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Climate Risk Insurance and Risk Financing in the Context of Climate Justice

A Manual for Development and Humanitarian Aid Practitioners

Published by

actalliance

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Acknowledgement: This Toolkit is a product of the ACT Alliance Global Climate Change Project, implemented with the support of ACT member Brot für die Welt.

2020

cover PHOTO: ALPHA KAPOLA/NCA

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REPORT

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List of abbreviations

A2R	Anticipate, Absorb, Reshape, UN Climate Resilience Initiative
ACLiFF	Asia-Pacific Climate Finance Fund (managed by the ADB)
ACRE	Agriculture and Climate Risk Enterprise Ltd. (insurance provider in Africa)
ACRI+	Advancing Climate Risk Insurance plus (global index-based weather insurance)
ACS	Association of Caribbean States
ADB	Asian Development Bank
ADC	Aggregate Deductible Cover (element of a CCRIF SPC insurance policy)
AIC	Agriculture Insurance Company of India
ARC	African Risk Capacity
BFA	Banco de Fomento Agropecuario (Agricultural Development Bank, El Salvador)
BMU	German Federal Ministry for the Environment
Cat DDO	Catastrophic Draw Down Option
CCF	Convertible concessional finance (risk financing instrument proposed by CVF)
CCIS	Comprehensive Crop Insurance Scheme (India)
CCRIF SPC	Caribbean Catastrophe Risk Insurance Facility
CGIAR	Consultative Group on International Agricultural Research
CRAIC	Climate Risk Adaptation and Insurance in the Caribbean (of MCII)
CSO	Civil Society Organization
CTA	Technical Center for Agricultural and Rural Cooperation
CVF	Climate Vulnerable Forum (group of climate-vulnerable countries)
DIW	Deutsches Institut für Wirtschaftsforschung (German Institute for Economic Research)
DHI	Danish Hydraulic Institute
DPL	Development policy loan
ECI	Extreme Climate Index (used by Extreme Climate Facility under ARC)
FAO	Food and Agriculture Organization (of the United Nations)
FBO	Faith-based organization
FOGASA	Fondo de Garantía para el Campo y del Seguro Agropecuario (a Guarantee Fund for Agricultural Insurance in Peru)
G7	Group of the biggest economies out of the OECD members
G20	Group of economically most advanced OECD members and developing countries
GDP	Gross Domestic Product

GIZ	German Corporation for Development Cooperation
GIIF	Global Index Insurance Facility
GFDRR	Global Facility for Disaster Reduction and Recovery
IBLI	Index-Based Livestock Insurance (in Africa)
IBLIP	Index-based Livestock Insurance Program
ICMIF	International Cooperative and Mutual Insurance Federation
IIF	InsuResilience Investment Fund
ILO	International Labor Organization (of the United Nations)
ILRI	International Livestock Research Institute
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
ISF	InsuResilience Solutions Fund
KfW	Kreditanstalt für Wiederaufbau
KLIP	Kenya Livestock Insurance Program
LDC	Least Developed Countries
LPP	Livelihood Protection Policy
LPC	Loan Portfolio Cover (under CRAIC)
LRI	Livestock Risk Insurance (Mongolian insurance company)
LWF	Lutheran World Federation
MAPFRE	International insurance company
MCII	Munich Climate Insurance Initiative (think tank)
MDTF	InsuResilience Multi-Donor Trust Fund
MENA	Middle East and North Africa
MiCRO	Microinsurance Catastrophe Risk Organization
MIT	Massachusetts Institute of Technology
MPCI	Multi-peril crop insurance
MMS	Manab Mukti Sangstha (Bangladesh)
mNAIS	modified National Agriculture Insurance Scheme Sangstha (India)
MSMEs	Micro, small and medium enterprises
NAIS	National Agriculture Insurance Scheme (India)
NGO	Non-governmental organization
OECD	Organisation for Economic Co-operation and Development
PA	Paris Agreement
PacRIS	Pacific Risk Information System (geographical information system)
PCRAFI	Pacific Catastrophe Risk Assessment and Financing Initiative
PCRIC	Pacific Catastrophe Risk Insurance Company
PMFBY	Pradhan Mantri Fasal Bima Yojana (Indian crop insurance scheme)
R4	Rural Resilience Initiative (Africa)
RIICE	Remote sensing–based Information and Insurance for Crops in Emerging Economies
RSIC	Reinstatement of Sum Insured Cover (element of CCRIF SPC insurance policy)
SANASA	SANASA Insurance Company Ltd. (Sri Lanka)
SAC	Seguro Agrario Catastrófico (index-based crop insurance, Peru)
SDGs	Sustainable Development Goals
SEADRIF	Southeast Asia Disaster Risk Insurance Facility
SIDS	Small Island Developing States
SFDRR	Sendai Framework for Disaster Risk Reduction
SIF	Sustainable Insurance Facility (an initiative of V20 countries)
UNFCCC	United Nations Framework Convention on Climate Change
UN	United Nations
UNDP	United Nations Development Programme
UNISDR	United Nations Office for Disaster Risk Reduction
UNU	United Nations University
V20	Vulnerable 20 Group of Finance Ministers of the members of the Climate Vulnerable Forum
VAT	Value-added tax
WBCIS	Weather-Based Crop Insurance (India)
WFP	World Food Programme
XCF	Extreme Climate Facility (under ARC)

Glossary

Climate justice: Climate justice is a term used to frame climate change as an ethical and political issue. It links climate policies to human rights and sustainable development, safeguarding the rights of the most vulnerable people and sharing the burdens and benefits of climate change and climate policies equally and fairly. Climate justice can also cover aspects of intergenerational and environmental justice, access to sustainable energy for all, and a just transition for those whose jobs or livelihoods are endangered by ambitious climate policies.

Concessional loan: Loans that are extended on terms substantially more generous than market loans. The concessionality is achieved either through interest rates below those available on the market or by grace periods or a combination of these. Concessional loans typically have long grace periods (OECD, see https://stats.oecd.org/glossary/detail.asp?ID=5901).

Disaster risk: The potential disaster losses of sudden or slow-onset events in lives, health, livelihoods, assets, and services, which could be incurred by a particular community or society over some specified future time period. Disaster risk is a function of hazard, exposure, vulnerability, and capacity.

Disaster risk reduction: The concept and practice of reducing disaster risks through systematic efforts to analyze and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events.

Financial protection: In the context of disaster risks, the level of payment to be expected based on the occurrence of a disaster event and/or the specific costs incurred as a result of a disaster event (for example, property insurance contract, parametric insurance contract, catastrophe bond, government compensation or financial assistance for disaster losses).

Financial vulnerability: A vulnerability that results from a gap between exposure to damage and loss and the financial capacity to absorb those damages and losses.

Gender justice: The degree to which people are affected by global warming, and how their voices are heard in the struggle against climate change, is often connected to their gender. Women, despite the international community's increasing acknowledgment of their particular experiences and skills and their commonly higher environmental concern, still have much less economic, political, and legal power. Gender justice in the context of climate change is an approach to address and close these gaps, empowering women to reduce their specific vulnerability, improving their participation and access to resources, and, hence, making responses to climate change more effective by drawing on women's experiences and skills.

Hazard: A dangerous phenomenon, substance, human activity, or condition that may cause loss of life, injury, or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

Human rights: Human rights–based approaches address adverse impacts of climate change that threaten the human rights of climate-vulnerable people. They call on duty bearers as states to ensure the fulfillment of their obligations with regard to respecting and protecting human rights standards and human rights principles.

Pro-poor principles: Adopted by InsuResilience Global Partnership for Climate and Disaster Risk Finance to provide guidance on designing climate risk insurance solutions that support closing the climate protection gap of poor, climate-vulnerable populations: 1. Comprehensive needs-based solutions 2. Client value 3. Affordability 4. Accessibility 5. Participation 6. Sustainability 7. Enabling environment

Reinsurance: Insurance that is purchased by insurers from the public or the private sector to cover parts of the risk taken by the insurer; reduces the financial risk of an insurer.

Resilience: The ability of a system, community, or society exposed to hazards to resist, absorb, accommodate to, and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions. The resilience of a community in respect to potential hazard events is determined by the degree to which the community has the necessary resources and is capable of organizing itself both before and during times of need.

Risk assessment: A methodology to determine the nature and extent of risk by both analyzing hazards and their potential likelihood and intensity and estimating impacts through evaluating conditions of vulnerability and identifying exposed people, property, infrastructure, services, and livelihoods and their environment.

Risk retention: An approach to risk management that involves retaining responsibility for the risk and any costs associated with the materialization of that risk.

Risk transfer: An approach to risk management that involves the transfer of financial responsibility for some or all of the risk and any costs associated with the materialization of that risk to a broader collective (for example, through a financial instrument such as a property insurance contract).

Slow-onset events: Climate-induced, slowly occurring change of hydrological or meteorological parameters. Compensation for loss and damage caused by slow-onset events cannot be provided by climate risk insurance due to three reasons: Slow-onset events are foreseeable, the magnitude of effects is huge and cannot be expressed in financial terms, and it is impossible to calculate exact losses and premiums.

Vulnerability: The characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard and, hence, disaster. There are many aspects of vulnerability arising from physical, social, economic, and environmental factors.

Executive summary

Climate-related hazards cause substantial humanitarian and development risks. They cause loss and damage and undermine the achievement of the Sendai Framework for Disaster Risk Reduction (SFDRR) and the UN Sustainable Development Goals. It is the role of climate risk management to identify and reduce these risks and to protect vulnerable people, communities, and countries from intolerable humanitarian catastrophes and losses that go beyond their capacity to absorb these risks. Climate risk insurance and other forms of climate risk financing are key elements of climate risk management. They complement risk prevention and risk reduction by compensating for a part of the residual risk that cannot be avoided. Climate risk transfer relies on data provided by climate risk assessments.

Risk transfer refers to the transfer of the financial costs and the potential future damage caused by climate risks to a broader collective. In the case of insurance, risks are transferred to insurance companies that are contractually obliged to make a disbursement in the event of loss or damage. Insurance companies have to provide the capital to do so themselves. As a rule, they transfer part of the risk they take on to larger insurance pools via reinsurance with broader levels of risk diversification or they use capital market instruments to limit their own risk.

Looking at climate risk insurance and risk financing from a climate justice perspective, the biggest challenge lies in the fact that the insurance concept (unless the insurance premium is paid by a third party) builds on the principle of mutuality: The insured form a pool and mobilize the financial means needed from within the pool, that is, usually no transfer payments are made to the pool from outside the pool. The same is true for most forms of risk financing. The costs have to be covered by those at risk, and the higher the risk, the higher the protection costs are. Overcoming this injustice, and introducing the justice principles of solidarity and accountability ("polluter pays") to the risk transfer discourse, is an important goal of climate advocacy.

It is not enough to make climate risk insurance available. The extent to which insurance helps to close the gaps in the protection of vulnerable groups against climate risks depends on the way in which insurance is structured. Respective guidance is provided by the pro-poor principles for climate risk insurance. ACT Alliance and other faith-based organizations (FBOs) often work with marginalized communities at the frontlines of climate change. Knowing their needs as well as their specific capacities, FBOs have a huge potential to serve as bridge- and trust-builder, linking communities with state authorities, insurers, and development partners and thus facilitating the development of climate risk finance and insurance solutions that are designed in a truly pro-poor way and that benefit climate-vulnerable people in their struggle for resilience, dignity, and sustainable development.

If communities cannot maintain their human–ecological systems in a safe operating space, lives, livelihoods, and social cohesion are threatened. In these cases, risk transfer options can be considered as part of a community-based risk management strategy. While risk sharing within a community is a widely practised strategy, the insurance concept of risk transfer to a third party outside the community is new and little known. Because of the advantage of insurance — that fewer financial resources are to be raised from within the community to cover high risks — it is worth it to raise insurance literacy of communities and introduce micro insurance. FBOs can greatly contribute by building bridges and connecting communities with governments, experts, insurers, and investors that are willing to contribute to finding climate risk insurance and risk financing solutions for communities; by supporting the development and testing of innovative pilot projects; by subsidizing insurance coverage for poor households that cannot afford it; and

by promoting and enabling the participation of socially excluded groups in community-level risk sharing and risk insurance schemes.

In order to select the most cost-efficient climate risk transfer instrument, and to decide whether an insurance is appropriate, the climate risk layering approach is used. The main selection criteria for risk layering are the frequency and the severity of disasters. A bottom-up approach is suggested: The government, the community, or the individual household creates savings to deal with relatively frequent but less severe events (low-risk layer). Climate risk insurance, social security nets, credits, and donor assistance are most appropriate to deal with moderate, less frequent risks (medium-risk layer). Risks of high severity and very low frequency are best transferred to climate risk insurance, including regional insurance pools (high-risk layer).

Most climate risk insurances in the Global South are parametric or index-based, that is, a payout is triggered automatically if certain indicators defined in the policy are reached or exceeded at the measurement site. These are usually meteorological indicators, such as the length of a dry period, the quantity of rain, and the wind speed. Micro-level insurance directly insures private individuals or micro-, small- and medium-size companies. The Rural Resilience Initiative (R4) is an interesting example of a micro insurance scheme that specifically tries to support the most vulnerable populations. Meso-level insurance provides insurance to intermediaries, such as co-operatives, rural development banks, and microfinance institutions. Macro-level insurance directly insures states (and indirectly, vulnerable populations) against damage to critical infrastructure or crop damages, as is the case of regional risk pools: African Risk Capacity (ARC), Caribbean Catastrophe Risk Insurance Facility (CCRIF SPC), Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI), and Southeast Asia Disaster Risk Insurance Facility (SEADRIF).

Even though 68 countries participate in these four regional risk pools, only about a third (32 percent) purchased insurance coverage in 2019, with almost half (46 percent) of the eligible countries not deploying any disaster risk finance instruments at all. These numbers hint at the challenges of regional climate risk pools. They are new and thus still relatively unknown instruments. Many governments lack experience and remain hesitant to purchase insurance. A second main hurdle is the high cost of premiums. Thirdly, unmet expectations — either because of the uninsured basis risk or because a member expected payouts without the insurance trigger being reached — also seems to be another critical factor for the still relatively low uptake.

The growing interest in climate risk insurance, and the need to make it accessible and affordable for the climate vulnerable, is reflected in the fast-growing landscape of initiatives created to support the development of climate risk insurance and broaden its global coverage. The most prominent one, InsuResilience Global Partnership for Climate and Disaster Risk Finance, was founded in 2017. As a multi-stakeholder alliance, it brings together different actors with partially divergent interests. It therefore remains to be seen how well the approach can be implemented. From the perspective of vulnerable states, the crucial question is whether the partnership can provide them with added value. In fact, the success of the InsuResilience initiative will be measured by whether it is able to place the primacy of climate risk insurance for the poor and vulnerable and their micro, small, and medium enterprises at the core of the partnership and strengthen this aspect within such a broad forum.

Apart from climate risk insurance, disaster risk financing is the second main financial pillar of countries' comprehensive climate risk management. Risk financing instruments can be categorized according to their sources and whether they are ex-ante or ex-post disaster financing instruments. Ex-ante disaster financing instruments, like contingent credit lines, calamity funds, catastrophe bonds, or climate risk insurance,

require proactive advance planning and upfront investments. In turn, funds would be available almost immediately after a disaster happened, for example, to support relief operations and the first recovery phase. Ex-post disaster financing instruments, like donor relief and rehabilitation assistance, budget reallocation, tax increases, or conventional credits, are sources that do not require advance planning or upfront investments. Mobilizing resources in such a way takes more time. Thus, these instruments are better suited for the reconstruction phase and longer-term recovery programmes with expenditures that are due months after the disaster takes place. Some of these instruments fall into the category of risk transfer instruments, such as catastrophe (cat) bonds and other securitized instruments where the risk is transferred to capital markets. In any of these cases, the risk is ceded to a third party, and the sovereign state has to pay an interest to the third party for agreeing to take the risk. The higher the risk, the higher the transfer price. Adaptation measures are not categorized as disaster risk financing in the narrow sense.

A new and innovative climate risk financing instrument proposed by the Climate Vulnerable Forum (CVF) is a contingent multilateral debt facility providing convertible concessional finance (CCF). The provision of CCF would be contingent on using the finance provided for ex-ante agreed disaster risk management measures that effectively reduce risks and address damages. Risk financing in the form of CCF would consist of highly concessional convertible debt instruments and grant-to-concessional debt, working with the following incentive: Building resilience against climate risks should first be supported by grants. If successful, the support could be converted into pre-approved concessional debt terms. Should a project financed by concessional debt fail, then the debt should be converted into a grant. Such an approach would help to overcome the dangerous spiral of worsening credit ratings, rising indebtedness, and more stranded assets caused by climate change. It would enable climate-vulnerable countries to mobilize risk capital for investment into resilience building. It would benefit vulnerable communities and people, and it would factor solidarity and justice into climate risk financing by offsetting economic loss and damage caused by climate extremes.

FBOs should scale up their engagement on climate risk insurance and risk financing at both levels, advocacy and programme work, and should focus on the specific needs and circumstances of vulnerable communities and how they can be better included in and protected by these approaches. Enhanced engagement may start with, among other things, capacity development, climate risk assessments, field research, policy analysis, stakeholder consultations, and pilot projects in close co-operation with communities, taking fully into consideration, on the one hand, community priorities, experience, value basis, and capacities and, on the other hand, the promotion and support of the full participation of socially excluded groups in community-level risk sharing and risk transfer schemes.

Climate risk insurance and risk transfer may be quite new approaches for most humanitarian and development practitioners and FBOs as a whole. That may raise the question of whether it is worth it to spend scarce resources to enter new territories. The answer to this question is very clear. The climate crisis requires much more than just continuing business-as-usual approaches. This also applies to disaster risk management and climate adaptation, where transformational pathways are required in the 2020s to better protect climate-vulnerable communities from climate-induced havoc and intolerable risk that are going far beyond traditional knowledge and community-based adaptive capacities.

Introduction

Climate change is leading to increasing numbers of extreme climate- and weather-related events. These are causing rising levels of climate risks, leading to loss and damage. Climate risks provoke havoc, lead to humanitarian catastrophes, and stand in the way of achieving the Sustainable Development Goals (SDGs). Thus, it is of great importance to prevent and minimize risks as much as possible. However, there remains a residual risk that cannot be avoided. This is where risk insurance and risk financing have an important role to play. Climate risk transfer, that is, risk insurance, and risk financing are tools to financially address residual loss and damage by providing financial compensation.

