Health risk reduction
and its implications in the global risk landscape

Rajib Shaw

Professor, Keio University, Japan
Distinguished Professor, Indian Institute of Technology (IIT), Guwahati, India
Distinguished Professor, Sichuan University, China

Co-Chair, United Nations Asia Pacific Science Technology Advisory Group (AP-STAG)
Coordinating Lead Author (CLA), Asia Chapter, IPCC 6th Assessment Report

Co-Founder, Resilience Innovation Knowledge Academy (RIKA) https://rikaindia.com
Co-Founder, RIKA Institute https://www.rikainstitute.org

Chair of Board, SEEDS Asia https://www.seedsasia.org
Chair of Board, CWS Japan https://www.cwsjapan.org

www.rajibshaw.org AND www.rikaindia.com

Academia

Science Policy interface

Start-up and innovation

NPO / NGO

WEF Global Risk Outlook 2020

Global risk landscape

Figure I: The Evolving Risks Landscape, 2007–2020

Top 5 Global Risks in Terms of Likelihood

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1st	Infrastructure breakdown	Blow up in asset prices	Asset price collapse	Asset price collapse	Storms and cyclones	Income disparity	Income disparity	Income disparity	Interstate conflict	Involuntary migration	Extreme weather	Extreme weather	Extreme weather	Extreme weather
2nd	Chronic diseases	Middle East instability	China economic slowdown	China economic slowdown	Flooding	Fiscal imbalances	Fiscal imbalances	Extreme weather	Extreme weather	Extreme weather	Involuntary migration	Natural disasters	Climate action failure	Climate action failure
3rd	Oil price shock	Failed and failing states	Chronic diseases	Chronic disease	Corruption	Greenhouse gas emissions	Greenhouse gas emissions	Unemployment	Failure of national governance	Climate action failure	Natural disasters	Cyberattacks	Natural disasters	Natural disasters
4th	China hard landing	Oil price shock	Global governance gaps	Fiscal crises	Biodiversity loss	Cyberattacks	Water crises	Climate action failure	State collapse or crisis	Interstate conflict	Terrorist attacks	Data fraud or theft	Data fraud or theft	Biodiversity loss
5th	Blow up in asset prices	Chronic diseases	Deglobalization (emerging)	Global governance gaps	Climate change	Water crises	Population ageing	Cyberattacks	Unemployment	Natural catastrophes	Data fraud or theft	Climate action failure	Cyberattacks	Human-made environmental disasters

Top 5 Global Risks in Terms of Impact

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1st	Blow up in asset prices	Blow up in asset prices	Asset price collapse	Asset price collapse	Fiscal crises	Financial failure	Financial failure	Fiscal crises	Water crises	Climate action failure	Weapons of mass destruction	Weapons of mass destruction	Weapons of mass destruction	Climate action failure
2nd	Deglobalization	Deglobalization (developed)	Deglobalization (developed)	Deglobalization (developed)	Climate change	Water crises	Water crises	Climate action failure	Infectious diseases	Weapons of mass destruction	Extreme weather	Extreme weather	Climate action failure	Weapons of mass destruction
3rd	Interstate and civil wars	China hard landing	Oil and gas price spike	Oil price spikes	Geopolitical conflict	Food crises	Fiscal imbalances	Water crises	Weapons of mass destruction	Water crises	Water crises	Natural disasters	Extreme weather	Biodiversity loss
4th	Pandemics	Oil price shock	Chronic diseases	Chronic disease	Asset price collapse	Fiscal imbalances	Weapons of mass destruction	Unemployment	Interstate conflict	Involuntary migration	Natural disasters	Climate action failure	Water crises	Extreme weather
5th	Oil price shock	Pandemics	Fiscal crises	Fiscal crises	Energy price volatility	Energy price volatility	Climate action failure	Infrastructure breakdown	Climate action failure	Energy price shock	Climate action failure	Water crises	Natural disasters	Water crises

Economic | Environmental | Geopolitical | Societal | Technological

Source: The Global Risk Report 2020: World Economic Forum

2021

Impacts

- Infectious diseases
- Livelihood crisis

Risks are getting interconnected

Likelihoods

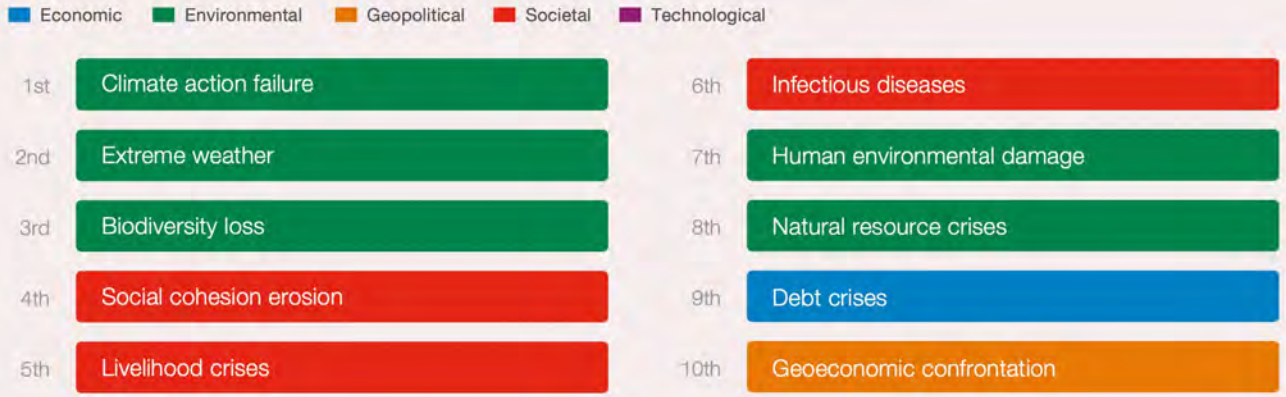
- Digital power concentration
- Digital inequality

Digital divide

Global Risk Report 2022

FIGURE 1.3

"Identify the most severe risks on a global scale over the next 10 years"



