REPORT

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INNOVATIVE INSURANCE SOLUTIONS FOR CLIMATE CHANGE

HOW TO INTEGRATE CLIMATE RISK INSURANCE INTO A COMPREHENSIVE CLIMATE RISK MANAGEMENT APPROACH

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Working Report

Innovative Insurance Solutions for Climate Change

How to integrate climate risk insurance into a comprehensive climate risk management approach

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Discussion paper open for comments:

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1 The expert workshop took place in Bonn at United Nations University Institute for Environment and Human Security (UNU-EHS), on 11–12 April 2013.

Purpose of the document

- → Supporting decision makers in exploring ways to implement climate risk insurance solutions in an integrated climate risk management approach in policy and practice;
- → Providing lessons learned from existing climate risk-related insurance approaches, considering limitations, challenges and current good practices;
- → Giving examples of comprehensive climate risk insurance approaches linking climate risk information, prevention, risk reduction and risk transfer in helping low-income groups and emerging economies manage climate risks.

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Abbreviations and acronyms

BMU	*The German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety*
BMZ	*German Federal Ministry for Economic Cooperation and Development*
CCRIF	*Caribbean Catastrophe Risk Insurance Facility*
COP	*Conference of the Parties (to UNFCCC)*
DRFI	*Disaster Risk Financing and Insurance Program (of the Global Facility for Disaster Reduction and Recovery)*
GAIP	*Ghana Agricultural Insurance Programme*
GDP	*Gross Domestic Product*
GFDRR	*Global Facility for Disaster Reduction and Recovery*
GIZ	*Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH*
HFA	*Hyogo Framework for Action*
IAIS	*International Association of Insurance Supervisors*
ICP	*Insurance Core Principles*
IBLI	*Index-Based Livestock Insurance*
ILO	*International Labour Organization*
IPCC	*Intergovernmental Panel on Climate Change*
IIPACC	*Innovative Insurance Products for the Adaptation to Climate Change*
MCII	*Munich Climate Insurance Initiative*
SBI	*Subsidiary Body for Implementation*
UNFCCC	*United Nations Framework Convention on Climate Change*
UNEP	*United Nations Environment Programme*
UNU	*United Nations University*
UNU-EHS	*United Nations University Institute for Environment and Human Security*

1. Introduction

Due to climate change, the frequency and severity of extreme weather events and natural catastrophes are on the rise worldwide. This threatens to undermine resilience, especially that of poorer countries and their citizens, by weakening their capacity to recover and absorb losses from these events. This has an adverse impact on the socio-economic situation of these countries e.g., on agricultural productivity, incidence of diseases, water and food security, and pose threats to the existing infrastructure and economic productivity. To assist the affected population and to speed up rebuilding efforts after disasters, governments commonly provide post-disaster aid programmes and appeal for ad hoc international assistance. Such programmes are not necessarily timely or financially adequate, thus posing an uncertainty to national budgets. In order to ensure efficient and sufficient provision of financial means shortly after a disaster, countries can include the promotion of insurance solutions within their national climate change adaptation strategies to support adaptation and build climate risk resilience.

Risk sharing and transfer instruments, such as insurance, are contributing to the efforts of governments and households to reduce the immediate and long-term financial impact associated with extreme weather events. They not only provide post-disaster liquidity for relief and reconstruction measures, but can also support *ex ante* measures to reduce vulnerability: If adequately designed, insurance solutions have the potential to encourage the uptake of risk prevention measures among the target population.

Since the Bali Action Plan in 2007, risk management and insurance have been increasingly highlighted as a means to advance climate change adaptation and manage risks of extreme weather events in international climate change negotiations. With the creation of the SBI work programme on loss and damage, at the sixteenth session of the Conference of the Parties (COP 16), in Cancun 2010, Parties to the United Nations Framework Convention on Climate Change (UNFCCC) increasingly expressed their desire for more knowledge, practical examples and capacity support to address some elements of the work programme such as risk management and risk transfer. To address these policy and practical concerns, this working report offers a close examination of how insurance can be one integral part of a comprehensive climate risk management strategy by gathering lessons learned from existing efforts with weather-related insurance approaches, considering their limitations, challenges and opportunities. It will also examine the enabling environment necessary to allow insurance to play a complementary role in managing climate risks.