Risk insurance and risk financing are comparatively new concepts in many countries in the Global South, and they are little known in civil society, not to mention vulnerable communities. With increasing climate risks, it is of great importance that this knowledge gap is addressed. This publication, designed as a manual, contributes to close the gap:

- It explains the full range of climate risk transfer approaches, with many case examples and visualizations.
- It introduces a set of climate justice–based criteria, helping readers to assess the advantages and limitations of the various risk transfer approaches. Thereby, readers get a framework that helps them to take positions with regard to risk transfer approaches, be it at the programme or the advocacy level.
- It provides an overview of the different types of climate risks and identifies those risk transfer instruments that are best suited for each climate risk type. Readers learn to assess how far the various instruments to financially protect vulnerable people, communities, and countries can close the protection gap against climate risks, and which would be the specific advantages and disadvantages of each of them.

The manual as an educational tool complements other publications that have been published by ACT Alliance and its members in recent years, tackling similar issues but designed as policy analysis or position papers for expert discourse with policy makers.

In view of its educational character, the manual is accompanied by a series of instructive presentations that cover its main content. These presentations can be used for trainings on climate risk transfer, with the manual as a resource book to deepen knowledge.

The manual is divided into seven main chapters. The first chapter provides an overview of climate risks, how they unfold in different world regions, and what they imply for achieving the SDGs and the goals of the SFDRR. The second chapter briefly presents key elements of disaster risk management and how climate risk insurance and risk financing are placed therein. The third chapter introduces a framework of climate justice, human rights, and pro-poor principles, providing guidance in assessing climate risk insurance and risk financing approaches. The fourth chapter provides an overview on climate risk insurance approaches, the fifth covers climate risk financing instruments, and both are illustrated with a lot of examples from across the Global South. The sixth chapter puts the focus on traditional community-level risk management and risk-sharing approaches and discusses how risk insurance and risk financing would fit in. Special emphasis is put on the role of humanitarian and development practitioners and, more generally, FBOs. The last chapter concludes with the main challenges that remain to make risk insurance and risk financing work for poor and vulnerable people, communities, and countries, and identifies possible entry points for FBOs.

How to use this manual

This manual aims to help ACT Alliance and its members enhance knowledge and understanding of climate risk insurance and risk financing approaches and instruments. It may initiate members' own engagement and application of such approaches, and it may guide climate advocacy on governments and other stakeholders on climate risk insurance and risk financing. It provides necessary basic information on content, key actors, and modalities of work.

The manual is divided into main modules, one for each of the key aspects of climate risk insurance and climate risk financing. Text boxes with key messages, key information, quotes or questions, as well as graphics, examples, and checklists are used as visual elements to ease learning processes. Technical terminology is explained in an easy-to-understand way, for both practitioners and non-experts on finance and insurance, including through a glossary.

This manual provides initial orientation on the instruments and issues at stake. For those who want to engage deeper on specific issues, the toolkit also serves as a navigator, providing useful information on additional resources and where to get further information. To facilitate navigation through the manual, the following graphic elements are used.

Key Message
Short pitches with take-home messages

Example
Illustration of good practices

Further Information
Key information

Checklist
Guiding action step-by step

Quote
Statements from agreements, experts, and decision-makers

Question
Clarification of common misconceptions

Graphic
Charts with key data or infographics

1 What you need to know about climate risks

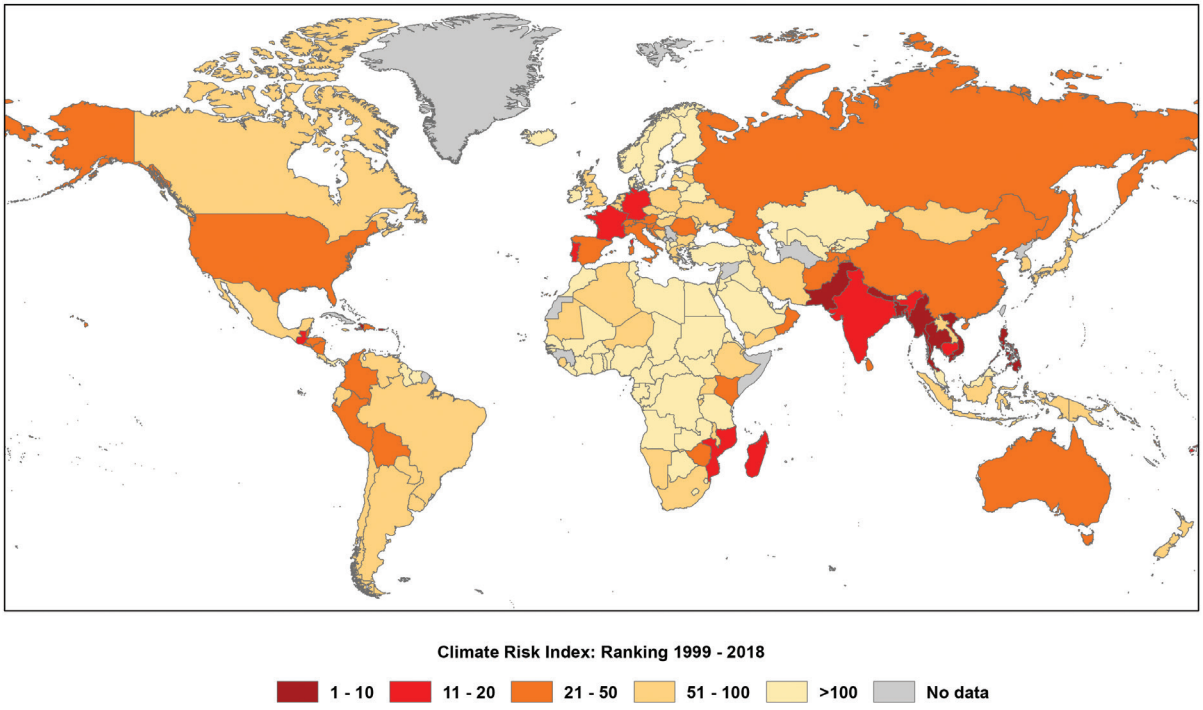
A range of climate-related hazards increasingly causes substantial humanitarian and development risks that undermine the achievement of the Sendai Framework for Disaster Risk Reduction (SFDRR) and the Sustainable Development Goals (SDGs) and provoke loss and damage.

This is one of the key messages of the Intergovernmental Panel on Climate Change (IPCC) Special Report "Global Warming of 1.5°C" (2018). It is the role of climate risk management to identify and reduce these risks and to protect vulnerable people from humanitarian catastrophe and losses that go beyond their capacity to absorb risk.

Climate change impacts are very unevenly distributed. Disasters have a much more disruptive impact on less-advanced economies. Developing countries are usually more geographically exposed to climate-induced hazards and have a higher socio-economic vulnerability and a lower technical and financial capacity to respond and recover. According to the latest global climate risk index (Germanwatch, 2019), if we examine the effects of extreme weather events for the period 1999 – 2018, we see that three of the ten most affected countries are in Central America and the Caribbean, four in Southeast Asia, and three in South Asia. Six of the next ten most-at-risk countries are in either of these world regions or in Africa. Only three — France, Germany, and Portugal — are industrialized countries (see figure 1). While some of these countries rank high in the long-term climate risk index because single extreme disasters have had very severe and long-lasting economic implications (for example, Puerto Rico), an increasing number of high-risk countries have been recurrently hit by climate extreme events in recent decades, for example, Bangladesh, the Philippines, Vietnam, and Haiti (ACT Alliance et al., 2018).

Figure 1: World map of the Global Climate Risk Index 1999–2018

Source: Germanwatch, 2019



Countries most affected by extreme weather events (1999–2018)			
1	Puerto Rico *	6	Vietnam
2	Myanmar *	7	Bangladesh
3	Haiti	8	Thailand
4	Philippines	9	Nepal
5	Pakistan	10	Dominica

** Countries where more than 90% of the losses or deaths occurred in one year or event*

Worsening climate conditions and more extreme events have become a huge concern of climate-vulnerable countries with a view to their aspirations to end poverty and to achieve the SDGs. The IPCC (2018) has warned that impacts of slow-onset events (for example, sea level rise) and sudden-onset events (for example, hurricanes) will cause further risks for achieving the SDGs. An overview of these impacts is provided in figure 2.

Figure 2: Risks of global warming for achieving the SDGs

Source: ACT Alliance, 2018

Weather	Social, economic, and ecological impact	Impact level at 1.5°C	Impact level at 2°C	Most-affected regions	People most at risk/SDG most at risk
Heat/heat waves	Significantly more hot days and heat waves; higher maximum temperatures	High	Very high	Mediterranean region; Southern Africa; Southern South America	People in megacities; vulnerable and disadvantaged people SDG 3: Good health and well-being SDG 11: Sustainable cities and communities
Rainfall	More erratic precipitation; accelerated seasonal changes; more heavy rainfall events	Moderate to high	High to very high	South Asia; Europe	Poor people; people dependent on agriculture SDG 1: No poverty SDG 2: Zero hunger
Drought/ dryness	More frequent and more intense drought/dryness	High	Extremely high	Mediterranean region; Southern Africa; Northeastern Brazil	Poor people; people dependent on agriculture SDG 1: No poverty SDG 2: Zero hunger SDG 6: Clean water and sanitation SDG 8: Decent work and economic growth
River flooding	More frequent and more intense river flooding due to heavy rainfall	High	High to very high	Mediterranean region; South and Southeast Asia; East Africa; Northern Andes	Poor people; people dependent on agriculture SDG 1: No poverty SDG 2: Zero hunger SDG 3: Good health and well-being SDG 6: Clean water and sanitation SDG 11: Sustainable cities and communities
Tropical storms and cyclones	More intense storms and cyclones; tropical cyclones migrating more poleward	High	Very high	Caribbean region and Central America; South Pacific; East China Sea; Gulf of Bengal	Coastal people and small islanders SDG 1: No poverty SDG 2: Zero hunger SDG 3: Good health and well-being SDG 6: Clean water and sanitation SDG 11: Sustainable cities and communities
Sea level rise	Increase by 80-100 cm by 2100	High (mainly after 2050)	Very high (mainly after 2050)	Low-lying SIDS; low-lying coastlines and delta regions (e.g., Amazon, Ganges, Nile, Niger, Mekong, Mississippi)	Coastal people and small islanders SDG 1: No poverty SDG 2: Zero hunger SDG 6: Clean water and sanitation SDG 8: Decent work and economic growth SDG 11: Sustainable cities and communities SDG 16: Peace, justice and strong institutions

According to the IPCC, climate-vulnerable countries have in common the fact that their exposure to climate hazards is very likely to increase sharply with rising temperatures. What is today a very rare one-in-100-years extreme event — for instance, a massive cyclone, flood, or drought — may become a more recurrent one-in-ten-years event within the next ten years, implying that disaster risk prevention and reduction will become a much more pressing topic and disaster risk financing strategies an urgent necessity (IPCC, 2018).

Risk awareness has not yet been adequately cultivated in most countries. Despite increasing climate-induced loss and damage, disaster risk financing and risk management, which lead to better preparedness

and more resilience, are not sufficiently established in most countries. Unless attitudes shift, the trend of increasing economic loss and damage is likely to continue. The more climate risks increase, the less a country can afford to disregard disaster risk financing options to improve its protection. This will become particularly relevant if the 1.5°C temperature threshold, as the new limit to unmanageable climate change, becomes reality.

According to the United Nations Office for Disaster Risk Reduction (UNISDR, 2012), 1.3 million children, women, and men lost their lives due to climate-induced disasters between 1992 and 2012 (UNISDR, 2012). IPCC projects that frequency and magnitude of climate-extreme events will further increase due to global warming. Many low-lying coastlines, for example, in river deltas, belong to the most densely populated regions on earth, with more than one billion people living there, most of them in Asia. Coastal communities face increasing risks caused by more intense hurricanes, storm surges and floods, rising seas, heat waves, and salinity, making agricultural land unfertile and water undrinkable. Hurricanes, for instance, are expected to significantly increase in magnitude, with more category 4 and 5 hurricanes occurring (IPCC, 2018). Another billion or more people are endangered by extended dry spells and drought, mainly in sub-Saharan Africa and the Mediterranean region (IPCC, 2018).

These and other trends are particularly relevant to the SFDRR, an international treaty drawn up in March 2015 in Sendai, Japan. The SFDRR has prioritized 1) the need to better understand disaster risks, 2) to strengthen disaster risk governance and management, 3) to invest in disaster risk reduction for resilience, and, 4) to enhance disaster preparedness. The seven associated targets (see figure 3) will have to be achieved by 2030 in order to minimize the risk of disaster, but they are becoming more difficult to achieve with every centigrade of additional warming.

Figure 3: Links between the targets of the SFDRR and different levels of global warming

Source: Bread for the World, 2018

SFDRR target by 2030	Negative impact of 1.5°C on achieving the targets	Negative impacts of 2°C on achieving the targets	The links between a 1.5°C pathway and the SFDRR
Substantially reduce global mortality from disasters by 2030	*high*	*very high*	*highly co-beneficial*
Substantially reduce the number of affected people globally by 2030	*high*	*very high*	*highly co-beneficial*
Reduce direct disaster-related economic loss in relation to global GDP	*high*	*very high*	*co-beneficial*
Substantially reduce disaster-related damage to critical infrastructure and the disruption of basic services	*high*	*very high*	*co-beneficial*
Substantially increase the number of countries with national and local disaster risk reduction strategies	*uncertain*	*uncertain*	*uncertain*
Substantially enhance international cooperation with developing countries by providing adequate and sustainable support	*uncertain*	*uncertain*	*uncertain*
Substantially increase the availability of the people's access to multi-hazard early warning systems and disaster risk information and assessments	*uncertain*	*uncertain*	*uncertain*

Displacement and mass migration could become the biggest humanitarian challenges under worsening climate change conditions, especially in regions where livelihoods are massively impacted and where people have few other options for how to make a living (Islam and Shamsuddoha, 2017). For many regions, a correlation exists between increasing climate extremes and accelerated migration rates. For instance, this is the case with South Africa, Syria, Mali, and Senegal. Extreme weather events often result in massive temporary migration and forced displacement, as was the case during the floods in Pakistan (2015, 2017, and 2018) and Bangladesh (2017 and 2018). Altogether, more than 90 percent of global displacement from 2011 to 2015 was caused by climate disasters, with 60,000 people being at least temporarily displaced every day (IDMC, 2015; Bread for the World, 2018).

Apart from these, other non-economic losses and damages — loss and damage that cannot be expressed in monetary terms, for instance, loss of culture, social cohesion, knowledge, and how to predict weather phenomena — resulting from slow- and sudden-onset climate events are increasingly worrisome for many vulnerable communities. They also undermine the adaptive capacity and the abilities to absorb climate risks and recover from disasters (ibid.).

Preventing, minimizing, and compensating for residual loss and damage that is beyond adaptive capacity become more important to avoid humanitarian, ecological, and developmental catastrophes with huge potential to undermine peace and stability. This requires massively scaling up of resilience building through adaptation and comprehensive climate risk management — and it comes at a price. The financial scale needed to minimize and redress loss and damage in developing countries alone is being estimated in an order of between 50 billion US dollars to hundreds of billions of US dollars per year (Bread for the World et al., 2019). The costs of inaction, however, would be several times higher, and losses will be impossible to recover.

The single most important step to take is to commit to a fast and massive global decarbonization of all socio-economic sectors, starting with the energy, construction, and transportation sectors. Secondly, adaptive measures are needed to enhance resilience and reduce climate risks, especially to sectors such as food, water, health, and low-lying coastal regions. However, this will not be enough to avoid massive economic and non-economic loss and damage, since the climate crisis will continue for decades, even if ambitious action is taken.

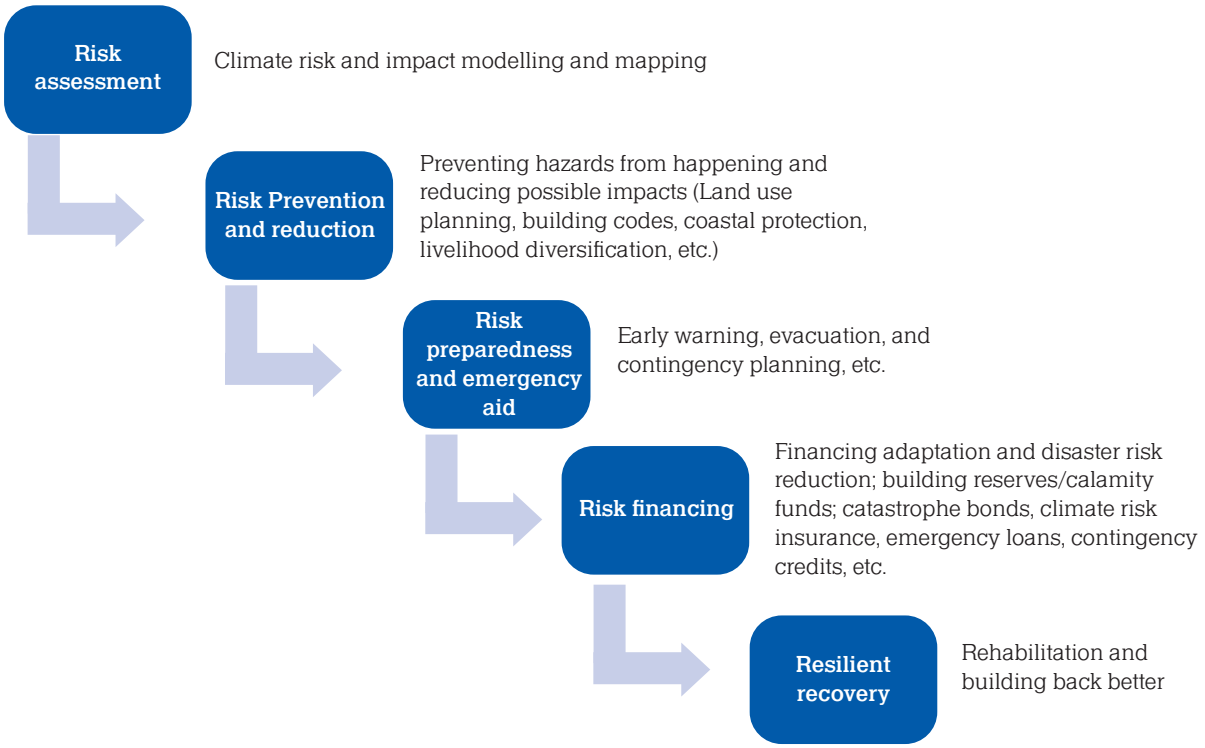
Thus, climate risk management needs to be fostered, with climate risk insurance and risk financing as integral parts of it. Only then do we have a chance to keep climate risks somehow manageable. This is even more important in the particular case of climate-vulnerable communities and countries. Climate change hits them the hardest. Being on their side to support their survival in dignity is a climate justice imperative. May this manual provide some useful information on how far climate risk financing and climate risk insurance approaches could contribute to reducing climate vulnerability of those most in need.