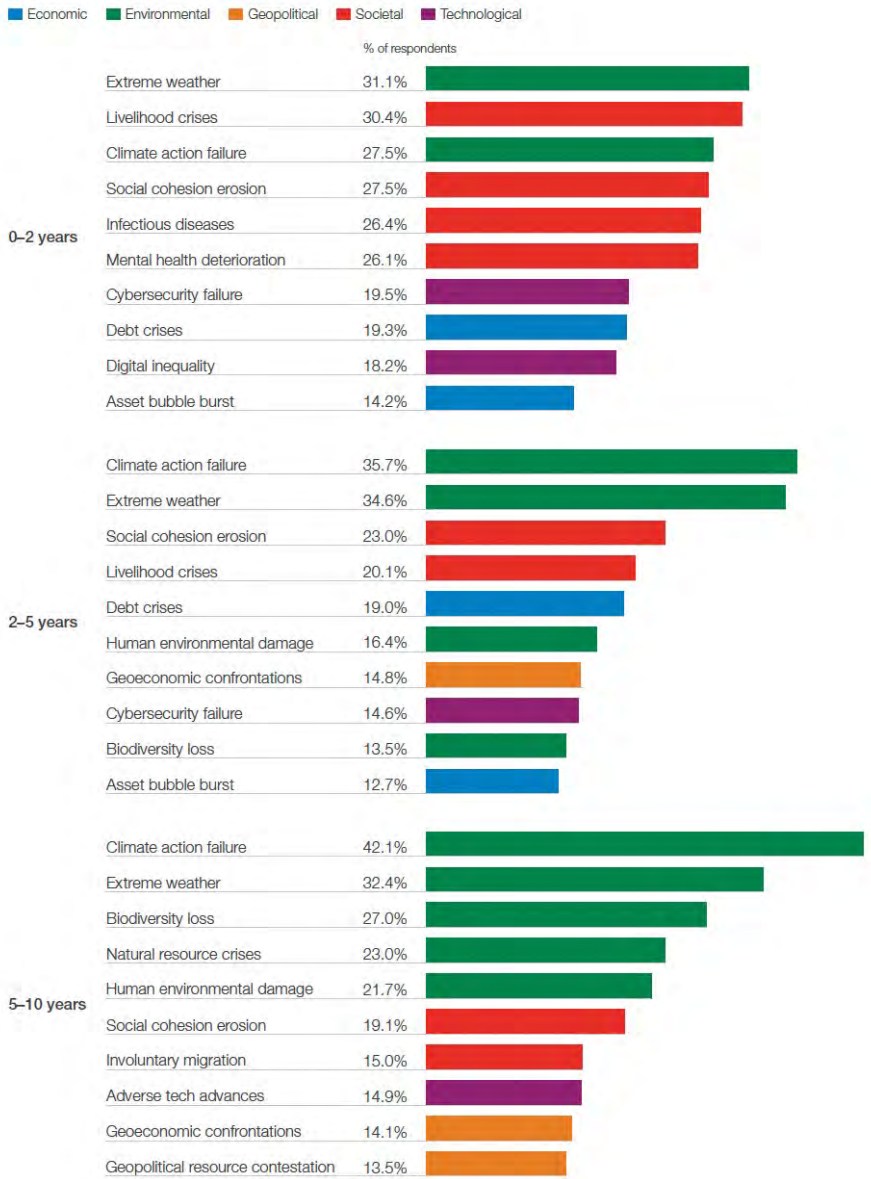
Source: World Economic Forum Global Risks Perception Survey 2021-2022

0-2 years: Cybersecurity failure, digital inequality
2-5 years: Cybersecurity failure
5-10 years: Adverse tech advances

FIGURE II

Global Risks Horizon

When will risks become a critical threat to the world?



Global Risk Report 2023

FIGURE D

Currently manifesting risks

"Please rank the top 5 currently manifesting risks in order of how severe you believe their impact will be on a global level in 2023"

1 Energy supply crisis
2 Cost-of-living crisis
3 Rising inflation
4 Food supply crisis
5 Cyberattacks on critical infrastructure

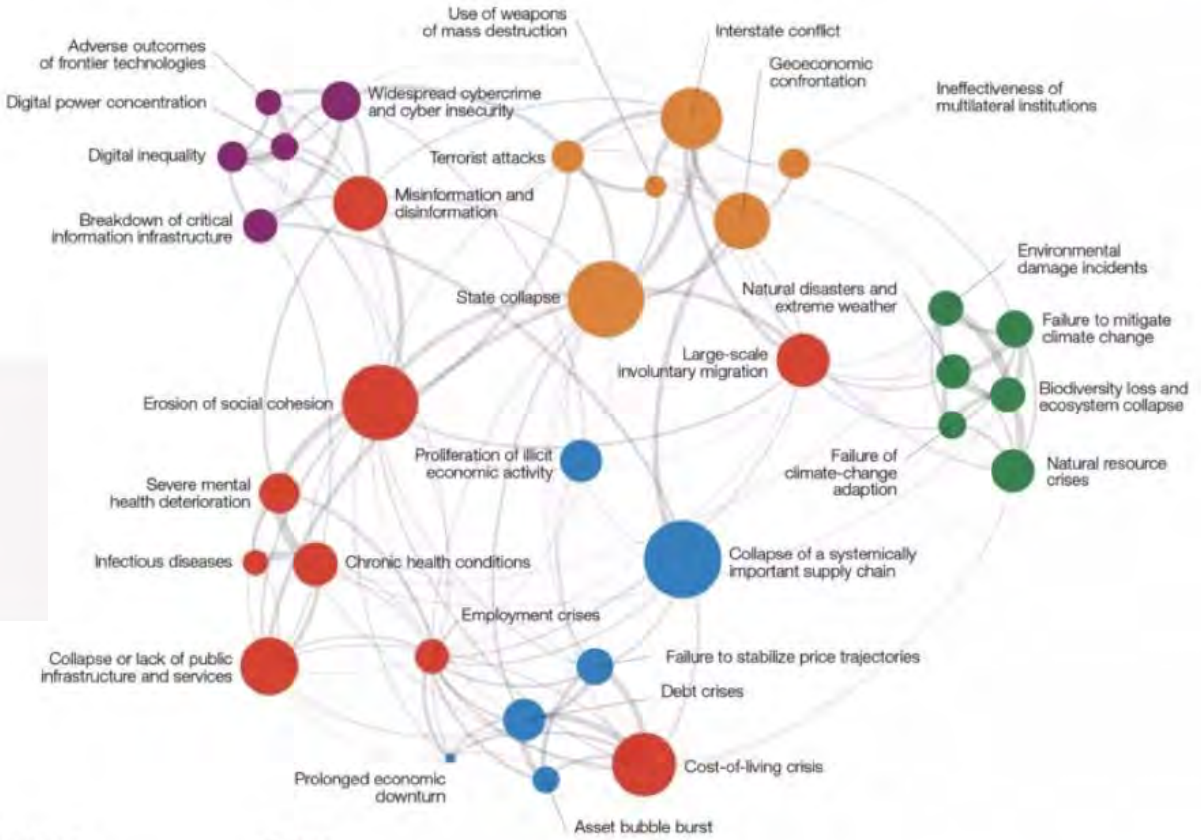
Source
World Economic Forum Global Risks Perception Survey 2022-2023.

Risk categories: Economic | Environmental | Geopolitical | Societal | Technological

Global Risks Report 2023

WORLD ECONOMIC FORUM

Global risks landscape: an interconnections map



Source: World Economic Forum, Global Risks Perception Survey 2022-2023

Global Risk Report 2023

Global risks ranked by severity over the short and long term

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period"

	2 years	10 years
1	Cost-of-living crisis	Failure to mitigate climate change
2	Natural disasters and extreme weather events	Failure of climate-change adaptation
3	Geoeconomic confrontation	Natural disasters and extreme weather events
4	Failure to mitigate climate change	Biodiversity loss and ecosystem collapse
5	Erosion of social cohesion and societal polarization	Large-scale involuntary migration
6	Large-scale environmental damage incidents	Natural resource crises
7	Failure of climate change adaptation	Erosion of social cohesion and societal polarization
8	Widespread cybercrime and cyber insecurity	Widespread cybercrime and cyber insecurity
9	Natural resource crises	Geoeconomic confrontation
10	Large-scale involuntary migration	Large-scale environmental damage incidents

Risk categories: Economic | Environmental | Geopolitical | Societal | Technological

FIGURE E

Global risks ranked by severity

"Please estimate the likely impact (severity) of the following risks over a 2-year and 10-year period"

