

Climate Related Systemic Risks:
Lessons Learned from Covid-19
June 21-23, Schloss Herrenhausen,
Hanover, Germany
Herrenhausen Conference



Climate Change and Disaster Economics: Views from Asia

June 22, 2023

Yasuyuki Sawada

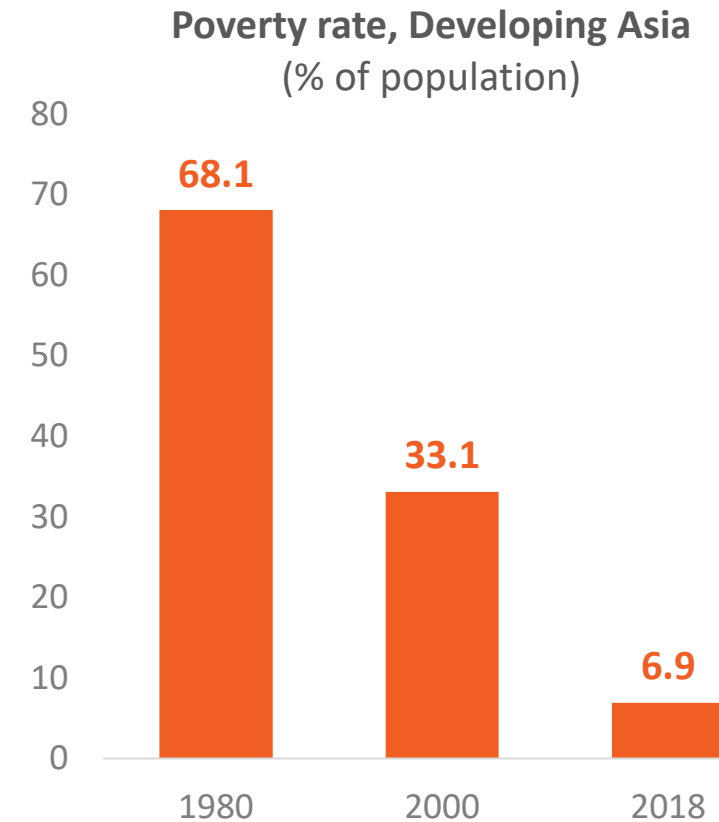
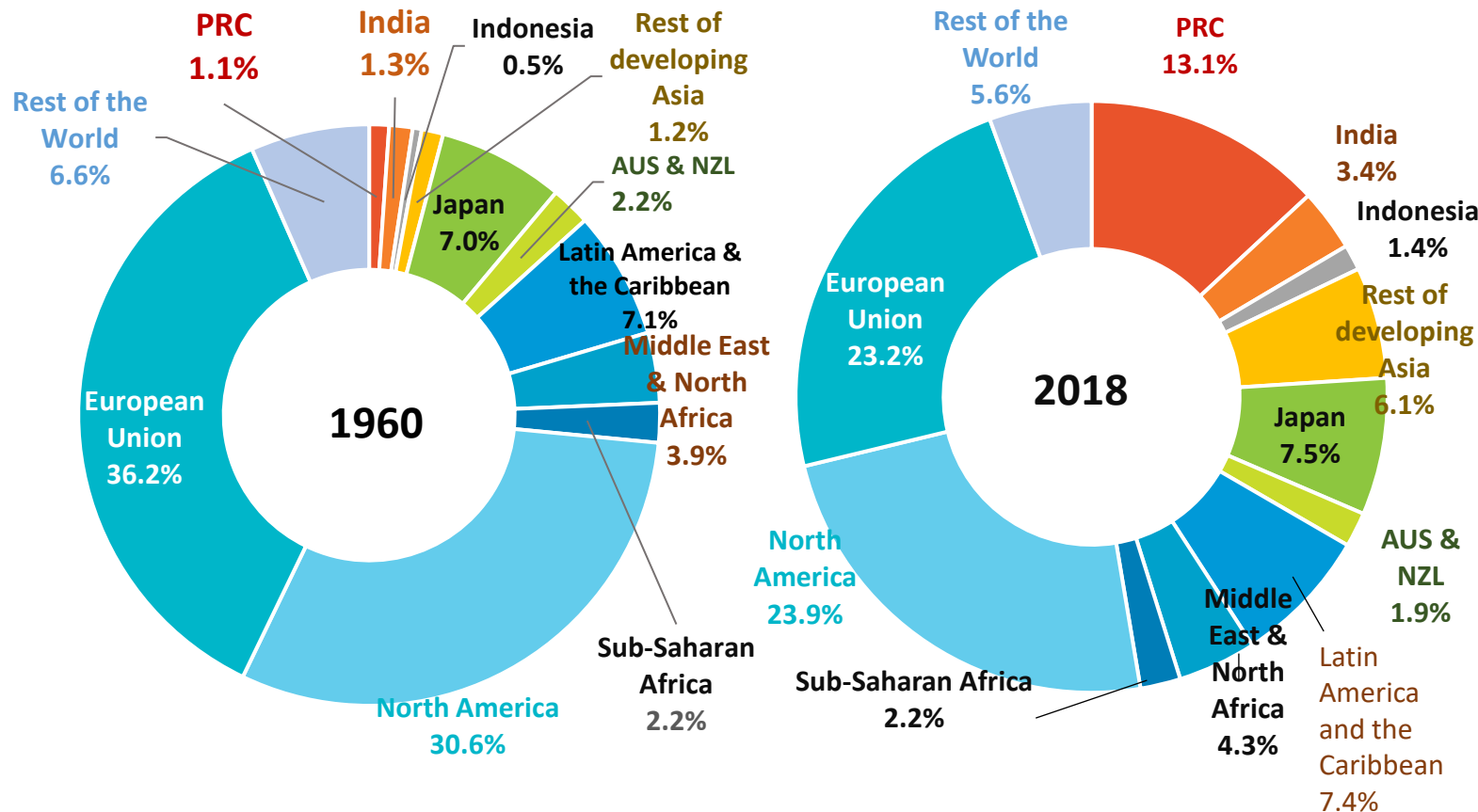
University of Tokyo

Outline

1. Asia's achievements in development and COVID-19 recovery
2. Environment and climate change challenges in Asia
3. Disaster Resilience in Asia
4. Financing challenges

Asia's Key Achievements

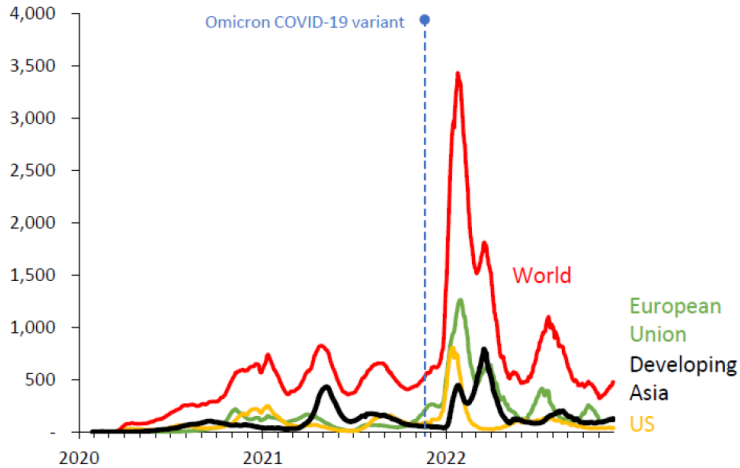
- Phenomenal economic growth led to a rising share in global GDP (**13% to 34%**) and improvements in broad development indicators.



The End of the Pandemic

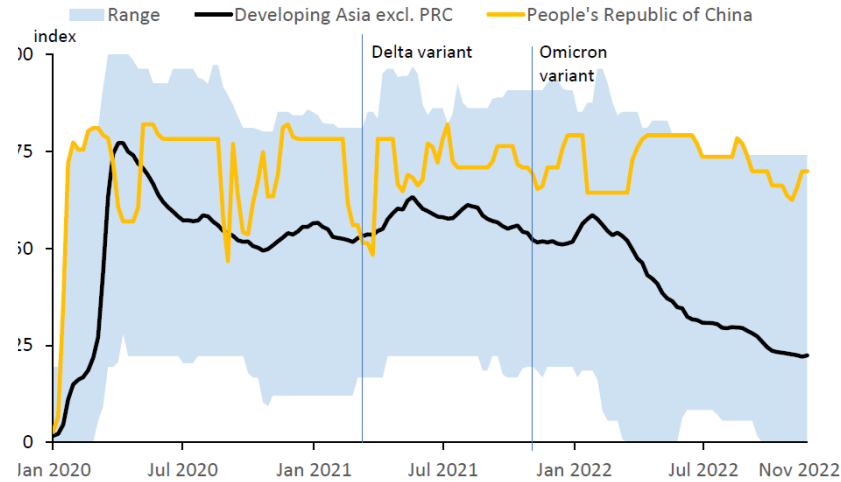
of infected people

New cases, 7-day moving average, thousand

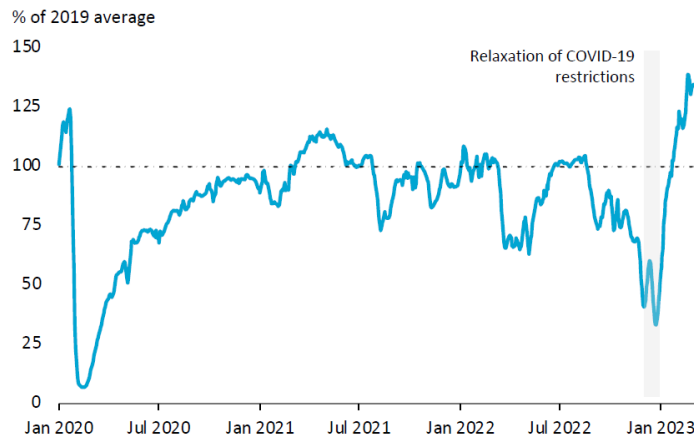


COVID-19 = coronavirus disease.
Source: Our World in Data (accessed 2 December 2022).

Mobility Restrictions

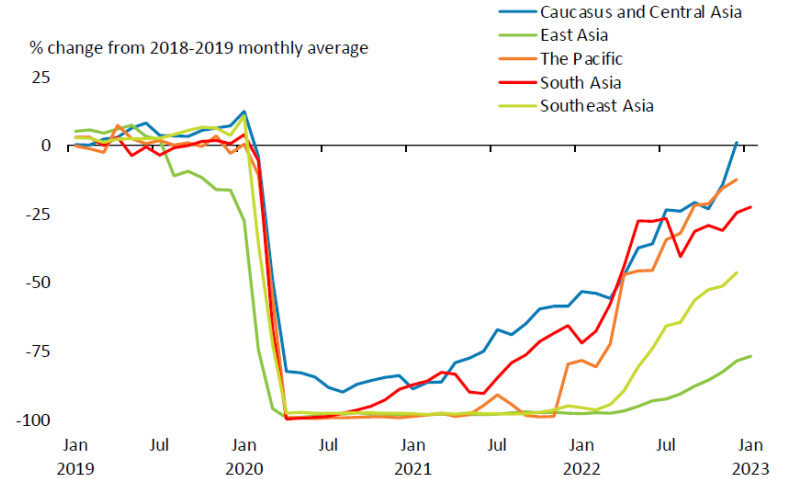


Subway Ridership in 23 Cities in the People's Republic of China



Note: 7-day average, last data point is 8 March 2023.
Source: Capital Economics.

Visitor Arrivals



Caucasus and Central Asia = Armenia and Georgia; East Asia = Hong Kong, China, Republic of Korea, and Taipei, China; The Pacific = Cook Islands, Fiji, Palau, Samoa, Tonga, and Vanuatu; South Asia = Bhutan, India, Maldives, Nepal, and Sri Lanka; Southeast Asia = Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Viet Nam.

Purchasing Managers' Index (>50 improvement; <50 worsening)

Economy	2022												2023	
	Q1			Q2			Q3			Q4			Q1	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
India	54.0	54.9	54.0	54.7	54.6	53.9	56.4	56.2	55.1	55.3	55.7	57.8	55.4	55.3
Thailand	51.7	52.5	51.8	51.9	51.9	50.7	52.4	53.7	55.7	51.6	51.1	52.5	54.5	54.8
Philippines	50.0	52.8	53.2	54.3	54.1	53.8	50.8	51.2	52.9	52.6	52.7	53.1	53.5	52.7
PRC	49.1	50.4	48.1	46.0	48.1	51.7	50.4	49.5	48.1	49.2	49.4	49.0	49.2	51.6
Indonesia	53.7	51.2	51.3	51.9	50.8	50.2	51.3	51.7	53.7	51.8	50.3	50.9	51.3	51.2
Viet Nam	53.7	54.3	51.7	51.7	54.7	54.0	51.2	52.7	52.5	50.6	47.4	46.4	47.4	51.2
Singapore	50.6	50.2	50.1	50.3	50.4	50.3	50.1	50.0	49.9	49.7	49.8	49.7	49.8	50.0
Taipei, China	55.1	54.3	54.1	51.7	50.0	49.8	44.6	42.7	42.2	41.5	41.6	44.6	44.3	49.0
Republic of Korea	52.8	53.8	51.2	52.1	51.8	51.3	49.8	47.6	47.3	48.2	49.0	48.2	48.5	48.5
Malaysia	50.5	50.9	49.6	51.6	50.1	50.4	50.6	50.3	49.1	48.7	47.9	47.8	46.5	48.4

PRC = People's Republic of China, Q = quarter.

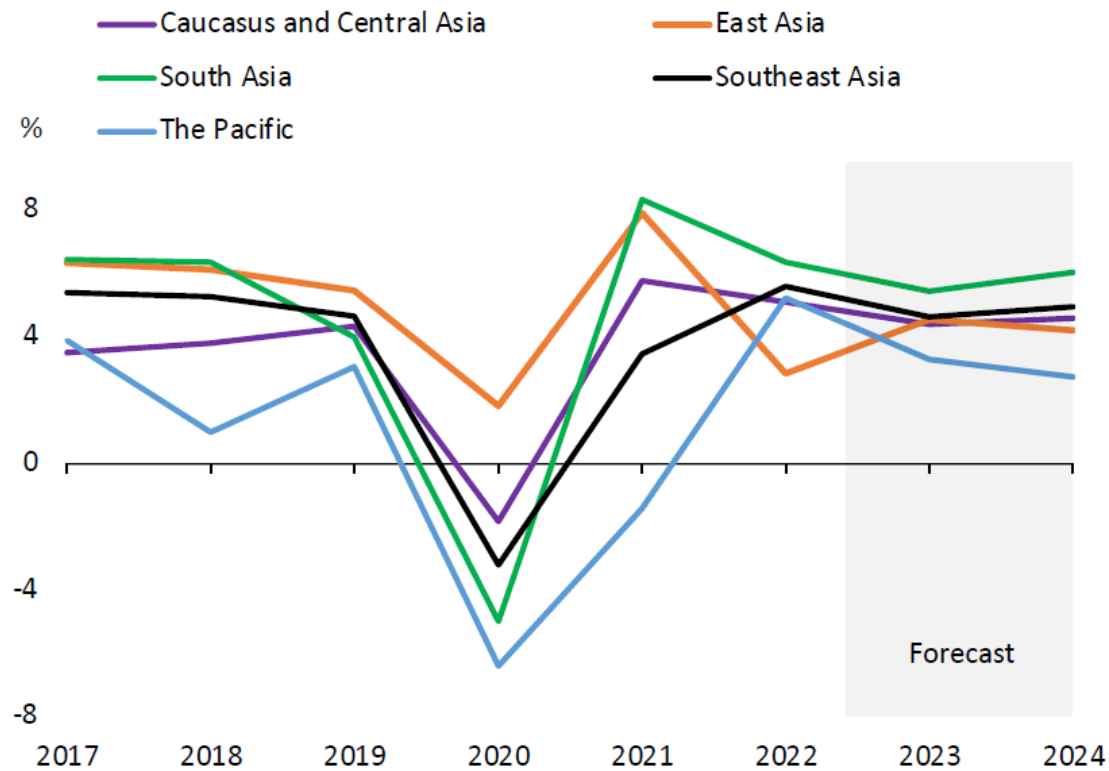
Note: Pink to red indicates worsening (<50) and white to green indicates improvement (>50). Series for Singapore is not seasonally adjusted.

Source: CEIC Data Company.

Source) Asian Development Bank

Developing Asia's "Brighter" Prospects

GDP growth is expected to return to pre-pandemic rates...



Source: Asian Development Outlook database.

...with some variation across economies.

	2022	2023	2024
Developing Asia	4.2	4.8	4.8
Developing Asia excluding the PRC	5.4	4.6	5.1
Caucasus and Central Asia	5.1	4.4	4.6
Kazakhstan	3.2	3.7	4.1
Uzbekistan	5.7	5.0	5.0
East Asia	2.8	4.6	4.2
People's Republic of China	3.0	5.0	4.5
Republic of Korea	2.6	1.5	2.2
South Asia	6.4	5.5	6.1
India	6.8	6.4	6.7
Pakistan	6.0	0.6	2.0
Sri Lanka	-7.8	-3.0	1.3
Southeast Asia	5.6	4.7	5.0
Indonesia	5.3	4.8	5.0
Viet Nam	8.0	6.5	6.8
The Pacific	5.2	3.3	2.8
Fiji	15.9	6.3	3.0
Papua New Guinea	3.2	2.4	2.6

Source: Asian Development Outlook database.

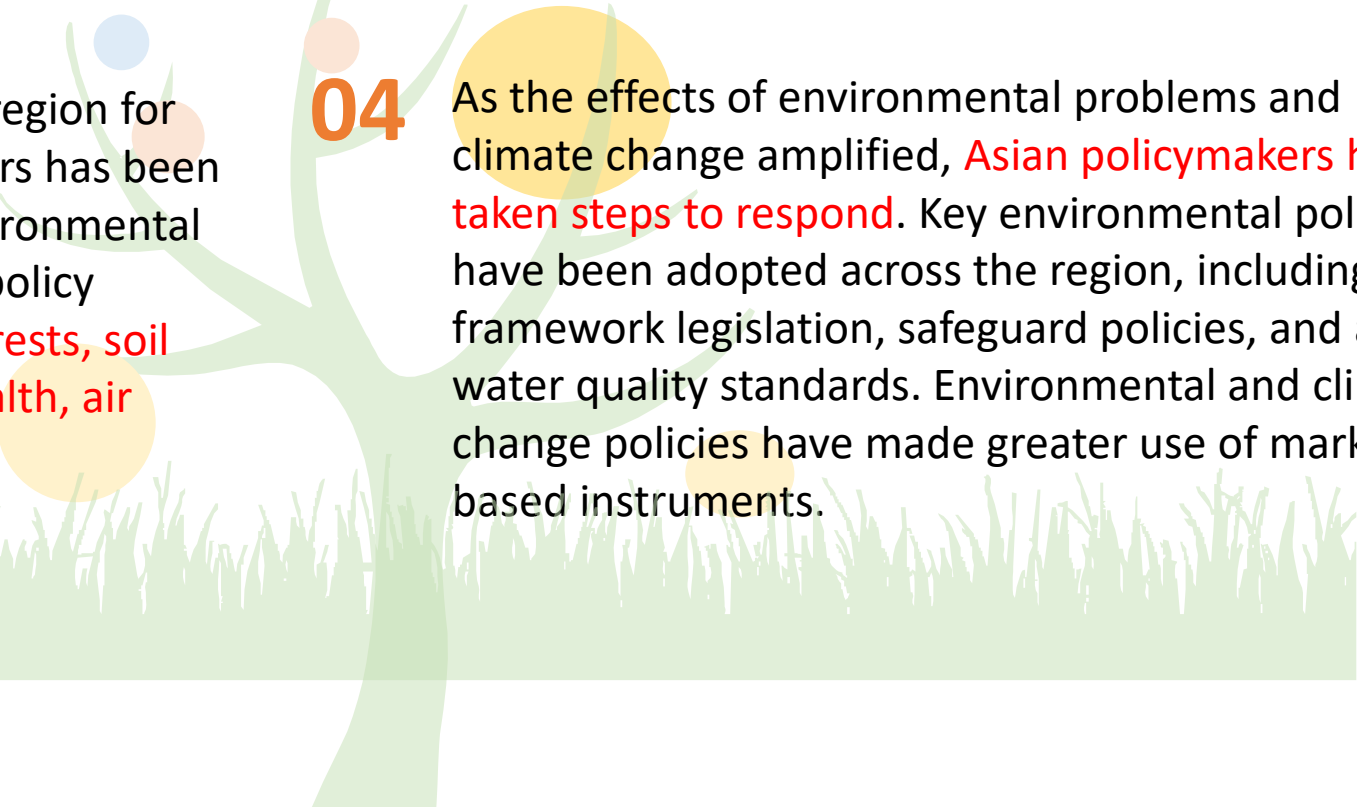
ASIAN DEVELOPMENT
OUTLOOK APRIL 2023



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Environment and Development in Asia

- 
- 01** Asia's rapid industrialization and economic transformation have also meant **more material and energy consumption**. A larger, more urban population has exerted escalating pressure on the environment.
- 02** The focus of development policies in the region for most of the earlier part of the past 50 years has been **"growth first, cleanup later,"** in which environmental considerations had low salience and low policy priority, **leading to the deterioration of forests, soil quality, freshwater ecosystems, ocean health, air quality, and biodiversity**.
- 03** **Asia's natural resources are facing additional risks** due to climate change. Although the region historically was not a major source of greenhouse gas emissions on a per capita basis, emissions have been growing much more rapidly than the global average in recent decades as Asia's growth accelerated and **energy systems have been fossil fuel dependent and carbon intensive**.
- 04** As the effects of environmental problems and climate change amplified, **Asian policymakers have taken steps to respond**. Key environmental policies have been adopted across the region, including framework legislation, safeguard policies, and air and water quality standards. Environmental and climate change policies have made greater use of market-based instruments.



