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Department of
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Disaster Risk Reduction through Risk-Informed Development and Governance

INTERNATIONAL MAYORS FORUM

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Source: Pedro Scudeller



DRR Concepts, Progress and Trends

Disaster Risk Reduction, Resilience and the SDGs

Multi-level Governance

Leveraging Digital Technologies for DRR and Resilience

Country Cases

Disasters are not natural







© Yann Arthus-Bertrand

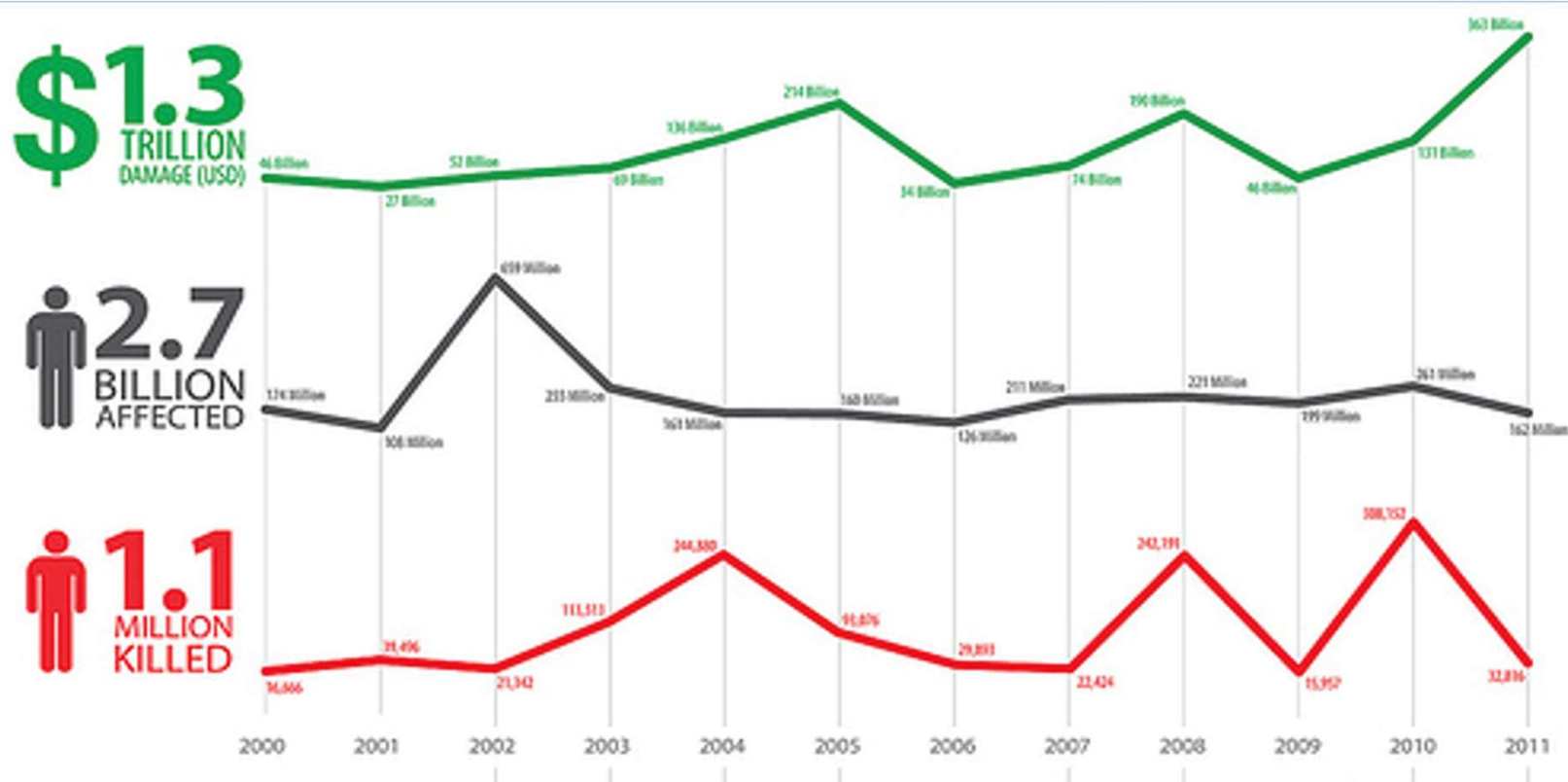


<https://capture.dropbox.com/hWyoV4iunBMt7wb0Z>

Photo courtesy of Igna Arthus-Bertrand



The Economic and Human Impact of Disasters from 2000-2011

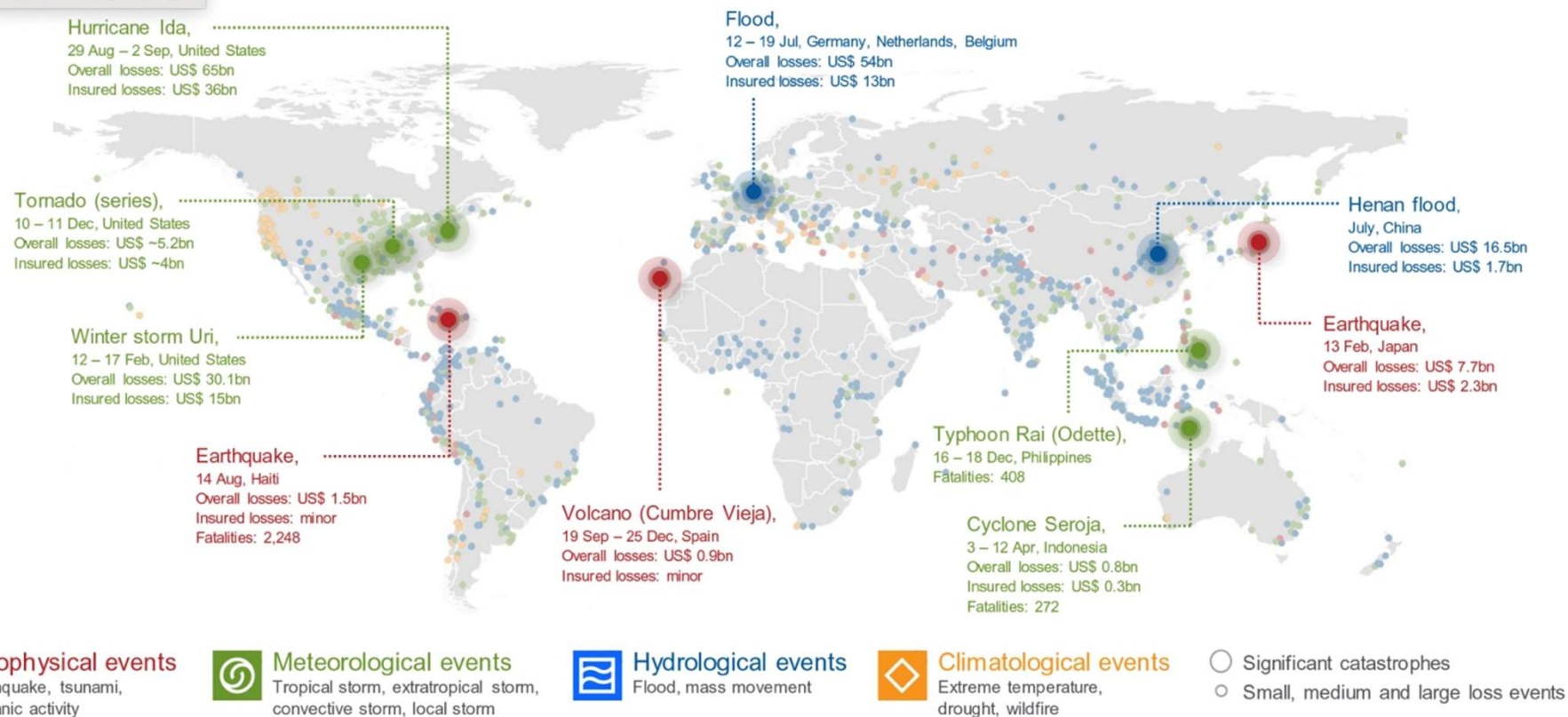


Source: UNDRR



2021 in Review: a picture of insured losses

World map of natural disasters 2021



Source: Munich Re, NatCatSERVICE, 2022

Challenges in Disaster Risk Reduction

1. Current mitigation trajectories are leading to unmanageable disaster risk
2. Investment in risk-informed adaptation is lagging
3. Action to manage long-term impacts and residual risks is inadequate
4. Investment and financial systems are not fit for purpose
5. Climate change and disasters are reinforcing inequalities



Transformational changes are needed: SDGs provide the roadmap

- Strengthening social protection systems and **public services**
- Increasing investments in science, technology and innovation
- Taking a green economy approach