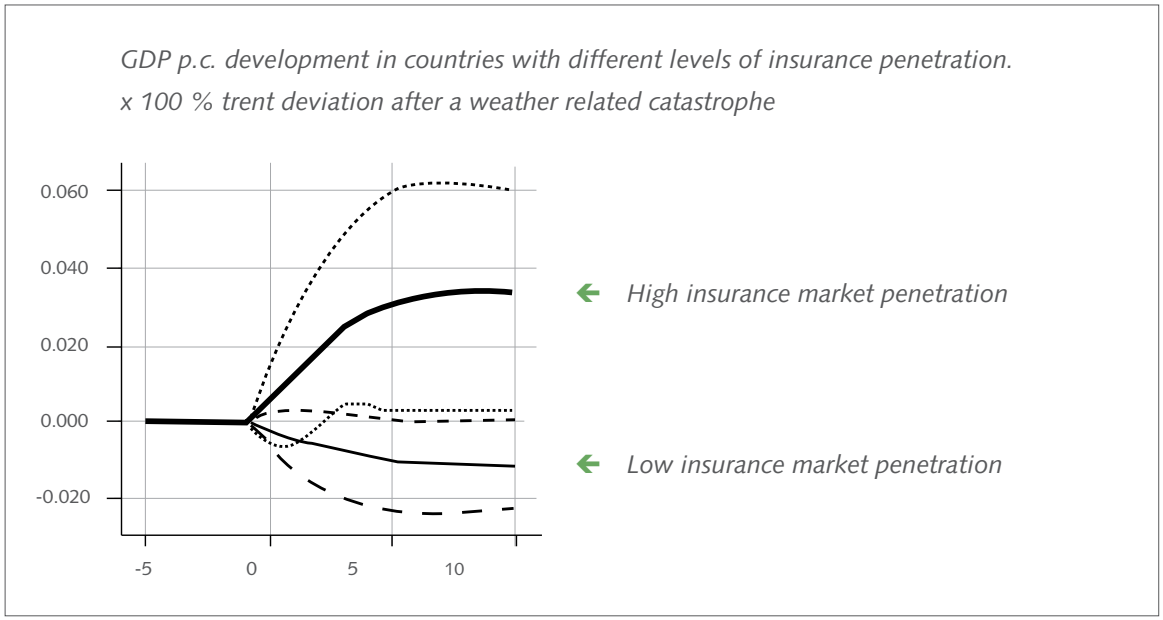
2. The case for insurance in managing climate risks

Risk transfer instruments such as insurance are commonly used to manage risks that would be too large for companies or individuals to cover on their own. By transferring some of the risk to a third party, insurance can protect individuals from the financial burden due to the loss of assets and livelihoods and thus facilitate economic growth after disasters.

A study conducted for the World Bank by Melecky and Raddatz (2011) compares countries with differering insurance penetration and evaluates the post-catastrophe patterns of economic growth. The study finds that countries with high insurance penetration experience a positive Gross Domestic Product (GDP) trend (adding to GDP growth) after a large weather-related catastrophe event. This is in contrast to countries with low insurance penetration that suffer from a negative GDP deviation after an extreme weather event (see Figure 1). Moreover, these countries can experience long-term reductions in GDP if they are not compensated by other growth factors.

2.1 Risk information, reduction and transfer: integrated climate risk management

A resilient climate risk management approach involves a balanced mix of approaches. This includes a comprehensive risk assessment before considering the different options on how to manage these risks. This process can be facilitated by a *layered approach to risk management*.



Note: The figure depicts the mean and possible ranges of weather-related catastrophe-triggered deviation of the GDP. The x-axis represents time in years and the y-axis represents changes in GDP per capita. The solid lines mark the mean developments of GDP change with high (bold line) and low (thin line) insurance penetration, the dotted line marks the range of GDP changes with high insurance penetration, the dashed line with low insurance penetration.

Figure 1: Comparison of GDP (p.c.) after a weather-related loss event in countries with high- and low insurance penetration.
Source: Melecky and Raddatz (2011).

