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INTEGRATING INSURANCE INTO CLIMATE RISK MANAGEMENT: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector

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NO. 24
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Deutsche Gesellschaft
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On behalf of:



Federal Ministry
for the Environment, Nature Conservation
and Nuclear Safety

of the Federal Republic of Germany



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Table of contents

Acronyms	4
Acknowledgements.....	5
Introduction	7
Our Approach	11
Scope	13
Target Audience.....	13
Before Starting.....	15
Phase 1: Prevention	
Risk analysis and risk reduction measures	17
Phase 2: Retention and Transfer	
Disaster risk financing plan to manage residual risks.....	25
Phase 3: Preparedness	
Developing response capacity and contingency plans	31
Phase 4: Response	
Implementing response procedures and communication.....	37
Phase 5: Recovery	
Building back better to create resilience.....	43
Conclusions	46
Glossary of terms.....	47
References	50

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Acronyms

ACRI+	Advancing Climate Risk Insurance Plus	GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
APA	Advanced Preparedness Actions	ICRM	Integrated Climate Risk Management
BMU	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (Germany)	IFRC	International Federation of Red Cross and Red Crescent Societies
BMZ	Federal Ministry for Economic Cooperation and Development (Germany)	IKI	International Climate Initiative
CCA	Climate Change Adaptation	MCII	Munich Climate Insurance Initiative
COP	Conference of Parties	MPA	Minimum Preparedness Action
DRF	Disaster Risk Financing	NGO	Non-governmental Organization
DRM	Disaster Risk Management	SME	Small and Medium Enterprise
FAO	Food and Agriculture Organization of the United Nations	WEF	World Economic Forum

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MCII and GIZ identified the disaster risk management (DRM) cycle as a valuable way to:

- Systematically analyse and pinpoint where insurance can add value.
- Provide an overview to public authorities/government officials of the status of international political momentum.
- Find synergies between the practical activities and policy of DRM and climate change adaptation (CCA).

The classical DRM cycle has been further developed into the integrated climate risk management approach. The ICRM approach includes a risk 'retention and transfer' phase. It utilizes financial instruments like insurance to further manage risks and enable the quick mobilization of finance in response to the impact of an extreme weather event.

To ensure user acceptance and to test the applicability of the ICRM approach, the document was validated through a delegate workshop with government officials attending the

23rd session of the Conference of the Parties (COP 23) to the United Nations Convention on Climate Change, hosted in Bonn. Additionally, two national workshops were conducted in Ghana. The validation process tested each phase of the ICRM approach, its major steps, guiding questions and suggested tools.

It is to this end that the authors would like to give special thanks to our workshop participants for their valuable input to shape and finalize this publication:

Samuel Abatey, Lorraine Abedi-Safo, Baba Adams, Charles Adams, Joseph Adingeya, Frank Aggrey, Eric Nana Agyem-mang-Prempeh, Arikun Martin Akudugu, Victor Algeria, Silley Alhassan, Kennedy Amankwa, Richard Amartey, Joseph Amikuzumo, Kingsley Amoako, Kenneth Amoateng, William Anamoo, Campos Angel, Stephen Abugri Anonyonde, Jerry Asamani, Kukwa Asamoah, William Asante, Daniel Asare-Kyei, Mawuli Asigbee, Millan Atam, Phillip Ayamba, Dzigbordi Azumah, Bernard Baatuwuwie, Sebastian Bagina, Riad Balaghi, Nana Kojo Bartels, Jacqueline Begerow, Veronika Bertram-Huemmer, Fautina Boakye, Richard Boatey, Acquah Jnr Isaac Charles, Evelyn R. Debrah, Hendrik Doll, Edgar Drah, Mathieu Dubreuil, Susanne Feser, Rosemary Forest, Gyamfi Foster, Romanus Gyan, Dassah Henry, Ulrich Hess, Ekho Suehi Iyehen, George Johnson, Issac Kankam-Boadu, John Kantam, Agyei Emmanuel Kassi, Ali Muhammad Katu, Christine Kugler, Nicolas Lamade, Solomon Lansey, Nathanael Laryea, Asamoah Lydia-Kukwa, Sulemana Musah, Bernard My-Issah, Mahama Nashiru, Idy Niang, Daniel Ninson, Charlotte Norma, Ebenezer Nortey, Godfrey Nyelia, Musah Osman, Aaron Oxley, Caroline te Pas, Tahiru Rafiu, Alexandra Rueth, Leslie Sackeyfio, Sandra Shuster, Meyer Sigrun, Dyllis Sowah, Roland Steinmann, Swenja Surminski, Andrew Q. Tetteh, Jennifer Tollman, Elina Vaananen, Timm Walker, Paul Wooma, Alhassan Zakani, Mohammed Abdulai Mukasa Zoogah and Astrid Zwick.





Introduction

According to the World Meteorological Organization, 2014, 2015, 2016 and 2017 were the four hottest years on record since 1880 (NOAA, 2018; WMO, 2018). Such rising temperatures are expected to affect agricultural systems significantly and also strain food production (WEF, 2018). It is critical for the 2.5 billion people worldwide depending on agriculture and its subsectors – i.e. crop, livestock, fisheries and forestry – as their main source of livelihoods (FAO, 2017). In 2017, in Nepal, Bangladesh and northeast India, over 6.3 million hectares of arable land were destroyed by heavy flooding and landslides (Singh, 2017). The resulting loss of harvest for subsistence farmers often means a loss of livelihoods with dramatic consequences (Singh, 2017; Gettleman, 2017). Recently, the Food and Agriculture Organization of the United Nations (FAO) published new figures showing \$93 billion worth of accumulated losses for the agricultural sector and its subsectors between 2005 and 2014. In Kenya, drought occurrence between 2008 and 2011 accounted for 86 per cent of total livestock damage with losses for the period amounting to \$8.9 billion. In Pakistan, in the single year of 2010 floods caused two-thirds of crop losses, reaching \$4.5 billion in damage (FAO, 2017a). In addition, the cascading effect of negative impacts goes beyond economic losses. Indirect effects, such as unemployment for farm labourers, increased imports of food and agricultural commodities, and low food availability in local markets resulting in food-price inflation, are commonplace in developing countries. This occurred, for instance, in Burundi, Djibouti, Somalia, Ethiopia and Kenya between 2016 and 2017 due to the dry weather conditions. Approximately 24.3 million people were affected and local market systems were strongly impacted, particularly in Ethiopia, with food prices rising to up to 70 per cent higher than the previous year (FAO, 2017b).



As a response to increasing disaster impacts, the importance of risk transfer and financial instruments such as climate risk insurance were highlighted in key international policy agendas in 2015. The Agenda 2030 for sustainable development, the Sendai Framework, the Addis Ababa Action Agenda and the Paris Agreement all called for different actors to come together and rethink future adaptation finance, in order to determine what is at risk, how to reduce these risks, which financial instruments can address these risks and how best to prepare for extreme weather events. Failure to make adequate financial provisions against extreme weather events bear heavy costs for individual producers, agricultural enterprises and governments, as well as have longer-term economic consequences. This creates an opportunity to consider risk transfer instruments, during the early planning stages of disaster risk management and climate change adaptations, in order to build a resilient pathway.

At the same time, climate change impacts make some risks less likely to be insured. The effects of climate change are projected to be more severe in the future than in the past. This could lead to higher uncertainty in agricultural insurance. Consequently, insurers could have difficulties in pricing risks and may become unwilling to write insurance to cover particular risk areas. In addition, it could also lead to higher insurance premiums and deter farmers from purchasing the insurance (ClimateWise, 2014).