	Short term	Long term
1	Cost-of-living crisis	Failure to mitigate climate change
2	Natural disasters and extreme weather events	Failure of climate-change adaption
3	Geoeconomic confrontation	Natural disasters and extreme weather events
4	Failure to mitigate climate change	Biodiversity loss and ecosystem collapse
5	Erosion of social cohesion and societal polarization	Large-scale involuntary migration
6	Large-scale environmental damage incidents	Natural resource crises
7	Failure of climate-change adaption	Erosion of social cohesion and societal polarization
8	Widespread cybercrime and cyber insecurity	Widespread cybercrime and cyber insecurity
9	Natural resource crises	Geoeconomic confrontation
10	Large-scale involuntary migration	Large-scale environmental damage incidents
11	Debt crises	Misinformation and disinformation
12	Failure to stabilize price trajectories	Ineffectiveness of multilateral institutions and international cooperation
13	Prolonged economic downturn	Interstate conflict
14	Interstate conflict	Debt crises
15	Ineffectiveness of multilateral institutions and international cooperation	Cost-of-living crisis
16	Misinformation and disinformation	Breakdown of critical information infrastructure
17	Collapse of a systemically important industry or supply chain	Digital power concentration
18	Biodiversity loss and ecosystem collapse	Adverse outcomes of frontier technologies
19	Employment crises	Failure to stabilize price trajectories
20	Infectious diseases	Chronic diseases and health conditions
21	Use of weapons of mass destruction	Prolonged economic downturn
22	Asset bubble bursts	State collapse or severe instability
23	Severe mental health deterioration	Employment crises
24	Breakdown of critical information infrastructure	Collapse of a systemically important industry or supply chain
25	State collapse or severe instability	Severe mental health deterioration
26	Chronic diseases and health conditions	Collapse or lack of public infrastructure and services
27	Collapse or lack of public infrastructure and services	Infectious diseases
28	Proliferation of illicit economic activity	Use of weapons of mass destruction
29	Digital power concentration	Proliferation of illicit economic activity
30	Terrorist attacks	Digital inequality and lack of access to digital services
31	Digital inequality and lack of access to digital services	Asset bubble bursts
32	Adverse outcomes of frontier technologies	Terrorist attacks

Source
World Economic Forum Global Risks Perception Survey 2022-2023.

Risk categories: Economic | Environmental | Geopolitical | Societal | Technological

Context 1: Evolving risk landscape and health risk

- Risk landscape is dynamic and changing
- Risks are becoming inter-connected
- Digital divide, digital inequality is a key issue
- Cybersecurity as a potential future risks
- Inclusive growth is very critical irrespective of development status

Sendai Framework: 2015-2030: Health and hazards

To enhance the resilience of national health systems, including by integrating disaster risk management into primary, secondary and tertiary health care, especially at the local level; developing the capacity of health workers in understanding disaster risk and applying and implementing disaster risk reduction approaches in health work; promoting and enhancing the training capacities in the field of disaster medicine; and supporting and training community health groups in disaster risk reduction approaches in health programmes, in collaboration with other sectors, as well as in the implementation of the International Health Regulations (2005) of the World Health Organization

- "Health" used 76 times within 37 pages

Scope of hazards expanded

- Biological hazards
- Natech (Natural hazards induced technological disasters)
- Cascading risk
- Complex emergencies

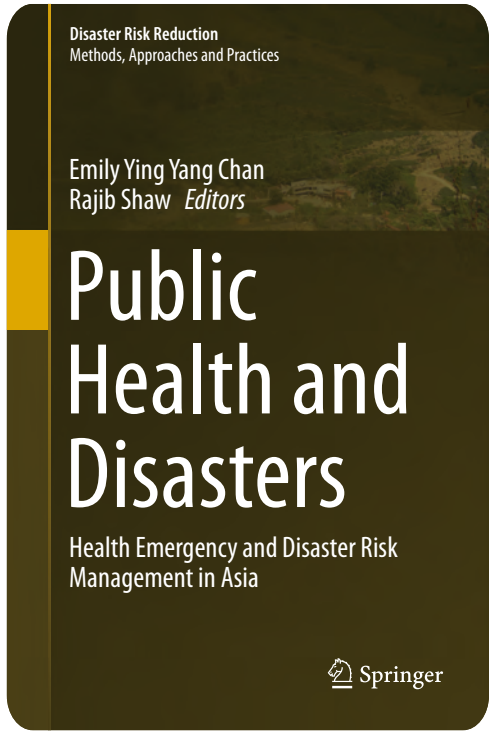
Non traditional stakehodlers

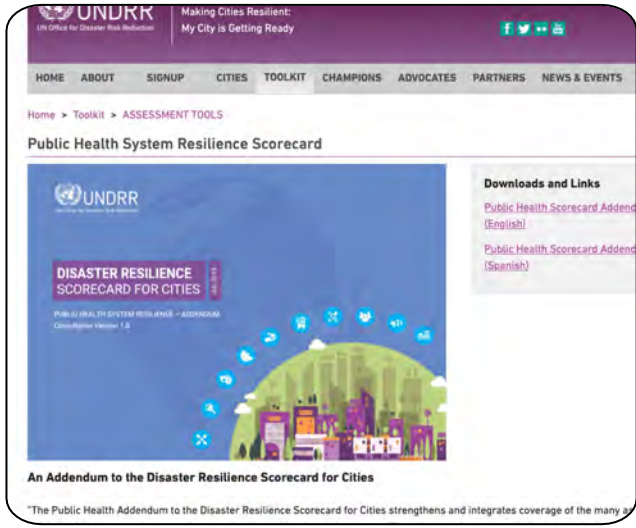
- Science technology community
- Private sectors

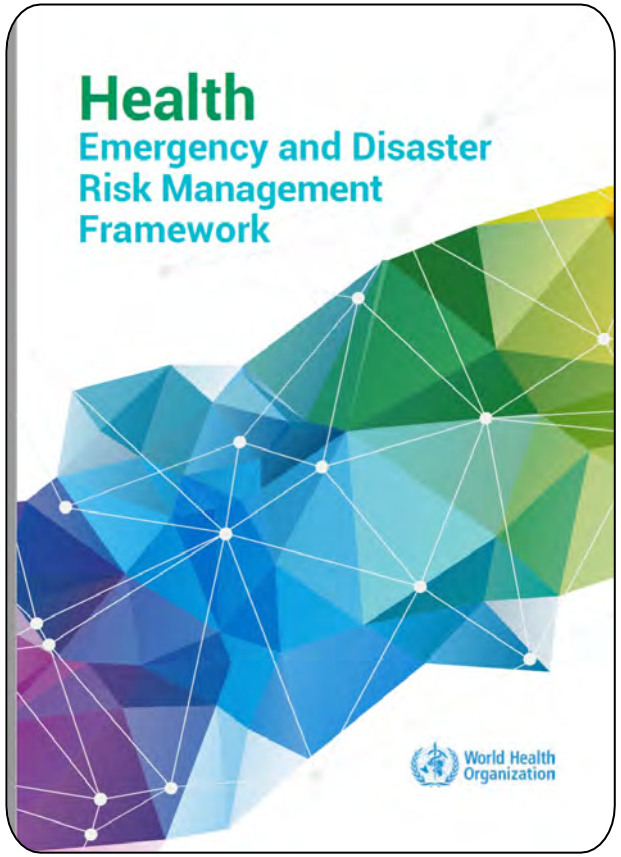
Biological hazards and Disaster Risk Reducion and Response