Risk layering separates risks into different segments according to their potential frequency and severity and also considers the roles which can be played by different actors in financing the potential losses. This suggests that for climate-related risks which happen often (high frequency) but which are less serious (low severity), preventative and risk reduction activities[2] may be the most cost effective (layer 1, Figure 2). The more severe and less frequent risks could be transferred to private and public insurance markets (layer 2, Figure 2). However, it is important to note that despite flawless adaptation strategies, climate change may bring some residual risk which cannot be transferred to the insurance market cost-efficiently (see layer 3, Figure 2). UNFCCC (2012, b) defines residual risk as "the loss and damage that remains once all feasible measures (especially adaptation and mitigation) have been implemented". Governments can adopt several approaches to address residual risk, such as finding institutional arrangements, strengthening socio-economic policies, etc.

Insurance approaches should therefore be designed and implemented as part of an *integrated climate risk management approach* that combines an *ex ante* risk assessment to gather information with – in a second step – a decision on how to manage and finance these risks according to the risk layering analysis. This approach is comprised of the following three elements (GIZ 2013):

- → Information and data collection are the basis for properly assessing the underlying risk, *informing* the decision-making process on the most appropriate risk management strategy and *increasing* risk awareness. Necessary information and data requirements include the mapping and costing of risk based on historical data (on both the hazard itself and associated losses), analyses on future hazard trends, risk modelling, vulnerability assessments and profound information on costs and benefits of different risk-management options;

- → Risk prevention/reduction measures are *ex ante* risk management strategies, such as early warning systems, better building codes and enforcement, improving agricultural practices or investments in infrastructure, and should be taken as a first step towards effective risk management;

- → Risk transfer instruments, such as insurance, transfer the financial losses associated with risks that cannot be prevented or reduced.

2 This can include structural measures (such as engineering, retrofitting) and non-structural measures (such as contingency planning, land-use planning, risk-reducing farm-level practices, building codes, population relocation, building public awareness of risks and early warning systems). See: http://unfccc.int/resource/docs/2012/sbi/eng/inf14.pdf

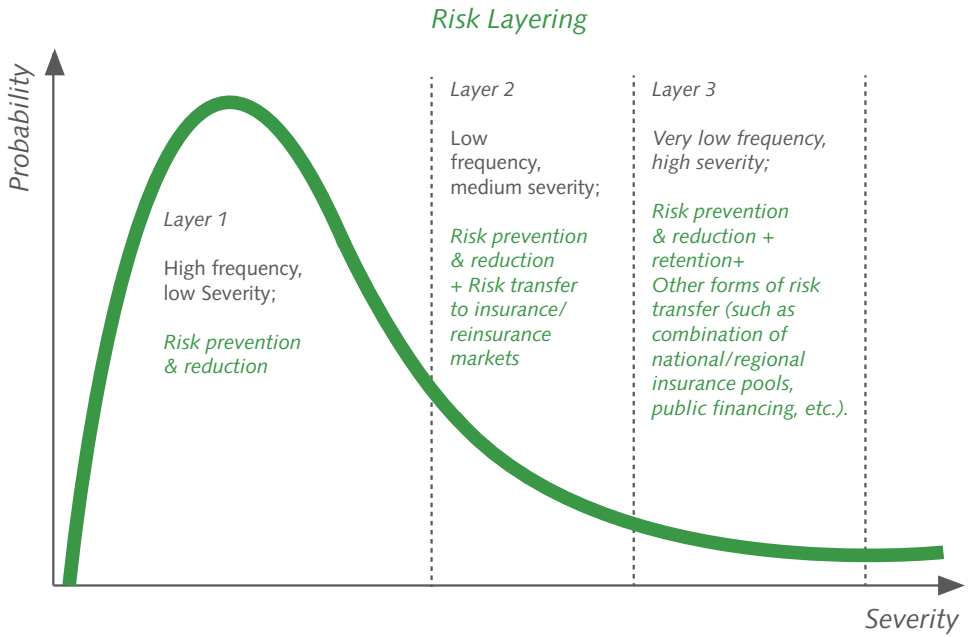


Figure 2: Risk layering approach to support decision-making process in climate risk management. Source: MCII and GIZ, own design, elaborated from World Bank (2011)[3].