Insurers' ability to price risks and thus set insurance premiums provides a signal that can raise risk awareness and incentivize risk-reducing behaviour (Le Quesne and others, 2017). The R4 initiative in Africa, for instance, provided insurance coverage for cash-poor farmers with the opportunity to engage in community risk reduction activities such as soil management or improved irrigation (Schaefer and others, 2016). Designing an effective and forecast-based insurance scheme is paramount for the agricultural sector in developing countries. Indeed, it might allow farmers and agricultural enterprises to engage in higher-risk, higher-return activities that spur economic growth

(WB, 2005; Le Quesne and others, 2017). Additional benefits of insurance relevant for the agricultural sector in developing countries are further discussed in this report.

Despite many potential benefits, to date suitable insurance coverage against losses and damages caused by extreme weather events and climate-related disasters is still widely unavailable. Even innovative approaches seeking to reduce underwriting and administrative costs, as well as payout delays related to traditional insurance schemes, face low penetration rates. As a consequence, only two per cent of weather-related losses incurred between 1980 and 2015 in developing countries were covered by insurance (Schaefer and others, 2016). Currently, 60 per cent of the world's population lives in these regions and faces increasing climate threats, continuing to suffer disproportionately (IMF, 2017). Hence, for the agricultural sector to foster food production and climate-resilient investment across its value chain effective agricultural risk management is needed to develop markets, policies and appropriate institutions.





Our Approach

Comprehensive climate risk management approaches are urgently needed to reduce, transfer and manage risks posed by climate change. As such, agricultural insurance is not a stand-alone solution and should build on existing measures and frameworks. Thus, the integrated climate risk management approach is a conceptual framework that advances the framework (BMZ, 2015) of the German Federal Ministry for Economic Cooperation and Development (BMZ). This ICRM approach offers a risk-oriented and comprehensive conceptual framework which incorporates climate change adaptation measures into disaster risk management policies in order to achieve national development goals.

Figure 1 shows the five phases of the ICRM approach (outer circle) and depicts the relationships of each phase (inner circle). It reflects that, in practice, the phases often overlap. For instance, pre-disaster financing occurs in the 'retention and transfer' phase as well as the 'preparedness' phase. Resilience in the centre indicates cross-cutting activities and interlinkages in all phases to create a systemic progress towards climate change adaptation goals and DRM targets over time (Le Quesne and others, 2017).

The pre-disaster and post-disaster financing in the figure are of particular significance in the ICRM approach. Examples of pre-disaster financing (also called *ex ante* financing) are accumulated reserves, savings, contingent credit and risk transfer approaches such as insurance, while examples of post-disaster financing (also referred to as *ex post* financing) are budget re-allocations, loan conversions and borrowing (Le Quesne and others, 2017). Without post-disaster financing, it can be difficult for people and governments to recover from a



Figure 1: Integrated climate risk management approach (GIZ/MCII 2017)

disaster. Long-term development prospects suffer if governments divert public funding from social and economic development programmes to fill the recovery gaps. Resilient reconstruction may be delayed or not take place at all due to a lack of resources. Nevertheless, it is important to recognize that the social, economic, financial, physical, institutional/ political and environmental processes in a country evolve over time. Hence, the ICRM approach is a dynamic process presented as a cycle.

Scope

This is a summary report of the publication *Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector*. It addresses challenges faced by various actors by including climate insurance in their agricultural policies. It follows the five phases of the ICRM approach and offers guiding questions and a step-by-step approach. In addition, the document – in its full version¹ – describes at least one tool linked with each guiding question. Hence, it informs the reader about what information is needed and what tools can be applied. It highlights insights into synergies between insurance and the different ICRM phases.

Nevertheless, this document should not be understood as a guideline, or a blueprint. Rather, it depicts different components and identifies the interlinkages of activities within each phase. Although each phase suggests a step-by-step process to implement the phase, certain steps may be omitted based

on existing structures and resources. For detailed activities under each step, see the full version of the publication.

The document presents an overview of internationally accepted DRM activities within each phase. However, it categorizes relevant DRM activities from an insurance perspective of the ICRM approach. This has already been done by other international organizations specifically dealing with these issues², but this document deals only with weather-related perils in the agricultural sector and does not consider other risks, such as market risks. The agricultural sector and its value chain have been used as an example, although with limited application. As the phases and components of the ICRM approach do not change, the document can be adapted to different sectors. Hence, this publication would be of value to risk managers in other sectors.

Target Audience

The primary target audience is government officials within developing countries interested in embarking on a systematic process to improve the agricultural sector. It is also targeted at officials who want to include insurance solutions to develop a comprehensive risk management approach.

The secondary target group is development organizations at the national and international levels engaged in assisting agricultural sectors to strengthen their national plans. It can be used by practitioners, although several technical skills and competencies are required. Thus, insurance companies involved in raising awareness of risks and designing insurance-related programmes may also find the document useful.

¹ Access to the full version – *Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector* is available on: <http://www.climate-insurance.org>

² For example, the United Nations Office for the Coordination of Humanitarian Affairs (UNOCHA) is mandated to ensure better preparation for, as well as rapid and coherent response to, natural disasters and emergencies.



Before Starting

Implementing the ICRM approach in the agricultural sector requires a general understanding about its potential to make the sector and related value chains more resilient to disaster risk and climate change impacts. Therefore, it is important to first study this document (in its full version³) and identify entry points that suit your particular need. Attention should be given to the guiding questions and the associated tools. The tools are a list of references to different databases, websites and reports which would require expert knowledge and, in some cases, technical skills to understand the relevant information.

The ICRM process calls for a mix of stakeholder expertise covering a broad spectrum of private- and public-sector actors, including insurers, reinsurers, actors of the agricultural sector (farmers, suppliers, agricultural cooperatives, distribution channels), agricultural researchers, women associations, non-governmental organizations (NGOs) and policy-makers spanning all of the phases. Establishing a multi-stakeholder engagement through a working group is recommended to ensure cooperation, participation and interaction in all phases. Bringing diverse stakeholders together will help establish a communication channel, as well as address cross-cutting issues such as capacity development, coordination, monitoring, participation and gender perspective.

Therefore, a stakeholder workshop is ideally conducted at an early stage; such a workshop can be populated as follows:

Workshop objective:

- To identify key stakeholders as well as facilitate a needs assessment with relevant government officials and all key stakeholders.

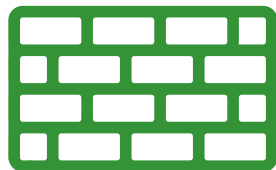
Workshop outcome:

- To create an initial understanding of the political landscape and agendas. An important process is the analysis of the existing capacity of key stakeholders, as this would be essential to identify which actors could contribute to the risk analysis (See Phase 1, below).
- Initial identification of risks/weather-related hazards affecting the different actors in the agricultural sector is ranked by geographical area or value chain and could form the basis for risk analysis in Phase 1.
- Tailor-made solutions such as literacy programmes or trainings ensure that all stakeholders have sufficient awareness and understanding of insurance and weather-related risks.

It is fundamental to have representatives from women groups in the workshop, as women represent half or more of the agricultural labour force in developing countries (FAO, 2011). Furthermore, in sub-Saharan Africa women are often paid less than men for the same work (Le Quesne and others, 2017). Additional factors such as limited access to land, capital, assets and other productive resources further puts them at a disadvantage. This needs to be understood for appropriate policy intervention and programme targeting.

