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InsuResilience GlobalPartnership

The Landscape of Climate and Disaster Risk Insurance (CDRI)

in South and Southeast Asia and Oceania

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List of acronyms

ADB	Asian Development Bank
ADPC	Asian Disaster Preparedness Centre
ASEAN	Association of Southeast Asian Nations
AWGCC	ASEAN Working Group on Climate Change
CAT DDO	Catastrophe Deferred Drawdown Option
CDRI	Climate and Disaster Risk Insurance
EU	European Union
FRC	Mongolia Financial Regulatory Commission
GFDRR	Global Facility for Disaster Reduction and Recovery
GIZ	Gesellschaft für Internationale Zusammenarbeit , GMBH
IC	The Philippines' Insurance Commission
IFI	International Financing Institutions
IGP	InsuResilience Global Partnership
IRCSL	Insurance Regulatory Commission of Sri Lanka
ISA	Vietnam Insurance Supervisory Authority
MEFIN	Mutual Exchange Forum for Inclusive Insurance
MRC	Mekong River Commission
MSC	MicroSave Consulting
MSL	Mean Sea Level
MSMEs	Micro, Small, and Medium Enterprises
NAP	National Adaptation Plans
OJK	Otoritas Jasa Keuangan (OJK)
PCDIP	The Philippine City Disaster Insurance Pool
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PEM	Pandemic Emergency Financing
PMFY	Pradhan Mantri Fasal Bima Yojana, India
SAARC	The South Asian Association for Regional Cooperation
SBC	Sadharan Bima Corporation, Bangladesh
SEADRIF	South East Asia Disaster Risk Insurance Facility
SECP	Securities and Exchange Commission of Pakistan
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNU-EHS	United Nations University's Institute for Environment and Human Security
USD	United States Dollar
WB; WBG	World Bank; World Bank Group

Executive summary

Countries in Asia, South Asia, and the Pacific need to address their limited capacities to finance climate change and disaster risks urgently. Asia, with its high population density and geographical expanse, remains vulnerable to both extreme weather events and climate change manifestations. Such risks are largely uninsured, which causes countries to retain them and adversely affects millions from the low and vulnerable segments of their populations.

Most disaster-induced losses remain uninsured in the region. Data from Swiss Re Sigma reports on 11 of the 22 countries studied in the past decade indicates that some of the biggest disasters and catastrophes caused losses worth USD 140 billion. **Of these, only USD 20 billion or a mere 14.2% losses were insured across all sectors.**

Legislative frameworks for disaster risk management are almost universal and well-defined disaster risk management structures are increasingly becoming more effective. These approaches focus on building resilience through disaster-resilient infrastructure, the use of early warning systems, well-defined response operating procedures, and the development of local capacities to respond to disasters. **Though disaster risk management frameworks are present and implemented in the region, they need to incorporate climate and disaster risk insurance (CDRI) and other climate risk financing instruments**. There is a need to explore risk financing and transfer tools for both ex-ante and ex-post planning for climate change and disaster risks. **No regulations specific to climate and disaster risk insurance exist in the region, while current insurance regulations are not seen as enabling for the development of CDRI business models.**

14 of the 22 countries studied have defined one or more contingency funds and reserves to mount disaster relief efforts, including national budgetary allocations and re-allocations that can be utilized for these efforts. Such disaster contingency funds are best used to respond to localized disasters like floods and earthquakes. These funds generally are sufficient for low to moderate severity events. While economic realities limit the size of such reserves, this creates greater dependence on foreign aid in times of need. Countries need to take a wider view to plan their short-term financing needs through expanding reserves but also extensively seek out contingent credit lines and sovereign risk transfer mechanisms. Further support can be extended by encouraging local insurance sectors to develop consumer-level insurance products against disaster risks. However, countries currently lack a policy-level focus on designing frameworks for such solutions, and methods to encourage the industry are absent.

In the region, the study identified 25 interventions that qualify as CDRI. At the macro level, these five sovereign risk transfer programs indirectly provide some degree of coverage to over 171.8 million people in countries like the Philippines, Myanmar, Laos, Maldives, as well as Pacific Island countries like the Marshall Islands and Fiji. At the meso and micro levels, through the 14 agricultural and disaster insurance solutions

identified, the study estimates a direct or indirect coverage to over 40.5 million farmers, fishers, among others, and over 43 million hectares of agricultural land. Of these, five are large-scale state-sponsored and subsidized agriculture insurance programs. The rest are private insurer-driven agriculture insurance programs developed mostly through support from international donors and funding.

From these numbers, the study estimates that CDRI solutions cover about 212 million people directly or indirectly. As per World Bank data, the total population of the 22 countries studied is about 2.47 billion. Hence, this estimated coverage of 212 million represents just 8.5% of the total population, which leaves a protection gap of 91.5%.

Like any other insurance product, distribution is a challenge for micro-insurance and retail disaster risk insurance solutions. The study finds that state-subsidized and mandatory coverage performs well, as evident in the case of the Pradhan Mantri Fasal Bima Yojana (PMFBY) in India. Moreover, bundled solutions can also find scale, as with the case of Pioneer Insurance and Surety Corporation (PISC), a leading insurance provider in the Philippines that covered 890,000 lives, as of 2018. However, retail-focused, non-subsidized solutions prove to be a hard sell, as per the study. As AXA Philippines observed, solutions like its business interruption coverage for MSMEs need time and effort from agents to explain and sell.

Insurance companies that operate in the region find that with disasters likely to become more frequent due to climate change, there is a market for such solutions. **However, challenges around poor data availability need to be tackled to enable the accurate modeling of risks**. Rural infrastructure in most Asian countries remains poor. This makes designing, monitoring, and servicing such products costly for insurers and expensive for customers. Insurers also have limited technical capacities to model weather and disaster risks. A combination of such factors discourages insurers from actively engaging with disaster risk solutions. States need to encourage their insurance industries by empowering regulations, making access to reliable data a public good, and creating a robust infrastructure for weather monitoring and data collection.

The use of technology in insurance and disaster risk insurance has huge potential for new solutions. Other than the use of weather-based indexes for factors like rains, floods, and earthquakes, we could identify limited examples of the use of technology in these markets. From a client-facing perspective, the study identified two interesting applications.

1. Red Button, a solution provided by AXA. This is a mobile app-based emergency call system
2. A blockchain-based agriculture insurance in Sri Lanka designed by Aon, and backed by OXFAM, and Etherisc. In this product, farmers do not have to submit claims while insurers do not need to train adjusters to administer the policies. Instead, Block-chain smart contracts automate the process and robotic weather stations record the amount of rainfall. In an event of extreme levels, claims are triggered automatically.

CDRI in the region is in its infancy. With over 90% of the population unprotected against the impacts of climate changes and a further increase expected in climate impacts with the increase in extreme events, there is an urgent need to develop appropriate adaptation strategies that involve ex-ante planning and preparedness. Risk finance and insurance is one element to help cope with the consequences of a disaster.

For disaster risk finance to grow and assume an important role in the region, governments and policymakers must encourage and engage with insurers. They should strive to understand the risks better and develop a comprehensive climate and disaster risk management strategy to better adapt to climate change. This involves pre-arranged financing at the governmental level for immediate response and the development of a more systemic approach to disaster risk management. A comprehensive strategy

should also enable regulatory environments for the development of disaster risk insurance at the individual level.

Furthermore, insurers in the region seek government support for reliable data that can be accessed and used efficiently, along with better weather monitoring infrastructure and reporting mechanisms. Insurers in the region also seek to develop their capacities to design and model solutions for negative weather events. They are interested in learning from peers and experiences in other geographies. Ultimately, for CDRI to succeed, especially at the micro-level, it will have to find the right fit with other financial services like credit and savings to help clients meet their disaster risk financing needs.

International cooperation and exchange of knowledge and capacities will be important, such as the International Conference on Inclusive Insurance. The role of platforms like Mutual Exchange Forum on Inclusive Insurance (MEFIN) is also significant to enable these exchanges in the region. Ultimately, the G20 or V20-initiated InsuResilience Global Partnership offers the platform for convergence, collaboration, and coordination between different actors and initiatives.

Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is, in addition to natural climate variability, observed over comparable periods[1].

The manifestations of climate change are both chronic and acute. Hence, a key distinction can be made between the slow onset events of the climate change process and the more extreme events that may take the form of disasters.

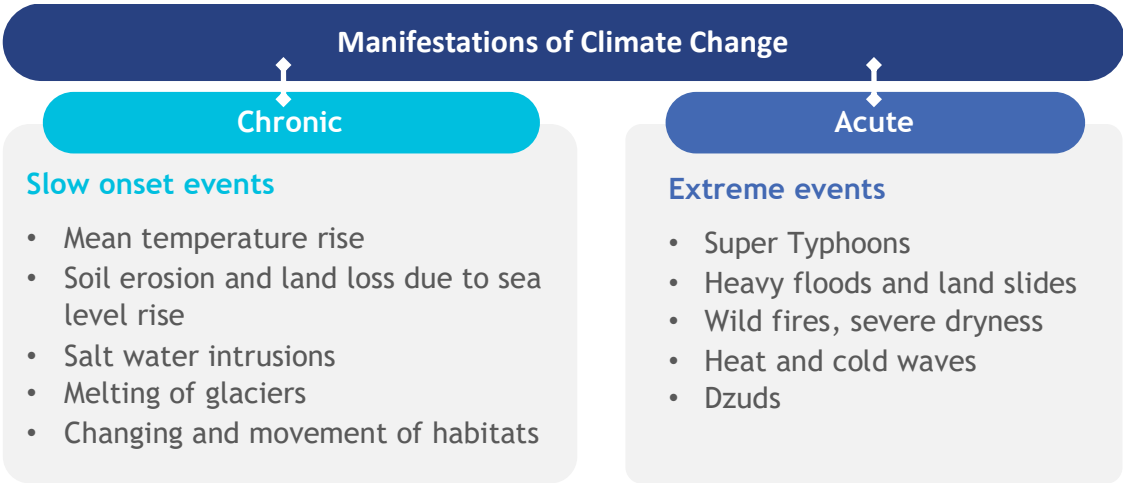


Figure 1: Manifestations of climate change
Sources: MSC analysis based on the framework by the Korea Environment Institute

While the impacts of slow-onset climate change events are felt across the globe, experts recognize that Asia will be among the hardest hit. Low-lying and crowded coastal cities in many South and Southeast Asian countries are most at risk, with hundreds of millions of people who reside in these cities particularly vulnerable.

According to the Asian Development Bank (ADB), disasters and extreme weather events in Asia and the Pacific from 1989 to 2018 have affected over 5.2 billion people, claimed one million lives, and caused total direct physical losses of USD 843.6 billion. Out of the 10 most vulnerable countries to climate change, seven are in Asia and the Pacific. These are Bangladesh, Cambodia, Philippines, Solomon Islands, Timor Leste, Tonga, and Vanuatu.[2]

Disasters affect the poor and vulnerable people in the developing world adversely. These people suffer disproportionately due to their higher vulnerability and exposure to climate change events and a lower ability to cope and recover. The impact of climate change is further amplifying this vulnerability and addressing this requires a multi-layered and multi-stakeholder approach. The InsuResilience Global Partnership brings together stakeholders from the Vulnerable 20 group (V20) and the G20 countries, multilateral development organizations, the private sector, civil society organizations, and academia.

[1] https://unfccc.int/
[2] The Growth Impact of Disasters in Developing Asia, Asian Development Bank,2019

This partnership works to strengthen the resilience of developing countries and protect the lives and livelihoods of poor and vulnerable people against the impacts of disasters. The central objective of the partnership is to enable more timely and reliable post-disaster response through climate and disaster risk finance and insurance solutions. The partnership works to reduce humanitarian impacts, helps poor and vulnerable people recover more quickly, increases local adaptive capacity, and strengthens local resilience. This complements ongoing efforts in countries to avert, minimize, and address climate and disaster risks.

Against this background, MSC (MicroSave Consulting) analyzed the status of CDRI in collaboration with the Gesellschaftfuer Internationale Zusammenarbeit (GiZ) and the Regulatory Framework Promotion of Pro-poor Insurance Markets in Asia (RFPI-Asia), together with the InsuResilience Secretariat, which shares first findings of the CDRI landscape in Asia and the Pacific.

The objective of this study is to assess the status of CDRI and financing from the following perspectives:

- Analysis of the existing government policy framework around adaptation, management, and financing of risks that emerge from climate change and disasters;
- Assessment of existing CDRI solutions in the countries reviewed, the nature of the products, and potential multipliers to scale up inclusive insurances that target the poor, vulnerable, and marginalized population groups;
- Assessment of challenges in terms of the distribution and capacity of insurers in the region;
- Use of technology in CDRI, especially in client-facing solutions;
- The role of international and regional partnership platforms for knowledge management to promote CDRI.

Scope of the study

The study focuses on 22 countries located across Asia and the Pacific region. They include Afghanistan, Bangladesh, Bhutan, Brunei, Cambodia, India, Indonesia, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, the Philippines, Singapore, Sri Lanka, Thailand, East Timor, Vietnam, Fiji, and the Marshall Islands. Out of these, we identified four key markets of Bangladesh, Indonesia, the Philippines, and Vietnam for greater focus because of their high vulnerability to disasters in general, while offering a contrast in the approach to disaster risk financing given the different nature of disasters that afflict these markets.[3]

The countries analyzed within the study

Figure 2: Geographical scope of the study

As part of the study, the team undertook a robust secondary research exercise on climate change adaptation policies and disaster risk management frameworks in the 22 countries. The research included an

[3]Earthquakes in Indonesia, typhoons in the Philippines, floods in Bangladesh, and storms and floods in Vietnam

analysis of the current sources of disaster risk financing used by these countries. For instance, contingent funds or budgetary allocations and re-allocations, or both. The team followed this by a scan of the existing insurance solutions that would fall under the CDRI category—sovereign risk transfers, agriculture insurance, and other disaster risk insurance products. In the markets of Vietnam, Indonesia, the Philippines, and Bangladesh, we engaged insurers and other stakeholders in person and via telephonic conversations.

Structure of the report

This report comprises the following six sections:

Section I – Context: This section sets up the context of the study with an overview of Asia's experience with extreme weather events and disasters. The countries of the study were comparatively analyzed using the InsuRisk tool developed by UN University in partnership with the InsuResilience Global Partnership.

Section II - Assessment of the policy environment around climate change and disaster risk management and financing: Building on the context, this section presents a high-level assessment of the existing government policy framework around the adaptation, management, and financing of risks that emerge from climate change and disasters.

Section III - Assessment of the climate and disaster risk financing and risk transfer tools: This section gives a high-level overview of the possible risk financing and risk transfer tools that can be used to finance climate and disaster risks. It also provides insights into the existing solutions that the studied countries utilize.

Section IV - The landscape of CDRI: This section presents the findings of the landscape assessment of CDRI solutions in the studied countries under the following three sections:

i. Sovereign risk transfer instruments
ii. Agriculture insurance solutions: State-sponsored and private-sector-driven
iii. Consumer-focused disaster risk insurance solutions

For each type of solution, the study worked to identify the associated numbers in terms of coverage, the way they work and insights emerging from them.

Section V - Distribution challenges and the use of technology in CDRI: This section summarizes challenges around the distribution and operations capacities of insurers in the region in offering CDRI solutions. The section also highlights some exciting uses of technology that help CDRI solutions become more accessible in the region.

Section VI - International partnerships: This section explores the relevance and importance of partnerships and coordination at the regional level to better address climate and disaster risks.

Section VII - Conclusion and the way forward: This section concludes the report with a summary of key findings and ideas about the road ahead.

Section I: The context: Asia's exposure to extreme events

Asia has a high exposure to catastrophic events and the nature of hazards varies significantly across the region. Asia has been at the receiving end of many disasters. Some of these, such as Cyclone Nargis in Myanmar[4] and the 2004 Indian Ocean Tsunami,[5] led to extensive loss of life while some like the Tohoku earthquake and tsunami as well as the 2011 Thai floods[6] had huge economic costs. Floods are the most recurring hazard across the region. An analysis of OECD indicates that the average annual economic losses from Asian floods could surge to USD 500 billion or more by 2050.[7] In the past decade, half of all member states of the Association of Southeast Asian Nations (ASEAN) have experienced at least one flood event that cost over USD 100 million.[8] Drought hazard is also widespread and affects agricultural production in parts of most Asian countries. The pattern of exposure to tropical cyclones and geophysical hazards of earthquakes and volcanic eruptions is more geographically specific.

This heterogeneity in hazards generates different disaster financing needs. While some countries may deal principally with costs for response and recovery after rapid-onset disasters, others may need to fund livelihood assistance and food security responses to flood or drought-damaged crops. Others still may need to deal with the reconstruction of critical infrastructure after an earthquake, flood, or storm damage. Some countries need to remain prepared to deal with many different types of response costs. The differences in economic development further amplify disaster risk financing needs.

The nature of costs that arise from disasters varies according to the type of population, asset, or economic activity exposed to the disaster. Countries with higher levels of economic development will have higher values of assets exposed and are often concerned with large losses that occur through damage to infrastructure and economic disruption. Conversely, countries with large populations of the vulnerable poor, may be focused on post-disaster assistance that supports livelihoods, such as social safety nets. For example, the 2011 Thailand floods caused an estimated USD 47 billion of damage and loss, 70% of which was borne by the manufacturing sub-sector[9].

On the other hand, the biggest single contributor to losses from the 2005 earthquake in Pakistan was the damage to private housing, which accounted for almost 50% of the total cost of reconstruction. Although there was damage to infrastructure and costs through economic sectors, the bulk of the costs arose from the large humanitarian response to aid the 3.5 million people rendered homeless.[10]
Asian countries need access to sufficient financial capacity to respond immediately and effectively following a disaster and minimize the human, economic, and fiscal costs that increase rapidly, in the event of delayed or inadequate response. Having a strategy in place for financial protection against disasters allows governments to increase their financial response capacity after a disaster. Such a strategy can also provide affected households and businesses with financial tools to aid recovery, which would improve financial inclusion.

[4]Cyclone Nargis: 84,537 dead and 2.7% of Myanmar's 2008 GDP lost - the Association of Southeast Asian Nations (ASEAN) and the United Nations (UN) released the Post-Nargis Joint Assessment (PONJA) report, 2009
[5]Indian Ocean Tsunami: Over 220,000 dead and combined losses of over USD 10 billion , Asian Disaster Preparedness Centre, 2005
[6]Thai floods 2011: A total economic loss of USD 8.2 billion: Thai chamber of Commerce, 2011, https://www.reuters.com/article/us-thailand-foods-factbox/factbox-thailands-flood-crisis-and-the-economy-idUSTRE7A11BC20111102
[7] "Ranking Port Cities with High Exposure and Vulnerability to Climate Extremes," OECD Environment Working Paper No. 1,
[8] World Bank and Global Facility for Disaster Reduction and Recovery, "ASEAN: Advancing Disaster Risk Financing and Insurance in ASEAN Countries: Framework and Options for Implementation," vol. 1
[9]Towards a regional approach to disaster risk finance in Asia, 2016, WBG, GDFFR
[10]Pakistan 2005 Earthquake, Preliminary Damage and Needs Assessment Report, ADB and World Bank 2005

Established financial mechanisms can also reduce the impact of disasters on social and economic development by smoothing financial shocks and preventing governments and populations from resorting to adverse coping mechanisms that disrupt development initiatives and productivity. Through these positive impacts, strategies for financial protection against disasters can help protect the welfare and economic gains, thereby contributing to poverty reduction and shared prosperity.

Most disaster-induced losses are uninsured in the region

Key insights

Most losses caused by disasters remain uninsured in the region. Data from Swiss Re Sigma reports on nine of the 22 countries being studied indicates that, in the past decade, 19 of the biggest disasters and catastrophes caused losses worth USD 140 billion. These disasters, including floods, earthquakes, storms, and typhoons, resulted in the deaths of 35,611 people and rendered 200 million homeless. Of the USD 140 billion losses suffered, only USD 20 billion or a mere 14.2% were insured across all sectors.

Countries	Disasters	Uninsured losses (in billion USD)	Insured Losses (in billion USD)	Deaths	Insurance penetration as % of GDP, 2018
Bangladesh	Floods (2007)	1.44	0.04	-	0.57%
Cambodia	Floods (2011)	0.88	0.01	320	0.50%
India	Floods (2009,12,13, 14,18,19); Storms (2014)	32.36	2.92	7574	3.70%
Indonesia	Earthquakes (2009, 18); Floods (2007, 13)	9.03	0.53	5091	2%
Myanmar	Floods (2008)	4.75	0.01	-	0.1%
Nepal	Earthquake (2015)	6.47	0.17	8960	2.60%
Pakistan	Floods (2010)	11.7	0.12	1958	1.00%
The Philippines	Storms (2008, 09, 13, 18); Earthquakes (2013)	19.96	1.5	10247	1.90%
Sri Lanka	Floods (2016,17)	1.69	0.14	484	1.10%
Thailand	Floods (2011)	51.34	14.74	815	4.30%
Vietnam	Storms (2009)	0.33	0.01	162	2.40%
Total	19 disasters between 2007–2019	**139.95**	**20.2**	**35,611**	**2 % (approx)**

Table 1: A summary of major disasters and insured and uninsured risks between 2007 and 2019

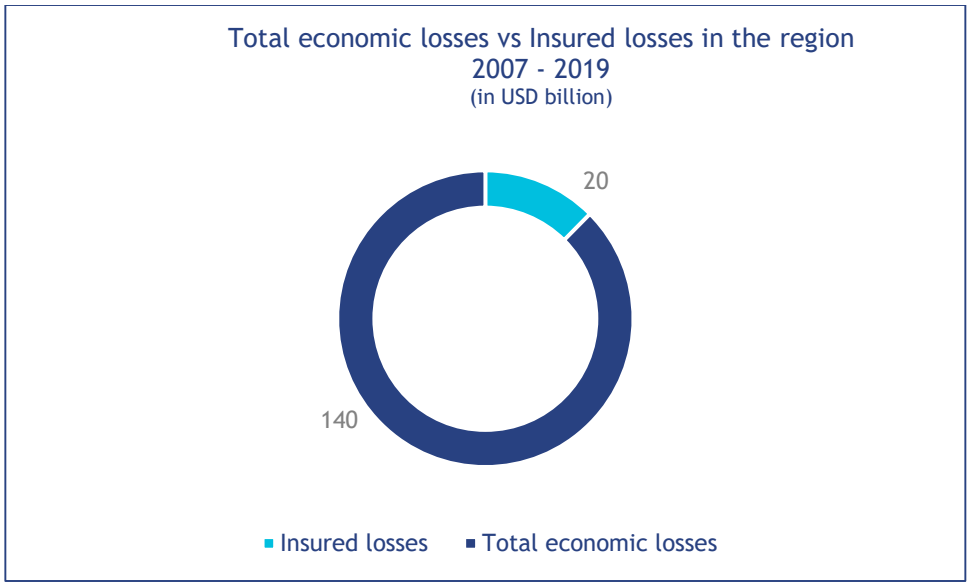


Figure 3: Total losses against insured losses between 2007 and 2019
(Source: Swiss Re Sigma, 2018)

Using the InsuRisk Tool to assess vulnerability and readiness for insurance solutions against disaster risks

In 2017, the InsuResilience Secretariat commissioned the United Nations University's Institute for Environment and Human Security (UNU-EHS) and Social Impact Partners. The task was to develop a concept and methodology that provides transparent and comparable information on the vulnerability of countries toward climate and disaster risks and their readiness to accommodate insurance solutions.

