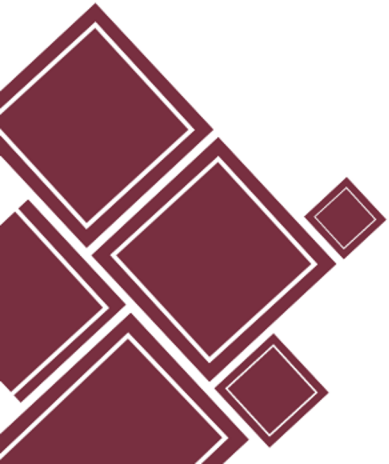


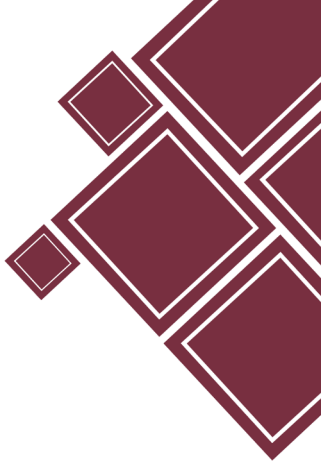
Disaster Risk and Financing : An Overview

Vinod Thomas
Lee Kuan Yew School of Public Policy

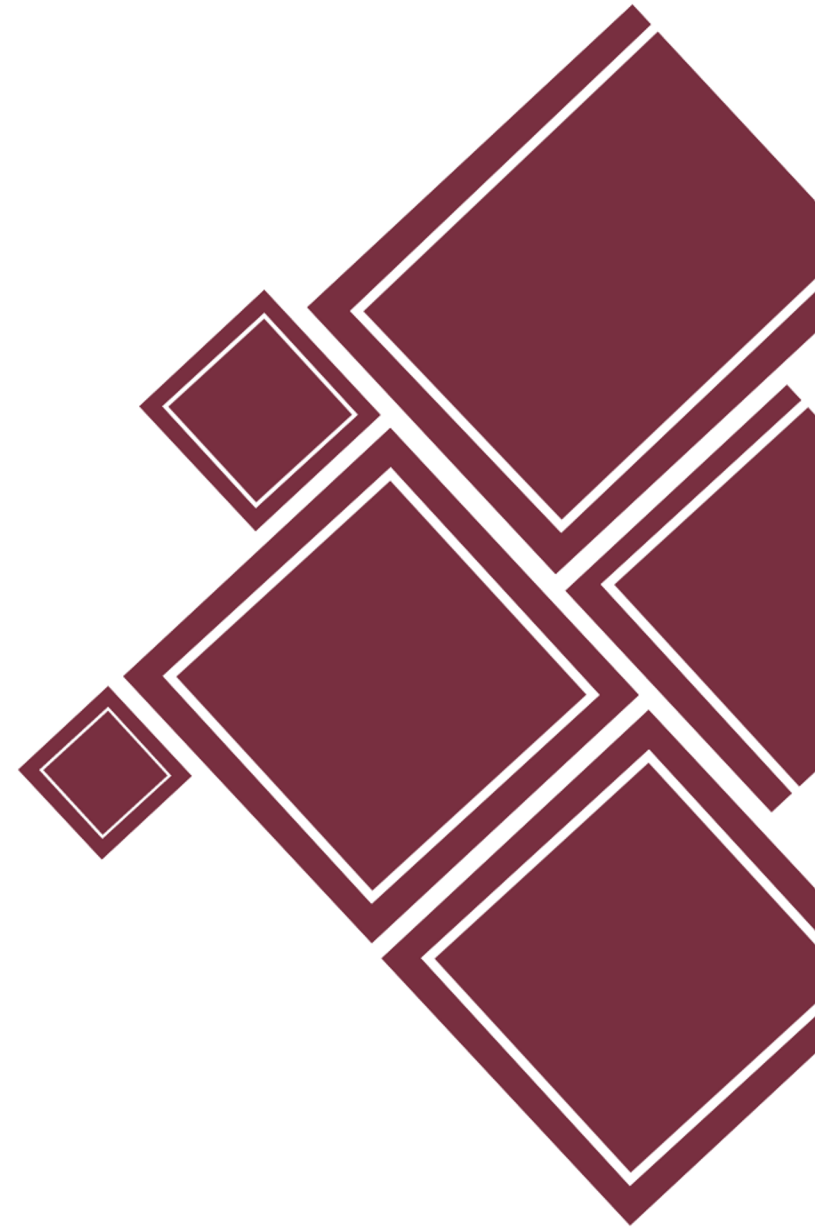


ANALYSIS TO ACTION

1. COUNTRY RISK IN SEA
2. BUILDING RESILIENCE
3. INVESTMENT AND FINANCING
4. CLIMATE CHANGE FINANCING

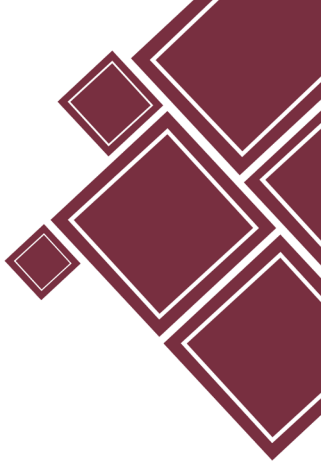


Country Risk Profiles in SEA



Sides of Country Risk

- Country risk refers to the economic, social, and political conditions and events in a country that affect a country's socio-economic prospects.
- Equally, it also refers to the prospects of a country that affect the operations of a financial institution that does business with that country.
- In the latter case, banks must institute adequate systems and controls to manage the inherent risks in their international activities.



Risk to Operations in the Region



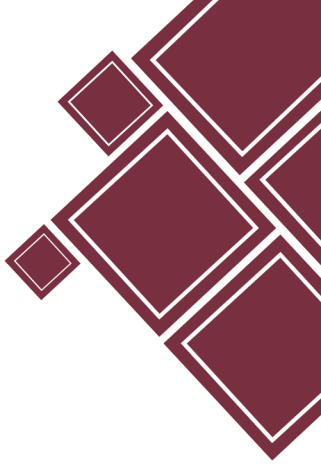
Actuarial risks require asset management, liability management, and valuation skills.

Capital Allocation and Performance Measurement.

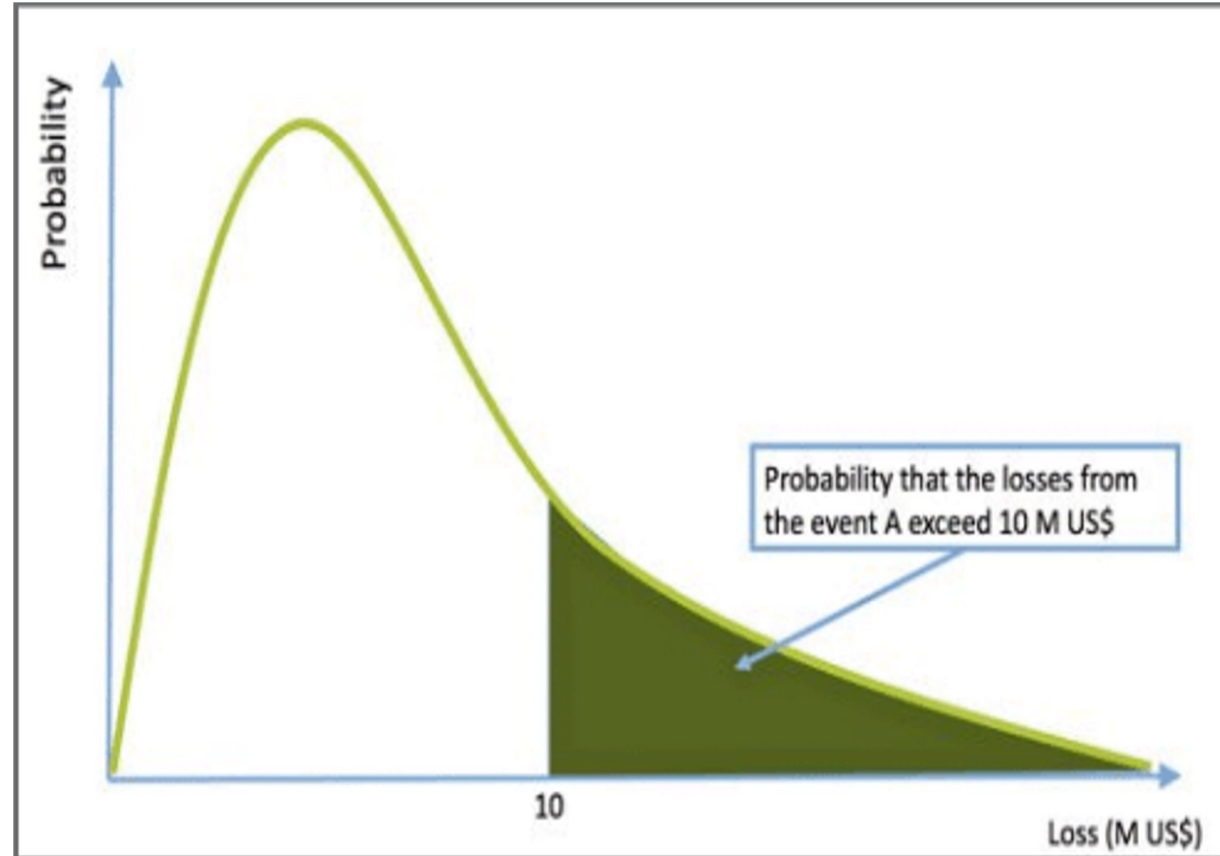
Political and societal risks.

Risk-adjusted return on capital, or “RAROC”.

Risk pooling, insurance, hedging.