2 Comprehensive climate risk management

To strengthen resilience and to avoid a downward spiral of increasing climate-induced disasters, comprehensive climate risk management measures need to be established, anchored in an "integrated framework of hazard identification, risk and vulnerability assessment, risk awareness and education, risk management, and disaster response and resilient recovery" (OECD, 2017). Comprehensive risk management strategies, in accordance with the "prevent – reduce – absorb" maxim, are essential to reduce climate risks and vulnerabilities and to enable climate-resilient sustainable development (Bread for the World, 2019). Figure 4 highlights the key steps in a comprehensive risk management approach.

Figure 4: Elements of comprehensive climate risk management

Source: Bread for the World, 2019



Climate risk assessments are essential to identify climate risks, risk-prone areas, and potentially affected people before a natural hazard happens and may turn into a disaster. Thus, risk assessments provide data that can help to prevent a disaster from happening or to reduce possible disaster impacts by providing information on possible risks. Risk assessments guide disaster risk prevention, reduction, and

preparedness measures. To be effective, a climate risk assessment has to provide robust information on both potential hazards, their possible frequency and magnitude, and on risk exposure of the population, their current adaptive capacity, and the main features of vulnerability. Risks are neither a synonym of merely natural hazards nor of socio-economic vulnerability or capacity, but the product of hazard and vulnerability. Hence, risk assessments should make impact chains visible, identify main risk drivers, and classify the risks for the assessment area in risk categories. Climate, meteorological, and hydrological systems and their phenomena, including extreme events, are developing dynamically over time, driven by climate change and influenced to a certain degree by land-use change and environmental management. These dynamic developments can have a significant influence on future risks, either in the near or long term. Therefore, future changes should be incorporated in the risk assessment in order to ensure that risk prevention measures are designed in such a way that people, assets, infrastructure, and livelihoods are not only sufficiently protected against current risks, but also against the foreseeable near- and mid-term future magnitude and frequency of hazards. Thus, risk assessment tools should be able to project future trends.

Climate risk assessments are used to identify climate risks and to estimate possible loss and damage. The requirements of climate risk analyses differ significantly depending on their purpose. Whereas humanitarian organizations need to identify potential hazards and future hot spots of emergency relief as early as possible, development co-operation organizations use climate risk analysis to plan adaptation projects.

The geographical scale (local to global), the forecasting period (short term to long term), the risk assessment (qualitative or quantitative), and the meteorological data basis (ground-level data, satellite data, and data projections from climatic models) differ significantly. However, all approaches are similar in that they attempt to identify climate risks and their possible consequences and costs — at least as far as it is possible in view of the uncertainties linked to forecasting (such as inadequate databases and the limits of climate models with regard to modelling complex and dynamic human–environmental systems). Finally, risk analysis merely forms the foundation for climate risk management and climate risk insurance.

Climate risk prevention involves avoiding loss and damage by eliminating the causes of risk: an ambitious climate protection programme that limits global warming to no more than 1.5°C is the best way of preventing climate-related damage. However, there are many other preventive measures, for instance, the preservation of natural flood lands and vegetation belts that help protect against erosion or the containment of agricultural land in fragile ecosystems (ACT Alliance/Bread for the World, 2017).

Climate risk reduction and disaster preparedness involve measures that limit unavoidable risks as far as possible in order to minimize the damage that occurs. This includes climate adaptation measures, such as the cultivation of crops that are more resistant to drought or the introduction of more efficient irrigation systems. It also includes preventive measures to protect against catastrophes, such as increasing the height of dikes, constructing cyclone shelters against tropical storms, and preparing emergency plans. The establishment and expansion of early warning systems is another important risk reduction measure (ibid.).

Acute disaster management, including civil protection and emergency relief, ensures emergency care can be provided and attempts to keep losses to a minimum after an extreme event has occurred. A rapid response is crucial to effective disaster control and to saving lives (ibid.).

Resilient recovery after or during a climate-related catastrophe focuses on rapid recovery as well as robust reconstruction.

Risk transfer refers to the transfer of the financial costs and the potential future damage caused by climate risks to third parties, either in accordance with the accountability principle (where risk is transferred to the responsible parties), the insurance principle (risk is transferred to the collective of those insured/the insurance company), the solidarity principle (risk is transferred from social protection systems to society/international co-operation), or the humanitarian principle of providing emergency aid (risk is transferred to the world community). In all of these cases, individual risk is at least partially transferred to a collective level in order to restore the individual capacity to act through the provision of material compensation (ibid.).

In the case of insurance, risks are transferred to insurance companies that are contractually obliged to make a disbursement in the event of loss or damage. Insurance companies have to provide the capital to do so themselves. As a rule, they transfer part of the risk they take on themselves to larger insurance pools via reinsurance with broader levels of risk diversification, or they use capital market instruments to limit their own risk.

As shown, climate risk management involves a large number of diverse stakeholders that belong to different entities, pursue different objectives, and are subject to different rules and political reference systems. Disaster preparedness that reflects the SFDRR development policy that is aligned with the SDGs and climate policy that is in line with the Paris Agreement (PA) are linked to one another to some extent (ibid.). Making these linkages visible, bringing down silos, and seeking cooperation across sectors and constituencies are very important prerequisites to making vulnerable communities more resilient and to lowering their risks. FBOs working with these communities should systematically follow this approach, promote it further, and advocate for comprehensive climate risk assessment.

3 Justice, human rights, and pro-poor principles to guide climate risk insurance and financing

The injustice of climate change lies in the undeniable fact that the world's poorest countries and people, which have done the least to cause the climate crisis, are hit the hardest by climate-induced loss and damage, driving them deeper into vulnerability, poverty, and debt. Thus, it is little surprise that the first calls for an international insurance-based risk transfer mechanism for climate-induced loss and damage were raised in 1991 by the Pacific island state of Vanuatu. Even though this legitimate call remained unheard, and whereas the PA that was adopted 24 years later also didn't solve the critical issue of a just burden sharing, there is evolving understanding that the mobilization of finance is necessary to address climate-induced loss and damage — and that the question of when, how, by whom, and through which channels the necessary compensation would be mobilized is a core climate justice concern.

Climate risk insurance and other forms of climate risk financing are crucial elements of climate risk management. They complement risk prevention and risk reduction by compensating for a part of the residual risk that cannot be avoided. Looking at climate risk insurance and risk financing from a climate justice perspective, the biggest challenge lies in the fact that the insurance concept in most cases (unless the insurance premium is paid by a third party) builds on the principle of mutuality: The insured form a pool and mobilize the financial means needed from within the pool, that is, usually no transfer payments are made to the pool from outside the pool. The same is true for most forms of risk financing. The costs have to be covered by those at risk, and the higher the risk, the higher the costs are to be protected from them.

While mutuality can still be seen as a justice principle, there are two more such principles, namely, solidarity and accountability. In both cases, payments to address loss and damage come from outside the pool of those being damaged (Bread for the World et al., 2019).

Solidarity is based on the concept of voluntary payments, that is, without liability, but made out of humanitarian and other considerations. According to the need of countries or people suffering from loss and damage, losses are redressed and thus an act of distributive justice takes place (ibid.). Thus, the application of the pro-poor principles (see figure 5) as well as of humanitarian principles in the context of climate risk insurance and risk financing can be considered a contribution to solidarity as an expression of the climate justice principle.

Accountability or responsibility differentiates from the solidarity principle insofar as the support for those experiencing loss and damage is motivated by a "perceived ethical or legal obligation" (Mechler, 2019). Thus, accountability links the support provided by an actor to their responsibility for direct or indirect causation, by fault or negligence, of outcomes that ultimately led to loss and damage experienced by those receiving the support. This is a case of compensatory justice, because accountability means that those who are responsible for climate-related impacts and risks are ultimately answerable for resulting loss and damage (ibid.). Thus, the application of human rights principles, the gender equality principle, or the polluter pays principle with regard to climate risk insurance or climate risk financing can be considered an integral part of accountability as an expression of climate justice principle.

Closing the gaps in the protection provided to the most vulnerable populations is a fundamental matter of justice. However, it is also an obligation enshrined in relevant international human rights and humanitarian

conventions that applies to all states (ACT Alliance/Bread for the World, 2017). All countries are therefore obliged to mobilize the maximum available levels of resources to assist their populations during emergencies, protect them from human rights violations, and ensure their human rights are respected; this includes their economic, social, and cultural rights. The ratification of the International Covenant on Economic, Social and Cultural Rights has led countries to enter into binding obligations under international law. The UN Social Committee has confirmed that any right derived from the International Covenant contains justifiable grounds that confer individuals with legally enforceable rights and that this applies to all signatory countries (ibid.).

The international community's human rights–based obligations to provide protection in emergencies also apply to climate risk. In fact, the countries that are most vulnerable to climate risk have a right to expect international solidarity as well as technical and financial assistance, provided they have already done everything within their power to respond to the disaster. Furthermore, the people living within these countries also have a right to social protection when faced with emergencies. Subsequently, their countries and the international community must ensure that social security instruments have been put in place to safeguard these people's livelihoods. This could involve creating a framework to provide the poorest and most vulnerable with free access (or at least, access they can afford) to climate risk insurance and thus prevent them from facing emergencies in the first place. The groups at risk should participate in the development of these instruments, and the instruments need to be embedded within a comprehensive resilience strategy and be designed to reflect people's needs. As a human rights issue, climate risk transfer should not exclude any population group, which means it also needs to provide populations that have been marginalized due to their ethnicity, culture, or financial circumstances with access to insurance (ibid.).

It is not enough to make climate risk insurance available: the extent to which insurances help to close the gaps in the protection of vulnerable groups against climate risks depends on the way in which these insurances are structured. The bywords in this regard are a focus on the poor and on vulnerability. Focusing on the poor means that climate risk insurance needs to be designed to effectively protect vulnerable populations against insurable climate-induced loss and damage; focusing on vulnerability means that vulnerability needs to be defined before target groups are identified and subsequently reached by the insurance scheme in question.

In order to benefit marginalized, resource-poor, and climate-vulnerable people, climate risk insurance needs to be designed in a sustainable and pro-poor way that makes it accessible, affordable, and valuable to them. The Munich Climate Insurance Initiative (MCII), a non-profit think tank specializing in climate protection insurance, developed seven principles for poverty-focused climate risk insurance (see figure 5). Such solutions will not be provided at larger scale by the market alone, but rely on enabling environments, promotion, and support, particularly including premium support, provided by governments and development partners. So far, these conditions are under initial development in some countries, in particular with regard to ARC and the Rural Resilience Initiative (see page 40), but not yet fully developed in any of them.

ACT Alliance, its members, and other FBOs work with marginalized communities at the forefront of climate change. Knowing their capabilities as well as their specific capacities, FBOs have a huge potential to serve as bridge- and trust-builders, linking communities with state authorities, insurers, and development

partners, and thus facilitating the development of climate risk finance and insurance solutions that are designed in a truly pro-poor way and that benefit climate-vulnerable people.

Figure 5: Seven principles of poverty-focused climate risk insurance

Source: ACT Alliance/Bread for the World, 2017

Seven principles of poverty-focused climate risk insurance

First principle: Needs-based solutions embedded within comprehensive climate risk management
Insurance to protect the poor and vulnerable population from extreme weather events must be tailored to local needs and conditions. It is imperative that insurance is embedded with comprehensive climate risk management strategies that improve resilience.

Second principle: Client value
Providing reliable coverage that is valuable to the insured is crucial for the widespread take-up of insurance products.

Third principal: Affordability
Measures to increase the affordability of insurance for poor vulnerable people are paramount to the success of insurance schemes and to satisfy equity concerns.

Fourth principle: Accessibility
In order for insurance to reach people promptly and efficiently, they must reflect the local context and use coast effective distribution channels, such as existing cooperatives and self-help groups.

Fifth principle: Participation, transparency, and accountability
Successful insurance schemes are based on transparency, accountability, and the meaningful involvement of (potential) beneficiaries and other relevant local level stakeholders in the design, implementation, and review of insurance solutions. This creates trust and provides a basis for local ownership and political support.

Sixth Principle: Sustainability
Safeguarding economic, social, and ecological sustainability is crucial to the long-term success of insurance solutions.

Seventh principle: Enabling environment
It is vital to actively build an enabling environment that accommodates and fosters pro-poor insurance solutions. This particularly includes establishing legal frameworks, state regulation, and insurance monitoring.

The pro-poor principles provide firm basis with which to develop insurance products for vulnerable populations living in poverty. The next step would be to expand the principles, but this would have to be done in a manner that specifically reflected the particular form of insurance. Therefore, it would be useful to continue assessing the experiences that have been made with various climate risk insurances until now. However, since almost all existing insurances are quite new, and relatively few claims have been made to insurers, this learning process will continue for several years. Finally, all stakeholders, including civil society, should be involved in the process.

Adapted from MCII, 2016a, p.31

4 Climate risk insurance

The role of climate risk insurance in redressing loss and damage

There are numerous types of climate risks. They vary with regard to magnitude and frequency, the level of certainty of occurring, and the nature of the risk, be it extreme events like drought, flood, or hurricane, or risks related to slow-onset changes, such as sea level rise. The same level of variability also applies to the losses and damages caused by climate disasters. They vary with regard to the level of severity, the frequency, and the type of loss, be it economic (for instance, loss of assets, crop, or livestock) or non-economic (for example, loss of life, biodiversity, culture, or territory).

There is no "one fits all" approach to redress loss and damage caused by climate disasters. Accordingly, climate risk insurance is not a magical solution. From an economic perspective, insurance approaches are most suitable to transfer risks of low frequency but moderate to high severity, that is, risks that cannot be shouldered by those affected if a climate disaster strikes. Losses of high frequency but low severity, in contrast, cannot be insured in a cost-efficient way. Due to the certainty of occurrence, the cost of insurance, called a premium, would be very high, that is, almost at the level of the sum insured. In these cases, other measures, such as risk reduction through adaptation (for example, changing to more drought-tolerant species in the case of dryness-related risks) or saving schemes, are more cost efficient.

Climate risk insurance is not a magical solution. It cannot be used to compensate for losses from events that will happen with certainty, such as sea level rise. However, if integrated in a comprehensive risk management strategy, it could serve as a highly relevant means to reduce vulnerability and improve resilience in situations of acute, climate-induced crisis. Despite this potential, climate risk insurance does not yet play a major role in disaster risk response, social protection, food and nutrition security and agriculture policy frameworks, and programmes in most climate-vulnerable countries.

In order to keep loss and damage and the costs of risk transfer as low as possible, it is essential to take all reasonable measures to mitigate risks. Doing so normally leads to a considerable reduction in the damage that is caused in the event of a disaster. To select the most cost-efficient climate risk transfer instrument, and to decide whether an insurance is appropriate, the so-called climate risk layering approach is used. The main selection criteria for risk layering are the frequency and the severity of disasters. Usually a bottom-up approach is suggested. The government, the community, or the individual household creates savings to deal with relatively frequent but less-severe events (low-risk layer). Climate risk insurance, social security nets, credits, and donor assistance are most appropriate to deal with moderate, less-frequent risks (medium-risk layer). Risks of high severity and very low frequency should best be transferred to climate risk insurance, including regional insurance pools (high-risk layer) (MCII, 2016a; World Bank Group, 2017a).

Types of climate risk insurance

Climate risk insurance is a tool set that helps people, enterprises, or countries cope with the consequences of extreme weather or hydrological events by providing a financial safety net.

By definition, climate risk insurance is a means of protection from financial loss caused by extreme climate events. It is a form of risk management, primarily used to hedge against the risk of a contingent or uncertain loss. Insurance is a contract, represented by a policy, in which an individual or entity receives financial protection against losses from an insurer. The person or entity who gets insurance coverage is called the policyholder. The policyholder pays a premium to the insurer in exchange for the insurer's promise to compensate the policyholder in the event of a covered loss.

There are significant differences in the types of losses that insurance policies can cover. The range extends from agricultural losses (for example, crop loss, loss of livestock) to financial loss insurance and insurance for buildings and other infrastructure. At the same time, insurable risks are also product specific. Droughts, floods, heavy rain, hail, and storms are the most commonly insured risks, and these may also be combined with geological risks (volcanic eruptions and earthquakes). Insurance can provide cash payments or goods, such as food aid. Supplementary services, such as consultancy or non-cash benefits like seeds or 48-hour emergency packages, may be supplied in addition to cash payments when a claim is triggered.

Parametric or index-based climate risk insurance

In the case of parametric or index-based insurance, a claim is triggered automatically if certain indicators (usually meteorological indicators, such as the length of a dry period, the quantity of rain, or wind speed) defined in the policy are reached or exceeded at the measurement site. Index-based insurance that works with data gathered about extreme weather events can, assuming this data is available, be combined with models of estimated levels of damage.

Advantage of parametric climate risk insurance: The majority of insurance products supplied to developing countries (measured by the number of policyholders) are index-based because they cost significantly less. At the same time, index-based insurance policies often lead to faster disbursements because they do not require elaborate and time-consuming estimates to be made of the actual level of damage that has occurred (ACT Alliance/Bread for the World, 2017).

Disadvantage of parametric climate risk insurance: As index-based insurance usually provides no coverage for the underlying basis risk (that is, a damage is happening due to a weather event that is below the indicators, so no trigger is touched), it results in a gap in protection. The size of the basis risk depends, on, for example, the way in which the indicators that trigger a disbursement are defined. In addition, and this is often closely linked to the problem of basis risk, many regions also face problems with data collection due to the lack of a closely meshed network of measuring stations. In these cases, satellite data can be used instead. In principle, this is a valuable approach because the alternative of establishing a network of terrestrial meteorological measuring stations is both costly and time-consuming. However, this approach is less accurate and more error-prone because instead of relying on actual measurements of the situation on the ground, it relies on simplified models to simulate a complex reality. Nevertheless, by continuously improving the models that are used, errors can be reduced to lead to improved risk assessments (ibid.).

Indemnity-based climate risk insurance

In the case of indemnity-based insurance, the actual loss of the policyholder, as covered by the insurance, is being compensated. In this case, the measurement of the damage is more accurate, and the compensation provided by the insurer covers the total loss, up to the maximum of the insured amount. This requires a more complex and thus more expensive and time-consuming process. It may take months to verify the damage through experts of the insurer and the respective costs increase the premium as compared to an index-based insurance. This makes these insurance products hardly affordable and accessible for poor and marginalized climate-vulnerable communities.