- Investing in clean energy and industry
- Transitioning to sustainable food systems
- **Investing in data and information infrastructure is critical for evidence-based decisions**
- Build back better requires effective multilateralism and the full participation of societies



Progress and Trends in DRR

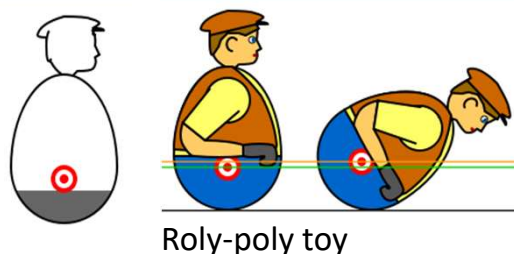
- Enhanced preparedness and response mechanisms
- Declining trend in disaster mortality (in the last decade)
- Increasing unpredictability of disasters and impact – changing climate
- Disaster-poverty-inequality nexus (low income economies and low income households)
- Increasing recognition of risk factors and drivers:
 - Kerala floods - ecosystems
 - Laos dam collapse – resilient infrastructure
 - Increasing population exposure and underlying risk drivers like urbanization
- Mainstreaming disaster risk reduction in development planning

Disaster Resilience

In the Context of Cities:

“the **ability to withstand and bounce back** from both acute shocks (natural and manmade) such as floods, earthquakes, hurricanes, wild-fires, chemical spills, power outages, as well as chronic stresses occurring over longer time scales, such as groundwater depletion or deforestation, or socio-economic issues such as homelessness and unemployment.”

- the Sendai Framework for DRR 2015-2030





Resilience has to address the “system of systems” that makes up a city.

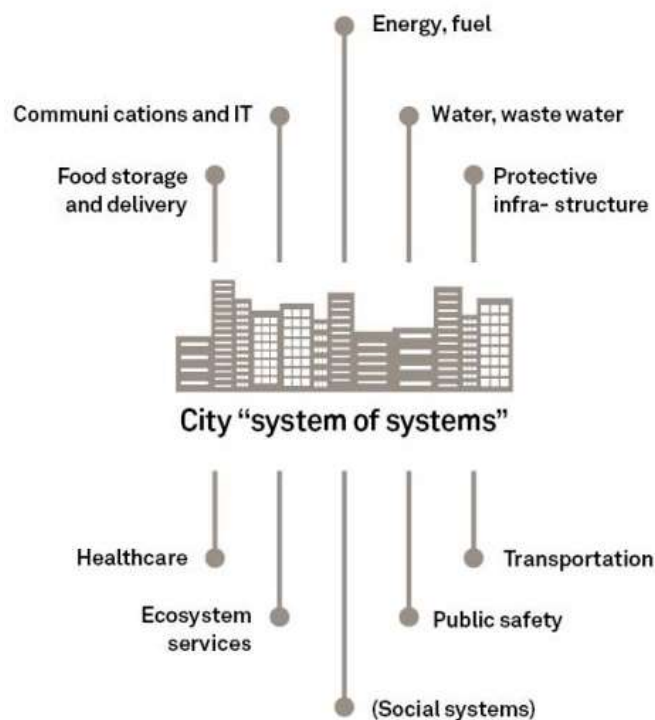
For example:

Multiple connections and interactions:

Causal

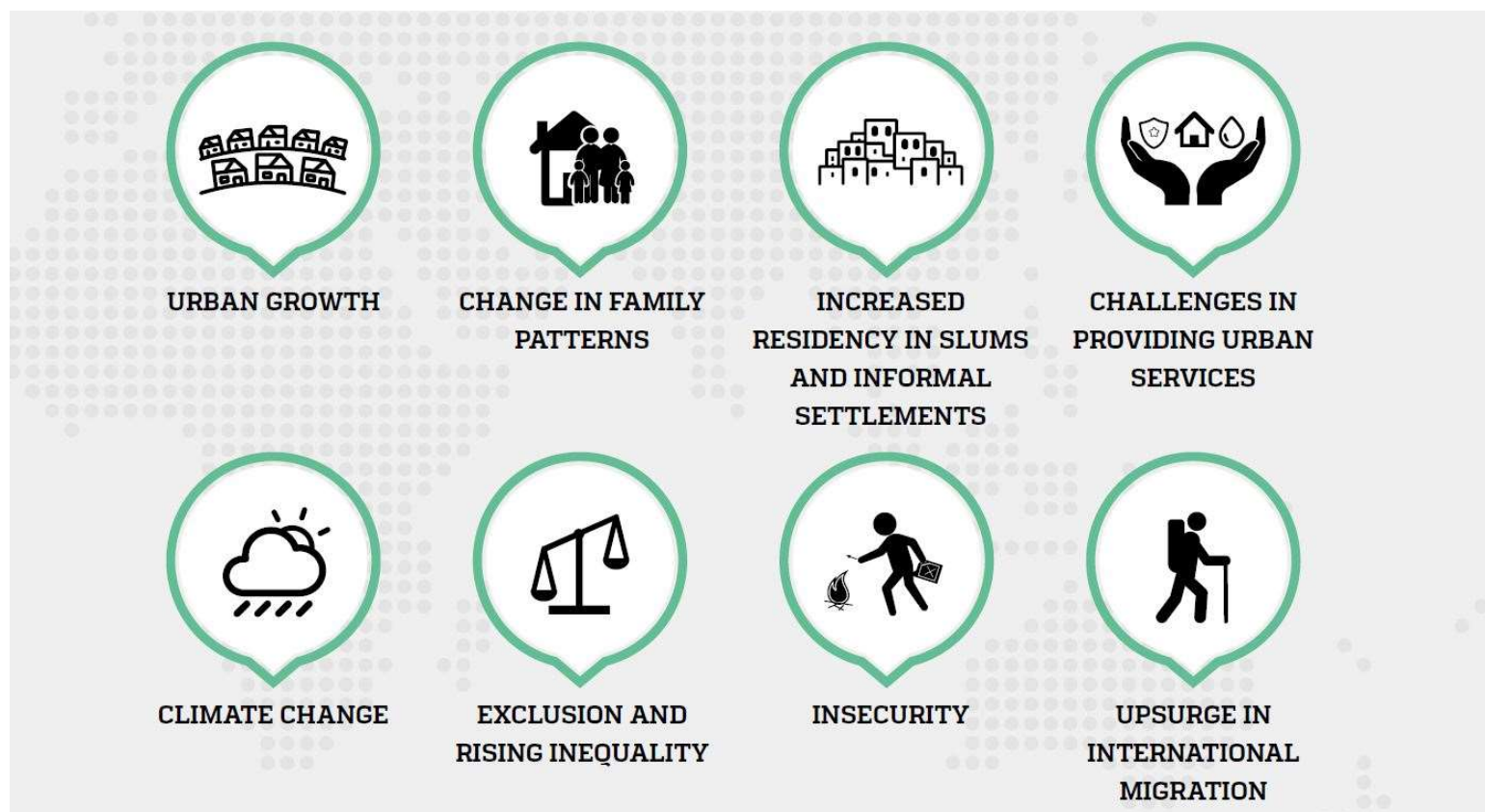
Resources, data

Because each system will have different owners and stakeholders, resilience is a multi-organizational endeavor.