The result was a "Risk and Readiness for Insurance Solutions Assessment Tool" or the InsuRisk Assessment Tool. It assesses the climate and disaster risk of partner countries as well as their readiness to accommodate risk insurance and other risk transfer solutions. In line with the pro-poor focus of InsuResilience, the analysis was focused on low and lower-middle-income countries. The InsuRisk Tool is designed to provide answers to the following key questions:

- What is the level of vulnerability and climate and disaster risk of a country?
- What is the short-term capacity of a country to cope with hazardous events?
- How high is the remaining residual risk?
- Which long-term preventive strategies exist in a country to tackle future disaster risk?
- What is the country's readiness to accommodate insurance and other risk transfer solutions?

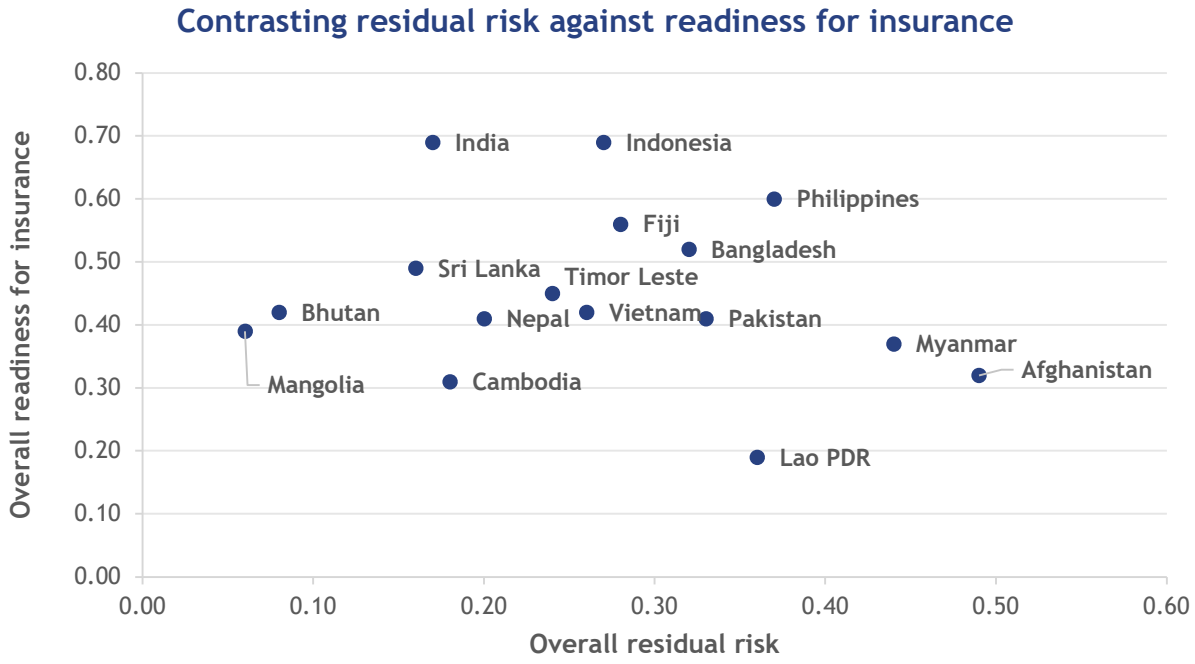
Open access data sets available for the countries were analyzed to arrive at these answers. Based on the analysis, the countries are assigned scores between 0 to 1 to estimate their overall residual risk and readiness to introduce insurance as a solution to mitigate these risks.

Residual risks can be understood as the remaining risks posed by hazards, exposures, and vulnerabilities due to disasters and climate change that individuals remain exposed to. They have to retain and suffer the consequences of these risks despite short-term individual-level coping strategies, such as savings, food

buffers, among others, as well as support through national-level disaster risk mitigation efforts like emergency services, health care, disaster risk management infrastructure, etc.

One strong option to mitigate this residual risk is through disaster risk and climate change risk insurance. While such insurance solutions are not widely available yet, the InsuRisktool, based on the state of the economy and the insurance industry as well as the levels of financial literacy and awareness in the country. These elements are taken into account to assign a score from 0 to 1 to a country to estimate its level of **readiness for insurance solutions**.

The table below gives a relative positioning of these countries when contrasting their residual risk and readiness for insurance solutions.



InsuRisk has not yet rated Brunei, Malaysia, Singapore, Maldives, Thailand, and the Marshall Islands

Figure 4: Relative InsuRisk ranking of the countries studied

Source: United Nations University; InsuResilience Global Partnership

Concerning InsuResilience' s focus on providing insurance solutions to those most at risk, figure 4 plots a country's residual risk against its readiness for insurance solutions, that is, the combination of individual readiness, enabling environment, and the state of insurance. Such analysis allows the development of country profiles and tailored support according to the specific situation of a country. For example, figure 4 allows the identification of countries where a very high residual risk concurs with a particularly grave lack of readiness to accommodate risk transfer solutions, such as Nepal, Lao PDR, and Cambodia. At the same time, countries with high residual risk concur and comparatively high readiness for insurance solutions are identified, such as India, the Philippines, and Indonesia.

The overarching takeaway from this analysis is that most countries in Asia, South Asia, and the Pacific face high levels of exposure to disaster and climate change risks. While some countries have vibrant insurance sectors that can work toward the design of risk transfer solutions against climate and disaster risks, plenty

of support and capacity building is needed for the insurance industry across the region to increase its readiness and capacities to offer meaningful CDRI solutions.

Section II: Assessment of the policy environment around climate change and disaster risk management and financing

Key insights

Disaster risk management frameworks are present and implemented in the region but these frameworks still need to incorporate CDRI. All countries analyzed except Brunei have a defined and legislated disaster risk management framework in place. At the legislative level, almost all such frameworks look at both pre- and post-disaster responses to disasters and catastrophes. Bigger economies in the region like India, Bangladesh, the Philippines, Thailand, and Vietnam have placed considerable emphasis on the development of a better understanding of the disaster risks the country faces. Based on this understanding, these nations develop early warning systems, better response mechanisms, and infrastructure for long-term resilience. None of the frameworks that the study covered featured insurance as an important mechanism of risk financing or risk transfer, except Vietnam, which identifies insurance as an important risk financing mechanism, and Indonesia, which has recently proposed a public assets disaster risk insurance program.

No regulations specific to CDRI exist in the region, while current Insurance regulations are not seen as enabling for the development of CDRI business models. The study did not identify any regulatory framework that works toward index-based or similar specialized weather index or disaster insurance products. For instance, in the Philippines, non-life insurance products are taxed at 26%. According to insurers like AXA and Pioneer, such a tax regime makes costly products like agriculture or disaster risk insurance appear even more expensive.

The framework of analysis

For this study, MSC developed a framework of analysis to make better sense of the emergence of policy-level interventions to address climate change adaptation, climate change, and disaster risk manifestations in the countries studied. The objective of this framework has been to understand the following:

a. How are countries defining their climate change adaptation policies? What are the key areas of focus?
b. How are countries defining their disaster risk management frameworks?
c. What are the commonalities of these policies and frameworks being developed or put in place?
d. How does insurance as a risk transfer tool feature in these policy frameworks?

The four components of the framework are summarized in the infographic below.

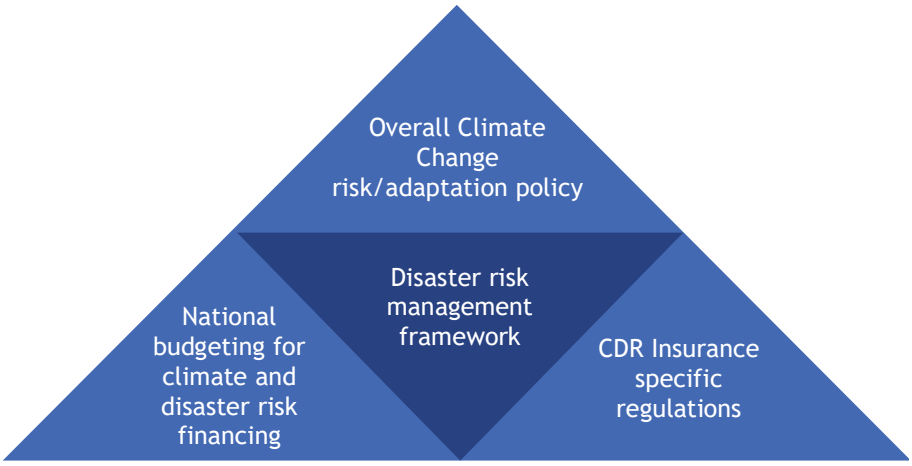


Figure 5: A policy framework analysis
Source: MSC analysis

Assessment of climate change risk or adaptation policies

In the review of publicly available information and documentation that refer to climate change adaptation policies in the countries studied, one common point of focus is the concept of climate change adaptation and resilience.

Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change. In simple terms, countries and communities need to develop adaptation solutions and implement action to respond to the impacts of climate change that are already happening, as well as prepare for future impacts.[11]

The study concurs with the now widely accepted idea that there is no "one-size-fits-all" route to adapt to climate change and build the resiliencies of countries and their societies to the vulnerability of climate change. Hence, adaptation can range from building flood defenses, setting up early warning systems for cyclones, and switching to drought-resistant crops to redesigning communication systems, business operations, and government policies. In addition to this, successful adaptation depends not only on governments but also on the active and sustained engagement of stakeholders including national, regional, multilateral, and international organizations, the public and private sectors, civil society, and other relevant stakeholders, as well as effective management of knowledge.[12]

Building resilience to the impacts of climate change requires the identification of hazards, exposures, and vulnerabilities in each project and sector and the identification of the options for adaptation and mitigation that are possible and economically sound, particularly in priority sectors. It also requires mainstreaming this process in the future development to ensure the implementation of the necessary measures. Climate change response policies, both adaptation and mitigation, are most effective when they are integrated fully within an overall sustainable development strategy and policy. The elements and prerequisites of integration in South and Southeast Asia include strengthening government coordination within and among countries and a regional framework to accelerate actions related to climate change.

[11] https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean
[12] UNFCC

These ideas as articulated above are represented in policy outlooks on climate change adaptation in the 22 markets studied. While some of the countries had a defined climate change adaptation policy in place and others had a policy framework that addressed climate change adaptation without naming it such, all 22 countries have a general policy framework in place to address climate change adaptation.

Assessment of disaster risk management frameworks

Our research highlights that 21 out of the 22 countries studied have, at least, a legislative disaster risk management framework in place. A generic framework, based on the assessment of the policies in place in these countries, at a high level, can be summarized as below:

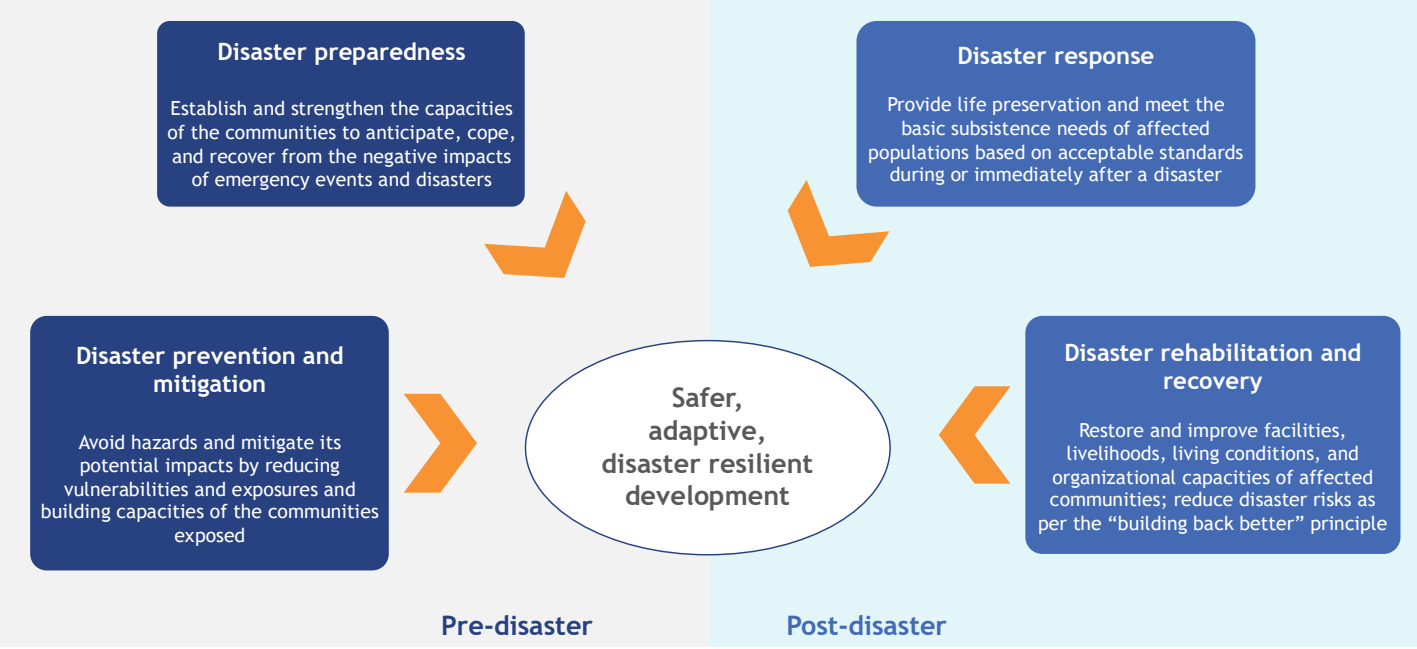


Figure 6: Summary of a generic disaster risk management framework

- All countries except Brunei have a defined and legislated disaster risk management framework in place. At the legislative level, almost all such frameworks look at both pre and post-disaster responses to disasters and catastrophes.
- While the information on pre-disaster efforts in these markets is more scattered, the post-disaster response structures are relatively well-defined.
- All the countries studied have a central coordination authority to manage emergency post-disaster relief efforts. These agencies are responsible for defining the roles, responsibilities, standard operating procedures, and the framework required to manage disasters at every level. Typically, the states and provinces also have disaster management agencies that work in close coordination with the central authority. The state agencies have a more frontline role in disaster response efforts.
- Our research also identifies that most countries focus on developing a better understanding of the disaster risks the country is exposed to and based on this understanding, develop early warning systems and better response mechanisms. This helps develop capacities of the communities to be more resilient and responsive in the face of disasters.
- Most of the funding for disaster response and relief comes from defined disaster risk funds in these countries.

- Insurance does not feature as an important risk financing or risk transfer mechanism in any of the frameworks that we studied, except for one passing reference identified in the Government of Vietnam's policy documents.

In summary, 21 of the 22 countries studied have a disaster risk management framework in place. While, theoretically, the emphasis is on both pre and post-disaster responses, post-disaster response mechanisms seem to be more robustly developed across the region. This is understandable given the need for quick mobilization of relief efforts once a disaster strikes. While most such frameworks do talk about financing aspects of disaster risks, risk transfer does not appear as a key mechanism.

Assessment of specific regulations around climate and disaster risk insurance (CDRI)

Our study did not find any insurance regulation in any of the markets that seek to address the development of climate and disaster risk solutions. Our research also highlights that insurance sector stakeholders are offered little encouragement to engage in addressing disaster risk solutions. Among the countries studied, Bangladesh emerged as the only market currently mulling over regulations for weather index insurance solutions. The state-owned Sadharan Bima Corporation (SBC) in Bangladesh, based on its weather index insurance project, supported by the ADB, has proposed a draft of regulatory guidelines for index insurance in Bangladesh, which is being considered by the insurance regulator.[13]

Engagements with insurers and stakeholders[14] in the markets of the Philippines, Vietnam, Indonesia, India, and Bangladesh revealed that in more traditional businesses, most corporate insurance solutions, such as those against the risk to property, have riders that cover losses due to disasters and catastrophic events, often referred to as "acts of god." Interestingly, insurers in the Philippines opined that it is a competitive market and hence, the prices for such coverage are set by the competition ("fight to be the lowest bid") than the technicalities of the risk itself.

Insurers, especially in the Philippines, who had in the past or currently offer solutions to cover risks due to calamities like typhoons, reveal that initially the prices set were based on simple high-level assumptions. However, in one case, after the typhoon Haiyan, the losses incurred on the portfolio forced the hand of the insurer to revise the premium levels by up to eight times. Hence, the technical pricing of such risks and the availability of data to make accurate analysis and assessment of the risks being underwritten is an area of concern. However, events like super typhoons and their increasing frequencies also upset such pricing models.

Insurers in the Philippines, Indonesia, and Bangladesh see disaster risk as a commercial opportunity. As PINC from the Philippines put it: "We have a big population and the impact of disaster events are felt by all sections of the society, so there is a risk and there is a market. All we need now are models, tools, and technical capacities to offer solutions that would be commercially viable while also offering customers value."

[13]MSC Interview with IFC, Bangladesh Insurance consultant working in the space of agriculture insurance
[14]MSC interviews with insurers/reinsurers/stakeholders in Philippines, Indonesia, India, Bangladesh, Vietnam

Section III: Assessment of climate and disaster risk financing and risk transfer solutions

Key insights

14 of the 22 countries studied have defined one or more contingency funds and reserves to mount disaster relief efforts, including national budgetary allocations and re-allocations that can be utilized for these efforts. However, except for countries like India, Malaysia, and Singapore, foreign and donor support remains critical for most countries when responding to disasters. The initial findings from the study estimate that over the past six years about USD 5 billion has been allocated for ex-ante disaster risk finance, such as contingency funds and reserves together with ex-post instruments, such as national budgetary allocations and re-allocations.

Depending on the type of risks that occur, the use of ex-ante disaster risk instruments like contingent funds, contingent credit lines, and risk transfer increases post-disaster financial capacity as these instruments enable fast liquidity after an event. The study estimates that in the same period, about USD 9 billion was received as international aid to address post-disaster management. However, shrinking international aid efforts threaten post-disaster relief. These contingency funds are not generally used to access insurance solutions. However, two examples of the use of funds were seen in the Philippines[15] and Indonesia[16].

Risk layering for climate and disaster risk planning

There is a growing consensus that developing countries need new ways to finance disaster preparedness, response, recovery, and rebuilding. Numerous international frameworks and political bodies, including the Paris Agreement, Sendai Framework for Disaster Risk Reduction, and the Group of Twenty and Group of Vulnerable Twenty alike have called for innovative financing mechanisms to help developing countries cope with disaster[17].

In this section, we seek to understand and analyze the financial options available for countries dealing with post-disaster losses, primarily focusing on those solutions that would be effective as an immediate response in the aftermath of a disaster. These short-term finance mechanisms can be deployed quickly to limit losses through early response to minimize long-term economic losses. We will look at the approaches to long-term-financing mechanisms that target recovery and rebuilding in the next section.

Short-term disaster risk financing options, at the country level, are categorized under the following three broad heads or layers:

1. National reserve funds earmarked for disaster response
2. Contingent credit lines
3. Risk transfer solution

[15] Insurance is allowed allocation up to 5% of DRM mandated funds to secure insurance coverage for disaster volunteers

[16] Indonesian government has recently announced that it will secure insurance coverage for all public assets, such as government buildings, etc.

[17] The Future of Disaster Risk Pooling for Developing Countries.pdf, WRI, 2019

Figure 6: Risk Layering approach, MSC analysis

National reserve funds generally refer to annual budgetary allocations, contingent budgets, and allocations made by a government in response to disasters faced by their respective countries. Theoretically, these funds can help cope with localized, low severity but high-frequency disasters a country may face, such as floods, landslides, earthquakes, among others.

Contingent credit lines, in the context of disasters, are pre-arranged loans disbursed after a disaster strikes a country that enables it to provide a robust response to disasters of medium to high severity and hence ask for extraordinary expenditures from the government. An example of such a contingent credit line is the Catastrophe Deferred Drawdown Option (CAT DDO) offered by the World Bank. An innovative contingent line of credit can provide immediate liquidity to countries in the aftermath of a disaster resulting from an adverse natural event. Theoretically, these arrangements can help a country cope with the risks of moderate to high severity and moderate frequency events.

Risk transfer solutions like sovereign insurance, global and regional risk pools, and consumer insurance solutions aim to transfer the risks from countries and individuals to a third party instead of a risk premium. Such solutions provide a contractual right, to countries or individuals, to receive pre-defined funds at the time of a disaster. Insurance coverage at the sovereign level can be well-suited risk financing mechanisms for high severity and low-frequency disaster events. Individual-level insurance solutions can help in avoiding financial ruin at the household levels. Theoretically, these arrangements can help a country cope with risks of high severity and low-frequency events.

The following table gives us a summary of the risk transfer instruments that can provide risk transfer solutions for climate and disaster risks.

Instrument category	Specific instruments	Instrument objectives	Role of the facilitating	Role of the national	Role of the private sector

			agency	government	
Global fund	Solidarity fund, compensation mechanism	The fund pays out directly to countries that have suffered catastrophic damages from a climatic event or climate change impact	• Set up the governance structure of the fund • Mandate Annex I parties to pay into the fund • Create mechanisms to disburse funding • Decide eligibility of recipient countries	• Annex I parties provide funds • Non-Annex I parties receive funds and decide how to spend them	None
Catastrophic risk insurance	Subsidized global risk pool	Rich countries pay insurance premiums to a global risk-pooling facility on behalf of vulnerable countries	• Sovereign Risk Pool	• Vulnerable countries pay premiums to insure their budgets against catastrophic risks. When multiple countries pool their risks, premiums are lower and countries have better access to capital through reinsurance.	• Decide on a price for climate risks • Build risk models incorporating risk data • Operate insurance program either independently or under a public-private partnership
	Sovereign Risk Pool	Vulnerable countries pay premiums to insure their budgets against catastrophic risks. When multiple countries pool their risks, premiums are lower and countries have better access to capital through reinsurance.	• Help set up risk pooling facilities • Provide technical support and financing support for backstopping (if losses are very high) • Provide data and risk models	• Join regional insurance mechanisms • Pay premiums to an insurance facility • Decide how much insurance coverage to purchase • Decide how to spend insurance payouts • Improve and standardize insurance market regulations	• Operate mechanism through the private sector or a public-private partnership • Reinsure through capital markets • Determine (private sector) prices for risks and premiums • Build risk models

Consumer insurance products	Commercial life and property insurance	Individuals and businesses pay premiums to a commercial entity to spread the risk of a certain event in the future over some time. When an event occurs, insurance policyholders receive payouts.	• Provide technical support, incentives, and help remove market barriers	• Form and improve regulatory frameworks for insurance • Safeguard contract enforcement and other legal rights	• Provide insurance through private commercial entities • Provide reinsurance through global insurers and capital markets
	Micro-insurance	Insurance is specifically designed for and targeted to the poor, which often means providing insurance to a large number of people with small assets to insure.	• Offer technical support (program and policy design, funding for research, sharing best practice, support for data gathering) • Financial support for insurance pilots	• Establish national regulatory frameworks • Obtain valuable local data through meteorological and agricultural extension services • Offer research and education on insurance and risk management • Decide whether to set up stand-alone or integrated insurance programs	• Determine price and model risks • Operate insurance programs • Provide reinsurance of micro-insurance portfolios

Table 2: List of risk transfer tools for climate and disaster risks
Source: Adapted from paying the premium; World Resources Institute; 2009

Assessment of climate and disaster risk financing and the risk transfer tools used

Among the 22 countries studied, only the Philippines is putting to use all three tools to finance its short-term disaster risks. In general, all countries have earmarked some funds as reserves for disaster risk financing, the quantum of which is a function of the economic capacities of those countries—countries with stronger economies make more budgetary allocations than those with weaker economies. Contingent credit lines are the least used mechanism in the countries studied, with only the Philippines and Maldives having those arrangements.