Micro- and meso-level insurance

Micro-level insurance directly insures private individuals or micro-, small-, and medium-size companies. Micro-level insurance involves a direct contractual relationship between the policyholder, such as a farmer who is compensated for loss or damage, and the risk-taking entity, usually an insurance company. In Europe and North America, direct climate risk insurance, whether property insurance or, as is often the case, agricultural insurance to cover crop failure, is common in agriculture and fishing, as these sectors are the most affected by climate risk. However, insurance is almost unknown in developing countries, particularly among small-scale farmers (ACT Alliance/Bread for the World, 2017).

Meso-level insurance provides insurance to intermediaries, such as co-operatives, rural development banks, and microfinance institutions. In this case, members, customers, and suppliers of intermediaries benefit from risk protection, for example, by having their loans secured against loss in the event of a disaster (ibid.).

Macro-level insurance

Macro-level insurance directly insures states (and indirectly insures vulnerable populations) against damage to critical infrastructure or against crop damages, as is the case of the regional risk pools described below. In these cases, the policyholder — and therefore the institution that pays the premium — is generally a country or a state institution. However, in the event of a claim, the payout is often bound to be used for pre-described relief and rehabilitation measures for target groups, such as poor, rural populations.

Macro-level insurance is particularly attractive to vulnerable countries with scarce financial reserves. In the event of a disaster, climate risk insurance can provide rapid liquidity and thus enable emergency aid to be distributed quickly, and it can also fund reconstruction measures. ARC, which is described below, is a good example. In order to take out insurance, prospective policyholders have to submit a contingency plan in accordance with guidelines drawn up and overseen by ARC. These guidelines are intended to ensure that insurance products benefit the parties affected in the best possible manner. Contingency plans also need to state exactly how disbursed funds are to be used in the event of a disaster. In addition to other aspects, they also need to include the preparation of risk, vulnerability, and needs analyses, as well as proposals for improved risk reduction and a review of national risk management structures. They often need to identify the areas in which work can be conducted jointly with domestic social protection systems in order to provide them with additional resources in the event of an emergency and benefit the affected population (ibid.).

Examples of climate risk insurance at micro or meso levels

In this chapter, we will briefly present examples of direct climate risk insurance schemes across developing countries. While climate risk insurance by and large still remains a niche product, with very little coverage in the huge majority of countries, it is notable that the range of climate risk insurance products has significantly increased over the last couple of years. On the one hand, that can be attributed to initiatives like InsuResilience (see below). On the other, it reflects growing climate-induced losses and the desire to be better protected.

Africa

The African continent is severely vulnerable to the advancing effects of the climate crisis. Due to its geographical position, the continent is highly affected by a magnitude of adverse impacts. At the same time, many countries in Africa only have limited capacity to adapt or mitigate climate-induced changes (UN Environment Programme, 2019). Thus, the climate crisis has severe impacts on the food and water security of the continent. For example, between 75 million and 250 million people in Africa are projected to be in heightened water distress in the year 2020 (ibid.).

The climate crisis impacts economies, especially threatening the livelihoods of the most vulnerable populations. The Gross Domestic Product (GDP) in the region is expected to face an annual loss of 2 to 4 percent by 2040, while countries are similarly confronted with immense costs for adaptation (ibid.). Agricultural production will also be severely affected by the impacts of climate change, for example causing a reduction of up to 50 percent of yields from rain-fed agriculture (UN Africa Renewal, 2019 and UN Environment Programme, 2019).

This is especially likely with strong increases of drought and high temperatures in the region, making it drier and more prone to heat waves. It is also very likely that climate change will have increasing impacts on the spread of pests and diseases for crops and livestock (IPCC, 2014). In view of these manifold and very concerning challenges, the interest in climate risk insurance is growing. Some of the most prominent examples are briefly introduced hereafter.

Rural Resilience Initiative (R4)

Type:	Index-based weather insurance
Countries:	Ethiopia, Kenya, Malawi, Senegal, Zambia, Zimbabwe
Total sum insured:	$10.3 million US dollars
Payouts total:	more than $2.4 million US dollars
Beneficiaries:	87,557 insured R4 farmers, out of which 55 percent are women

(World Food Programme and Oxfam, 2018a)

R4 is an interesting example of a micro insurance scheme that specifically tries to support the most vulnerable populations. Initiated by the World Bank and Oxfam, and currently intensively promoted by the World Food Programme (WFP), the programme aims to support communities that are faced with food

insecurity due to the rising intensity and frequency of climate events in Ethiopia, Kenya, Malawi, Senegal, Zambia, and Zimbabwe.

When disaster arises, the compensation of R4 is supposed to help farmers sustain their living without having to sell their production assets, thereby stimulating fast recovery. Because the mechanism offers protection to farmers in case of a bad season, it also facilitates investments by farmers to build a more profitable enterprise, for example, by allowing them to buy new seeds, fertilizers, or technologies (WFP, 2019).

A key feature of the R4 initiative is that it specifically aims to provide support to the most vulnerable part of the population. In order to do so, the initiative actively works to include their potential insurance holders in the design of the programme. For example, R4 has formed local design teams that include farmers to consult on their needs and to give feedback on insurance contracts. As a result, farmers are able to voice their specific needs and express their individual risks. This serves as a basis to customize coverage and frequency of payout and to create fitting indices for insurances. Once an index is developed, it is then given back to farmers for evaluation before it serves as a basis for an insurance product (MCII, 2016a).

Another method the R4 insurance initiative uses to facilitate the participation of the most vulnerable populations is the possibility of receiving insurance coverage not only for premium payment, but also through work. Low-income farmers can receive weather index insurance coverage by working in community projects aiming at risk reduction, for example, by improving irrigation or soil management. This possibility has experienced a high demand, beyond what the scope of the programme was able to provide. This high interest underlines the importance of affordability of climate insurance (MCII, 2017; MCII, 2016a).

As part of its integrated approach, R4 also aims to solve the problem of high basis risk, which can occur due to mismatched triggers. In order to address this challenge, R4 tries to improve the use of automated weather data and offers capacity-building measures to communities. However, in order to be effective, capacity building will ultimately have to be complemented by financial support measures to build new weather data collection stations (InsuResilience Global Partnership, 2019a). Further information on the R4 approach, which aims to integrate four risk management strategies, can be taken from the boxes below.

R4 aims to integrate four risk management strategies into its approach:

1) **Risk reduction:** R4 incentivizes people to identify central risks for their community and actively work for risk reduction, for example, by improving the management of natural resources or changing agricultural methods and practices. These methods include techniques to support small-scale water harvesting or to increase soil moisture retention, which reduce risks for farmers and increase crop production at the same time. Consequently, these risk-reduction activities not only serve farmers directly, but also decrease the premium for the weather insurance due to the lowered risk.

2) **Risk transfer:** R4 offers weather index insurance even to low-income farmers. The aim is to secure quick financial support in case of a natural event in order to allow farmers to keep their assets and quickly rebuild what has been lost.

3) **Prudent risk taking:** Another important component of R4 is the improved access to credits for low-income farmers, who are otherwise often not eligible for a loan. With a credit option and an increased security of food and assets, farmers are able to rebuild and invest in new production assets, such as technology or seeds.

4) **Risk reserves:** Lastly, R4 encourages policyholders to build financial savings both as individuals and in the community group. These savings can buffer shocks and short-term financial needs and therefore serve as a self-insurance mechanism within the community.

(Oxfam, 2018a; InsuResilience Global Partnership, 2019a; World Food Programme and Oxfam, 2013)

The R4 initiative is one of the few insurance schemes that actively supports gender equality. Many other insurance schemes are gender blind and may even end up excluding women as beneficiaries. R4 has found positive impacts of its strategy on food security and production for female-headed households in Ethiopia and positive effects on women's decision-making power and credit eligibility in Senegal (World Food Programme, 2019; Oxfam, 2018a).

R4 in Ethiopia

Insured farmers in Ethiopia show an increased resilience, for example, by accumulating savings about twice as much as farmers without insurance. Investments in seeds, fertilizers, and productive assets by farmers under the R4 scheme also have risen. *(MCII, 2016a)*

In order to ensure the fit to different regional contexts, R4 is working with existing local structures and networks. R4 is not only engaged in public–private partnerships, but also cooperates with civil society

organizations, community institutions, and local non-governmental organizations (NGOs) in a multi-stakeholder process. These partnerships help R4 to scale up and to establish ties to and trust within communities, which otherwise takes a long time to build (MCII, 2016a).

R4 in Senegal

Since its launch in Senegal, around 10,000 farmers have received a payout of a total of $418,000 US dollars. Around 9000 farming households (45,000 people) were insured in 2018 alone (InsuResilience Global Partnership, 2018). The R4 scheme has succeeded in protecting farmers from adverse effects of shocks in two consecutive years by stabilizing their level of food security. In times of hardship, the decrease of food consumption was limited to 4.7 percent for insured farmers, compared to 49.1 percent for non-insured farmers (MCII, 2016a). Insured households also seem to be more confident to invest more in agricultural tools and inputs. The programme also has a positive impact on women's empowerment and inclusion. *(Oxfam, 2018a)*

Index-Based Livestock Insurance

Type:	Index-based livestock insurance
Insured events:	Drought
Countries:	Ethiopia, Kenya
Average premium cost:	3.25–5.5 percent
Total sum insured:	$1.63 million US dollars
Payouts total:	$34,000 US dollars
Beneficiaries:	3666 pastoralists

(Index Insurance Forum, 2019a; IBLI, 2019)

Index-Based Livestock Insurance (IBLI) is another micro-insurance scheme that offers donor-funded, index-based drought insurance. It started in the arid and semi-arid lands of northern Kenya, which are especially prone to water scarcities. For example, in 2011, one of the worst droughts in the country's history killed up to 30 percent of northern Kenya's livestock (Index Insurance Forum, 2019a). Since its initial launch in 2010, IBLI not only has expanded within northern Kenya, but is also available in southern Ethiopia (Index Insurance Forum 2019a, ILRI, 2019).

IBLI caters to pastoralist communities, which are often highly dependent on their livestock. The programme aims to design, develop, and implement market-mediated products to protect livestock keepers from the devastating effects of severe drought (CTA, 2018). The trigger, or the index, of the insurance is based on satellite images, which depict the availability of forage in a particular season. IBLI has also incorporated data on livestock mortality to estimate the impact level of drought in a region. However, due to expansion into areas where livestock mortality data is insufficient, in some regions the index now relies on satellite

data only (IBLI, 2019). If a weather event triggers the threshold of forage loss or livestock mortality, a payout is made to the pastoralist, which is proportionate to the number and type of animals insured and the severity of forage loss or expected herd loss in the area (ILRI, 2019).

The programme co-operates with Mercy Corps, World Vision Kenya, and CARE on the ground and tries to offer insurance protection and capacity-building activities fitted to the needs of pastoralists. IBLI also partnered with the World Bank Group and the Government of Kenya to launch a separate insurance, the Kenya Livestock Insurance Program (KLIP) in 2015. KLIP essentially made it possible to scale up the IBLI scheme, even though both remain as separate products (see https://ibli.ilri.org/ibli-kenya). The aim is to offer training that improves understanding about IBLI and insurance products more generally (IBLI, 2019). Another successful instrument is the offline sales tool for mobile phones, which is offered by IBLI (Index Insurance Forum, 2019a).

Recent evaluation research on the impact of IBLI has found that households with purchased insurance are 33 percent less likely to be forced to reduce their food consumption after a catastrophic drought. Furthermore, in households with insurance, the sales of assets in times of distress dropped by 50 percent and the reliance on food aid dropped by 33 percent (Index Insurance Forum, 2019a; MCII, 2016a). This illustrates that IBLI has a positive impact on food security. Pastoralists with IBLI also seemed to increase their investments in livestock veterinary and vaccination services and changed their production strategies, which led to an increase in livestock's milk productivity and the value of milk produced (MCII, 2016a).

However, the programme also faces challenges: Pastoralists live very remotely and geographically dispersed and move seasonally. Furthermore, many potential clients are unaware or mistrusting of insurance or are illiterate and innumerate (ILRI, 2019). The scheme also might not actually support the most vulnerable populations. A recent evaluation concluded that the beneficiaries are often those vulnerable but not poor. Compared to the poorest herders, whose assets are too small for the insurance scheme, the vulnerable-but-not-poor pastoralists usually own herd sizes that are just above the critical poverty line. The insurance scheme can protect them from falling into poverty after a severe incident of drought, but seems to be unable to address the most vulnerable (MCII, 2017).

Asia-Pacific

The Asia-Pacific region will be severely affected by climate change. Due to the large population in Asia and extreme urbanization, along with the frequency of natural disasters, the region is said to belong to the most vulnerable to climate change (*South China Morning Post*, 2019; *Financial Times*, 2018).

The location of many of the mega cities in Asia (for example, Shanghai, Mumbai, Ho Chi Minh City, Jakarta, Singapore) in low-lying coastal areas makes them highly susceptible to the impending sea level rise (*Financial Times*, 2018). A sea level rise of 1 metre in China, for example, would put at risk a population of 23 million people, while a rise in 3 metres would affect 52 million people (*South China Morning Post*, 2019). Many Southeast Asian nations are similarly vulnerable to sea level rise, as are the Pacific Island nations (IMF, 2018).

The unfolding of climate change will also impact extreme weather events in the region. For example, cyclones and typhoons will become stronger due to increased temperatures at sea (*South China Morning Post*, 2019). This will have an increasing impact on human health, livelihoods, and security, especially for vulnerable groups. Rising temperatures will leave the future coolest months warmer than the hottest summer months between 1951 and 1980 (IMF, 2018; IPCC, 2014).

Of course, the climate crisis will have an enormous impact on the economy in the region. Already, disasters have an immense economic cost. Between 2007 and 2016, average damages from natural hazards were estimated at $76 billion US dollars a year (*Financial Times*, 2018). Recent financial models found that for Southeast Asia, for example, climate change could reduce the region's GDP by 11 percent by the end of the century (IMF, 2018).

The agricultural branch of many Asian economies will also be affected by the climate crisis. Agricultural productivity, especially with regards to rice farming, is expected to decline (IPCC, 2014). Sea level rise will impact low-lying deltas in South and Southeast Asia, where around 88 percent of the world's rice supply is produced (*South China Morning Post*, 2019). For example, by the year 2100, rice yields in Indonesia, the Philippines, Thailand, and Vietnam could drop as low as 50 percent of 1990 production levels (IMF, 2018).

These changing framework conditions make resilience-building and climate risk management — with climate risk insurance part of it — a growing necessity in the Asia-Pacific region. Some instructive examples are shown below.

Bangladesh Flood Index Insurance Program

Type: Index-based flood insurance
Countries: Bangladesh
Beneficiaries: over 1600 poor households

(MMS, 2019; Swiss Re, 2014; Oxfam, 2013)

Oxfam launched the index-based Bangladesh Flood Insurance scheme in 2012, in co-operation with the private sector and meso-level institutions. The insurance coverage extends over the river basin areas of Sirajganj, a flood-prone region, and includes 1660 poor and vulnerable households in ten villages (Swiss Re, 2014). The policyholder of the index insurance is actually a local NGO, Manab Mukti Sangstha (MMS), which is working against poverty, social inequality, and the effects of natural catastrophes (MMS, 2019). Once the trigger is reached, MMS receives a payout that it then distributes among the households that fulfill the compensation criteria (Swiss Re, 2014; Oxfam, 2013). The final beneficiaries mainly consist of poor and extremely poor households, including those that are headed by widowed or abandoned women and those that depend upon daily wage labour and do not own land (MCII, 2016a).

Since flood loss data and models are scarce and expensive, potential risks models and the resulting premiums are hard to calculate. As a solution to this problem, the scheme uses a model that merely predicts the level of flood water, rather than the losses. This form of modelling is cheaper and faster than a damage model, and it similarly functions as a trigger for the insurance. Payouts are staggered with regards to the level of flood water and the duration of the flood (Oxfam, 2013; Reliefweb, 2014). Both the direct index of the insurance and the meso-level structure of the insurance coverage simplify administrative work and therefore increase the affordability of the insurance (Swiss Re, 2018). Insurance payouts have been found to assist beneficiaries with immediate liquidity problems after a flood has occurred, which lowered the distressed sales of the labour and productive assets. Payouts are usually used to undertake repairs of damaged properties for farming, vegetable or poultry cultivation, which can provide affected households with another source of income and ultimately foster resilience (MCII, 2016a).

In 2014, floods caused severe damage to multiple villages in the region, which triggered a payout to MMS for more than 700 affected households in four villages, amounting to 1,982,400 Bangladeshi taka (25,000 US dollars).

(Swiss Re, 2014; Swiss Re, 2018)

Despite these positive impacts, the flood insurance scheme still faces challenges. For example, the current product design needs development and fine-tuning in order to fit the needs of MMS. There are also challenges related to affordability, with poor households being unable to pay the premium. Floods also regularly affect the region, which is why it has to be critically evaluated, if an insurance scheme is the right form of risk transfer (MCII, 2016a).

Sanasa Insurance

Type:	Index-based weather insurance
Countries:	Sri Lanka
Average premium cost:	≈ 8.5 percent of the sum insured
Beneficiaries:	50,000 farmers

(InsuResilience Investment Fund, 2018)

The SANASA Insurance Company Ltd., in co-operation with the Global Index Insurance Facility (GIIF), has been offering an index-based weather insurance to tea and paddy farmers in Sri Lanka since 2011. SANASA is a network of credit and saving societies working toward raising living standards for poor Sri Lankan communities, with a focus on rural areas. The company's co-operative network spans across Sri Lanka and includes nearly 8400 savings and credit institutions. The SANASA network also consists of around 400,000 members, out of which around 47 percent live on less than 50 US dollars (5000 Sir Lankan rupees) a month (ILO's Impact Insurance Facility, 2017).

So far, SANASA's index-based crop insurance programme has reached about 50,000 farmers to offer them a financial backup in case of severe drought and heavy rainfall (Index Insurance Forum, 2019c; InsuResilience Investment Fund, 2018). To further increase the attractiveness for farmers, SANASA has started to offer bundled services, which, besides their crop insurance, also incorporate property, life, or health insurance (MCII 2016; InsuResilience Investment Fund, 2018). Premium payments and triggers are calculated by a loss approximation, including a burn analysis. This means that the basis for a risk model is calculated by looking at how the insurance would have performed in previous years. Together with the data of weather stations, insurance premiums for regions are calculated (InsuResilience Investment Fund, 2018). A big challenge for this index-based insurance programme is the high premium cost, which has hindered farmers from purchasing insurance. The programme is exploring premium subsidies and a programme redesign to lower premium costs (Index Insurance Forum, 2019c; World Bank Group, 2017b).

