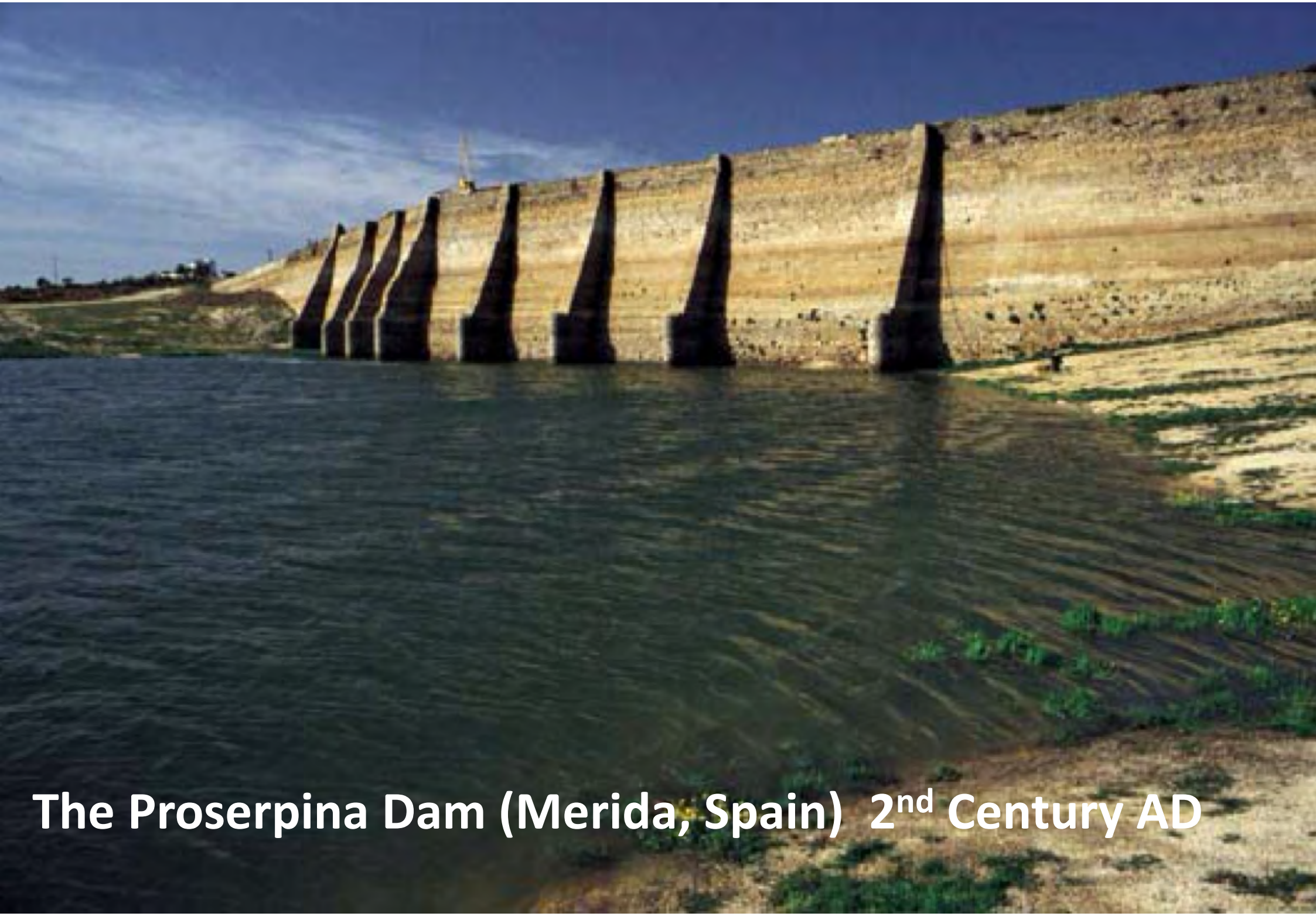
Making Infrastructure Disaster Resilient Opportunities and Challenges

International Recovery Forum 2020

Kobe, 28 January 2020

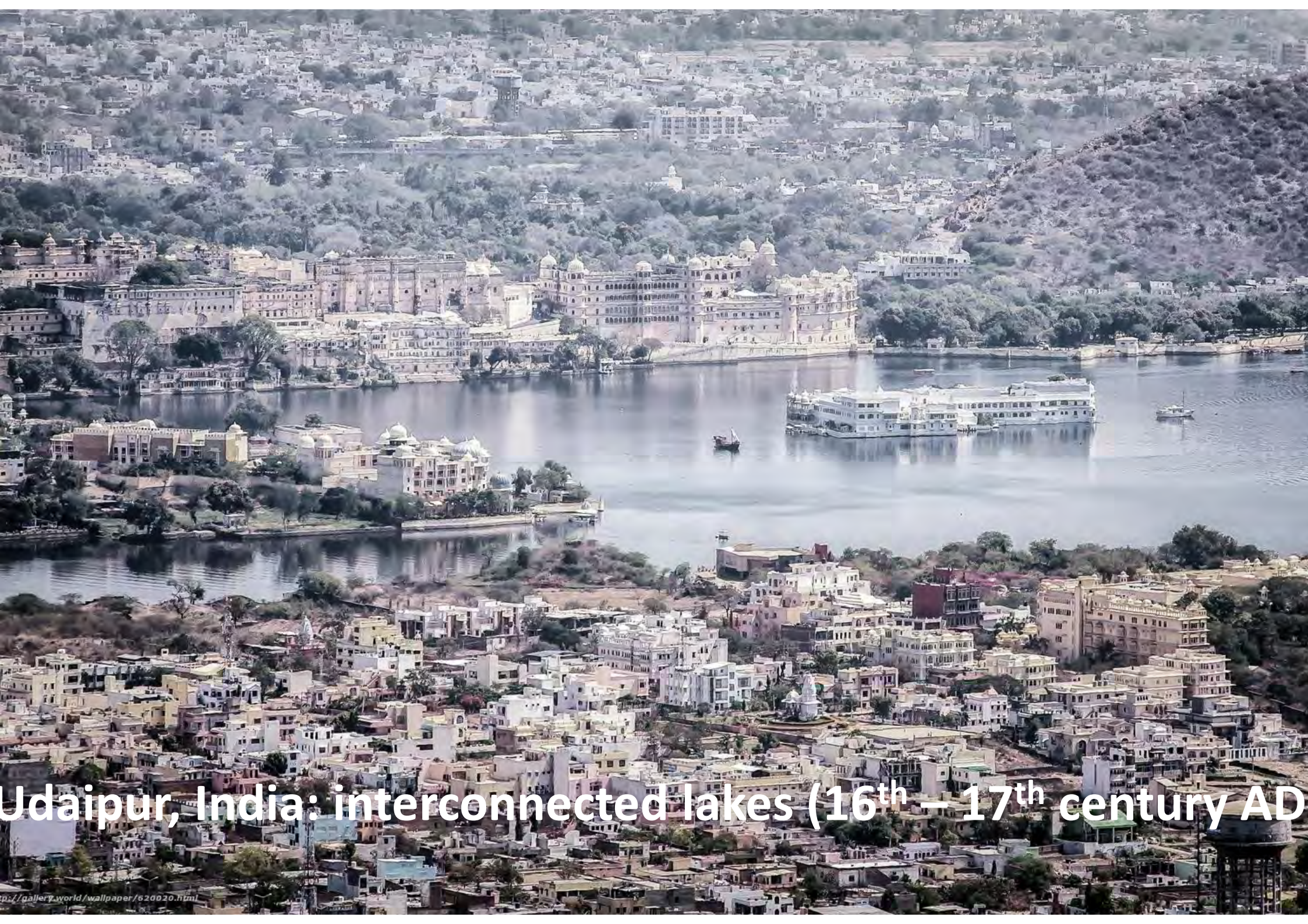
Indus Valley Civilisation (3300 BCE -1300 BCE)