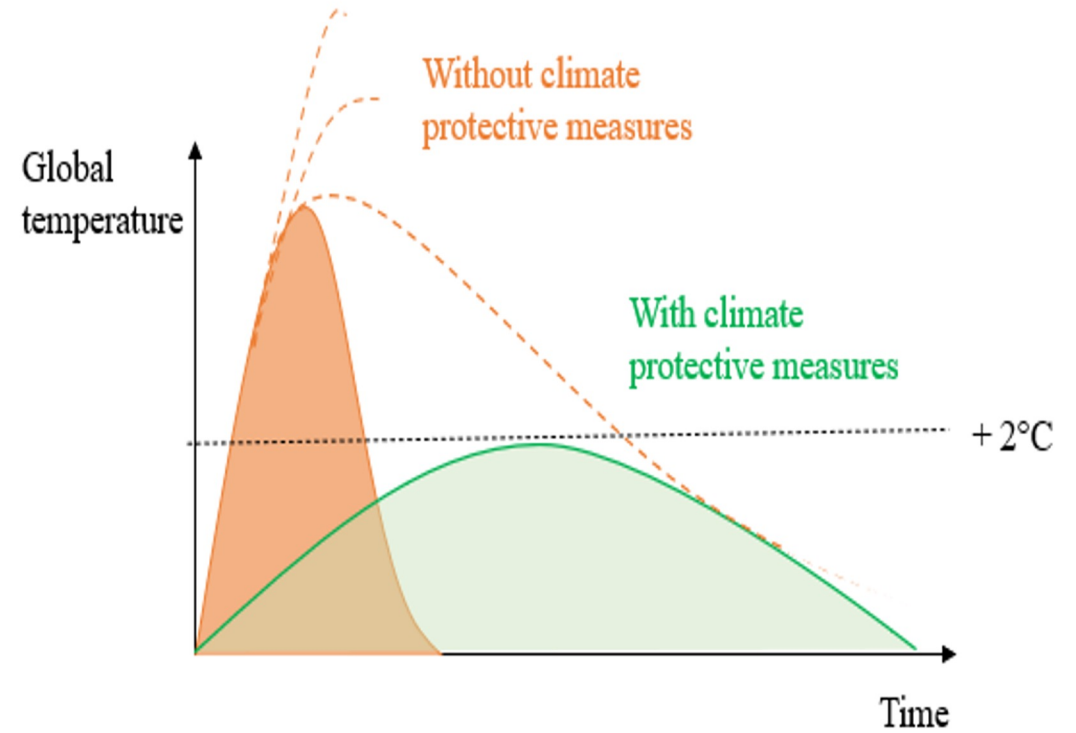
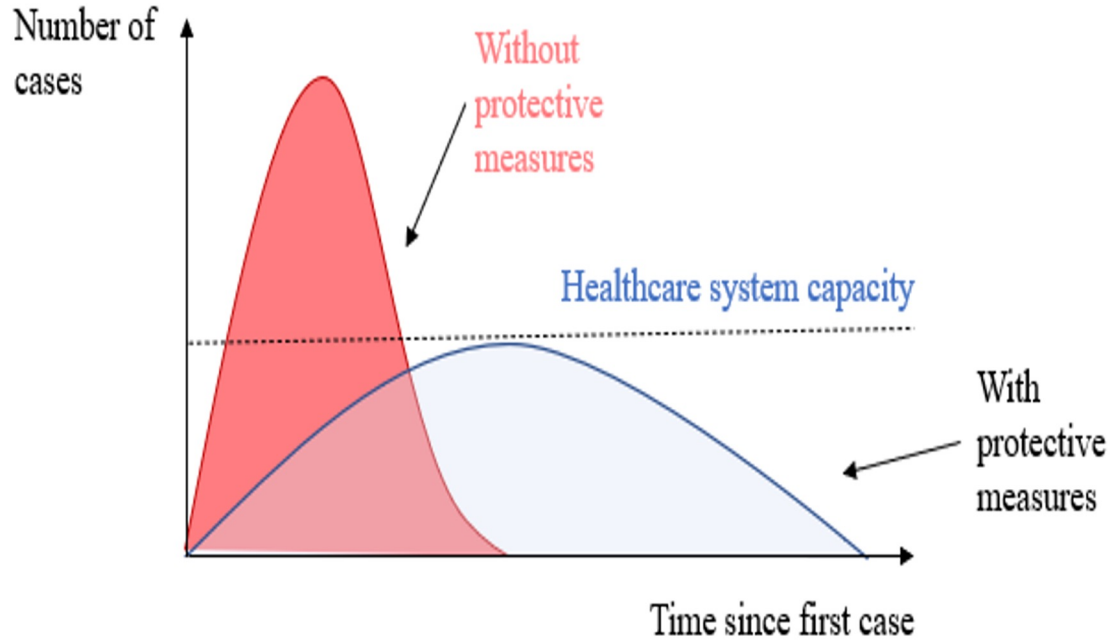
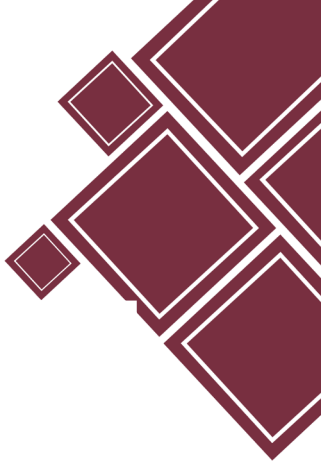
A Way to Assess Risk

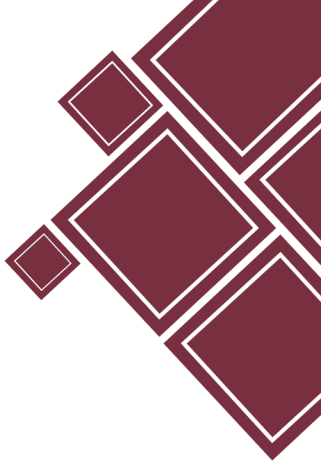


- **Probability** = Exposure X Vulnerability.
- **Exposure:** Location of the asset and its characteristics.
- **Vulnerability:** How the asset is affected by its vulnerability.
- **Risk** = Probability X Damage.

<https://public.wmo.int/en/resources/bulletin/quantifying-risk-disasters-occur-hazard-information-probabilistic-risk-assessment>

Comparing Risks of Climate Change and the Pandemic





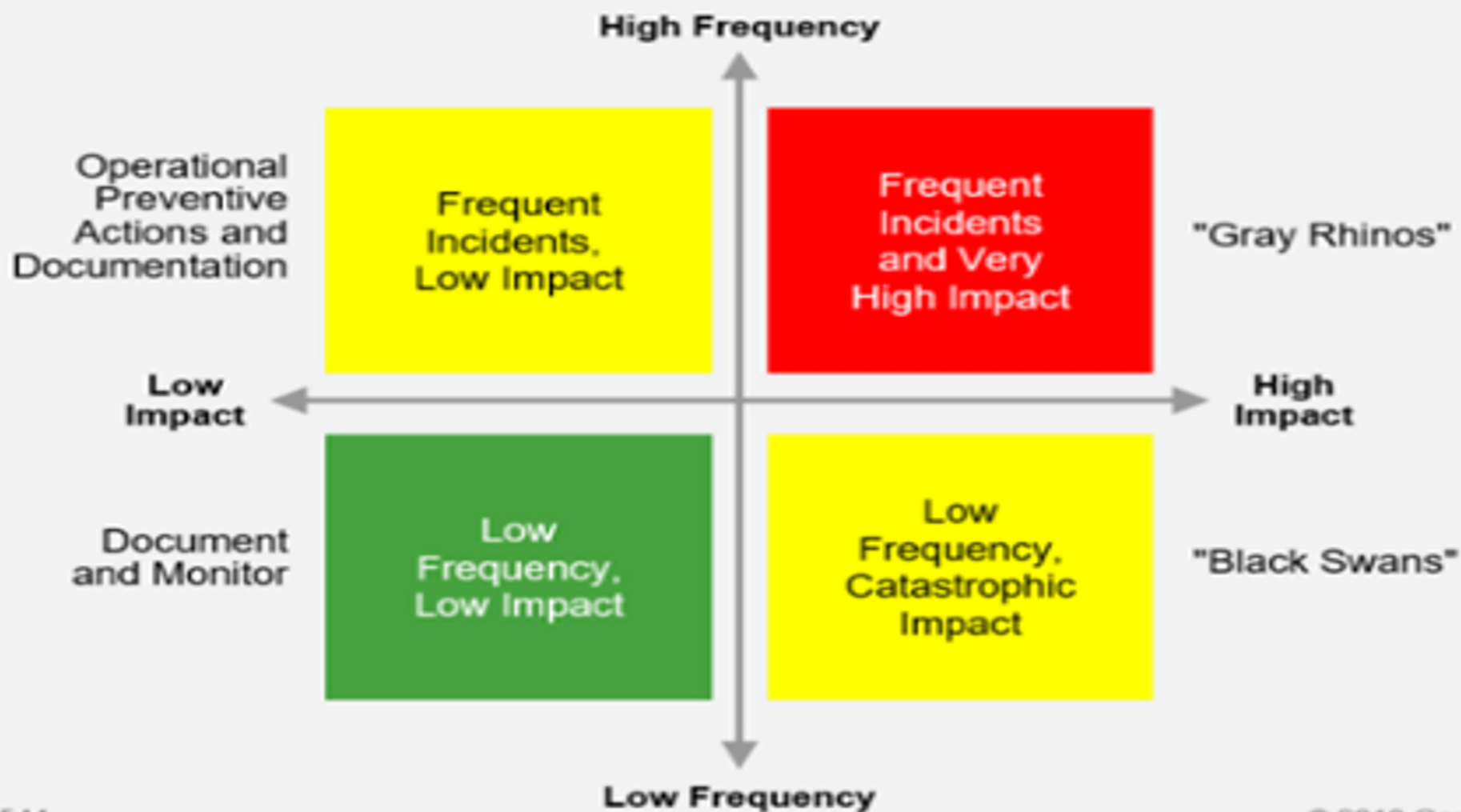
		Threats					Opportunities				
		0.90	0.70	0.50	0.30	0.10	0.90	0.70	0.50	0.30	0.10
Probability	0.90	0.05	0.09	0.18	0.36	0.72	0.72	0.36	0.18	0.09	0.05
	0.70	0.04	0.07	0.14	0.28	0.56	0.56	0.28	0.14	0.07	0.04
	0.50	0.03	0.05	0.10	0.20	0.40	0.40	0.20	0.10	0.05	0.03
	0.30	0.02	0.03	0.06	0.12	0.24	0.24	0.12	0.06	0.03	0.02
	0.10	0.01	0.01	0.02	0.04	0.08	0.08	0.04	0.02	0.01	0.01
		0.05	0.10	0.20	0.40	0.80	0.80	0.40	0.20	0.10	0.05
		Impact									