- Health EDRM (Health Emergency Risk Management): WHO 2019
- Health Addendum to City Resilience Score Card: 2019
- Public Health and Disasters 2020
  - by Emily Chan and Rajib Shaw

1. Financing and fiscal policy
2. Data management and scenario projection /risk assessment
3. Supply chain management
4. Transport planning
5. Resource mobilization, and
6. Early recovery planning: livelihoods







Context 2: Global Health and disaster framework

SFDRR provides a great framework to link health and disasters

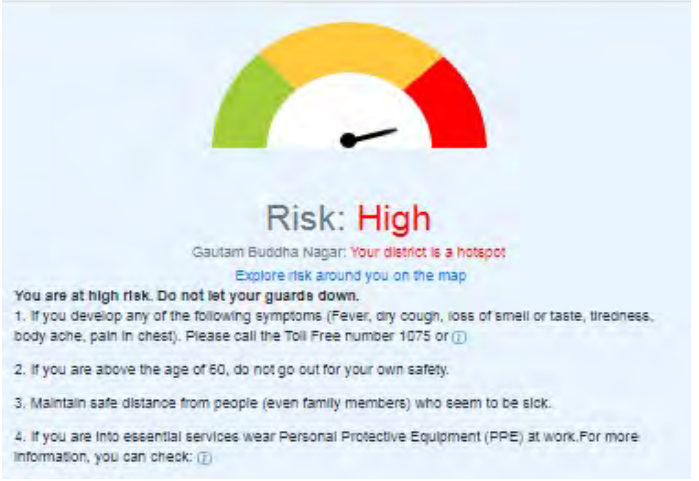
HEDRM enhances the framework

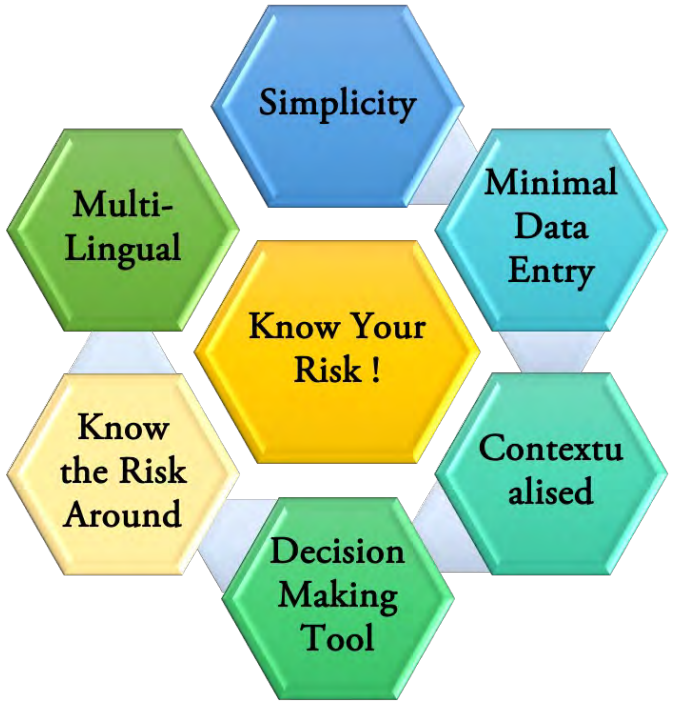
Health risk management needs interdisciplinary approach

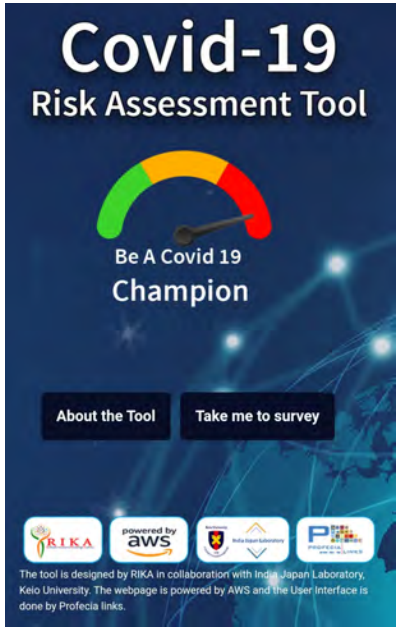
Risk Assessment: Communication and Governance

https://www.covid19risk.net
https://www.sciencedirect.com/science/article/pii/S2590061720300466?via%3Dihub

- Health (age, co-morbidity, gender, smoking habit)
- Behaviour (mask, hand wash, sanitizing, social distancing, anxuety, trust)
- Exposure (residential type, occupation, travel history)
- Social Policy (lockdown, community compliance)







Contents lists available at ScienceDirect

Progress in Disaster Science

journal homepage: www.elsevier.com/locate/pdisas

Invited ViewPoint

COVID-19 Risk Assessment Tool: Dual application of risk communication and risk governance

Ranit Chatterjee [a,b], Sukhreet Bajwa [a], Disha Dwivedi [a], Repaul Kanji [c], Moniruddin Ahammed [d], Rajib Shaw [a,e,*]

[a] Resilience Innovation Knowledge Academy (RIKA), India
[b] Kyoto University, Japan
[c] Gujarat Institute of Disaster Management, India
[d] Amazon Web Service, India
[e] Keio University, Japan

ARTICLE INFO

Article history:
Received 16 May 2020
Accepted 22 May 2020
Available online 02 June 2020

Keywords:
COVID-19 pandemic
Risk governance
Risk communication
Awareness generation
Social behaviour

ABSTRACT

Risk awareness is the best way to prevent and slow-down the transmission of the COVID-19 pandemic. Risk awareness is achieved through communication of risk assessment. Effective risk communication is an important measure to control the infodemic. Most risk assessment tools focus on either tracking the affected patients or diagnosing a probable health condition through symptoms. RIKA India introduces an innovative Risk Assessment Tool which goes beyond the symptom detection and patient tracking. It includes four factors in assessment of risk: Health, Behaviour, Exposure and Social Policy. Each of these four factors have sub-factors which help to assess the overall risk in a more comprehensive way and also present it to the user in a simplified way. The paper discusses the importance of the Risk Assessment Tool for awareness generation and decision making. Further, the datasets generated through the tool have been analysed to understand the key intervention areas for COVID-19 response and management.

https://www.mdpi.com/2071-1050/12/13/5250

sustainability

MDPI

Risk Governance:

Science based decision making and Risk Communication

- Cluster approach
- Scenario planning

Six key factors

- Government response
- Culture
- Health care system
- Sanitation
- Food habits
- Immune system