3 See:http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTARD/EXTCOMRISMAN/0,,contentMDK:23212196~menuPK:8696956~pagePK:210058~piPK:210062~theSitePK:4827781,00.html

A combination of these different risk management tools can lead to a reduction in costs and an increase in the benefits of using limited private and public funds (UNFCCC 2012,a). The examples below help to demonstrate how countries are currently applying more comprehensive approaches to managing their risks by combining different risk management tools:

a) Early warning and insurance in the Caribbean

The Climate Risk Adaptation and Insurance in the Caribbean project[4] employs an early warning system and risk reduction information in combination with weather-index-based insurance products aimed at low-income individuals and lending institutions exposed to climate stressors. Remote sensing data is used to monitor daily rainfall levels and wind speed. Customers receive weather warnings and advice via SMS phone texts, allowing them to take precautionary measures and reduce exposure before a storm hits. Additionally, customers are supported with training and education modules to help them better understand the insurance product and improve insurance literacy. The overall goal of this project is to incentivize sustainable adaptation measures by incorporating climate risk insurance within a broader framework of disaster risk reduction strategies.[5]

b) A holistic approach to reduced vulnerability in the Horn of Africa

The Horn of Africa Risk Transfer for Adaptation (HARITA) programme, in conjunction with Ethiopia's Productive Safety

Figure 3: Integrated Climate Risk Management Approach. Source: GIZ, own design

4 The Climate Risk Adaptation and Insurance in the Caribbean project is developed and led by the Munich Climate Insurance Initiative (MCII) - hosted at UNU-EHS. The project is implemented by MCII together with its partners, Caribbean Catastrophe Risk Insurance Facility (CCRIF), MicroEnsure and Munich Re. Funding for the project has been provided by the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) under the International Climate Initiative.

5 See: http://www.climate-insurance.org/front_content.php?idart=3592

Net Programme (PSNP), was launched in 2007 to assist farmers in building their resilience to climate change (Oxfam America 2011). It integrates insurance with risk reduction, credit and savings, whereby the poorest farmers can use their labour to pay their premiums. Those farmers who bought insurance work extra days on community projects such as planting grass and trees to mitigate soil and water erosion, while more prosperous farmers pay their premiums in cash. In turn, farmers benefit even when there are no payouts because these risk reduction activities will help them improve their yields and minimize vulnerability to drought. Additionally, with the cushion insurance provides, farmers are more able to take other well-considered risks that allow them to build a more secure future for their families. Today, the programme is known as the R4 Rural Resilience Initiative and aims to expand in Ethiopia and move into other countries (e.g., the R4 Pilot 2013 project in Senegal) in the coming years.[6] When the pilot project was first launched in Ethiopia, 200 households in one village enrolled. In 2012, the R4 exceeded its goal of reaching 15,000 farmers by successfully extending insurance services to more than 70 villages in 11 districts in Tigray, Ethiopia (Oxfam America 2012).

c) Remote sensing-based Information and Insurance for Crops in Emerging economies (RIICE)[7]

By using satellite technology, the RIICE[8] project collects data on rice areas and rice growth in seven Asian countries to reduce the vulnerability of rice smallholders. The use of satellites will facilitate the forecast of rice growth and expected harvest; furthermore, crop losses can be more easily quantified by using this technology. The data collected will serve two purposes: (1) To build up a crop information system that informs governments on potential losses and as such, can trigger preventive measures with regard to food security in the country, and (2) to use the data collected for developing agricultural insurance solutions for rice smallholders.

2.2 The characteristics and role of insurance in climate risk management

Risks that cannot be prevented or reduced in a cost efficient manner can either be retained by risk holders and/or transferred to third parties through financial instruments such as insurance. Risk transfer tools are part of a portfolio of options to manage risks that should be combined in an integrated climate risk management approach as described in the previous section. In the context of climate change, insurance solutions can be effective measures to manage the negative financial effects of unforeseeable low frequency, high severity natural catastrophe events.[9]

Well-designed insurance products help to reduce the economic impact of and facilitate quick recovery after natural catastrophes. In accordance with insurance theory, insurance works by replacing "uncertain prospect of losses with a certainty of making small, regular payments" (Churchill 2006). In turn, it can help protect livelihoods from catastrophic events and in combination with mitigation and risk prevention measures, risk transfer can help to strengthen resilience to climate change.