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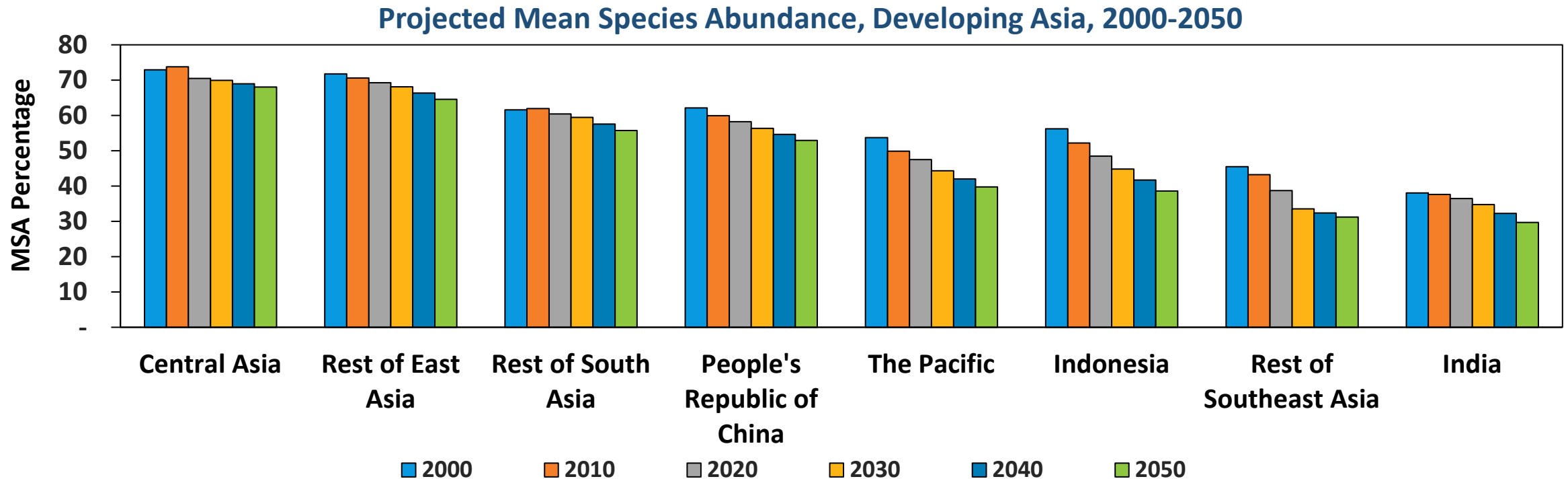
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Forests and Land

- **Forests and terrestrial ecosystems have faced significant pressure** during Asia's development. Accordingly, **biodiversity has been lost rapidly** which is still threatened due to climate change, pollution, and destruction of other important ecosystems.



MSA = mean species abundance.

Notes: MSA is defined as **the mean abundance of the original species relative to their abundance in undisturbed ecosystems**. An area with an **MSA of 100%** means a biodiversity that is similar to a natural situation. An MSA of **0%** means a completely destroyed ecosystem, with no original species remaining. Subregional averages are simple averages.

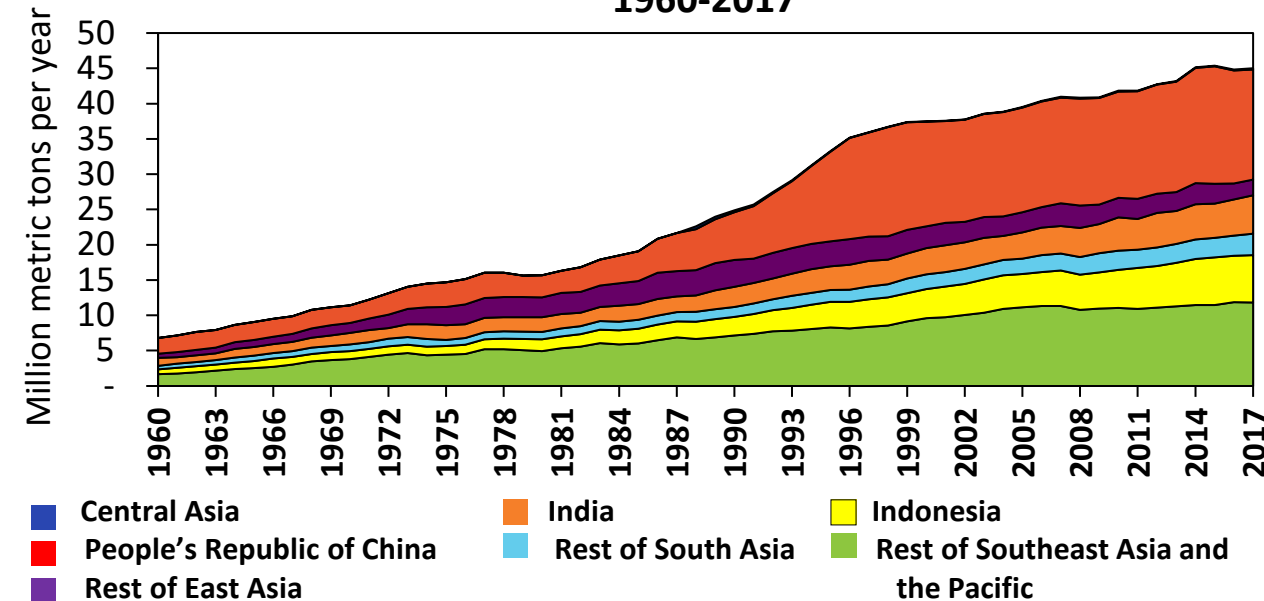
Source: PBL Netherlands Environmental Assessment Agency. *IMAGE 2.4–2.5 using GLOBIO for RIO+12 Global Integrated Assessments, Baseline Scenario*. The Hague.



Ocean Health

- Annual **fish** catches in Asia have grown 9 times over the past 50 years, leading to **overfishing** of marines areas. **Plastic waste** has also accumulated in oceans; more than half of global plastic waste is from 5 Asian countries.

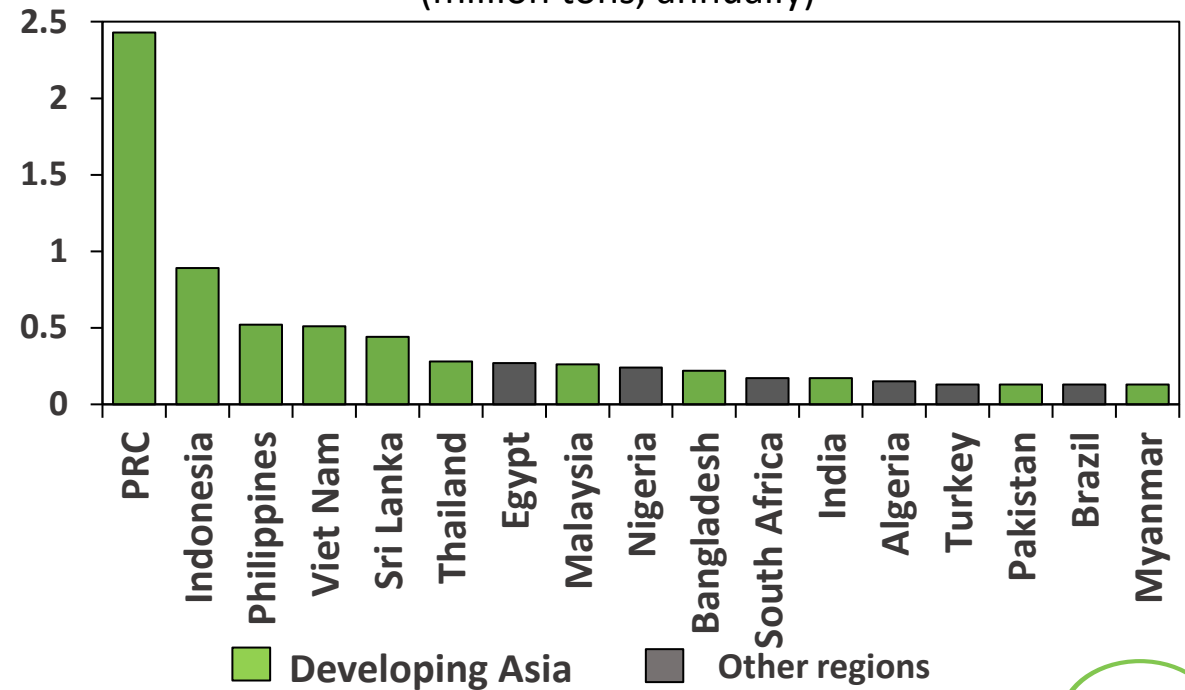
Capture Fisheries Production, Developing Asia, 1960-2017



Notes: Data availability varies across countries over time. Fish catches are reported by country of the vessel performing the catch.

Source: Food and Agriculture Organization of the United Nations. 2019. Global Capture Production 1950-2017. <http://www.fao.org/fishery/statistics/global-capture-production/query/en> (accessed 31 October 2019)/

Plastic Waste Disposal in Oceans, 2010 (million tons, annually)



PRC = People's Republic of China.

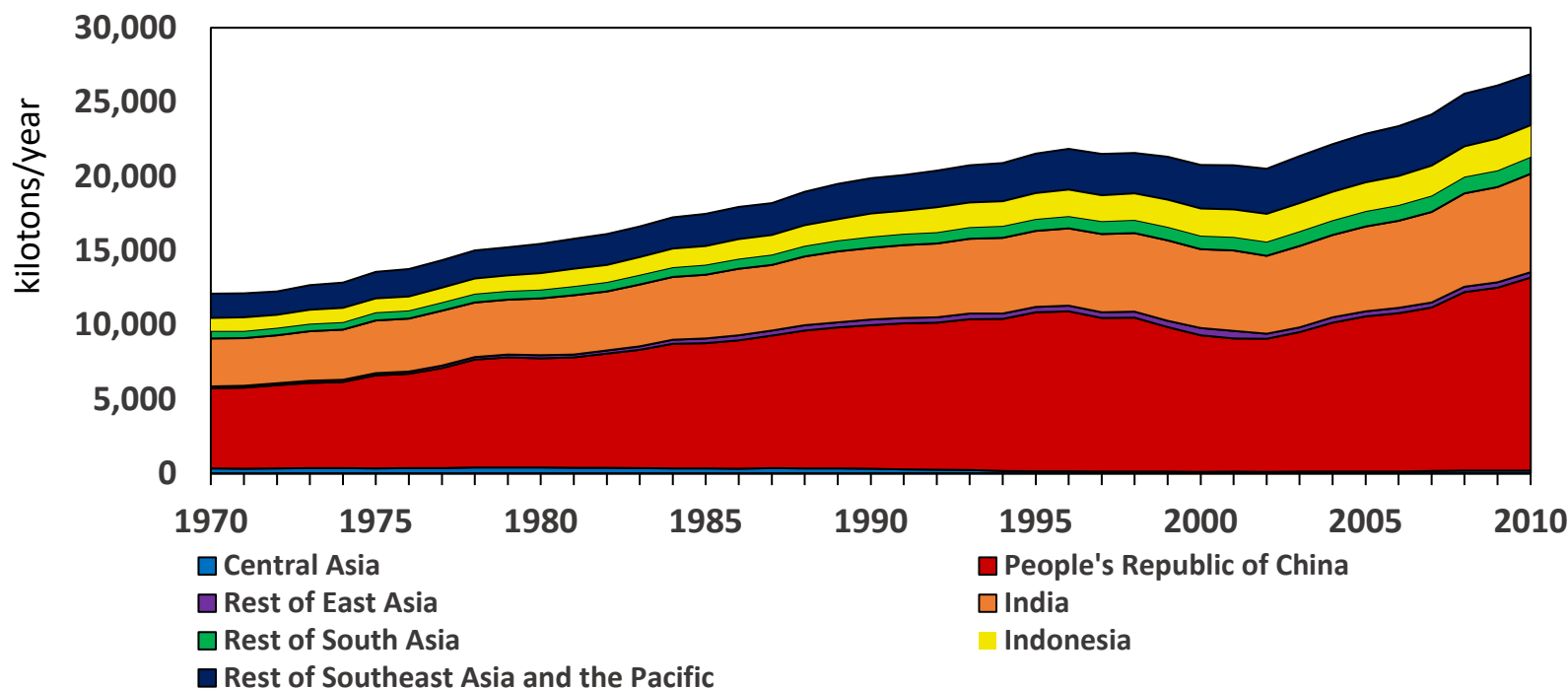
Source: Jambeck, J. R., et al. 2015. Plastic Waste Inputs from Land into the Ocean. *Science*. 347 (6,223). pp. 768-771.



Air Pollution

- Air pollution has also gravely increased. In developing Asia, fine particulate matter **PM2.5 emissions increased by 121% from 1970 to 2010.**

PM2.5 Emissions by Region, Developing Asia, 1970-2010



- Much of Asia's economic growth has been fueled by increasing reliance on **coal, oil, and gas-based energy** for an expanding array of uses.
- Overall, in low- and middle-income countries, 97% of **cities** with more than 100,000 inhabitants do not meet the air quality guidelines of the World Health Organization.
- The overall **health** impact of air pollution has risen, with 4.2 million premature deaths estimated in 2016 in developing Asia.

PM2.5 = fine particulate matter.

Note: Data availability varies across countries over time.

Source: European Commission. Emissions Database for Global Atmospheric Research. <http://edgar.jrc.ec.europa.eu/> (accessed 5 February 2019).



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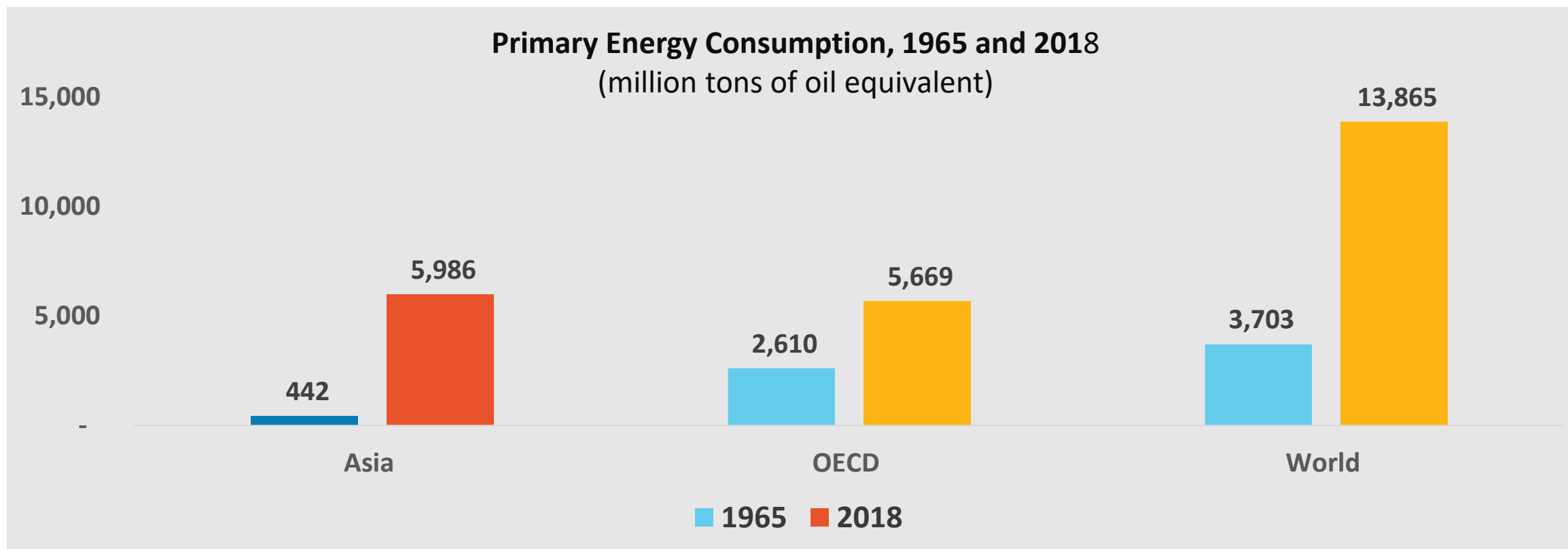
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Energy Consumption

- Asia's final energy consumption increased significantly—by **13.5 times**—between 1965 and 2018.



OECD = Organisation for Economic Co-operation and Development

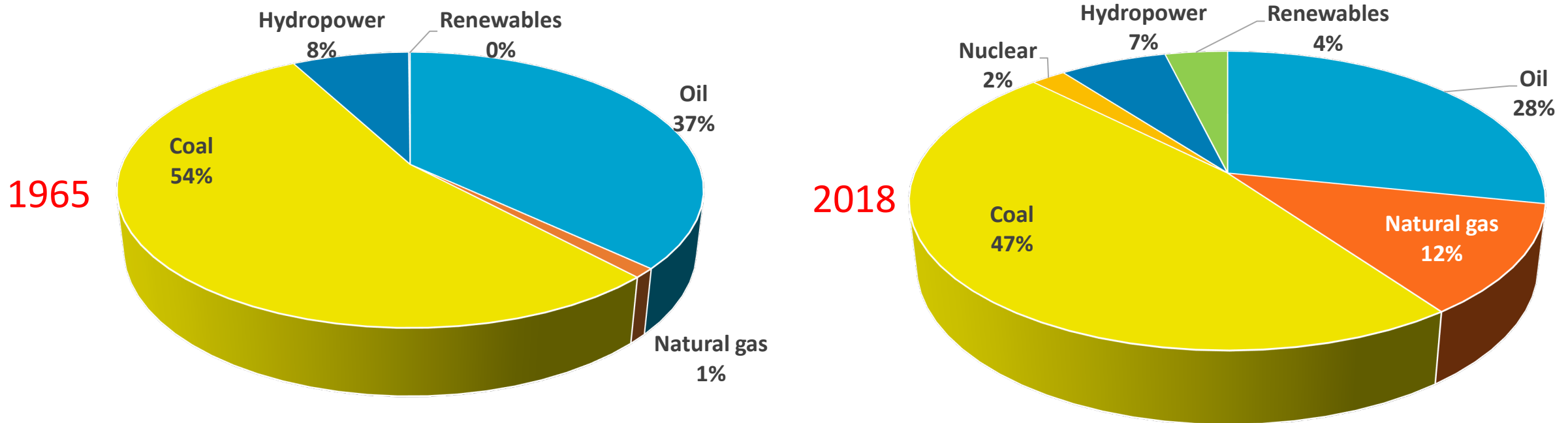
Sources: BP. 2019. *BP Statistical Review of World Energy 2019*. <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>; and World Bank. World Development Indicators. <https://data.worldbank.org/> (accessed 29 October 2019).