Drainage systems Indus Valley Civilization

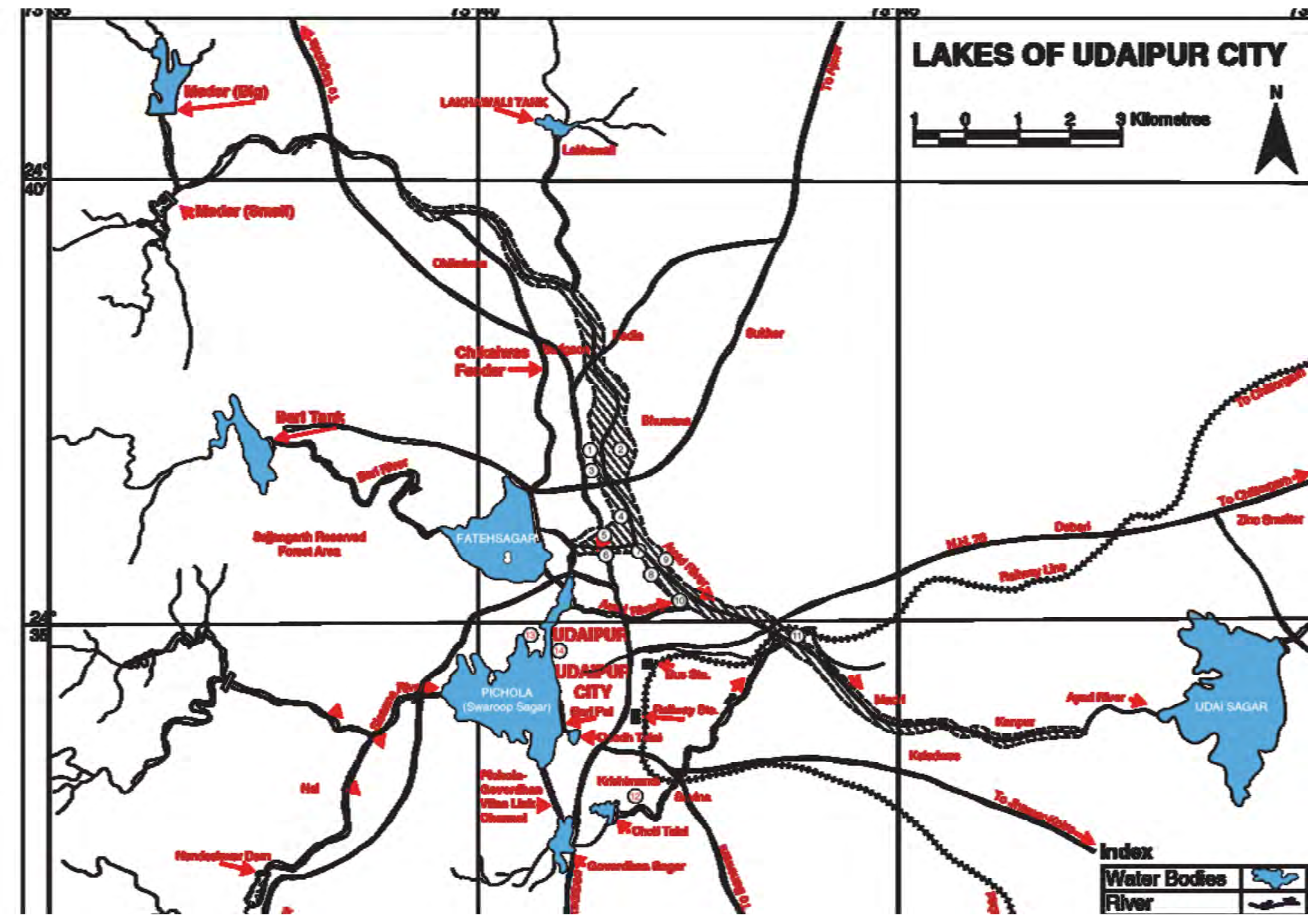


The Proserpina Dam (Merida, Spain) 2nd Century AD

Roman Aqueducts (Segovia, Spain), 1st Century AD


Udaipur, India: interconnected lakes (16th – 17th century AD


Udaipur, India
Photo by Akhtar Khan/ UdaipurPost.