Recently, SANASA announced a planned co-operation with Oxfam in Sri Lanka, Etherisc, and AON Plc, to release a new form of weather insurance, which operates through block chain technology (AON, 2019).

This insurance aims to provide a more affordable coverage to farming communities (Oxfam, 2019a; Oxfam 2019b). The increased inclusion of the private sector and financial organizations is supposed to help the insurance scheme to offer coverage even for complicated disaster scenarios at an affordable price (Oxfam 2019b). Another hope is that the digitalization of insurance processes simplifies the claims process. An automated mechanism is supposed to start a payment process, which means that farmers should receive money within two to four weeks (Oxfam, 2019a). Weather stations set up by Oxfam are also able to communicate rainfall data in real time via SMS, allowing full transparency to both the insurance provider and the beneficiaries (Oxfam 2019b).

NAIS, mNAIS, WBCIS, and PMFBY

Type:	Index-based crop insurance
Countries:	India
Average premium cost:	subsidized between 30–75 percent by government
Beneficiaries:	more than 3 million farmers

The agricultural sector in India has faced many struggles over the last years, both financially and socially. The Indian government has responded to those needs by, among other things, heavily investing in the establishment of an insurance structure. These efforts have allowed India to develop one of the best-established and most dynamic agricultural micro-insurance programmes in the world (Oxfam, 2018a). In 1999, the traditional public Comprehensive Crop Insurance Scheme (CCIS) programme was replaced by the National Agriculture Insurance Scheme (NAIS). NAIS offered an index-based insurance against yield loss for all major crops. The index was tracked at a sub-district level. The programme itself was subsidized by the government and was offered through the state-sponsored Agriculture Insurance Company of India (AIC). If farmers wanted to take out credit from state banks, the purchase of the insurance was mandatory. In the year 2011–12, 16 million farmers were insured through NAIS, which is about 15 percent of the total number of farmers in India. Despite the spread of the scheme, NAIS experienced some difficulties in administration and financing, which were the reasons for increasing delays in the payouts of NAIS (GIZ, 2016).

To tackle these problems, the modified National Agriculture Insurance Scheme (mNAIS) was introduced. Like its predecessor, mNAIS is an index-based insurance scheme to cover crop losses. Among other things, the scheme changed the insurance unit from sub-district to villages, which lowered the basis risk. mNAIS also raised the trigger level of yield levels for payouts and expanded the coverage to include failed planting and post-harvest loss (GIZ, 2016). The new scheme is also subsidized by the government and was offered parallel to NAIS until 2015, when NAIS was discontinued (Oxfam, 2018b).

Besides the aim of giving farmers the opportunity to invest in progressive farming practices, mNAIS also incentivizes risk reduction behaviour (MCII, 2016a). For example, if all farmers in a unit adopt better water conservation techniques and employ more sustainable farming practices, these clients receive a discount on their premiums (MCII, 2016a; MCII, 2016b).

In 2003, the Indian government also introduced a weather-based crop insurance (WBCIS) as a pilot project. Since 2007, WBCIS is offered as a private-sector alternative to the state-offered insurance schemes. WBCIS insures a range of climate risks and around 40 crops. The premium is subsidized by the state by 30–75 percent, depending on the crop and state (InsuResilience Investment Fund, 2018; GIZ, 2016). In 2014–15,

WBCIS covered 9.6 million farmers and insured a total sum of 2.3 billion US dollars (InsuResilience Investment Fund, 2018).

Since 2016, a new crop insurance scheme, the Pradhan Mantri Fasal Bima Yojana (PMFBY), which literally translates to "Prime Minister's Crop Insurance Scheme," is available. It has replaced both NAIS and mNAIS and is offered parallel to WBCIS (InsuResilience Investment Fund, 2018). Even though PMFBY also supports farmers to access credits, even in the case of crop failure, it might not be able to tackle underlying problems in the agricultural sector, such as the increasing production costs, the small profit margins of farmers, the lack of rural social banking systems, and the loss of subsidies for fertilizers and seeds (Oxfam, 2018a).

IBLIP

Type:	Index-based Livestock Insurance Program
Countries:	Mongolia
Payouts total:	3.2 billion Mongolian tughriks (1.17 million US dollars) (2006–2015)
Beneficiaries:	10,000 – 18,000 herders (as of 2015)

(Mongolian Re, 2019)

The Index-Based Livestock Insurance Program (IBLIP) was established in 2005 as an effort of the government of Mongolia, with the financial support of the World Bank. Since 2014, the donor-funded project has transitioned into a private company, which is designed as a public–private owned reinsurance company (CGIAR, 2015).

IBLIP aims to support herders in times of severe herd loss caused by extreme climate events. The base for the insurance is the livestock mortality rate per district and species, which is calculated from the data collected in the annual Mongolian livestock census in December and the livestock losses survey conducted by the National Statistical Office in June each year (CGIAR, 2015).

In the winter period, the extreme weather event Dzud (a severe, cold, and snowy winter, often following a hot and dry summer), which occurs approximately every five to eight years, can result in high livestock mortality. Unsurprisingly, the most vulnerable and poor often lack the resources to mitigate, which leaves them the most susceptible to these severe weather events (CGIAR, 2015). IBLIP, therefore, aims to provide herders with financial security, which helps to mitigate or bridge these significant livestock losses (CGIAR, 2015). The policies are sold between April and June and cover the loss of livestock the first half of the following year, when more than 80 percent of livestock losses occur (DIW, 2018; CGIAR, 2015).

A special feature about IBLIP is the risk layering approach. If livestock losses are small (below 6 percent), farmers have to absorb the resulting costs. Larger livestock losses (between 6 and 30 percent) are covered by a private insurance company, the Livestock Risk Insurance (LRI). Farmers have to purchase a base insurance product from this commercial, private insurance at a full price to receive the payouts for losses (GlobalAgRisk, 2007). They can firstly purchase protection for one or more of the five most common livestock animals, namely sheep, goats, cows, horses, and camels. IBLI clients can also decide on the insurance value, which means they can choose the percentage of the value of their herd they would like to

insure. On average, farmers chose to insure around 30 percent, which shows that herds are generally under insured (DIW, 2018; CGIAR, 2015; MCII, 2017).

The third layer of coverage is called Government Catastrophic Coverage, which offers a social safety net to its clients, the disaster response product (MCII, 2016a). In case of catastrophic losses (exceeding 30 percent), the national government of Mongolia takes responsibility. Until 2008/2009, herders were able to access the Government Catastrophic Coverage as a stand-alone measure. Now, however, it is only available in combination with the Livestock Risk Insurance (CGIAR, 2015).

Overall, this public–private partnership is seen to be highly successful (MCII, 2016a; MCII, 2017). IBLIP has also succeeded in offering improved access to credits to its beneficiaries, who are being offered loans at a decreased interest rate (MCII, 2016a). Herders with IBLIP also seem to recover faster from a shock and its induced losses and appear to show better and more sustainable coping strategies and reduced distress (MCII, 2016a).

In spite of these positive results, IBLIP's impact seems to be limited to wealthy and very wealthy farmers (CGIAR, 2015; MCII, 2016a). Insurance is mainly purchased by herders with more than 350 livestock, which indicates that IBLIP was not successful in supporting the most vulnerable populations in Mongolia. Rather, evidence suggests that the programme even exacerbated inequality (Oxfam, 2018a; MCII, 2016a).

ClimateRe

Type: Index-based crop insurance
Countries: Nepal

(InsuResilience Global Partnership 2018 and 2019a)

An insurance programme that is currently being developed is the ClimateRe initiative "Enhancing the resilience of smallholder rice farmers in Nepal" (InsuResilience Global Partnership, 2018). The initiative won the A2R (Anticipate, Absorb, Reshape) InsuResilience Absorb Contest in 2018 with its proposal to develop a two-tiered crop insurance system in Nepal (InsuResilience Global Partnership, 2019a).

The idea is to establish a community-managed insurance for smaller events and a pooled group risk insurance for more severe damages (InsuResilience Global Partnership, 2019a). In this system, the community insurance would offer quick and efficient help without involving any external insurance company. Communities would design the community insurance risk coverage on their vast ground experience and direct insights into their communities (InsuResilience Global Partnership, 2019a). The larger group insurance would allow communities that otherwise would not have access to an insurance market to receive coverage against large weather events with affordable premium rates (InsuResilience Global Partnership, 2019a; Climate CoLab, 2018).

ClimateRe also aims to link insurance to a broader and comprehensive approach to build climate resilience by fostering climate adaption and value-chain development (InsuResilience Global Partnership, 2018). For the implementation of these aims, ClimateRe has developed a system of three work packages. The first aims to develop a climate toolbox, which helps farmers to adapt to climate-related changes. It includes measures to foster climate-resilient rice cultivation, for example, through developing reliable irrigation or

using healthier seeds (Climate CoLab, 2018; Climate MIT, 2018). The second focuses on a customized value chain development strategy, for example, by developing measures to support labour, improve farmers' access to markets, and make the marketplace fairer (Climate CoLab, 2018; Climate MIT, 2018). The last work package includes the two-tiered insurance system to help the communities cope with the adverse effects of climate change (Climate CoLab, 2018; Climate MIT, 2018).

The project also aims to fully include farmers in the process, both in the development, implementation, and management of the community-based insurance, as well as in the mitigation training of other farmers (Climate MIT, 2018). Furthermore, a special focus will be put on including marginalized groups (for example, Dalits) and women to combat social inequality in the field of rice cultivation. This will be implemented by reserving 50 percent of the participation for members of these disadvantaged groups (Climate MIT, 2018).

So far, the project has started a pilot with five communities of smallholder rice farmers to understand and develop the insurance project (InsuResilience Global Partnership, 2019a; Climate MIT, 2018).

Latin America and the Caribbean

Latin America and the Caribbean are already severely affected by the effects of climate change. The Caribbean nations make up about half of the 39 members of the Association of Small Island States. Especially for them, a severe danger is the rising sea level, which displaces people and leads to coastal erosion, a loss in livelihoods, and a collapse of costal eco-systems, such as the bleaching of corals (UNDP, 2019). It is also observed that the occurrence of severe weather events changes. For the future, tropical cyclones, severe floods, and other intense weather events are expected to occur more frequently and forcefully (Association of Caribbean States – ACS, 2019). Predictions also forecast that the region will become drier, with rainfalls decreasing, particularly in the summer. Coupled with the deterioration in water quality due to saltwater intrusion and forest depletion, the climate crisis will endanger agricultural production (UNDP, 2019; FAO, 2019). Because the agricultural sector is the second most important source of employment and is highly important for ensuring food security for island nations, climate change will also have severe economic impacts in the Caribbean and in Latin America more broadly (ACS, 2019; UNPD, 2019). Thus, climate resilience building and risk management become increasingly relevant, with climate risk insurance an important part of it.

Livelihood Protection Policy (LPP), developed by CRAIC and promoted by CCRIF SPC

Type:	Index-based weather insurance
Countries:	Belize, Grenada, Jamaica, Saint Lucia, Trinidad and Tobago
Average premium cost:	13 percent of maximum payout
Beneficiaries:	approximately 1,000 LPPs

(CCRIF SPC, 2019d)

The Climate Risk Adaptation and Insurance in the Caribbean (CRAIC) Project was started in 2011 by Munich Climate Insurance Initiative (MCII), in co-operation with CCRIF, MicroEnsure, DH, Munich Re, and the ILO Impact Insurance Facility and funded by the German Federal Environmental Ministry's International Climate Initiative (United Nations University, 2011; CCRIF SPC, 2019c). Starting out with three pilot countries, namely Jamaica, Grenada, and Saint Lucia, the programme has expanded in its second phase to Belize and Trinidad and Tobago (United Nations University, 2011; CCRIF, 2019c). CRAIC is designed to function as a model case for regional and international leaders and organizations to support climate risk reduction efforts and to include vulnerable people in these solutions (CCRIF, 2019c).

CRAIC aims to support countries in the Caribbean to strengthen their climate resilience through climate insurance within a broader framework of disaster risk reduction (MCII, n.d.). The project has designed two index-based insurance products, the Livelihood Protection Policy (LPP) and the Loan Portfolio Cover (LPC). The latter supports financial institutions in their loan portfolio management in times of weather-related losses (United Nations University, 2011). LPP insures small farmers and day labourers against excess rainfall and high winds (CCRIF SPC, 2019c).

The LPP is a trigger-based, parametric index insurance that covers damages of heavy rain and storm-related damage (MCII, n.d.,2; United Nations University, 2011). Its beneficiaries are low-income households and vulnerable individuals (MCII 2019b; United Nations University, 2011). To obtain insurance, the premiums can be either paid weekly, monthly, or yearly by beneficiaries directly, or the insurance premium is paid by a credit union. In that case, beneficiaries can choose to add additional premium levels to the basic protection that is paid by the credit union (GIZ, 2015; CCRIF SPC, 2019d). The level of coverage depends on the region, but the maximum coverage on a policy is 4000 US dollars. Individuals have the chance to purchase more than one policy (CCRIF, 2019d).

The payouts, which depend on the amount of coverage purchased and the severity of the event, are usually received within 14 days (MCII, 2016a). In its current second project phase, LPP tries to further reduce the time until payouts are received to 72 hours.

LPP in Saint Lucia

The first payouts in Saint Lucia were made in January 2014 after a drought that hit the region in December 2013. In 2016, small farmers received another payout following Tropical Cyclone Matthews. In the latter case, 31 policyholders received an average payout of $3290 US dollars, totalling 102,000 US dollars.
(CCRIF SPC, 2019d)

Besides the actual insurance coverage, the LPP also offers a digital early warning system, which sends an SMS if there is a weather event approaching. This allows customers to prepare for these events and to take precautionary measures (GIZ, 2015; CCRIF SPC, 2019d). For the weather-related data, CRAIC has been co-operating with the DHI (formerly known as the Danish Hydraulic Institute), which is monitoring rain data, and, with the CCRIF SPC, which tracks wind data (MCII, n.d.,2).

Produce Seguro

Type:	Index-based weather insurance
Countries:	El Salvador
Average premium cost:	5 percent (plus VAT)
Beneficiaries:	< 1000 policies in the pilot phase (2018)

(ICMIF, 2018; MiCRO, 2018)

Produce Seguro, index-based insurance against earthquakes, droughts, and excess rainfall, is the first natural catastrophe insurance in El Salvador to target low-income individuals (ICMIF, 2018; MiCRO, 2018). The project was launched by Seguros Futuro in co-operation with Banco de Fomento Agropuecario (Agricultural Development Bank or BFA) in 2018, aiming to assist low-income families and small business owners, which is a critical sector in many Central American economies, but one highly underserved in terms of climate insurance (ICMIF, 2018). To make Produce Seguro affordable for vulnerable and low-income populations, BFA subsidized part of the premium in the pilot phase (MiCRO, 2018; ICMIF, 2018). Besides BFA as a key implementation partner, the project's design and implementation was supported by Microinsurance Catastrophe Risk Organization (MiCRO) and its partnering organizations (MiCRO, 2018; ICMIF, 2018).

Another key feature of the programme is the capacity development in disaster risk reduction that is offered to policyholders (ICMIF, 2018). This value-added programme incorporates a five-step process, the "Prevention Route," which aims to prepare clients against natural catastrophes. It also rewards policyholders with a 72-hour emergency backpack upon completion of the programme (MiCRO, 2018). Besides the prevention aims, policyholders are also offered financial education, with a variety of custom-made materials (for example, infographics, videos, board games) that are specifically designed to address the needs of low-income clients (MiCRO, 2018).

Seguro Agrario Catastrófico (SAC)

Type:	Index-based crop insurance
Countries:	Peru
Average premium cost:	11 percent, fully subsidized by the government for smallholders
Total sum insured:	$131 million US dollars
Beneficiaries:	275,000 farmers (in the agricultural season 2017–18)

(InsuResilience Fund, 2018)

In Peru, the agricultural sector is of great importance, since it provides work to three quarters of the population (GIZ, 2018). Some 58 percent of poor and 82 percent of extremely poor populations are associated with agricultural activity (Universidad Nacional Agraria La Molina, 2017; InsuResilience Fund, 2018). In order to offer protection and some form of financial emergency security to these vulnerable populations, Seguro Agrario Catastrófico (Catastrophic Agricultural Insurance or SAC) was set up in 2009 as a co-operation project between the Peruvian Ministry of Agriculture and the insurance companies La Positiva Seguros and MAPFRE Peru (InsuResilience Fund, 2018).

Since its founding, the insurance has increased from an insured volume of 58 million US dollars in 2014 to 131 million US dollars in 2017 (International Climate Initiative, 2017). In the agricultural season 2016/2017, the scheme provided insurance to around 230,000 farmers in eight regions of the country (GIZ, 2019; Gestión, 2017). SAC insures farmers against yield loss caused by drought, flood, frost, and other weather-related perils, as well as pests, predators, and diseases (Universidad Nacional Agraria La Molina, 2017).

A payout is triggered once the average return of the insured crop falls below 40 percent of the recorded yield (InsuResilience Fund, 2018). In order to make these triggers more reliable, a pilot has been launched to explore the use of satellite and remote sensing data to calculate the agricultural statistics (GIZ, 2019). Due to its success, SAC was expanded in 2017 to six coastal regions, which are affected by the outcomes of El Niño, a climate phenomenon with often devastating effects (International Climate Initiative, 2017; Gestión, 2017). This expansion also aimed to increase the insured area in Peru by 20 percent (from 550,000 hectares to 660,000) and the number of insured farmers to 275,000 in the agricultural season 2017/18 (Gestión, 2017).

A special focus of SAC is the protection of subsistence farmers with less than 5 hectares of land and only a limited capability to deal with the impacts of climate catastrophes (InsuResilience Fund, 2018). Therefore, the government of Peru subsidizes the payment of premiums through FOGASA (Fondo de Garantía para el Campo y del Seguro Agropecuario), a Guarantee Fund for Agricultural Insurance (InsuResilience Fund, 2018). Consequently, SAC is entirely subsidized by the government as a means to address the needs of the poorest and most affected.

Besides SAC, a commercial agricultural insurance launched in 2013 provides non-subsidized coverage to large- and medium-sized producers (International Climate Initiative, 2017). Some banks in the country have supported the scheme and have made it a required condition that an insurance policy is taken out with the approval of a loan. This way, banks are guaranteed a payback, even if the yield of the crop is lost (GIZ, 2018).

Additionally, SAC co-operates with the Ministry of Agriculture with regards to capacity development. For example, training courses for experts and decision-makers in the ministry were held to improve the quality of decisions within the agricultural sector (GIZ, 2019).