Article

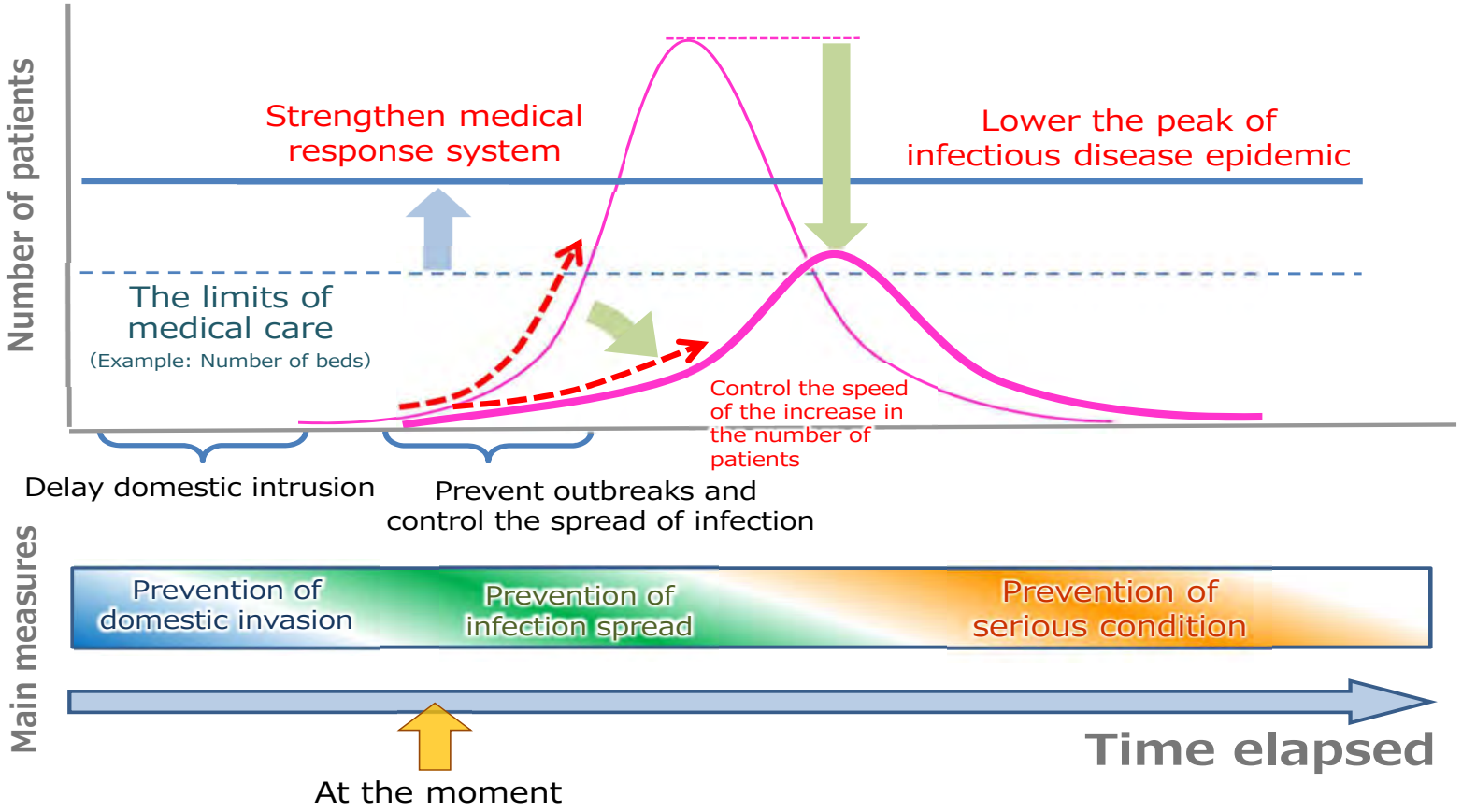
COVID-19 Pandemic Response in Japan: What Is behind the Initial Flattening of the Curve?

Ai Tashiro [1] and Rajib Shaw [2,*]

[1] Graduate School of Environmental Studies, Tohoku University, 468-1 Aoba, Aramaki, Aoba-ku, Sendai, Miyagi 980-0845, Japan; ai.tashiro.q7@dc.tohoku.ac.jp
[2] Graduate School of Media and Governance, Faculty of Policy Management, Keio University, 5322 Endo, Fujisawa-hi, Kanagawa 252-0882, Japan
* Correspondence: shaw@sfc.keio.ac.jp

Received: 15 May 2020; Accepted: 27 June 2020; Published: 28 June 2020

check for updates



Adaptive governance: Addressing multiple risks

- Control the disease spread in the evacuation center
  - Critical health monitoring
  - Separation of spaces
  - Ensure air circulation etc.
- Volunteer management: specific incentive schemes with local government and business sectors
- Data management: link to contract tracing
  - Cluster approach and early detection

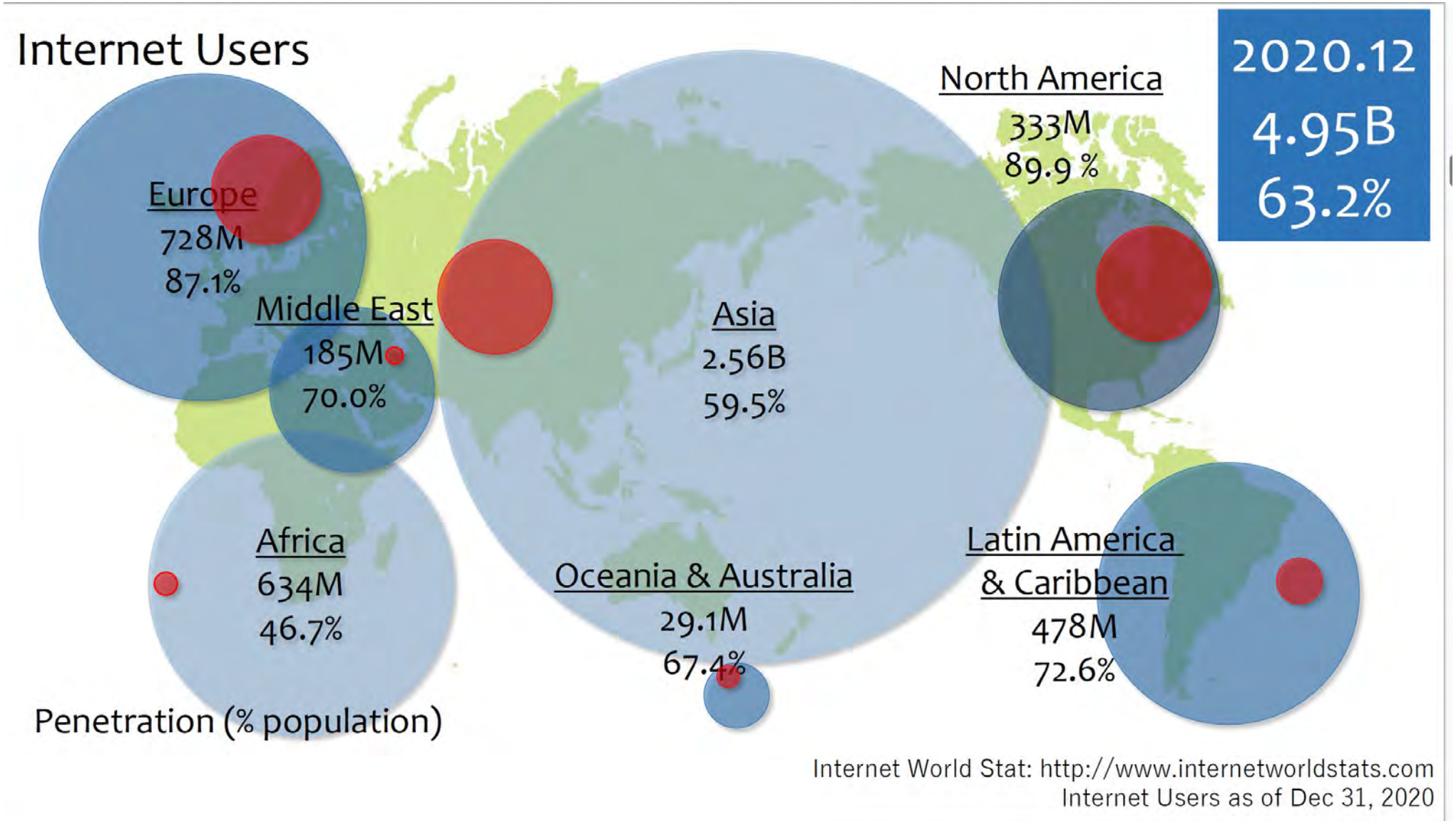
Context 3: COVID-19 enhanced the link of health and disasters