Risk as Probability X Impact:

- An event of low probability (0.3) and high impacts (0.4) would have a ranking value of 0.3 x 0.4 (0.12).
- An event of high probability (0.7) and low impact (0.1) would have a ranking value of 0.7 x 0.1 (0.07).

A low probability/high impact event has a different score than high probability/low impact because probability scores are on a linear scale while impact scores are on a logarithmic scale, stressing impact more than probability.

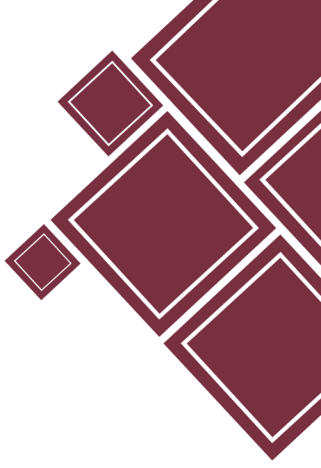
Classifying the Risk Landscape



ID: 348544

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DISASTER MANAGEMENT STRATEGY




Key elements:

■ *Priority*

■ *Prevention*

■ *Protection*

Locality	Climate Change Country	Region
Low Impact		
High Impact	Low Probability	High Probability



Class Discussion 1: SEA's Response to Pandemics

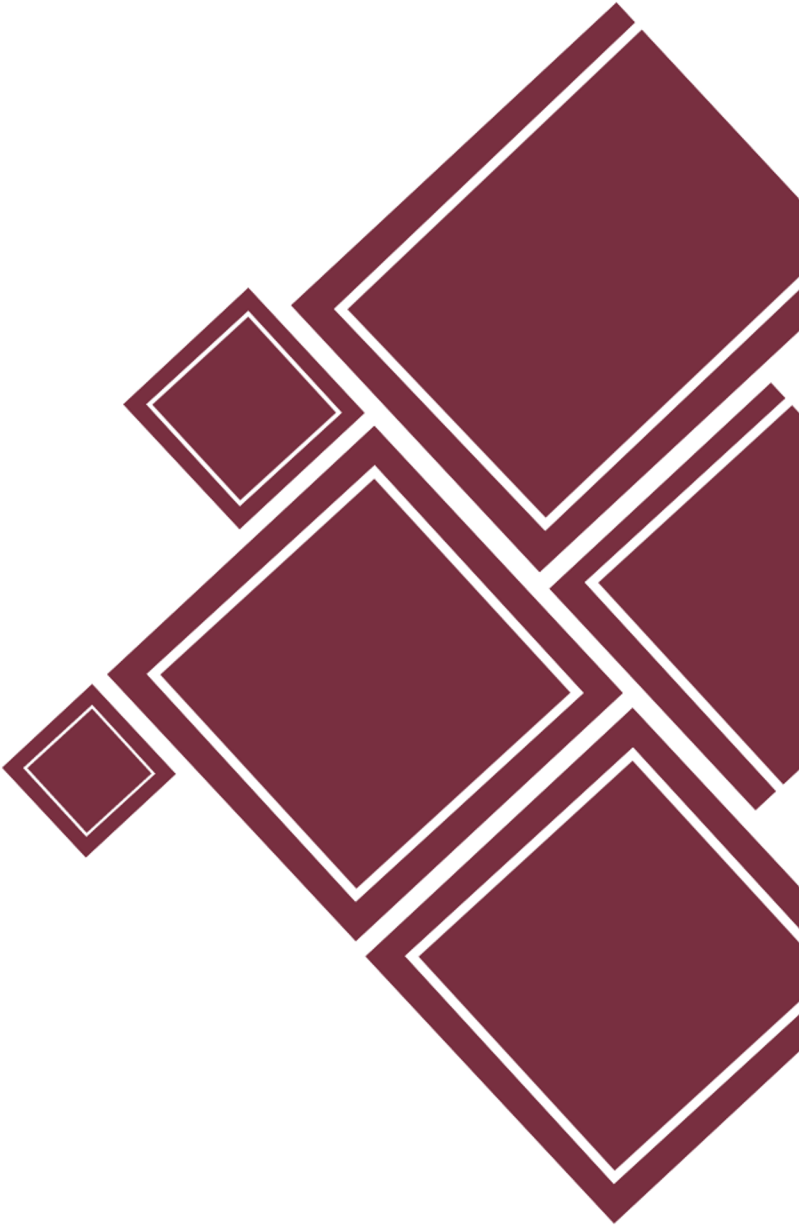
Southeast Asian countries, on average, are ranked at the upper third mark of WHO's 2019 [Global Health Security Index](#) for 195 countries across six categories—prevention, detection, rapid response, health system, norms (standards), and the risk environment. The global average score is only 40.2 out of 100, and Southeast Asia is 48.3. Thailand ranks 6th globally and Singapore 24th, with an overall score of 58.7. Laos places 73rd, Cambodia 89th, Philippines 53rd, and Viet Nam 50th.

Consider two Southeast Asian countries and their risk profiles.

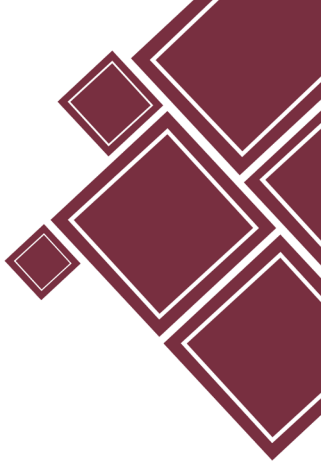
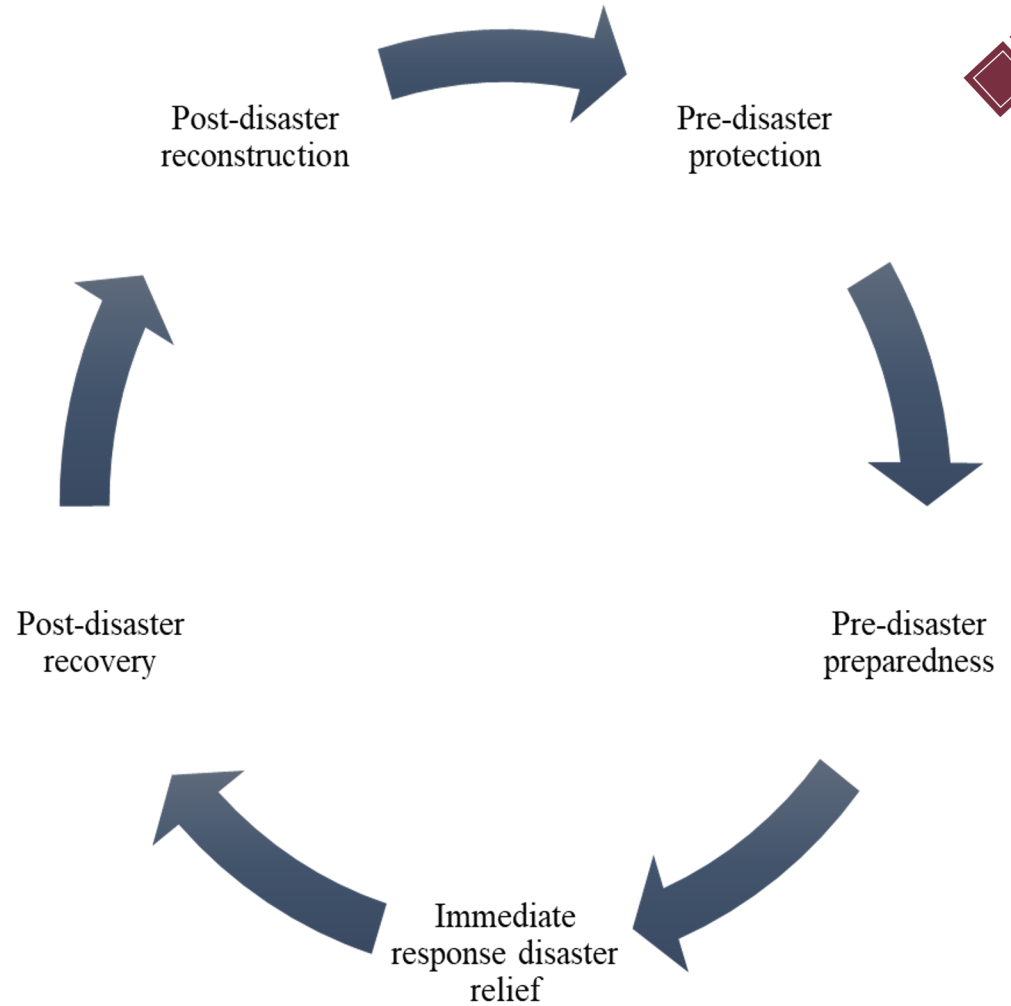
- Using the framework of probability and impact (for example, identify the top gaps in their preparedness for a pandemic.
- How would your priorities for action differ across the two countries? Give examples.
- What constraints do you need to overcome in going from recommendations to action and results on the ground?