MENA region

In the Middle East and North Africa (MENA) region, there is still very little climate risk insurance coverage. However, there is a great need and potential to expand the scope of these safety features to MENA countries. Already the region is the most water-stressed in the world (World Bank Group, n.d.). With around 6 percent of the world's population, it only has access to less than 2 percent of the world's fresh water supply (World Bank Blogs, 2015). With intensifying water scarcity and the overuse of fresh water, especially by the more prosperous members of the Gulf Cooperation Council, water availability per capita is expected to be halved by 2050. This will have devastating consequences for the agricultural sector, which is currently consuming around 85 percent of the water in many MENA countries (World Bank Group, n.d.). With an expected 20 percent reduction in rainfalls, higher rates of evaporation of water, and a resulting prediction of desertification of many areas in the region, the agricultural sector is in high need of sustainable adaptation measures — and also for climate risk insurance solutions.

Advancing Climate Risk Insurance plus *(ACRI+)*

Type:	Index-based weather insurance
Countries:	Barbados, China, Ghana, Morocco
Average premium cost:	57–90 percent subsidized by the government

(MCII and GIZ, 2019; www.climate-insurance.org/projects/advancing-climate-risk-insurance-acri)

The Advancing Climate Risk Insurance plus (ACRI+) initiative has Morocco as one of its focus points. The goal of the programme is to provide financial and strategic capacities to adapt to climate change risks, especially to micro, small, and medium enterprises (MSMEs) in the region. ACRI+ is part of the Promoting Integrated Climate Risk Management and Transfer project funded by the German Federal Ministry of Environment, Nature Conservation, and Nuclear Safety.

As part of a broader approach to risk management, direct risk transfer options for MSMEs play an important part. There are three types of climate insurance products that specifically cover climate risks: crop insurance (97 percent of climate insurance products), hail insurance (2.9 percent of climate insurance products), and livestock mortality insurance (0.1 percent of climate insurance products) (MCII and GIZ, 2019).

Morocco has the highest insurance penetration rate in Africa, with the insurance sector having a turnover of 3000 million US dollars in 2015, out of which 41 million US dollars were related to climate insurance products (GIZ 2017 in MCII and GIZ, 2019).

Even though insurance is subsidized by the government by up to 90 percent, spreading insurance to the people who most need it is still facing obstacles. A key problem is the lack of awareness of these insurance products, partially due to the low frequency of natural catastrophes thus far. Also, there are no personalized insurance products available, despite the heterogeneous needs of different MSMEs (MCII and GIZ, 2019). Alternatively, Moroccan MSMEs have the possibility to access loans (with individual guarantees), or micro loans, given to some self-entrepreneurs and micro companies.

Regional climate risk insurance pools

Besides climate risk coverage provided by insurance schemes at the micro and meso level, usually limited to relatively small pools of the insured, macro insurance is an alternative approach. In this case, countries from a wider region pool together, covering their specific climate risks and forming one common insurance umbrella that can protect their populations. Pooled together, the risks are shared and spread among the participants in the pool, which makes insurance more cost-efficient for each party. A key element of these indirect forms of insurance is that they provide payouts to governments of affected countries very quickly, enabling them to provide relief, such as food aid, very fast or to compensate affected people for losses they suffered.

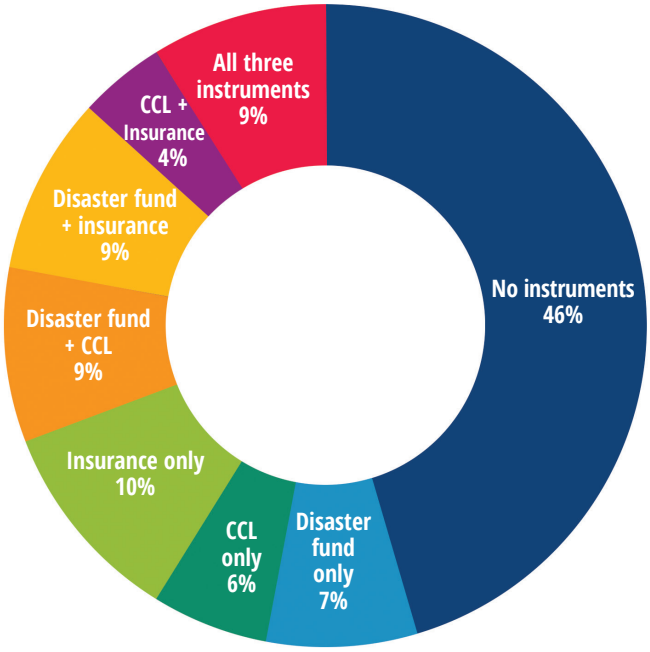
The InsuResilience initiative (see below) has significantly contributed to setting up four macro insurance schemes that exist around the globe, namely: ARC, CCRIF SPC, PCRAFI, and SEADRIF. Each of them will be introduced in the following pages. Through InsuResilience, G7 member states committed to "intensify support particularly for vulnerable countries' own efforts to manage climate-related disaster risk and to build resilience" (G7 2015). From its beginning, InsuResilience prioritized the expansion of existing state-owned insurance instruments, such as ARC or CCRIF SPC, accompanied by support for the creation of new instruments where regional risk insurance pools did not exist, as in Asia (SEADRIF).

Even though 68 countries participate in these schemes, only about a third (32 percent) purchased insurance coverage in 2019, with almost half (46 percent) of the eligible countries not deploying any disaster risk finance instruments at all. These numbers hint at the challenges of regional climate risk pools. What are the main reasons for the quite low uptake? First of all, climate risk insurance and especially the regional risk pools are new and thus still relatively unknown instruments. Many governments lack respective experience and remain hesitant to purchase insurance. A second main hurdle is the high cost of premiums. Thirdly, unmet expectations (either because of the uninsured basis risk or because a member expected payouts without the insurance trigger being reached) seem to be critical factors for the relatively low uptake.

An analysis conducted by InsuResilience suggests that countries that use more disaster risk finance instruments "tend to be wealthier, less indebted, and more likely to enjoy higher government capacity than are their peers that deploy fewer tools" (World Resources Institute, 2019). These findings raise the question of how to fine-tune climate insurance to make it more attractive and affordable for countries with weaker capacity and lower per capita income.

Figure 6: Use of disaster risk financing tools among members of ARC, CCRIF SPC, and PCRIC

Source: World Resources Institute, 2019



Notes: CCL = Contingent credit line. This chart includes the 68 countries that are currently eligible to purchase insurance through CCRIF SPC (CCRIF), Pacific Catastrophe Rick Insurance Company (PCRIC), or African Risk Capacity (ARC), as well as to access multilateral development bank contingent credit lines as members of the Asian Development Bank, Inter-American Development Bank, or World Bank. Although the 55 African Union member states are eligible to purchase ARC insurance, we only include those 33 that have signed the ARC Establishment Agreement, the first required step toward purchasing ARC insurance, as currently eligible to purchase insurance. The analysis includes several contingent credit lines that are not yet finalized and one contingent loan from the Japan International Cooperation Agency.

	ARC	CCRIF CARIBBEAN	CCRIF CENTRAL AMERICA	PCRIC
No instruments	75%	7%	0%	40%
Disaster fund only	9%	0%	0%	13%
Contingent credit only	3%	7%	0%	13%
Insurance only	6%	36%	0%	0%
Disaster fund + contingent credit	3%	0%	57%	7%
Disaster fund + insurance	3%	29%	0%	7%
Contingent credit + insurance	0%	14%	0%	7%
All three instruments	0%	7%	43%	13%

Notes: Columns do not always add up to 100% due to rounding.

African Risk Capacity (ARC)

Type:	Index-based regional macro insurance providing coverage against drought and against additional perils
Member countries:	Benin, Burkina Faso, Burundi, Central African Republic, Chad, Cote d'Ivoire, Comoros, Republic of Congo, Djibouti, Gabon, The Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Nigeria, Rwanda, Sahrawi Arab Democratic Republic, São Tomé and Príncipe, Senegal, Sierra Leone, Sudan, Togo, Zambia, and Zimbabwe.
Countries with insurance:	Burkina Faso, Senegal, Gambia, Mali, Mauretania (2017/18)
Total sum insured:	over 400 million US dollars in drought risk coverage (by December 2019)
Payouts total:	36,800,000 US dollars (by December 2019)
Beneficiaries:	over 2.1 million vulnerable people assisted (by December 2019)

(ARC, 2019: www.africanriskcapacity.org)

ARC was established in 2012 as a Specialized Agency of the African Union. ARC forms a sovereign risk pool and is comprised of two legal entities: The ARC Specialized Agency as a treaty body of the African Union and the ARC Insurance Company as a hybrid mutual insurer and financial affiliate of the Specialized Agency. The latter not only partners with member states, but is also financially supported by Germany and the UK. Private reinsurance companies also cover parts of the risk (KfW, 2016).

ARC serves as a pan-African response system to the impacts of climate change, envisioned to help member states improve their capacities to better plan for, prepare for, and respond to extreme weather events and natural disasters, therefore protecting the food security of their vulnerable populations. Starting out with 18 founding states, the scheme now is supported by 33 member states of the African Union. What brings them together is the goal to better respond to extreme weather events by strengthening their disaster risk management systems and providing predictable and immediate financial support in case of an emergency.

As an insurance risk pool, ARC's objective is to capitalize on the natural diversification of weather risk across Africa, allowing countries to manage their risk as a group in a financially efficient manner in order to respond to probable but uncertain risks. The initial capital comes from participating countries' premiums as well as partner contributions (for example, KfW).

ARC usually starts its in-country engagement with member states with capacity development in disaster risk management. In a second step, the specific climate (that is, drought) risks for the country's food security are calculated using a tool called Africa Risk View. The findings of this assessment help national

decision-makers — whether they purchase insurance coverage or not — to better understand climate risks and how they may translate into food security risks.

Countries then decide if and at which protection level they want to be insured. Before purchasing insurance coverage, a contingency (or operations) plan will be developed by the insured country with the support of ARC, precisely defining how the payout would be used to support those in need. These plans are evaluated by the ARC Board's Review Mechanism according to standards set by the conference of ARC parties.

As an index-based insurance, a payout is provided to a member country once a certain threshold or predetermined trigger is surpassed (KfW, 2016). ARC aims to provide payouts to governments within two to four weeks, so that relief can reach people on the ground within 120 days (MCII, 2016a). The country is responsible for disbursing the funds to the people in need.

The Sahel region was faced with a severe drought in 2015. Niger, Mauritania, and Senegal quickly received more than 25 million US dollars out of the insurance pool. These funds allowed them an initial response to the crisis and were used for food, fodder, and direct payments to affected populations (KfW, 2016; MCII, 2016a).

Between 2014 and 2018, eight out of 33 members purchased the insurance, with 95 percent of their premiums from the national budget, ensuring an African ownership over the scheme (MCII, 2016a; ARC, 2018). On the other hand, 75 percent of the member states never purchased insurance from ARC, be it because of lack of understanding, interest, or high premium costs. Here again, the critical question of affordability for the most vulnerable comes into the picture, paired with the fundamental consideration of whether it is just and fair that those who have contributed the least to climate change, and who are the poorest, should pay for their protection against extreme events.

As briefly introduced above, one unique and important ARC feature is the inclusion of contingency plans into the mechanism of insurance, broadening the focus from a mere ex-post disaster relief programme toward ex-ante risk management. In order to receive funds, a country has to actively prepare for catastrophes by submitting a contingency plan, illustrating the allocation and use of the insurance payout, which is then peer reviewed by other member states for approval (KfW, 2019; KfW, 2016). As a result, ARC not only provides governments with emergency funds, but also incentivizes states to invest in emergency planning and response capacities, and therefore strengthens a prevention focus (MCII, 2016a).

Another key aspect of the ARC scheme is the establishment and continuous improvement of the risk monitoring and early warning software platform, Africa Risk View (MCII, 2019a; MCII, 2016a). The software collects satellite data to assess the impact of extreme weather events, especially on vulnerable populations, which then provides a foundation for early warning systems. The data also supports the risk and vulnerability analysis by the member states and allows them to monitor in near real time the impact of weather developments.

ARC Replica and the Extreme Climate Facility (XCV) are two additional instruments designed to complement the sovereign risk pool approach of ARC. They are briefly introduced in the two boxes hereafter.

ARC Replica

Through the programme ARC Replica, it is also possible for international and civil society organizations to participate in the insurance scheme, in coordination with governments and their contingency plans. ARC Replica creates the possibility for civil society actors to match the insurance coverage of countries that have already purchased insurance policies from ARC. The vision of ARC Replica is to improve the effectiveness of the humanitarian response of climate risk insurance to reach most vulnerable populations (InsuResilience Global Partnership, 2018; InsuResilience Global Partnership, 2019a; KfW, 2019; WFP, 2018).
On 4 November 2019, the first payout of ARC (and therefore of any sovereign risk pool so far) to a non-sovereign actor was made. The payout of 10 million US dollars to the Start Network operating in Senegal is the largest early action payout ever to civil society, and it will support the implementation of prevention measures. The implementation will be conducted by six Start Network agencies in Senegal, namely Action Against Hunger, Catholic Relief Services, Oxfam, Plan International, Save the Children, and World Vision (Start Network, 2019).

ARC Extreme Climate Facility (XCF)

XCF is a not-yet-operative additional climate risk financing instrument of ARC that has been designed for the rapid mobilization of private capital that can be accessed by countries that are premium-paying members of the ARC risk pool in case of extreme events that cause massive loss and damage (ACT Alliance/Bread for the World, 2017).

XCF is a data-driven, multi-year financial vehicle. With its new index called Extreme Climate Index (ECI) it tracks the frequency and magnitude of extreme climate shocks in Africa. Whenever a pre-defined threshold of extreme events is exceeded, indicating that changes in the frequency of extremes are virtually certain, XCF would trigger a progressive payout scheme to all eligible countries. While the first payout would trigger a selected fraction of the full payment, in case of a second, consecutive XCF payout the full amount would be disbursed (ARC, 2018).

Payouts are intended to enable eligible countries to invest in measures that increase their climate resilience and help prevent or reduce risks of climate extremes. XCF transactions will be structured in five-year financing windows, with payouts at the end of the five-year window if there has been a significant increase in extreme weather events in the five years compared to a baseline period. The above-mentioned link to private capital consists in the fact that the financial risk of XCF triggering funds is planned to be transferred to international financial markets (ARC, 2019).

Caribbean Climate Risk Insurance Facility (CCRIF SPC)

Type:	Index-based regional macro insurance, providing coverage against earthquakes, tropical cyclones, and excess rainfalls; drought coverage and specific products for fisheries are offered for selected countries for the first time in 2019/2020; coverage against additional perils for agriculture and public utilities might be added in future
Member countries:	Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guatemala, Haiti, Jamaica, Montserrat, Nicaragua, Panama, St. Kitts and Nevis, St. Lucia, St. Maarten, St. Vincent and the Grenadines, Trinidad and Tobago, and Turks and Caicos Islands.
Payouts total:	38 payouts (20 for excess rainfalls, 14 for tropical cyclones, and four due to earthquakes) made to 13 member states, which amounts to a total of more than 138 million US dollars (by December 2019)

(CCRIF SPC, 2019b)

Similar to ARC, CCRIF SPC is another parametric macro insurance risk-pooling facility, owned by Caribbean governments and operated to strengthen climate resilience.

Even though the vulnerability toward extreme weather events and the adverse effects of climate change is very high for many countries in the Caribbean and in Central America, they often lack either the funds and liquidity to face these challenges or the capacity for external borrowing (GIZ and World Bank Group, 2019). In light of the severe damage caused by Hurricane Ivan in 2004, Caribbean states co-operated with the World Bank to establish CCRIF (later renamed CCRIF SPC, see below) in 2007, headquartered in the Cayman Islands.

CCRIF SPC allows countries to transfer their risk and spread it over the region, whereby the premium of the insurance is significantly lowered (by up to half) for each member state compared to those of individual risk insurances from the insurance market (GIZ and World Bank Group, 2019; MCII, 2019a).

The insurance scheme is capitalized through a multi-donor trust fund, which is financially supported by the European Union; the governments of Canada, the United Kingdom, France, Ireland, and Bermuda; the World Bank; the Caribbean Development Bank; and through membership fees from participating states (CCRIF SPC, 2019a; GIZ, 2015). Therefore, CCRIF SPC is a good example of how partnerships not only with domestic, but also with international governments and organizations, can facilitate the provision of technical and financial support (MCII, 2016a).

The facility was restructured in 2014 to a segregated portfolio company (SPC). This made it possible to base regional risks on the risk profiles of the countries in that region, which means that risks are kept segregated

across regions. This allowed an expansion of insurance products to Central America. As of 2018, CCRIF SPC has 22 member states, including Belize, Guatemala, Nicaragua, and Panama from Central America (CCRIF SPC 2019a; MCII, 2019a).

Hurricane Dorian caused widespread devastation when it hit two of the 16 main islands of the Bahamas in 2019. CCRIF SPC made two payouts totalling 12.8 million US dollars because a policy was triggered (CCRIF SPC, 2019: www.ccrif.org/news/ccrif-announces-final-payout-numbers-us128-million-bahamas-following-hurricane-dorian).

Like ARC, CCRIF SPC is an index-based insurance scheme and offers risk insurances against the effects of earthquakes, tropical cyclones, and excess rainfalls (GIZ and World Bank Group, 2019). Also similar to ARC, CCRIF SPC — besides providing mere climate risk insurance — aims at strengthening the in-country capacity to understand and assess financial mechanisms by providing the member states' ministries of finance with advisory services and analytics, including country-specific climate risk profiles (World Bank, 2019a).

Since the insured events differ in their frequency, the regularity of when triggers are reached also varies. For example, earthquake policies tend to be used less frequently compared to rainfall policies, which is why smaller amounts of risks are usually transferred. Based on this logic, a unique feature of CCRIF SPC is that the insurance coverage is customizable, which means that the price of insurance is partially based on the risk countries would like to transfer *(MCII, 2019a)*.

So far, CCRIF SPC has had a total number of 38 payouts made to 13 member states, which amounts to a total of more than 138 million US dollars. These payments were made within 14 days, which fulfills CCRIF SPC's promise to provide quick financial liquidity in times of crisis (CCRIF SPC , 2019a; MCII, 2019a).

Since 2017, CCRIF SPC also offers two new features for earthquake and tropical cyclone policies, the Aggregate Deductible Cover (ADC) and Reinstatement of Sum Insured Cover (RSIC). The ADC is able to provide minimum payments for events that are below the threshold of triggering a CCRIF SPC policy. Therefore, it somewhat buffers the inherent base risk of index-based insurances. The RSIC is able to provide funds after the regular coverage limit is reached for the policy year, and thus bridges times when insurance coverage is exhausted in order to prevent countries from being exposed *(InsuResilience Global Partnership, 2019b; MCII, 2019a)*.