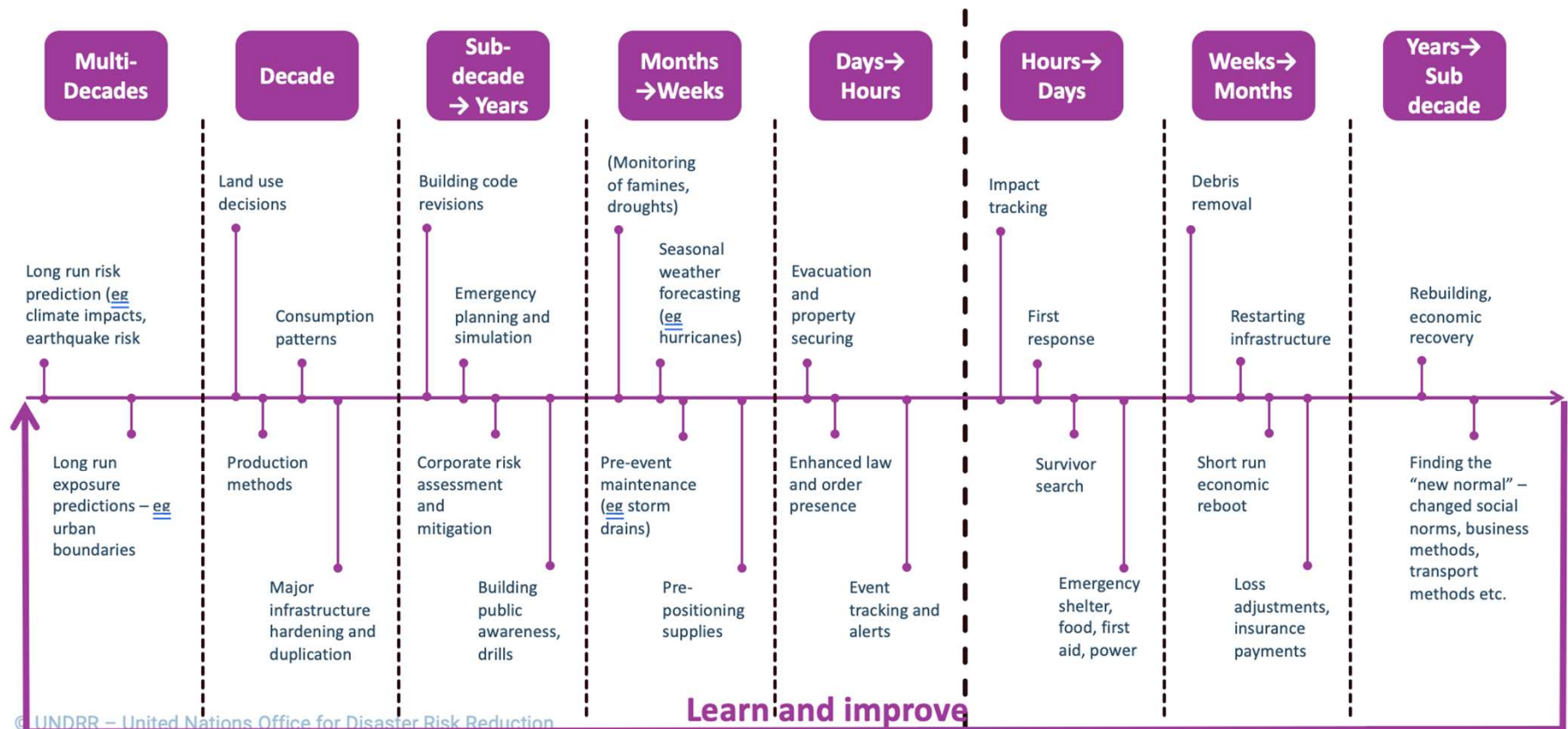
Local and Urban Challenges





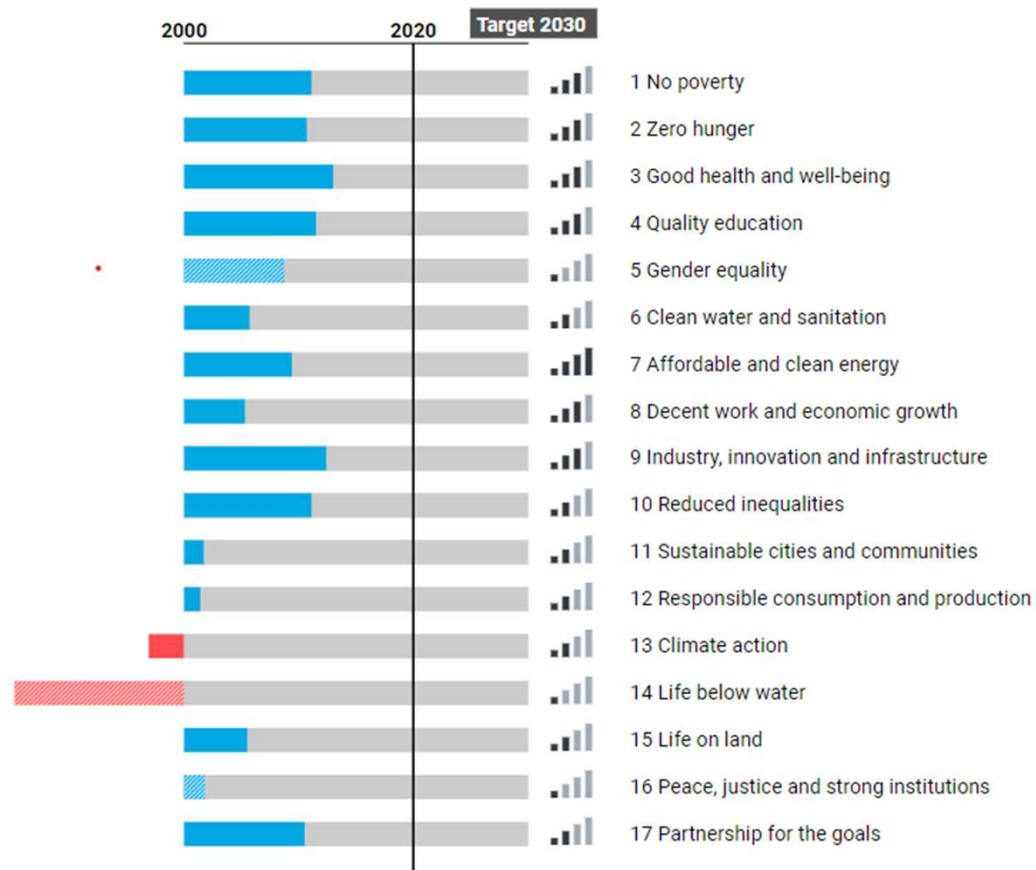
Resilience is a process, with multiple timescales

- Some resilience functions play out over many years. Others require real time response.





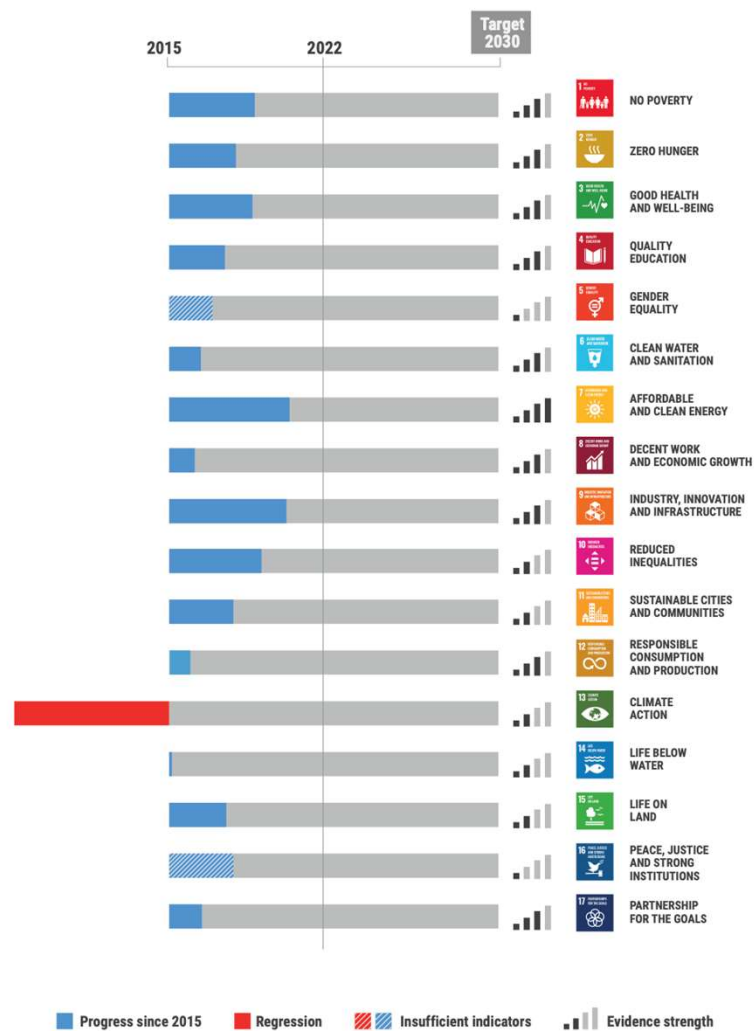
Snapshot of SDGs progress in Asia and Pacific (2021)



Source: ESCAP



Snapshot of SDGs progress in Asia and Pacific (2023)



Source: ESCAP

Sendai Framework and 2030 Agenda: Common Indicators





The Sendai Framework Targets in the Sustainable Development Goals & Indicators

SDG 1 calls for an end to poverty in all its forms everywhere and recognizes that **reducing exposure and vulnerability of the poor to disasters** is essential for sustainable poverty eradication (**target 1.5**).



Indicator 1.5.1 Number of deaths, missing persons and persons affected by disaster per 100,000 people [**Sendai Framework Targets A and B**]

Indicator 1.5.2 Direct disaster economic loss in relation to global gross domestic product (GDP) [**Sendai Framework Target C**]

Indicator 1.5.3 Number of countries with national and local disaster risk reduction strategies [**Sendai Framework Target E**]



The Sendai Framework Targets in the Sustainable Development Goals & Indicators



SDG 11 on inclusive, safe, resilient and sustainable cities and human settlements has explicit links are seen with the Sendai Framework targets. Target 11.5 calls for reducing the “number of deaths” and “direct economic losses relative to global GDP” caused by disasters, which align directly with the global targets (a), (b) and (c) of the Sendai Framework. **Target 11.b calls for an increase in the number of cities and human habitats with integrated plans on inclusion, resource efficiency, adaptation to climate change and resilience to disasters** “in line with the Sendai Framework for Disaster Risk Reduction 2015-2030”, calling for aligned implementation on the ground. Other targets under this goal promote enhanced urban planning and upgrading of slums, which also tackle key risk drivers for disaster losses.

Indicator 11.b.1 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 **[Sendai Framework Target E]**

Indicator 11.b.2 Number of countries with national and local disaster risk reduction strategies **[Sendai Framework Target E]**



The Sendai Framework Targets in the Sustainable Development Goals & Indicators

SDG 13 is on combating climate change and where all the targets can be linked to the Sendai Framework, for example **target 13.1 which calls for strengthening resilience and adaptive capacity to disasters.**



Indicator 13.1.1 Number of countries with national and local disaster risk reduction strategies