³ Access to the full version – Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector is available on: <http://www.climate-insurance.org>





Phase 1: Prevention

Risk analysis and risk reduction measures

GOVERNMENTS CAN BENEFIT FROM THE INSURANCE INDUSTRY'S DATA AND RISK ANALYSIS, RESULTING IN A FASTER ASSESSMENT AT REDUCED COSTS.

In the context of managing extreme weather events, a risk analysis will help inform better policies and safer investments in the sector. It will also enable insurance companies to develop appropriate insurance products for crop, livestock, forest and aquaculture. In this phase, existing DRM mechanisms are also analysed to evaluate measures and identify gaps. A cost-benefit analysis is an important element of this phase. It helps the comparison of different adaptation measures such as processing facilities, weather stations, innovative irrigation systems or applied education programmes to develop crop varieties. These measures should be assessed based on the potential of each to increase or decrease risks along the agricultural value chain. For example, initiating a river embankment project to protect agricultural farmland may result in moving a large amount of water downstream and possibly causing flooding in another area. On the basis of this information, the most effective measures can be selected and the demand for insurance identified. The inclusion of insurance can provide the government with better access to capital, for example through easier access to credit or green bond guarantees, to build preventative infrastructures such as dams and desalination or recycling plants to strengthen water resilience during droughts.

This is an essential phase at the beginning of the ICRM approach and it contains the following components:

COMPONENT A: RISK ASSESSMENT.

COMPONENT B: IMPACT ANALYSIS.

COMPONENT C: DRM PERFORMANCE ANALYSIS.

COMPONENT D: INTEGRATING PREVENTIVE MEASURES INTO POLICIES.

For instance, the Ministry of Agriculture (MoA) could establish a national system in coordination with other relevant ministries such as finance, infrastructure, energy, trade and environment. It will also include departments dealing with climate change adaptation and national emergency offices. This system should aim to understand disaster risk and act as the central repository of all publicly available risk information and historical weather data. This would lead to an up-to-date assessment of national disaster risk and the implementation of risk reduction measures. For instance, policy intervention such as social protection instruments may reduce emergency credit and liquidity constraints, and increase savings. As a consequence, smallholder and subsistence farmers are better protected. This is imperative given the multifaceted character of climate risks, their causes and their need for interlinked actions at all government levels, and across sectors and communities.

Overarching Questions from an Insurance Perspective:

- What have been the historical climate disaster risks for the agricultural sector and its value chain? What are their specific frequencies, intensities and impacts?
- Are there any production practices which tend to increase or decrease disaster risks in the agricultural sector?
- Are there any gaps in the DRM mechanism, and at what point can insurance solutions be more economical to fill the gap?
- Which risk reduction and preventive measures can reduce the impact of climate disasters on governments, the agricultural sectors (especially small and medium enterprises) and individual producers?
- In which way could the insurance industry design insurance products as a risk management instrument to reduce the magnitude of future disaster losses and vice versa – and how could the insurance industry and the insured benefit from loss prevention measures in the prevention phase?

Expected Outcome:

An inventory of key risk profiles of all agricultural actors will assist the government in prioritizing its support to specific vulnerable groups, and set policy priorities. The cost-benefit analysis embedded in this phase will provide a selection of measures to enhance DRM strategies. Such measures could be technical trainings such as participatory capacity building programmes on diversified production systems (e.g. mixed and relay intercropping or integration of crops with livestock). At this level, the ICRM approach will create risk-informed measures and investments, while at the same time ensuring legitimacy, comprehensiveness and effectiveness. These will all culminate in a comprehensive DRM and/or CCA plan based on the most suitable risk reduction and preparedness measures, disaster risk financing (DRF) and insurance products, as well as response mechanism.



COMPONENT A: RISK ASSESSMENT

Risk assessment examines weather-related hazards in relation to the agricultural sector's vulnerability, in order to estimate potential damages and losses after an extreme weather event. It enables DRM decision-making to be tailored to local risk profiles (risks and uncertainties have a strong influence on decisions pertaining to which agriculture input to use, and when to invest in land improvements and/or the adoption of agricultural technology). Risk assessment therefore enhances the awareness of extreme weather events across the agricultural value chain. Risk assessment should ideally use open-access, freely available data, which is also traceable (in terms of the methodology). The risk assessment component contains the following steps:

STEP 1: Hazard assessment.

STEP 2: Exposure assessment.

STEP 3: Vulnerability assessment.

SYNERGIES

- ✓ Governments can benefit from the insurance industry's historical data and analysis of weather risks, resulting in a faster assessment at reduced cost.
- ✓ Collaboration between government and insurance providers can enhance the awareness of risks.
- ✓ High-quality data using probabilistic risk modelling from insurers for agricultural risk assessment. Governments could use insurance expertise for establishing data standards and accessing insurance-data repositories. This could enhance the speediness and quality of agricultural risk assessment.
- ✓ A comprehensive risk assessment can provide hazard- and sector-specific data for insurance product design.
- ✓ Increased risk awareness within governments could increase demand for insurance as a risk-management measure.

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

PREVENTION

COMPONENT B: IMPACT ANALYSIS

Impact analysis refers to the effects of extreme weather events on human, physical, economic, environmental, institutional and social systems. It provides information for re-evaluating the risk assessment. The impact analysis provides the data required for risk financing and designing agricultural insurance products. The impact analysis contains the following steps:

STEP 1: Preparation of disaster impact assessments.

STEP 2: Establishing special entities for coordination.

STEP 3: Data collection.

SYNERGIES

- ✓ Estimated potential insurance premium costs can be compared with the level of the financial negative impact of the extreme weather event, and the costs for relief and reconstruction measures (e.g. cost-benefit analysis).
- ✓ Public awareness of risks encourages risk-reducing behaviour and reduces the impacts of extreme weather events.
- ✓ Using loss and damage data from insurers enables governments to identify needs and plan for necessary risk reduction action.
- ✓ Loss and damage data from the impact analysis can provide information for potentially insurable losses, which are a precondition for underwriting and product pricing.



DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

COMPONENT C: PERFORMANCE ANALYSIS OF EXISTING DISASTER RISK MANAGEMENT MECHANISMS

DRM Performance Analysis assesses the effectiveness, affordability, feasibility, applicability, scalability and sustainability of existing DRM mechanisms. The results enable the user to identify which protection gaps can be closed in an economically efficient way. This allows the government to identify the appropriate legislation and institutions to facilitate the implementation of selected measures through cost-benefit analysis. Hence the analysis enables the development of the most effective DRM solutions for producers, consumers and operators along the agricultural value chain. The performance analysis contains the following steps:

STEP 1: Preparation of the DRM assessments.

STEP 2: Stocktaking and analysis of the current DRM mechanisms.

STEP 3: Identifying protection gaps.

STEP 4: Exploring DRM solutions.

STEP 5: Developing a DRM plan.

SYNERGIES

- ✓ *The DRM analysis provides information on protection gaps that may be most efficiently closed by insurance solutions. The analysis can show how insurance could be most suitably integrated into a comprehensive DRM system for strengthening resilience.*
- ✓ *Calculating the cost-benefit of existing DRM mechanisms (including agriculture insurance).*
- ✓ *Gap identification for potential insurance products.*
- ✓ *Integration of insurance into agricultural risk management strategies.*





ICRM PHASE 1

PREVENTION

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

COMPONENT D: INTEGRATING PREVENTIVE MEASURES INTO POLICIES

Preventive measures contain various risk reduction measures such as promoting water resource management and new irrigation systems for the future to minimize the risk of climate-related disasters. However, barriers such as structure of governance, and inadequate capacity, knowledge and skills at the operational level can hinder the process and progress of integrating these measures into actionable programmes.