LAKES OF UDAIPUR CITY
N
1 0 1 2 3 Kilometres
Mader (Big)
LAKHAWALI TANK
Mader (Small)
Chikalwas Feeder
Bari Tank
Bari River
Sajjangarh Reserved Forest Area
FATEHSAGAR
UDAIPUR
UDAIPUR CITY
PICHOLA
(Swaroop Sagar)
Bus Sta.
Railway Sta.
Chhoti Talai
Goverdhan Sagar
Railway Line
Ayad River
UDAI SAGAR
Zinc Smelter
Index
Water Bodies
River

108 ponds of Melikote, Karnataka


108 ponds of Melikote, Karnataka

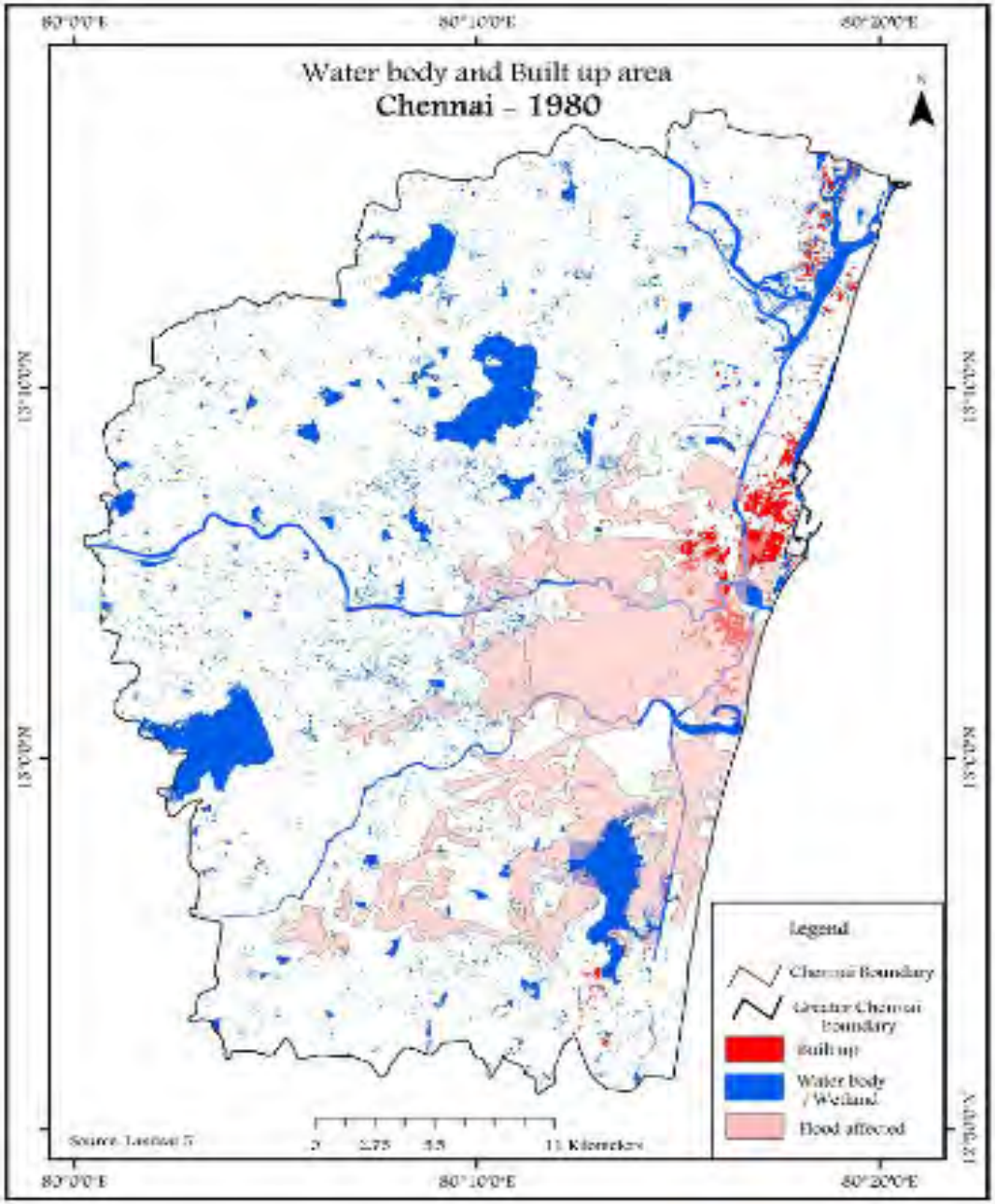
“The world’s fastest-sinking city”