Sovereign risk transfer solutions are still an emerging approach in the region and the study found that seven countries use such solutions. Consumer-level disaster risk solutions primarily take the form of agriculture insurance, offered by either the states or the private sector. Exclusive disaster risk insurance solutions are still not much in use across the region.

The table below summarizes the situations in a comparative manner:

Countries	National reserve funds	Contingent credit lines	Consumer-level risk transfer tools	Sovereign risk transfer tools
Afghanistan	✓	✗	✗	✗
Bangladesh	✓	✗	✓	✗
Bhutan	✓	✗	✗	✗
Brunei	✓	✗	✗	✗
Cambodia	✓	✗	✓	✓*
India	✓	✗	✓	✗
Indonesia	✓	✗	✓	✗
Laos	✓	✗	✗	✓
Malaysia	✓	✓	✓	✗
Maldives	✓	✗	✗	✓
Mongolia	✓	✗	✗	✗
Myanmar	✓	✗	✗	✓
Nepal	✓	✗	✗	✗
Pakistan	✓	✗	✗	✗
The Philippines	✓	✓	✓	✓
Singapore	✓	NA	NA	NA
Sri Lanka	✓	✗	✓	✗
Thailand	✓	✗	✓	✗
East Timor	✓	✗	✗	✗
Vietnam	✓	✗	✗	✗
Fiji	✓	✗	✗	✓*
Marshall Islands	✓	✗	✗	✓

Table 7: MSC analysis of CDRI Solutions in the region

The study estimates that over the past six years, about USD 5 billion has been allocated for ex-ante disaster risk finance, such as contingency funds and reserves together with ex-post instruments, such as national budgetary allocations and re-allocations. Depending on the type of risks that occur, the use of ex-ante disaster risk instruments, such as contingent funds, contingent credit lines, and risk transfer increase post-disaster financial capacity as these instruments enable fast liquidity after an event. The study estimates that in the same period, about USD 9 billion was received in international aid to address post-disaster management. (Please refer to Annex VI for more details.)

Section IV: The landscape of climate and disaster risk insurance in South and Southeast Asia and Oceania

Key insights

In the region, the study identified 25 interventions that qualify as CDRI that cover, directly or indirectly, over 212 million people. At the macro level, these five sovereign risk transfer programs indirectly provide some degree of coverage to more than 171.8 million people in countries like the Philippines, Myanmar, Laos, Maldives, and Pacific Island countries like the Marshall Islands and Fiji. At the meso and micro levels, through the 14 agricultural and disaster insurance solutions identified, the study can estimate a direct or indirect coverage to more than 40.5 million farmers, fishers, and others, and to more than 43 million hectares of agricultural land. Through these numbers, we estimate that about 212 million people are covered directly or indirectly. As per World Bank data, the population of the 22 countries studied is about 2.47 billion. Hence, this estimated coverage of 212 million represents just 8.5% of the total population, leaving a protection gap of 91.5%.

The study identified five sovereign risk transfer arrangements relevant to seven of the 22 markets studied. The report covers the following projects: SEADRIF in Lao PDR, Myanmar, and possibly Cambodia), PCRIC in the Marshall Islands and possibly Fiji, CAT DDO, supported by the World Bank, in Maldives, as well as CAT DDO, supported by the World Bank, and City Insurance Pools, supported by ADB in the Philippines. The chief objective of these arrangements is to ensure the availability of funding in the face of disasters that trigger these arrangements without compromising the economic viability of the countries covered when dealing with disasters.

Five large-scale state-sponsored and subsidized agriculture insurance programs are implemented in the region. These programs cover India, the Philippines, Thailand, Sri Lanka, and Indonesia and offer coverage to farmers against negative weather events. These programs cumulatively cover over 40 million farmers and over 43 million hectares of agricultural land, with a total premium of USD 3.021 billion, with India contributing the largest share of USD 2.8 billion.

Private insurer-driven agriculture insurance has mostly developed through support from international donors and funding. The study identified that nine such pilots or products existed between 2016 and 2019—three in Sri Lanka, two in Bangladesh, two in Indonesia, and one each in Cambodia and the Philippines. Out of these, all but two programs in Sri Lanka and one program in the Philippines did not depend on donor support.

Insurance and resilience against climate and disaster risks

Recently, the concept of resilience has received significant attention and has become a widely recognized part of the sustainable development and climate adaptation movement. However, the definition and measurement of resilience are not straightforward and involve varied approaches and methodologies in different contexts. In the most basic sense, we understand resilience as the ability of a system and its parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.[18]

Risk transfer is a tool in the holistic climate risk management framework. This can increase resilience to climate and disaster risks as highlighted by the InsuResilience initiative launched in 2015 by the Group of

[18] Intergovernmental Panel on Climate Change,2012

Seven leaders.[19] The mandate is to extend climate insurance to 400 million highly exposed, uninsured poor and vulnerable people by 2020 to make these individuals, communities, and countries more climate-resilient.[20]

However, while the positive relationship between other types of insurance, such as health or life insurance, and economic growth is explored in detail, the empirical evidence on the benefits of market-based CDRI products, and in particular, their impact on resilience, is still scarce. Recent research on the insurance penetration rate and resilience at the global level finds that the effect of natural disasters depends on access to insurance through private insurance markets and suggests that private insurance penetration and a stable public institutional infrastructure help build resilience to the negative effects of natural disasters.[21]

Our study identified 25 insurance programs in 11 of the 22 countries under study that can qualify as CDRI solutions. Their presence as per the nature of these programs is classified in the table below:

Countries	State-supported agriculture insurance	Private agricultures insurance	Disaster risk insurance	Sovereign risk transfer
Afghanistan	✗	✗	✗	✗
Bangladesh	✗	✓	✓	✗
Bhutan	✗	✗	✗	✗
Brunei	✗	✗	✗	✗
Cambodia	✗	✓	✗	✓*
India	✓	✓	✓	✗
Indonesia	✓	✓	✓	✗
Laos	✗	✗	✗	✓
Malaysia	✗	✗	✗	✗
Maldives	✗	✗	✗	✓
Mongolia	✗	✗	✗	✗
Myanmar	✗	✗	✗	✓
Nepal	✓*	✗	✗	✗
Pakistan	✓*	✗	✗	✗
The Philippines	✓	✓	✓	✓
Singapore	✗	✗	✗	✗
Sri Lanka	✓	✓	✗	✗
Thailand	✓	✗	✗	✗
East Timor	✗	✗	✗	✗
Vietnam	✓*	✗	✗	✗
Fiji	✗	✗	✗	✓*
Marshall Islands	✗	✗	✗	✓

*- Asterisk indicates under development or progress but no data was available at the time of the study.

Table 8: The presence of different CDRI solutions in the 22 countries studied
Source: MSC analysis

The 25 programs so identified are into four categories:

Sovereign risk transfers

State-supported large-scale agriculture

Private-sector-led agriculture insurance

Disaster-focused risk insurance

[19] The Group of Seven consists of Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States.
[20] InsuResilience, 2017
[21] Disaster Insurance in Developing Asia: An Analysis of Market-Based Schemes, ADB, 2019

The programs are summarized in the table below:

CDRI mechanism	Number of programs	Countries
Sovereign disaster risk transfers	5	The Philippines, Maldives, Myanmar, Laos, Marshall Islands, Cambodia*, and Fiji*
State-supported large-scale agriculture insurance	5	India, the Philippines, Sri Lanka, Indonesia, and Thailand
Private sector agriculture insurance programs	9	Bangladesh, Sri Lanka, the Philippines, Cambodia, and Indonesia
Disaster risk insurance	6	Indonesia, India, and the Philippines
25 programs		

Table 9: Sovereign risk transfer tools in the studied countries
(Source: MSC analysis)

i. Sovereign disaster risk transfers

Figure 7: Geographical presence of Sovereign Risk Transfer Solutions in Asia

More and more governments are moving toward a proactive and more cost-effective approach to financial planning to protect national budgets, as well as the lives and livelihoods of their citizens from the impacts of disasters. This approach helps governments consider disaster and climate shocks as part of their fiscal risk management strategies. It also complements other elements of a comprehensive disaster risk management strategy, ranging from investments in risk reduction to improved preparedness and resilient reconstruction. Financial protection involves planning to better manage the cost of disasters, ensure predictable and timely access to much-needed resources, and ultimately mitigate long-term fiscal impacts.

By combining various financial instruments—such as contingency budget, contingent loans and grants, and risk transfer solutions—financial protection allows governments to manage the full range of disaster impacts.

Different instruments help address different risks that range from recurrent to more rare events and different funding needs that range from short-term emergency relief to recovery and reconstruction.[22]

During our study, we identified two types of such instruments in the region:

a. **Sovereign risk pools**
b. **Catastrophe bonds**

Sovereign risk pools

According to the World Bank, through Sovereign catastrophe risk pools, countries can pool risks in a diversified portfolio, retain some of the risks through joint reserves and capital, and transfer excess risk to the reinsurance and capital markets.[23] Since it is rather unlikely that several countries will be hit by a major disaster within the same year, the diversification among participating countries creates a more stable and less capital-intensive portfolio, which is cheaper to reinsure.

In Southeast Asia and Oceania, there are two risk-pooling facilities currently at different stages of evolution:

a. **Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI)**

Launched in 2007, the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) seeks to provide disaster risk management and finance solutions to help build the resilience of Pacific Island countries. PCRAFI is a joint initiative of the World Bank, the Pacific Community, and the ADB that receives financial support from the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR), and the European Union (EU).

Since 2016, the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) has provided Pacific Island states with insurance against tropical cyclones, earthquakes, and tsunamis. Vanuatu, Tonga, Marshall Islands, Samoa, and the Cook Islands were the first policyholders to join PCRAFI in 2016. Germany, Japan, the UK, and the US collaborated with the World Bank Group and Pacific Island countries to found PCRAFI, which is now expanding to include more countries. New products will also be developed with the support of InsuResilience. The Pacific Catastrophe Risk Insurance Company is an initiative of the PCRAFI, designed to offer insurance solutions to the member countries in the pacific region. This insurance program focuses on assisting its member countries with post-disaster funding needs without compromising on their economic viability.

Countries of focus:

The current members of PCRAFI or PCRIC include Cook Islands, the Marshall Islands, Samoa, Tonga, and Vanuatu.[24] Fiji has been in discussions with PCRIC to become a member. PCRAFI can reach up to 4.5 million beneficiaries, based on the current funding within InsuResilience by 2020.

How does it work?

[22] Sovereign and disaster risk pooling-World Bank technical contribution to G20, 2017.
[23] What makes catastrophe risk pools work: Lessons for policy makers, World Bank, 2017
[24] http://pcrafi.spc.int/

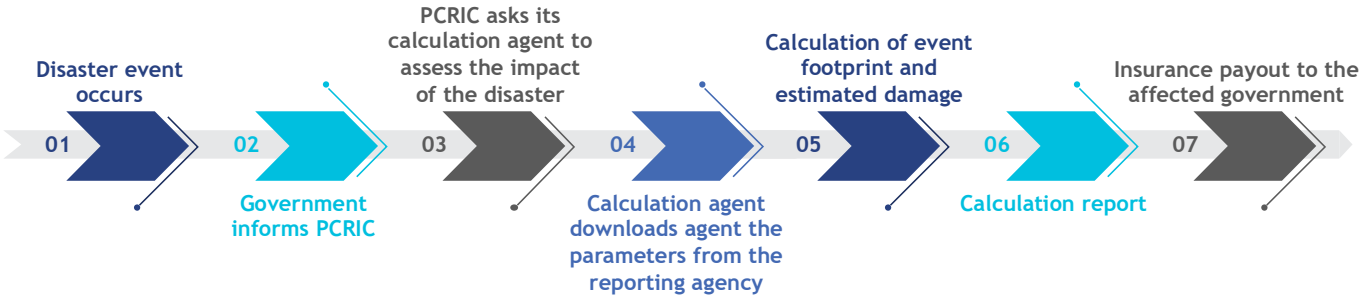


Figure 8: How does the PCRIC work?
Source: MSC analysis

Whenever a disaster like a tsunami or tropical cyclone, among others, affects one of the PCRIC countries, the affected government informs the PCRIC of the disaster experienced through a "notice of the applicable event." This notice should be sent to the PCRIC within 40 days. On the receipt of the notice, PCRIC instructs its calculation agent to begin the process of calculating the impact of the disaster by sending a "notice of calculation." This notice should be issued within five days of the receipt of the relevant notice of the applicable event. Air Worldwide is currently the calculation agent for PCRIC.[25]

On the receipt of the notice of calculation, Air Worldwide downloads the parameters associated with the relevant disaster from the designated reporting agency. Currently, Joint Typhoon Warning Centre JTWC is the reporting agency for tropical cyclones and United States Geological Survey (USGS) is the agency for reporting parameters associated with earthquakes and tsunamis. Once the required information is received, Air Worldwide undertakes the calculation exercise to define the impact of the relevant disaster. This is done through a risk modeling software that estimates the geographic footprint of the disaster event as well as modeled losses from the impact on buildings, public infrastructure, and crops in the affected area.

Based on the calculation report and the terms of the policy purchased by the affected government, PCRIC confirms if a payout is to be triggered or not. If yes, the pre-defined pay-out is paid to the government within 15 days of the notification of the disaster by the government.

b. South East Asia Disaster Risk Insurance Facility (SEADRIF)

SEADRIF is a regional approach to disaster risk finance that seeks to increase the fiscal capacity of governments to manage the financial impact of natural disasters, and improve access to rapid response financing for emergency humanitarian response.[26] It is a catastrophe risk pool comparable to a reinsurance-based disaster liquidity facility, providing participating countries with immediate financing for response in the aftermath of a natural disaster. SEADRIF's key functions are as follows[27]:

- Build regional reserves to finance losses from small and medium events;
- Liaise with donors to capitalize the fund;
- Pool country-level disaster risks into one diversified regional portfolio;
- Access international reinsurance markets on competitive terms.

Countries of focus:

[25] http://pcrafi.spc.int/about/ : The section on partners
[26] https://www.seadrif.org/
[27] Brochure of SEADRIF: https://www.seadrif.org/images/SEADRIF_Brochure_EN.pdf

The SEADRIF program supports ASEAN countries, initially focusing on **Cambodia, Lao PDR, and Myanmar**. While Laos and Myanmar are already engaged, Cambodia is still in discussion with SEADRIF.

How does it work?

SEADRIF is implemented at the following two levels:

At the national level, it helps countries take stock of existing disaster risk finance mechanisms, develop a national disaster risk finance strategy, and improve the public financial management of climate and disaster risks. The World Bank Group provides a comprehensive set of financial and advisory services on DRF to Cambodia, Lao PDR, and Myanmar. This set of services is embedded in disaster risk management lending operations that also include resilient infrastructure and hydromet investments[28].

At the regional level, SEADRIF supports the preparation and implementation of the proposed regional catastrophe risk pool. The risk pool will complement national mechanisms by providing access to additional immediate liquidity in case of severe disasters. SEADRIF is not designed to finance all disaster losses but rather to provide rapid financing for response and early post-disaster recovery.[29]

c. The Philippine City Disaster Insurance Pool (PCDIP)

The Philippine department of finance led the design of PCDIP, with technical assistance from the ADB to address the need for rapid access to early recovery financing for cities in the Philippines that typically face particularly high disaster risk, reflecting the concentration of people, assets, infrastructure, and economic activities in urban areas.[30]

Once implemented, PCDIP will offer parametric insurance cover against typhoons and earthquakes in its first phase. It is also expected to offer flood cover once existing data and modeling challenges have been addressed. Parametric indices will be calculated individually for each city, based on spectral acceleration, a measure of ground motion, for earthquake covers and on three-second peak wind gusts, a measure of wind speed, for typhoons. These physical parameters will be measured at the center of each *barangay* and weighted according to the proportion of the relevant city's assets located in that *barangay*.[31]

Countries of focus: The PCDIP program is a sub-sovereign risk pool since does not address risks associated with the whole country but only for the cities covered in the Philippines. Manila will be the first city to be covered by this arrangement.

How does it work?

The parametric cover will be offered through a risk pooling arrangement. A disaster insurance pool is a structure under which participating entities, in this case, city governments, collectively buy insurance through a single platform. The pool essentially operates as an insurance company that acts for the benefit of insured cities.

[28] https://www.financialprotectionforum.org/sites/default/files/styles/SEADRIF.pdf
[29] https://www.financialprotectionforum.org/sites/default/files/styles/SEADRIF.pdf
[30] Philippines City Disaster Insurance Pool – Rationale and Design, ADB, 2018
[31] Philippines City Disaster Insurance Pool – Rationale and Design, ADB, 2018

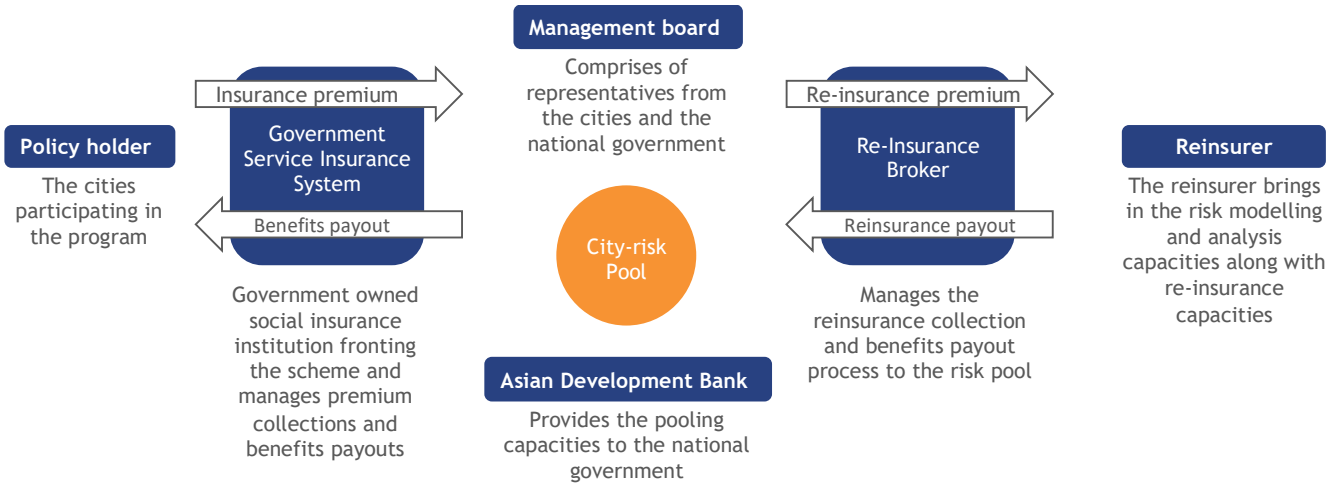


Figure 9- How does PCDIP work?
Source: MSC analysis

The policyholders will be the cities participating in the program. These cities will interact with the Government Service Insurance System (GSIS). GSIS is a government-owned risk management and insurance organization. GSIS will be responsible to collect the insurance premiums and provide the resultant benefits in case a payout is triggered. At the backend of the city risk pool will be a reinsurance agent that will facilitate access to a reinsurer that would underwrite the risk and will also bring in the risk modeling and analysis capacities. The reinsurance agent will be responsible for collecting the reinsurance premiums as well as the claims process and reinsurance payout, if any, to the city risk pool.[32]

A board comprising representatives from the participating cities as well as the national government of the Philippines will manage the city risk pool. ADB will provide the capacities to the government to create and run this risk pool.

What are the benefits of these sovereign risk pools?

Sovereign Insurance pools reduce the price of premiums for such instruments in several ways[33]:

01

Diversification

A pool combines risk across multiple regions and types and levels of severity of the natural hazard. This reduces the variability (often termed volatility) of total losses experienced by the group as a whole and leads to greater stability in the group's funding requirements, reduced capitalization and reinsurance (insurance purchased by an insurance company) costs, and therefore lower insurance premiums.

[32] Philippines City Disaster Insurance Pool – Rationale and Design, ADB, 2018
[33] Philippines City Disaster Insurance Pool – Rationale and Design, ADB, 2018

02 **Economies of scale**

All insurance products have inherent costs associated with their set-up and their ongoing administration which countries or cities can share by grouping together. These costs include licensing, structuring, setup, administrative, claims management, data and modeling, and regulatory and other statutory compliance costs.

03 **Profit retention**

Profits made by a pool during years with fewer disasters can be retained within the pool, rather than being paid to shareholders of a commercial company.

04 **Outreach**

If SEADRIF becomes functional in offering coverage to Myanmar (60 million people) and Laos (6.8 million people) and the Philippines city risk pool covers just metro Manila (12.6 million people), these risk pools will indirectly secure a population of 80.8 million people. This is more than the total number of people with access to agriculture insurance in the region.

Catastrophe bonds

According to the World Bank[34], a catastrophe bond (CAT) is a high-yield debt instrument designed to transfer the risks of its sponsors—the countries that stand to benefit from the bonds when triggered in the event of a natural disaster, to transfer the risk of disasters to the international capital markets. This transfer is done through the sale of these bonds to investors. The funds these bonds raise plus the premium paid by the sponsors are invested in liquid and safe avenues that offer market-risk-adjusted returns to its investors. However, if a payout is triggered, the whole capital is transferred to the sponsors and the investors do not receive anything. A CAT bond is generally offered for short durations of three to five years. The study found the following examples of CAT bonds in the Asian markets:

a. World Bank catastrophe bonds for the Philippines

The Philippines obtained a catastrophe risk parametric insurance policy with annual coverage of USD 206 million for national government assets against earthquakes and severe typhoons, and protection against severe typhoons for 25 local government units (LGUs) in 2017. This is essentially a renewal by the World Bank of its program started in 2015 to help the Philippines respond better to losses from climate and disaster risks. The renewal provides 25 provinces in the country with the Philippine Peso equivalent of USD 390 million in insurance against major typhoon and earthquake events. The coverage under the new policy became effective on December 19, 2018.[35]

Country of focus: The Philippines

How does it work?