Energy Source in Asia

- In Asia and the Pacific, **coal is the primary energy source**, followed by oil and natural gas, although the region's dependency on fossil fuels decreased somewhat as nuclear and renewable energy grew.

Primary Energy Consumption in Asia, 1965 and 2018



OECD = Organisation for Economic Co-operation and Development.

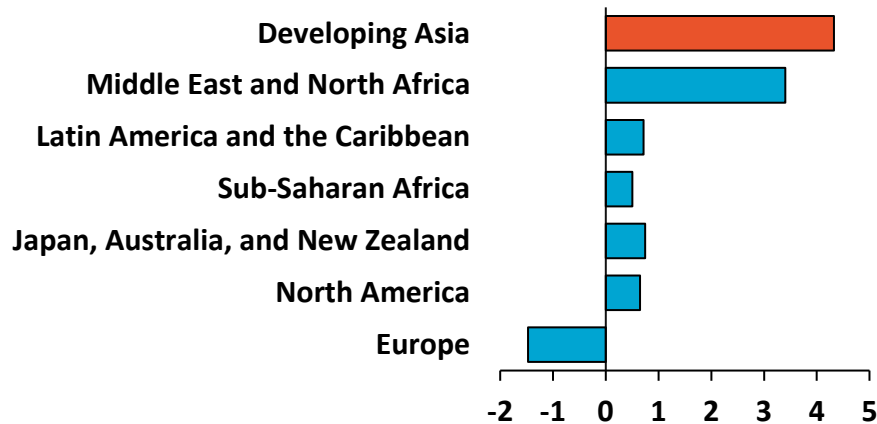
Sources: BP. 2019. *BP Statistical Review of World Energy 2019*. <https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>; and World Bank. World Development Indicators. <https://data.worldbank.org/> (accessed 29 October 2019).



GHG Emissions

- Developing Asia's **greenhouse gas (GHG) emissions** have risen rapidly with economic growth. Its global share rose from **13% in 1965 to 49% in 2018**.

Greenhouse Gas Average Annual Emissions
Growth in World Regions, 1990-2014

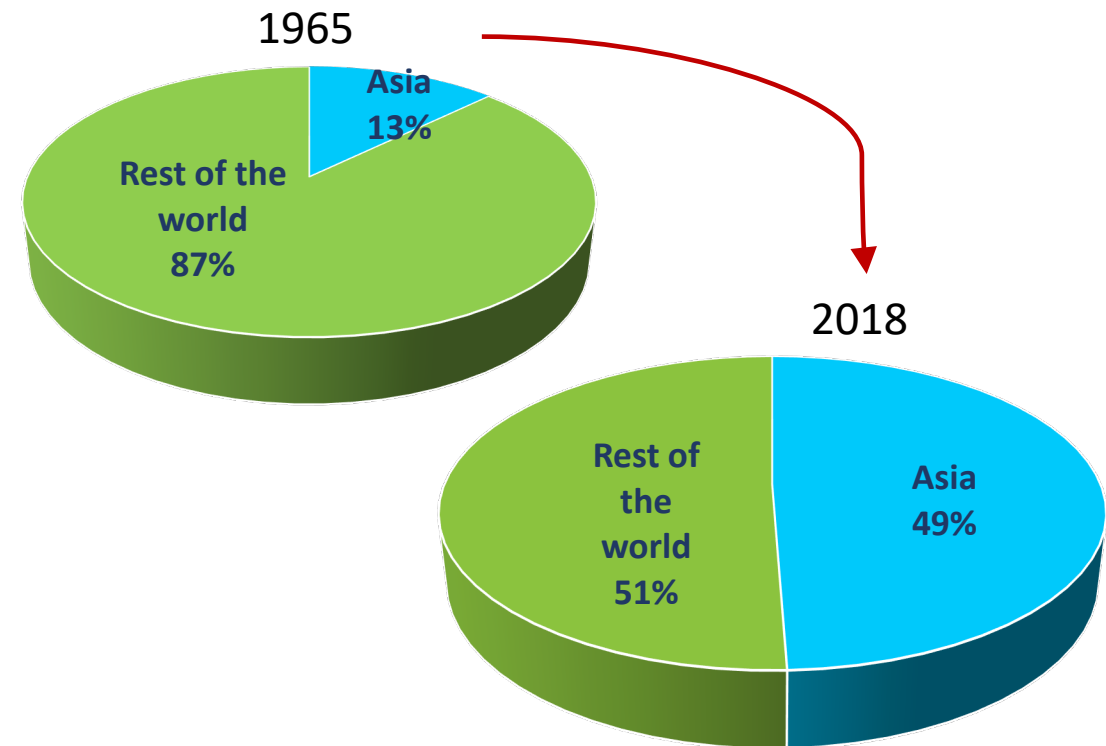


Note: Includes emissions from land use, land-use change, and forestry.
Source: Author's calculations from World Resources Institute. CAIT Climate Data Explorer. <http://cait.wri.org> (accessed 26 October 2019).

Drivers of rise in GHG:

- Agriculture sector
- Expanded electrification
- Coal's dominance in power generation mixes
- Fuel subsidies
- Deforestation (esp. in Southeast Asia)

Share of Global CO₂ Emissions



CO₂ = carbon dioxide, OECD = Organisation for Economic Co-operation and Development

Sources: BP. 2019. *BP Statistical Review of World Energy 2019*.

<https://www.bp.com/en/global/corporate/energy-economics/statistical-review-of-world-energy.html>; and

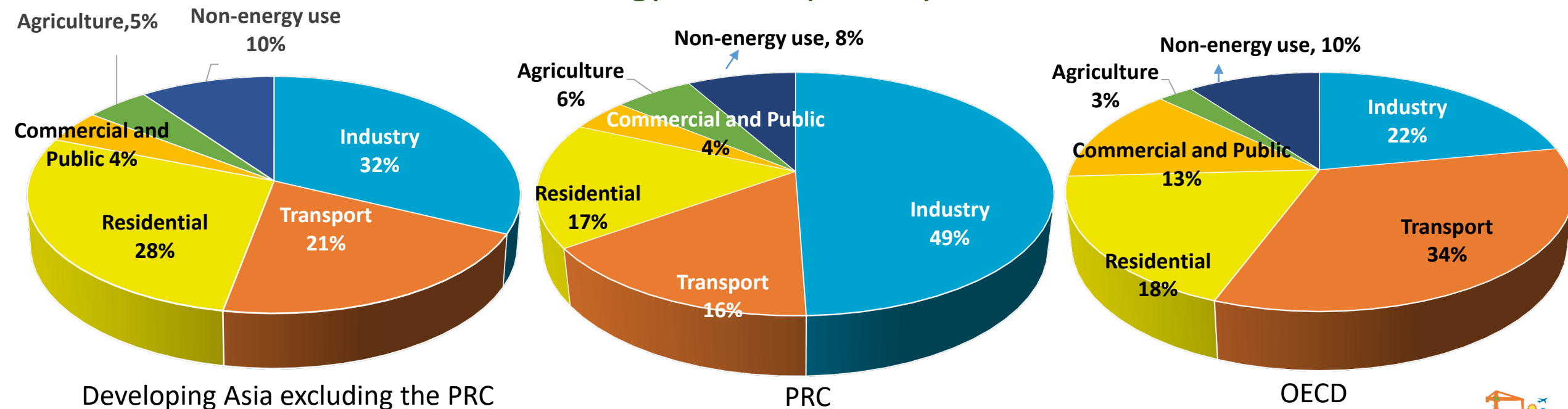
World Bank. World Development Indicators. <https://data.worldbank.org/> (accessed 29 October 2019).



Users of Energy

- The **industry and residential sectors** are the two largest final energy consumers in developing Asia, followed by **transport**.
 - Industry has the highest share of final consumption in the People's Republic of China (PRC). In the Organisation for Economic Co-operation and Development, transport has the top share.

Final Energy Consumption by Sector, 2017



OECD = Organisation for Economic Co-operation and Development, PRC = People's Republic of China.

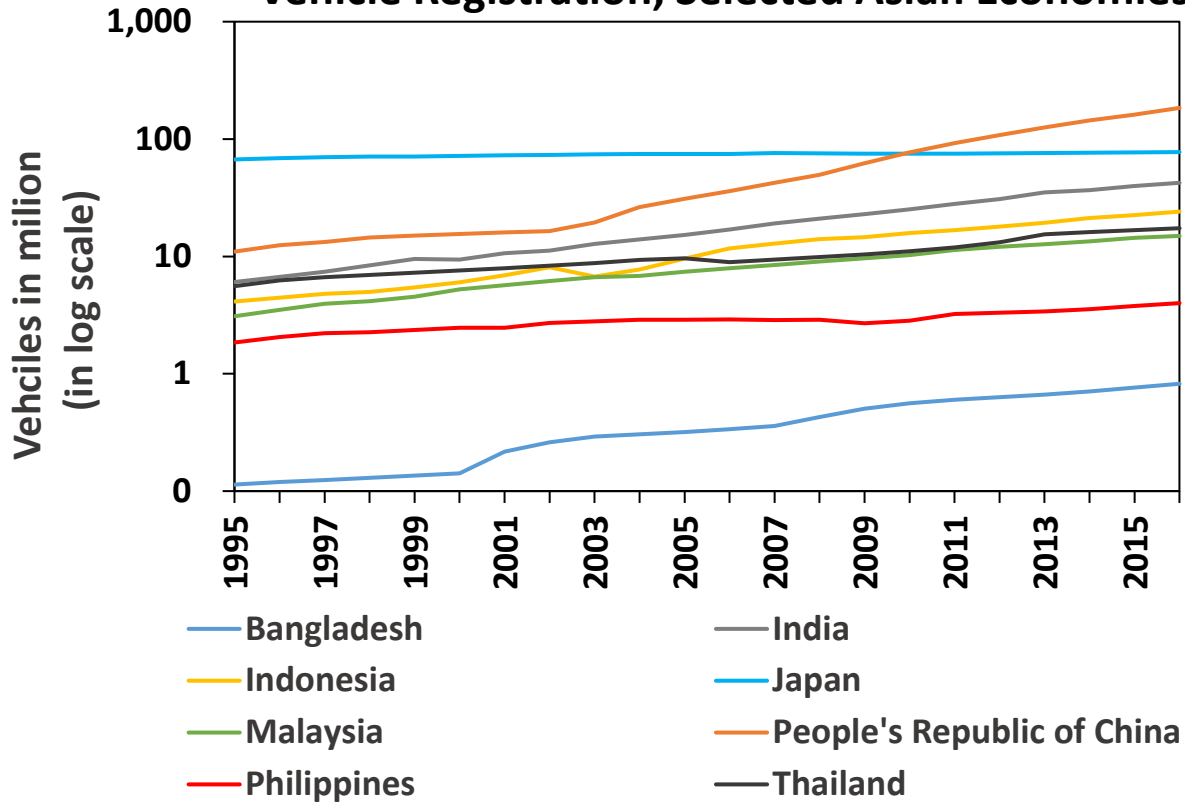
Sources: IEA. *Statistics*. <https://www.iea.org/statistics/>; and World Bank. World Development Indicators. <https://data.worldbank.org> (accessed 29 October 2019).



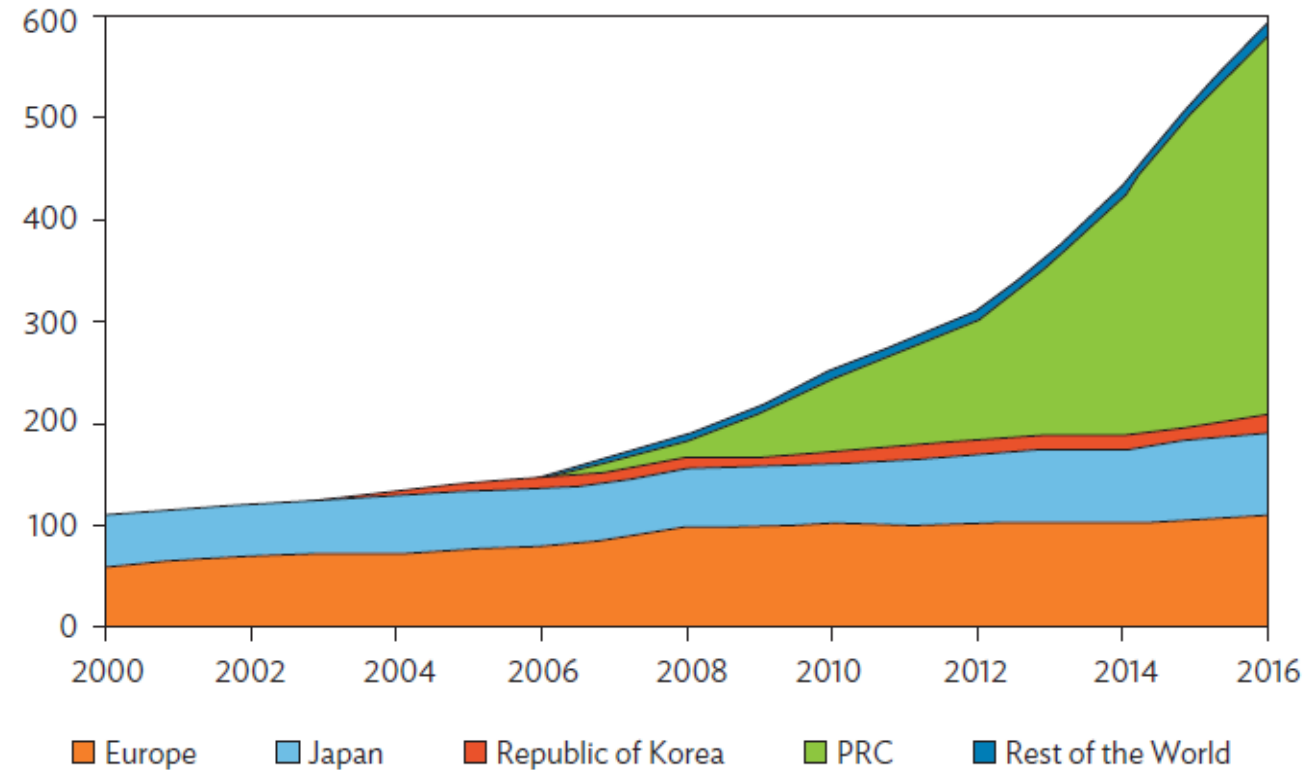
Transport in 2000s, 2010s, and 2020s

- From the 2000s onwards, **road congestion** becomes a critical issue in many developing Asian countries. The 2010s saw a much more balanced approach to transportation system

Vehicle Registration, Selected Asian Economies



High-Speed Rail Activity in Key Regions, 2000-2016
(billion passenger-kilometer)



Source: World Health Organization.2018. *Global Status Report on Road Safety*. Paris

PRC = People's Republic of China.

Source: International Energy Agency. 2019. *The Future of Rail*. Paris.

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Policy Actions

- Asia started implementing key **environmental policies since the 1970s**. During 1990s, several Asian economies introduced environment quality standards, and nearly all had a framework for environmental legislation.

Water and Air Quality Standards in Developing Asia

Policy	1960-1969	1970-1979	1980-1989	1990-1999		2000-2009		2010-2016	
Establishment of water quality standards	Brunei Darussalam	India	Hong Kong, China	Azerbaijan	Nepal	Afghanistan	PNG	Cook Islands	Turkmenistan
		Malaysia		Bangladesh	ROK	Armenia	PRC	Maldives	Tuvalu
		Philippines		Cambodia	Timor-Leste	Bhutan	Samoa	Mongolia	Pakistan
		Taipei, China		Kyrgyz Rep.	Uzbekistan	Indonesia	Tajikistan	Nauru	
				Lao PDR		Kazakhstan	Vanuatu	PRC	
Establishment of air quality standards	Hong Kong, China	Taipei, China	India	Armenia	Pakistan	Azerbaijan		Afghanistan	
				Cambodia	Philippines	Mongolia		Malaysia	
				Georgia	ROK	Sri Lanka		PRC	
				Indonesia	Tajikistan			Turkmenistan	
				Kyrgyz Rep.	Uzbekistan				
			Maldives						

Lao PDR = Lao People's Democratic Republic, PRC = People's Republic of China, ROK = Republic of Korea

Notes: Economies with environment ministries merged with other functions and those with unclear establishment dates are not included. Year used for legislation is the year when separate legislation was adopted for air quality and water quality.

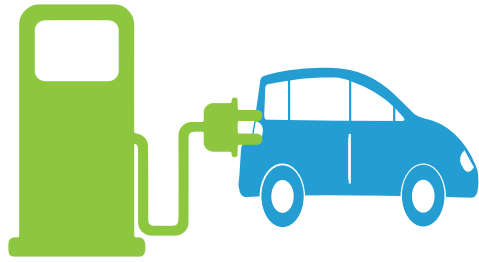
Sources: Environment ministry websites of listed governments, various sources; primary source materials from available databases in environment legislation.



Evolving Approaches

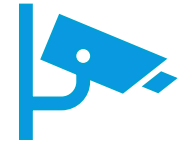
- Policy makers in the region have increasingly **mainstreamed** attention to the environment in their development strategies. **Market-based policy instruments** have also emerged in Asia as a means of directly addressing incentive problems.

Market-based instruments used include taxes, fees, or charges; subsidies; tradable permits; cap-and-trade and emission trading schemes; payments for ecosystem services; and information provision, labels, and voluntary agreements.



For air pollution and climate change mitigation, these instruments include **measures to control emissions, and promote energy efficiency and renewable energy.**

For water resources management, **volumetric pricing and markets for irrigation water** have developed in selected locations.



Both judicial activism and civil society participation have **increasingly monitored environmental actions.**



Climate Change and Disaster Risks

- Developing Asia is one of the world's most **vulnerable** regions to the impact of climate change. Rising global temperatures have also exacerbated natural resource degradation.
 - ❖ Under climate change, Asia's substantial population dependent on agriculture and natural resources will be affected by **more droughts, floods, salinity intrusion, and pest and disease epidemics for crop production**.
 - ❖ Reduced **water** availability for irrigation and increased water demand will increasingly constrain production.
 - ❖ With temperatures to rise even further, **productivity** will be lost in sectors where cooling is not possible.
 - ❖ Human **health** will be impacted by increased incidence of vector borne diseases (such as malaria and dengue) as climate change worsens. Cardiovascular mortality from heat stress and other illnesses also poses high health risk.
 - ❖ More frequent floods and landslides from intensified rainfall and storms will expose other populations to increased **disaster risk** as well.
 - ❖ Rising global **temperatures** have exacerbated natural resource degradation. Approximately 95% **of coral reef area** in Southeast Asia is considered highly threatened by **rising ocean temperatures and acidification**.
 - ❖ **Tropical Asian forests** will be severely affected by increasing frequency of fires and by water stress.
 - ❖ Many countries will be affected by a rise in sea levels.