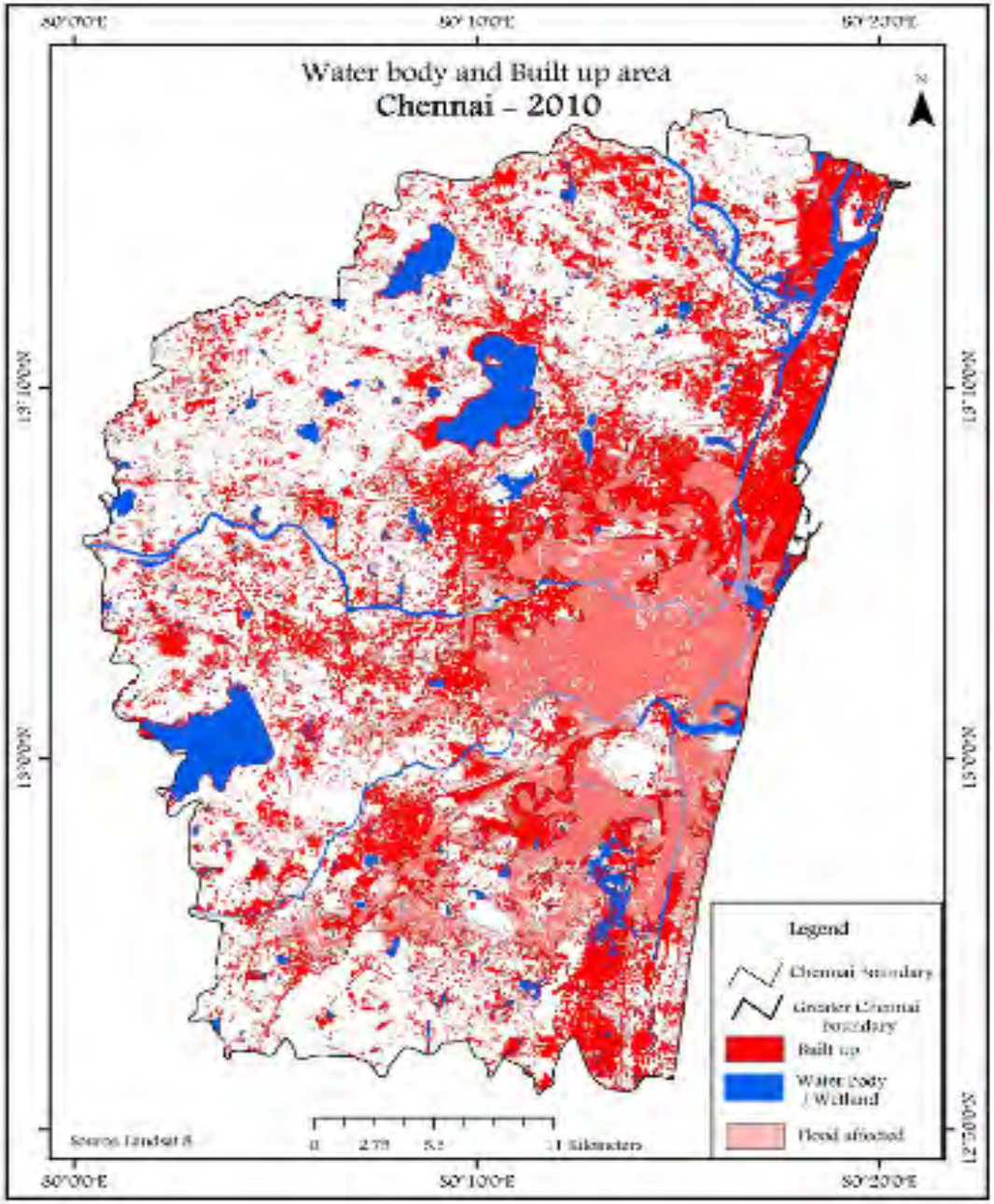
-The New York Times, 21 December 2017

Drivers of Infrastructure Transition

1. Urbanisation

Urban Growth in Chennai

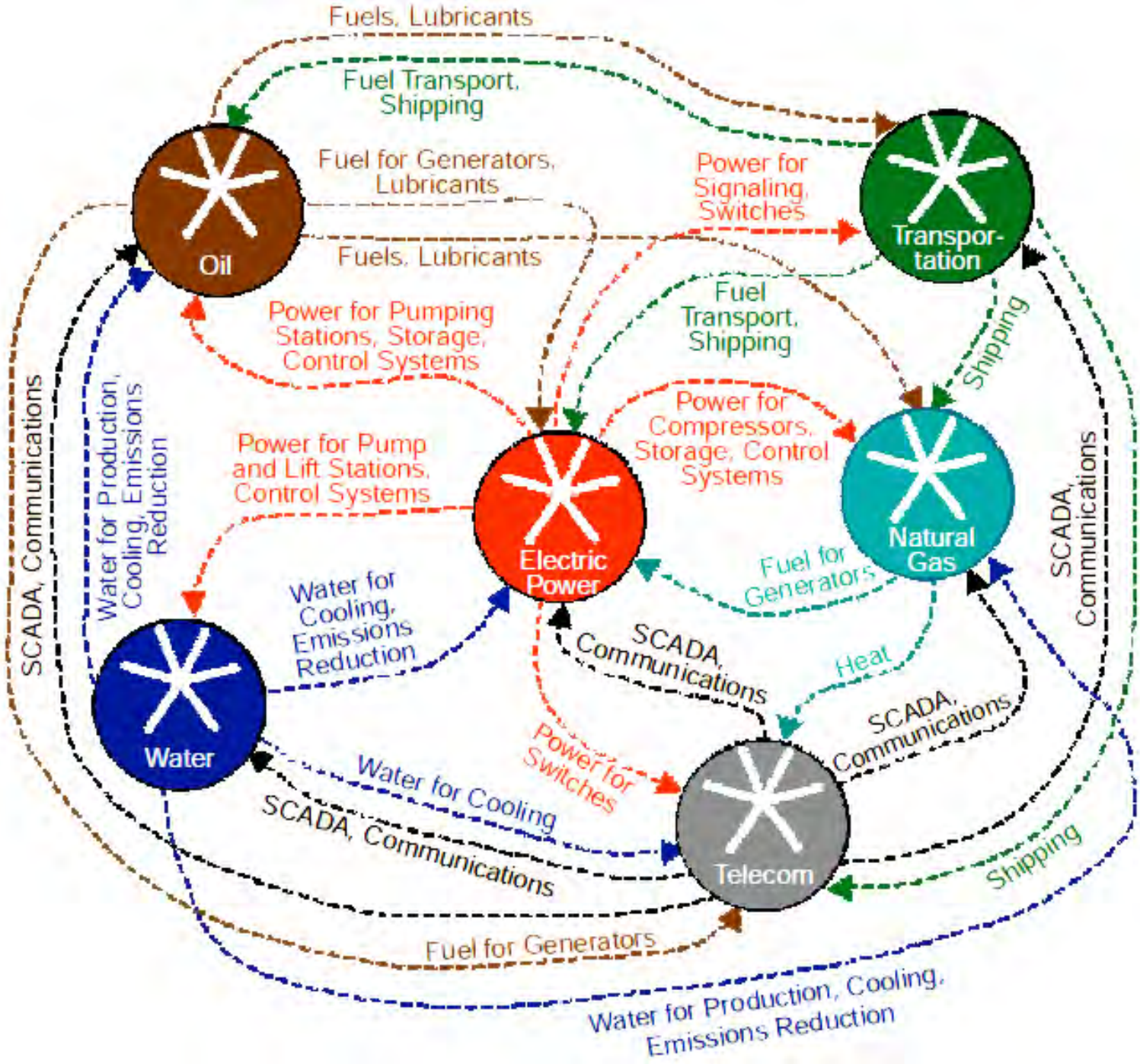




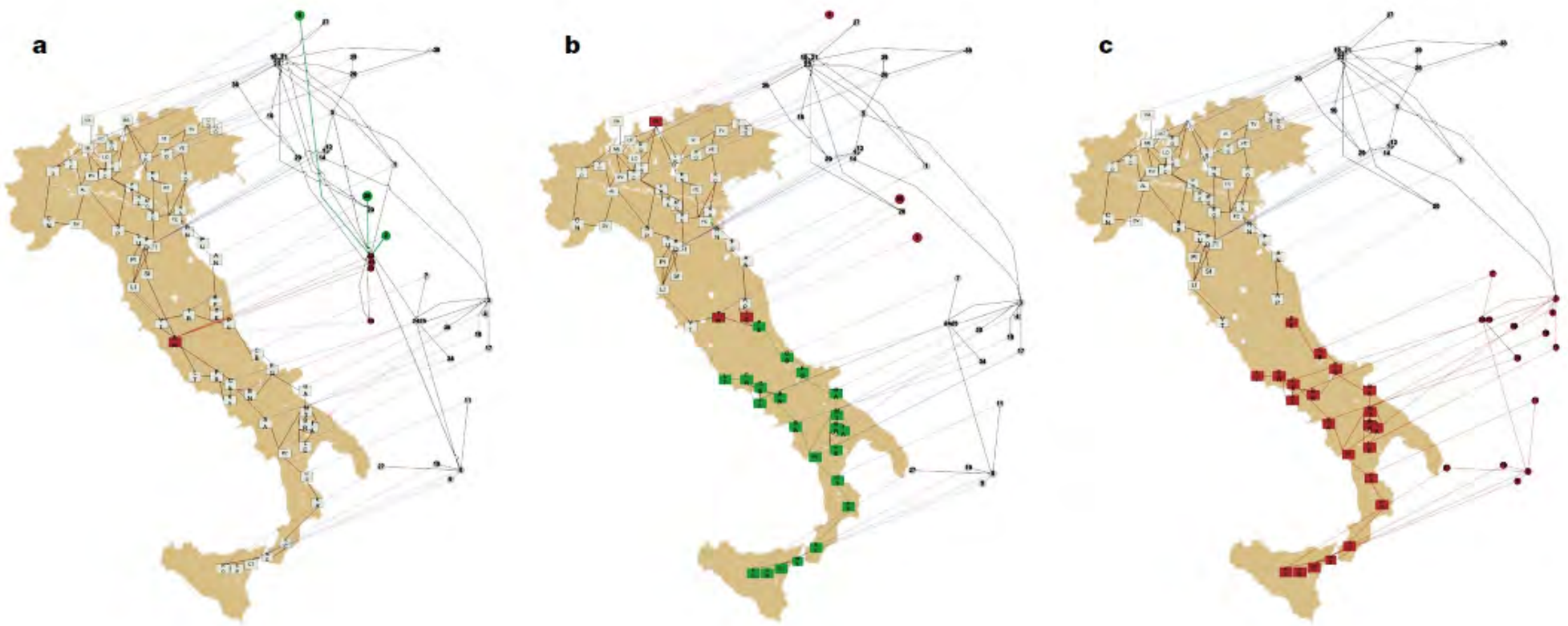

ayar River
mber 2000
gle earth
1 km


Proposed Reinforced Concrete perimeter wall
Google earth
Image © 2016 CNES / Astrium
Image © 2016 DigitalGlobe

2. Interdependent Systems

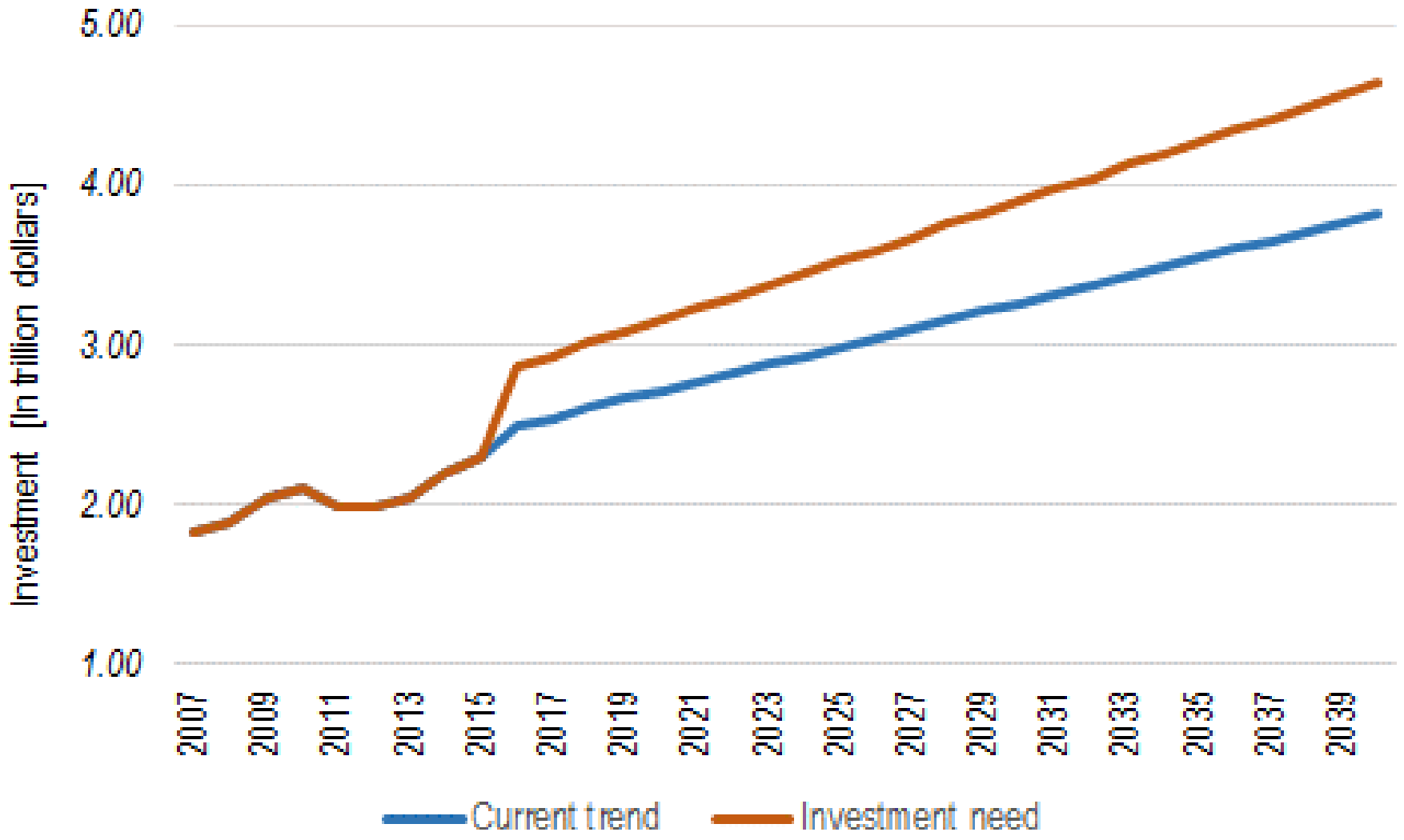

Fuels, Lubricants
Fuel Transport, Shipping
Fuel for Generators, Lubricants
Power for Signaling, Switches
Oil
Transpor-tation
Fuels, Lubricants
Power for Pumping Stations, Storage, Control Systems
Fuel Transport, Shipping
Shipping
Power for Compressors, Storage, Control Systems
Power for Pump and Lift Stations, Control Systems
Electric Power
Natural Gas
SCADA, Communications
Water for Production, Cooling, Emissions Reduction
Fuel for Generators
Water for Cooling, Emissions Reduction
SCADA, Communications
Heat
SCADA, Communications
Power for Switches
Water
Water for Cooling
SCADA, Communications
Telecom
Shipping
Fuel for Generators
Water for Production, Cooling, Emissions Reduction