Pacific Climate Risk Assessment and Financing Initiative (PCRAFI)

Type:	Parametric regional macro insurance, providing coverage against tropical cyclones and earthquakes/ tsunamis; coverage against additional perils, such as drought, excess rainfall, and volcano eruption, is currently in the planning/feasibility assessment
Member countries:	Cook Islands, Fiji Islands, Federated States of Micronesia, Kiribati, Marshall Islands, Nauru, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu, Vanuatu
Countries with insurance:	Cook Islands, Marshall Islands, Tonga, Vanuatu (sixth season 2018/19)
Total sum insured:	45 million US dollars (in sixth season 2018/19)
Payouts total:	6.7 million US dollars (by February 2019)

(PCRAFI, 2019b; World Bank Financial Protection Forum, www.financialprotectionforum.org/publication/pacific-catastrophe-risk-insurance-company-pcric-what-happens-when-a-disaster-strikes)

PCRAFI is the third macro insurance scheme. It was founded in 2007 as a joint initiative of Geoscience Division, Secretariat of the Pacific Community, the World Bank, and the Asian Development Bank. Financial support is provided, among others, by the Government of Japan, the Global Facility for Disaster Reduction and Recovery (GFDRR), and the European Union.

Inspired by the establishment of CCRIF SPC for the Caribbean Region, the Pacific Islands in co-operation with the World Bank started to develop their own regional climate risk financing scheme. PCRAFI aims to provide member states with disaster risk modelling and assessment tools and to find integrated risk financing solutions.

Prior to the establishment of PCRAFI insurance products, a risk assessment laid the foundation for the risk transfer mechanisms. This assessment was conducted through the Pacific Risk Information System (PacRIS), a geographic information platform that generates individual risk profiles on hazards, exposures, and vulnerabilities from 15 Pacific Island countries. PacRIS is the largest database of its kind in the Pacific and includes, for example, information on more than 5 million buildings and their attributes (World Bank Group, 2019a). PacRIS' geographic information is also designed to assist island states, development partners, and the private sector in developing risk reduction solutions (PCRAFI, 2019a).

Just like states in the Caribbean, the Pacific Island states are especially vulnerable to the effects of climate change and seismic catastrophes. It is estimated that Pacific Island economies suffer annual losses of around 284 million US dollars due to climate shocks, while similarly leaving them without the financial resilience of big economies. PCRAFI tries to buffer these adverse effects by providing parametric insurance products against tropical cyclones, earthquakes, and tsunamis through its own insurance company, the Pacific Catastrophe Risk Insurance Company (PCRIC). PCRIC is owned by the PCRAFI Foundation and was established by legal status in the Cook Islands in 2016 (World Bank Group, 2019a;Understanding Risk, 2019). Prior to the establishment of PCRIC, an insurance pilot programme, launched in 2013, was tested.

So far, Cook Islands, Marshall Islands, Tonga, Samoa, and Vanuatu have purchased insurance policies with a total coverage of 38.2 million US dollars. PCRIC has had three payouts with an overall amount of 6.7 million US dollars, which were received within the first 10 days of the disaster (World Bank Group, 2016; MCII, 2016a,). This once again underlines the fast availability of funds.

Cyclone Gita, a category 4 cyclone, made landfall in Tonga in February 2018, where it caused widespread damage. The event triggered a policy purchased by Tonga. Within ten days, PCRIC made a record payout of 3.5 million US dollars. "Our thoughts and prayers go out to the affected communities across the Pacific. Despite the tragic circumstances, we are proud to have been able to provide rapid funding to the Tongan government which will provide immediate support to help meet the needs of local communities," said PCRIC Chief Executive David Traill (https://reliefweb.int/report/tonga/tonga-receives-record-insurance-payout-following-cyclone-gita).

As part of Phase II of PCRAFI, which was launched in April 2016, two main pillars are formulated: The PCRAFI Facility, which is in charge of the disaster risk financing tools, and the PCRAFI Technical Assistance Program. The latter is led by the World Bank to offer technical assistance and institutional capacity-building opportunities to its members, with a special focus on post-disaster budget mobilization (MCII, 2016a; World Bank Group, 2019a). It operates in three areas: market-based instruments, public financial management (at both a national and regional level), and learning and knowledge management. It may be noted that the last area of knowledge management would offer a number of possible inclusion opportunities for NGOs, however, so far, only disaster management agencies are explicitly considered (MCII, 2018).

Southeast Asia Disaster Risk Insurance Facility (SEADRIF)

Type:	Parametric regional macro insurance, providing coverage against floods
Member countries:	Cambodia, Indonesia, Lao PDR, Myanmar, Singapore, Japan
Countries with insurance:	Cambodia, Lao PDR, Myanmar (2018/19)

(SEADRIF, 2018; World Bank Group, 2019b)

In December 2018, in the context of the 21st ASEAN+3 Finance Ministers' and Central Bank Governors' Meeting, Cambodia, Indonesia, Lao PDR, Myanmar, Singapore, and Japan established the first macro insurance platform for Southeast Asia. SEADRIF aims to provide advisory and financial services to increase preparedness, resilience, and co-operation in response to climate risks. SEADRIF will insure events of floods in the region through a parametric component (based on pre-agreed parameters) and a soft trigger component, which is designed to provide a payout in case an event lies below the parametric trigger or in case of losses caused by catastrophes other than floods. The soft trigger component is based on a proof of

loss, for example, a declaration of emergency (GFDRR, 2018). SEADRIF is underpinned by a web-based floor risk assessment platform, which aims to make flood risk information and flood impact analysis (in real time) more accessible to its member countries (GFDRR, 2018).

SEADRIF, like all other macro insurance schemes, aims to reduce transaction and policy costs for countries by pooling risks, which, according to preliminary estimates, will save countries up to 25 percent of the insurance fee they would pay for an individual insurance product (World Bank Group, 2019b; GFDRR, 2018).

Currently, Lao PDR, Myanmar, and Cambodia are part of this risk pool and have purchased policies. Besides the insurance coverage, the World Bank is also providing technical assistance and analytical support to these three countries (SEADRIF, 2018; World Bank Group, 2019b).

Do NGOs engage with these macro schemes?

CCRIF SPC: So far, there has only been a marginal engagement with NGOs in the insurance scheme due to the lack of knowledge about the programme and the limited staff capacity. However, it would be worth considering a co-operation with NGOs with regards to the training offered by CCRIF SPC and the discussions around new disaster risk financing strategies. A higher inclusion of NGOs could promote transparency and accountability.

PCRAFI: Similar to CCRIF SPC, the engagement with NGOs is somewhat unclear, but limited. However, NGOs could be of great value to the knowledge exchange mechanisms that lay the groundwork for policies and risk estimates. Therefore, once again, including civil society could promote knowledge and accountability.

ARC: Even though ARC encourages governments to involve civil society actors in the customization of the programme, NGOs often face the barrier of being excluded by their governments or are not meaningfully involved. However, their participation could help improve the customization of ARC parameters and the creation and implementation of contingency plans.

How can engagement be fostered?

Often NGOs only become aware of and involved with disaster risk insurance frameworks once an initial payout fails. Additionally, there is a lack of awareness of these mechanisms outside of those organizations directly engaging with the topic. Others often see climate risk insurance as a very complex and technical topic, which makes them hesitant to engage with these mechanisms. Furthermore, policy discussions frequently take place behind closed doors and do not yet include a meaningful representation of civil society organizations *(CSOs) (MCII, 2018)*.

InsuResilience Global Partnership and other support initiatives

The InsuResilience Global Partnership for Climate and Disaster Risk Finance was founded in 2017 with the support of the G20 and V20 member countries. It aims to "protect the lives and livelihoods of poor

and vulnerable people against the impacts of disasters" (InsuResilience Global Partnership, 2019). The Global Partnership builds on the InsuResilience initiative that was launched at the 2015 G7 Summit on the initiative of Germany with the commitment to provide, by 2020, 400 million additional poor and vulnerable people with climate risk insurance coverage. InsuResilience has been formed as a multi-stakeholder platform. From its very beginning, consultations were conducted with potential partner countries, insurance initiatives, and development banks, as well as with the insurance industry and NGOs. InsuResilience has always argued that it will not be successful without broad participation (ACT Alliance/ Bread for the World, 2017).

"Bringing insurance to those who need it most is a task that no actor can achieve individually. This is what makes InsuResilience unique: The initiative brings together partners from governments, insurance industry, international organizations and civil society to join forces and enhance the resilience of poor and vulnerable communities through climate risk insurance."

(I.G. Hoven, Director-General at the German Federal Ministry for Economic Cooperation and Development). (www.insuresilience.org).

Affordable access to climate risk insurance is a key concern of InsuResilience. In 2017, a working group was established to develop proposals for smart support. It has started to investigate the options that exist to make climate risk insurance more accessible for poor and vulnerable countries. The aim is to enable countries to decide which solutions are appropriate in which context. Testing knowledge transfer approaches has also been placed high on the agenda. This includes supporting the creation of needs analyses and cost-benefit calculations for climate risk insurance, data analysis, risk modelling and risk pooling, the creation of the necessary framework conditions, and raising awareness about climate risk management, as well as evaluating lessons learned from climate risk insurance approaches in consideration of their benefits for poor and climate-vulnerable people. A good impact assessment is particularly important, answering questions such as: How many people are actually protected? Are the most vulnerable people being reached? Is their resilience being strengthened in the face of disaster? InsuResilience has developed the tools needed for monitoring and evaluation, but a standardized reporting system, covering all insurance systems and risk pools that work together with the initiative, is still to be established (Bread for the World, 2019). The InsuResilience Global Partnership, according to its understanding, particularly builds on collaboration between G20 and V20 countries.

What is the V20 Group?

The Vulnerable Twenty (V20) Group of Finance Ministers was founded in October 2015 as a high-level policy dialogue and action group pertaining to climate change and the promotion of climate-resilient and low-carbon development. Despite its name, the V20 Group now spans over 49 countries and represents over one billion people.

(https://thecvf.org/category/member-states/)

The multi-stakeholder approach of the InsuResilience Global Partnership brings together different actors with partially divergent interests. It therefore remains to be seen how well the approach can be implemented. From the perspective of the vulnerable states, the crucial question is whether the partnership can provide them with added value. In fact, the success of the InsuResilience initiative will be measured by whether it is able to place the primacy of climate risk insurance for the poor and vulnerable and their micro, small, and medium enterprises at the core of the partnership and strengthen this aspect within such a broad forum. Moreover, an assessment of the continued development of the partnership needs to take another important criterion into account: the extent to which the V20 remain involved. The real litmus test for successful V20–G20 co-operation on reducing climate disaster risks will be whether it can produce concrete results in terms of reducing vulnerabilities and fairly offsetting the climate-induced losses and extra financial burdens suffered by vulnerable countries (ibid.).

V20 made it clear that its members need to protect critical infrastructure and micro, small, and medium enterprises (MSMEs) as their economic backbone against climate change. To facilitate the necessary protection, the V20 endeavours to enable private sector uptake of insurance in V20 economies. V20 national markets, however, are often too small to be viable, and the risks faced are too distinct to be diversified. That is why the V20 is currently developing the Sustainable Insurance Facility (SIF). The SIF, aligning with the objectives of the partnership, is envisioned as a V20-initiated technical assistance facility that enables country-level insurance solutions aimed at medium and small enterprises for the financial protection of key economic sectors and, in particular, their value chains. A second objective will be the de-risking of investments in renewable energy and financial protection (ibid.).

Over time, the SIF would substantiate the gradual buildup of regional risk transfer solutions that connect several country-led initiatives across V20 economies, allowing pooling across different geographical areas and addressing the common market constraints and barriers the V20 face. Furthermore, the V20 strongly believe that there is a need to not only come up with a broader range of finance instruments, but to also build the most cost-effective, complementary solutions that provide resilience dividends (ibid.).

The launch of the InsuResilience Investment Fund (IIF) and the InsuResilience Solutions Fund (ISF), both initiated by Germany under the auspices of InsuResilience and designed to be instrumental for the development of climate risk insurance products, could be steps toward that end (www.insuresilience-solutions-fund.org/en and www.insuresilienceinvestment.fund). The ISF promotes the development of innovative and sustainable climate risk insurance products for poor and vulnerable households in developing countries on a grant basis. It combines private debt and private equity investments, technical assistance, and premium support in a public–private partnership approach to improve access to climate risk insurance.

The InsuResilience Multi-Donor Trust Fund (MDTF) was established in 2017 at the World Bank and is administered by the GFDRR to implement the InsuResilience initiative by financing risk analytical work; technical assistance; cost-sharing of new, market-based risk transfer solutions; and monitoring, evaluation, visibility, policy, and knowledge management (https://www.insuresilience.org/the-insuresilience-multi-donor-trust-fund-mdtf).

GIIF is a multi-donor trust fund sourced by the European Union and the governments of Germany, Japan, and the Netherlands and operated by the World Bank. It provides advice and technical consultancy on index or parametric insurance solutions, primarily in Africa and Asia. It aims to expand insurance covering natural disasters and provide insurance to vulnerable groups in the agricultural sector. It claims to have provided insurance to more than 27 million farmers, herders, and small businesses with a total insurance volume of 855 million US dollars via its partners (https://www.indexinsuranceforum.org).

In order to enable climate risk insurance to be expanded in Asia, the multi-donor fund Asia-Pacific Climate Finance Fund – ACliFF was launched in 2017 by the Asian Development Bank (ADB). ACliFF aims to leverage more private funding for climate protection, climate adaption, and climate risk insurance in Asian and Pacific developing countries (https://www.insuresilience.org/the-asia-pacific-climate-finance-fund-acliff).

Remote sensing–based Information and Insurance for Crops in Emerging Economies (RIICE) is a public–private partnership between the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the Swiss Agency for Development and Cooperation, the International Rice Research Institute, sarmap (geographical information systems), and Swiss Re. RIICE aims to reduce the vulnerability of paddy smallholder farmers, with a regional focus on low- and middle-income countries in Asia, such as Bangladesh, Cambodia, India, Indonesia, the Philippines, Thailand, and Vietnam. RIICE promotes the generation and use of data that can be used for insurance solutions (www.riice.org/about-riice/9).

The UN Climate Resilience Initiative A2R is concerned with the expansion of climate risk insurance and the targeted strengthening of social protection systems in the event of extreme events. As a whole, A2R aims to promote comprehensive climate management (www.a2rinitiative.org).

The A2ii – Access to Insurance Initiative is a global partnership dedicated to raising awareness and distributing information about inclusive and responsible insurance instruments in developing countries, including to marginalized groups and women, and supporting the development of regulatory frameworks (https://www.a2ii.org).

5 Climate risk financing

The role of climate risk financing to redress loss and damage

Extreme weather and slow-onset events are increasingly causing substantial socio-economic and financial risks that undermine sustainable development. It is the role of disaster risk financing strategies, embedded in comprehensive risk management, to mobilize the necessary financial means to minimize these risks and to protect vulnerable countries and people from losses that go beyond their capacity to absorb risk. Three main dimensions of climate-related socio-economic risks can be identified. While it is important to note that the only lasting solution to overcome these socio-economic risks is a rapid global decarbonization, keeping global warming well below 2 degrees, it is also important to understand that loss and damage caused by the climate crisis will continue to increase even in a fast-decarbonizing world.

Loss and damage leading to reduced economic development and lower adaptive capacity: Both the number of extreme events as well as the global economic losses caused by them have quadrupled over the last 40 years. The number of extreme events per year increased from 200 to 800, and the average annual losses increased from 39.6 billion US dollars per year in the period 1980–1988 to 158.6 billion US dollars of inflation-adjusted losses per year between 2010 and 2018 (Munich RE, 2019). If indirect damages, such as dropping consumption, are also included, the total losses would have amounted, on average, to as much as 520 billion US dollars annually over the last decade (World Bank Group, 2017a). The loss in global GDP growth caused by climate-induced disasters has reached average levels of about 0.4–0.7 percent (Bread for the World, 2019).

Increasing risk of stranded assets: Assets must be protected from damage in order to retain their value — the mere risk of potential damage being caused by future climate extremes can lead to value loss. Such stranded assets are investments that have become worthless because they have lost value. For example, coastal communities face growing financial risks as a result of sea level rise. Houses, roads, harbours, rail lines, bridges, and other private and public infrastructure may become stranded. To mobilize the necessary resources to significantly reduce the risks caused by the climate crisis and to make coastal communities climate resilient, high upfront investments are needed, which again puts an extra financial burden on these communities.

Higher indebtedness: Worsening access to international capital has become another huge concern, particularly for climate-vulnerable countries and small island developing states. They feel they are being penalized by the financial markets for being vulnerable. Research findings conclude that for every 10 US dollars paid in interest by these countries, an additional dollar will be spent due to climate vulnerability. Econometric modelling suggests that climate vulnerability has already raised the average cost of debt in a sample of developing countries by 1.17 percent. It is estimated that climate change–induced additional interest costs are set to rise to between 146 billion and 168 billion US dollars over the next decade (Bread for the World, 2019).

Climate-vulnerable countries and communities should establish climate risk financing strategies to better manage the financial impacts of climate disasters. These impacts can be grouped into three categories: direct and indirect loss and damage caused by extreme events, increasing risks of stranded assets due to even more future climate extremes, and higher indebtedness caused by climate extremes.

Types of climate risk financing instruments

Risk financing instruments can be categorized according to their sources and whether they are ex-ante or ex-post disaster financing instruments (World Bank, 2012).

Ex-ante disaster financing instruments, like contingent credit lines, calamity funds, catastrophe bonds or climate risk insurance, require proactive advance planning and upfront investments. In turn, funds would be available almost immediately after a disaster happened, for example, to support relief operations and the first recovery phase. A climate risk financing strategy must take the time dimension — when and how many resources will be required for disaster risk reduction, emergency aid, and resilient recovery — into account (Bread for the World, 2019).

Ex-post disaster financing instruments, like donor relief and rehabilitation assistance, budget reallocation, tax increase, or conventional credits, are sources that do not require advance planning or upfront investments. Mobilizing resources in such a way takes more time. Thus, these instruments are better suited for the reconstruction phase and longer-term recovery programmes with expenditures that are due months after the disaster takes place (ibid.).