Under the program, World Bank enters into an agreement with private investors to provide coverage against disaster and severe weather impacts for national government agencies and 25 participating provinces. Insurance payouts are made when pre-defined parametric triggers are met. The Philippines Government Service Insurance System (GSIS) provides parametric catastrophe insurance coverage. The insurance policy is designed to provide rapid liquidity in the face of disasters to the government to enable rebuilding and recovery to commence.[36]

[34] Demystifying CAT Bonds for debt managers, World Bank, 2018
[35] Insuring Philippines against natural disasters, World Bank
[36] World Bank press release, 2019

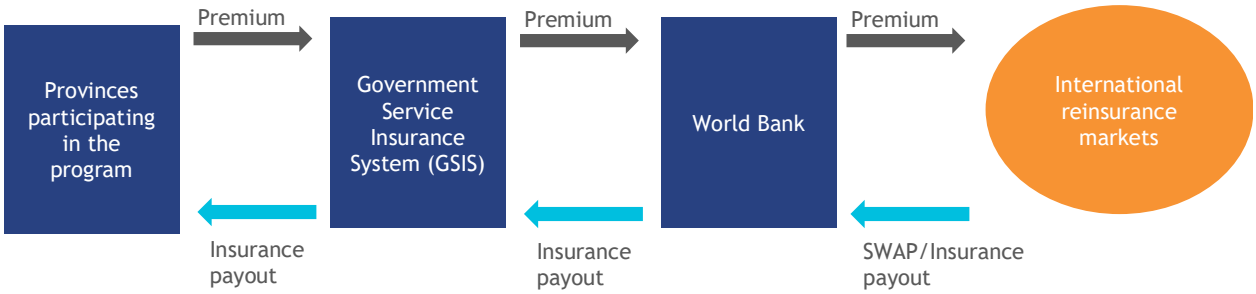


Figure 10: Working of the catastrophe risk parametric insurance policy for provinces in the Philippines
Source: MSC analysis

The renewed policy nearly doubles the coverage under the 2017 policy, facilitated by the World Bank through a catastrophe swap that provided the Philippine Peso equivalent of USD 206 million in 2017 to USD 390 million in 2019. The panel of risk-takers, selected through a competitive bidding process, also doubled under the renewed policy. Risk-takers were able to participate in the transaction through either a derivative contract or a retrocession agreement.[37]

b. Maldives Catastrophe Deferred Drawdown Option (CAT DDO) and the Pandemic Emergency Financing (PEM) Facility

Maldives is highly vulnerable to natural hazards and extreme climatic events with considerable economic consequences. Located in the central Indian Ocean, it has a fragile ecological profile and low elevation. With sea levels expected to rise and extreme weather events likely to increase in frequency and intensity, Maldives is considered one of the world's most vulnerable countries. More than 44% of its settlements—home to 42% of the population—and more than 70% of all critical infrastructure is located within 100m of the shoreline. This makes them vulnerable to the rise in sea level and other calamities. 80% of the total land area of Maldives, less than 300 square km, is lower than the mean sea level (MSL) of 1m.[38]

The CAT DDO-PEF operation, supported by the World Bank, will assist the efforts of Maldives to advance and consolidate its ongoing disaster risk management agenda. It will further develop the country's regulatory, institutional, technical, and financial capacities to respond better to the impact of natural hazards and emergencies. The proposed operation will be one of the first CAT DDOs, the second in the South Asian region, and the first-ever that incorporates the PEF.

Country of focus: Maldives
How does it work?

The proposed operation will include
(a) Cat DDO, an instrument that can provide immediate liquidity to the country in the aftermath of a disaster resulting from an adverse natural event including public health emergencies,
(b) PEF, an innovative mechanism that can provide resources through its cash and insurance windows for Maldives to respond to high-severity disease outbreaks and to prevent them from becoming pandemics.

[37] World Bank press release, 2019
[38] Maldives CAT DDO and PEM Facility, World Bank

The link between Cat DDO and PEF: While the CAT-DDO is designed to support the response to natural disasters including health emergencies, the PEF is designed to specifically support the response to large-scale disease outbreaks. Cat DDO and PEF complement each other and will support the efforts of the country to address climate and disaster risk.

Drawdown triggers: Funds may be drawn down upon occurrence or imminent occurrence of a natural disaster, a health-related shock, or both. This must be as per
1. The declaration of a state of a disaster by the President,
2. Declaration of a state of public health emergency by the Minister of Health.

The PEF is a mechanism that can provide surge financing in the form of non-reimbursable trust fund grants, in response to outbreaks with the potential to become a pandemic.

The programs highlighted above show that more opportunities and tools for sovereign risk transfers are emerging in the region. However, these are still early developments and there is a need to push for greater usage of sovereign risk transfers in the region.

ii. State-supported and subsidized agriculture insurance

The provision, administration, and oversight of agricultural insurance programs help a sovereign manage the systemic risks of natural disasters, such as widespread droughts or floods that affect a large number of farmers simultaneously. The cost of managing systemic risks that arises out of major catastrophic events is much higher than the expected cost. For example, estimates suggest that a widespread drought in India could generate crop-yield losses up to three times higher than the annual expected losses at the national level (World Bank, 2007).

Figure 9: Geographical spread of state-supported insurance programs in the region
Source: MSC analysis

Traditionally, governments in the region tend to alleviate the effects of crop failures or other natural disasters by providing post-disaster direct compensation as a relief measure or by crop loan waiver programs in the face of disasters. This poses a "samaritan's dilemma," whereby post-disaster aid discourages programs, such as insurance, which provide more efficient financial solutions and reduce the magnitude of losses from

future events.[39] Moreover, natural disasters affect the fiscal exchequer as a major shock in unplanned expenditure. Insurance, on the other hand, not only reduces the cost of relief but also enables the government in fiscal planning for natural disasters and crop failures.

The study identified five countries that implement a state-sponsored and supported agriculture insurance program. These countries are India, the Philippines, Indonesia, Sri Lanka, and Thailand. A summary of the outreach of these programs for 2017 is summarized below.

Country	Outreach: Farmers covered (in millions)	Outreach: Land covered (in million hectares)	Total premium (In million USD)	Percentage of state subsidy	Nature of coverage
India	34.77	34.04	2,800	87%	• Mixed index and indemnity based • Mandatory for farmers who get agri-credit • Voluntary for all others
Indonesia	1	0.6	7.8	80%	• Indemnity based
The Philippines*	1.69	1.4	124	100% / 55%	• Indemnity based
Thailand	1.9	4.5	86	60%	• Indemnity based • Bundled with credit
Sri Lanka*	1.5	2.5	4	100%	• Indemnity based • Universal**
Total	40.86	43.04	3,021.8	80% (on average)	

*includes fishers (Source: Annual reports, public dashboards, 2015-2018)
**All farmers are technically covered by the program up to a sum of SLR 40,000/hectare (approximately USD 220)

Table 9: A summary of state-supported agri-insurance programs

Source: MSC analysis based on annual reports of these programs, insurers, state-provided information for 2016-17, 2017-18, and 2018-19

- In these five markets, a total of 40.86 million farmers are covered by one of the state-supported insurance programs. This is still just one-fifth of more than 200 million farmers (estimates based on census and news reports) in these countries.
- On average, the study found that the rate of premium charged would be in the range of 3% of the sum assured in Indonesia to almost 12.25% in India.
- The average subsidy level for these programs are 80% and above. This subsidy is provided by the state. In some parts of these interventions in the Philippines and Sri Lanka, the premium is 100%. Thailand has the lowest subsidy at 60% for its rice farmers.
- India's numbers skew these inferences greatly. If we take India out, a mere 8% or 6.1 million out of 81 million farmers are insured in the remaining four countries.

[39] Government Support to Agriculture Insurance, World Bank, 2010

- While India and Indonesia are moving toward index and yield-index-based models, the other programs are largely indemnity-based.
- While the Indian programs PMFBY does have an evolving technology infrastructure with a centralized dashboard and mobile and web-based claims-making process in place, among others, the use of technology in other programs is minimal when it comes to client-facing interactions.
- Out of the 40 million farmers insured through these programs, the study estimates that more than 60% of these farmers have loan-linked coverage. So in a way, the estimation of loss of crop is equated with the loans taken for investments. In such a scenario, the "real" loss of the farmers or the loss of income and profits as well as the damage suffered by the land, among others, are not reflected or not even addressed.
- Most of these programs, in some form or the other, are in place for decades. In contrast, multiple agriculture insurance pilots have been initiated, but were cancelled after donor money dried up. The study shows that state-provided subsidies act as enablers for agricultural programs to scale up and last longer.

How do these programs work?

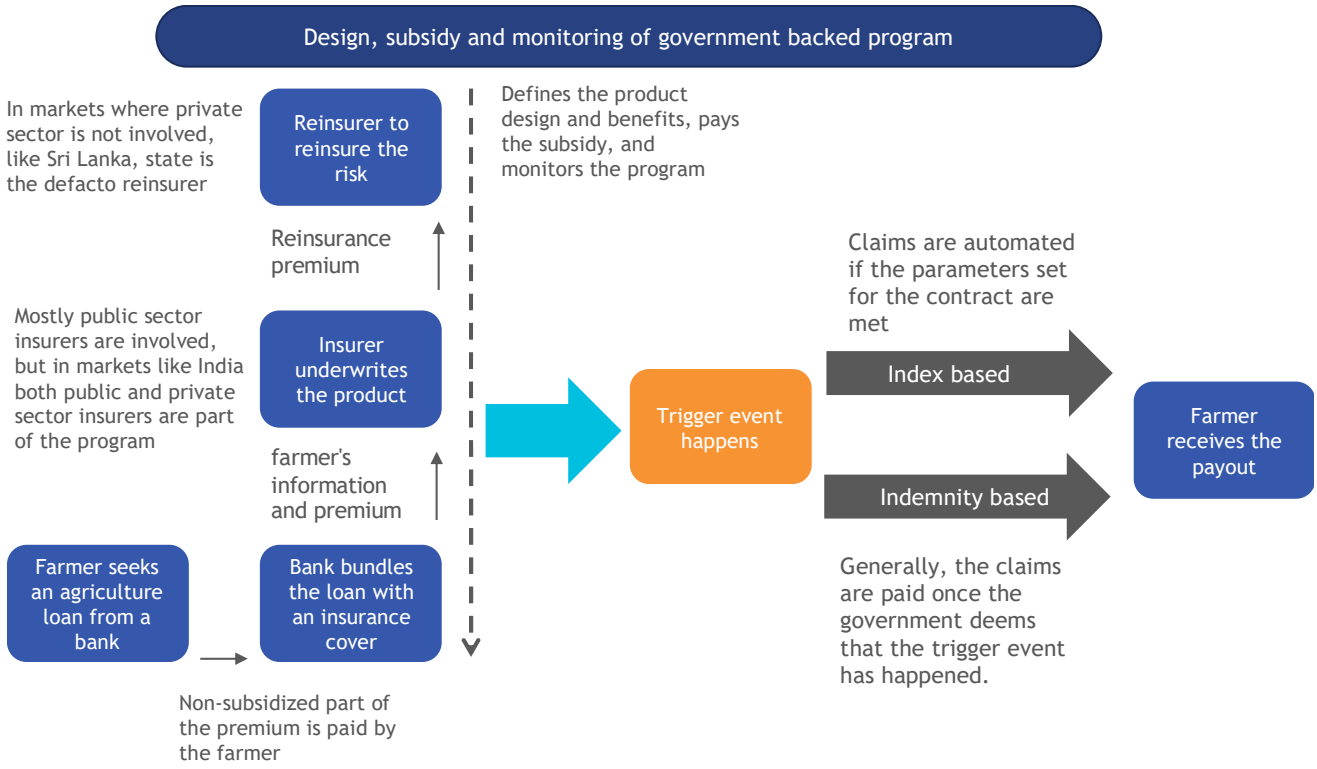


Figure 10: MSC analysis for how state-supported programs work

a. In countries like India, Indonesia, and Thailand as well as some parts of the Philippines these programs are mandatory for anyone who takes a loan for agriculture activities. Hence, most of the coverage is equated to the loans taken by the farmers. Bundled distribution through loan providing banks is the most common business model for these programs.
b. Barring India, where private insurers are involved in the process, all other countries handle such coverages through a state-owned agriculture insurance company.

c. These programs generally do not have any direct linkage between the insurer and the farmer—the farmer is covered either by the virtue of a loan or by the virtue of a government program. Hence, this lack of direct linkage at times does lead to poor service delivery by insurers.

The role of subsidy

As the findings of the study suggest, the state-supported programs have a high level of subsidy component. Agriculture insurance is expensive and back-of-the-envelope estimates generally price agriculture risks at 10 to 12% of the sum assured. This can be a big hindrance for small and medium-holder farmers to enroll in agriculture insurance programs. Also, without the participation of the small and medium farmers in markets across Asia, the insurers will find it challenging to get the scale as well as the geographical and risk diversification they need to offer the products in the long-term.

Hence, offering subsidies does make the products affordable for a larger number of farmers and also enables scale. All programs identified in the study have strong premium subsidies. The government picks the tab for more than 80% of the premium bill. In markets like India, Indonesia, and Thailand, claim payments are not subsidized and hence, the products are managed on insurance principles and pricing parameters. This creates more efficient markets, as well.

However, in markets like the Philippines and Sri Lanka, the state-supported programs are in essence benefits transfer programs for farmers. While this allows the collection of token insurance premiums, the payment of benefits comes from government coffers. These programs, while of great value to farmers, create negative incentives for more market-driven insurance solutions emerging in these markets.

Also, none of these programs talk about any exit strategy when it comes to the question of subsidies. Such programs and their scale have political ramifications for the governments as well and seen to be withdrawing benefits/subsidies can be an unpopular step. Based on a study of "Agricultural insurance in Asia and Pacific region" conducted by the Food and Agriculture Organization of the United Nations, it was realized that premium subsidies are the most widely practiced form of government support to agricultural insurance. They are being practiced by over two-thirds of countries that have some form of agricultural insurance.

Subsidies also come with certain disadvantages. They offer more benefits to large-holder farmers, increase in moral hazard and crop production in high hazard areas. Further, once premium subsidies are introduced they are very difficult to reduce or to withdraw. Hence, decisions to offer subsidies in state-supported agriculture programs must be taken carefully and with the assumption that the subsidy components will remain practically perpetual.

Also, a more practical and efficient use of subsidy seems to be in subsidizing premiums rather than the claim benefits. The success of India suggests that such programs should be designed and priced as close to market rates as possible and that insurers should run it as any other insurance product. The subsidization of premiums for such a market-driven and soundly-designed product decreases the government's burden concerning farmer distress in the case of a bad year.

Hence, the key takeaway from these programs are as follows:

i. Offer subsidies only when they can be sustained in the long run;
ii. Subsidize premiums and not claim payouts;
iii. Price the product at market rates and manage it like any other commercial insurance product.

iii. Private-sector-led agriculture insurance

Figure 11: Geographical scope of private sector-led agri-insurance solutions
Source: MSC analysis

The study identified eight private sector agriculture insurance programs active in between 2017 and 2019. Three programs were identified in Bangladesh, one each in Cambodia, Indonesia, and the Philippines, and two in Sri Lanka. The programs and their outreach are summarized in the table below.

Country	Number and types of programs	Outreach - farmers covered	Total premium (In USD)	subsidy (if any)
Bangladesh (3)	2 weather index-based crop insurance 1 meso-level flood insurance product	16,711	N/A	Yes
Cambodia (1)	1 indemnity based	120	5,232	No
Indonesia (1)	1 weather index based	1,200	36,000	Yes
The Philippines (1)	1 indemnity based	4,000	5,800	No
Sri Lanka (3)	1 indemnity based 1 index based 1 blockchain based	72,200	1,255,000	No
	9 programs	94,211	1,302,032	

***Pakistan - There is general information on at least 1 to 2 credit-linked agriculture insurance programs. However, the data and state of operations were not identified.

Table 10: A summary of non-state-supported agriculture insurance programs
Source: MSC analysis

- The programs in Sri Lanka, Indonesia, and Bangladesh are all bundled solutions with agricultural credit while the programs in Cambodia and the Philippines are voluntary, which also accounts for the low outreach of these programs.

- All these programs, except in the Philippines, have their genesis in a donor-supported or funded project.
- Though most of these programs are moving toward index-based coverage, the scale is a concern.
- Inputs during interactions with some of these insurers brought forth their concerns around the lack of scale, which they attributed to limited client education and awareness.

A value chain approach in Bangladesh

For one of the weather-index-based insurance initiatives in Bangladesh supported by the IFC, the implementer, and insurer, Green Delta Insurance Corporation (GDIC) is taking a value chain approach. Rather than selling directly to the farmers, the project seeks to deliver agriculture insurance through a value chain bundled approach, where the insurance company ties up with one or more agencies providing finance, input, or contract farming support to the farmers. Apart from reducing the transaction cost, this approach helps the insurer create a network effect, reach scale, and deliver value to the farmers through partial or full subsidy by the partner agency. The partner agencies also find value in such an approach since their business objectives are inversely related to the anomalies of the insured weather events.

This project is globally unique among agriculture insurance implementations in terms of experimenting with multiple distribution models through a value chain bundling approach. In this project, the IFC team facilitates GDIC to reach farmers through all potential organizations that provide support to the farmers during crop production, including finance providers like banks and MFIs, agriculture input companies, contract farming entities like including seed companies as well as farmer associations and NGOs. The product and the delivery methodology are customized to the business model of each partner.

The project team has already discussed the potential of insurance bundling with more than 50 potential partners. These include 20 banks, 3 MFIs, 6 input suppliers, 11 contract farming entities, 9 farmer association or steering bodies, and 2 mobile network operators. These relationships were in different stages of development when this information was reported.

Challenges insurers face while offering agriculture insurance

Insurers across Bangladesh, India, Indonesia, the Philippines, and Vietnam all pointed toward the lack of useable and relevant data for the modeling and design of agriculture insurance solutions. This is accentuated by the limited infrastructure in rural areas in these markets. Limited weather monitoring stations are not the only indicator of poor infrastructure. Poor roads and connectivity also add undue costs in the distribution efforts for agriculture insurance products.

Insurers in the Philippines, Bangladesh, Vietnam, and Indonesia also highlighted the limited technical capacities in these markets to develop optimal risk models. The challenges related to capacities also encompass challenges in underwriting, claims monitoring, and processing of claims. The marketing and client awareness efforts around the promotion of agriculture insurance solutions remain limited in these markets.

In our analysis MSC has seen that insurers in Asian markets insurers need to build technical capacities, actuarial, as well as customer facing capacities, to offer agriculture insurance solutions successfully. These efforts must be supplemented with the creation of public goods like access to actionable and reliable data by government agencies, including satellite imagery of disaster affected regions, et.al. To mitigate the challenges poor infrastructure poses in these markets, insurers must also explore adopting digital solutions.

iv. Consumer-focused CDRI solutions addressing disasters

Private insurer-driven agriculture insurance has mostly developed through support from international donors and funding. The study identified that nine such pilots or products existed between 2016 and 2019—three in Sri Lanka, two in Bangladesh, two in Indonesia, and one each in Cambodia and the Philippines. Out of these, all but two programs in Sri Lanka and one program in the Philippines did not depend on donor support.

The study found a total of five insurance-based interventions that directly address the risks that arise out of a disaster—one each in India and Indonesia and three in the Philippines. The table below summarizes these interventions:

Country	Program	Type of Coverage	Outreach	Type
Indonesia				
	Earthquake index insurance	Meso: Portfolio protection for FIs	N/A	Voluntary
India				
	Index-based flood insurance	Micro: Individual or household	200	Voluntary
Bangladesh				
	Index-based flood insurance	Micro: Individual or household	1,661	Bundled
The Philippines				
	Bundled disaster risk insurance	Micro: Bundled with credit	590,000	Bundled
	Bundled calamity assistance	Micro: Bundled with credit	300,000	Bundled
	MSME business interruption due to catastrophes	Micro: Business interruption due to catastrophe	6 MSMEs	Voluntary

Table 11: A summary of CDRI insurance programs
Source: MSC analysis

Disasters and MSMEs: An emerging sector of focus for insurers and policymakers

Disasters have had significant impacts on all types of businesses, affecting business activities and their continuity. These effects are disproportionately higher for MSMEs because they tend to operate in sub-optimal locations, are smaller and financially weaker, and have a more limited, usually local market. They also tend to implement fewer DRR measures and are more excluded from recovery programs. The handicap for MSMEs to cope with disasters is two-fold.

- MSMEs have less financial and technical resources to cope with the risk;
- MSMEs typically operate among the community and hence experience amplified impact and damages of the disaster. This is especially true for micro-enterprises.

This is due to community's informal mechanisms of supporting each other in situations, where the impact of an event is not felt across the community. However, in the case of a natural catastrophe, such informal mechanisms break down as all members of the community are affected and hence the scope to help each other out informally is limited.

A recent study conducted by MSC for GIZ's RFPI program in the Philippines found that a quarter of MSMEs do not reopen after being hit by a major disaster. However, almost all such micro-entrepreneurs go on to start new ventures.

An MSME-focused business interruption insurance program is a unique intervention in the Philippines. The program seeks to indemnify MSMEs against disaster-related business interruptions. In the Philippines, we have identified efforts to make insurance a key part of disaster response and financing. For example, the Department of Trade and Industry of the government offers a program that educates MSMEs on business continuity planning in the face of disasters. This includes education on the disaster map and evacuation plans of a city or area as well as precautionary measures to minimize damage from a disaster.

MSMEs are encouraged to get insured against business interruptions due to catastrophes, working on both the reduction and financing of risks. However, only six businesses have so far bought the insurance product developed and promoted. Hence, education and its promotion is a factor but so are distribution challenges.

Section V: Distribution challenges and the use of technology in insurance and disaster risk insurance

Key insights

Like any other insurance product, distribution is a challenge for micro and retail disaster risk insurance solutions. The study finds that state-subsidized and mandatory coverage performs well, as with the case of PMFBY in India. Moreover, bundled solutions also can find scale, as evident from the case of Pioneer, which covered around 890,000 lives in 2018. However, retail-focused, non-subsidized solutions have proved to be a hard sell, as per the study. As AXA in the Philippines observed, solutions like its business interruption coverage for MSMEs need time and effort on part of agents to explain and sell. An agent more focused on selling credit products quickly may find it challenging to invest the effort needed.

Inputs from insurers and stakeholders in the Philippines, Vietnam, Indonesia, and Bangladesh reveal that they remain optimistic concerning CDRI becoming a strong commercial opportunity in the medium to long run. However, they also identified the capacity building of insurance professionals in terms of CDRI, availability of suitable and reliable data, actuarial and modeling capacities, and lowering distribution costs through the greater use of technology as the missing pieces. All insurers were unanimous in the identification of the need for client education as well as awareness and state support as the most important factors to increase the effectiveness in offering CDRI solutions.

The value that a CDRI product can offer to the end-client is also a matter of overall design of solutions against disaster risk. Card Pioneer in the Philippines observes that an insurance solution by itself is not enough and has to be complemented with other financial services like credit, savings, or both for it to be of value to the clients.