Cascading effects of disaster



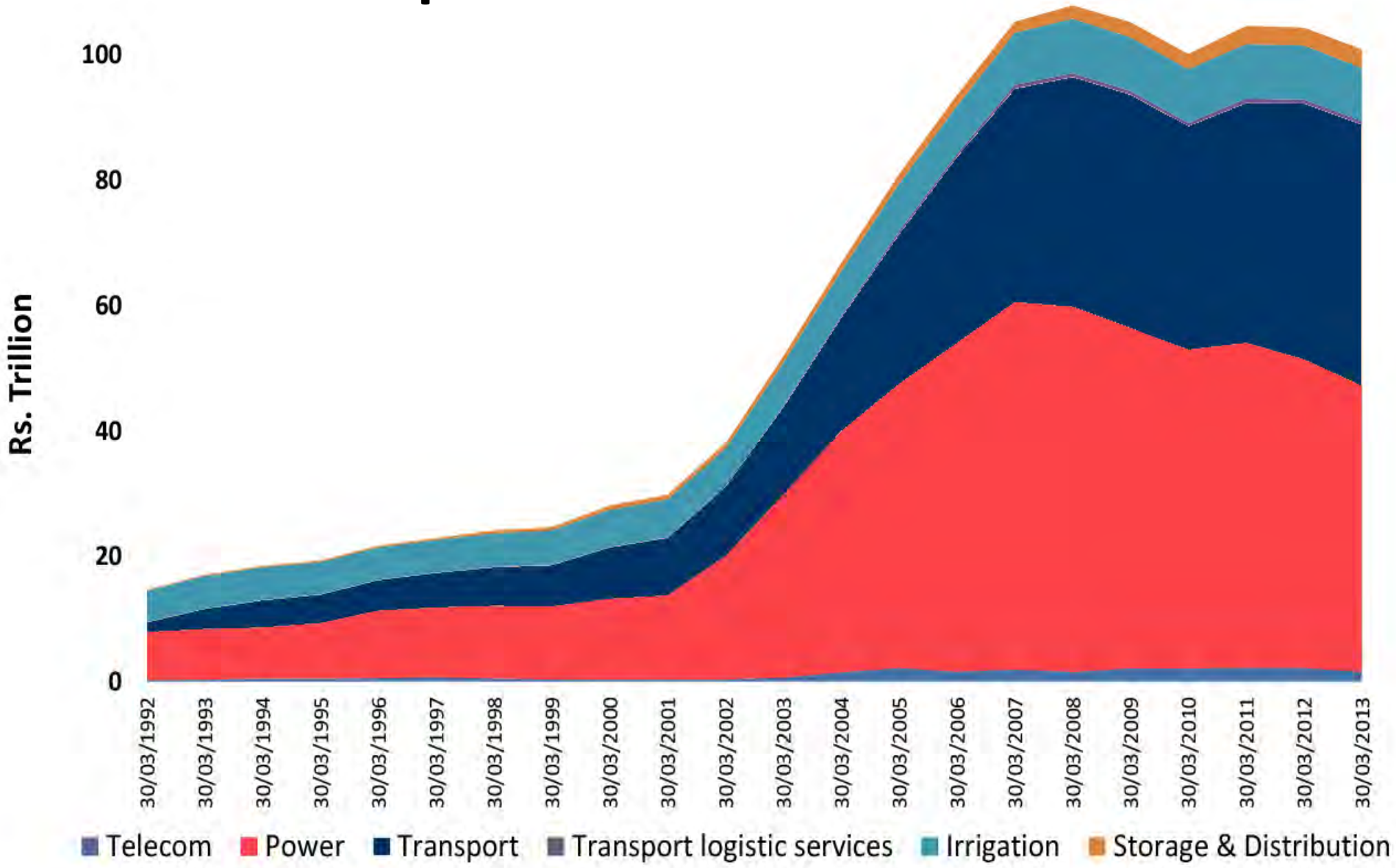
3. Scale

Infra Investments: Current Trend and Needs



Source: UNISDR, computed from Global Infrastructure Outlook

The Indian Example



Source: Projects announced and under-implementation, CMIE Capex database

Length of metro lines will go up 6 times by 2025

- Highways length will go up **1.5 times** by 2025

- Electricity generation capacity will almost **double** by 2025

4. New Players in Infrastructure Development

5. De-carbonisation

Cost of not investing in resilience

How do infrastructure losses stack up as proportion of public losses in disasters?