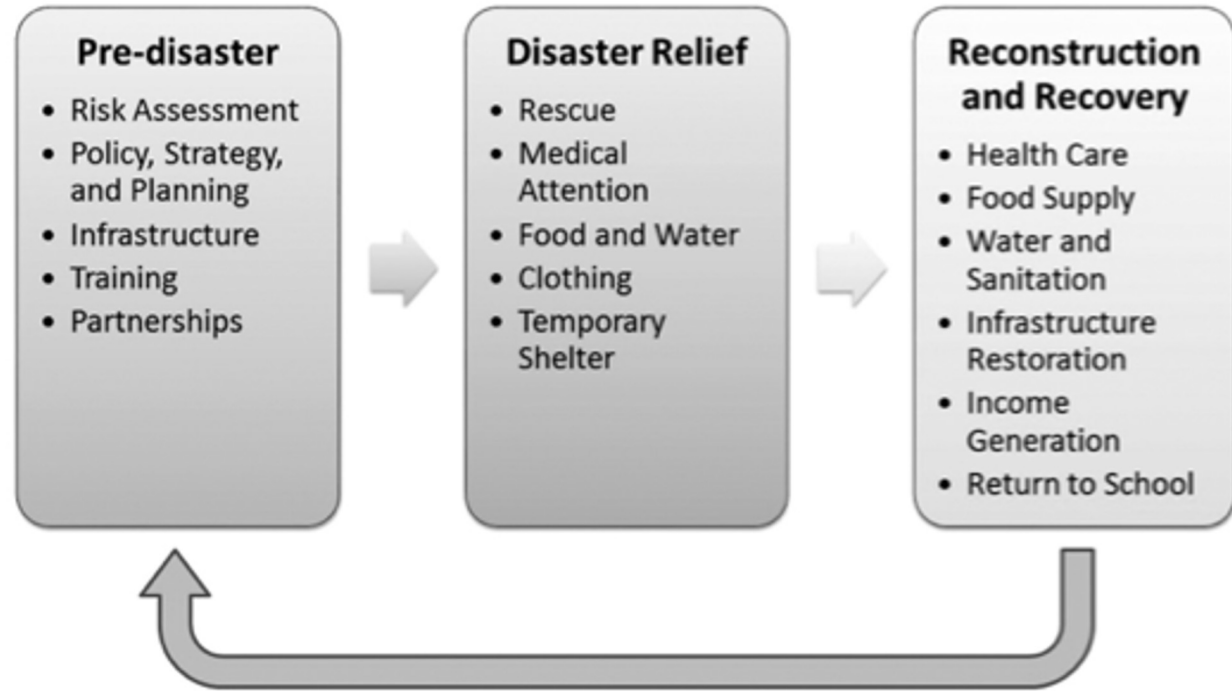
Building Resilience



Phases of the Disaster



The Disaster Cycle



Disaster Risk Management and Disaster Risk Finance

Disaster Risk Finance as Part of Disaster Risk Management

Disaster risk financing and insurance is an integral part of disaster and climate risk management. The financial impact of disasters is best managed when integrated into holistic risk management practices. It complements disaster risk management activities by securing adequate financial resources to cover

residual risks that cannot be mitigated and by creating the right financial incentives to invest in risk reduction and prevention. By quantifying the financial and fiscal impact of risk, it elevates risk management within the ministries that control public investment.

Financial protection, a key pillar of disaster risk management

Pillar 1: Risk Identification

Risk assessment and risk communication

Pillar 2: Risk Reduction

Structural and non-structural measures; infrastructure, land-use planning, regulation

Pillar 3: Preparedness

Early warning systems; support of emergency measures; contingency planning

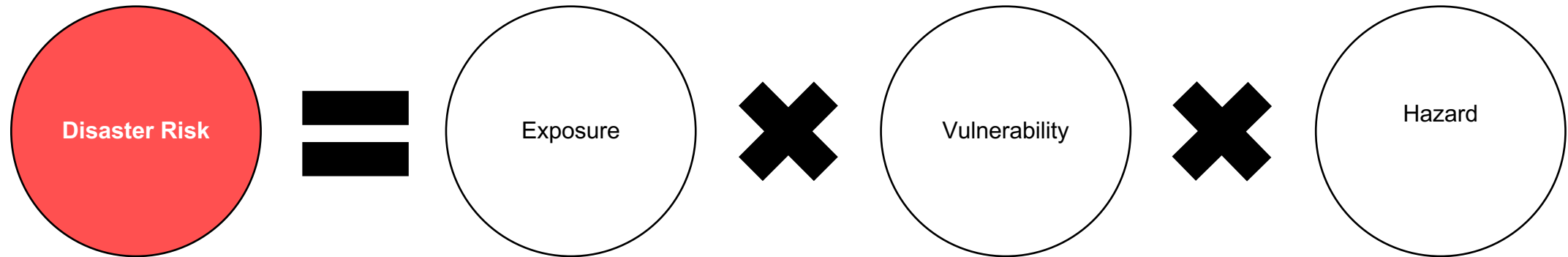
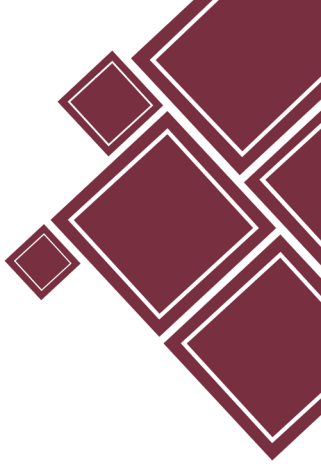
Pillar 4: Financial Protection

Assessing and reducing contingent liabilities; budget appropriation and execution; ex-ante and ex-post financing instruments

Pillar 5: Resilient Recovery

Resilient recovery and reconstruction policies; ex-ante design of institutional structures

Contributors to Disaster Risk



Risk, Prevention and Coping

Insurance

to transfer resources across people and over time, from good to bad states of nature

Knowledge

to understand shocks, internal and external conditions, and potential outcomes, thus reducing uncertainty

Coping

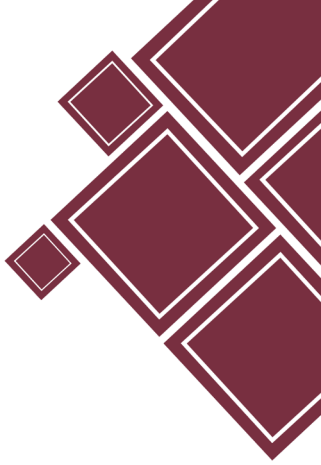
to recover from losses and make the most of benefits

Protection

to reduce the probability and size of losses and increase those of benefits

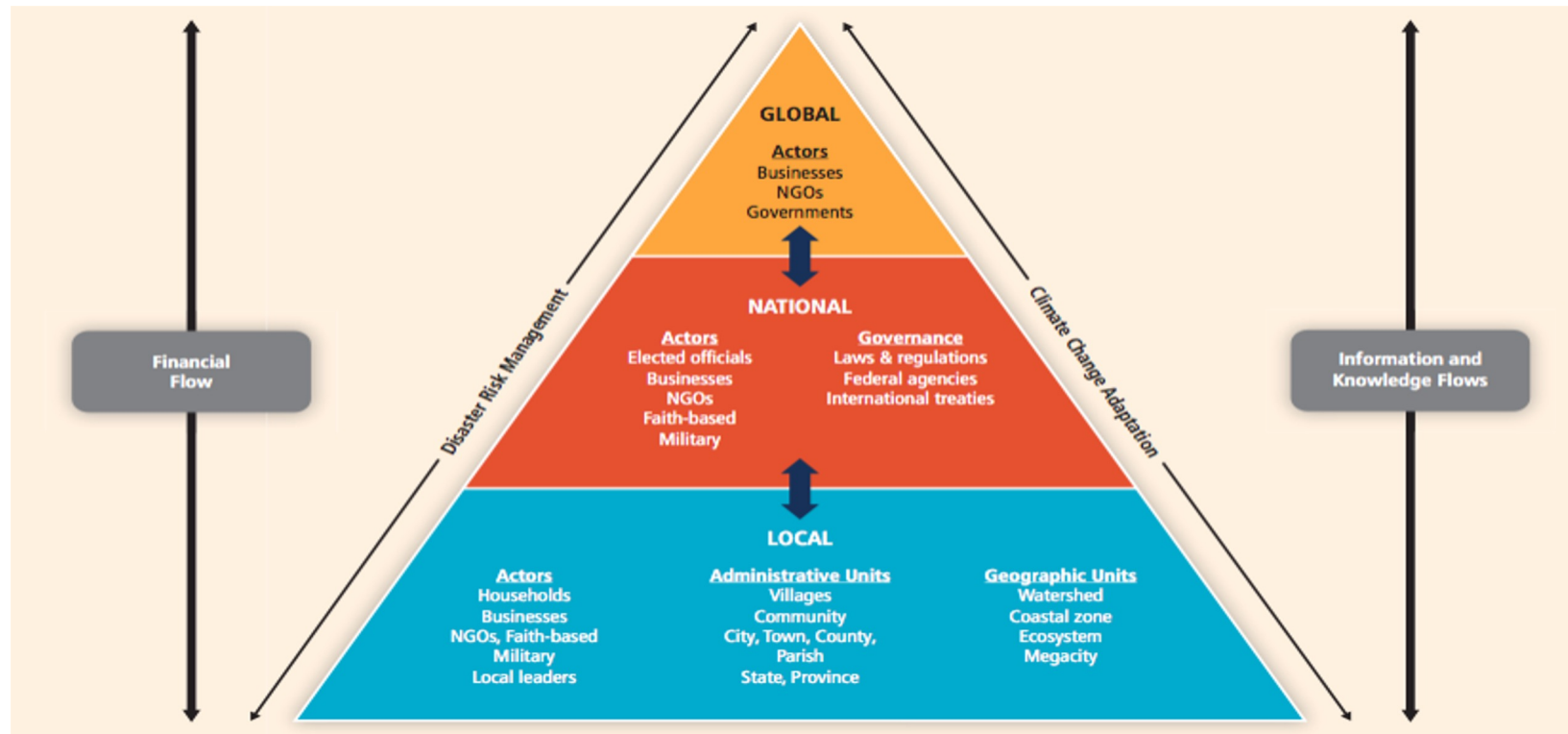


Source: WDR 2014, World Bank



MAIN ACTORS IN THE DISASTER MANAGEMENT CYCLE

Linking local to global actors and responsibilities



Managing climate-related disaster risks is a concern of multiple actors, working across scales from international, national, and sub-national and community levels.