- Risk assessment
- Science based decision making
- Adaptive governance

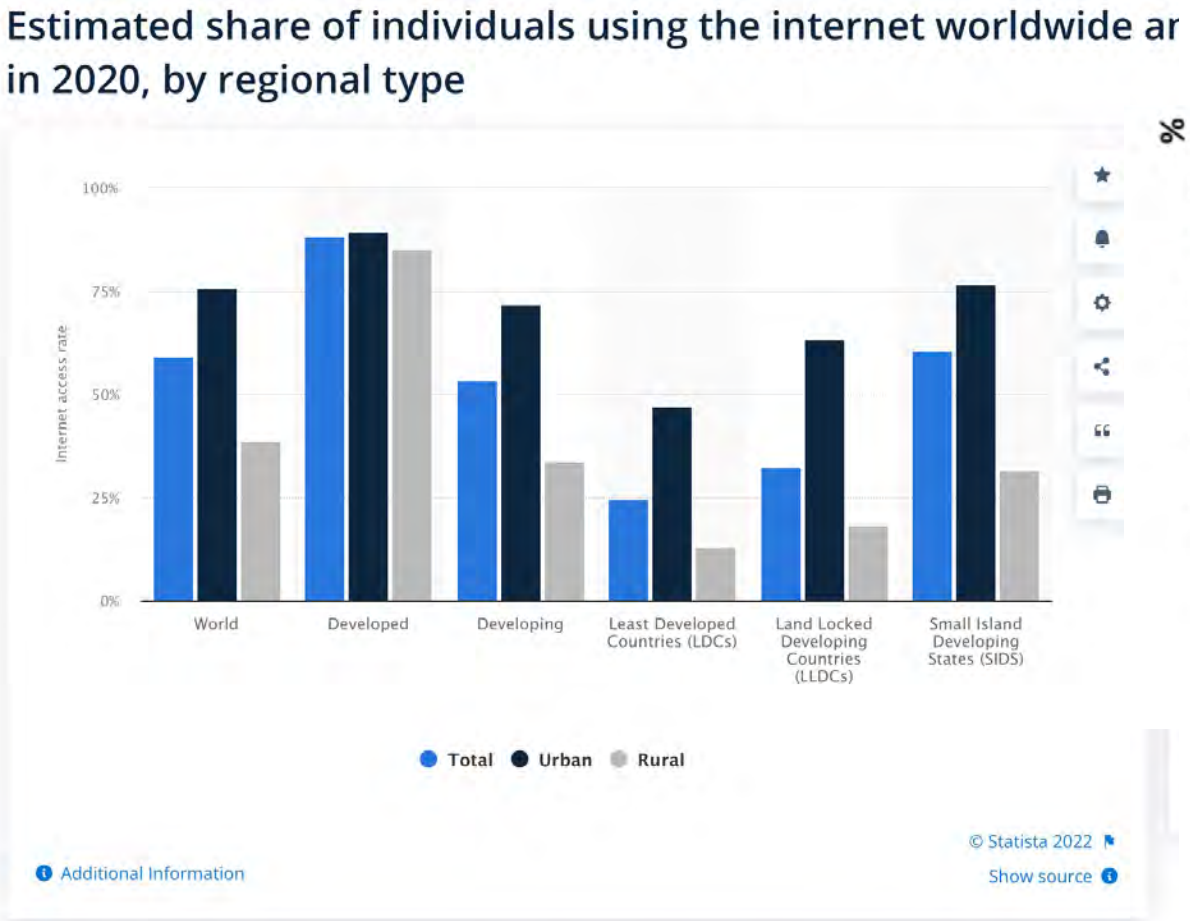
Source: Jun Murai 2021

Towards Digital World: Internet users: Global in 2021

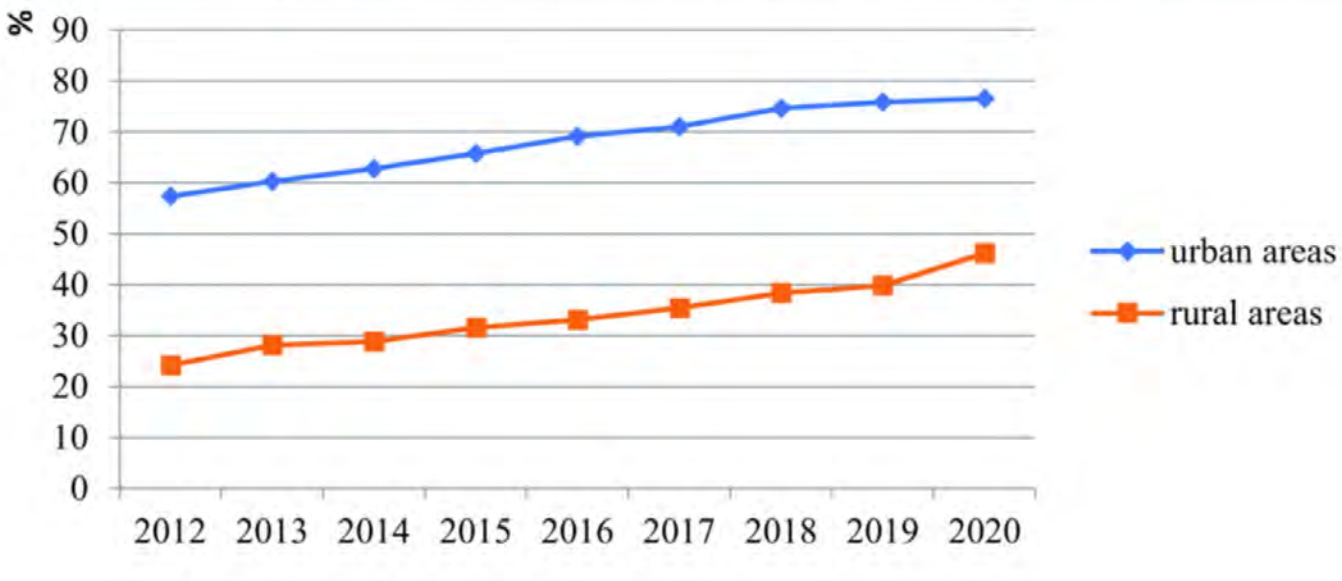
July 2022: 5.03 Billion



Internet and digital world: urban rural divide



Source: statista.com



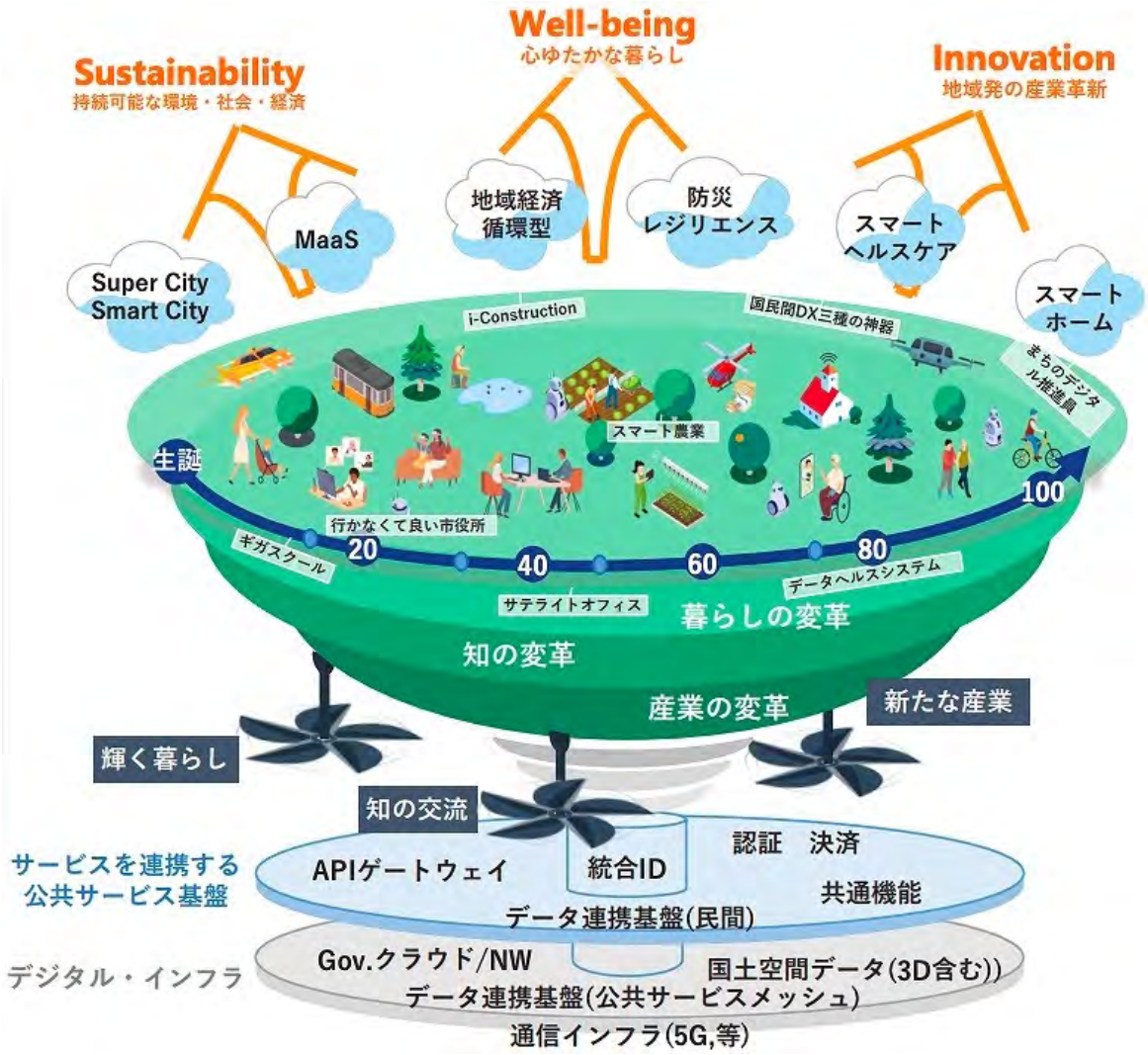
Source: Zhang and Zhang, Sustainability 2020