The use of technology in insurance and disaster risk insurance shows a huge potential for new solutions
Other than the use of weather-based indexes for factors like rains, floods, earthquakes, we could identify limited examples of the use of technology in these markets. From a client-facing perspective, the study identified two interesting applications. A solution provided by AXA “Red Button,” a mobile-app-based emergency call system and a blockchain-based agriculture insurance in Sri Lanka. In this program by Aon, OXFAM, and Etherisc, farmers need not submit claims while insurers do not need to train adjusters to administer the policies. Instead, blockchain smart contracts automate the process. Robotic weather stations record the amount of rain falling on farms. In the event of extreme levels, claims are triggered automatically.

Distribution models and capacities for CDRI are a work in progress

As evident from the section above, the outreach of CDRI programs offered by the private sector is limited, except in the Philippines. In the Philippines, the product is a part of a credit-life bundle for one of the biggest lenders in the rural markets. Launched in 2012, the cover that Card Pioneer offers may be one of the longest-running disaster risk insurance covers in the region. This program also has an interesting history.

Since its launch in 2012, this coverage was a part of a voluntary credit life package and paid out 10,000 Pesos in case of an earthquake, flood, or typhoon. The annual premium charged was 450 Pesos per person. According to Pioneer, the product was priced based on its estimated experiences. However, the super typhoon Haiyan in 2013-14 changed these experiences and the product wiped out all gains from the past and dealt a serious blow to the overall operations of the company. The coverage was modified for the year 2015 and the price was revised to Pesos 1,500 per person while the coverage for floods and cyclones came down to 5,000 Pesos. This reduced the number of policies significantly, from a high of 300,000 policies in 2014 to only 50,000 policies in 2015. The product has since seen an upward growth and sold 280,000 policies in 2018.

Pioneer was able to make up this lost ground through better client awareness and high levels of customer centricity as well as prioritization of claims payments. The trust generated through years of effort also helped Pioneer greatly. However, it struggled to explain why the premiums went up so dramatically while the benefits were reduced practically by half.

Hence, the key takeaway from this experience is that it is important to price any disaster risk product prudently as a revision of features due to an outlier negative experience that can challenge the sustainability of the product. Also worth noticing is the fact that if the insurer works hard to be customer-centric and has the trust of the customers, it can reclaim lost ground if any. However, Pioneer was prudent to acknowledge that it should have gotten the product right the first time itself.

Technology offers opportunities for scale and innovation

Other than the use of weather-based indexes for factors like rains, floods, earthquakes, limited examples of the use of technology were identified in these markets. From a client-facing perspective, the following two interesting applications were identified during the study:

1. **AXA's red button**: As part of its business interruption product for the MSMEs in the Philippines, AXA, through its mobile application AXA Assist, offers a red button feature. In case of emergencies, the application sends a distress message and the location of the policyholder to their emergency contacts and the command center of AXA Assistance. The center then calls the policyholder to enquire what service is needed and deploys police, ambulance, or fire assistance. The AXA Assist app may be downloaded from Google Play or the Apple Store.

2. **Blockchain-based agriculture insurance in Sri Lanka:** Aon, one of the world's largest insurance companies, teamed up with Oxfam, a confederation of charitable organizations, and blockchain start-up Etherisc delivered blockchain crop insurance policies to small farmers in Sri Lanka. The group's system recognizes the lack of sophistication with insurance in emerging markets. In the program, farmers need not submit claims while insurers do not need to train adjusters to administer the policies. Instead, blockchain smart contracts automate the process and robotic weather stations record the amount of rain that falls on farms. In the event of extreme levels, claims are triggered automatically.

With traditional policies, an agent from the insurance company needs to travel to the area affected by floods or droughts. Automation not only reduces the cost but the time taken to authorize claims. Often in emerging markets, it can take farmers years to get back on their feet while they work to rebuild enough capital to buy seed or livestock. Getting cash in hand quickly allows farmers to rebuild much faster after disasters.

200 farmers have already signed up to use the Ethereum-based application .

3. **Using mobile phones to address the information gap:** ACA insurance and its partner Mercy Corps, offer the single agriculture insurance solution offered by the private sector. Mercy Corps identified the lack of access for farmers and the target clients to technical and market information as well as financial services as a major challenge. It then came up with the solution to provide access to advisory and financial services for farmers in rural areas through mobile phones. AgriFin Mobile linked up rural and commercial banks together with local input providers that supply agriculture inputs like seed and agrochemicals to develop a loan product tailored for smallholder farmers. As part of the loan application process, farmers were registered on the digital platform where they can send questions and receive answers regarding good agriculture practices[40].

Section VI: The role of international and regional partnership platforms including knowledge management

Countries experience the impacts of climate change at all levels—local, national, international, regional, and global. All countries look to develop national-centric climate change adaptation plans and policies as well as disaster management frameworks. Most developing countries are also putting in place their National Adaptation Plans (NAP) under the United Nations Framework Convention on Climate Change (UNFCCC). However, these efforts also need to take cognizance of cross-boundary consequences of climate change and must not miss out on the benefits that regional-level cooperation and joint action offer.

Regional cooperation could help countries achieve the following:

- Pool financial and technical resources, promoting self-help in the form of a regional support mechanism;
- Access international financial and technical resources in a more coordinated manner based on adaption gaps, which requires transboundary co-operation;
- Pool expertise, knowledge, and experiences at the regional level to allow countries to benefit from knowledge-sharing with other countries that face similar climate impact through coordinated knowledge management.

Some of the prominent examples of partnerships that facilitate regional cooperation in South and Southeast Asian countries are given below:

ASEAN Working Group on Climate Change (AWGCC): AWGCC was established in 2009 and is envisaged to be a consultative and collaborative platform with the following objectives:

- Enhance regional cooperation and action to address the adverse impacts of climate change on socio-economic development in ASEAN member states, including through cooperation and information sharing

[40]Mercy Corps Agrifin

with other stakeholders, such as the private sector, local community, regional and international partners, etc.;
- Formulate the interests, concerns, and priorities of the region through an ASEAN Joint Statement on Climate Change to be articulated at annual UNFCCC COP sessions; and
- Serve as a consultative forum to promote coordination and collaboration among various ASEAN sectoral bodies that deal with sectors affected by climate change, such as energy, forestry, agriculture, transportation, science and technology, and disaster management, among others.

Asian Disaster Preparedness Center: Asian Disaster Preparedness Centre (ADPC) is an intergovernmental organization that works to build the resilience of people and institutions to disasters and climate change impacts in Asia and the Pacific. Established in 1986, it provides comprehensive technical services to countries in the region across social and physical sciences to support sustainable solutions for risk reduction and climate resilience. ADPC helps countries and communities in Asia and the Pacific build their DRR systems and institutional mechanisms and capacities to become resilient to numerous hazards, such as floods, landslides, earthquakes, cyclones, droughts, etc.

ADPC is governed by its nine founding member countries that include Bangladesh, Cambodia, China, India, Nepal, Pakistan, the Philippines, Sri Lanka, and Thailand.

The South Asian Association for Regional Cooperation (SAARC): SAARC comprises eight member states—Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka. SAARC Regional Centers have established and constituted an important framework of SAARC Institutions, which addresses diverse aspects of the environment, climate change, and natural disasters. These are as follows:

- SAARC Energy Centre (SEC) for the protection, conservation, and prudent use of environmental resources by adopting sustainable forest management practices through research, education, and coordination among the member states;
- SAARC Disaster Management Centre (SDMC) to provide policy advice and facilitate capacity building, including strategic learning, research, training, system development, expertise promotion, and the exchange of information for effective disaster risk reduction and management. The mandate of the Centre was expanded to include the development of a Natural Disaster Rapid Response Mechanism.

Looking at insurance and reinsurance-focused regional cooperation, we have mentioned SEADRIF, promoted by the ADB, as well as PCACFRI, promoted by the World Bank Group, in the previous sections.

InsuResilience Global Partnership: The InsuResilience Global Partnership for Climate and Disaster Risk Finance and Insurance Solutions was launched at the 2017 UN Climate Conference in Bonn. Since its launch, more than 65 members have joined the partnership. The partnership seeks to strengthen the resilience of developing countries and protect the lives and livelihoods of poor and vulnerable people against the impacts of disasters.

The central objective is to enable more timely and reliable post-disaster response and to better prepare for climate and disaster risk. This would be done through the use of climate and disaster risk finance and insurance solutions, reducing humanitarian impacts, helping poor and vulnerable people recover more quickly, increasing local adaptive capacity, and strengthening local resilience. This complements ongoing efforts in countries to avert, minimize, and address climate and disaster risks. It brings together G20 countries in partnership with the V20 nations, as well as civil society, international organizations, the private

sector, and academia. Since the launch, more than 80 diverse partners have signed the Joint Statement and become members of the Global Partnership.

Mutual Exchange Forum for Inclusive Insurance: MEFIN is a Network of insurance regulators and supervisors in Asia that work for a peer-to-peer exchange of knowledge and experiences with the insurance industry. MEFIN currently has seven member-countries who are the insurance supervisors from Indonesia Otoritas Jasa Keuangan (OJK), Mongolia Financial Regulatory Commission (FRC), Nepal BeemaSamiti, Philippines Insurance Commission (IC), Securities and Exchange Commission of Pakistan (SECP), Vietnam Insurance Supervisory Authority (ISA), and the Insurance Regulatory Commission of Sri Lanka (IRCSL).

MEFIN has been working toward the promotion of cross-country knowledge exchange and the promotion of dialogue with regulators on the issues around climate and disaster risk insurance through consultative forums and training programs for regulators.

Section VII: Conclusion and the way ahead

Key insights

Climate and disaster risk insurance in the region is in its early stages. With more than 90% of the population unprotected against the impacts of climate changes and disaster and the further increase in climate impacts due to more extreme events, there is an urgent need to develop appropriate adaptation strategies that involve ex-ante planning and preparedness. Risk finance and insurance is one element to better cope with the consequences of a disaster.

For disaster risk finance to grow and take up an important role in the region, governments and policymakers must encourage and engage with insurers by understanding the risks better and develop a comprehensive climate and disaster risk management strategy to better adapt to climate change. This involves government-level pre-arranged financing for immediate response and the development of a more systemic approach to disaster risk management. A comprehensive strategy should also enable regulatory environments for the development of disaster risk insurance at the individual level.

Furthermore, insurers in the region seek government support for reliable data that can be accessed and used efficiently as well as better weather monitoring infrastructure and reporting mechanisms. Insurers in the region also seek to develop their capacities to design and model solutions for negative weather events. They are interested in learning from peers and experiences in other geographies. Ultimately, for CDRI to succeed, especially at the micro-level, it will have to find the right fit with other financial services like credit and savings to help clients meet their disaster risk financing needs.

International cooperation and exchange of knowledge and capacities will be important, such as the International Conference on Inclusive Insurance. The role of platforms like Mutual Exchange Forum on Inclusive Insurance (MEFIN) is also important to enable these exchanges in the region. Ultimately, the platform for convergence, collaboration, and coordination between different actors and initiatives is offered by the G20 or V20-initiated InsuResilience Global Partnership.

The vulnerability of Asian countries to climate change and disaster risks will only deepen in the absence of accessible and optimal CDRI solutions

Asia is quite vulnerable to climate change and disaster risks. Its heavy population density and geographical spread make it vulnerable to frequent and extreme weather events and disasters, which causes economic

loss as well as the loss of lives. Largely, such losses remain uninsured and people have to retain these risks, which hampers them economically and in worse cases, pushes them to poverty and economic ruin.

The countries as a whole do not fare much better as there are not enough financial capacities in most of the countries studied. They lack the capacities to tackle anything more than localized events of moderate severity. Anything of high severity makes most of these countries depend upon international support for an immediate response, which is not a sustainable strategy in the long run.

While countries have proactively started earmarking budget funds to meet disaster response and recovery costs, these are usually not enough. While this is an economic capacity issue, it needs to be emphasized that countries need more reserves for disaster response. These should be further augmented by actively seeking contingent credit lines and sovereign-level risk transfer solutions, as well as localized, consumer-level insurance solutions. Contingent credit lines for disaster response are not yet a popular tool in the region but countries need to consider this arrangement through partnerships with international monetary agencies or even with partner countries on the lines of business-focused contingent credit lines.

Policy-level progress needs to become more tangible, especially to encourage the insurance sector to offer CDRI products and services

At the policy level, most countries have made impressive progress in putting together a credible disaster risk management framework as well as a disaster risk management apparatus on the ground. These disaster risk management approaches lean heavily and rightly toward the creation of more resilient infrastructure, early warning systems, and the development of local communities' capacities to weather such disasters. These need to be strengthened further and the capacities of these disaster risk management response structures need to be enhanced.

However, one clear gap has been a lack of policy focus on insurance as a risk management and transfer tool. None of the countries identify insurance as a key pillar of disaster risk management and neither do they set up encouraging regimes for local insurance players to engage with the disaster insurance and agriculture insurance space.

The development, availability, and access to risk transfer solutions at the sovereign and consumer level, is a work in progress in the countries studied

While we found that sovereign risk pools and other risk transfer arrangements like CAT DDOs have started emerging in the region, these are still not widely used. Countries need to define their risk financing approaches clearly and use a mix of budget reserves, contingent credit, and risk transfer solutions.

Consumer-level disaster risk insurance solutions fall into two categories of agriculture and non-agriculture insurance solutions

Agriculture insurance solutions in the region are broadly of two origins—state-supported agriculture insurance programs and agriculture insurance solutions offered by the private sector. The state-supported agriculture insurance solutions have a wide outreach since they are bundled with agriculture loans and the heavy subsidies they offer to make the programs viable. India's approach suggests that it makes more sense to subsidize the premiums and utilize the private insurance sector to offer such solutions at scale.

Countries like Sri Lanka and the Philippines that focus on providing state-funded benefits surely help smallholder and poor farmers but their outreach and scale are limited by the state's capacity to foot the bill. Hence, states must focus on pricing and offering solutions through market mechanisms during the design of subsidy-based insurance programs. Countries also need to utilize private-sector insurers and re-insurers so that the risks are priced at a sustainable rate. The state should focus on subsidizing premiums,

hence limiting its liabilities and exposures while still being able to offer valuable coverage to small and medium farmers.

Private-sector-led agriculture insurance solutions suffer from the challenge of suitability. These are functions of limited technical capacities within insurers, poor infrastructure in rural areas that make selling, monitoring, and servicing such solutions prohibitively expensive. Besides, actionable reliable data and weather monitoring stations are a rarity in the region. Moreover, the lack of a policy level framework or regulatory encouragement makes it more challenging for insurers.

Insurers in the region need assistance to build their technical capacities in risk modeling, product design, and monitoring of such solutions. Actionable reliable data should be offered as public goods by states and international agencies for insurers to price the risks and hence their products fairly and in a way that remains attractive to the target segments.

Consumer-focused, non-agricultural climate and disaster risk insurance products are in their infancy but the innovative use of technology highlights potential

Consumer-level non-agriculture climate and disaster risk insurance solutions are still at a nascent stage in the region. Though the region has some interesting experiments and approaches, they are, at best, testing the waters. While micro-insurers in countries like the Philippines offer some kind of disaster risk benefits against typhoons, floods, among others, they have their ups and downs. To promote such solutions, there is a need to promote new product ideas around disaster risk solutions for MSMEs, a major segment, as well as the better use of technology. States as well as donors and international monetary agencies should encourage and support these efforts to test new concepts, pilot them, and take them to scale.

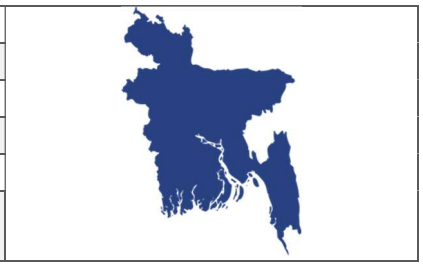
Partnerships, at all levels, will help Asia become resilient

The impacts of climate change are experienced at all levels including the local, national, international, regional, and global levels. All countries look to develop national-centric climate change adaptation plans and policies as well as disaster management frameworks. Most developing countries are also putting in place National Adaptation Plans (NAP) under the United Nations Framework Convention on Climate Change (UNFCCC). However, these efforts also need to take cognizance of the cross-boundary consequences of climate change and must not miss out on the benefits that regional-level cooperation and joint action offer. Such regional and global platforms for cooperation must be strengthened and promoted to create policy-level awareness and encourage all partners, states, as well as the private sector to up their game. Climate and disaster risks will keep challenging the region but product policies and smart financing approaches can create resilience and allow Asia to continue its march toward economic success.

Annex I: Country profile of Bangladesh

Bangladesh factsheet

Population	**161 million**
GDP	247 billion USD
Human Development Index	0.48 (Scale 0-1)
GDP per Capita	3,634 USD
Population below the poverty line	24.3 % (2016)
Income classification	Low to middle-income country Source: World Bank data



Climate and disaster risk profile

In 2005-2014, Bangladesh suffered economic losses worth USD 2.85 billion and 7,220 deaths due to disasters. On average, Bangladesh loses more than USD 285 million.[41] Floods are responsible for 58.1% of all losses, followed by storms and earthquakes with 38.3% and 3.6% of the losses, respectively.

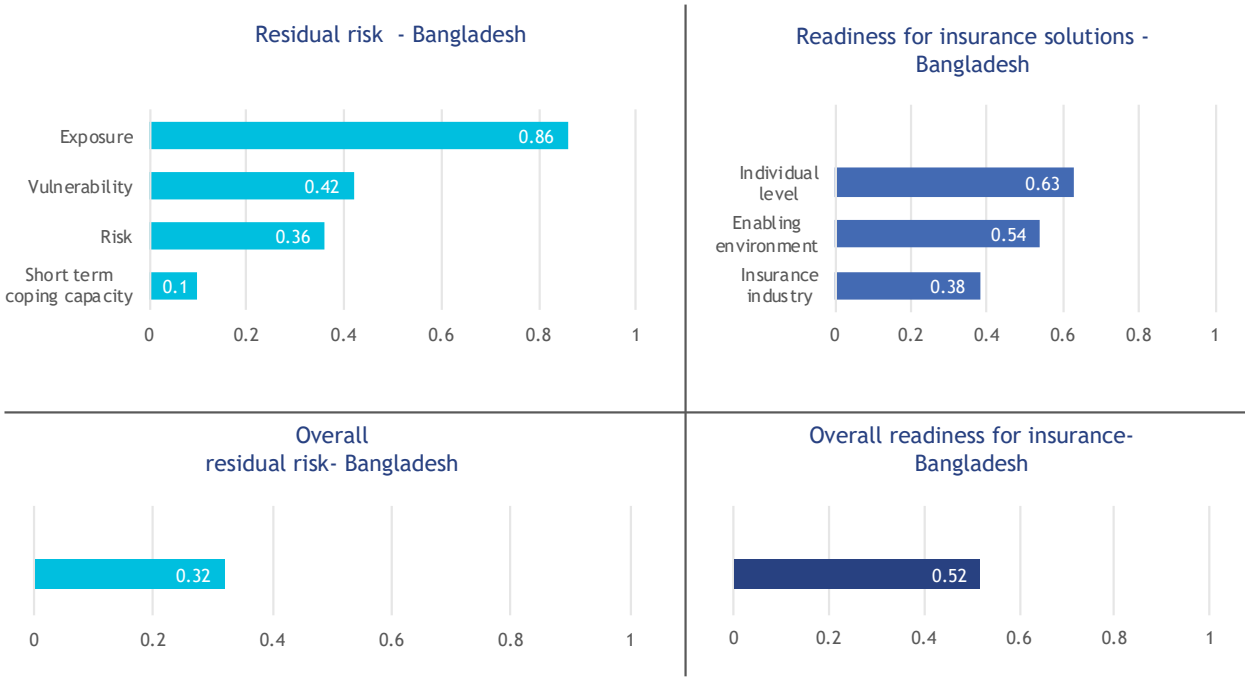
InsuRisk assessment of Bangladesh

According to the InsuRisk Assessment Tool, Bangladesh is characterized by higher than average residual risk (0.32 on a scale from 0 to 1) and high readiness for insurance solutions (0.52 on a scale from 0 to 1).

The residual risk is the sum of the short-term coping capacity, which is comparatively low, the risk as such, and the vulnerability. The country has high exposure to multiple hazards, notably floods, storms and earthquakes, and medium overall vulnerability. This leads to a higher than average residual risk for Bangladesh.

On the other hand, InsuRisk brings up readiness for insurance solutions in Bangladesh. There is already an insurance market set up in Bangladesh containing market concentration and market coverage, which leads to a medium score for the insurance industry. The environment as such for solutions, like, a functioning government, allows a high rating. The individual level, which includes financial literacy, risk awareness, and trust in finance solutions, is comparatively high.

Low GDP per capita, the lack of social and financial health protection, as well as freshwater scarcity are key drivers of vulnerability in Bangladesh.



Source: MSC analysis of InsuRisk data

CDRI landscape of Bangladesh

The MSC study identified three active agriculture insurance interventions in Bangladesh between 2016 and the present.

[41] https://www.preventionweb.net/countries/bgd/data/

Country	Number and types of programs	Outreach - Farmers Covered	Total Premium (In USD)	Subsidy (if any)
Bangladesh (3)	• 2 weather index-based crop insurance • 1 meso-level flood insurance product	18,372	N/A	Yes; provided by donor organizations

The key insights into these programs are:

- **Meso-level Flood Index Insurance program, one of the first of its kind** was launched in 2013 with 1,661 poor households covered by Pragati Insurance Limited and reinsurance protection from Swiss Re. The program was supported and subsidized by Oxfam. The program continued for two years and currently, the stakeholders are considering a commercial version of the product to be launched.
- ADB-supported state non-life insurance company, Sadharan Bima Corporation, expects to launch a rainfall index-based crop insurance product, which was piloted in 2014 and reached 6,772 marginal farmers in 2018.
    - The program provided financial assistance to the Bangladesh Meteorological Department (BMD) to purchase and install at least 20 Automatic Weather Stations.
    - The project, through SBC, submitted the draft framework to Insurance Development and Regulatory Authority (IDRA) for implementing index insurance solutions. However, the regulations have not been implemented yet.
- The International Finance Corporation (IFC) is working with the Green Delta Insurance Company (GDIC) and the Global Index Insurance Facility (GIIF) to develop index-based insurance products to address perils such as drought, excess rain, heat waves, and cold spells in Bangladesh. By 2018, this program covered over 10,000 farmers. This program has explored many firsts in the Bangladesh market, some of which are as follows:
    - **Archiving of weather and crop production data of the past 30 years for entire Bangladesh;**
    - **Development of a Weather Data Grid:** Due to the thin density of weather stations, farm-specific monitoring of weather parameters was not possible, causing a basis risk. Hence, the program created a weather data grid providing a spatially smooth source of interpolated weather data (rainfall and temperature) for every 10km X 10km of Bangladesh, which is updated weekly;
    - **Value chain bundling of weather index insurance:** Rather than selling directly to the farmers, the project aimed to deliver agriculture insurance through a value chain bundled approach, where the insurance company ties up with one or more agencies providing finance, input, or contract farming support to farmers. Apart from reducing the transaction cost, this approach helps the insurer create a network effect, reach scale, and deliver value to the farmers by partial or full subsidy by the partner agency. The partner agencies also find value in such an approach since their business objectives are inversely related to the anomalies of the insured weather events.