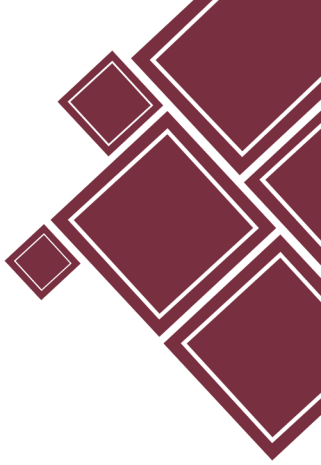
Class Discussion 2. Disaster Risk Management

Southeast Asia is on the front line of natural disasters with Cambodia, Philippines, and Vietnam at the top of global lists of vulnerability. According to the IMF report:

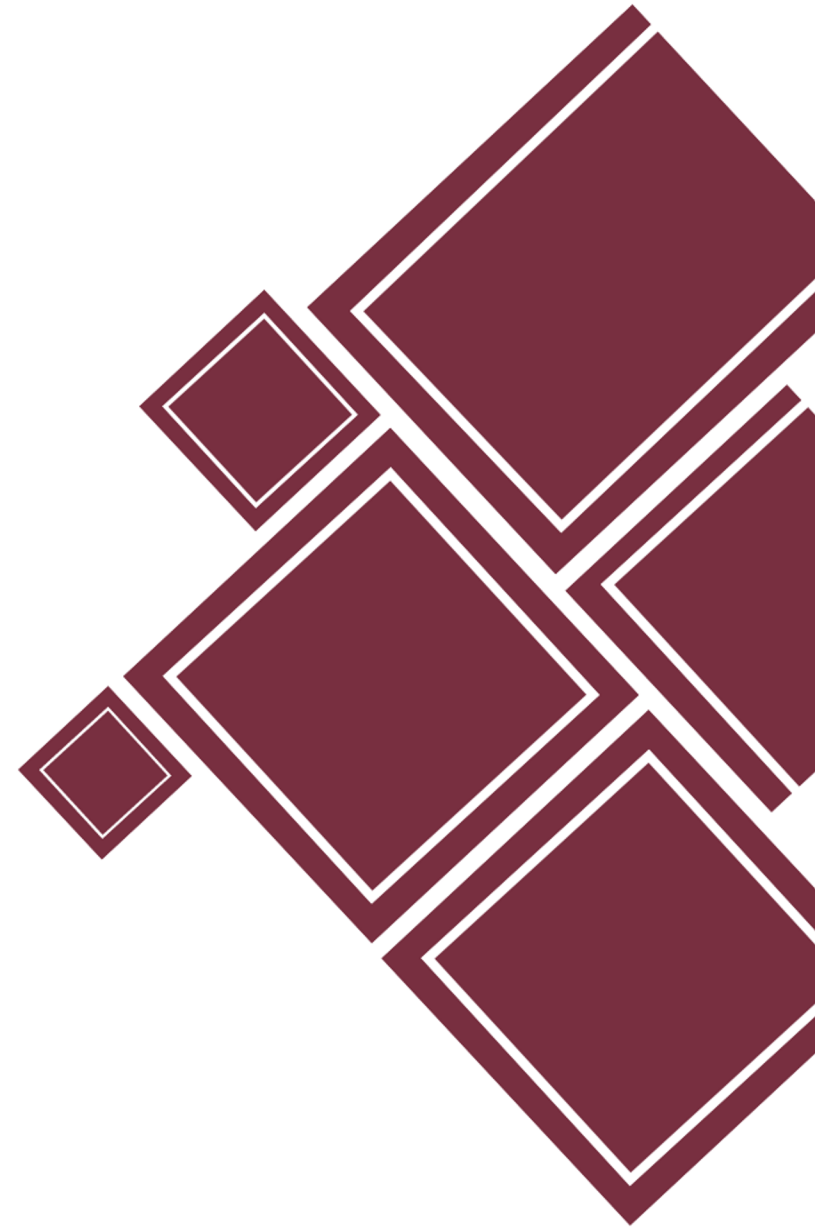
“One of the most vulnerable regions to climate change (Southeast Asia) is witnessing the world’s biggest jump in greenhouse gas emissions.”

Consider one Southeast Asian country and its disaster risk management, including disaster risk finance, to deal with hazards of nature.

- How would you rate the country’s preparedness in comparison to others and with itself overtime ?
- In proposing improvements, how would you differentiate between crisis management and risk management?
- What organizational considerations would top your “to do” list ?
- How do you see the role of education, capacity development, negotiations, communication?



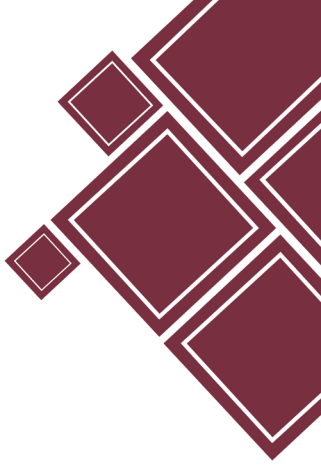
Investment and Financing



Disaster Risk Finance

- DRF as a pillar under the over-arching umbrella of DRM, while a cross-cutting agenda.
- The phases of disaster require different types of DRFI instruments that are timely and cost-efficient.
- Governments need to have a national DRF strategy that anticipates the sources of financing.
- DRF also looks at different interventions of the national government level and line agencies, local governments, private sector, and population segments.

See: Disaster Risk Finance: A Primer: Core Principles and Operational Framework, WBG.



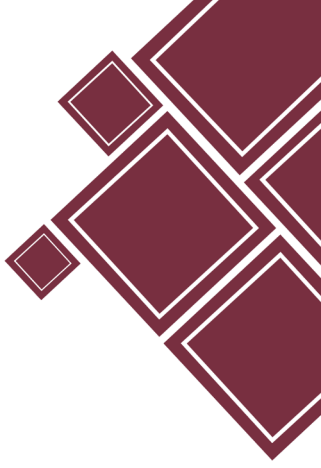
POLICIES FOR DISASTER INVESTMENTS

Climate policy options are categorized under three primary categories:

1. Capacity and information-based instruments
2. Regulatory instruments
3. Market-based instruments (MBIs).

MBIs are further divided into four sub-categories, namely:

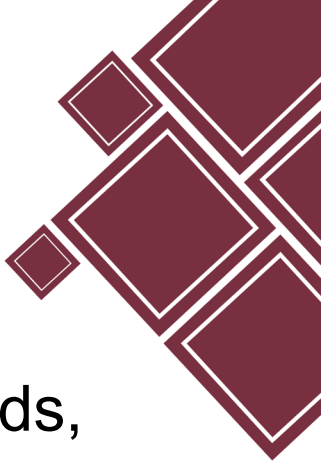
1. Fiscal incentives
2. Early market-development instruments
3. Debt-based and equity-based instruments
4. Trading instruments



SOURCES AND INTERMEDIARIES OF FINANCING

1. Public Actors

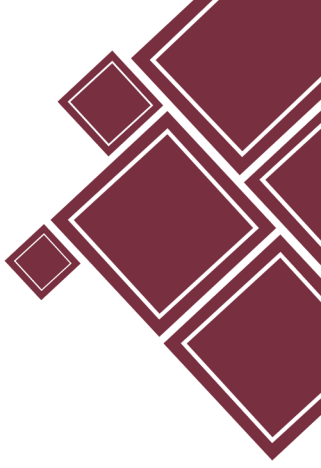
- Public actors include governments, bilateral aid agencies, climate funds, and multilateral, bilateral, and national Development Finance Institutions (DFIs).
- DFIs' commitments are about one third of total climate finance flows.
- National DFIs contribute more than half of total DFI flows.
- Climate finance commitments represent a growing share of DFIs' business volume.
- Carbon tax, carbon trade, green bonds.