Hazards, Exposure, & Vulnerability, Causing Disasters



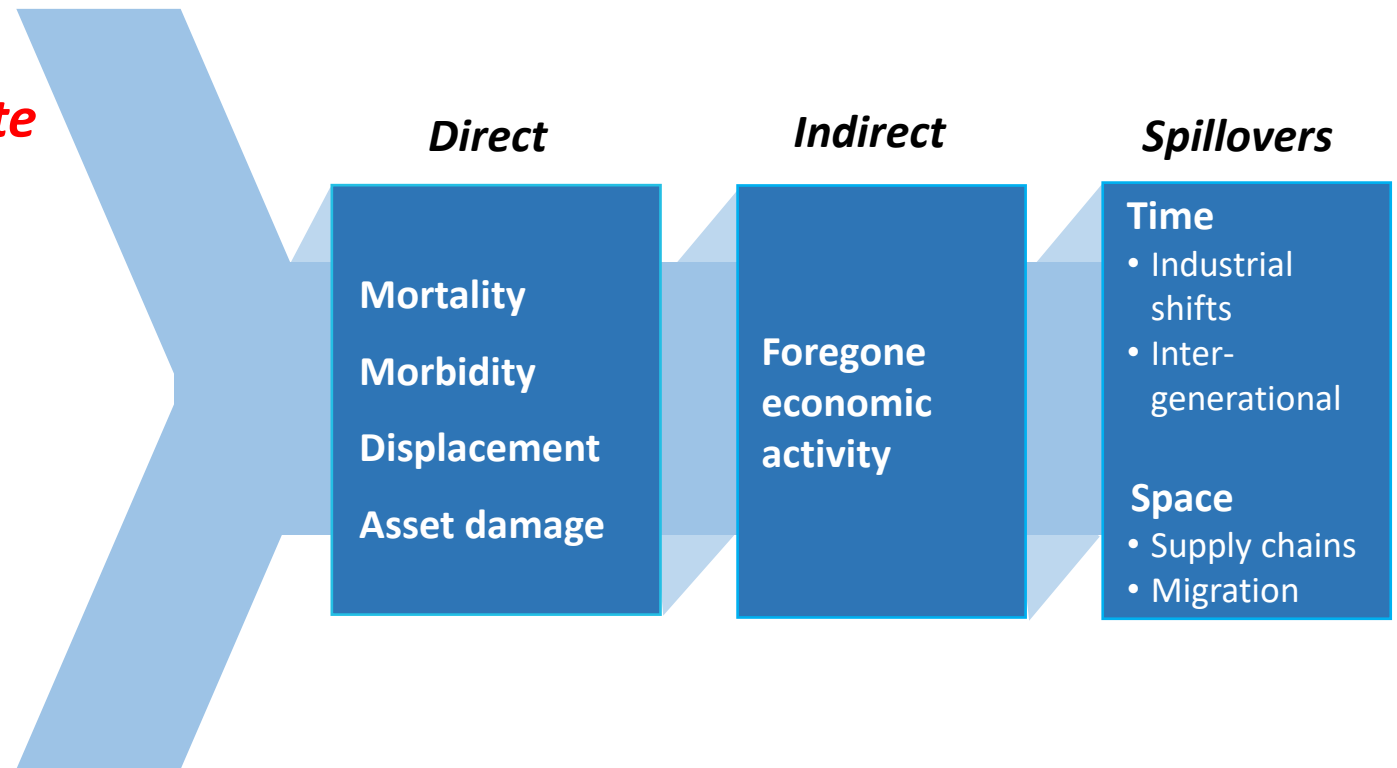
Hazards
(due to climate change)



Exposure



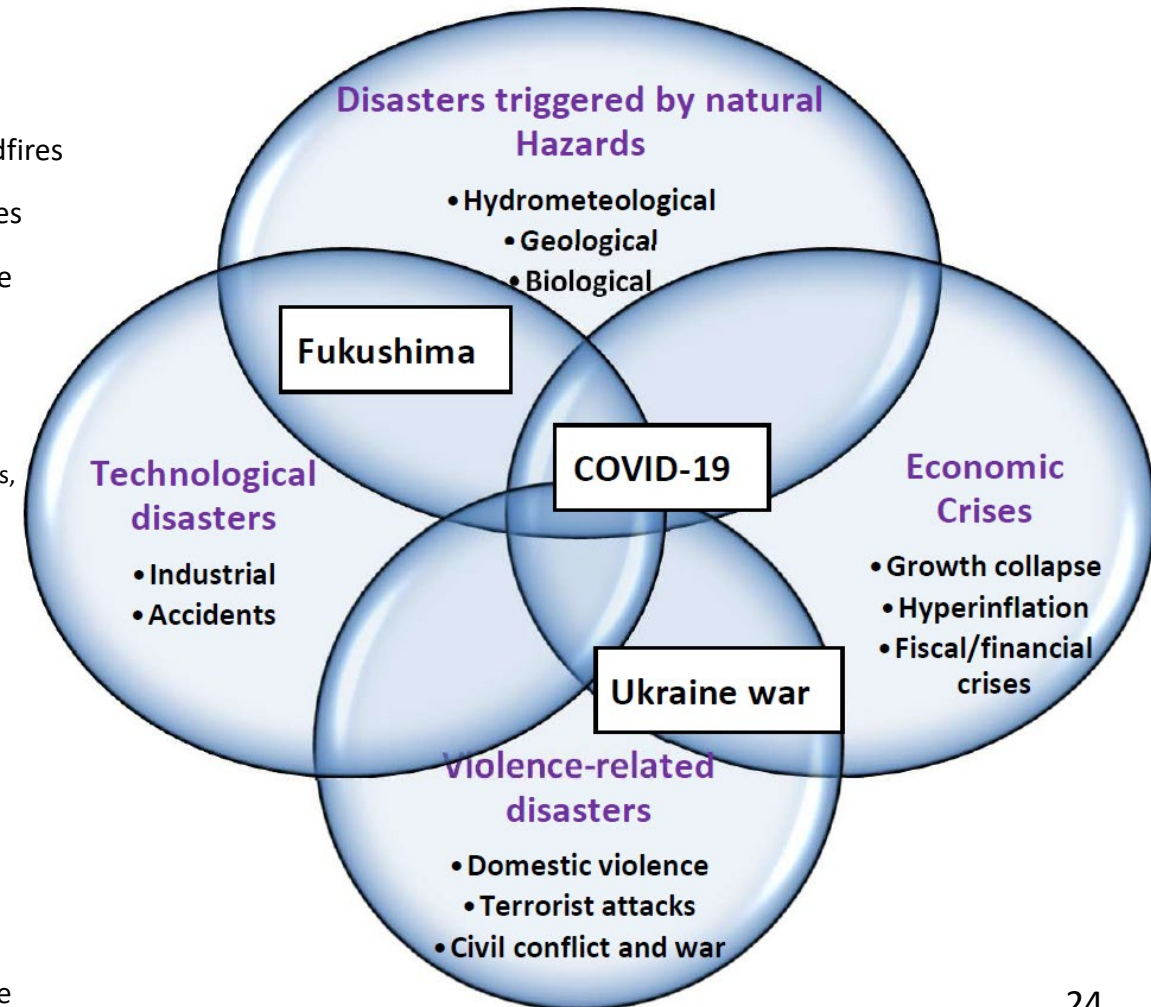
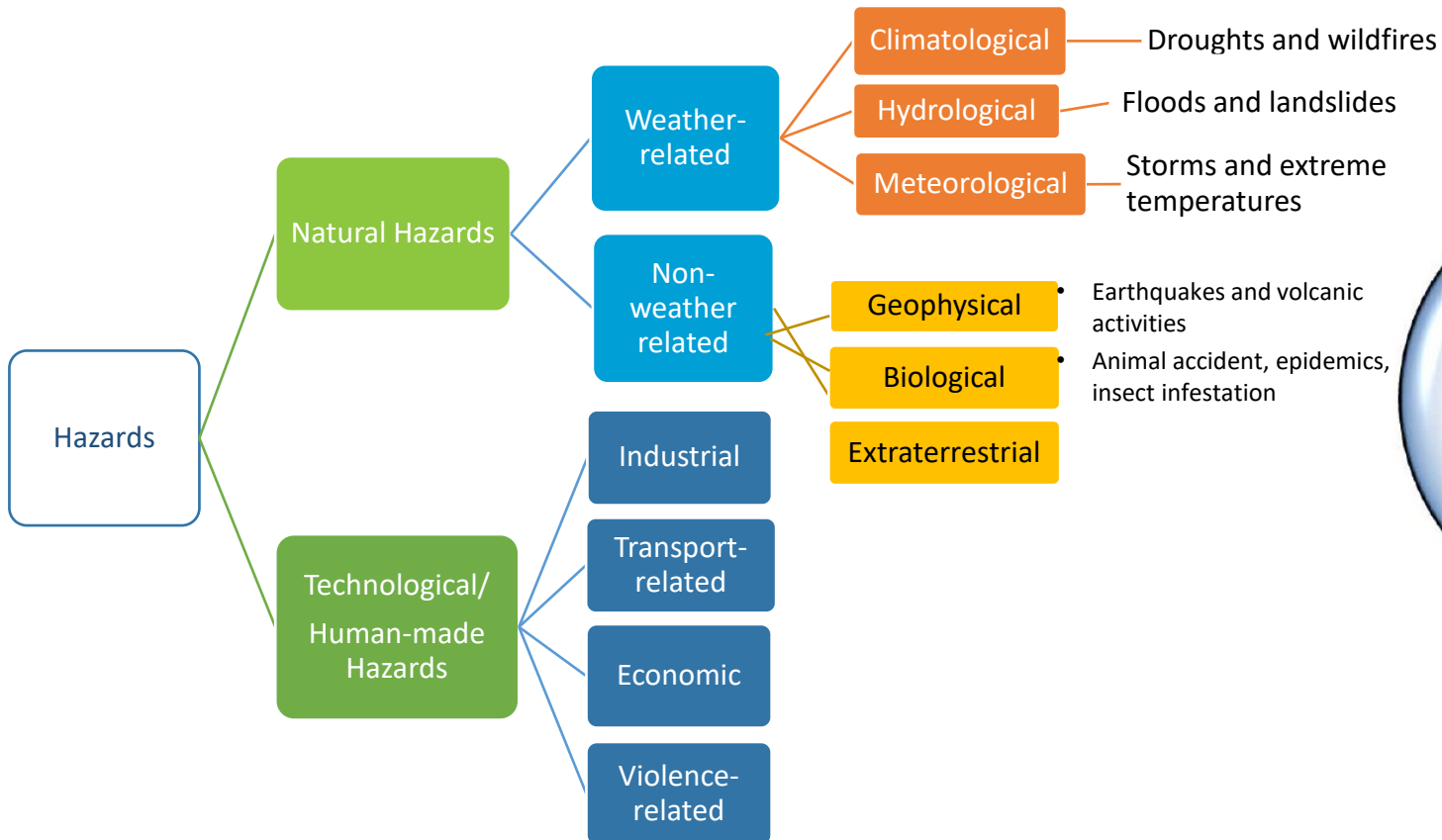
Vulnerability



Source: *Asian Development Outlook 2019: Strengthening Disaster Resilience*, Asian Development Bank.
<https://www.adb.org/publications/asian-development-outlook-2019-strengthening-disaster-resilience>

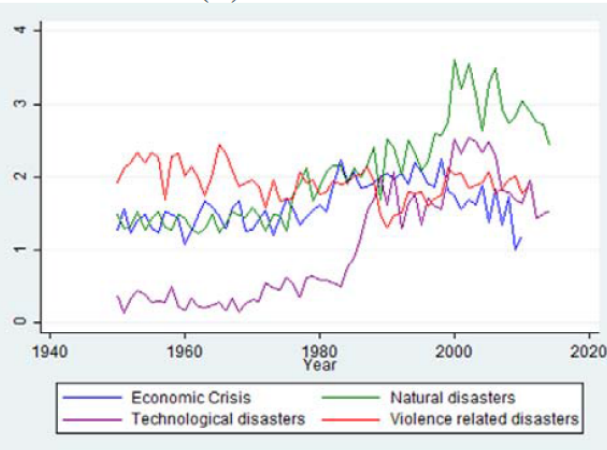
Disaster Taxonomy, Complexity, and Ripple Effects

- Hazards are either natural or human-made.
- Compoundedness and complexity
- Ripple effects over time and space

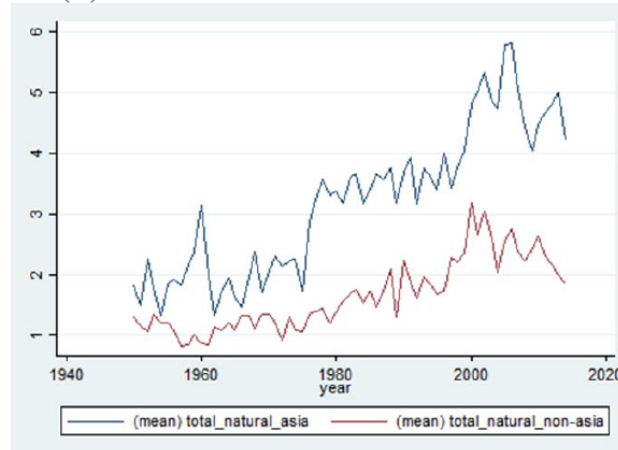


Disasters Trends

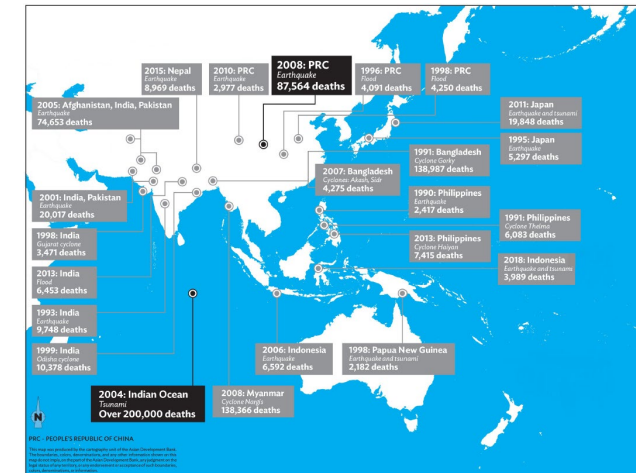
(A) Global Trend



(B) Natural disasters in Asia and Non-Asia

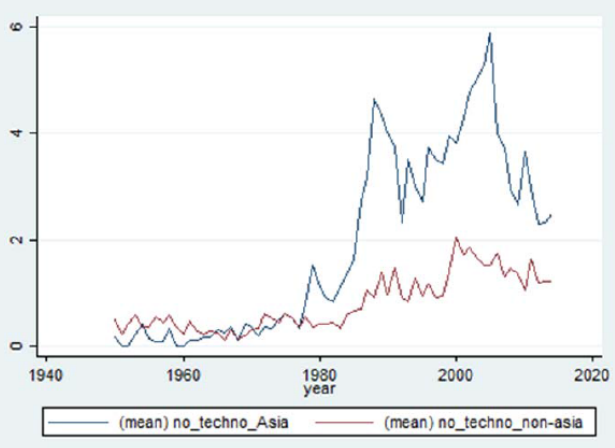


High-profile disasters in Asia since 1990

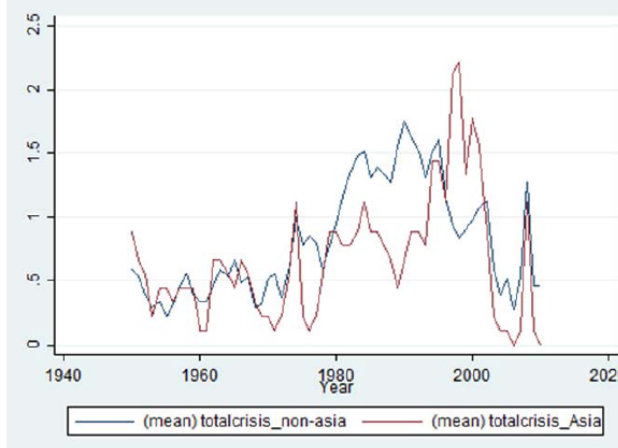


- **On economic crises:**
- The **“double mismatch”** problem
 - Maturity and currency mismatches
- **Evolution of policies against “systemic risk” of economic crises:**
 - After the AFC, many Asian economies shifted to **more flexible exchange rates**.
 - The use of **capital flow management measures** (such as minimum holding periods for government bonds by nonresidents and restrictions on external borrowing by banks), which restrict certain types of capital flows, has also picked up.
 - **Macroprudential policies** have become an integral part of macroeconomic management globally through IMF, Financial Stability Board, and G20.
 - Measures such as caps on loan-to-value or debt-to-income ratios, or countercyclical capital requirements, aim to limit the risk of financial system distress.

(C) Technological Disasters in Asia and Non-Asia



(D) Economic Crises in Asia and Non-Asia



Note) These figures indicate the average occurrence of the four types of disaster per country per year.

Data sources) Natural and technological disasters are from CRED’s EM-DAT database; wars are from the Correlates of War (COW) database; and economic crisis is from Reinhart and Rogoff (2010) and IFS.

Resilience against Systemic Economic Risk

- **Post-AFC regional monetary and financial cooperation in Asia.** The AFC also prompted Asian governments to consider alternative regional arrangements and institutions, which complement IMF support.

One early suggestion in mid-1997 was Japan's proposal to create an **Asian Monetary Fund**. This did not materialize, in part due to US opposition on the ground that such a new system could compromise the role of the IMF and create moral hazard.

mid-1997

By then, other initiatives based on similar ideas as the Manila Framework had grown more important, such as the Association of Southeast Asian Nations (ASEAN) plus Japan, the People's Republic of China (PRC), and Korea (**ASEAN+3 Chiang Mai Initiative (CMI)**), a network of bilateral swap arrangements among ASEAN+3 countries—a first for the region.

The ASEAN+3 in 2011 established a **Macroeconomic Research Office (AMRO)**, located in Singapore, to monitor CMIM economies, support implementation of the CMIM, and provide technical assistance to CMIM members.