The study found no sovereign risk transfer solutions present in Bangladesh. Bangladesh also has no state-sponsored, large-scale agriculture insurance solution. In the past, the public sector insurer Sadharan Bima Corporation (SBC) launched a pilot crop insurance program in 1977, which was shut down in 1995 owing to a highly unsustainable claim ratio (average 508%) and low uptake (less than 1,000 farmers per year). This created a negative perception among the insurers that agricultural risks cannot be sustainably insured. It took almost 14 years since the shutdown of this program for Bangladesh to pilot another weather risk insurance pilot.

The way forward

Despite these bright spots, Bangladesh has a long way ahead before it can make insurance a key part of its disaster financing mechanism, especially for its critical agriculture sector. Inputs from insurance industry stakeholders in Bangladesh identify some key pointers that will help Bangladesh move forward:

The state needs to provide a strong basis through a legal and regulatory framework for agriculture insurance through the insurance regulator.
Lead the efforts in research and development and create the enabling the infrastructure in terms of better weather monitoring systems, reliable databases, etc.
Insurers identify the following four major challenges that need to be addressed for them to make progress in offering better solutions:

a. **Capacity constraints** in terms of technical, actuarial, and risk modeling capacities, especially for systemic risks like drought, flood, and epidemic diseases.
b. **High start-up costs of agricultural insurance:** Rural and weather infrastructure, which are essential for the development and implementation of agri-insurance, are poorly developed. Hence, the costs of establishing insurance systems and procedures are high.
c. **High costs of insurance administration:** Due to the scattered land-holding pattern in Bangladesh, the unit of insurance is often small, making the cost of administration of the agri-insurance a costly affair. Also, due to the infrastructural requirement, the operation of agri-insurance becomes too high for small farmers.
d. **Affordability**: Agriculture insurance is a costly insurance segment since the probability of occurrence has to be intelligible enough for the farmers for any real benefit. However, a high probability of incidence and high operation cost makes the products expensive and it often becomes unaffordable for small farmers. This can be seen as an expectation of the state providing premium subsidy for agriculture insurance solutions.

Annex II: Country profile of Indonesia

Indonesia factsheet

Population	**268 million**
GDP	1 trillion USD
Human Development Index	0.54 (Scale 0-1)
GDP per capita	11,161 USD
Population below the poverty line	9.8 % (2016)
Income classification	Lower to middle-income country

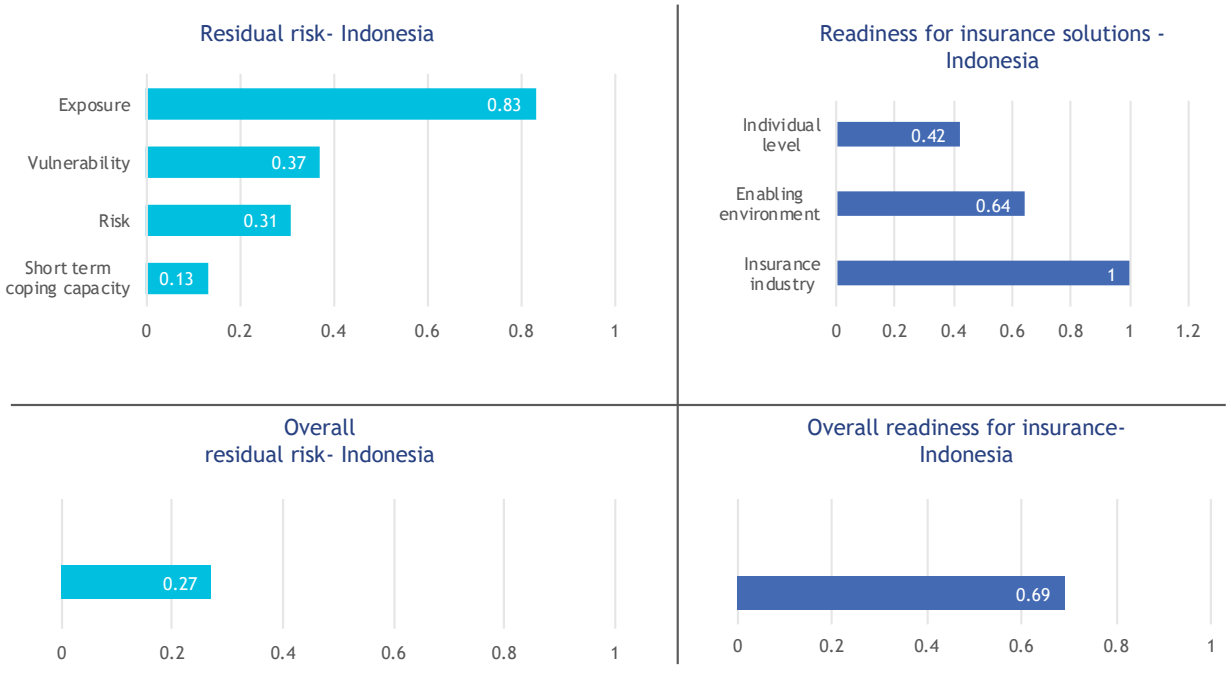
Source: World Bank

Economic losses suffered due to disasters

Between 2005 and 2013, Indonesia suffered economic losses worth USD 16 billion and 14,000 deaths due to disasters. On average, Indonesia lost more than USD 2 billion to disasters every year.[42] Storms and typhoons were responsible for 58.3% of all losses followed by floods (35.5%) and droughts (6.2 %).

InsuRisk assessment of Indonesia

According to the InsuRisk Assessment Tool, Indonesia is characterized by a very high average residual risk (0.27 on a scale from 0 to 1) but with above-average readiness for insurance solutions (0.69 on a scale from 0 to 1).



Source: MSC analysis of InsuRisk data

The residual risk is summarized by a low short-term coping capacity of disasters, an average vulnerability, and very high exposure to multiple hazards, notably earthquakes, floods, and wildfires, and very high

[42] https://www.preventionweb.net/countries/indo/data/

overall vulnerability. The readiness is the sum of the well-set insurance industry, which highlights that the market penetration and different actors are working in Indonesia. Individual level factors, like risk awareness, trust and financial literacy, are above average in comparison to other Asian countries.

The study found a newly-implemented state-supported agriculture insurance program in Indonesia as well as a private insurer-driven agriculture insurance solution. In addition to this, there is an earthquake index-based insurance solution against earthquake-caused disasters.

The state-supported agriculture insurance program covers 0.6 million hectares. Given the average landholding in Indonesia, we estimate this coverage reaches about 1 million farmers. The program enjoys 80% state-sponsored subsidies.

Country	Outreach: Farmers covered (in millions)	Outreach: Land covered (in million hectares)	Total premium (in million USD)	Percentage of state subsidy	Nature of coverage
Indonesia	1	0.6	7.8	80%	Indemnity based

The private sector agriculture insurance coverage is still in the early stages in terms of the coverage and outreach.

Country	Number and types of programs	Outreach - Farmers covered	Total premium (In USD)	Subsidy (if any)
Indonesia	1 weather index-based	1,200	36,000	yes

Supported by the Global Index Insurance Facility and International Finance Corporation, the state reinsurer, PT Reasuransi MAIPARK, offers an earthquake index insurance solution. It is offered as a portfolio-level cover to financial services providers like MFIs, among others, to cover the loss of portfolio due to earthquakes and its negative impacts.

Country	Program	Type of Coverage	Outreach	Type
Indonesia	Earthquake index insurance	Meso: Portfolio protection for FIs	N/A	Voluntary

Some of the key insights from engagement with stakeholders in Indonesia are as follows:

- **The earthquake index insurance (EQII) product, a pioneering product in the market,** was approved by the regulator in 2016 and is available in the retail market. The insurance payout is triggered by a pre-determined earthquake parameter (magnitude and intensity), which is announced by an independent and established third party like the BMKG—Indonesia's Meteorological, Climatological, and Geophysical Agency, or the United States Geological Survey. The idea is for the MFIs to buy insurance to protect their loan portfolios from potential liquidity crises after earthquake events.
- Overall, the insurance industry in Indonesia has been slow when it comes to offering inclusive insurance solutions and that includes exploring climate and disaster risk insurance solutions.
- **Using mobile phones to address the information gap:** Mercy Corps, a partner of ACA insurance, have been offering the single agriculture insurance solution offered by the private sector. Mercy Corps identified the lack of access to technical and market information and financial services for farmers and target clients as a major challenge. It came up with the solution of providing access to advisory and financial services through mobile phones for farmers in rural areas. AgriFin Mobile linked up rural and commercial banks together with local input providers (supplying agriculture inputs like seed and

agrochemicals) to develop a loan product tailored for smallholder farmers. As part of the loan application process, farmers were registered on the digital platform, where they can send questions and receive answers regarding good agriculture practices.[43]

- **Informal Insurance in Indonesia is huge**: Cooperative organizations have been the main engine for financial inclusion and community development across Indonesia, especially in the semi-urban and rural regions. The ILO (International Labour Organization) describes the cooperative movement in Indonesia as the largest civil society organization and social innovation which contributes significantly to the nation's rural development and employment formation (ILO, 2012). Indonesia has over 83,500 credit cooperatives, in different shapes and forms that serve at least 24 to 26 million members across Indonesia. Almost all cooperatives have solidarity funds, a form of informal insurance arrangement. Membership to these funds is mandatory for all members. However, none of these solutions cover disaster risk solutions yet.

The way forward

Though the insurance sector in Indonesia has been working toward offering inclusive insurance solutions, most of it has remained limited to credit-life products and its variants. However, with a new state-sponsored program for agriculture, there may be opportunities for the industry to explore it further.
One key aspect that may be interesting in the future is that the cooperative sector in Indonesia is huge and has rudimentary self-insurance programs. It is also estimated that a good part of the membership of these cooperatives are rural population and farmers and MSMEs, both ideal candidates for CDRI solutions. Efforts need to be focused on formalizing these insurance solutions and bringing them into the regulatory ambit of the insurance regulator, the OJK. As the next step, these cooperatives can be a key factor in promoting disaster and agriculture insurance successfully in Indonesia.

[43]Mercy Corps AgriFin

Annex III: Country profile of the Philippines

The Philippines factsheet

Population	**106.6 million**
GDP	331 billion USD
Human Development Index	0.55 (Scale 0-1)
GDP per Capita	7,581 USD
Population below the poverty line	21.6 % (2016)
Income classification	Low to middle-income country

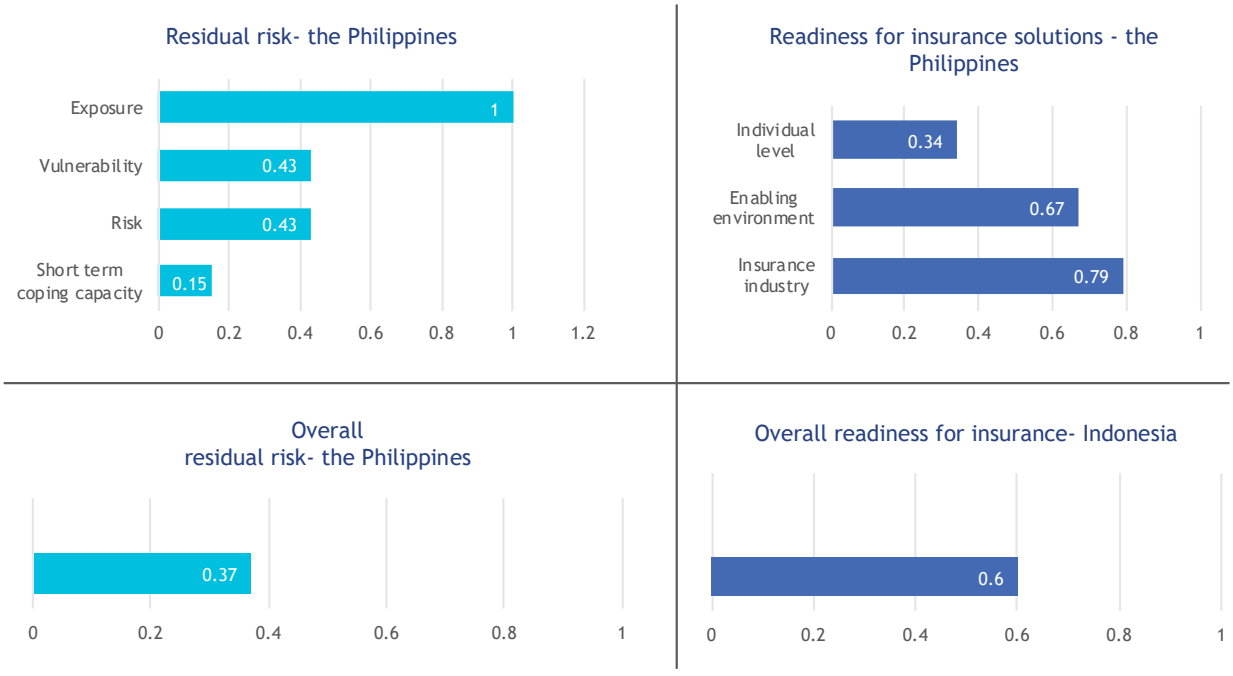
Source: World Bank

Economic losses suffered due to disasters

Between 2005 and 2010, the Philippines suffered economic losses worth USD 4.5 billion and 2,300 deaths due to disasters. On average, the Philippines loses more than USD 982 million.[44] Storms and typhoons have been responsible for 58.3% of all losses followed by floods (17.3%) and earthquakes (2.2 %).

InsuRisk assessment of the Philippines

According to the InsuRisk Assessment Tool, the Philippines is characterized by higher than average residual risk (0.37 on a scale from 0 to 1) and high readiness for insurance solutions (0.60 on a scale from 0 to 1).



Source: MSC Analysis of InsuRisk data

[44] https://www.preventionweb.net/countries/php/data/

The residual risk sums up the comparatively low short-term coping capacity, the risk as such, and the vulnerability. The country suffers from typhoons, floods, and earthquakes, and has a very high overall vulnerability. This leads to a higher than average residual risk for the Philippines.

InsuRisk also displays the readiness for insurance solutions for the Philippines. There is a well prepared and working insurance market set up in the Philippines containing market concentration and market coverage, which leads to a medium score for the insurance industry. The environment as such for solutions (a functioning government) allows a high rating. The individual level, which includes financial literacy, risk awareness, and trust in finance solutions) is comparatively high.

CDRI landscape of the Philippines

The study found two sovereign risk transfer solutions present in the Philippines.

	Type of Sovereign Risk Transfer	What does it offer?
World Bank Catastrophe Bonds for the Philippines	Catastrophe bonds	Annual coverage of USD 206 million for national government assets against earthquakes and severe typhoons, and protection against severe typhoons for 25 Local Government Units (LGUs)
The Philippine City Disaster Insurance Pool	Risk pooling	PCDIP will offer parametric insurance cover against typhoons and earthquakes in its first phase to cities in the Philippines that will expand to cover floods. The parametric cover will be offered through a risk pooling arrangement

The Philippines also offers a state-supported agriculture insurance program.

Country	Outreach: Farmers covered (in millions)	Outreach: Land covered (in million hectares)	Total premium (in million USD)	Percentage of state subsidy	Nature of coverage
Philippines*	1.69	1.4	124	100% / 55%	Indemnity based

*includes fishers (Source: annual reports, public dashboards: 2015-2018)

The Philippines also offer a small-scale agricultural insurance cover offered by a private insurer, which is bundled with agri-credit offered by a leading rural financial services provider.

Country	Number and types of programs	Outreach - Farmers covered	Total Premium (In USD)	Subsidy (if any)
Philippines	1 Indemnity based	4,000	5,800	No

Overall, 1.69 million farmers in the Philippines have access to agricultural insurance that are indemnity based and are almost fully subsidized.

The study also identified three disaster risk insurance solutions being offered by the private sector.

Country	Program	Type of Coverage	Outreach	Type
Philippines				
	Bundled disaster risk insurance	Micro: Bundled with credit	590,000	Bundled
	Bundled calamity assistance	Micro: Bundled with credit	300,000	Bundled
	MSME business interruption due to catastrophes	Micro: Business interruption due to catastrophe	6 MSMEs	Voluntary

Some of the key insights into these programs are as follows:

- **The challenge of pricing a product adequately:** Card Pioneer, the leading microinsurer in the Philippines had a very successful credit bundled product. It offered, apart from death benefits, a flood and typhoon benefit priced at USD 10 with USD 5 as the premium for the disaster risk coverage. It had an outreach of 400,000 lives. This pricing was more of a hunch than based on technical analysis. When Typhoon Yolanda struck in 2013, the product had a claims ratio of over 400%. To its credit, Card Pioneer honored the commitment and paid all true claims. When it revamped the product, the premium was revised to USD 40 with USD 30 as the risk premium for catastrophic events for a USD 100 payable a steep increase of 400%. This had a major impact on the market and the product was withdrawn in 2016.
- **Learning agilely**: Pioneer today offers two credit bundled product and a bundled agriculture product that are better priced and reach more than 890,000 clients.
- **MSME insurance**: AXA Philippines offers an MSME insurance product that offers a business interruption coverage against disasters like typhoons and floods. This product has the support of the Department of Trade and Industry of the Philippines Government that educates its member MSMEs on planning against disasters and business continuity planning in the face of disasters. However, despite best efforts, the product reached only six MSMEs since launched a few months ago.
- **Getting the distribution right**: Pioneer's success lies in its capacity to partner with leading rural financial services providers and utilizing a partner agent model for its products. AXA has partnered with a leading chain of pawnshops that also offer business loans to MSMEs. One of the concerns that AXA has is that an MSME insurance product needs time and effort to sell. The agents at the pawnshops who gain handsome incomes through the sale of credit services find it hard to make time to pitch and explain the product. Hence, a mismatch between the product and the channel may be an issue in the slow uptake.
- **The AXA red button**: AXA offers a client service app called AXA Assist in the Philippines. It has an emergency red button that, when pushed, makes contact with an AXA-supported call center that calls and asks about the kind of emergency faced by the client. It then coordinates the message to the police, fire department, and ambulance services as needed.

The way forward

The Philippines has enjoyed the reputation of being a market that has done well in promoting inclusive insurance solutions. It was interesting to observe that insurers in the Philippines see a commercial opportunity in offering CDRI solutions in the times to come. The assessment, based on inputs from insurers and stakeholders in the Philippines, on the way forward is as follows:

1. Stakeholders in the Philippines understand that to offer suitable CDRI and agri-insurance, the right data is key. However, getting reliable data is a challenge. Hence, a part of the enabling environment support from the state can be in terms of making access to good quality data easy. Access to the right data and models will determine how far insurers can go in offering client optimum solutions.
2. Insurers in the Philippines strongly agree that agriculture insurance and disaster risk insurance solutions will become a strong commercial opportunity in the future. However, the sector does expect the regulators to lay out more enabling regulations to offer such services, especially easing on the 26% tax imposed on non-life insurance policies.
3. Another key challenge that insurers grapple with when considering climate and disaster risk insurance is how to design around it. Card Pioneer highlighted the point that offering good agriculture insurance

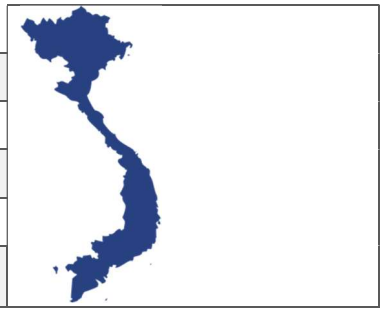
or climate and disaster risk insurance solutions is also a function of the ecosystem of inclusive financial services. While insurance will remain an important risk financing tool, it will benefit a great deal from finding the right combination with other services like credit and savings.

4. Insurers were also interested in the ideas around risk pooling when it comes to underwriting disaster risk solutions, which can be a great idea to spread the risks better, both geographically and among insurers.

Annex IV: Country profile of Vietnam

Vietnam factsheet

Population	**95 million**
GDP	245 billion USD
Human Development Index	0.67 (Scale 0-1)
GDP per Capita	6,233 USD
Population below the poverty line	9.8 % (2016)
Income Classification	Low to middle Income Country



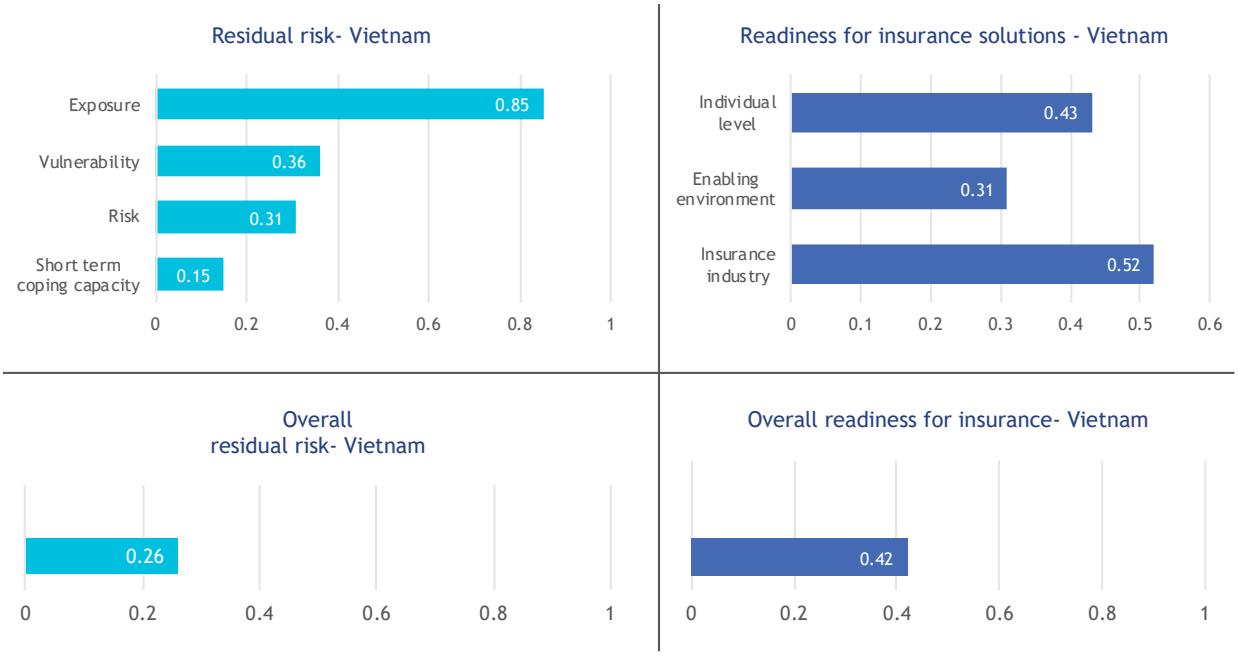
Source: World Bank

Economic losses suffered due to disasters

Between 2005 and 2014, Vietnam suffered economic losses worth USD 7.02 billion and 2,650 deaths due to disasters. On average, Vietnam lost more than USD 702 million to disasters every year.[45] Storms and typhoons have been responsible for 58.3% of all losses followed by floods (35.5%) and droughts (6.2%).