Indonesia, 2004
56%


Samoa 2012
66%


Nepal 2015
30%

Fiji 2016

47%

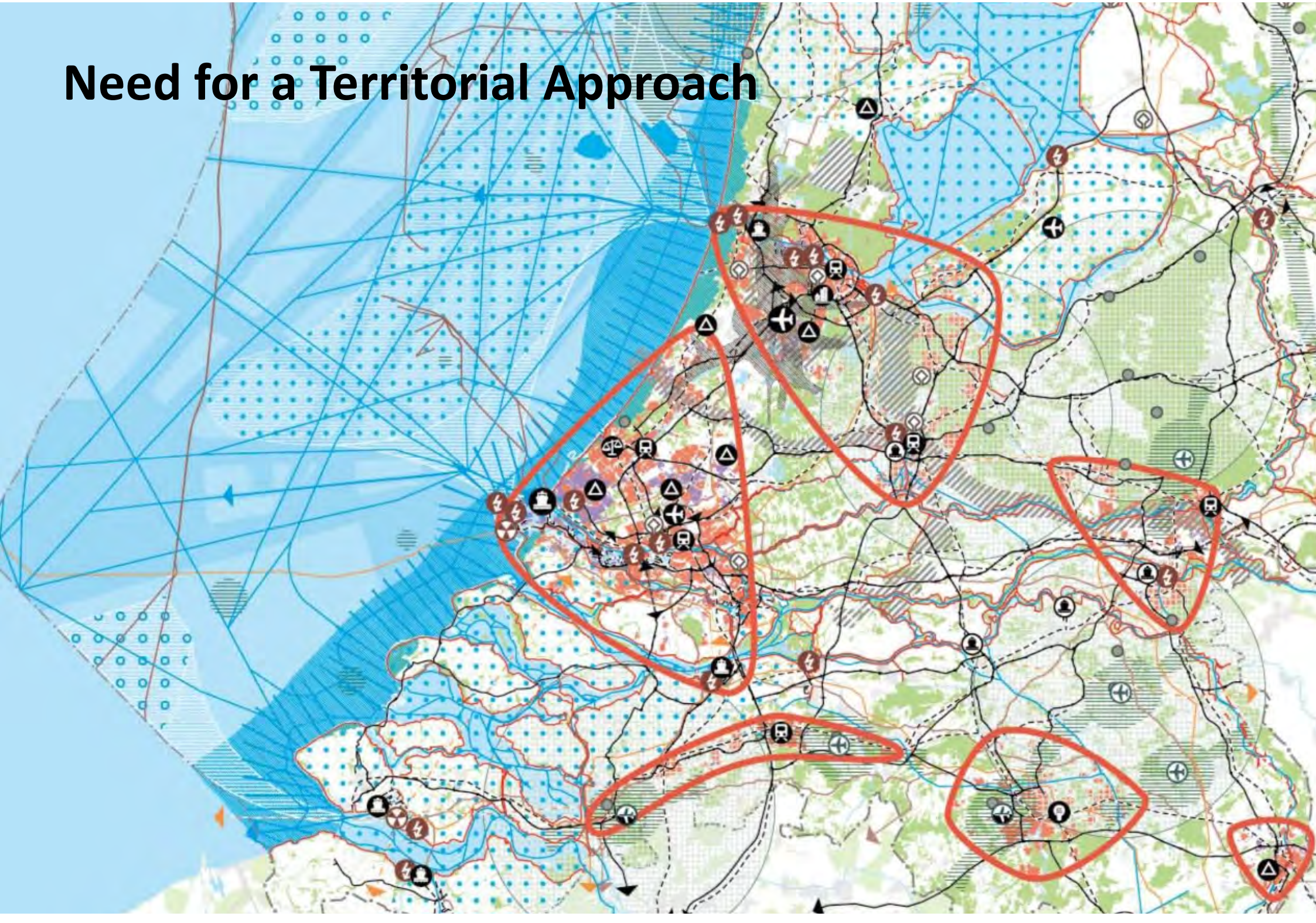
Event	Total D&L (mn US$)	Infra. D&L (mn US$)	Infra D&L % of Total Loss	Infra D&L as % Public Loss
2001/India/ Quake	2.131	334	16%	n/a
2004/ Indonesia/ Tsunami	4.452	877	20%	56%
2004/ Sri Lanka/ Tsunami	970	127	13%	n/a
2005/ Pakistan/ Quake	2.852	472	17%	n/a
2006/ Indonesia/ Quake	3.134	59	2%	17%
2010/Pakistan/ Flood	10.056	2.025	20%	n/a
2012/ Samoa/ Cyclone	204	75	37%	66%
2014/ Cape Verde/ Volcano	28	2	8%	30%
2015/ Nepal/ Quake	7.065	668	9%	30%
2016/ Fiji/ Cyclone	1.327	116	9%	47%


CARRIER

What can be done?