2011

November 1997

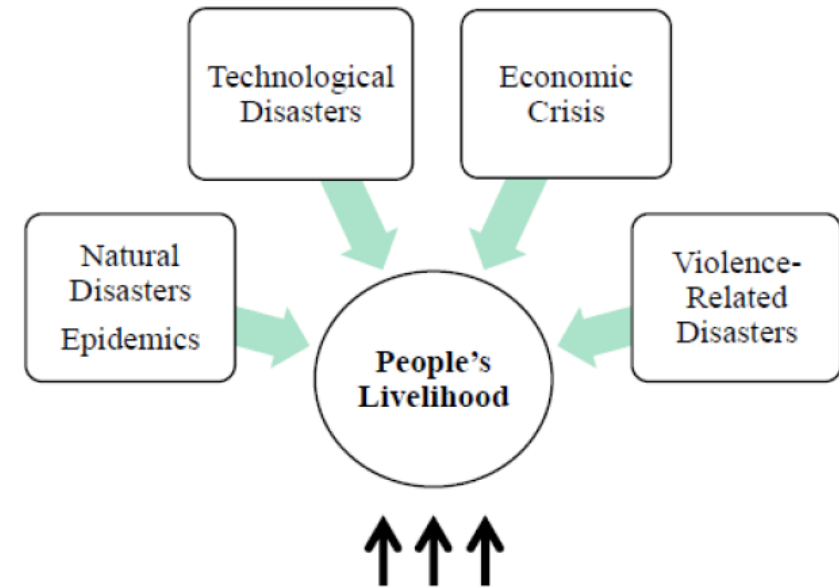
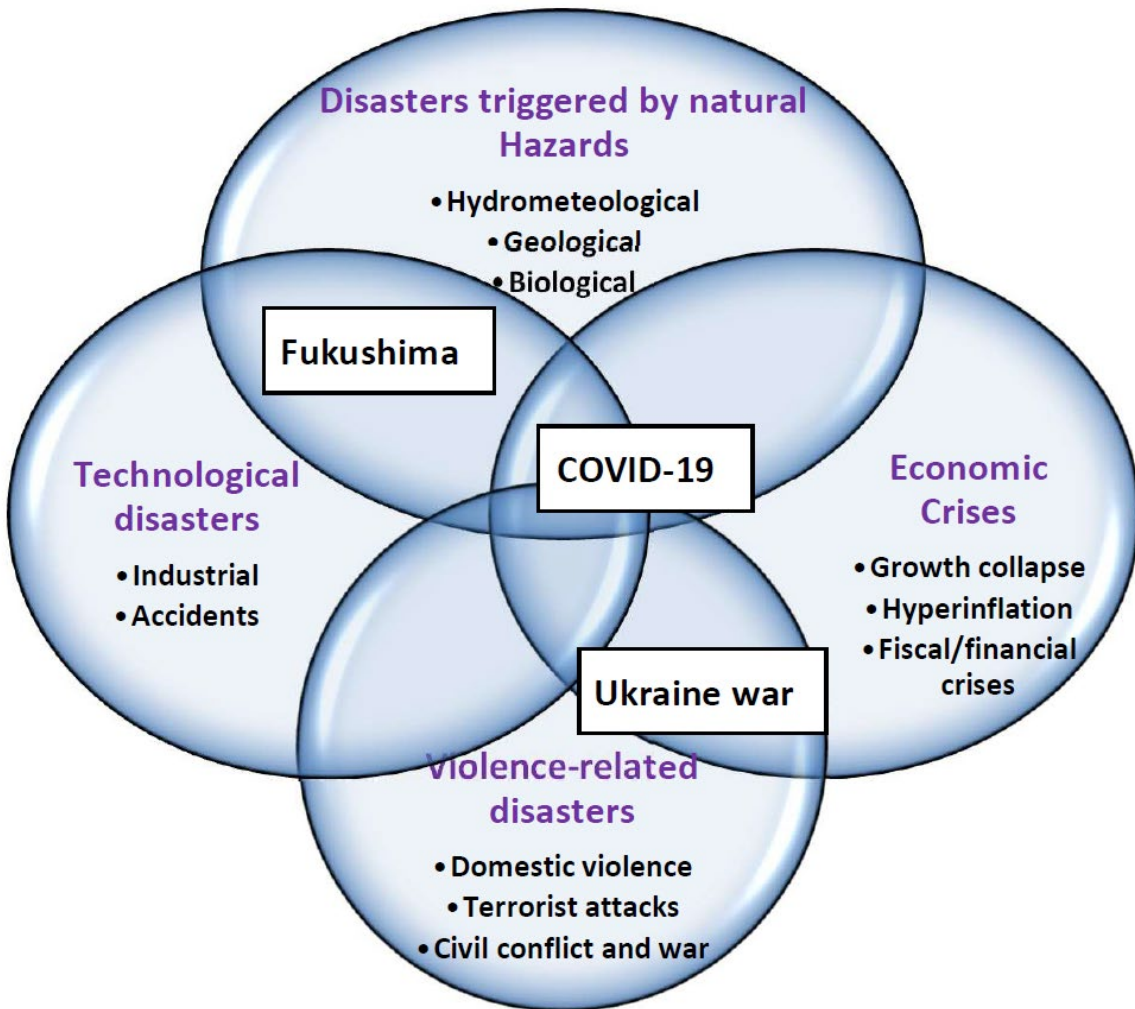
In November 1997, the Manila Framework (New Framework for Enhanced Asian Regional Cooperation to Promote Financial Stability) was endorsed by 18 Asia-Pacific Economic Cooperation leaders. It comprised mutual foreign exchange financing during the crisis, surveillance among members, and technical assistance for capacity building. Manila Framework meetings were held periodically until it was terminated in 2004.

2010

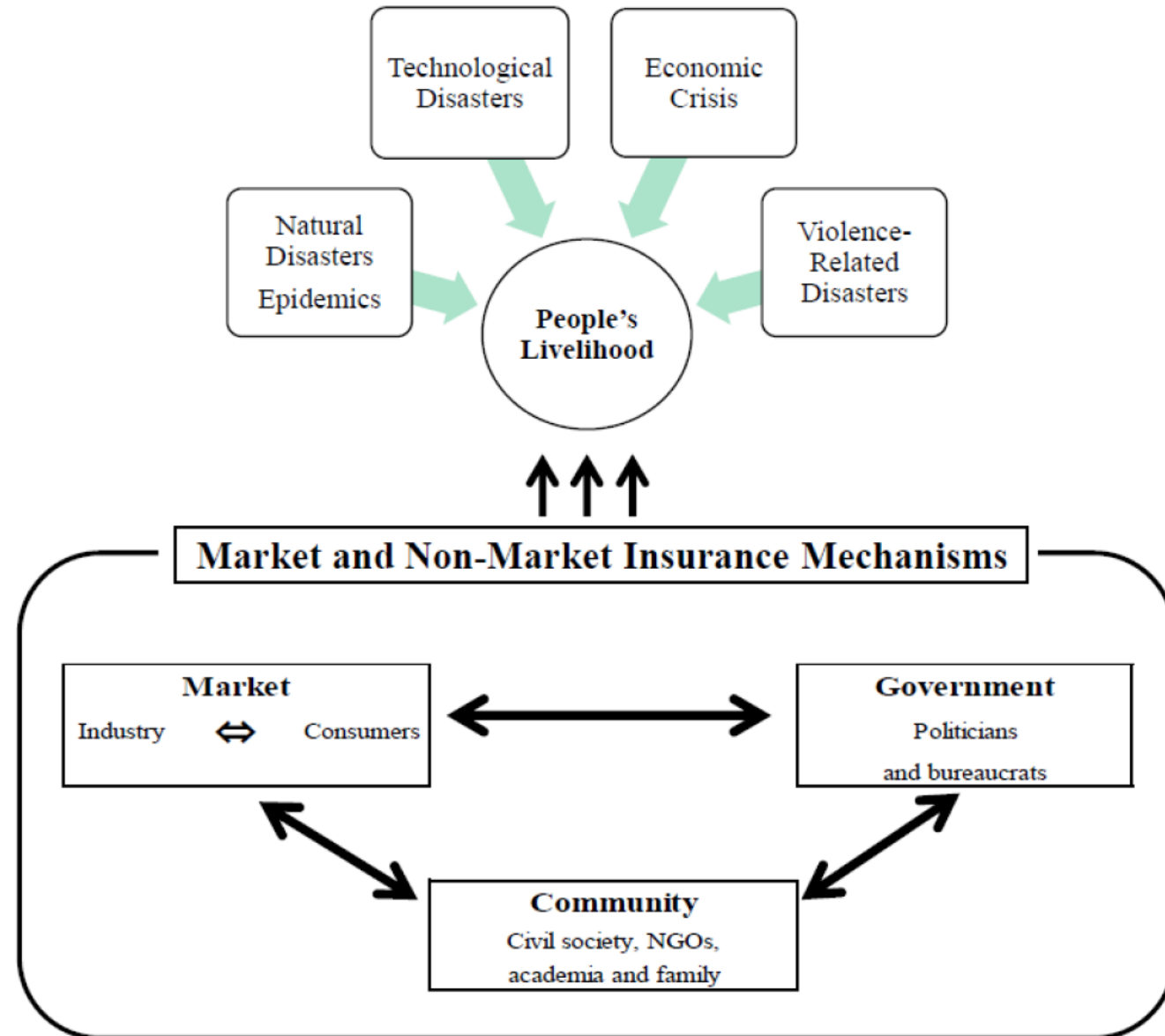
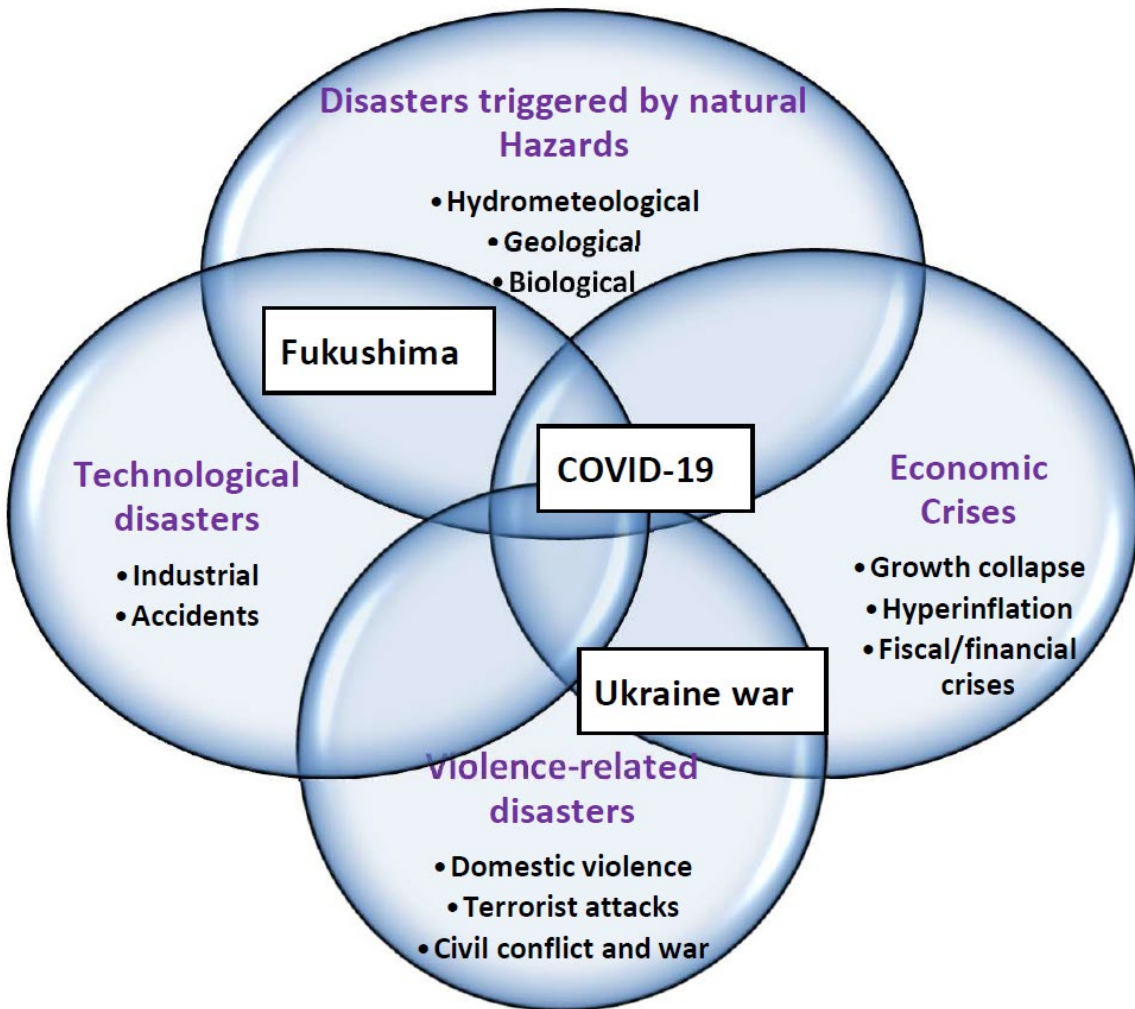
CMI became **the Chiang Mai Initiative Multilateralization (CMIM) in 2010**, a multilateral currency swap arrangement under a single contract between countries, initially totaling \$120 billion and expanding to \$240 billion in 2012.



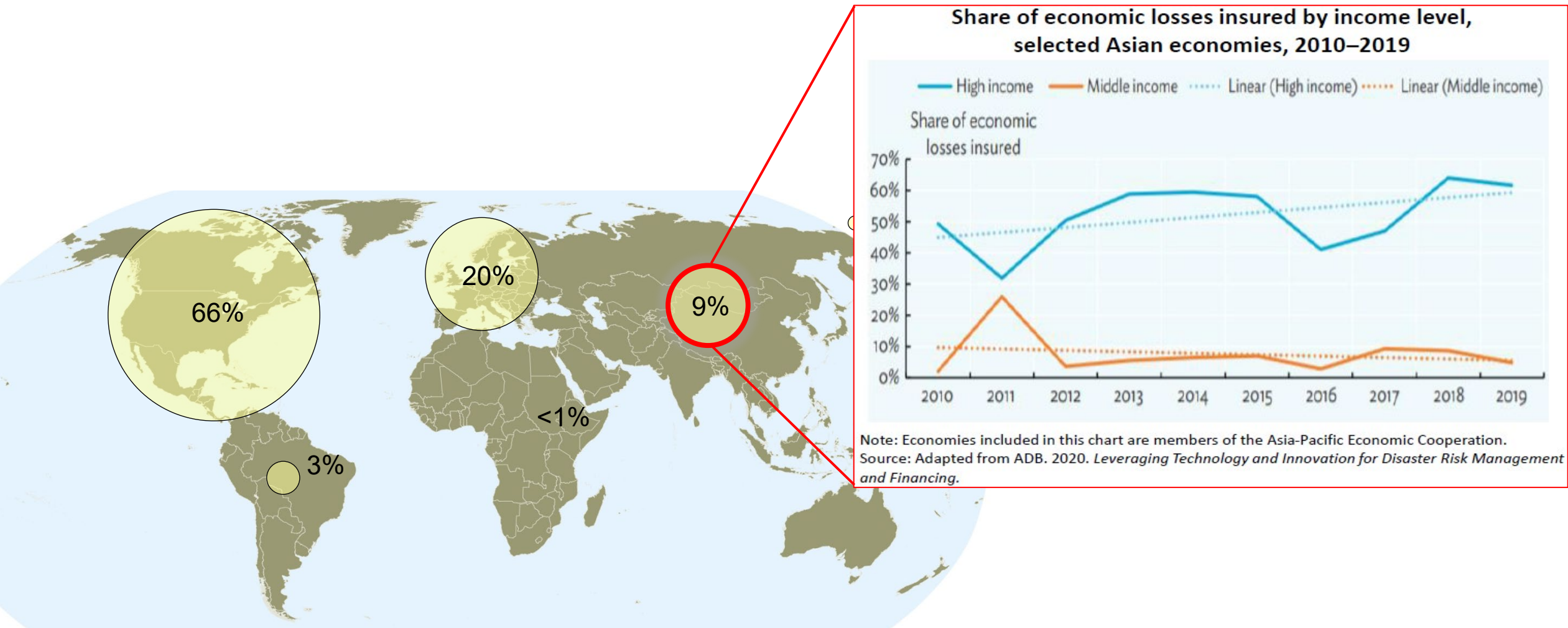
Market, State, and Community “Insurance” Mechanisms



Market, State, and Community “Insurance” Mechanisms



Markets Fail



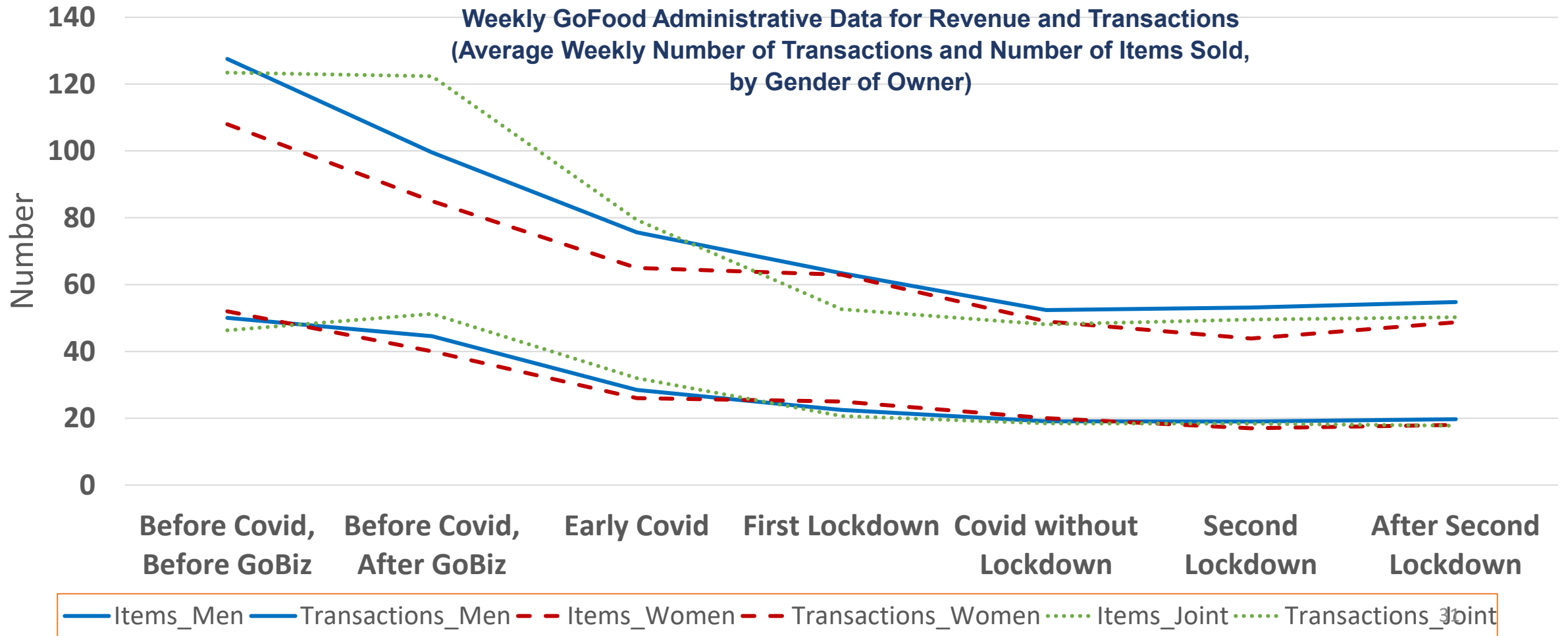
Note: Economies included in this chart are members of the Asia-Pacific Economic Cooperation.
Source: Adapted from ADB. 2020. *Leveraging Technology and Innovation for Disaster Risk Management and Financing.*

Markets Fail

- **Conventional indemnity-based insurance** arrangements fail (Adachi, Nakata, Sawada, and Sekiguchi, 2023, JEBO):
 - Foreign firms under 2011 Thai floods
 - Property insurance and business interruption insurance revealed serious adverse selection and moral hazard problems.
- **Innovative microinsurance programs** have been unpopular
- **Macro insurance** (CRIFF and PCRAFI) and CAT Bond markets remain small

Markets Fail but Promising

- Transaction data from **GoJek Indonesia** show that the digital platform helped micro-merchants to survive (Elhan-Kayalar, et al., 2022)



Governments also Fail

The middle layer of risk is most suited for transfer through disaster insurance...

Layered approach to disaster risk financing

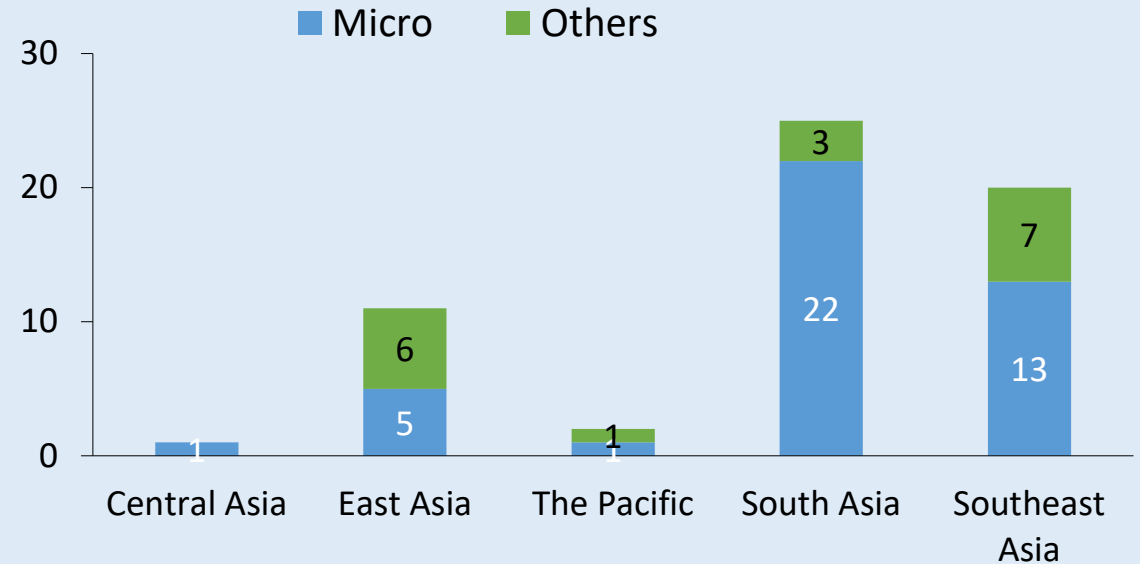


- Disaster risk cannot be eliminated entirely
- Risk retention vs. transfer

Source) Asian Development Bank

...which is spreading across the region, but remains limited.