InsuRisk assessment of Vietnam

According to the InsuRisk Assessment Tool, Vietnam is characterized by a very high average residual risk (0.26 on a scale from 0 to 1) and below-average readiness for insurance solutions (0.42 on a scale from 0 to 1). The country has very high exposure to multiple hazards, notably typhoons, floods, and droughts, and a very high overall vulnerability.



Source: MSC analysis of InsuRisk data

[45] https://www.preventionweb.net/countries/vnm/data/

CDRI insurance landscape of Vietnam

The study did not find any CDRI or agriculture insurance in Vietnam.

Vietnam piloted a National Agriculture Insurance Pilot Program between 2011 to 2013. It was multi-peril indemnity insurance coverage against storm, flood, drought, and tornadoes. The program was underwritten by state-owned insurers. Over the two years of the pilot, the product covered a total of 304,000 hectares of agricultural land and collected premiums worth USD 17.5 million. However, the program had a claims ratio of 177%, paying out more than 30 million USD in claims. This ended the pilot.

Some of the key insights from engagement with insurers in Vietnam are as follows:

- Most insurers concede that the insurance industry in Vietnam is still in its early stages, hence there are little to no technical capacities to consider offering climate and disaster risk or agriculture insurance solutions. The industry is focused on tapping traditional life and non-life businesses.
- Almost all insurers cited the example of the pilot scheme to suggest that they think that agriculture insurance cannot be offered profitably unless subsidized and underwritten by the government.
- Insurance regulations in Vietnam are also in their early stages. Consequently, a lot of insurers are also not sure what kind of partnerships can be allowed. For instance, the Vietnam Bank of Social policy, the largest lender in the rural area, is not allowed to tie up with insurers by the law.
- Overall, education and awareness of all involved including the regulators, insurers, and the end clients like farmers is a necessity in Vietnam.

The way forward

There has been positive news on the regulatory front in 2019 in Vietnam. The Ministry of Finance, which also is the regulator for the insurance sector, is pushing through the legal framework on micro-insurance and agriculture insurance. The effect of these regulations will be a major boost for insurers to become more interested in exploring the disaster and agriculture insurance space.

Annex V: Short country profiles

CDRI profile: Afghanistan

Climate and disaster risks

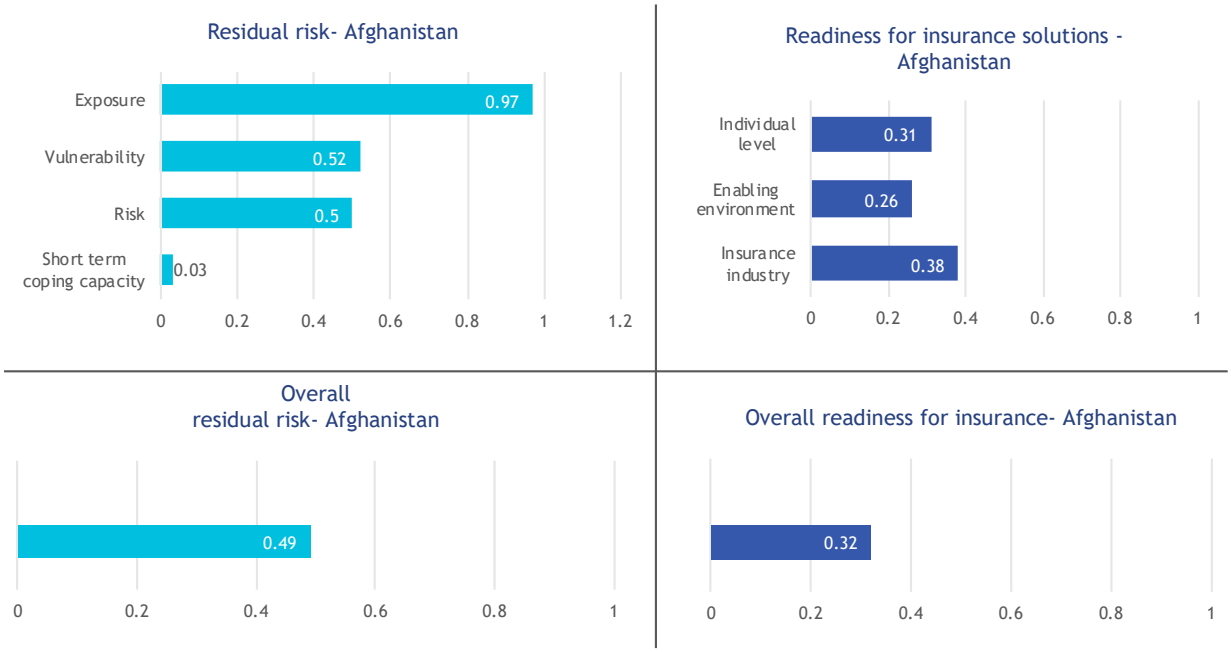
Between 2005-2014, disaster in Afghanistan caused the deaths of 439 people and economic losses of USD 16.7 million.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Droughts	56.6%	3.1%
Floods	33.5%	54.3%
Earthquakes	8%	5.5%
Others	1.9%	37.1%

Source: https://www.preventionweb.net/countries/afg/data/

Droughts, while less frequent, cause the highest economic distress while floods are the more persistent of the hazards faced.

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

InsuRisk Tool assessment identifies the residual risk for Afghanistan as moderately high, given its high exposure to the disaster events as identified above. In addition to this, the short-term coping capacity of Afghanistan is practically non-existent.

The challenge is further accentuated by very low readiness for insurance solutions in the country. The insurance industry is weak in general and the country lacks a policy-level enabling environment. In such a scenario, an economically challenged Afghanistan will have a high dependency on international support to

respond to its disasters. Contingent credit lines and sovereign risk transfer mechanisms can help the country cope better with disaster in the future.

Existing CDRI solutions

None were found during the study.

CDRI profile: Bhutan

Climate and disaster risks

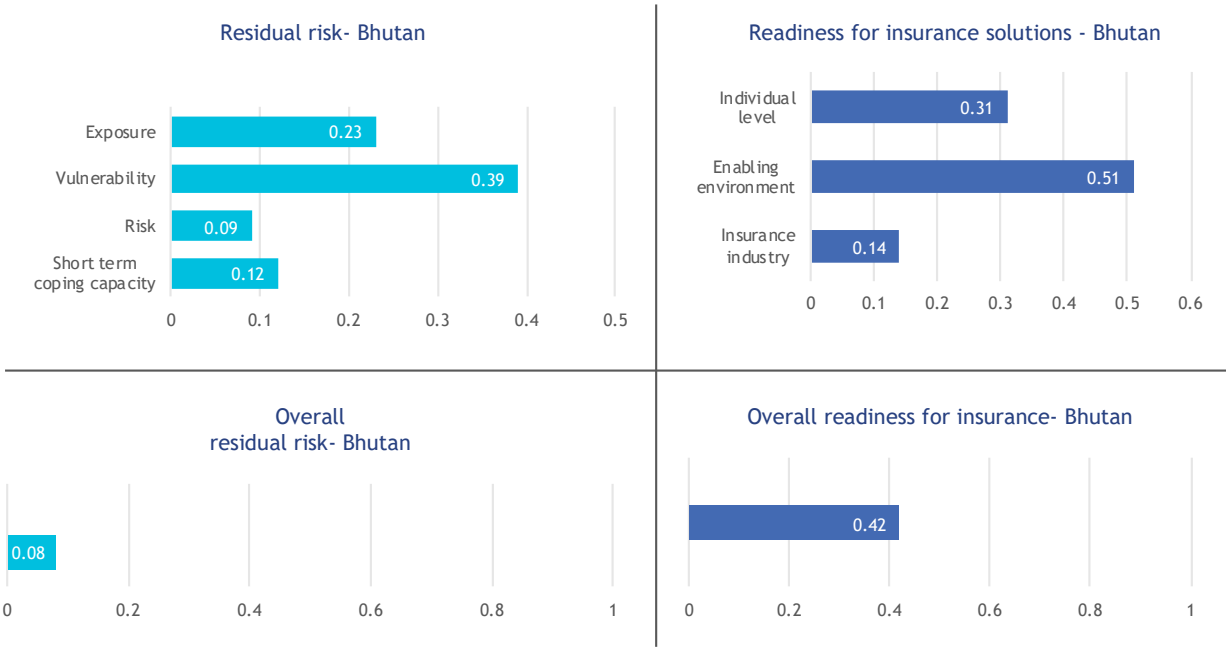
Between 2003-2013, Bhutan's exposure to disasters led to approximately 4 deaths annually, and economic losses worth USD 1.1 million.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Earthquake	87.3%	25%
Floods	12.7%	37.5%
Storms	N/A	25%
Others	N/A	13.5%

Source: https://www.preventionweb.net/countries/btn/data/

Earthquakes are the leading reason for economic losses, while floods are more persistent among the hazards faced by Bhutan.

InsuRisk tool analysis



Source: MSC analysis of InsuRisk data

The InsuRisk Tool assessment pegs Bhutan's residual risks to climate risks and disasters as very high. While its overall exposure to disasters remains moderate, Bhutan's underdeveloped economic capacities create high vulnerability and leave limited short-term coping capacity for its people.

Bhutan also has a low readiness for insurance solutions in the country. Although its insurance industry is underdeveloped, the country has an enabling policy environment. This makes it possible for Bhutan to consider risk-transfer-based solutions for its short-term disaster risk financing needs. Bhutan currently has no contingent credit lines and sovereign risk transfer mechanisms.

Existing CDRI solutions

None were found during the study.

CDRI profile: Fiji

Climate and disaster risks

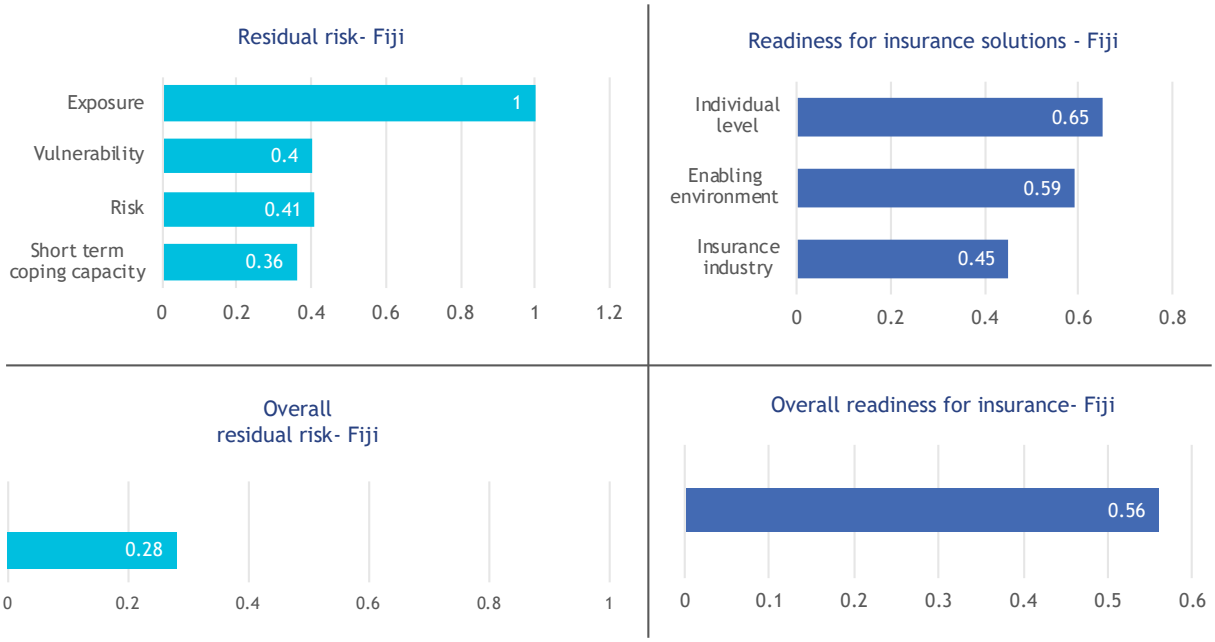
Between 2005-2013, Fiji's exposure to disasters led to approximately 17 deaths annually and economic losses of USD 36.7 million.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Earthquake	87.3%	25 %
Floods	12.7%	37.5%
Storms	N/A	25%
Others	N/A	13.5%

Source: https://www.preventionweb.net/countries/fji/data/

In Fiji, there are two most common disasters, storms, and floods. Storms are both more economically damaging to the country as well as more frequent. Floods also occur with persistence and account for more than 40% of all of Fiji's economic losses due to disasters.

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Fiji's exposure to climate and disaster risks is absolute and hence its residual risks are among the highest in the region, highlighting its vulnerability and low short-term coping capacities in the face of these ever-present risks.

Fiji has been opening to securing sovereign risk transfer tools to manage these risks. Fiji's improving insurance sector and positive policy environment provide it with good readiness to consider the use of risk transfer tools to manage disaster and climate change risks.

Existing CDRI solutions

Fiji was engaged with the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) to become a part of the region risk pool at the time of the completion of the study.

CDRI profile: Cambodia

Climate and disaster risks

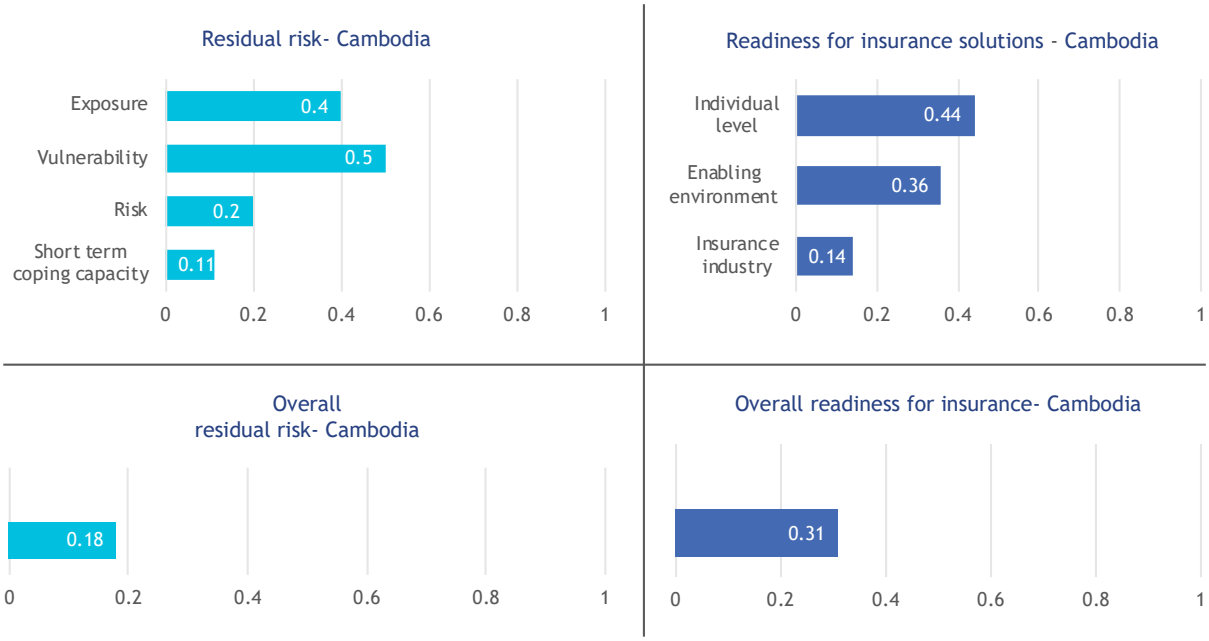
Between 2005-2014, Cambodia experienced disaster-induced losses worth USD 109 million. These disasters also caused more than 59 deaths annually in the country.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Floods	91.1%	72%
Droughts	8.9%	16%
Storms	N/A	12%

Source: https://www.preventionweb.net/countries/khm/data/

In Cambodia, floods are the most frequent as well as the most severe disasters that account for more than 90% of all losses suffered by the country. Droughts in some parts of Cambodia also lead to economic hardships for the people. Storms are also frequent in the country.

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Cambodia is a country with high vulnerability to climate and disaster risks with moderate to high exposure to hazards like floods, storms, and droughts. Short-term coping capacities through savings and distress sale of assets is very low, which adds to the grim situation.

Cambodia also has an underdeveloped insurance sector with limited policy encouragement or individual-level solutions. Its readiness for insurance solutions is both a technical challenge and a policy issue. The country will do well to work toward the growth of its insurance industry to develop CDRI solutions.

Existing CDRI solutions

Cambodia is exploring the possibility of being a part of the South East Asia Disaster Risk Insurance Facility (SEADRIF) initiative. It has also an active pilot of an indemnity-based agriculture insurance solution, though it is currently limited in outreach with a coverage of only 120 farmers.

CDRI profile: India

Climate and disaster risks

Between 2005-2014, India experienced 16 substantial disaster events. These left 2,377 people dead in its wake and caused economic losses to the tune of USD 4.3 billion.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Floods	66.3%	53.5%
Storms	23.1%	22.7%
Earthquakes	7.1%	10%
Drought	2.8%	3.3%
Others	0.6%	10.5%

Source: https://www.preventionweb.net/countries/ind/data/

In India, floods are the most frequent as well as most severe disasters that account for more than half of all the losses suffered by the country. Given its vast size, India also experiences storms, droughts, earthquakes, and other disasters with varying frequencies but high economic damage.

InsuRisk Tool analysis

Source: MSC analysis of InsuRisk data

India's size and huge population as well as uneven economic development make it one of the more vulnerable countries to climate and disaster risks in the region. With moderate to high exposure and vulnerability and very limited short-term coping capacity, India is a highly vulnerable country to disasters.

On the positive side, India has a robust insurance industry with a strong regulatory and policy environment that allows the country to design and implement risk transfer solutions.

Existing CDRI solutions

While India has no sovereign risk transfer arrangements as of yet, it has one of the biggest state-supported agriculture insurance program in the world, the PMFBY.

Country	Outreach: Farmers covered (in millions)	Outreach: Land covered (in million hectares)	Total premium (in million USD)	Percentage of state subsidy	Nature of coverage
India	34.77	34.04	2,800	87%	• Mixed: Index and indemnity based • Mandatory for farmers who get agri-credit • Voluntary for all others

In addition, India also has some examples of disaster risk insurance solutions like an index-based flood insurance pilot launched in 2017.

Country	Number and types of programs	Outreach - Farmers covered	Total Premium (In USD)	Subsidy (if any)
India	Index-based flood insurance	Micro: Individual or household	200	Voluntary

CDRI profile: Laos

Climate and disaster risks

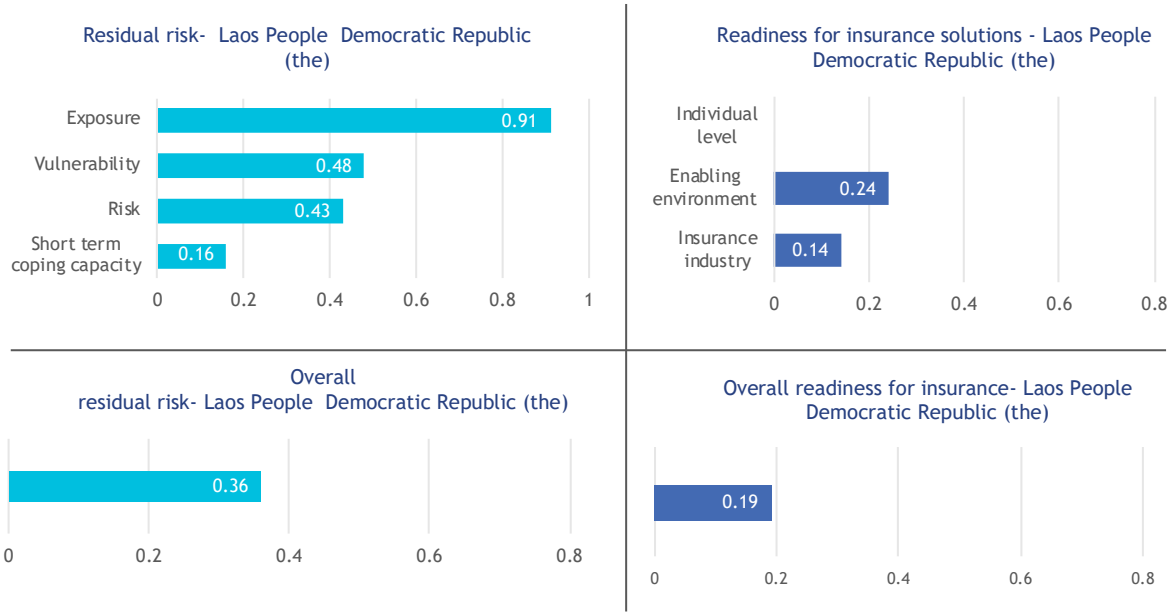
Between 2005-2012, Laos experienced disaster-induced losses estimated to be around USD 221 million. These disasters also caused at least 25 deaths annually in the country.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Floods	60.9%	63%
Storms	20.8%	16.2%
Droughts	10.7%	2.1%
Others	7.6%	18.7%

Source: https://www.preventionweb.net/countries/lao/data/

In Laos, floods are the most frequent as well as the most severe disasters that account for more than 60% of all losses suffered by the country. Storms and droughts also lead to economic hardships for the people.

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Laos is a moderate to highly vulnerable country to climate and disaster risks with very high exposure to potential disaster events. Its short-term coping capacities through savings and distress sale of assets is very low, which adds to the overall risk for the people in Laos.

Laos has an underdeveloped insurance sector. This leads to low readiness for insurance solutions in the market. Laos needs to improve its policy environment to encourage local insurance companies. It also needs to explore sovereign risk transfer mechanisms as its internal capacity to finance such risks is very low.

Existing CDRI solutions

Lao is a member of the upcoming South East Asia Disaster Risk Insurance Facility (SEADRIF) initiative. No other CDRI solutions were identified.