STEP 1: Deciding and implementing prevention mechanisms by the government at the macro level.

STEP 2: Implementing preventive mechanisms by producers and the private agricultural sector at the micro level.

SYNERGIES

- ✓ *Prevention measures could lead to lower insurance premiums because pricing indemnity products includes factors such as the projections of potential losses. This could be achieved by combining insurance with obligatory preventive measures.*
- ✓ *Preventive and adaptation measures can have a positive effect on basis risk.*
- ✓ *Linking insurance to preventive programmes such as agricultural training and advisory services through agricultural extension services could increase insurance awareness and literacy.*
- ✓ *Bundling preventive measures with insurance can increase acceptance of high-risk clients by insurance providers.*





Phase 2: Retention and Transfer

Disaster risk financing plan to manage residual risks

RISKS OF EXTREME WEATHER EVENTS THAT CANNOT BE REDUCED OR AVOIDED CAN BE TRANSFERRED TO THE INSURANCE MARKET THROUGH A 'RISK-LAYERED' APPROACH⁴

The risk 'retention and transfer' phase refers to the fact that even when all the necessary steps have been taken in the prevention phase there are some risks that remain unmanaged. This is sometimes referred to as residual risk. Risk retention refers to self-insurance, that is: obtaining financial protection through the accumulation of funds set aside for future use or acquired externally through prearranged credit facilities for any losses that may occur. While risk transfer is the process of shifting the financial burden to another party that would be too large for the government, farmers' cooperatives, micro-, small- and medium-sized enterprises, and farmers to independently cover. This risk requires response and recovery capacities to ensure resource allocation in the event of disaster impact. To finance the residual agricultural risk, farmers and governments can apply risk retention instruments such as disaster reserve funds or budgetary allocation, and risk transfer instruments, e.g. catastrophe bonds and insurance. Disaster risk financing is practised by farming households and SMEs at the local level, although effectiveness is enhanced when incorporated in the overall DRF government strategy.

⁴ The risk-layered approach identifies and assigns a combination of appropriate financial instruments and prevention measures based on the frequency and severity of extreme weather events.

Insurance as a disaster risk financing component helps governments, individual producers and private enterprises along the agricultural value chain to manage extreme weather impacts. If embedded into agricultural risk management plans, insurance can contribute to resilience building in the sector and its value chain, including the promotion into better production. Therefore, DRF plans should build on risk assessment, the impact assessment and the DRM analysis – Phase 1 Prevention. In general, pre-disaster financing measures are designed to stabilize agricultural production, price or income.

Addressing the residual risks requires the following component and sub-component:

COMPONENT A: PRE-DISASTER FINANCING.

SUB-COMPONENT A: INSURANCE.

Overarching Questions from an Insurance Perspective:

- How can governments, agricultural businesses and producers identify means for meeting the costs of weather-related events while minimizing the threats to well-being, fiscal stability or development?
- What disaster risk financing mechanisms are available to mitigate the adverse impact of extreme weather events?
- How can DRF instruments best complement insurance solutions in mitigating adverse impacts on the agricultural sector and its value chain?
- What is the level of insurance interest existing among the governments, agricultural businesses, smallholders and individual farmers to use insurance as a risk financing mechanism?

Expected Outcome:

The establishment of an agricultural sector DRF plan that categorizes residual risks according to their potential frequency and severity, while considering different stakeholders and their roles. This phase facilitates the process of combining appropriate DRF instruments with insurance products. It identifies the most effective 'risk layering' approach by combining preventive measures with different risk retention and transfer instruments such as credit, savings or insurance, at the same time determining regulatory and legal rules for the financial system.



ICRM PHASE 2

RETENTION AND TRANSFER

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

COMPONENT A: PRE-DISASTER FINANCING

Pre-disaster risk financing represents an approach to planning for risks that cannot be reduced or avoided practically or cost-effectively. It ensures the availability of funds for post-disaster response and resilient recovery. The disaster risk financing analysis contains the following steps:

STEP 1: Analysing and determining the risk retention capacity.

STEP 2: Developing disaster risk financing products at all levels.

STEP 3: Establishing integrated approaches – linkages to insurance.

SYNERGIES

- ✓ Risk financing strategies allow the government to decide which risks to transfer to the insurance industry.
- ✓ A 'risk layering' approach with different DRF solutions, including insurance, reduces ad hoc post-disaster needs financing.
- ✓ Systematic disaster financing approaches, including the promotion of insurance by governments, may influence sovereign credit ratings.





SUB-COMPONENT A: INSURANCE

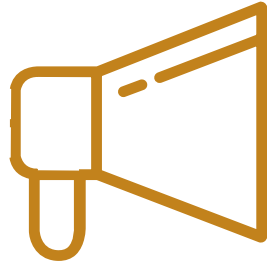
Insurance is a form of risk transfer. Insurance against extreme weather events can be defined as a mechanism which provides financial security against loss of assets and livelihoods by ensuring effective post-disaster relief on an individual, local, regional and national level. Insurance products for extreme weather risks can be distinguished into two categories:

- Direct insurance approaches are those in which the insured customers benefit directly from transferring risks to a risk-taking entity (such as an insurer) in the event the insurance agreement is triggered. The insured beneficiary receives the insurance payout (direct transfer).
- Indirect insurance approaches are those where the final intended customers benefit indirectly from payments. This is usually intermediated by an insured government or from being a member or client of an institution that has insurance cover.

Insurance can be divided into the following steps:

- STEP 1:** Analysing and determining the need for insurance.
- STEP 2:** Developing an insurance strategy by the government.
- STEP 3:** Developing insurance products and schemes.
- STEP 4:** Building insurance capacity for implementing insurance.





Phase 3: Preparedness

Developing response capacity and contingency plans

CONTINGENCY PLANS THAT INCLUDE INSURANCE POLICIES AND PAYOUTS HAVE TO MAKE SURE THAT THERE IS ACCOUNTABILITY, AND A MONITORING AND EVALUATION PLAN. BETTER ASSET PROTECTION THROUGH EARLY ACTION FROM AN EFFECTIVE EARLY WARNING SYSTEM COULD POSSIBLY LOWER THE PREMIUMS.

‘Preparedness’ is the capacity to effectively anticipate, respond to and recover from the impacts of extreme weather events. It builds on previous phases and sets the ground to understand what an effective response and recovery system is, and to develop and coordinate one. It will also define the potential (in)formal actors to be involved and their role in the response and recovery phases. To achieve coordination among all stakeholders and avoid time-consuming donor intervention, a contingency plan should be developed to include programmes that bridge recovery and development. Contingency plans that include insurance policies and payouts have to make sure that there is accountability and a monitoring and evaluation plan. This contributes to the development, or further enhancement, of a risk management information system, and also incentivizes people to take early action. Better asset protection through early action from an effective early warning system could possibly lower the cost of premiums.

Capacity development and coordination are cross-cutting issues throughout the different phases of the ICRM approach. However, it is of particular significance in this phase, due to the number of stakeholders that need to be involved. For example, in the event of extreme drought response actions such as food and water distribution, rehabilitation of water supply systems and emergency livestock health interventions would need to be coordinated.

Preparedness consists of the following components:

COMPONENT A: RISK MONITORING AND MINIMUM PREPAREDNESS ACTION (MPA).