SOURCES AND INTERMEDIARIES OF FINANCING

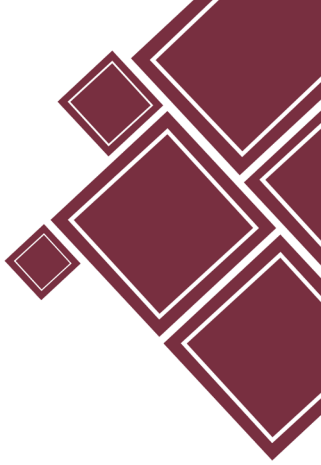
2. Private Actors

- **Private actors invest an increasing share in renewable energies, for example, solar PV and onshore wind capacity.**
- **Project developers** remain the most prominent private investor class..
- **Corporate actors** (non-energy corporations and manufacturers) invest sizably.
- **Households' investments.**
- **Commercial financial institutions.**
- **Also, private equity, venture capital, infrastructure funds, and institutional investors.**



INSTRUMENTS OF FINANCING

- On-balance sheet financing or borrowing funds or through equity capital.
- Equity investors expect a greater return for the risk, accounting for new ventures that may fail.
- Banks focus on getting that debt repaid, earning a relatively small return on the transaction.
- Green bonds, catastrophe bonds, project financing, equity options, insurance, hedging.

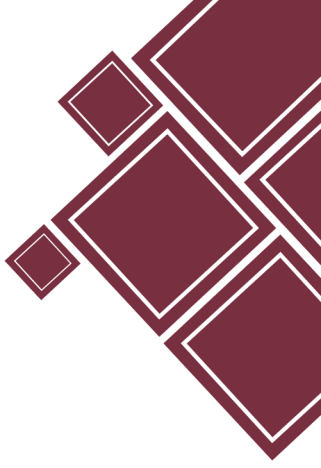
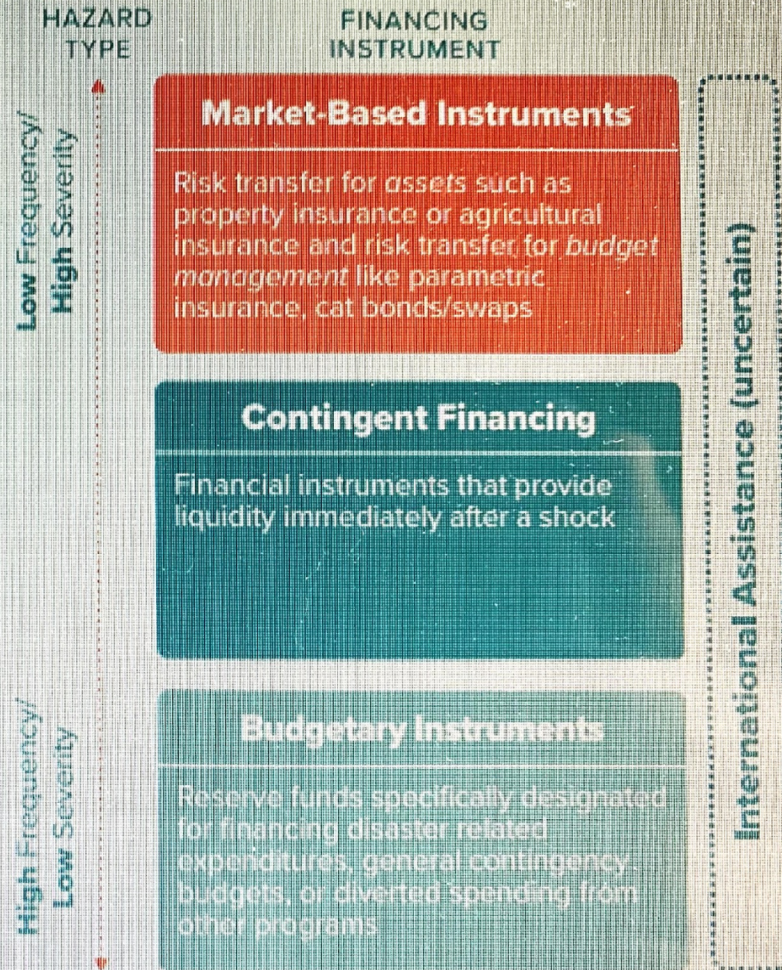


Core Principle 3

Disaster risk layering: No single financial instrument can address all risk.

International experience has shown that governments ideally combine different instruments to protect against events of different frequency and severity. This approach, known as risk layering, is part of a comprehensive financial protection strategy that mobilizes different instruments, either before or after a disaster strikes, to address the evolving need for funds.

Risk layering ensures that cheaper sources of money are used first and that the most expensive instruments are used only in exceptional circumstances. For example, insurance can provide cover against extreme events, but is not appropriate to protect against low-intensity events that recur regularly. To retain this lowest layer of risk, the government could consider setting up a dedicated contingency fund.



COST BENEFIT ANALYSIS



Identify the problem and define alternatives



Clarify issues of standing or whose viewpoint which decides results



Identify the implications of each alternative



Predict impacts quantitatively (be clear about how you predict it)



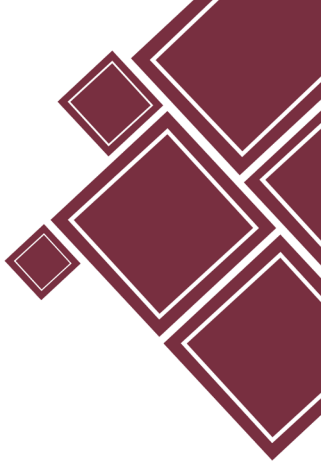
Value costs and benefits



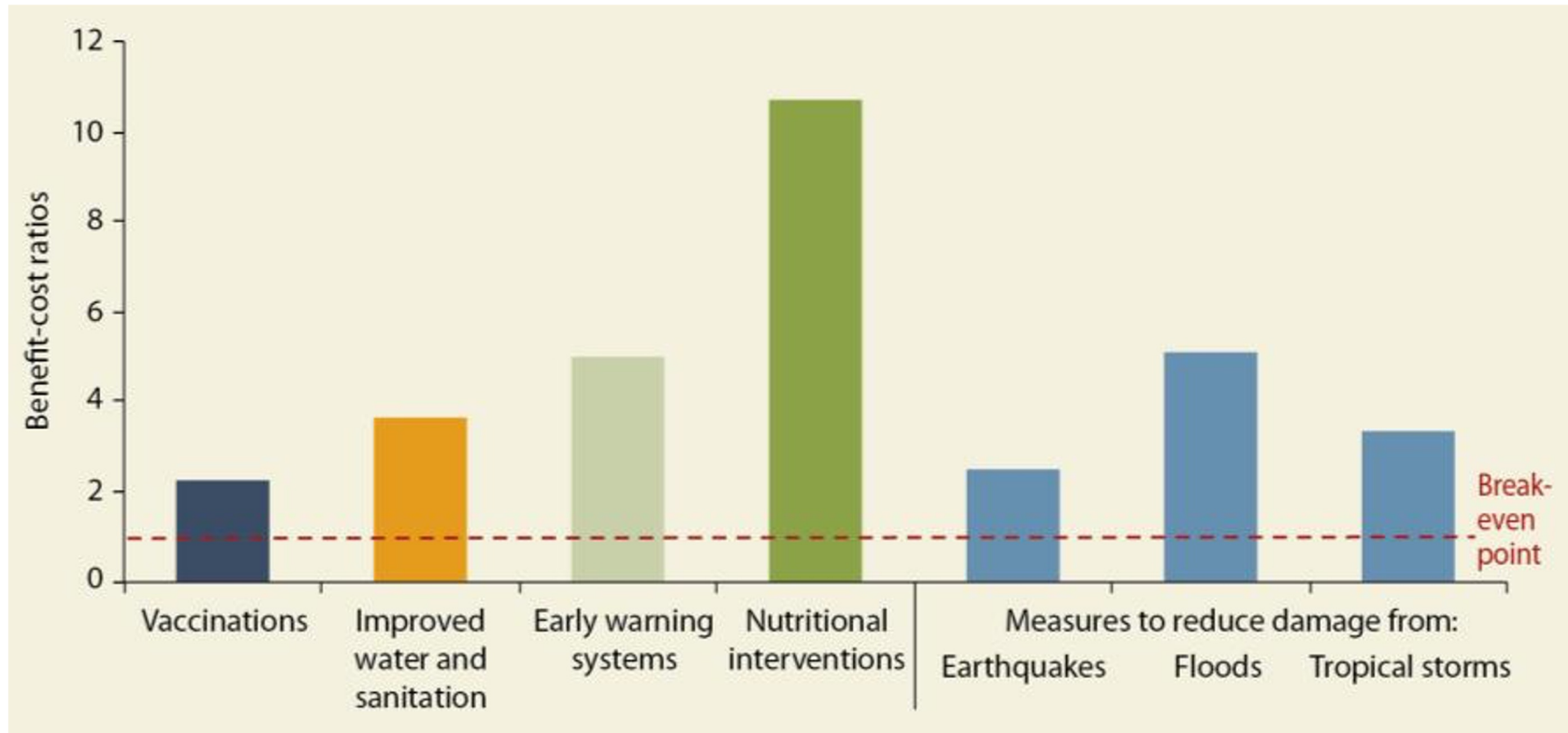
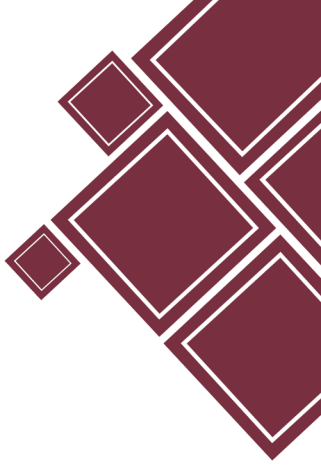
Decide appropriate discount rate (concern of climate change, people having higher belief in climate change would use lower discount rate) and account for uncertainty



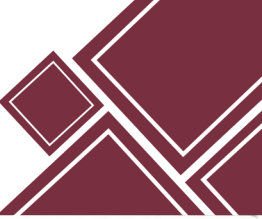
Compute net present value for each alternative