Context 4: Inclusive Digital growth

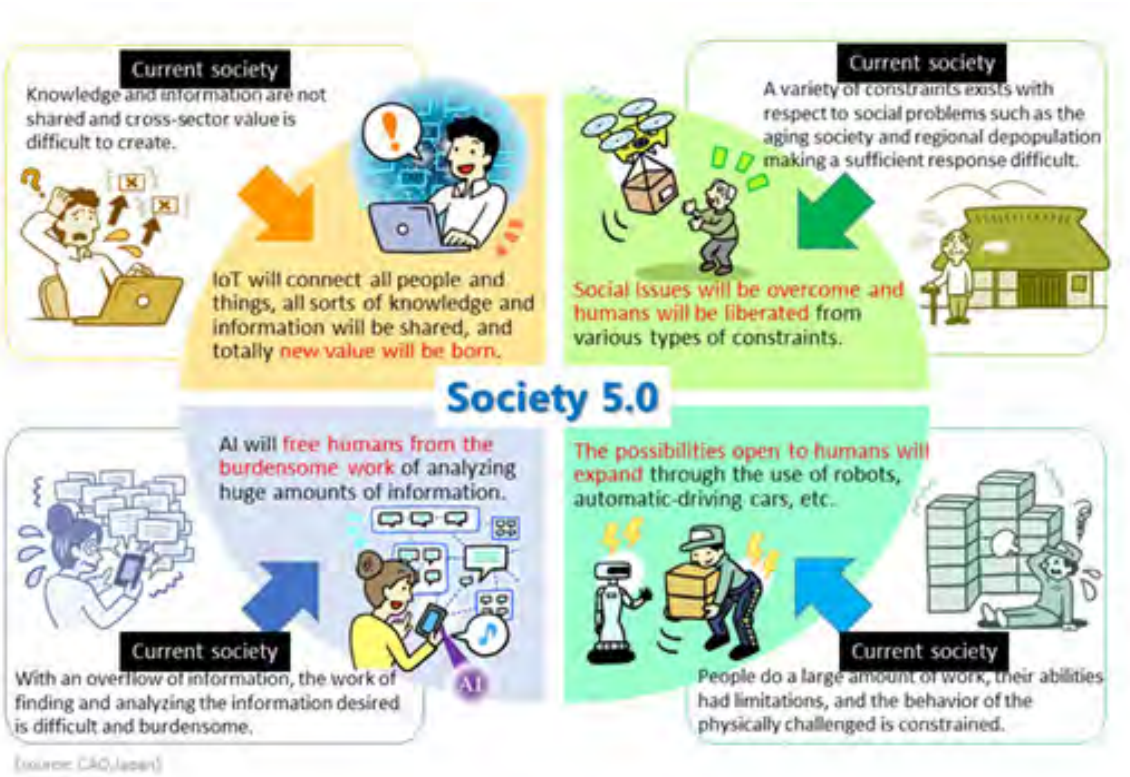
Asia has the most internet users

Urban rural divide a concern

Digital Den-en-toshi

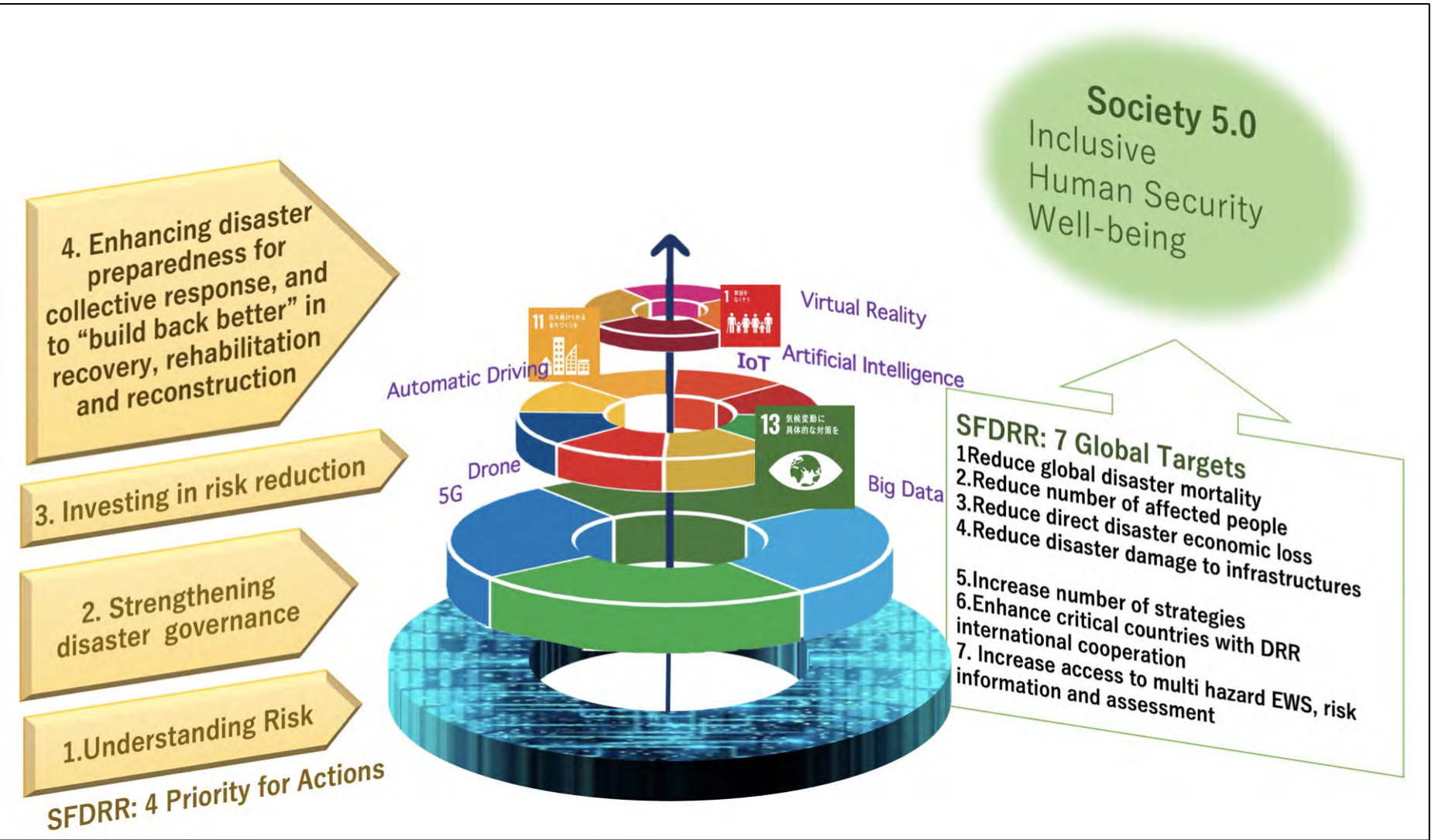


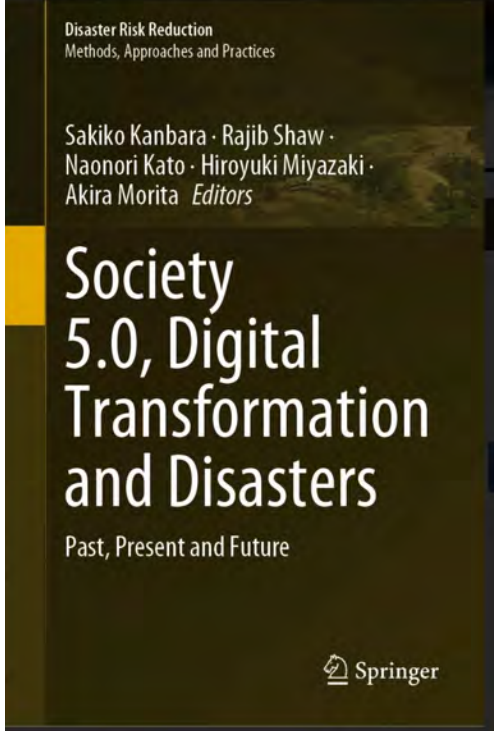
Keys to the Success of the Digital Rural City State Concept
(Source: Digital Agency,
"2nd Digital Rural City Nation Concept Realization Conference"
materials (December 2021))

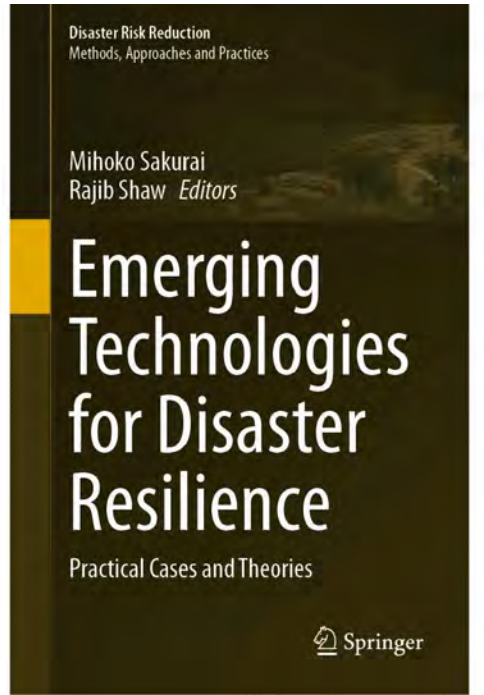


The concept of the Kishida Cabinet, which is launched in 2022.
The objective is "to promote regional revitalization through digitalization", and furthermore, to realize bottom-up growth from the regions to the entire country.

Health, well being and DRR







Science-preunership: Science based entrepreunership

- Entrepreneur mindset and ecosystem : incubation hub (government – academic – enterprise linkage)
- Developing incubation centers for DRR in universities

How to bring Youth and Young Professionals
to solve local problems and
achieve the targets of SDGs?

Science-preuner (Scientist + Entrepreneur) bring research into the core of disaster management activities of the private sector and policy making

Resilience Innovation Knowledge Academy (RIKA)

www.rikaindia.com

Context 5:
Innovation and Entrepreneurship

Society 5.0: sustainability, well being and innovation

Digital drive and emerging technologies

Entrepreneurship and youth involvement


Science advice to government
Inclusiveness
Climate change
Extreme weather
Sendai Framework
Open Data
Sci-preunership
Governance
Social Innovation
Open science
Digital divide
Incubation
Science link to people
Young professionals
Urbanization
Health risk
HEDRM
Digital world
Multi-disciplinary science
Society 5.0
Urban rural linkage
Sciencepreunership
New Urban Agenda
Technology
Regional Circular Ecological Sphere
Citizen science
Education and Awareness
Disruptive technology
Innovation
Smart governance