COMPONENT B: ADVANCED PREPAREDNESS ACTION (APA) PLUS CONTINGENCY PLANNING.

Overarching Questions from an Insurance Perspective:

- Which preparedness mechanisms complement preventive measures, disaster financing and insurance to reduce potential losses and damages in the agricultural sector?
- What are the consequences of preparedness measures on insurance?
- How can the insurance industry contribute to enhancing preparedness?

Expected Outcome:

This phase should define the legal and policy frameworks and capacities that are to be in place prior to the disaster. The overall aim is to establish early warning systems that facilitate the early action of governments and other stakeholders to manage the emergency response process. The resilience of storage facilities and evacuation centres will be identified, and the role of relevant actors, including private businesses, will be defined.



ICRM PHASE 3

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

COMPONENT A: RISK MONITORING AND MINIMUM PREPAREDNESS ACTION

The risk monitoring should be undertaken for providing early warnings, which allow for early action such as scale-up of drought-resilient agricultural cultivation practices, and dissemination of climate information to support decision-making. A well-designed early warning system as part of an insurance scheme can trigger early action such as 'forecast-based payouts' and allow farmers and producers to prepare for, and reduce the impacts of, disasters.

MINIMUM PREPAREDNESS ACTION

- Risk monitoring.
- Coordination.
- Needs assessment and information management.
- Operational capacity and arrangements to deliver relief programmes.

Out of these categories, only activities which are of specific relevance for the insurance focus of the document are selected below as steps. Accordingly, the MPA analysis contains the following steps:

STEP 1: Early warning systems.

STEP 2: Coordination.

STEP 3: Capacity development.

PREPAREDNESS

SYNERGIES

- ✓ Including insurance companies in data provisions for weather forecast data can enhance the quality of early warning systems.
- ✓ Coordination mechanisms including insurers can help prepare for an effective payout structure, needed after disasters.
- ✓ Information from insurers can enhance the capacity of governments when developing their DRM strategies.
- ✓ An insurance literacy campaign can be integrated into government agricultural and DRM awareness campaigns, building insurance awareness.





ICRM PHASE 3

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

PREPAREDNESS

COMPONENT B: ADVANCED PREPAREDNESS ACTION

Advanced Preparedness Action (APA) and Contingency Planning builds on the MPA, but responds to a specific risk. It is aimed at guiding the government and humanitarian communities, with the involvement of technical agencies (ministry of agriculture and its departmental offices), to an advanced level of readiness. The second component is the contingency planning, which defines the response strategy and fosters a common understanding of all partners involved, as well as an operational plan to meet critical humanitarian needs and to stabilize production and reduce price shocks.

The contingency plan is one element of the overall response planning process. APA clusters the wide range of activities under two broad categories:

- Advanced preparedness actions.
- Contingency planning.

Thus, APA contains the following steps:

STEP 1: Organizing APA activities, e.g. stockpiling of relief goods.

STEP 2: Contingency plans.

SYNERGIES

- ✓ *Response programmes can be sped up by combining insurance with relief facilities and materials. Defining payout processes and identifying delivery channels contribute to quick insurance payouts that enable the affected population and government to start response and resilient recovery programmes faster.*
- ✓ *Agriculture inputs and produce storage help farmers to re-start faster and lessen suffering if index insurance payout was not triggered.*
- ✓ *Insurance for relief facilities and storage speed up response programmes and assist governments to restock and 'build back better'.*
- ✓ *Defining payout processes and identifying delivery channels contribute to the speed at which insurance payouts reach beneficiaries.*
- ✓ *Appropriate institutional arrangements help quick insurance payouts if infrastructures are damaged.*





Phase 4: Response

Implementing response procedures and communication

DESPITE WELL-STRATEGIZED PLANS, A GENERAL PROBLEM WITH EMERGENCY APPEAL-BASED FUNDRAISING IS THAT IT IS BASED ON A VOLUNTARY CONTRIBUTION.

The response to the impacts of an extreme weather event is predominantly focused on immediate actions just before, during or immediately after a disaster, to save lives and meet short-term needs. This includes the development of the response capacities of all actors (e.g. individuals, communities, civil society organizations, private sector and government agencies). **Effective and efficient response activities rely on disaster risk-informed preparedness strategies and actions defined in contingency plans.** This includes all actions for reducing losses and damages across actors from national to local levels, as well as across borders. For example, in 2011 Somalia, Djibouti, Ethiopia and Kenya suffered a severe food crisis due to successive rain failure (Slim, 2012). Although effective early warning systems existed in all countries, delayed response actions meant 13 million people were affected. When countries lack the financial capacity to respond immediately and effectively to an extreme weather event, the adverse implications increase rapidly. Insurance payouts can provide early finance for early response action, resulting in quick relief programmes. **Despite well-strategized plans, a general challenge with emergency appeal-based fundraising is that it is based on a voluntary contribution.** That makes humanitarian aid fluctuate,

and therefore it is not reliable or predictable enough to be ordinarily taken into decision-making processes by recipient governments and individuals. An insurance payout covers only a fraction of the finance needed for response and recovery.

Linking insurance to forecast-based financing approaches enables insurance policyholders to receive information with the specified amount and disbursement time prior to an event.

This phase is where all the activities implemented in previous phases will be tested in terms of efficiency and effectiveness. At the same time, decisions made at the response stage can have a significant impact on early recovery, as these processes are interlinked.

The emergency response consists of the following components:

COMPONENT A: RESPONSE – WITH RELIEF PROGRAMMES.

COMPONENT B: POST-DISASTER FINANCING.

Overarching Questions from an Insurance Perspective:

- What is the effect of insurance on response and relief programmes – and subsequently on the affected population, the private sector and the government?
- Can loss models used in insurance help to better integrate agro-meteorological and climate information in humanitarian decision-making processes?
- Can insurance reduce the adverse impacts of post-disaster financing?

Expected Outcome:

The establishment of an effective and integrated communication system for civil servants from national to local level is essential to build trust in order to ensure access to food and water. For example, linking agricultural monitoring and humanitarian response mechanisms provides a clear indication of who and what will be affected in the event of a climate-related disaster. Emergency guidelines and standards, such as water-and-livestock early warning or needs assessments and response options, are developed in a contingency plan. The combination of post-disaster financing with pre-disaster financing insurance and other DRM mechanisms will reduce ad hoc fund allocation. This helps enhance the reputation of public authorities and may attract external funding.



ICRM PHASE 4

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

RESPONSE

COMPONENT A: RESPONSE – WITH VARIOUS RELIEF PROGRAMMES

Responding with a relief programme is the provision of emergency services and government/ external assistance during or immediately after a disaster to save lives, ensure public safety and meet the basic needs of the people affected. Therefore, the agricultural sector needs to reduce the impact of price volatility and supply shocks. This could mean safeguarding agriculture-based livelihoods, protecting and enhancing livestock production, increasing water access through improved infrastructure, and information, coordination and analysis. The response contains the following steps:

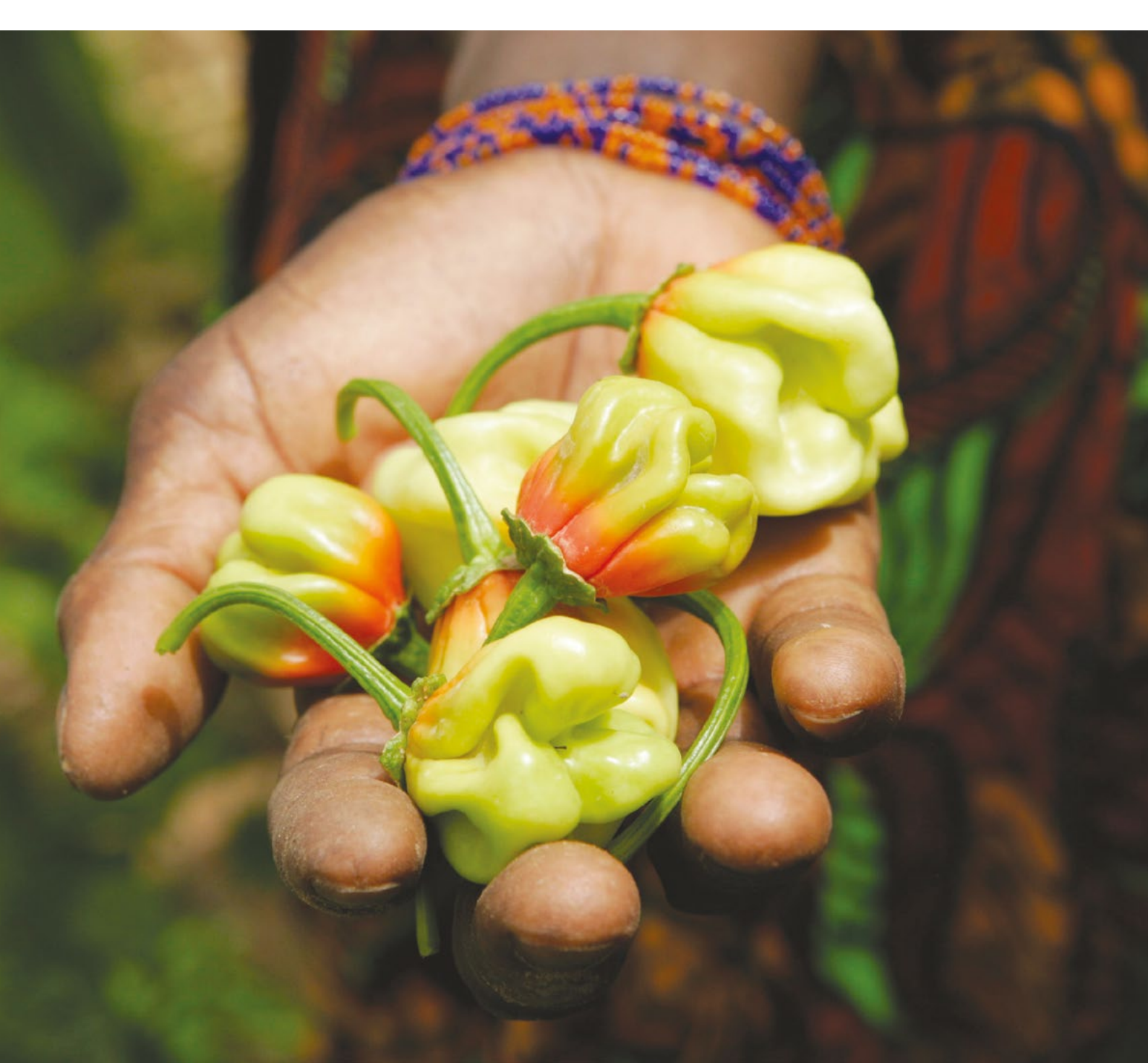
STEP 1: Post-disaster needs assessment.

STEP 2: Relief programmes and alternative livelihoods.

STEP 3: Policy adjustment of existing legal frameworks and strategies.

SYNERGIES

- ✓ *Appropriate institutional arrangements help quick insurance payouts if infrastructures are damaged.*
- ✓ *Insurance can play a role as a safety net as it enables positive coping strategies against developments that might impede sustainable development or let affected people slip back into poverty.*
- ✓ *Insurance can increase access to capital for building resilient infrastructures.*





ICRM PHASE 4

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

RESPONSE

COMPONENT B: POST-DISASTER FINANCING

Post-disaster financing arrangements are usually able to ascertain the magnitude of the disaster impact and make provisions to mobilize larger finance (than in pre-disaster financing) to respond and recover. These financial instruments are contingency budget, budget reallocation, external credit, tax increase, and donor assistance for relief and recovery. The post-disaster financing strategy is to combine different financial instruments to address actual losses.

The post-disaster needs analysis contains the following steps:

STEP 1: Assessing financial demand.

STEP 2: Mobilizing resources.

STEP 3: Establishing public financial management systems for post-disaster situations.

STEP 4: Establishing financial auditing and monitoring oversight systems.

SYNERGIES

- ✓ *As insurance payouts are defined in insurance policies, they follow objective indices, hence helping to depoliticize disaster responses.*
- ✓ *Insurance is a tool to anticipate potential loss and damage, and enhances the ability to estimate the impact of weather events on the agricultural sector.*
- ✓ *Insurance (and pre-disaster financing) ensures the availability of funds for post-disaster response and recovery.*





Phase 5: Recovery

Building back better to create resilience

INSURANCE CAN HELP TO UNLOCK OPPORTUNITIES AND STRENGTHEN RESILIENCE BY CLOSING THE FINANCIAL LIQUIDITY GAP. IT CAN HELP LESSEN THE FINANCIAL REPERCUSSIONS OF VOLATILITY AND CREATE A SPACE FOR INVESTMENTS AND PLANNING AT THE MACRO LEVEL.

Recovery supports efforts to 'get better', rebuild and strengthen resilience. The recovery programming needs to be time-bound and define realistic, appropriate achievements and should be linked to longer-term development (IFRC, 2012). 'Build back better' is an essential concept of resilient recovery, aiming to reduce vulnerability in the future and improve livelihood conditions while promoting sustainable agricultural management and reconstruction. This can be realized through a variety of measures, for example agro-climate risk management and support for sustainable management of local river basins and land tenure, investing in water management and/or transfer, and educating farmers on new technology such as drought-resistant crops. Insurance can close the financial liquidity gap for faster and better resilient recovery. It can help create a space for investments and planning at the macro level. Thus, insurance can help to 'unlock opportunities' and strengthen resilience. While insurance payouts from index products can bridge the financial liquidity gap until other assistance can be obtained, indemnity products can condition

funding so that it includes the 'build back better' concept for more resilient reconstruction.

The 'recovery' phase contains a multitude of activities that can be clustered under the following key steps⁵:

STEP 1: Setting sectors' priorities and implementing sector-level recovery programmes.

STEP 2: Adjusting institutional frameworks for resilient recovery.

STEP 3: Establishing/refining effective coordination and communication mechanisms.

STEP 4: Developing standard implementation procedures within the 'build back better' concept.

STEP 5: Developing a monitoring and evaluation system.

Overarching Questions from an Insurance Perspective:

- Which policy intervention (farmlands, livestock, water, crop etc.) is the most appropriate considering the types of hazards, target groups and livelihoods?
- What is the effect of insurance on resilient recovery programmes (including the 'build back better' concept) – and subsequently on the affected population, the private sector and the government?
- Can lessons learned from recovery and insurance provide a chance to improve pre-disaster planning in the prevention phase?

⁵ The 'recovery' phase does not contain 'components', like the other phases. However, it does select insurance-relevant activities and categorizes them into steps, as outlined in the main report – Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector.

Expected Outcome:

An agriculture monitoring system is implemented as institutional structures and communication plans are developed and ownership is ensured by including the affected communities. Agricultural sector strategies are translated into projects across different implementers and communities, under consideration of interfaces with other relevant sectors such as environment and transport. The 'lead agency', in most cases MoA, undertakes a programme-by-programme approach with activities summarized in the 'general steps'. For instance, in drought-prone areas where pastoralists have sold off livestock, recovery programming can provide information on alternative suppliers and help herders to purchase (replacement) livestock.