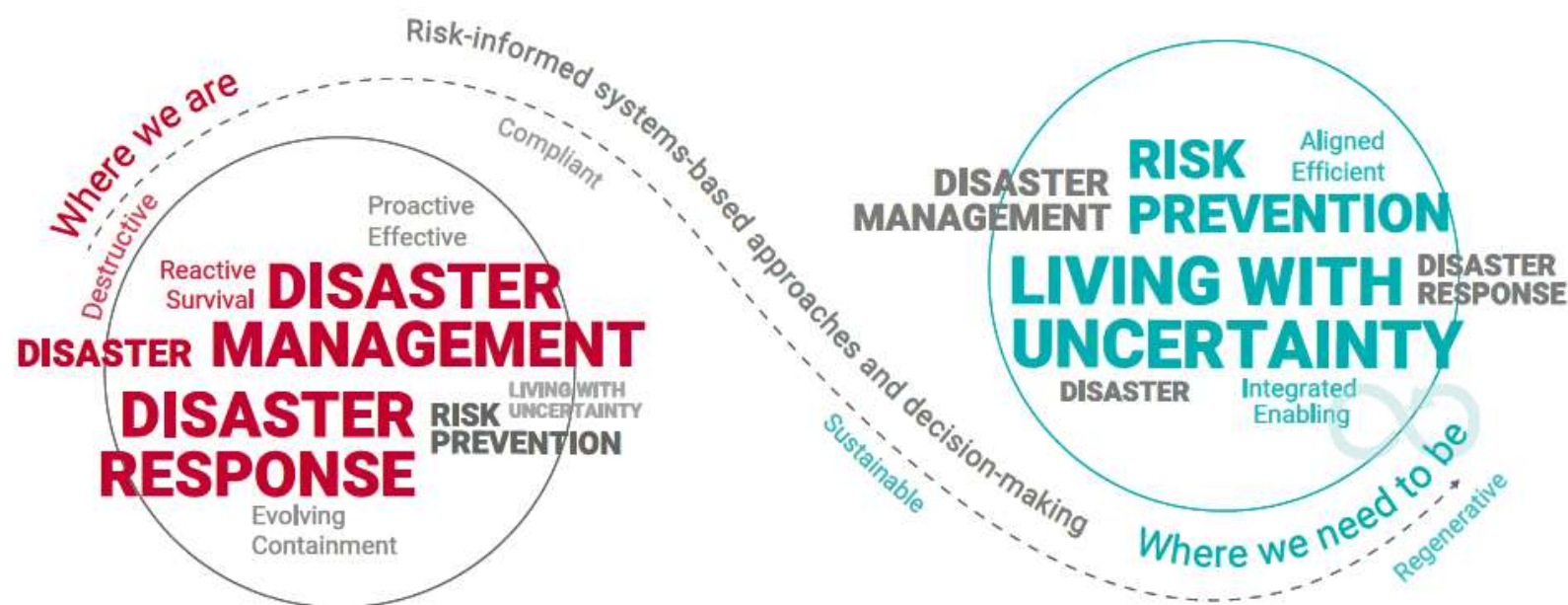
[Sendai Framework Target E]

Indicator 13.1.2 Number of deaths, missing persons and persons affected by disaster per 100,000 people

[Sendai Framework Targets A, B]

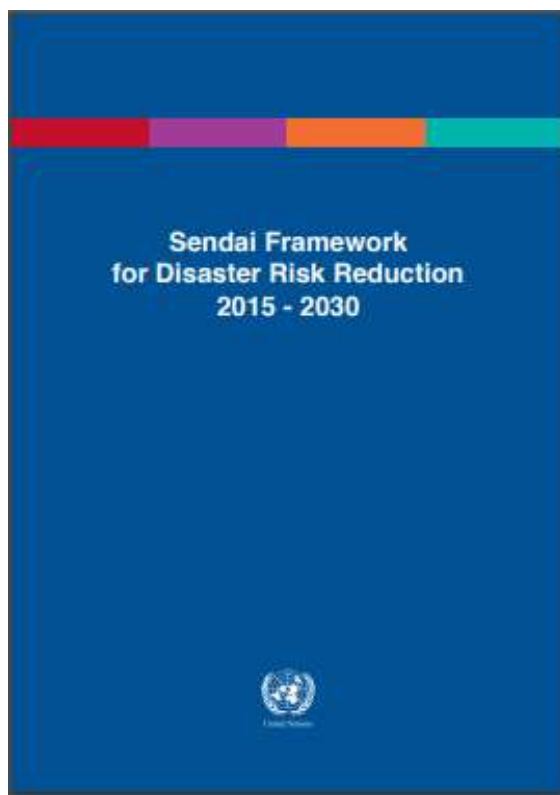
Towards System Risk Governance

“Innovation curve” – from destructive to regenerative approaches



(Source: UNDRR 2019)

The Sendai Framework for Disaster Risk Reduction (2015-2030)

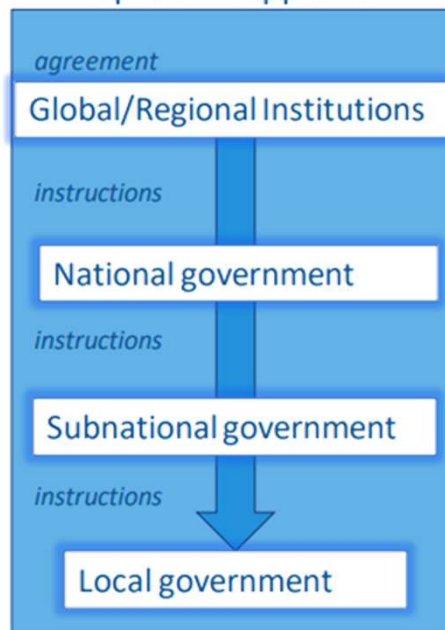


- Shift from **disaster loss** to **disaster risk**
- Shift from disaster management to **disaster risk management**
- Shift from “**what to do?**” to “**how to do?**”
- Focus on **people-centred** preventive approach to DRR
- **Primary** responsibility of States for DRR
- **Shared** responsibility for DRR with stakeholders
- **Scope** includes slow-onset, man-made and bio hazards
- Set of global **targets**
- Set of guiding **principles**

Multi-level Governance for Climate Action



Top-down approach



E.g.: Rule of law, clear division of tasks



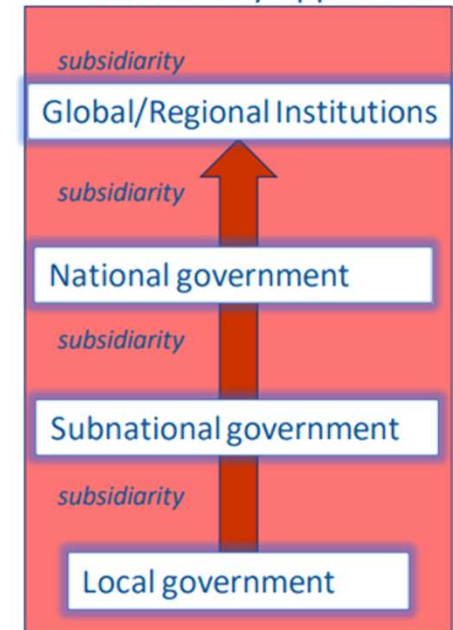
Real-time collaborative



E.g.: collaboration, co-production



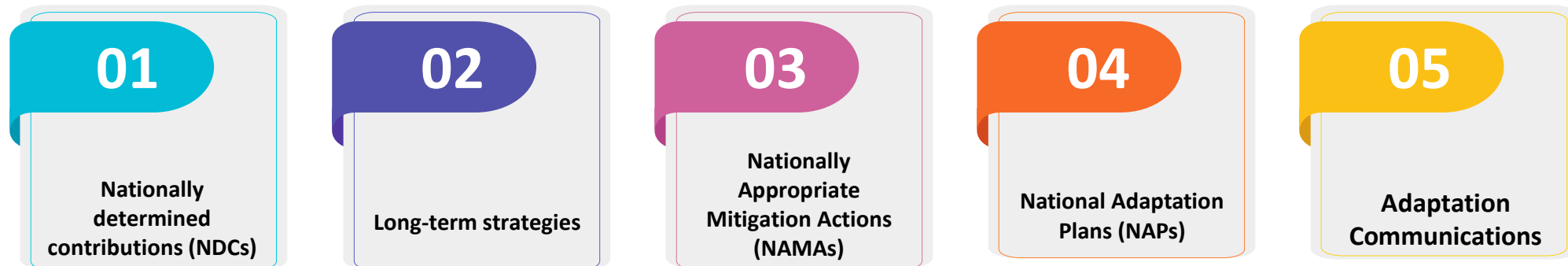
Subsidiarity approach



E.g.: Empowerment, incentives



Domestic tools for climate change action that could benefit from multi-level governance approaches