6 For more information on this project along with the Quarterly Review see: http://www.oxfamamerica.org/issues/insurance/background#sthash.1cz0qiuc.dpuf

7 Project partners are sarmap SA, a Swiss-based technology company, the International Rice Research Institute, Allianz Re, GIZ, the German Development Cooperation – providing capacity building to local aggregators through the programme develoPPP.de on behalf of BMZ, and the Swiss Agency for Development and Cooperation as the main funder of the project.

8 For more information see: http://www.riice.org

9 Today, most of the existing experience revolves around managing extreme events like flooding, windstorms, drought or hail. It is still being discussed how insurance approaches could be applied to also manage large-scale slow-onset climate processes like ocean acidification, sea level rise, desertification, glacial retreat, etc. (see section 3).

As mentioned above, insurance can help manage the financial implication of a certain shock. Ideally, insurance provides timely finance and reduces financial repercussions in the occurrence of a catastrophic event. For example, Haiti received a payment of US$7.75M from the Caribbean Catastrophe Risk Insurance Facility (CCRIF), 14 days after being struck by a devastating earthquake in January 2010. It was estimated that the CCRIF funds received by the Government of Haiti accounted for approximately 50 per cent of the total aid received in the first 10 weeks in the form of direct liquidity by Haiti, inclusive of all international and regional pledges made (CCRIF 2010[10]; SIDSnet 2010[11]).

10 See:http://www.ccrif.org/news/haitian-government-receives-us775m-ccrif-payout

11 See:http://www.sidsnet.org/partnerships/succes-stories/caribbean-catastrophe-risk-insurance-facility-ccrif

A variety of insurance products exists to deal with specific kinds of extreme climatic events. For individuals or households this could include crop insurance against drought, excessive rainfall or other adverse weather events. For communities or governments, insurance products could protect infrastructure or the agricultural sector. Insurance can be organized in many ways and at different levels ranging from individual direct insurance to state-organized insurance of a large group of people as depicted in Table 1. As the table below indicates, the different levels are distinguished by the direct beneficiary of the risk financing or insurance tool – catastrophe bonds and risk pools could play a role on the macro / government level; index-insurance and derivatives primarily benefit larger communities and cooperatives and micro(-index) insurance target low-income households, farmers and enterprises.

	Micro	Meso	Macro
Insured	Individual, group of people	Larger community, associations, cooperatives, etc.	Nation / government
Tools and products	Microinsurance: health, life, property, crops, livestock, index insurance	Derivatives, index insurance	Catastrophe bonds, pools, index insurance

Table 1: Dimensions of insurance: Scale, products, beneficiaries. Source: Table derived from Churchill and Matul 2012.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3. Opportunities and challenges of insurance solutions in the context of climate risk management

3.1 Opportunities

Insurance as a risk management tool provides many benefits to stakeholders - ranging from regions, national governments and communities, to households and individuals. These include:

3.1.1 Incentives for loss reduction and resilience building behaviour

Promoting the use of insurance solutions can lead to increased risk management awareness at the stakeholders' level. This increased awareness has the potential to be translated into risk reduction activities by individuals, thereby strengthening national and community resilience. For instance, in contrast to many government programmes or social security schemes that are either tax-financed or involve cross-subsidization between different population groups, insurance is characterized by risk-based pricing. The price for an insurance product thus varies with the insured's probability of loss. As a consequence, the prospect of

reduction measures, reducing their probability of loss. Additionally, eligibility for payouts can be linked with concrete risk reduction measures. One example is the National Agricultural Insurance Scheme in India. The project tries to encourage farmers to adopt progressive farming practices by offering a discount on the premium to those who have adopted better water conservation and sustainable farming practices (Surminski and Oramas-Dorta 2011). Aside from providing financial incentives for loss reduction, governments along with the private sector can help to integrate policies and incentives for risk reduction in insurance systems. For instance, enhancing early warning systems and risk awareness, implementing zoning and building code standards, investing in public protection infrastructure, along with offering premium support for individual risk reduction activities. In turn, this will have benefits for both the policy-holders and the insurers, since they decrease risk and the cost of the scheme in the long-term.