Some of these instruments fall into the category of risk transfer instruments, such as catastrophe (cat) bonds and other securitized instruments where the risk is transferred to capital markets. In any of these cases, the risk is ceded to a third party, and the sovereign state has to pay an interest to the third party for agreeing to take the risk. The higher the risk, the higher the transfer price (ibid.). Adaptation measures are not categorized as disaster risk financing in the narrow sense. Risk financing is thus defined as investments to address or compensate for residual loss and damage that could not be prevented for different reasons (ibid.).

Figure 7: Climate risk financing instruments

Source: Thomas Hirsch

	Ante-disaster risk financing	Post-disaster risk financing	Financing resilience building
National sources	Calamity funds/disaster reserve fund Budget contingency	Budget reallocation Tax increase Domestic credit	Own budget lines/ national funds Domestic Credit
International sources	Contingent debt facility	Donor assistance External credits and bonds	Bilateral donor assistance Multilateral climate funds External credits and (green) bonds
Risk transfer to third parties	Climate risk insurance Sovereign (regional) climate risk pools Catastrophe (Cat) bonds		

Examples of climate risk financing instruments

National risk financing instruments

Calamity/disaster reserve funds: Many governments have established special disaster funds that provide resources for immediate relief and recovery in case a disaster strikes the country. Examples are the Calamity Fund in the Philippines and Mexico's National Disaster Fund.

The Calamity Fund of the Philippines, also called National Disaster Risk Reduction and Management Fund, worth 390 million US dollars (2019), covers costs of pre-disaster operations as well as of relief, rehabilitation, and reconstruction to support communities in case of natural calamities and human-made disasters. National as well as local government units can request support. During 2011–15, the Calamity Fund spent on average 237 million US dollars per year (https://www.dbm.gov.ph/index.php/programs-projects/calamity-and-quick-response-funds).

Budget contingencies: Some governments set aside budgetary contingency reserves before a disaster happens, serving as a budgetary reserve to compensate for losses.

In June 2019, the Ethiopian multi-agency Flood Task Force issued a flood alert based on forecasts of the National Meteorological Agency. In response to the alert, the Ethiopian government developed a Joint Government–Humanitarian Partners' National Flood Contingency Plan and set aside respective financial reserves. By December 2019, over 2.8 million people were affected by floods due to unusually heave rainfalls in Ethiopia and neighbouring countries.

Budget reallocation, tax increases, and domestic credits are ex-post disaster sources to mobilize additional resources in the recovery and reconstruction phase; mobilizing finance from these sources usually requires additional legal steps and thus takes more time as compared with ex-ante risk financing. These instruments should be used only once calamity funds and budget contingencies have been exhausted (Bread for the World, 2019).

International climate risk financing instruments

Contingent credits: A contingency loan or a financial guarantee will be initiated once a disaster-related trigger has been breached. The World Bank Group provides such contingent credit lines through its contingent financing programmes, allowing borrowers to rapidly meet financial requirements in case of a medium- or large-scale disaster. Contingent credit lines are agreed ex-ante. The first African country that got access to the World Bank Group's Development Policy Loan with a Catastrophic Draw Down Option (DPL with Cat DDO) was Seychelles in 2014.

"The reason the DPL with Cat DDO is so significant is because it provides immediate liquidity when disasters hit the Seychelles. As a result, we can avoid diverting funds originally set aside for development projects and attend to the needs of the poorest."

(P. Laporte, Minister of Finance, Seychelles) (https://www.worldbank.org/en/news/feature/2014/10/15/a-landmark-first-for-africa-seychelles-uses-contingent-credit-for-disasters).

Donor assistance: Post-disaster assistance is provided by international donors for relief, recovery, and reconstruction. Donor assistance can be provided in the form of grants, concessional loans, or equity capital. This is an important source of risk financing, particularly for poor countries and in the aftermath of medium- or large-scale disasters. However, these funds usually require months to be raised and disbursed, apart from immediate support, which is usually minimal.

In March and April 2019, cyclones Idai and Kenneth devasted coastal parts of Mozambique. In September 2019, the World Bank granted 130 million US dollars from its Crisis Response Window in support of the government's emergency recovery and resilience project. The Netherlands agreed to a complementary contribution of 60 million US dollars. The two cyclones affected 1.7 million people. Losses amounted to 3 billion US dollars. (https://www.worldbank.org/en/news/press-release/2019/09/30/world-bank-injects-130-million-in-support-of-recovery-efforts-in-cyclones-affected-communities)

External credits and bond issues: Mobilizing resources on commercial capital markets is the most expensive form of climate risk financing, particularly in the case of poor and vulnerable countries with low credit ratings (Bread for the World, 2019).

Risk transfer to third parties

Catastrophe bonds (cat bonds) are capital market–based, risk-linked securities that transfer an ex-ante defined set of risks, such as cyclone, flood, or drought, to investors. Cat bonds are usually used for insurance securitization to create risk-linked securities that transfer a specific set of risks from an issuer or sponsor to investors. In this way, investors take on the risk of a specified catastrophe or event occurring in return for attractive rates of investment. Should a qualifying catastrophe or event occur, the investors will lose the principal they invested and the issuer — often insurance or reinsurance companies, but also states; for instance, the government of Mexico or the state of Florida, in the case of hurricanes — will receive that money to cover their losses (Bread for the World, 2019).

Contingent multilateral debt facility providing convertible concessional finance (CCF): CCF, as proposed by the Climate Vulnerable Forum (CVF), would be a new and innovative instrument. The provision of CCF would be contingent on using the financing provided for ex-ante agreed disaster risk management measures that effectively reduce risks and address damages. Risk financing in the form of CCF would consist of highly concessional convertible debt instruments and grant-to-concessional debt, working with the incentive that building resilience against climate risks should first be supported by grants. If successful, the support could be converted into pre-approved concessional debt terms. Should a project financed by concessional debt fail (subject to ex-ante agreed indicators for success and failure), the debt should be converted into a grant. Such an approach would help overcome the dangerous spiral of worsening credit ratings, rising indebtedness, and more stranded assets caused by climate change. It would enable climate-vulnerable countries to mobilize risk capital for investment into resilience building, it would benefit vulnerable communities and people, and it would factor solidarity and justice into climate risk financing by offsetting economic loss and damage caused by climate extremes. Finally, it would be a new hedging strategy of global common interest that helps stabilize the international financial and economic systems against climate-induced disasters, which will occur more frequently and on a larger scale in future (Bread for the World, 2019).

6 Climate risk transfer at the community level

It is at the community level where many adverse impacts of global warming materialize and where the protection gap becomes most obvious. While community-based adaptation initiatives have contributed to reducing vulnerability by moving adaptation frontiers during the last decade, climate extremes have become more frequent and catastrophic, too. Thus, limits to adaptation have become obvious, so that many communities are no longer able to "maintain human–ecological systems in a safe operating space" (Rockström et al., 2009), meaning to expose communities to intolerable risks, threatening their health, security, welfare, and sustainability (Schäfer et al., 2019). Increasing vulnerability to such risks is a defining characteristic of poverty and can trap households and communities in poverty (Bhattamishra, R./C.B. Barrett, 2008). ActionAid (2008) showed in a case study for coastal Bangladesh that the most vulnerable are trapped, being even too vulnerable to migrate from climate hot spots.

Climate extremes expose communities to intolerable climate risks going beyond their adaptive capacity. If communities cannot maintain their human–ecological systems in a safe operating space, lives, livelihoods, and social cohesion will be threatened. In these cases, risk transfer options should be explored as part of a community-based risk management strategy.

Risk transfer means to transfer risks that are too big to be retained by a person, household, or community to a third party. The first important step is to understand current and future risks. Understanding climate risks well, including the related potential loss and damage, is a prerequisite to assessing if the response capacity of existing protection measures and safety nets would be adequate to cover possible losses or if there would be gaps.

Climate risk transfer, including the transfer to an insurer as a third party, always requires a thorough risk assessment, finally calculating the risk in financial terms, thus putting a price tag on a climate risk by calculating the premium to be paid by the policyholder to the insurer for financial compensation in case a disaster strikes in a pre-defined way that triggers the policy. Better understanding a risk through a thorough risk assessment is an important advantage in itself, whether or not insurance is taken out afterwards.

Why is a climate risk assessment so important for communities?

Characteristics of global warming are non-linear, dynamic, and often extreme changes of weather patterns that cannot be predicted by just looking at observed trends of the past. To provide a reliable projection of near-, mid- and long-term future risks, climate risk assessments have to factor in these characteristics. Thus, they need to be based on scientific climate models, and for those regions where reliable data of ground-based weather stations doesn't exist, reanalyzed satellite data needs to be considered too. Specialized agencies and insurers can provide this information. As a first entry point, the highly recommended World Bank's Climate Change Knowledge Portal, https://climateknowledgeportal.worldbank.org, can be used.

Risk transfer to a third party based on a contractual relation that is signed before a disaster strikes and requires a premium payment without knowing if a payout will ever take place —that is, paying for compensation in the case of an extremely damaging but little likely event — is a fairly unknown approach for most communities in the Global South. Insurance illiteracy is a very high hurdle for introducing new forms of risk transfer to third parties at the community level. Thus, as a second step (following the enhancement of understanding of climate risks), creating understanding of the modalities and advantages of climate risk transfer, including climate risk insurance, through education is very much recommended to development and humanitarian practitioners aiming to improve climate risk management at the community level.

While risk sharing within a community is a widely practised strategy, the insurance concept of risk transfer to a third party outside the community is new and little known. Because of the advantage of insurance — that fewer financial resources are to be raised from within the community to cover high risks — it is worth raising the insurance literacy of communities.

Worldwide, and across all times, communities have developed a wide range of risk-sharing arrangements. Therefore, instead of just promoting the introduction of climate risk insurance at the community level, it is recommended to first take stock of existing risk-sharing approaches. Some of them may have a potential to be fostered in a way that they also effectively contribute to coping with climate shocks.

Common community-level, risk-sharing approaches often fall in the category of microfinance:

- Community-based micro saving: Money that was set aside can be used in case of a disaster
- Community-based contingency micro credits: Credit access in case of pre-specified conditions
- Community-based self-insurance: Payouts under pre-specified conditions

(Bhattamishra, R./C.B. Barrett, 2008)

The step from a semi-formal, community-based self-insurance to a micro insurance is small.

"Microinsurance is typically group-based and involves payment of premiums in small amounts (often designed to accommodate clients' irregular cash flows), in return for prespecified payouts when a specific condition occurs. Because of the pro-poor nature of microfinance interventions, their clients are low-income individuals or households that would typically be excluded from standard insurance schemes"

(R. Bhattamishra/C.B. Barrett, 2008).

Community-based risk transfer arrangements have specific advantages. They are usually set up in a very targeted way, serving community needs well. They have low information and enforcement costs, and they build on local knowledge. On the other hand, they also have specific limitations. The group that shares the risk is usually very small and homogeneous (for example, indigenous communities, extended families, ethnic groups, neighbourhood groups, professional networks like fisherfolk), making it very likely that when a climate disaster strikes, the entire group is hit. Thus, the risk coverage for each community member would be quite limited because the precautionary savings, contingent credit lines, or payouts would be quickly exhausted. A second possible limitation lies in the fact that community management often faces limitations in technical decision-making.

Case studies from northern Pakistan suggest that greater community participation in non-technical decisions results in better project outcomes, but not in the case of technical decisions. Thus, greater external assistance in technical decision-making and management may be advisable (R. Bhattamishra/ C.B. Barrett, 2008). A third possible limitation concerns the lack of inclusiveness of many community-based risk transfer schemes. Empirical studies show that often the most marginalized sub-populations of a community — be it the poorest, the economically inactive, specific ethnic or social groups, or women — are excluded from risk sharing schemes (ibid.). To conclude, despite their advantages, community-based risk-sharing approaches are too limited to provide sufficient protection against climate extremes that expose communities to very high risks. However, existing risk-sharing approaches may provide part of the solution and the right entry point to discuss with the community options to back them up.

The major limitation of local, community-based arrangements is their inability to manage extreme climate risks. The limitation of effective climate risk insurance of local inter-household transfers is that community members find themselves in the same boat. Community-based systems thus commonly fail in the wake of climate disasters, during which poor households have limited resources for self-insurance and often cannot avail themselves of local risk-sharing arrangements. The severity of a shock also determines the efficacy of informal risk management arrangements, as risk sharing may break down in the face of more severe shocks.

(R. Bhattamishra/C.B. Barrett, 2008)

Why do development workers have a role to play in community-based risk transfer?

While humanitarian aid primarily focuses on relief and rehabilitation after a disaster has occurred, development co-operations often focus on building the institutional capacity of communities. Other priorities are livelihood support and strengthening advocacy for improved legal, political, and socio-economic framework conditions. By doing so, development and humanitarian practitioners are usually closely involved in a broad range of stakeholders from both the community, policymakers, market agents, experts, and other constituencies. Being trustworthy, flexible, and well-connected puts humanitarian and development practitioners in a key position to help communities to broaden the range of community-based risk arrangements and to help them to absorb climate risks better.

Irrespective if the entry point of humanitarian or development organizations is relief, rehabilitation, disaster risk reduction, climate adaptation, or another climate change–related issue, without comprehensive climate risk management going far beyond traditional coping strategies, climate-vulnerable communities are in great danger, and development partners may also lose the progress achieved if a climate disaster strikes. Therefore, risk management should be integrated into any approach. While there is no magic formula, there are a number of elements that should be considered and then chosen, depending on the specific circumstances.

Better preparedness of vulnerable communities for climate extremes comes at costs that cannot be covered by poor communities alone. Apart from affected states, development partners should financially support preparedness. FBOs, for instance, could create a climate solidarity fund that can be used to support climate risk reduction and climate risk transfer.

Possible interventions to strengthen community-level climate risk management and transfer:

Capacity development: Raising awareness about climate risks, enhancing understanding of risk management, and creating literacy about risk insurance and risk financing approaches; capacity building should finally lead to better-informed choices of communities about what adaptive and risk transfer options they prefer to take.

Climate risk assessment: Supporting the community to understand their climate risk profile, how it will change in future, what the possible losses are, how they are triggered, how they could be minimized, and what the options are to deal with the residual risk; risk assessments should be based on both people's observations and scientific data and projections.

Disaster risk prevention and reduction: Protection measures, early warning, disaster risk reduction committees/teams at the community level, regular community training on how to respond to disaster alerts, the establishment of safe shelter, safe community seed banks, provision of survival kits, and so on.

- Support of traditional community-level risk-sharing approaches (see above) to retain the loss of relatively frequent but low to moderate climate events.
- Advocacy for pro-poor climate risk management, risk insurance, and risk financing approaches that are inclusive and benefit climate-vulnerable communities.
- Build bridges and connect communities with governments, experts, insurers, and investors that are willing to co-operate and find climate risk insurance and risk-financing solutions for communities.
- Support the development and testing of innovative risk insurance or risk financing pilot projects for communities.
- Subsidize start-up costs and insurance coverage for poorest households who cannot afford it.
- Promote and enable the participation of socially excluded groups in community-level risk sharing and risk transfer (insurance) schemes.

In many, if not most, cases of climate-vulnerable communities, comprehensive solutions will probably reduce the residual risk to levels that can be considered tolerable by community members. This would be a tremendous improvement as compared with the current situation, characterized by increasing climate-induced loss and damage year by year, of which only a marginal part is covered by risk insurance or risk financing. This is why so many communities in climate change hot spots — especially Africa, Central America, MENA region, South and Southeast Asia, and small island developing states — face intolerable climate risks going far beyond their adaptive capacity and putting lives, livelihoods, assets, social cohesion, and the survival of communities at risk.

Such comprehensive solutions could consist of community risk sharing, saving, insurance, and disaster risk reduction. The R4 initiative, which is described in this manual, is a good example of such an approach.

However, there still are problems and limits to climate risk insurance and risk financing. The biggest threat is runaway climate change, leading to such massive climate extremes as a new climate normal that insurance becomes too expensive. Then there are so-called uninsurable risks: If the occurrence of a damaging event is near to certain, the risk cannot be insured any longer. This is why sea level rise is uninsurable. Another limiting factor is the scalability of comprehensive, community-level solutions. Their scalability hinges on the availability of financial resources (and most communities would depend on financial support from outside the community to implement such solutions) and on the replicability (which is limited because the context factors largely vary between communities).

7 Conclusion

In view of the rapidly advancing climate crisis, it is time that humanitarian and development organizations focus more strongly on climate risk management, including risk insurance and risk financing. Climate-vulnerable communities are hit hardest by climate-induced loss and damage, they often face intolerable risks beyond their adaptive capacity, and they need support to close the protection gaps and to introduce new risk transfer instruments. It is up to humanitarian and development practitioners to help close these gaps.

While climate risk insurance is not a magic solution, it can contribute to closing the protection gap of vulnerable communities and countries. However, it cannot be used as a stand-alone, but needs to be integrated in a comprehensive risk management strategy and linked with social safety nets (where applicable), poverty reduction, and the implementation of the SDGs. There is still a long way to go. So far, climate risk insurance does not play a major role in disaster risk response, climate adaptation, social protection, food security, and agriculture policy frameworks in most developing countries. Even less relevant is climate risk insurance at the community level, though risk sharing among community members is a very common practice.

Climate risk insurance and other forms of risk transfer and risk financing, in order to benefit marginalized, resource-poor, and climate-vulnerable people and countries, needs to be designed in a pro-poor (including participatory, inclusive, and transparent) way that makes it accessible, affordable, and valuable to them. Such solutions will not be provided at a larger scale by the market, but rely on enabling environments, promotion, and support, (including premium support, provided by governments and by development partners, such as FBOs). So far, these conditions are under initial development at least in some countries, in particular with regard to R4, but are not yet fully developed in any of them.

Whether or not climate risk insurance and risk financing approaches serve the needs of climate-vulnerable communities will depend to a great extent on multi-stakeholder engagement and NGOs advocating for pro-poor and comprehensive design, financing, and implementation of these approaches. NGOS should also engage in awareness raising and capacity building.

Enhanced engagement may also include, among other things, climate risk assessments, field research, policy analysis, stakeholder consultations, and pilot projects in close co-operation with communities — taking fully into consideration, on the one hand, community priorities, experience, value basis, and capacities, and, on the other hand, the promotion and support of the full participation of socially excluded groups in community-level risk sharing and risk transfer schemes.

Climate risk insurance and risk transfer may be a newer approach for most humanitarian and development practitioners and FBOs as a whole. This may raise the immediate question of whether it is worth it to spend scarce resources to enter new territories. The answer to this question is very clear: The climate crisis requires much more than just continuing with business-as-usual approaches. This also applies to disaster risk management and climate adaptation, where transformational pathways are required in the 2020s in order to better protect climate-vulnerable communities from climate-induced havoc and intolerable risk that is imposing far beyond traditional knowledge and community-based adaptive capacities.

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