Formal Mechanisms

- Intergovernmental bodies with multi-stakeholder representation
- Financing mechanisms
- Bilateral agreements between levels of government

Informal Mechanisms

Collaborative practices that have been forged without the aid of regulatory instruments

Inter-municipal Coordination

Address issues that go beyond jurisdictional boundaries



Capacity Building



Fiscal Decentralization



Public Participation



**Local Mandate for Climate
Change Related Areas**



**Data Collection and
Sharing**



**Supportive Legal
Frameworks**



Political Will

Leveraging Digital Technologies for DRR and Resilience





▪ **Leveraging Science, Technology and Innovation (including ICT and frontier technologies)**

- Helps anticipate, respond to, and recover from disasters effectively
- Promotes access to critical and innovative public services in time of public health emergencies

▪ **Data-Driven and Evidence-based Decision-making**

- Quality data sharing and data analytics is an enabler for public health emergencies
- Effective and timely data is key for risk-informed decision-making
- Strengthen and streamline early warning platforms



Risk-informed Governance through Digital Government Technologies are Key Enablers for achieving the SDGs

Financial inclusion: Mobile access to financial services for the world's two billion unbanked



Smart water management systems, sanitation and hygiene

e-Agriculture: Access to market updates, and weather forecasts increases rural business productivity



Energy efficiency, smart grids, green standards and technology for sustainable energy

e-Health: Be Healthy, Be Mobile. Direct patient interaction, health informatics and telemedicine



e-learning: Access to knowledge to all people no matter where they live or how much they earn



Promoting the digital economy, ecommerce, tech-SMEs, entrepreneurship and cyber trust

ICTs are an essential pathway to gender equality and empowerment



Provide universal and affordable access to the Internet, ICTs are essential for a resilient 21st century infrastructure and access to services and applications

Narrow the digital divide and empower communities



Smart sustainable cities, intelligent transport systems, 5G and the Internet of Things



ICTs enable sustainable production and consumption through smart grids, smart metering and cloud computing



ICTs support greener lifestyles, climate monitoring, forecasting and early warning systems



Satellite oceanic observation and monitoring increases scientific knowledge of the oceans



Satellite observation of terrestrial ecosystems help to protect biodiversity



Open data increases transparency, empowers citizens and drives economic growth

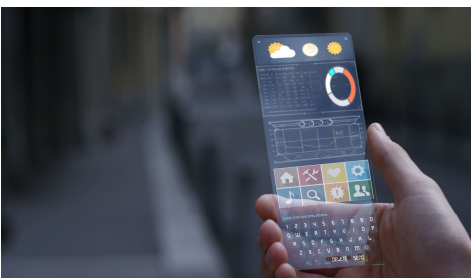


ICTs integrate and facilitate all SDGs through innovative collaboration and scaled up capacity building





<https://indianexpress.com/article/technology/tech-news-technology/can-humans-and-ai-coexist-6453996/>

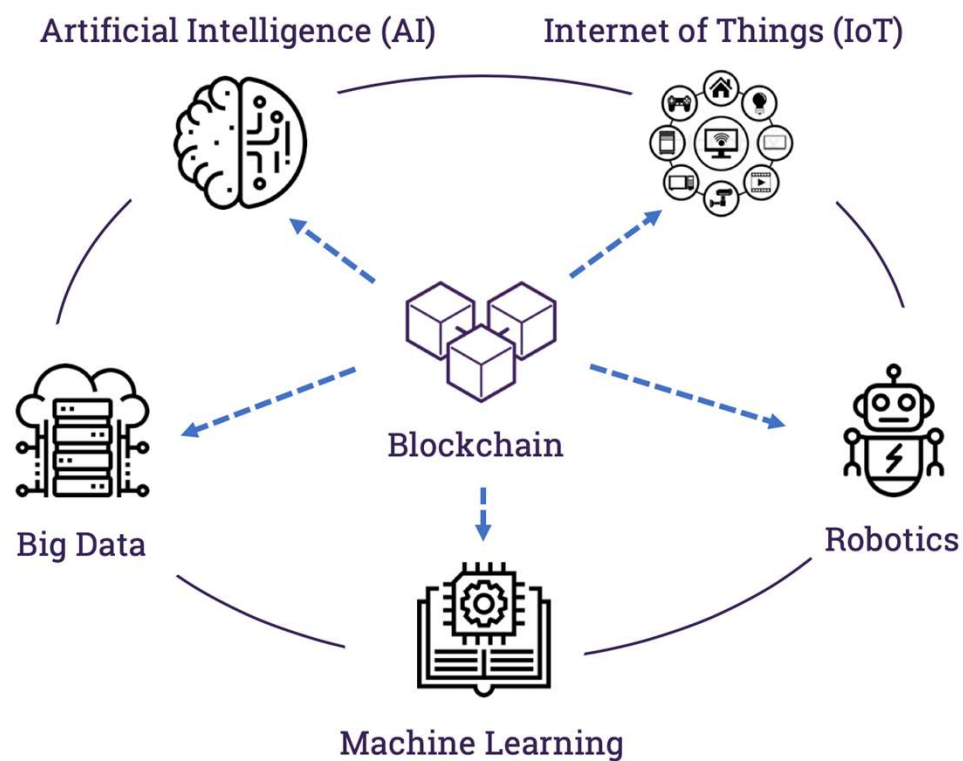


<https://cdn.mos.cms.futurecdn.net/X8ajP3firD9QzBCipfEtPk.jpg>



<https://www.nttdata.com/sg/en/services/big-data-solutions/big-data-platform>

Some Digital and Frontier Technologies



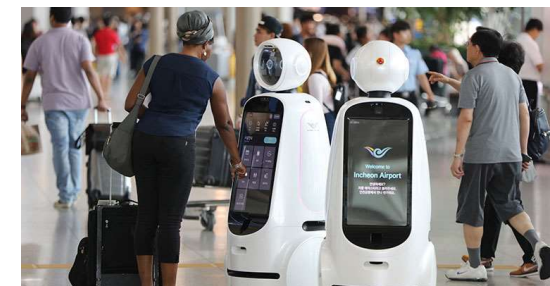
<https://micoedward.com/wp-content/uploads/2020/07/Covid-19-Tech-07-blockchain.png>



<https://www.smartdatacollective.com/5-incredible-iot-applications-in-civil-engineering/>



Image: Medical package loaded onto UAV in Puerto Rico during pilot testing program.
Image Source: Butschli, Jim, 2018. <http://bit.ly/2BLvOIL>.