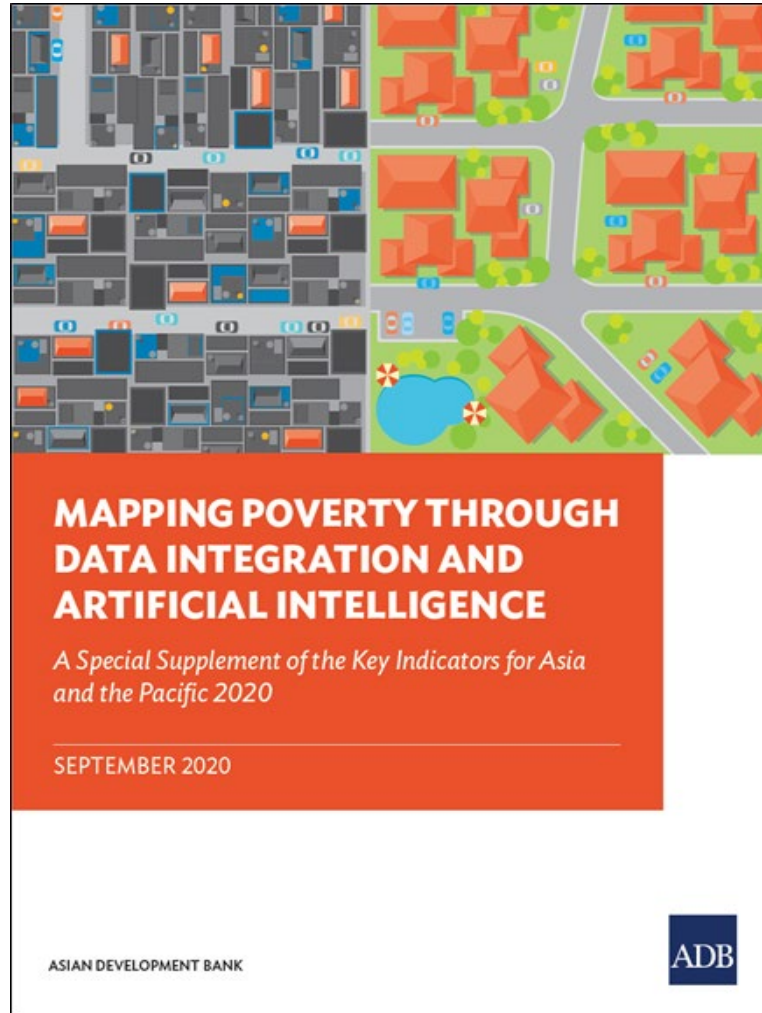
Disaster insurance programs



- Still limited: only 8% of losses are insured
- 80% of insurance programs are subsidized

Source: Surminski, Panda, and Lambert (forthcoming).

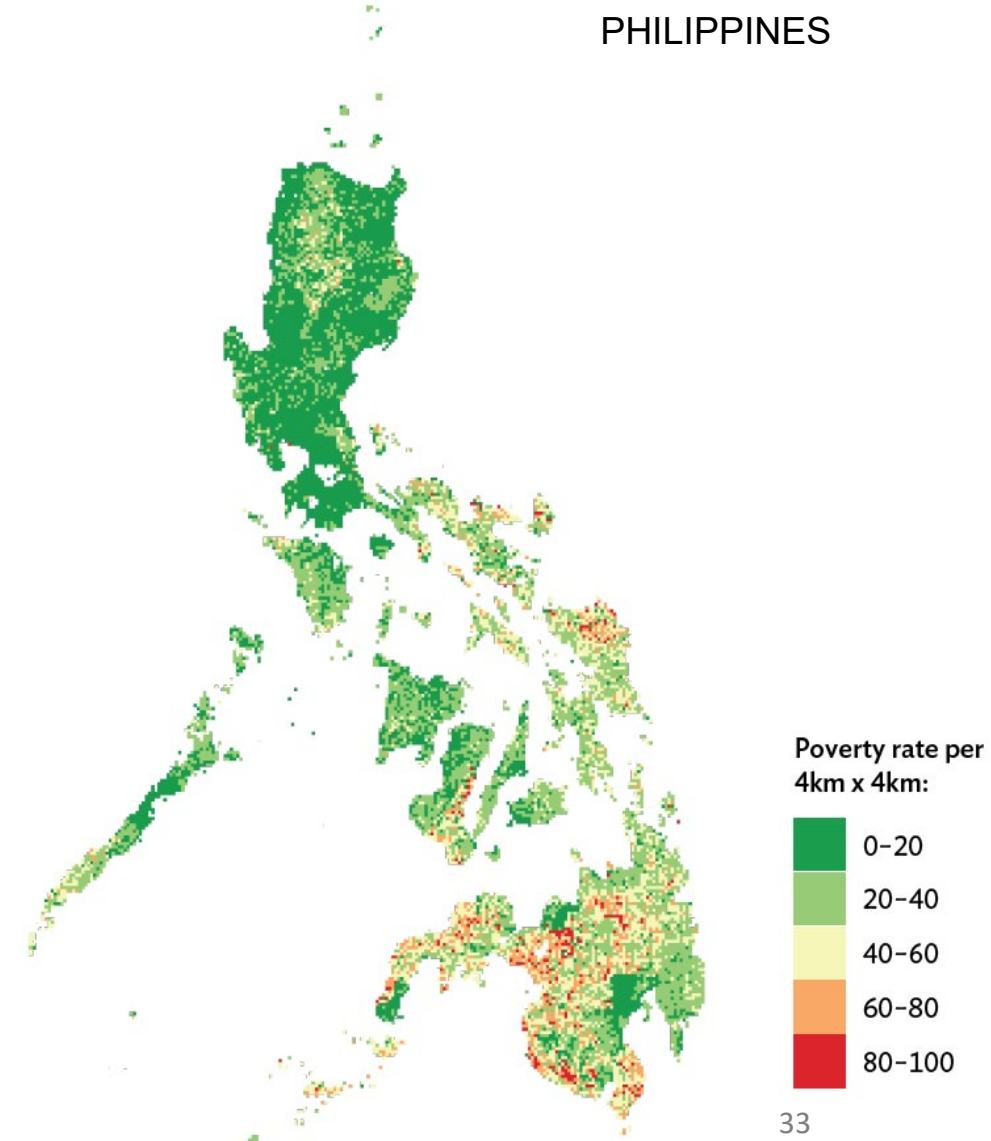
Governments Fail but Promising



<https://www.adb.org/publications/mapping-poverty-data-integration-ai>



PHILIPPINES



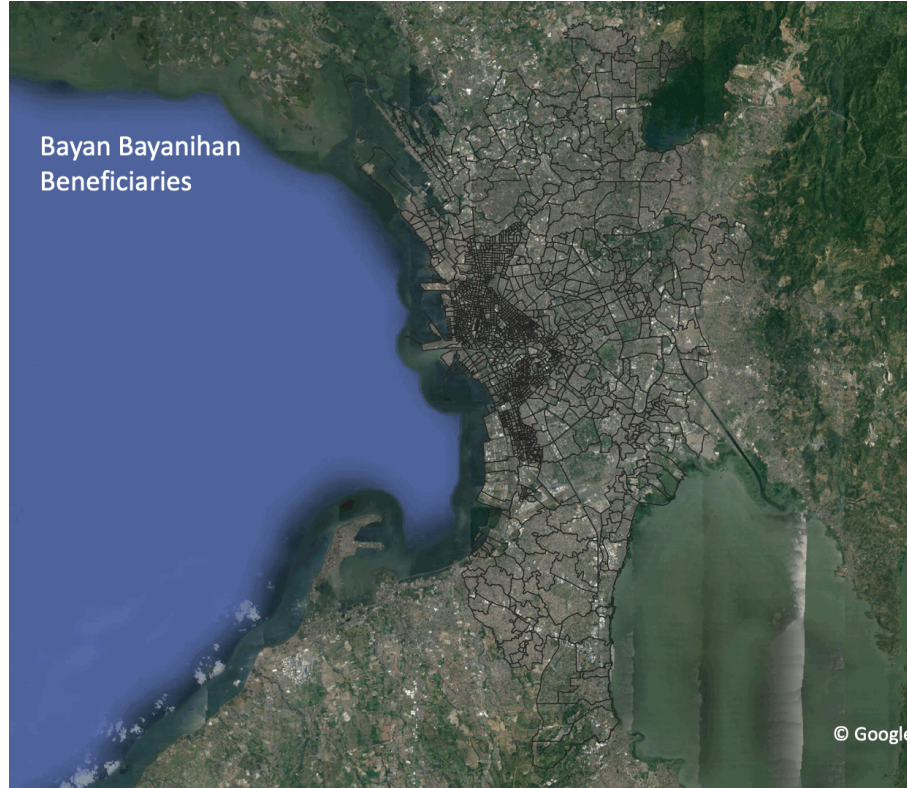
Innovative Data for EBPM



Bayan Bayanihan
PARA SA PAMILYANG PILIPINO

Handog sa hapag-kainan ng Pamilyang Pilipino

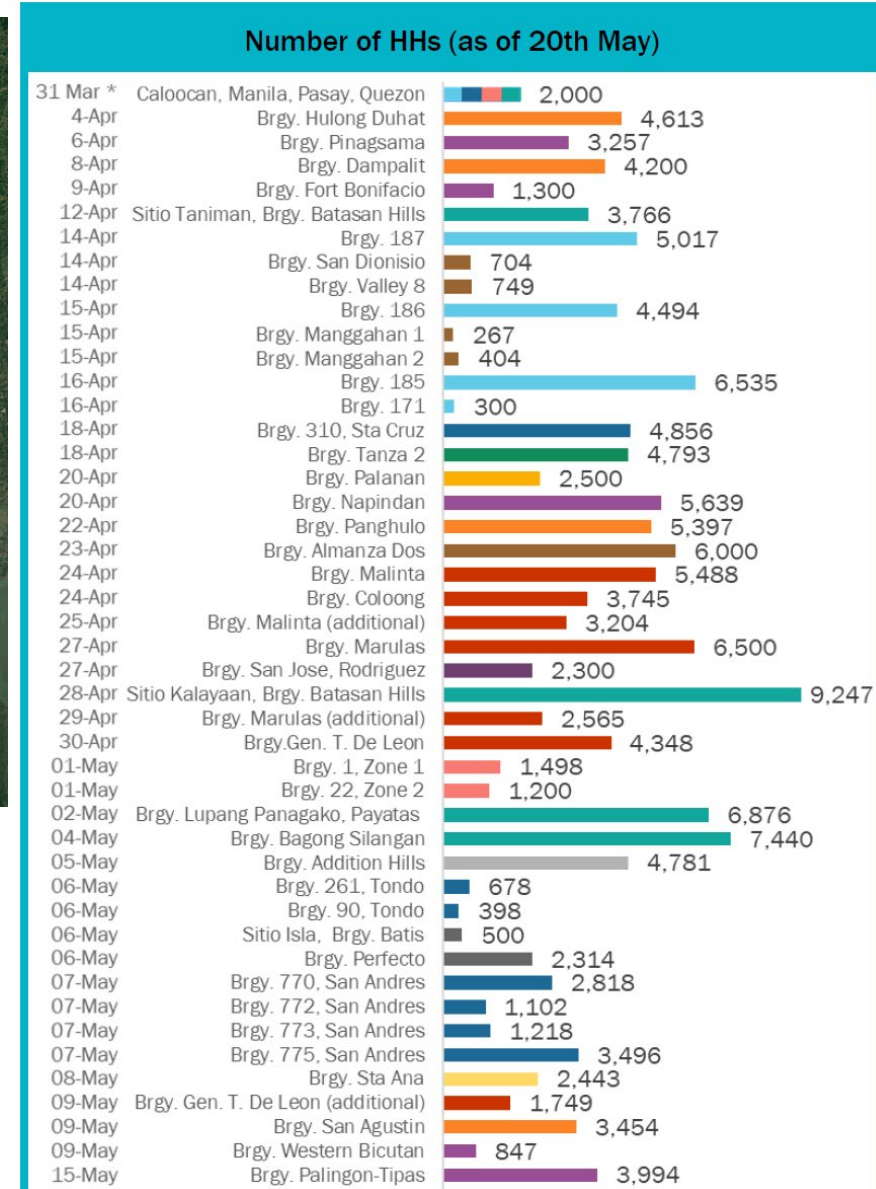
A partnership between the Asian Development Bank, the Government of the Philippines, and the private sector, in coordination with the Philippine Army, for families affected by COVID-19



- **March 16, 2020, lockdown in Manila**
- **Emergency food distribution**
- **To whom?**

- **Covered 162K households (810K individuals)**
- **44 barangays in NCR and nearby provinces**

Source: Indicative administrative boundary produced by PSA, NMRIA, and UNOCHA. Basemap taken from Google Earth.



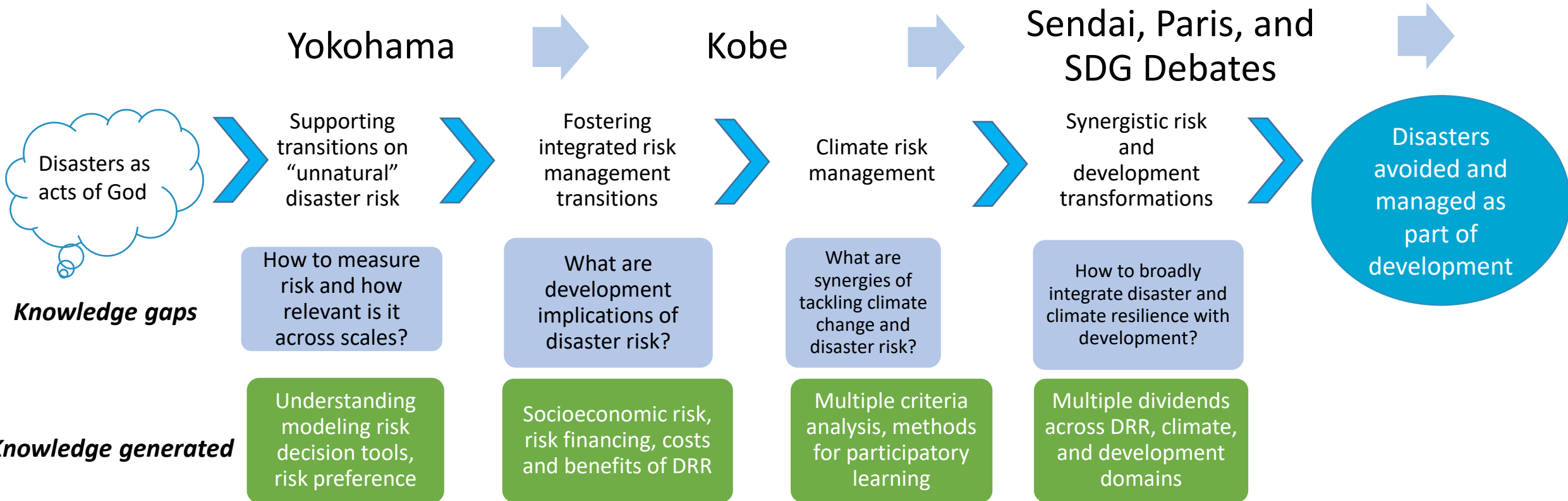
Global Actions for DRM still Limited

- The approach to **disaster management** has evolved through the years.

Knowledge

Evolving Approaches to Disaster Risk Management

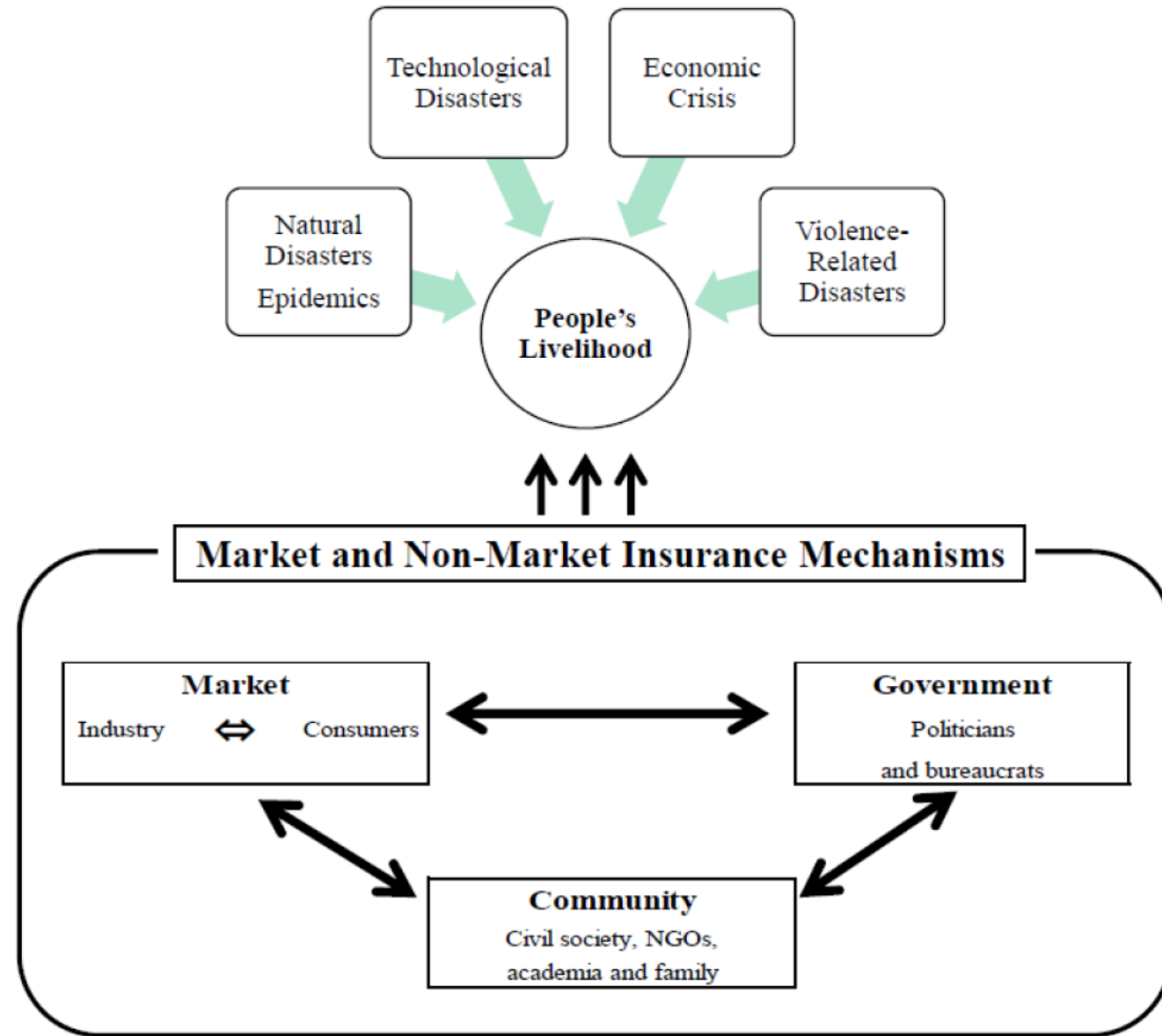
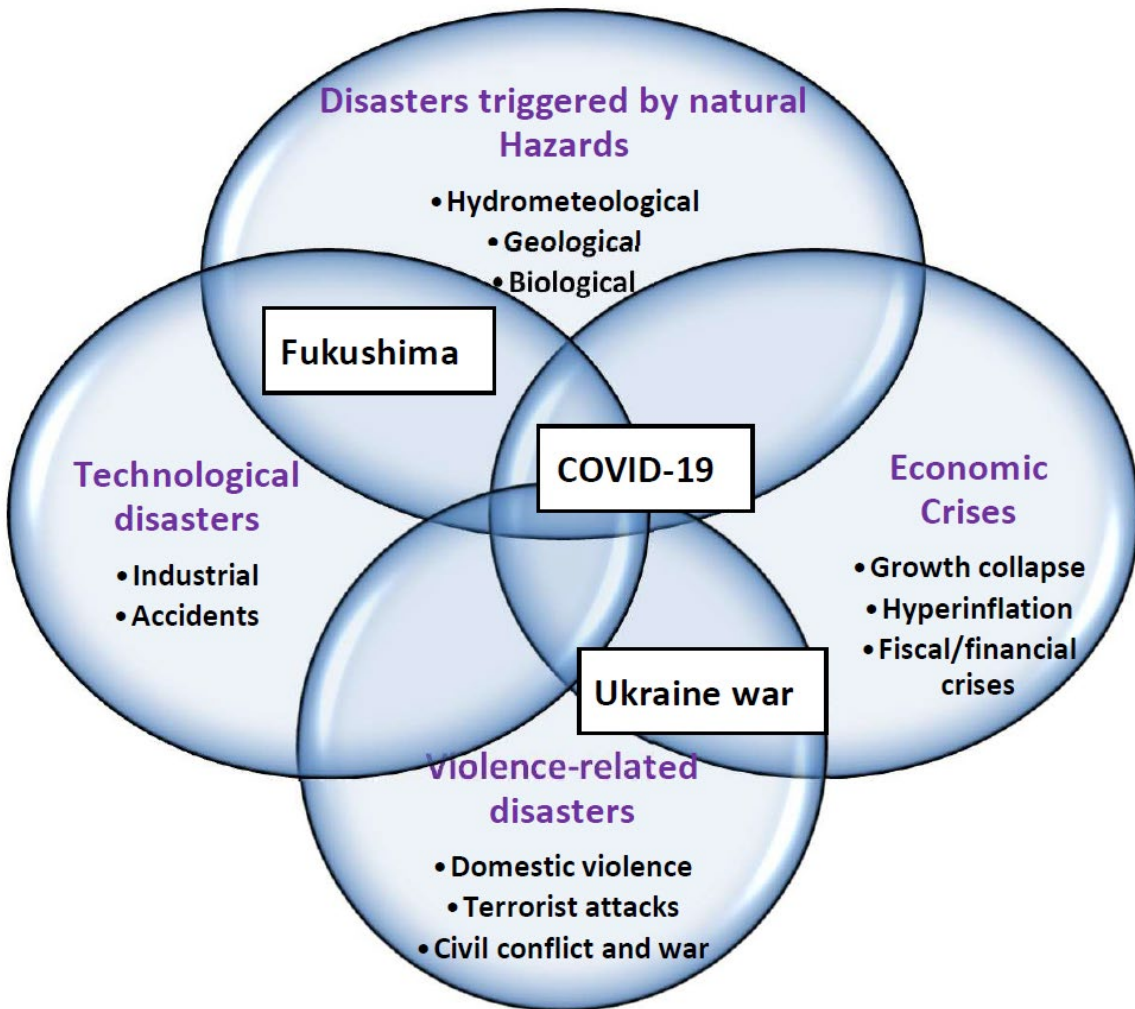
Action