ICRM PHASE 5

DESCRIPTION OF COMPONENTS AND THEIR RELEVANT STEPS

RECOVERY

RESILIENT RECOVERY

Resilient Recovery is comprised of recovery measures to reinforce resilience in order to improve the next agricultural season. For example, supplementing livestock losses, rehabilitating boreholes, and training farmers on conservation agriculture and rangeland management. It is important that recovery programmes make necessary adjustments to reduce disaster risks according to the 'build back better' concept.

SYNERGIES

- ✓ Insurance helps to lessen the financial repercussions of volatility and create a space for investments and planning to be undertaken.
- ✓ Insurance payouts from index products can bridge the financial liquidity gap until other assistance can be obtained (response programmes); indemnity products can provide funding that includes the 'build back better' concept for more resilient reconstruction.
- ✓ Insured public buildings and critical infrastructure, when reconstructed according to 'build back better' criteria, could lead to reduced premiums for indemnity insurance products.

Conclusions

This summary report provides the most important insights into the concept of the document *Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector*. It aims at assisting decision makers to decide if the herein proposed approach is useful for their purposes. Once such a decision has been made, the end (technical) users of the extended document will find useful information on how to, for example, obtain data on extreme weather events and related damages to the agricultural sector from the past, in the present and in the future. This summary report and the extended document⁶ can therefore catalyse identification of gaps in the existing CCA and DRM measures, as well as facilitate the design of mechanisms to close the gaps in order to build more resilient systems. They further enable governments to enhance institutional support and capacity, and generate knowledge to attain short-term objectives of disaster risk reduction and the longer-term objectives of adaptation to climate change.

⁶ Access to the full version – *Integrating Insurance into Climate Risk Management: Conceptual Framework, Tools and Guiding Questions: Examples from the Agricultural Sector* is available on: <http://www.climate-insurance.org>

Glossary of terms⁷

Adaptation: in human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate.

Agriculture input providers: are suppliers that provide inputs for agricultural production such as fertilizers, fodder, and products that are allowed to be used for crop protection, cleaning, and as additives in food production.

Agriculture sector: also known as the agribusiness sector, it comprises all of the business activities performed that range from agricultural production to final product consumption. The sector is one of the world's largest employers, both generating income and contributing to food security and nutrition. It includes the entire value chain: the supply of agricultural inputs,

the production and transformation of agricultural goods, and their distribution as products to final consumers.

Agro-climate risk management: is the application of risk reduction policies and strategies related to climatic variability and its adverse effects on agricultural production, including the important socioeconomic activities and livelihoods linked with it.

Basis risk: is the risk of discrepancy between an insurance payout and an actual loss incurred. An instance of weak correlation between a defined trigger threshold and realized loss, potentially due to spatial and temporal variations as well as the specificities of the loss, may prevent a payout from occurring. In this case, the insured party bears the amount of the uninsured loss.

Build back better: is the post-disaster integration of disaster risk reduction measures during the recovery, rehabilitation and reconstruction phases in order to increase the resilience of nations and communities through the restoration of physical infrastructure and social systems, and the revitalization of livelihoods, economies and the environment.

Capacity development: is the process by which people, organizations and society systematically stimulate and develop their capacities over time to achieve social and economic goals. It is a concept that extends the term of capacity-building to encompass all aspects of creating and sustaining capacity growth over time. It involves learning and various types of training, but also continuous efforts to develop institutions, political awareness, financial resources, technology systems and the wider enabling environment.

7 This glossary is based on the following sources:

Food and Agriculture Organization (2010). Agricultural value chain development: Threat or opportunity for women's employment? Gender and Rural Employment Policy Brief #4, 2010. Available at <http://www.fao.org/docrep/013/i2008e/i2008e04.pdf>

Food and Agriculture Organization (2017). Agribusiness and value chains. Available at <http://www.fao.org/3/a-i6811e.pdf>

Warner, Koko, and others (2013). Innovative Insurance Solutions for Climate Change: How to integrate climate risk insurance into a comprehensive climate risk management approach. Report No. 12. Bonn: United Nations University Institute for Environment and Human Security (UNU-EHS).

World Bank (2014). Financial Protection against Natural Disaster: An Operational Framework for Disaster Risk Financing and Insurance. Available at <https://www.gfdrr.org/sites/default/files/documents/Financial%20Protection.pdf>

United Nations General Assembly (2016). Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction.

World Bank Group (2017). Global Financial Inclusion and Consumer Protection Survey. 2017 Report. Available at <https://openknowledge.worldbank.org/bitstream/handle/10986/28998/122058.pdf> ; http://www.who.int/health_financing/topics/financial-protection/en/

Contingency plan: is a type of risk management tool which is used to ensure that sufficient arrangements are in place in order to respond to a disaster. This is most often carried out via a planning process, which then leads to an action plan and subsequent actions.

Contingent liabilities: are potential liabilities that have not yet been actualized but may occur. Contingent liabilities are important for policy and analysis, and thus information on them needs to be collected. A high level of contingencies may signify an unacceptable level of risk within the agricultural sector.

Credit portfolio: is an investment folder containing debts, like home and car loans. Private investors can build credit portfolios, but more commonly they are held by banks and other financial institutions.

Credit rating: is a score given to an individual, firm or other entity that represents credit risk and whether or not the borrower will be able to pay back the money borrowed, or reimburse the money for items purchased on credit. The rating is based on an entity's financial status and past records of debt repayment, amongst other factors. Insurance can help to reduce losses caused by credit-default.

Disaster risk management: is the usage of disaster risk reduction strategies and the application of policies to prevent new disaster risk, reduce existing disaster risk and manage residual risk in order to contribute to the reduction of disaster losses and build resilience.

Early warning system: is an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments and businesses to take timely action in order to reduce the risks of disaster prior to its occurrence.

Financial protections: are the results achieved when financial products are obtained through direct payments in order to build financial resilience and guard governments, the private sector and households from exposure to financial hardship.

Forecast-based financing: is a mechanism that provides access to funding in order to ensure early action and prepares to respond based on in-depth scientific forecast and risk analysis. The mechanism has three components: (1) trigger levels based on detailed risk analysis of relevant hazards for a particular region are identified; (2) selection of actions/pre-determined early action to reduce the humanitarian impact of the event; and (3) pre-disaster (early) financing mechanism that automatically allocates funding once a forecast reaches a pre-agreed trigger level.

Forecast-based payout: is the amount of money paid out to an insurance policy holder, which is established according to calculations, estimations and modelling of a future event.

Index insurance: is a type of insurance contract that involves the use of predetermined parameters (e.g. temperature, rainfall, or area yield), and thresholds as the basis for payouts to be issued. Once a certain threshold of a certain parameter is crossed (for example, when rainfall surpasses a pre-determined level), payments will be issued to policy holders. Index insurance works in contrast to indemnity insurance, which involves damage assessments and payments that correspond to a policy holder's actual loss.

Insurance premium: is the amount charged to an insured party for an insurance coverage that reflects the expectation of loss. The terms of the payment (i.e. payment due dates, frequency, and amount to be paid) are stipulated in a contract.

Insurance products: are the different types of insurance agreements sold by an insurer. For example, an insurer may sell car and home insurance, liability insurance, healthcare coverage and contracts tailored for businesses. The various products offered by insurers are made to target different clients and the specific risks that they may be facing.