<https://www.futuretravelexperience.com/2020/05/incheon-airport-presses-ahead-ai-biometrics-big-data/>



Innovative technologies as tools for pandemic preparedness and response



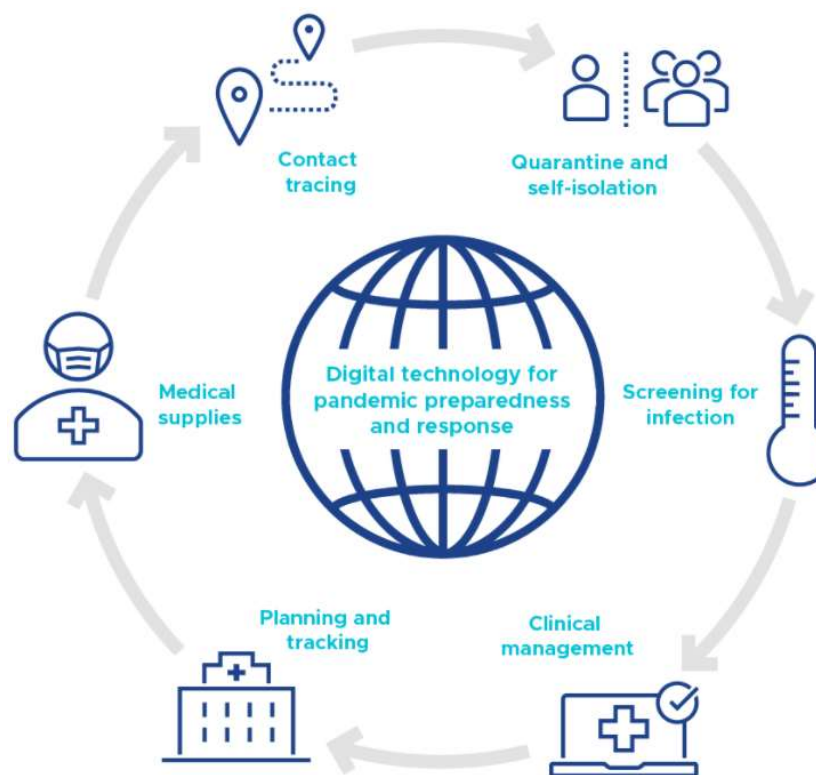
Source: Modified based on Sera Whitelaw and others, "Applications of digital technology in COVID-19 pandemic planning and response", Lancet Digital Health, vol. 2, issue 8 (August 2020), e435-e440.

Digital technology used in the COVID-19 pandemic response: selected examples

Purpose	Digital tool or technology	Examples of use	Asia-Pacific Countries (selected)
Epidemiological Surveillance; Tracking	Machine learning	Web-based epidemic intelligence tools and online syndromic surveillance	China, Singapore, Australia, New Zealand, Turkey
Survey apps and websites	Symptom reporting	Smartphone app and web-based epidemic intelligence tools	Japan, Kazakhstan
Rapid case identification; Screening for infection	Connected diagnostic device	Point-of-care diagnosis	Australia, China, Thailand, Singapore, New Zealand, Turkey
Interruption of community Transmission	Smartphone app, low-power Bluetooth technology	Digital contact tracing; Quarantine and self-isolation	Republic of Korea, China, Australia, Viet Nam, India, Pakistan
Clinical care and management	Tele-conferencing	Telemedicine, referral	Australia, Thailand, China, Singapore, New Zealand, Pakistan
Public communication	Social-media platforms	Targeted communication	Viet Nam, Australia, New Zealand, China, Mongolia, Pakistan, Afghanistan

Sources: Nature Medicine, vol. 26 (August 2020), pp 1183-1192; Lancet Digital Health, vol. 2 (August 2020): e435-40, ESCAP, Promoting meaningful and affordable access to broadband Internet for inclusive development (February 2021).

UN DESA's Compendium of Digital Government Initiatives for COVID-19



- Information sharing
- E-Participation
- E-Health
- Partnerships

■ Case Study: Drones Fly Disaster Relief in Puerto Rico

- **Problem:** Communities in remote locations have ongoing public health requirements requiring outside delivery of supplies and equipment
- **Need:** Reliable delivery mechanisms
- **Obstacle:** Distance and vulnerable infrastructure
- **Solution:** Alternative delivery mechanisms using long-distance UAV flights



Image: Medical package loaded onto UAV in Puerto Rico during pilot testing program.
Image Source: Butschli, Jim, 2018. <http://bit.ly/2BLvOIL>.

■ Case Study: Vaccine Delivery in Vanuatu

- **Problem:** Public health needs remain unmet in remote parts of the country
- **Need:** Vaccines and other medications
- **Obstacle:** Transportation options are not conducive to delivery of vaccines and medication
- **Solution:** UAV equipped to carry and monitor a climate-controlled package used to quickly transport vaccines



Video: Vanuatu vaccine delivery pilot program footage.
Image Source: UNICEF, 2018.

■ Case Study: Humanitarian Cash Transfers in Vanuatu

- **Problem:** Disaster impacted populations experience cash shortages for a variety of reasons.
- **Need:** Access to cash or a viable cash alternative.
- **Obstacle:** Banks may not be operating; cash programs are often associated with poor transparency / accountability.
- **Solution:** Blockchain-based cash card program in partnership with verified businesses in the impacted area.

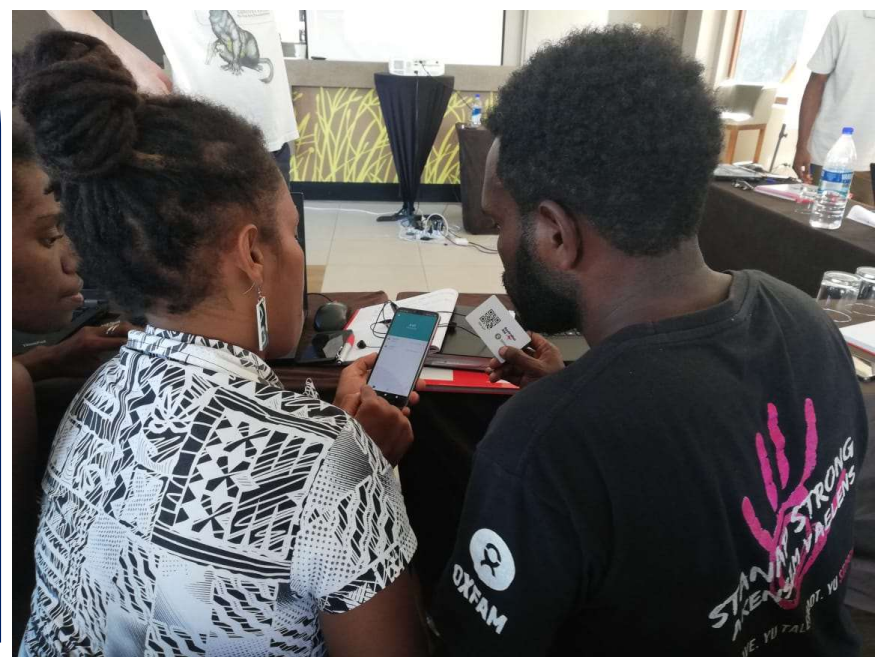


Image: Sempo employees train Oxfam Vanuatu project team members to use the blockchain-based cash transfer technology..
Source: Sempo, 2019.