3.1.2 Decision-making support

Weather extremes put excessive pressure on the economic and social systems which is a challenge for social and economic development. Through the identification and pricing of risks, insurance can help create a space of certainty within which investments and planning can be undertaken. For instance, the compilation and availability of historical and current data and its thorough analysis needed to underpin insurance solutions can generate a public good. Decision makers can then access this to create an environment more conducive to climate-resilient investments in sectors such as tourism and agriculture, and in job creation and market development. It therefore can contribute to national investment decisions and more relevant and effective public policy.

3.1.3 Provision of protection to take risks and pursue opportunities

Insurance can provide the necessary financial security ("peace of mind") to take on risky but productive investments (Cutter et al., 2012). Examples include an accompanying study in Ghana on investment behaviour of smallholder farmers and crop insurance, which shows that insured smallholder farmers invested significantly more in their farms than those without crop insurance. Particularly, Karlan et al., (2012) conducted several experiments in Northern Ghana in which farmers received either cash grants, grants for/or opportunities to purchase rainfall index insurance or a combination of them. After three years of field experiments, the researchers found that insurance leads to significantly larger agricultural investment as well as to riskier production choices. These increased investments led to higher output as Fosu and Dittoh (2011) show in their experiment in Northern Ghana, where an additional expenditure of $60 per acre of fertilizer used generated $215 of additional output per acre.

3.2 Challenges

In addition to the opportunities and potential benefits, there are a number of challenges that need to be considered in the design and implementation of insurance solutions in the context of climate risk management including:

3.2.1 Costs for insurance and complexity

Insurance-related approaches can be relatively expensive for low-income countries, communities and individuals due to high start-up costs, transaction costs and infrastructure requirements

for data collection. The lack of insurance literacy and the complexity of insurance products on the one hand, and low willingness and ability to pay by the customers on the other, can make insurance a "hard sell" for national leaders.[12]

3.2.2 Asymmetric information

Insurance-related approaches must explicitly be designed to incentivize appropriate risk-management behaviour and to reduce asymmetric information problems, i.e., adverse selection and moral hazard. "Adverse selection" may occur when the customers are better informed about their individual risk profile than the insurance company. Thus, potential customers with a higher-than-average risk profile are more likely to buy insurance coverage while low-risk profile customers might not take up insurance as a means to manage their comparatively lower risk. The term "moral hazard" describes undesired "maladaptive" behaviours on the side of the insured, i.e., reduced efforts in risk prevention because of insurance coverage. As the IPCC highlights: "where insurance is not applied without adequate risk reduction it can be a disincentive for adaptation, as individuals may rely on insurance to manage their risks and are left overly exposed to impacts" (Cutter et al., 2012).The risk of adverse selection and moral hazard facing traditional insurance systems are absent in index-based programs because an established parameter or physical trigger is used to determine payout levels. Thus, policyholders will have an incentive to reduce potential losses and favour risk reduction measures due to the potential double benefit of having reduced their risk and getting the insurance payout if the trigger is reached.[13]

3.2.3 Establishment of cost-effective distribution channels

The establishment of cost-effective distribution channels for a pilot initiative to be scaled up nation-wide is a crucial challenge to be addressed. However, selling through existing networks, such as branch networks of insurance or banking companies, branch networks of input suppliers, member networks of large farmer organizations or through the public extension service, could keep transaction costs at a manageable level. Using innovative technologies such as mobile-phone based money systems could also help to keep costs low and reach large numbers.

3.2.4 Scaling-up of small pilot projects

Risks, livelihoods, geographies, micro-climates, coping mechanisms and other factors vary from place to place making it hard to broadly spread and replicate the same insurance product over a large area (see boxes on pages 24–25).

12 People in developing countries often do not have experience with or even a negative perception of insurance products because insurance is not well understood, perceived as costly and claim payment processes are sometimes inefficiently organized and/or delayed. For potential measures to finance climate insurance mechanisms see Box 3 on financial public sector support and section 5 on international financial support.