Integrated climate risk management approach: is a risk-oriented guide which incorporates climate change adaptation measures into disaster risk management policies and plans for sustainable development. It takes into consideration the physical, social, economic, financial and environmental dimensions of a country, region or municipality. It leverages insurance as a risk transfer instrument which can catalyse targeted investments that can be used in order to prevent and reduce risks, address residual risk and prepare to respond and recover from the impacts of a disaster.

Liquidity gap: is the discrepancy between the amount of financial assets accessible from available sources and the actual need for those resources.

NatCatSERVICE database: is a database of losses, which have been caused by natural disasters. This database, owned by Munich Re, is one of the world's most comprehensive databases. Users of this database can produce quickly online analyses that meet their own needs.

Premium: is the monetary sum paid by the insured party to the insurer for the duration (term) of insurance coverage granted by the policy.

Protection gap: is the disparity of access to financial markets or affordability in emerging and low-income countries and access in high-income countries.

Reinsurance: when the potential for losses surpasses the limit of an insurer (insurance company) due to the level of exposure of a risk or group of risks, the insurer may purchase reinsurance – insurance of the insurance.

Relief programme: is a series of practical interventions or financial assistance provided in order to help the affected populations meet their needs and overcome hardship after having been impacted by a disaster. A relief programme can be put into place during an emergency situation or it can be carried out post-disaster.

Residual risk: is the amount of risk left over after natural or inherent risks have been reduced by risk controls.

Resilience: is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform 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.

Risk transfer: is the process in which the burden of financial loss or responsibility for risk financing is shifted to another party, through insurance, reinsurance, government regulations or other means.

Value chain: is the set of actors and activities within the agricultural sector which brings a basic agricultural good from production in the field to final consumption, where at each stage value is added to the product. A value chain can be a network or vertical linkage between numerous independent business organizations and can involve the processing, packaging, storage, transport and distribution of a product. The term 'value chain' is often used synonymously with the term 'supply chain'.

Water resource management systems: are the combinations of various approaches used to strengthen water security, especially in the context of increasing water scarcity, growing demand, greater extremes and rising uncertainty due to the numerous challenges related to water resources. These approaches include the different institutional organizations, infrastructural projects, information management arrangements, technologies and investments, as well as the legal and regulatory frameworks that work towards achieving a better allocation, administration and conservation of water resources.

References

BMZ (2015). *Disaster Risk Management Approach and Contributions of German Development Cooperation*. Available at https://www.giz.de/en/downloads/giz2015-en-Materialie245a_disaster_risk_management.pdf

ClimateWise (2014). *Insurability in the face of climate change*. Available at <https://www.cisl.cam.ac.uk/business-action/sustainable-finance/climatewise/pdfs/insurability-in-the-face-of-climate-change.pdf/view>

Food and Agriculture Organization (2011). *The role of women in agriculture*. ESA Working Paper No. 11-02. Available at <http://www.fao.org/docrep/013/am307e/am307e00.pdf>

Food and Agriculture Organization (2017a). *The impact of disasters on agriculture: Addressing the information gap*. Available at <http://www.fao.org/3/a-i7279e.pdf>

Food and Agriculture Organization (2017b). *Food Security Update: A quarterly bulletin of FAO Subregional Office for Eastern Africa*. October. Available at <http://www.fao.org/3/a-i8135e.pdf>

Gettleman, Jeffrey (2017). More Than 1,000 Died in South Asia Floods This Summer. *New York Times*, 29 August. Available at <https://www.nytimes.com/2017/08/29/world/asia/floods-south-asia-india-bangladesh-nepal-houston.html>

International Federation of Red Cross and Red Crescent Societies (2012). *IFRC Recovery programming guidance 2012*. Available at <http://www.ifrc.org/PageFiles/41104/IFRC%20Recovery%20programming%20guidance%202012%20-%201232900.pdf>

International Monetary Fund (2017). *World Economic Outlook. Seeking Sustainable Growth Short-Term Recovery, Long-Term Challenges*. Available at <https://www.imf.org/en/Publications/WEO/Issues/2017/09/19/world-economic-outlook-october-2017>

Jaffee, Steven, and others (2008). *Rapid Agricultural Supply Chain Risk Assessment. Conceptual Framework and Guidelines for Application*. Draft, June 13. Available at <http://siteresources.worldbank.org/INTCOMRISMAN/Resources/RapidAgriculturalSupplyChainRiskAssessmentConceptualFramework.pdf>

Le Quesne, Felicity, and others (2017). *The role of insurance in integrated disaster and climate risk management: Evidence and lessons learned*. Report No. 22, October. Available at http://www.climate-insurance.org/fileadmin/user_upload/ACRI__2017_Role_of_Insurance_in_ICRM_online.pdf

NOAA National Centers for Environmental Information (2018). *State of the Climate: Global Climate Report – Annual 2017*, January. Available at <https://www.ncdc.noaa.gov/sotc/global/201713>

Schaefer, Laura, and others (2016). *Climate risk insurance for the poor & vulnerable: How to effectively implement the pro-poor focus of InsuResilience*. Available at http://www.climate-insurance.org/fileadmin/mcii/documents/MCII_2016_CRI_for_the_Poor_and_Vulnerable_full_study_lo-res.pdf

Singh, Abhay (2017). PM Narendra Modi to make aerial survey of flood- hit today. *Times of India*, 26 August. Available at <https://timesofindia.indiatimes.com/city/patna/pm-narendra-modi-to-make-aerial-survey-of-flood-hit-purnia-today/article-show/60226590.cms>

Slim, Hugo (2012). *IASC Real-Time Evaluation of the Humanitarian Response to the Horn of Africa Drought Crisis in Somalia, Ethiopia and Kenya*. Synthesis Report. Available at https://reliefweb.int/sites/reliefweb.int/files/resources/RTE_HoA_SynthesisReport_FINAL.pdf

Tisdall, Simon (2012). East Africa's drought: the avoidable disaster. *Guardian*, 18 January. Available at <https://www.theguardian.com/world/2012/jan/18/east-africa-drought-disaster-report>

World Bank (2005). *Managing Agricultural Production Risk: Innovation in Developing Countries*. Report No. 32727-GLB. Available at http://siteresources.worldbank.org/INTARD/Resources/Managing_Ag_Risk_FINAL.pdf

World Economic Forum (2018). *The Global Risks Report 2018, 13th Edition*. Insight Report. Available at http://www3.weforum.org/docs/WEF_GRR18_Report.pdf

World Meteorological Organization (2018). *WMO Statement on the State of the Global Climate in 2017*. Available at https://library.wmo.int/doc_num.php?explnum_id=4453

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The United Nations University (UNU) is a global think tank and the academic arm of the UN. The mission of the Institute for Environment and Human Security (UNU-EHS) is to carry out cutting edge research on risks and adaptation related to environmental hazards and global change. The institute's research promotes policies and programmes to reduce these risks, while taking into account the interplay between environmental and societal factors.

About MCII

The Munich Climate Insurance Initiative was initiated as a charitable organisation by representatives of insurers, research institutes and NGOs in April 2005 in response to the growing realization that insurance solutions can play a role in adaptation to climate change, as suggested in the UN Framework Convention on Climate Change and the Kyoto Protocol. This initiative is hosted at the United Nations University Institute for Environment and Human Security (UNU-EHS). As a leading think tank on climate change and insurance, MCII is focused on developing solutions for the risks posed by climate change for the poorest and most vulnerable people in developing countries.

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