DRR= Disaster risk reduction, SDG=Sustainable Development Goal

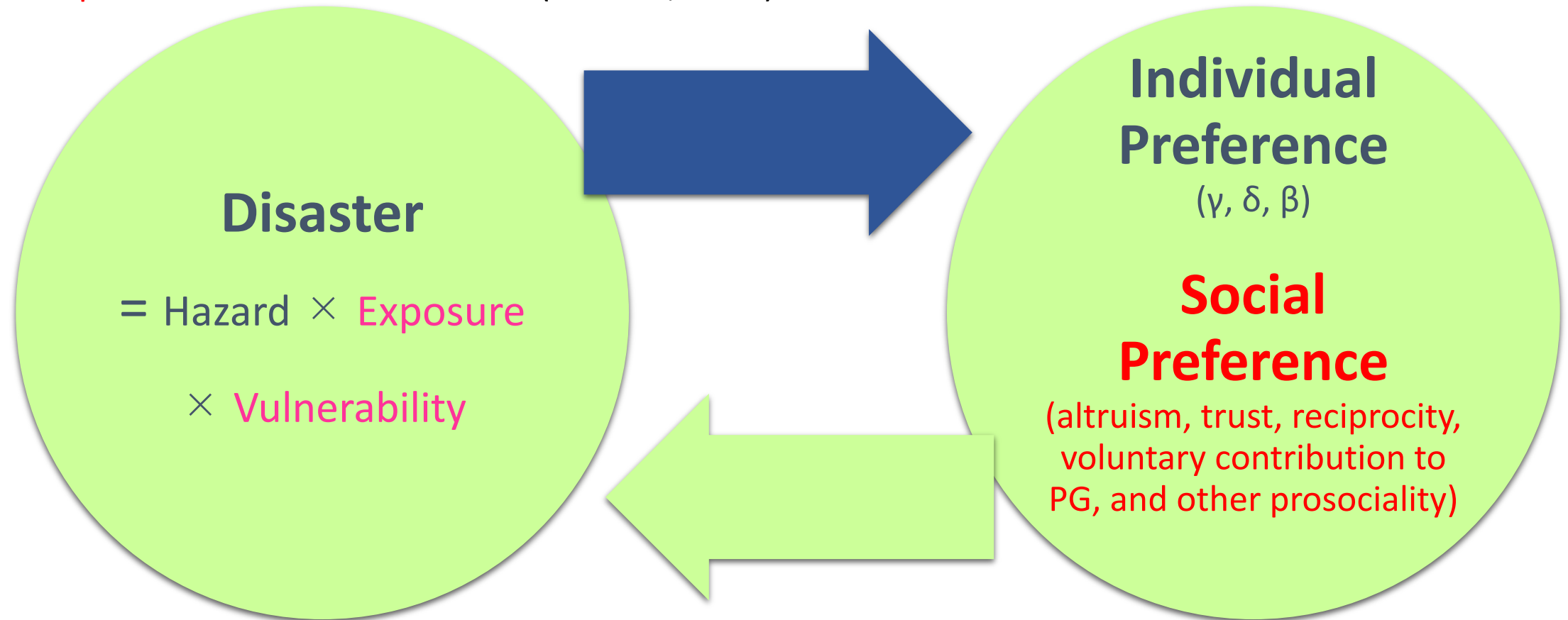
Source: Mechler, R., and S. Hochrainer-Stigler. 2019. [Generating Multiple Resilience Dividends from Managing Unnatural Disasters in Asia: Opportunities for Measurement and Policy](#). ADB Economics Working Paper Series No. 601.

Market, State, and Community “Insurance” Mechanisms



Community Mechanisms?

- The disaster and “preference” nexus
- The existing academic findings on the impacts of disasters on **risk and time preference domains as well as social preferences** have been mixed (Sawada, 2022).



Community Mechanisms?

Study	Disaster Type	Risk Attitude	Time Discounting	Social Preference
Alesina and La Ferrara (2002)	Traumatic event in the US			Less trust
Eckel et al. (2009)	Hurricane Katrina in the US	Less risk averse		
Castillo and Carter (2011)	Hurricane Mitch in Honduras			More trust on small shocks, less trust on large shocks
Voors et al. (2012)	Civil conflict in Burundi	Less risk averse		More altruistic
Callen et al. (2014)	Insurgent attacks in Afghanistan	No change		
Fleming-Muñoz et al. (2014)	Earthquake in Chile			Less reciprocity
Kim and Lee (2014)	Displacement in Korea	More risk averse		
Page et al. (2014)	Floods in Australia	Less risk averse		
Toya and Skripmor (2014)	Storms, floods, earthquakes, mass movements, and volcano eruptions, 131 to 146 countries			More trust
Callen (2015)	Tsunami in Sri Lanka		More patient	
Cameron and Shah (2015)	Earthquakes and floods in Indonesia	More risk averse		
Samphantharak and Chantarat (2015)	Floods in Thailand	More risk averse		Less altruistic
Sawada and Kuroishi (2015a)	Floods in the Philippines		More present-biased	
Sawada and Kuroishi (2015b)	Earthquake and tsunami in Japan		More present-biased	
Sawada and Kuroishi (2015c)	Earthquake and tsunami in Japan			More voluntary contribution to public goods
Andrabi and Das (2017)	Earthquake in Pakistan			Neutral on trust
Cassar et al. (2017)	Tsunami in Thailand	More risk averse	More impatient	More altruistic
Shupp et al. (2017a)	Tornado in Oklahoma City in the US	(Direct) More risk averse (Indirect) Less risk averse		
Shupp et al. (2017b)	Tornado in Oklahoma City in the US		Less patient	More trust
Chantarat et al. (2019)	Floods in Cambodia	More risk averse	More patient	More altruistic, less trust
Hanaoka et al. (2018)	Earthquake in Japan	Less risk averse		
Sawada et al. (2018)	Earthquake and tsunami in Japan		More present-biased	
Akesaka (2019)	Earthquake in Japan		More present-biased	
Kuroishi and Sawada (2019a)	Earthquake and tsunami in Japan and floods in the Philippines	Less risk averse	More present-biased	More altruistic
Kuroishi and Sawada (2019b)	Floods in the Philippines			More altruistic
Matsuyama et al. (2020)	Earthquake and tsunami in Japan		Less patient	
Sawada et al. (2021)	Earthquake and tsunami in Japan			Less prosocial among the elderly, more prosocial among the young laborer

Community Mechanisms?

- **Ibashi Japan (2013-):** Lee et al. (2022) *Scientific Reports*
 - Ofunato city after 2011 Great East Japan earthquake and Tsunami
- **Ibashi Philippines (2015-):** Aida et al., (2023) *Scientific Reports*
 - Ormoc city after 2013 Typhoon Yolanda (Barangay Bagong Buhay)
- **Ibashi Nepal (2016-)**
 - **Matatirtha village**

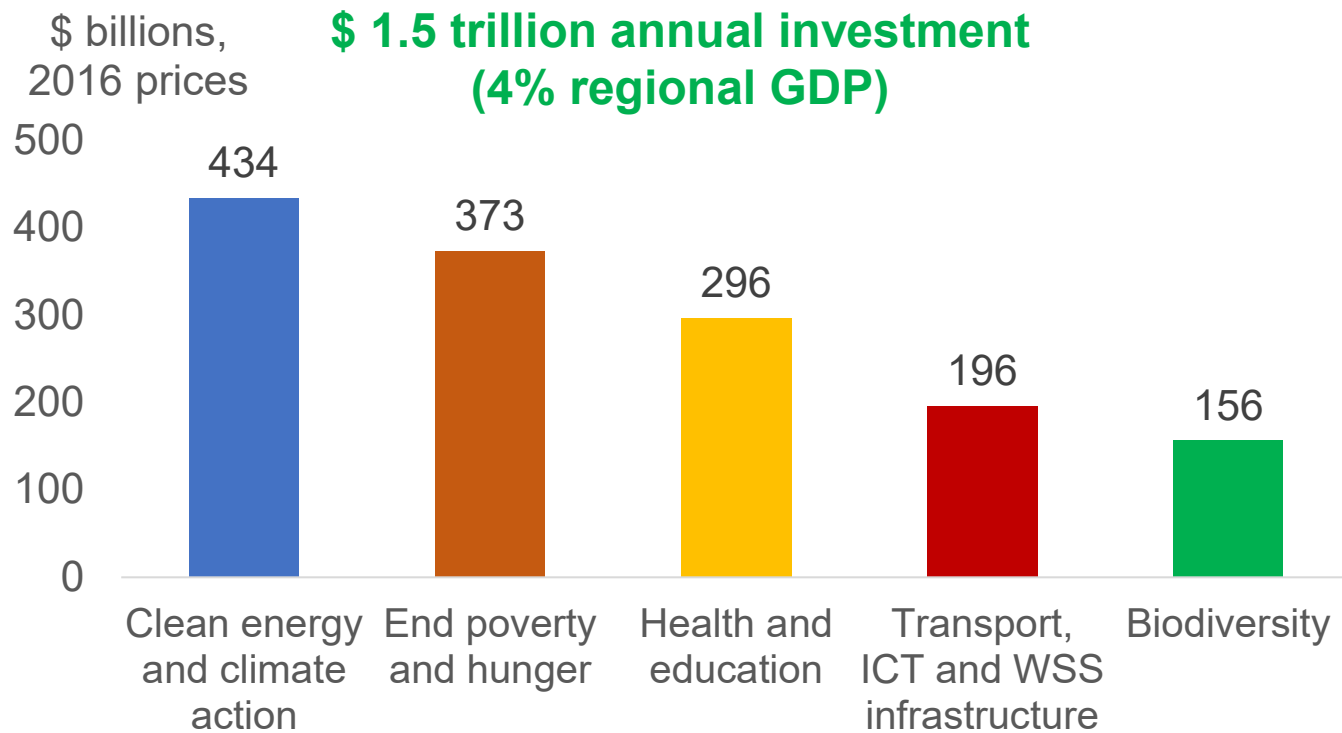


Outline

1. Asia's achievements in development and COVID-19 recovery
2. Environment and climate change challenges in Asia
3. Disaster Resilience in Asia
- 4. Financing challenges**

Development Financing Challenge

Asia Pacific region's **annual investment requirements**, 2016-2030, to meet SDGs (by broad SDG sectoral groupings)



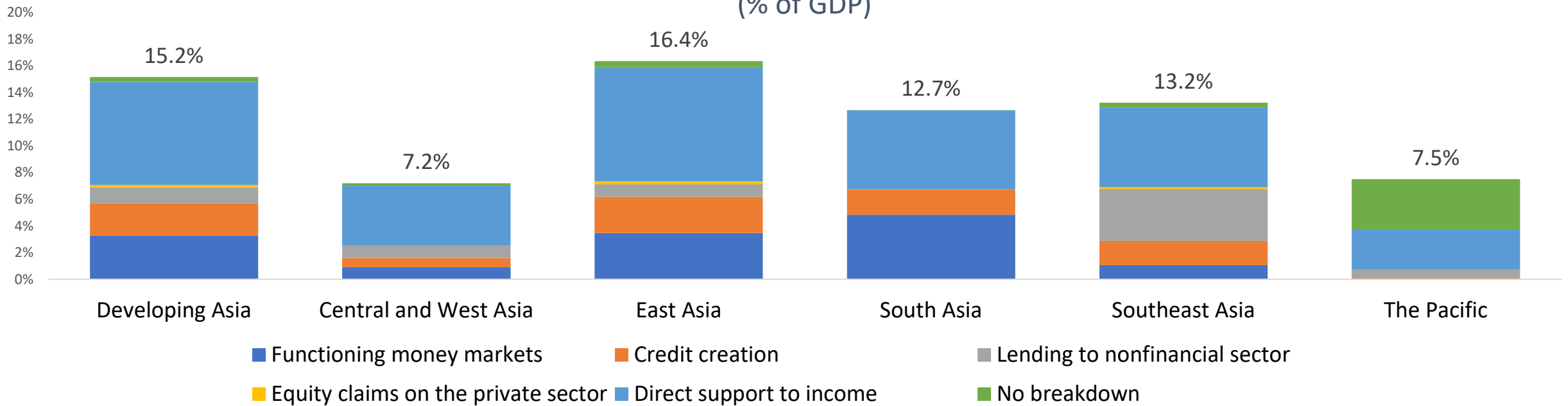
ICT = information, communications and technology, SDG = sustainable development goals, WSS = water, sanitation, and safe water. Source: UNESCAP (2019).

- **Developing Asia needs to build better**
- **Green and social finance are specifically targeted toward SDGs**
- **With limited public resources, private capital must be mobilized.**

Government Response

- Governments around the world have taken steps to mitigate the economic impacts. In developing Asia, policy packages worth **more than \$3.6 trillion (or more than 15% of regional GDP)**

Packages Announced in Developing Asia, by Subregion and Policy Measure
(% of GDP)

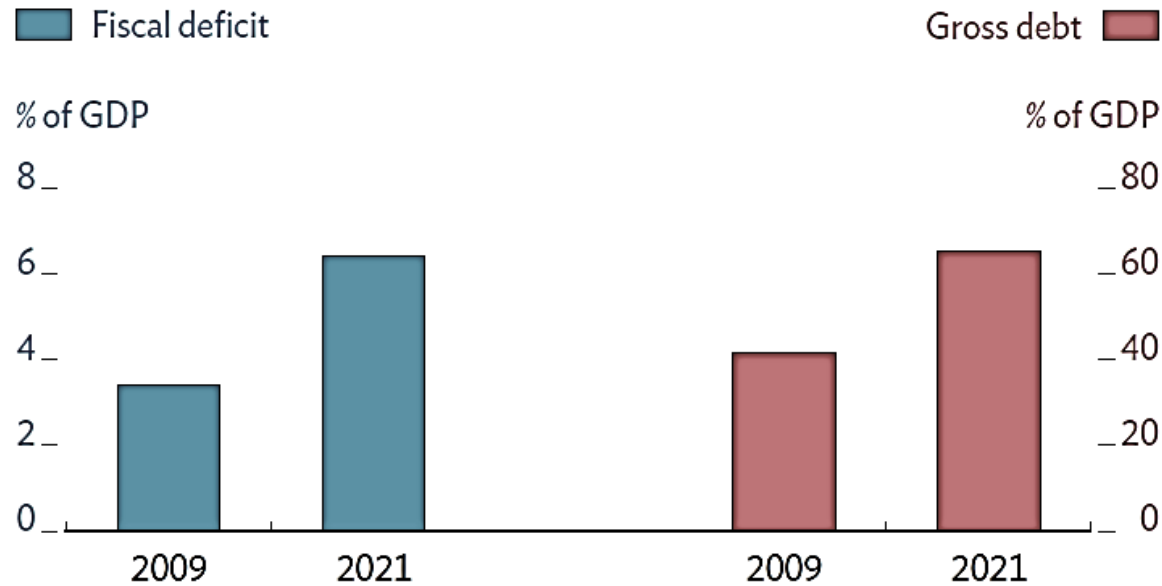


GDP = gross domestic product

Notes: Data as of 11 January 2021. Sources: [ADB COVID-19 Policy Database](#), accessed on 16 January 2021. For the database, see Felipe, J. and S. Fullwiler. 2020. [ADB COVID-19 Policy Database: A Guide](#). *Asian Development Review* 37(2): 1–20.

COVID-19 and Looming Debt

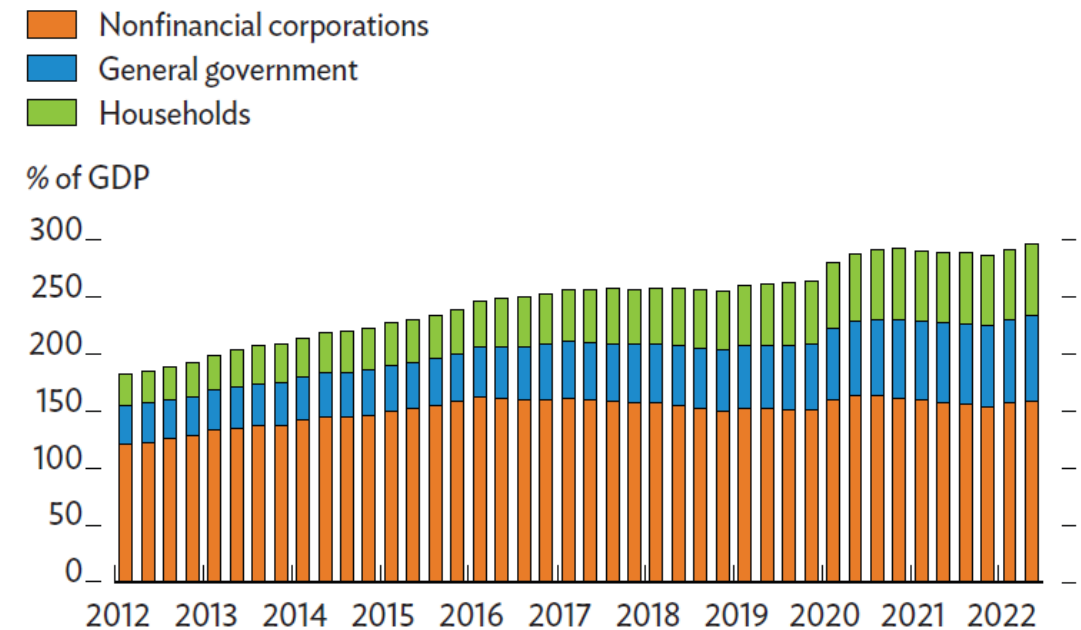
In developing Asia, fiscal deficits and debt are now much higher than following the global financial crisis.