CDRI profile: Myanmar

Climate and disaster risks

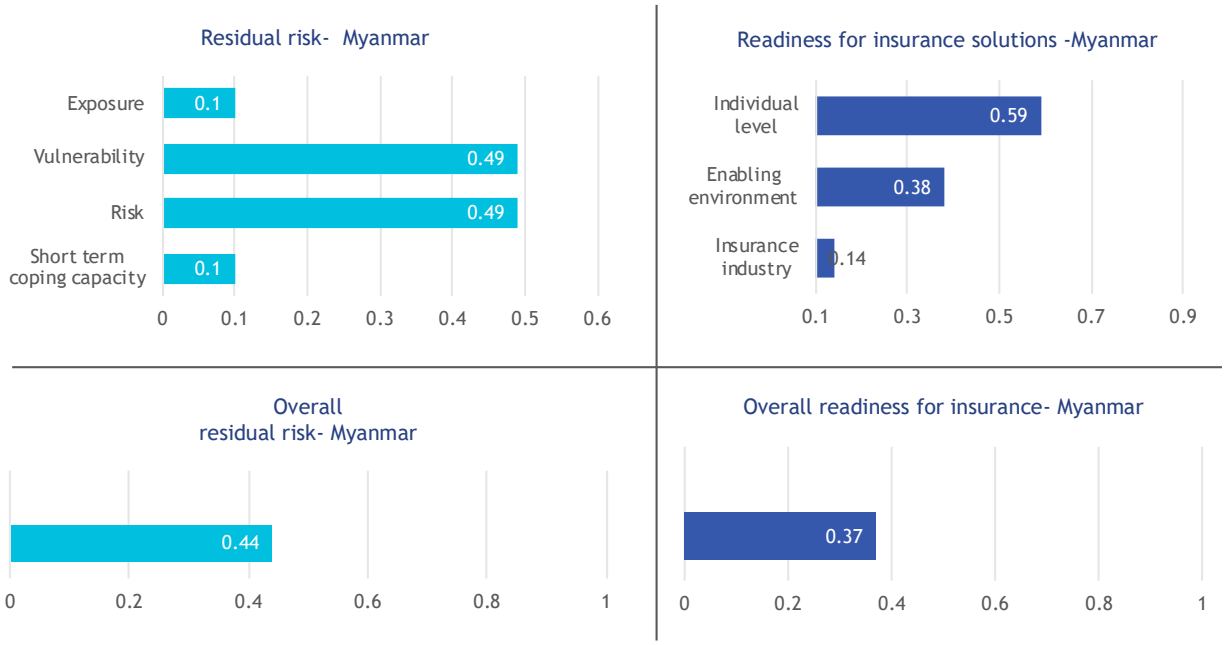
Between 2005-2012, Myanmar was exposed to 2 major disasters that took 13,887 lives and inflicted losses equivalent to USD 406 million.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Storms	86.4%	54.8%
Earthquakes	10.7%	16.1%
Floods	2.9%	16.1%
Others	N/A	13%

Source: https://www.preventionweb.net/countries/mmr/data/

While floods are the most frequent disaster faced by Myanmar in terms of frequency, storms cause real damage, both in terms of economic loss as well as the loss of lives. Earthquakes are also a risk that Myanmar is quite exposed to.

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Myanmar has an extreme vulnerability and high exposure to disaster risks, which leads to high vulnerability to economic losses in the country. A very limited short-term coping capacity of the people, in general, makes Myanmar very exposed to disaster risks.

Myanmar has a nascent insurance sector and its policy-level approach to insurance is limited. While the financial literacy at the individual level is improving with time, it still has below average readiness for disaster risk insurance solutions.

Existing CDRI solutions

Myanmar is a member of the upcoming South East Asia Disaster Risk Insurance Facility (SEADRIF) initiative. No other CDRI solutions were identified.

CDRI profile: Mongolia

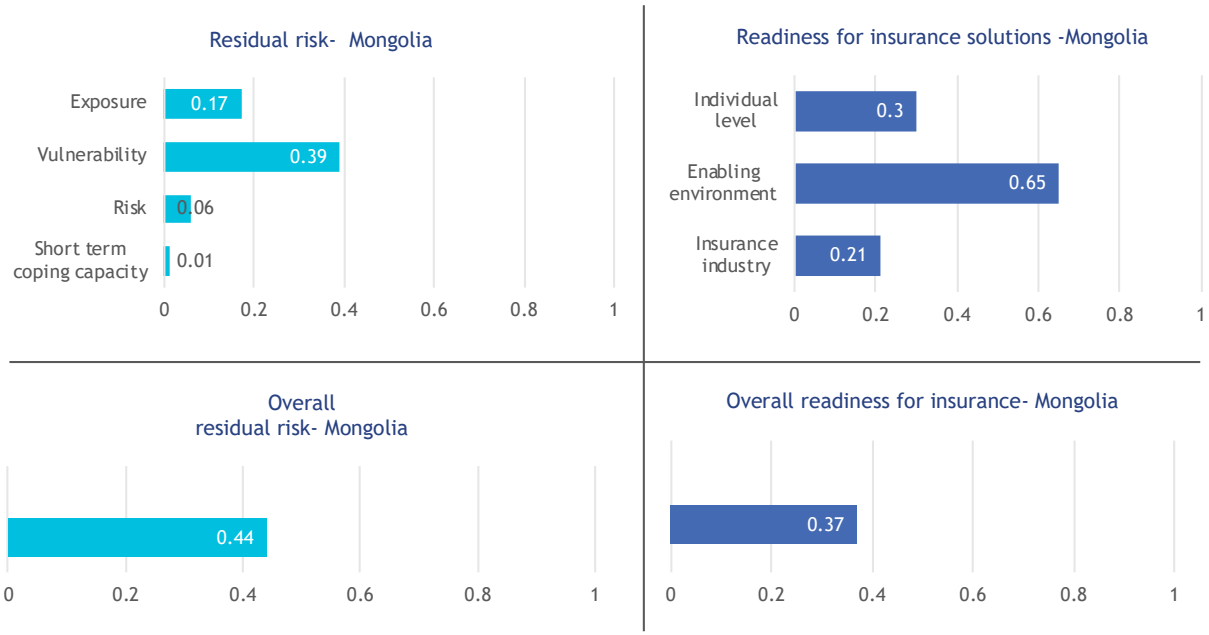
Climate and disaster risks

Mongolia is projected to have an average annual of USD 43.2 million due to disasters. These are largely on account of risks posed by floods, extreme temperatures, and earthquakes.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Floods	91.1%	27%
Earthquakes	8.9%	50%
Extreme Temperatures	N/A	5.6%

Source: https://www.preventionweb.net/countries/mng/data/

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Mongolia's capacity to manage its residual risks is very low and highlights the risks it faces from climate and disaster risks.

Mongolia has an ever-improving insurance sector and forward-looking policy environment that gives it moderately low readiness for insurance solutions as a mechanism to manage its disaster risks.

CDRI profile: Nepal

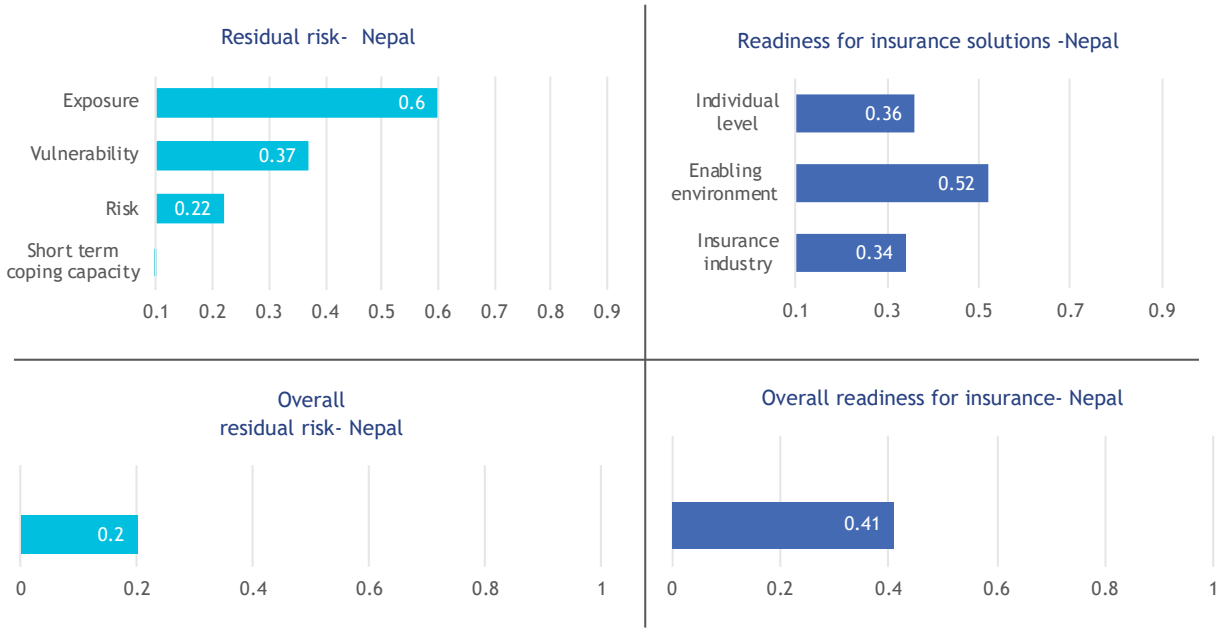
Climate and disaster risks

Between 2005–2013, Nepal suffered disasters that caused the deaths of 463 people and an economic loss of more than USD 177.4 million. These losses were almost exclusively due to floods and some from earthquakes.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Floods	97.9%	50%
Earthquakes	2.1%	3%
Others	N/A	47%

Source: https://www.preventionweb.net/countries/npl/data/

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Nepal has moderately high exposure and high vulnerability to disasters. This is further accentuated by the very limited short-term coping mechanism of its people, most of which belong to the low-income segments.

Nepal has a young insurance industry but it still lacks the technical expertise to offer insurance solutions against climate and disaster risks. The policy environment is forward-looking. However, together with limited financial awareness and literacy among its people, Nepal has a below-average readiness for use of insurance solutions against disasters as of now.

Existing CDRI Solutions

The study did not find any CDRI solutions in Nepal.

CDRI profile: Pakistan

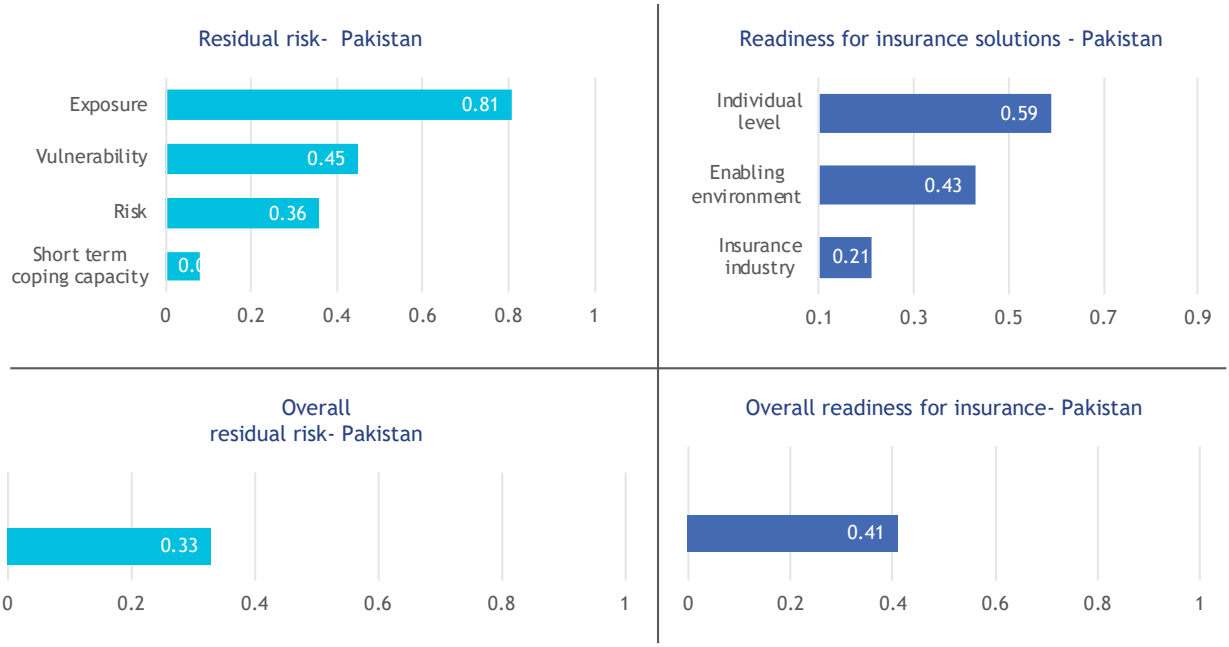
Climate and disaster risks

In 2005-2013, Pakistan reported 10,420 disaster-related deaths and economic losses worth USD 7 billion. These losses have largely been due to extreme floods and earthquakes.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Floods	73%	46.8%
Earthquakes	19.6%	15.3%
Storms	6.3%	12.1%
Others	1%	24.8%

Source: https://www.preventionweb.net/countries/pak/data/

InsuRisk Tool analysis



Source: MSC analysis of InsuRisksData

Pakistan has high exposure to multiple hazards like floods, earthquakes, among others, which makes it moderate to highly vulnerable to natural disasters. The short-term coping capacity of the country, on account of savings and government measures, are deemed to be inadequate, due to which Pakistan has a high degree of overall residual risk.

While the expanse of its insurance sector is rather limited, policy-level efforts in promoting insurance solutions have been positive. The local capacities in terms of factors like financial literacy, while still inadequate, show an upward trend. Pakistan is hence just below the average readiness for insurance solutions. The country has great potential to help the insurance sector grow and address the residual risk.

Existing CDRI Solutions

The study did not find any CDRI solutions in Pakistan.

CDRI profile: Sri Lanka

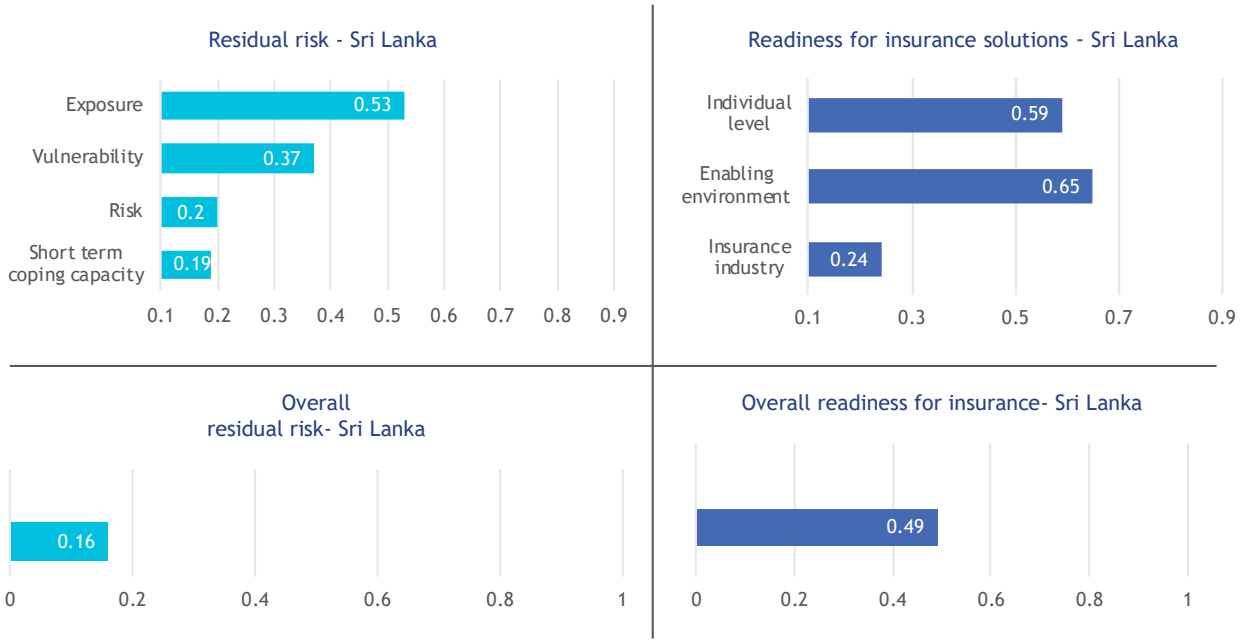
Climate and disaster risks

In 2005-2013, Sri Lanka experienced 99 deaths and losses of more than USD 199 million due to natural disasters. Floods, storms, landslides, and earthquakes are the main disaster risks that Sri Lanka is exposed to.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Earthquakes	56.7 %	78.2%
Earthquakes	39.8%	1.8%
Storms	2.5%	9.1%
Others	1.1%	11.1%

Source: https://www.preventionweb.net/countries/lka/data/

InsuRisk Tool analysis



Source: MSC analysis of InsuRisk data

Sri Lanka remains exposed to economic losses and loss of lives due to its exposure and vulnerability to multiple hazards. Its short-term coping capacity, while better than some others in South Asia, is still limited. This translates to a very high degree of residual risk for Sri Lanka.

The Sri Lankan insurance industry, given the small market size, is relatively limited. On the upside, both the policy environment and the awareness levels in the country are deemed to be high. That offers Sri Lanka a strong opportunity to utilize insurance solutions to mitigate its exposure to disasters.

Existing CDRI solutions

While Sri Lanka is not a party to any sovereign risk transfer arrangement, it does have a nationwide state-supported agriculture insurance program that covers farmers and fishers and associated lines of work against weather-related risks.

Country	Outreach: Farmers covered (in millions)	Outreach: Land covered (in million hectares)	Total premium (in million USD)	Percentage of state subsidy	Nature of coverage
Sri Lanka*	1.5	2.5	4	100%	✓ Indemnity based ✓ Universal**

In the private sector, the study identified 3 agriculture insurance programs that are active in the country.

Country	Number and types of programs	Outreach - Farmers covered	Total Premium (In USD)	Subsidy (if any)
Sri Lanka (3)	1 indemnity based 1 index based 1 blockchain based	72,200	1,255,000	No

Sri Lanka has the only blockchain-based agriculture insurance solution in Asia.

CDRI profile: Timor Leste

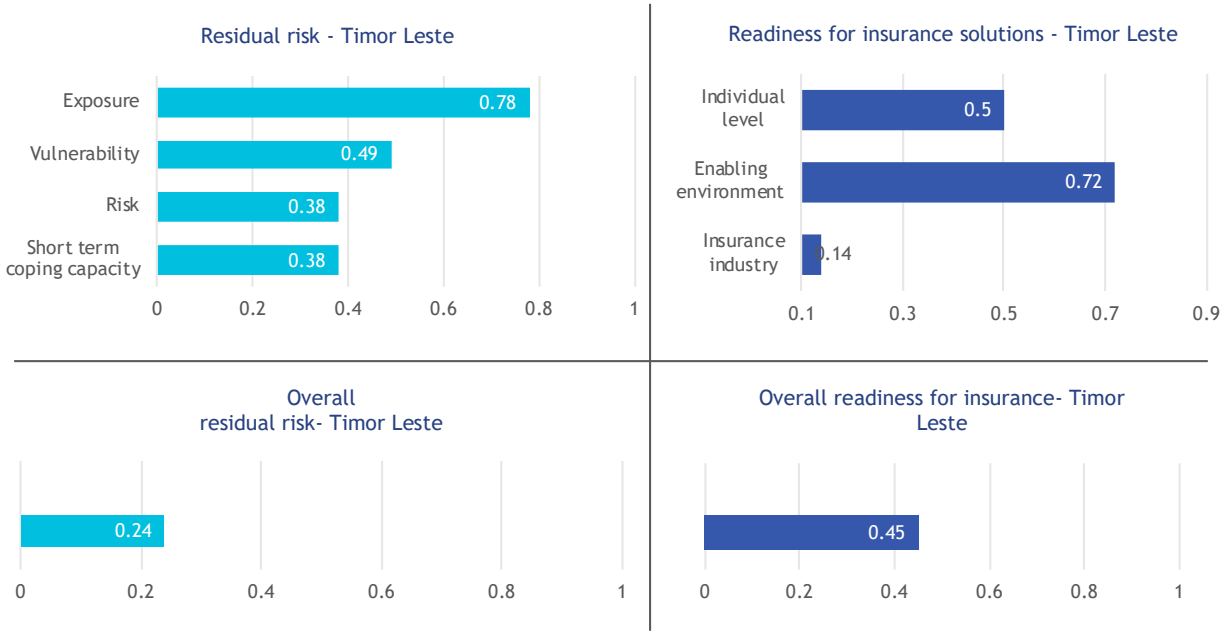
Climate and disaster risks

Limited information is available about previous disaster-related losses suffered by Timor Leste. Risk modeling by Université Catholique de Louvain Brussels, Belgium predicts that Timor Leste may have an annual exposure to over almost USD 16 million in losses due to earthquakes, tsunamis, and floods.

Disasters	Contribution to economic loss	Frequency as a percentage of all disasters
Earthquakes	91.8 %	71.4%
Floods	6.2%	14.3%
Tsunami	2%	14.3%

Source: https://www.preventionweb.net/countries/tls/data/

InsuRisk tool analysis



Source: MSC analysis of InsuRisk data

Timor-Leste has high exposure to multiple hazards, which adds to the vulnerability profile of the country. The local short-term coping capacities are deemed to be above average for the region but are still quite limited. This leads to a high overall residual risk for the country.

The insurance industry in Timor-Leste is tiny. However, the enabling environment on account of regulations and policies is considered to be good. This, together with average awareness and financial literacy levels of the population, offers Timor-Leste reasonable readiness for insurance solutions.

Existing CDRI Solutions

Timor-Leste is a part of the Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI). No other CDRI solutions were identified in the country.

Annex VI: Estimating disaster risk financing sources

To gain an understanding in terms of the numbers, countries budget for and finance their climate and disaster risk reduction and management interventions, we attempted to tabulate the information on existing resources for disaster risk financing. While it was difficult to get this data for all countries corresponding to the same period, we have culled data that tells us the last available budgetary allocation numbers in the past five to eight years and the donor support received for the same period. The numbers given in the table below indicate the financing capacities of these countries when faced with disasters.

Disaster risk financing sources (in million USD)			
	Disaster response or contingency funds	National budget allocation or re-allocation	Donor or international support
Afghanistan	2.6	0	40.9
Bangladesh	621	1,159	1,100
Bhutan	1	3.13	250
Cambodia	0	11.5	40
Fiji	1	9.3	65
India	1,400	4,100	N/A
Indonesia	300	700	1,000
Marshall Islands	1.9	0	59.2
Mongolia	0	31.2	30
Myanmar	17	86	365
Malaysia	10	400	NA
Nepal	81.2	550	4,040
The Philippines	395	818.4	575
Sri Lanka	40	40	1,200
Timor- Leste	N/A	N/A	22.8
Vietnam	70	650	195
Total	2,940.7	8,558.53	8,982.9

Table 5: National budgeting and foreign funding utilized by countries for disaster financing
Source: MSC analysis based on data points on UNDRR's Prevention Web, 2014, and other publicly available information accessed through desktop research.

This table helps us make the following inferences:

- All countries have defined one or more budgeted funds and reserves to mount disaster relief efforts including national budgetary allocations and re-allocations that can be utilized for this. However, their quantum is primarily determined by the financial strengths of these countries.
- Re-allocation of budgetary allocations in the face of disasters is observed to be almost three times the contingency funds earmarked for disaster response and adaptation. The current level of contingency funding in these countries is not enough and needs revision to reflect reality.

Annex VII: References

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14. Mr. Moin Ahmed, Green Delta Insurance, Bangladesh
15. Mr. Nguyen Chien Thang, Bao Viet, Vietnam
16. Mr. Binh Do, Non-life insurance, TechnomBank Vietnam

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GIZ Office Manila
10th Floor, Bank of Makati Building,
Ayala Avenue Extension near corner Metropolitan Avenue,
1209 Makati City, Philippines
T+63 2 6515169
E antonis.malagardis@giz.de

www.giz.de
www.inclusiveinsuranceasia.com
www.mefin.org

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November 2020

Author
Microsave Consulting

Layout
Microsave Consulting
Pauline Arada

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