Benefits and Costs of Risk Management



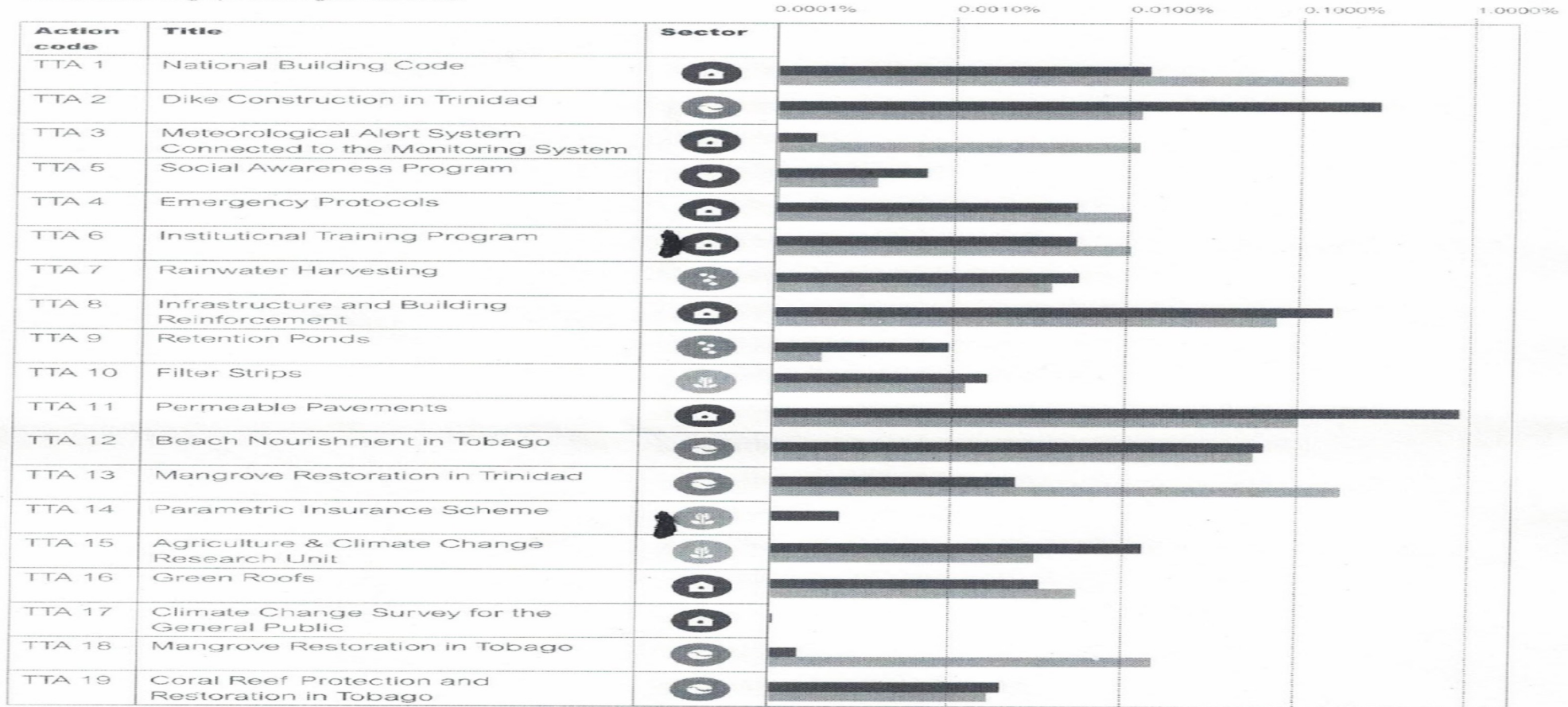
Source: WDR 2014, World Bank



Class Discussion 3: What are your top priority investments and why?

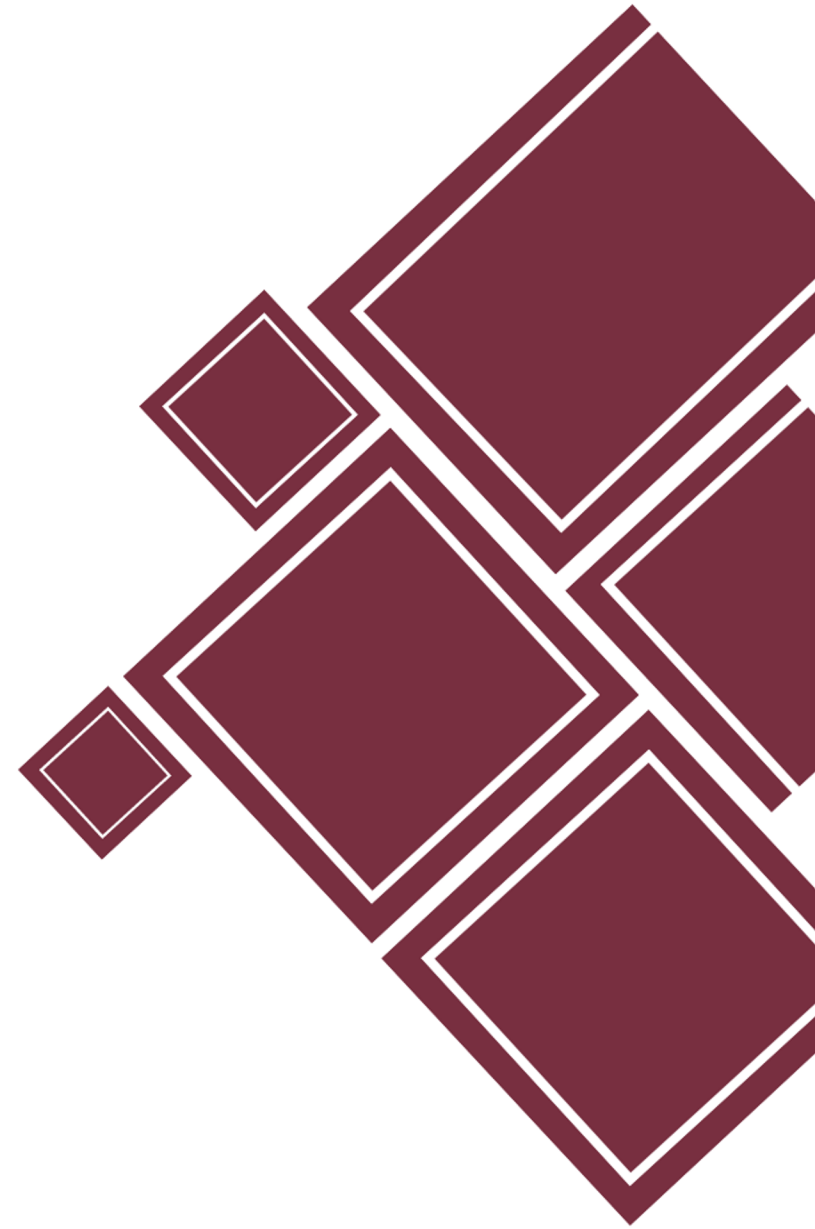
Total Costs and Total benefits as a Percentage of GDP

Please Note: This graph is in Logarithmic Scale.



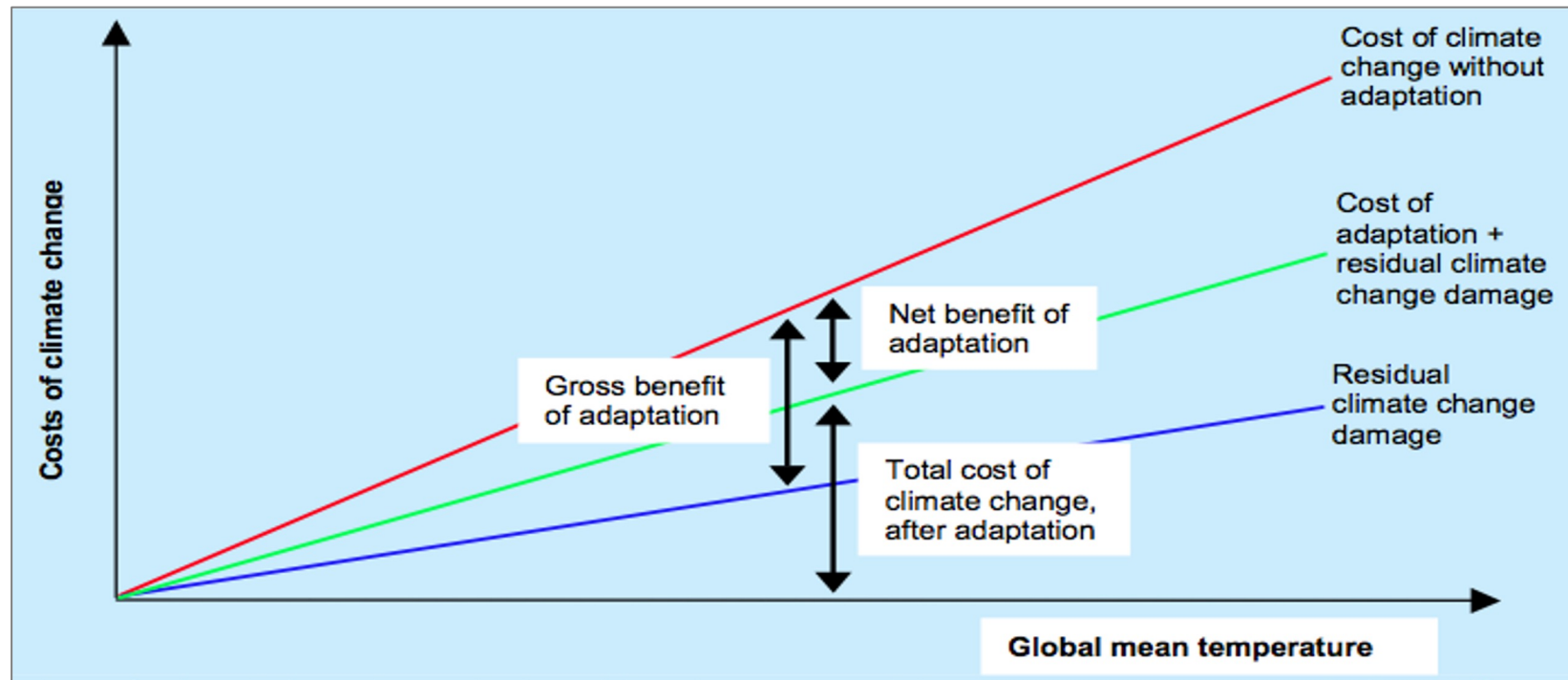
■ Total Cost as a % of GDP ■ Total Benefit as a % of GDP