GDP = gross domestic product.

Sources: International Monetary Fund. World Economic Outlook October 2021 online database (accessed 31 January 2022); Asian Development Bank estimates.

Debt in the PRC has increased following the onset of the COVID-19 pandemic in 2020.



GDP = gross domestic product.

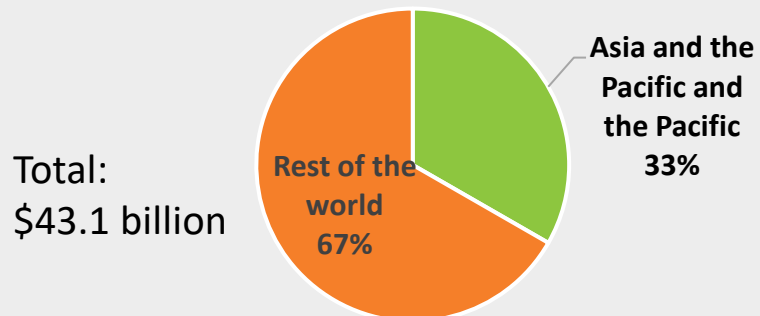
Source: [Bank for International Settlements](#).

Development Partners and Private Sector

- The development of **environmental standards and climate change policies** have benefitted from **bilateral and multilateral support**. The **private sector** also plays a role in generating solutions through green finance & industries.

- MDBs, including ADB, and bilateral partners have increasingly aligned their strategies to support environment and climate change goals.

Recipient of Climate Change Finance From Multilateral Development Banks, 2018

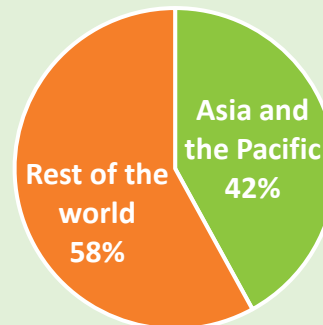


Source: African Development Bank, ADB, European Bank for Reconstruction and Development, European Investment Bank, Inter-American Development Bank Group, Islamic Development Bank, and the World Bank Group. 2019. *2018 Joint Report on Multilateral Development Banks' Climate Finance*. London: European Bank for Reconstruction and Development. <https://www.adb.org/news/mdb-climate-finance-hit-record-high-431-billion-2018>.

- To remain competitive, private companies are adopting “green supply chains,” getting certified they are meeting environmental standards, and eco-labeling their products.

- To address private sector risks, **green finance** is also emerging as a way to accelerate environmentally oriented investment.

Outstanding Climate-Aligned Bonds, 2017



The region is a leader in the use of green or climate-aligned bonds.

It is also a leader in green innovation—the region accounted for 44% of global exports of climate change mitigation technologies.

Khanna, M. 2018. *Greening Businesses in the Asia and Pacific Region: Opportunities and Challenges*. Manila: Asian Development Bank.



Debt Reduction and Restructuring Challenge

- COVID-19 responses generated **the debt problem globally**.
- Moreover, **China's development finance** has increased since 2004 and then receded since 2019.

[Horn et al. \(2023\)](#)

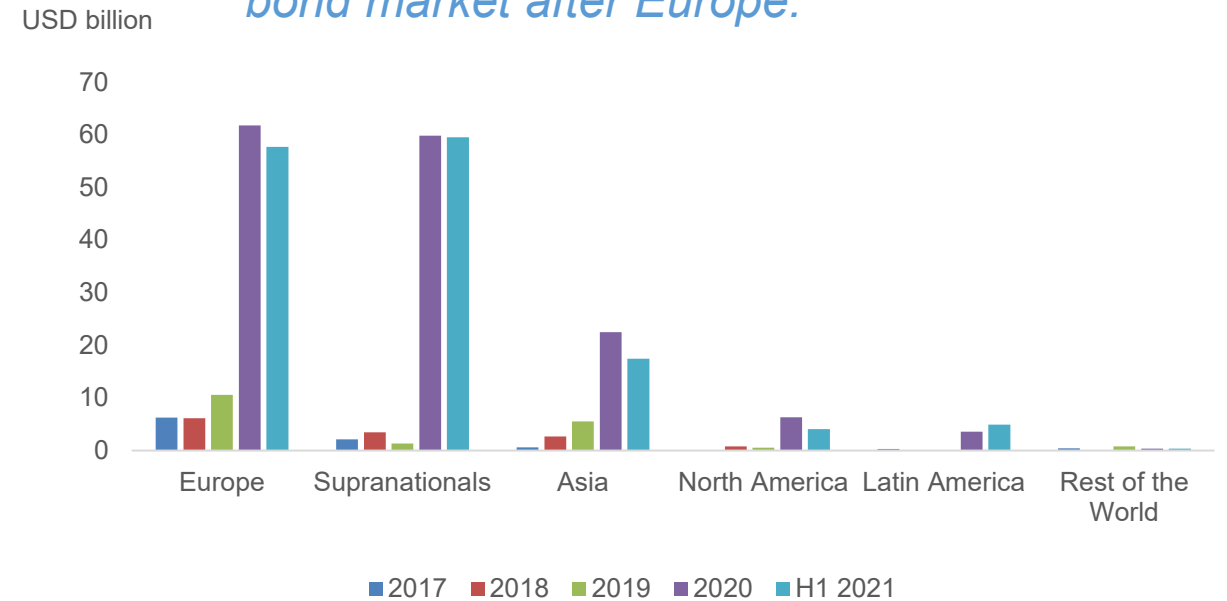
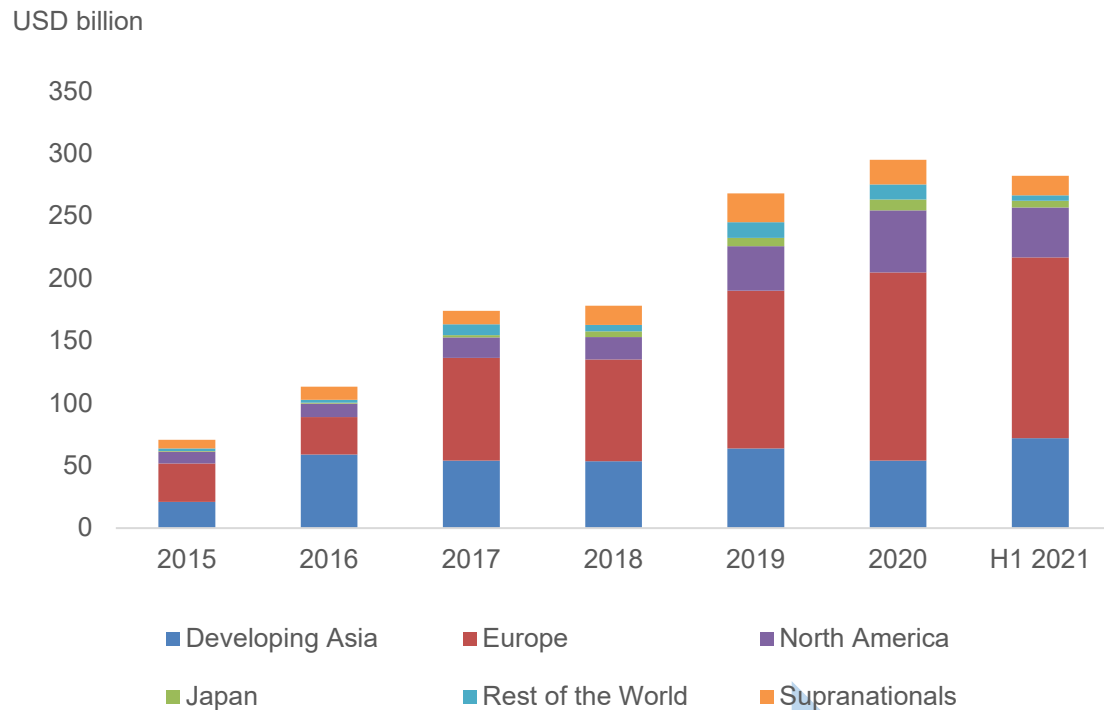
[“China as an International Lender of Last Resort”](#)

[NBER WP](#)

Green and Social Bond Markets

Asia accounts for around 26% of global green bond Issuance...

.. and is the world's 2nd largest regional social bond market after Europe.



Source: Bloomberg

Factors driving green and social finance

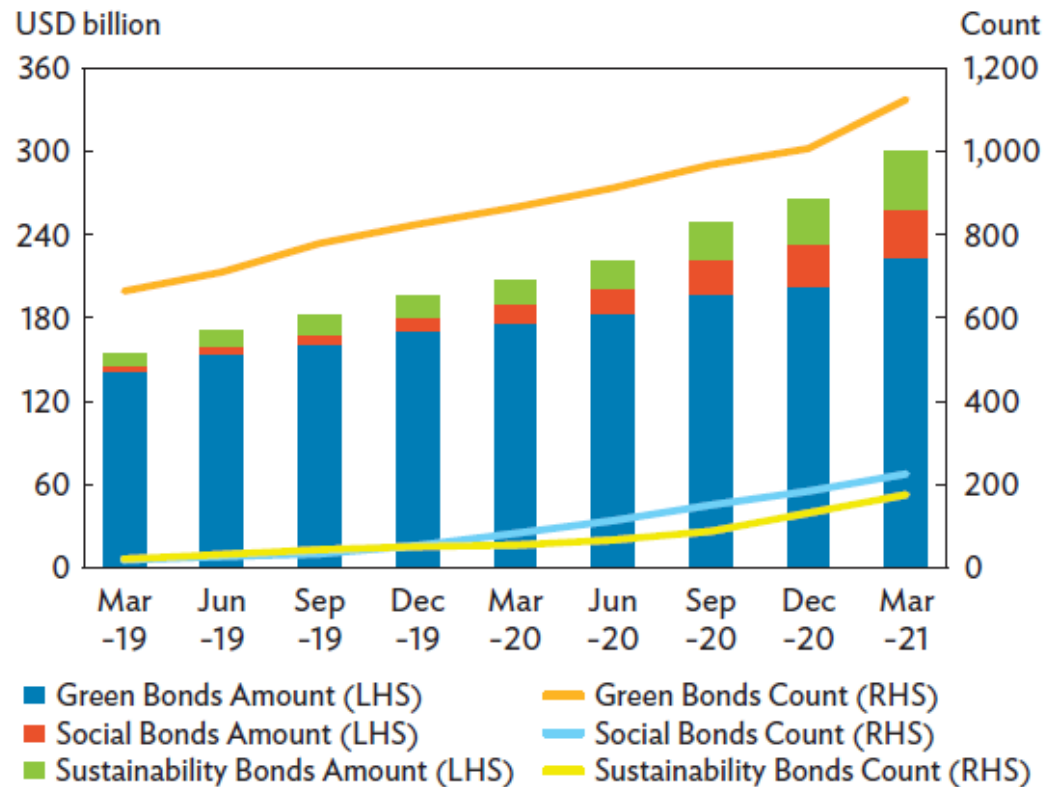
Changing stakeholder preferences

Hedging and mitigating sustainability risks

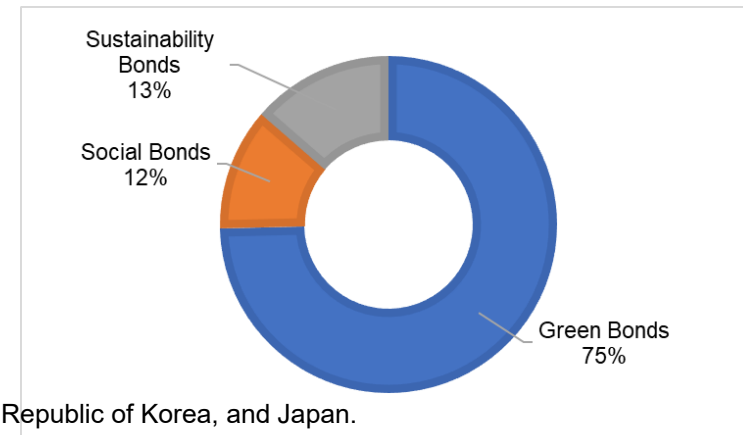
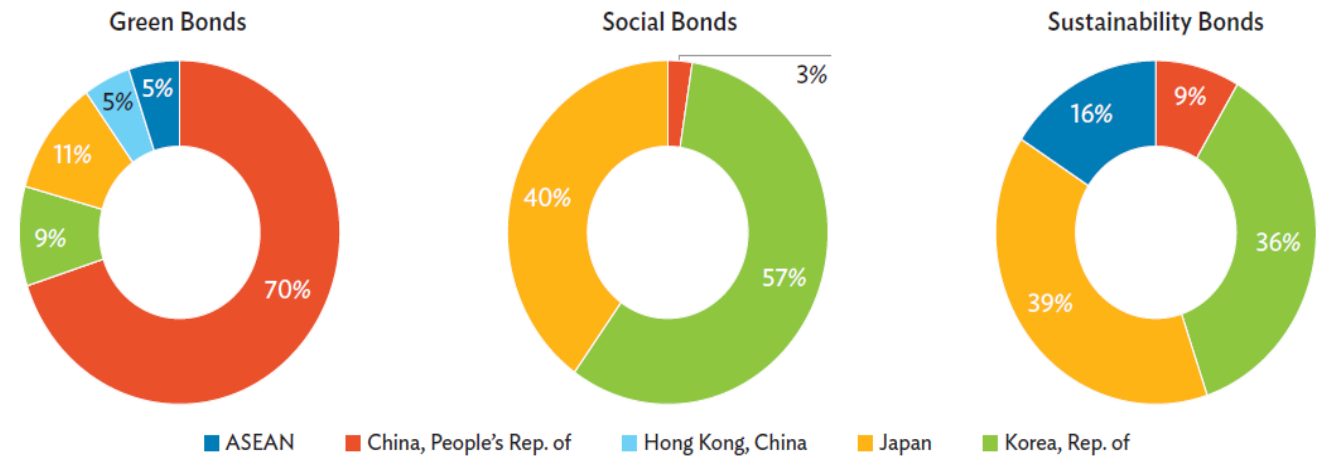
Greater resilience under shocks

Role of the Market (ASEAN+3)

Outstanding Amount of Green, Social, and Sustainability Bonds in ASEAN+3 Markets



Outstanding Green, Social, and Sustainability Bonds in ASEAN +3 (% share of total)

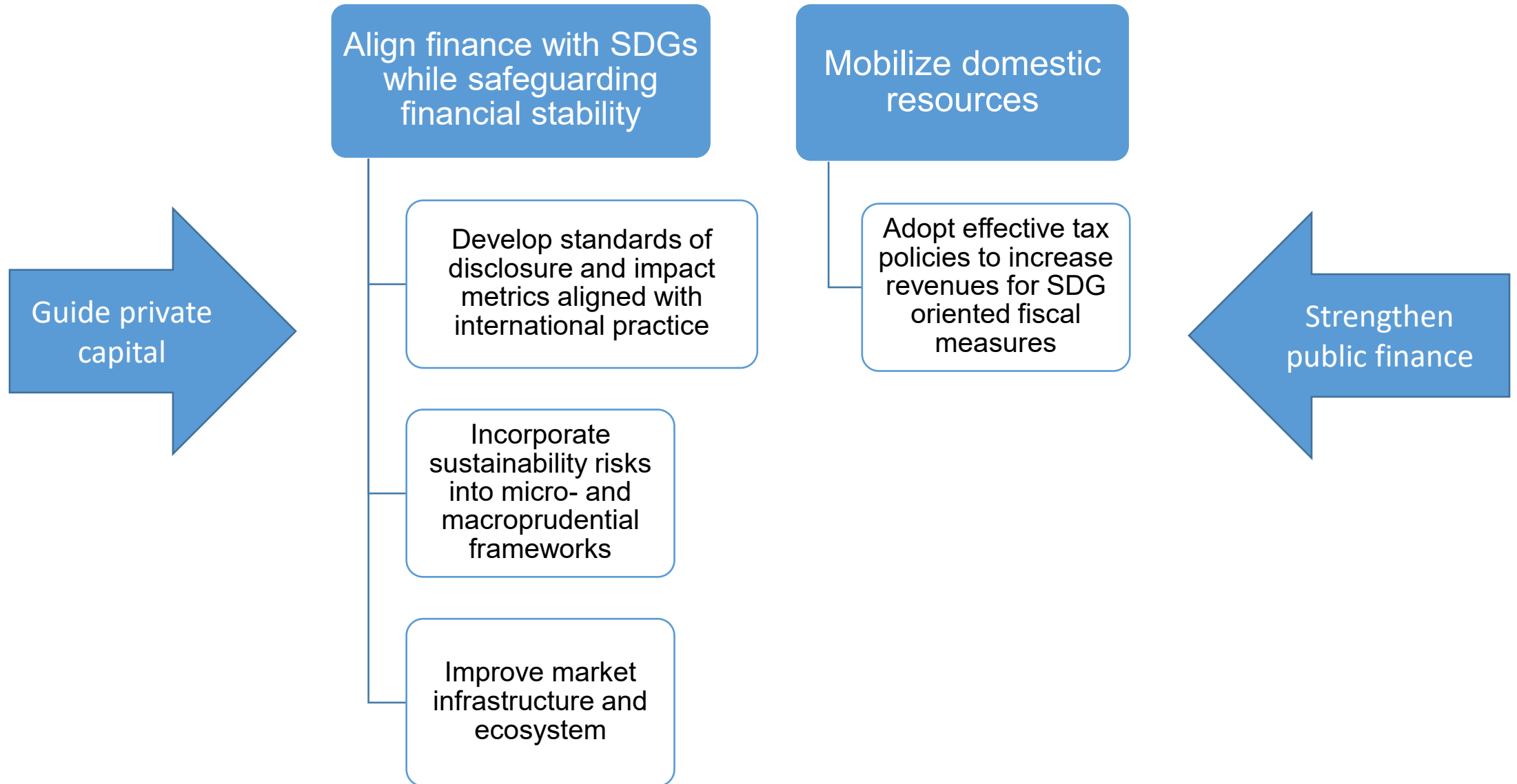


Notes:

1. ASEAN include the markets of Indonesia, Malaysia, the Philippines, Singapore, and Thailand.
2. ASEAN+3 includes ASEAN members plus the People's Republic of China; Hong Kong, China; the Republic of Korea, and Japan.

Source: Asia Bond Monitor June 2021

Financing Challenges



Remarks

1. **Asia's achievements in development and COVID-19 recovery**
2. **Environment and climate change challenges in Asia**
3. **Disaster Resilience in Asia**
4. **Financing challenges**

Moving Ahead: Multiple Dividends across DRR, Climate and Development Domains



First, ensure prices reflect the costs of environment and climate change externalities as well as disaster risks. Pervasive subsidies need to be replaced with progressive alternatives.



Second, enhance governance for better environmental management and disaster resilience.



Third, substantially invest in environmentally friendly, low-carbon, and climate- and disaster-resilient infrastructure (e.g. renewable energy, energy efficiency, and sustainable public transport). Existing infrastructure needs to be fortified to be climate-friendly and disaster-resilient.



Fourth, attract private investment in sustainability and disaster resilience. More investment is needed than the public sector can offer.



Fifth, advance transformative technologies. The successful transition to low-carbon development depends on technologies such as advanced biofuels and energy storage. Innovative insurance remote-sensing data can be developed further.



Sixth, intensify international cooperation. Many of the region's most pressing environmental challenges are transboundary.



Last but not least, build resilience of people and social systems.