Risk Management Framework for Infrastructure Development

Need for a Territorial Approach



A System of Systems Approach

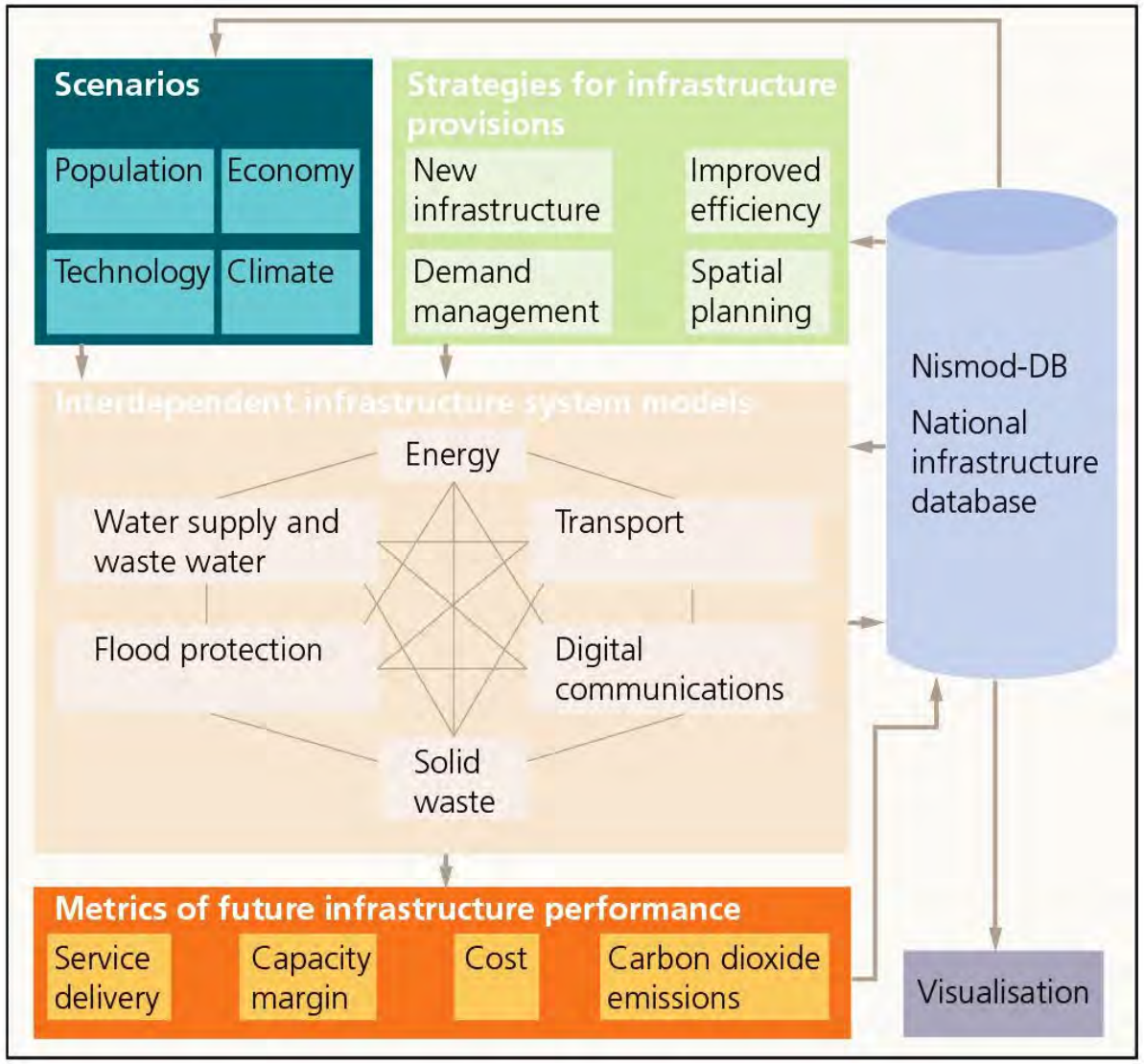


Figure 2. Schematic overview of the use of Nismod for national infrastructure assessment

Preserve the existing systems


Those who don't smoke have to be given money and
those who smoke having to be given cigarettes and *biri*.

Four areas of work…

Assessment of disaster risk (to and from) infrastructure

Standards of design and implementation, operations and maintenance

Financing new infrastructure and mechanisms for covering risks

Reconstruction and recovery of infrastructure after disasters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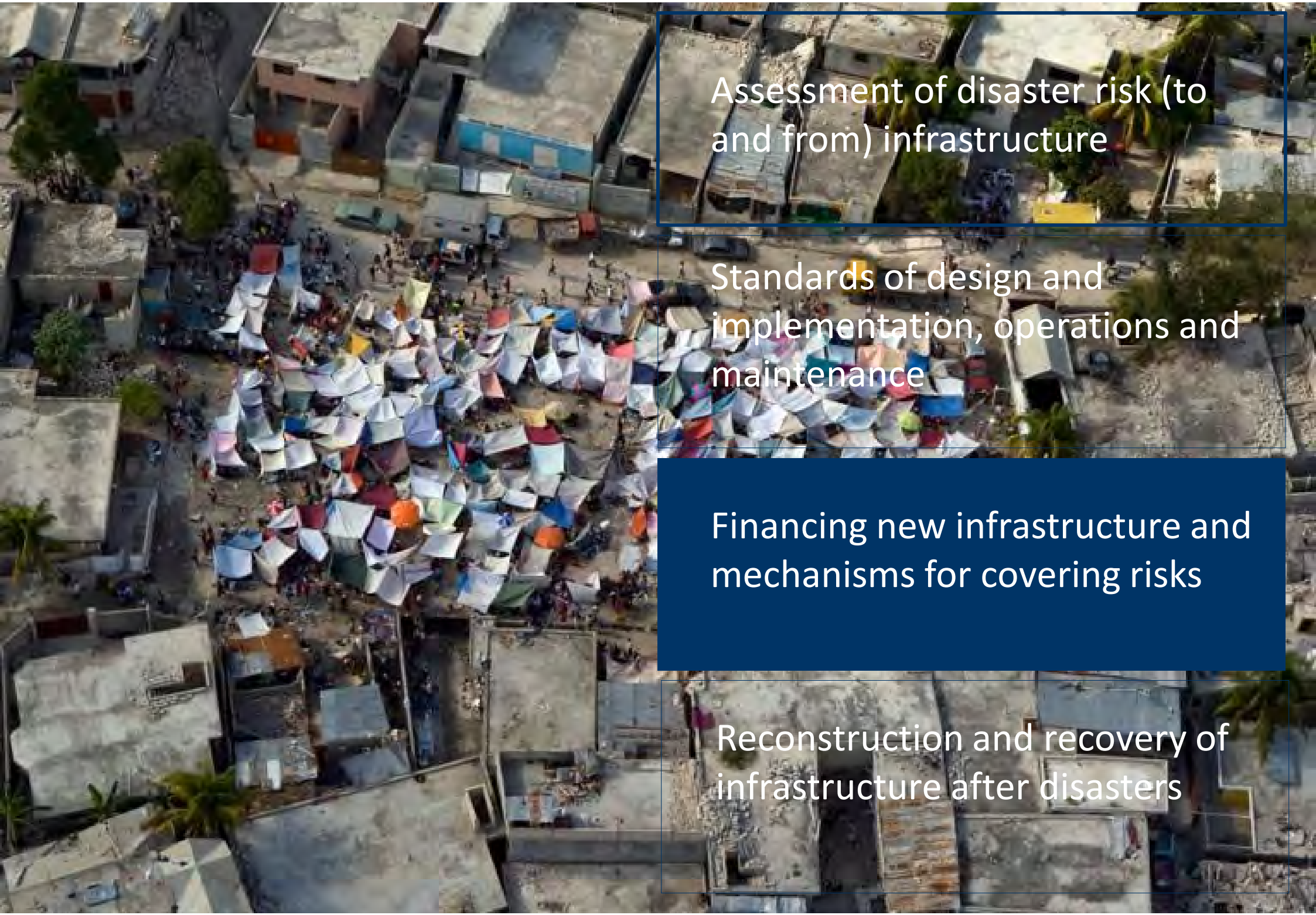
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It’s a commitment


SUSTAINABLE
DEVELOPMENT
GOALS


6
CLEAN WATER
AND SANITATION


7
AFFORDABLE AND
CLEAN ENERGY


8
DECENT WORK AND
ECONOMIC GROWTH


9
INDUSTRY, INNOVATION
AND INFRASTRUCTURE


11
SUSTAINABLE CITIES
AND COMMUNITIES


SUSTAINABLE DEVELOPMENT GOALS
1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS
17 PARTNERSHIPS FOR THE GOALS
SUSTAINABLE DEVELOPMENT GOALS

Sendai Framework for Disaster Risk Reduction

Substantially reduce global disaster mortality by 2030, aiming to lower average per 100,000 global mortality between 2020-2030 compared to 20052015

Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 between 2020-2030 compared to 20052015

Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030

Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030

Choice is ours..

Locking in Risk / Resilience