■ Innovative technologies for Smart and Resilient Cities

- **Smart cities** initiatives are emerging globally
- By 2050, more than two thirds of the world's population are expected to live in cities
- Cities are taking advantage of advancements in digital government innovation to become smarter
- Smart cities are characterized by conscious efforts to use ICTs
- Digital government and ICTs emerges as a fundamental tools in making cities smart

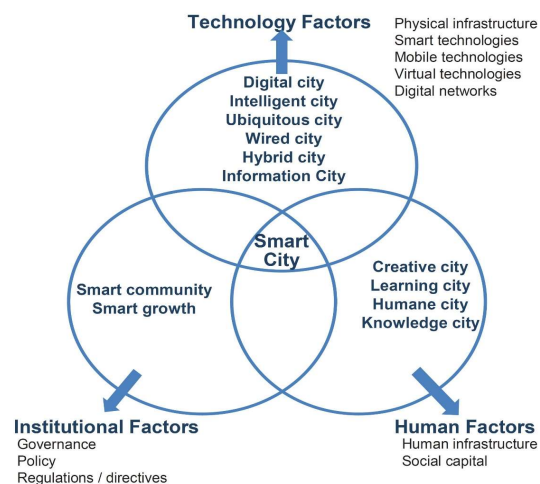
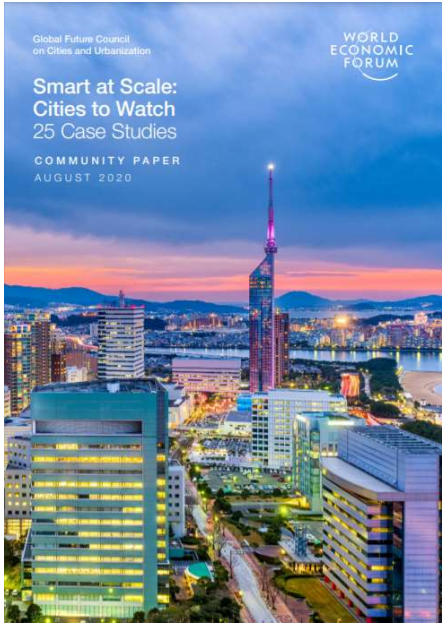


Image: Fundamental components of a Smart City
 Image credit: Taewoo and Pardo, 2011



http://www3.weforum.org/docs/WEF_Smart_at_Scale_Cities_to_Watch_25_Case_Studies_2020.pdf

Smart City Case Study – Songdo, Korea

Innovation in Service Delivery

- Planned Smart City with construction started in 2008
- Wide range of public and private services, including
 - ✓ transportation, energy, Safety and Security



Songdo Emergency and Response Services

- Real-time emergency / disaster information collected
- Hazard monitoring
- Public alert and warning



Image Above: Songdo, Incheon, Republic of Korea; Image credit: IDB-KRIHS, 2016
 Image: Diagram of emergency response services provided by Songdo Smart City system.
 Image credit: IDB-KRIS, 2016.



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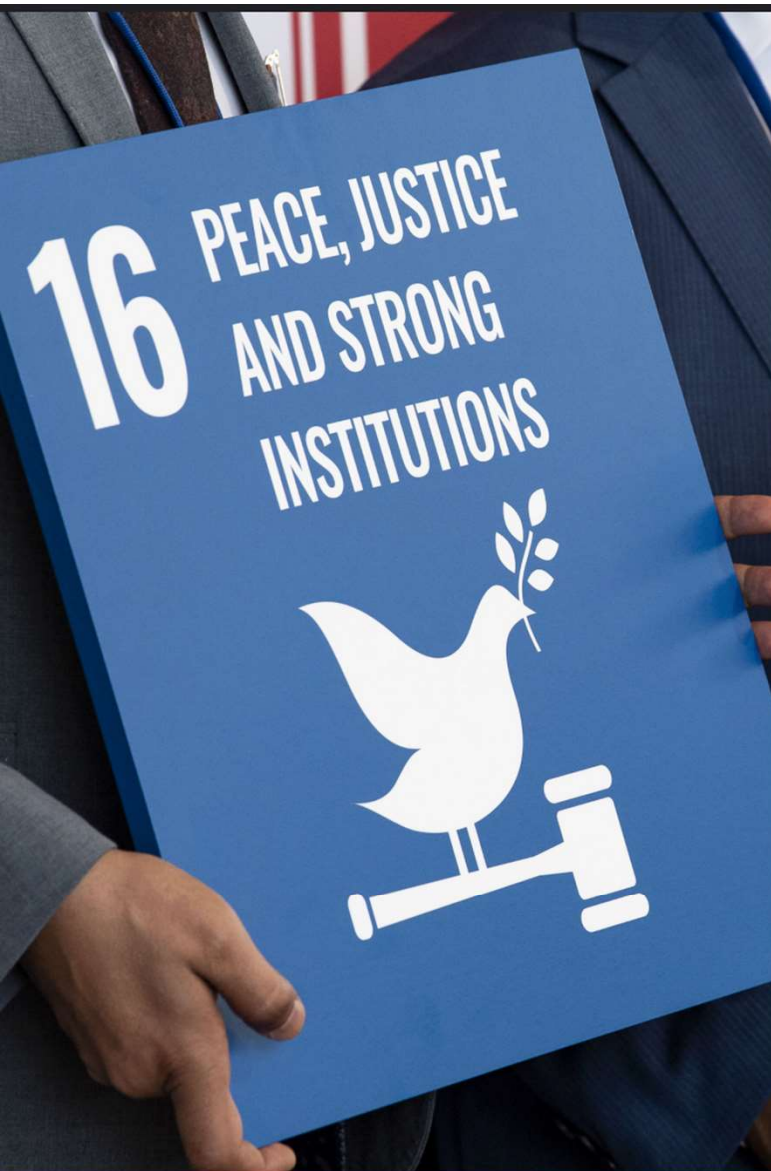
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Curriculum on Governance for the Sustainable Development Goals

The [Curriculum on Governance for the Sustainable Development Goals](#) aims to promote critical understanding of sustainable development issues, enhance governance capacity, and strengthen public servants' awareness of their active role in contributing to the achievement of the SDGs. It aims at developing the knowledge and capacities required to implement the 2030 Agenda for Sustainable Development and support concrete outcomes and lasting impact. [Read more ...](#)

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