- Over 25 degrees.

Disruptive technologies applications to DRM:
Social Media & Big Data Analysis

Using crisis/disaster as an opportunity to do better development

7. Questions for Discussion

Explore Ideas

- How is DRM relevant to my study/research/organization?
- What are some ways we can collaborate?

Food for thought

- What are the most critical actions that we must take to ensure a resilient future effectively?

Working in DRM

- What is the biggest joy & challenge in working in the field?

Take-aways & Resources

- What is the best resource for people who want to dive in deeper?

THANK YOU!