Climate Change Financing



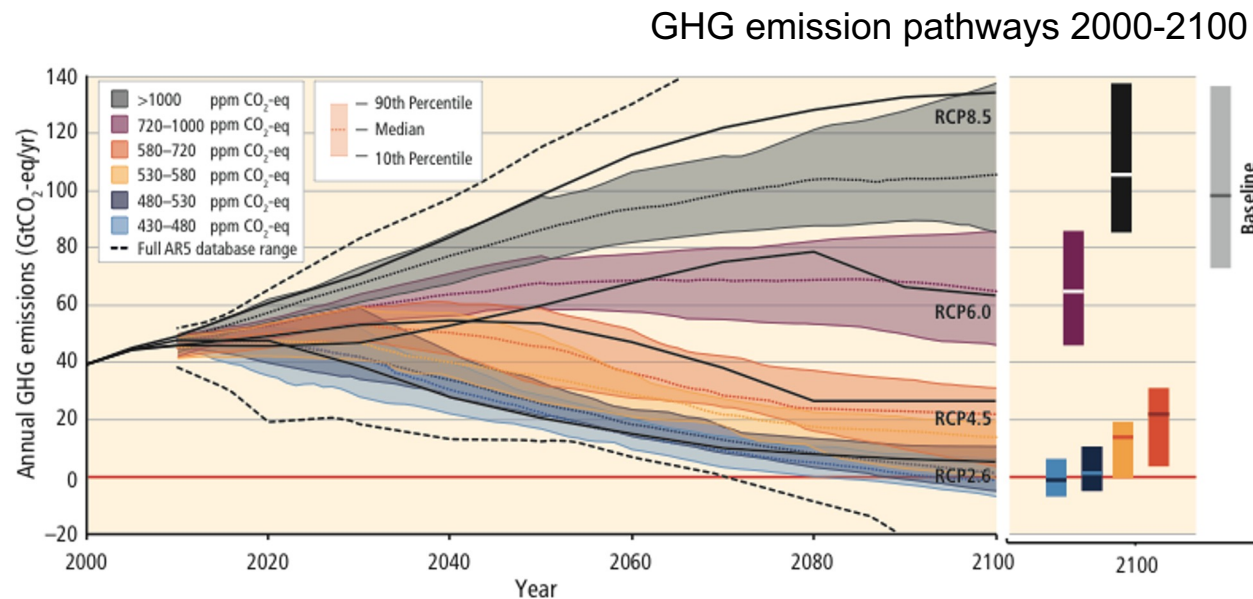
ADAPTATION OPTIONS

Adaptation will reduce the negative impacts of climate change (and increase the positive impacts), but there will almost always be residual damage. The gross benefit of adaptation is the damage avoided. The net benefit of adaptation is the damage avoided, less the cost of adaptation. The residual cost of climate damage plus the cost of adaptation is the cost of climate change, after adaptation.



Mitigation response

- Mitigation is an action to reduce the risk of climate change. IPCC defines mitigation as **“an anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases.”**
- There are multiple **mitigation pathways** that can limit warming to below 2°C relative to pre-industrial levels, requiring substantial emissions reductions over decades and near zero emissions of GHGs.



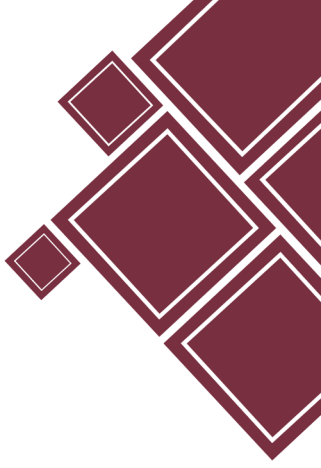
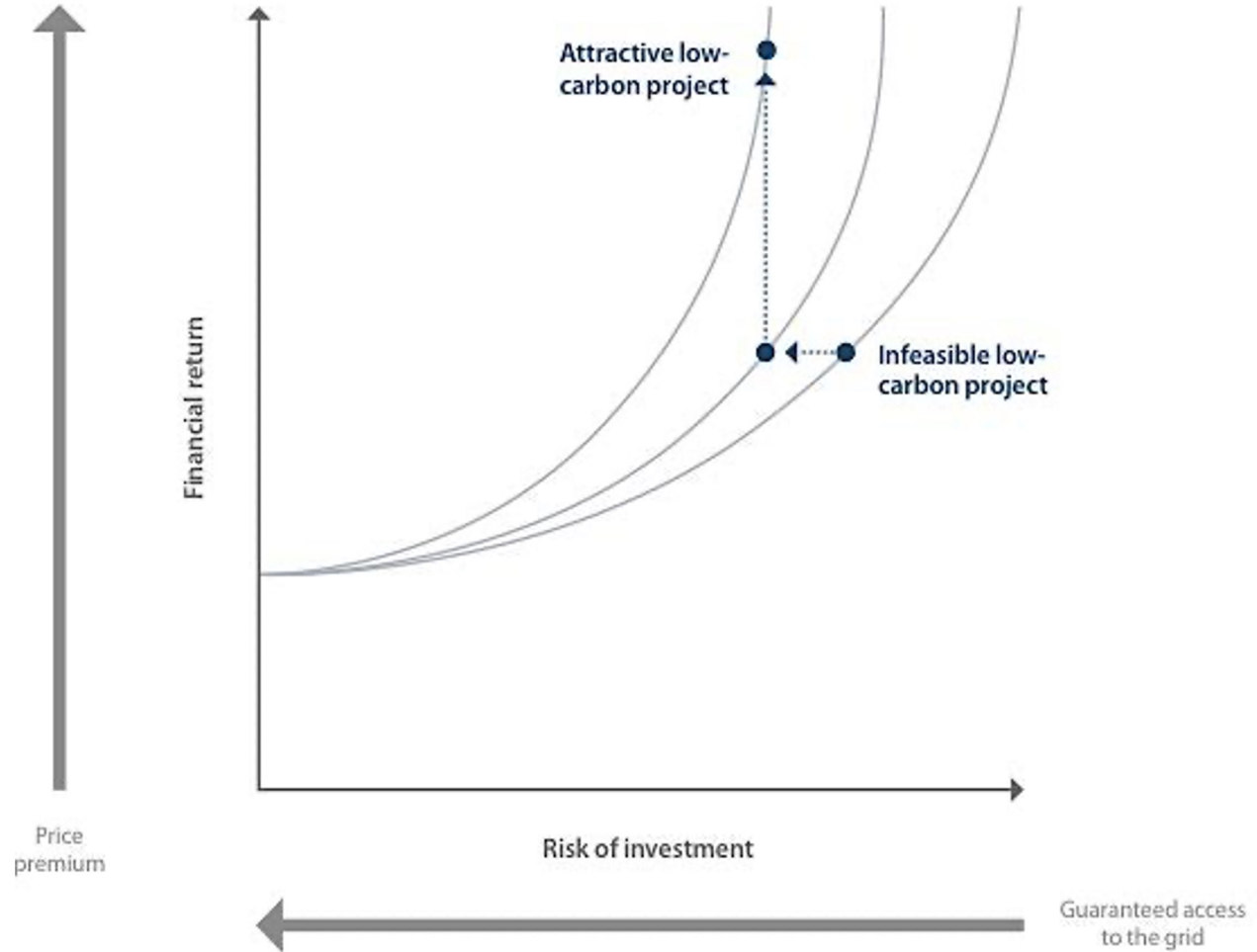
Mitigation policies have traditionally focused on the following:

- i) reducing GHG emissions,
- ii) increasing carbon sinks, and
- iii) switching to low-carbon energy.

MAKING CLIMATE INVESTMENTS MORE ATTRACTIVE

A shift from a commercially unattractive investment opportunity (right) to a commercially attractive one (top).

First, reduce risk, for example through guaranteed access to the grid for power producers and, second, with a premium price for renewable electricity through a feed-in tariff.



Class Discussion 4: World Bank loan to Philippines for Haiyan

The World Bank's Haiyan Response included US\$500 million budget support loan to finance overall recovery and reconstruction. There was an additional US\$480 million loan for a national community driven development project, which would help typhoon affected areas build infrastructure and social services.

A rapid assessment (GIS, rapid structural assessment with JICA) was built in.

- How would you put together the rapid assessment and what principal constraints would you confront as a priority?
- How would you arrive at the size of the loan and its principal components? What should be the complementary financing from the government and others?
- What features would you build in to improve the chances that the proceeds of the loan are well used and that the project delivers on its promise?



Best Wishes in Following up!



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Political Economy of Resilience

Dimensions of Disaster Risk

Innovations in Risk Financing

Macroeconomics and Scenarios

Risk Communication and Impact

Data and Analytics of Risk

Multiple Stakeholders and Interests