13 The limitation with index-based insurance is basis risk whereby there is a potential difference between the payout trigger and the actual loss experienced. For some possibilities on how to overcome this, see section 4.3.

Box 1a: Lessons learned from the IIPACC project

GIZ, on behalf of BMU, in collaboration with the National Insurance Commission of Ghana and the Ghana Insurers Association initiated the Innovative Insurance Products for the Adaptation to Climate Change (IIPACC) project.[14] The IIPACC project supported Ghana to establish the Ghana Agricultural Insurance Programme (GAIP) and assists to develop a sustainable agricultura insurance system and introduce innovative and demand-oriented crop insurance products to protect against financial risks resulting from the negative impact of climate change such as excessive rainfall, floods and droughts. GAIP introduced a drought index insurance product for maize farmers in 2011 and expanded this product to sorghum and soya farmers in 2012. In 2013, an Area-Yield-Index product was introduced in three pilot districts for smallholder farmers in addition to that Multiple-Peril Crop Insurance covers for commercial farmers. GAIP further intends to scale-up in terms of numbers of clients, products offered, regions and risks covered. Some lessons learned for this scale-up process are as follows:

→ Creating an environment for a public-private sector dialogue from the beginning of the project is essential (e.g., Steering Committee with all key stakeholders for coordination and governance).

→ Ownership of local stakeholders and proactive public coordination and support is crucial (e.g., including climate-risk insurance as part of the national agricultural policy or climate change adaptation strategies, funding, premium subsidies, coordination with complementary risk management initiatives).

→ Capacity building of the local supply side (designing, pricing, marketing and underwriting of products and claims management) as part of a sustainable approach rather than donor-driven solutions. Supporting in setting up local institutional and organizational structures;

→ Finding cost-effective distribution channels by partnering with risk aggregators (e.g., banks) or actors with a wide network to keep transaction costs low (e.g. branch network of insurance companies) and reach large numbers at the same time. Taking advantage of technology such as the use of mobile phones;

→ Product design has to be based on the local context which can be assessed by a market research ("one size does not fit all"). In Ghana, clients are not interested in products which only cover catastrophic events and make payouts only every 10–12 years but rather in more comprehensive cover, i.e. insurance solutions which pay out more frequently. This poses a challenge for a sustainable scale-up since clients are usually not willing to pay the higher premium rates which go along with more comprehensive insurance covers;

→ Client education on climate risks and the different tools which can be used to tackle these risks. This should also include awareness creation on basic insurance principles; running nation-wide awareness campaigns with support of the government, via different channels specifically designed for the local context, can also help in reaching scale;

→ Improvement of data availability by supporting public actors in setting up additional automatic weather stations and retrieving alternative remotely-sensed datasets for implementing suitable insurance solutions.

Source: GIZ, IIPACC 2013

Box1b: Lessons learned from the Climate Risk Adaptation and Insurance in the Caribbean project

The Caribbean islands of Saint Lucia, Grenada and Jamaica, pioneered a new programme to protect low-income people against extreme weather risks with the Livelihood Protection Policy (LPP), an innovative insurance product launched by the Climate Risk Adaptation and Insurance in the Caribbean project. The LPP is a weather-index-based insurance policy designed to help low-income and vulnerable individuals to recover from damage by heavy rain and strong winds during hurricanes and tropical storms. The project aims to replicate this product across a number of Caribbean countries and thus offers the following potential lessons on achieving scale:

- For insurance to be taken up by neighbouring countries, the product should be flexible and generic to fit the local context;
- The product should initially be designed to be introduced across the region;
- In the case of the Caribbean, a homogenous environment – similar cultural and environmental conditions – can allow for better uptake;
- Countries should actively engage with one another and this includes a sustainable public engagement with relevant stakeholders like private sector and civil society for pro-active management of climate risks;
- For insurance to play an active role in risk management, an enabling risk management environment including access to an early warning system and access to mobile phone technology by final beneficiary should be in place.

Source: Interview with MCII (2013)

14 For more information, see: www.gaip-info.org

15 See: http://www.climate-insurance.org/front_content php?idart=3585

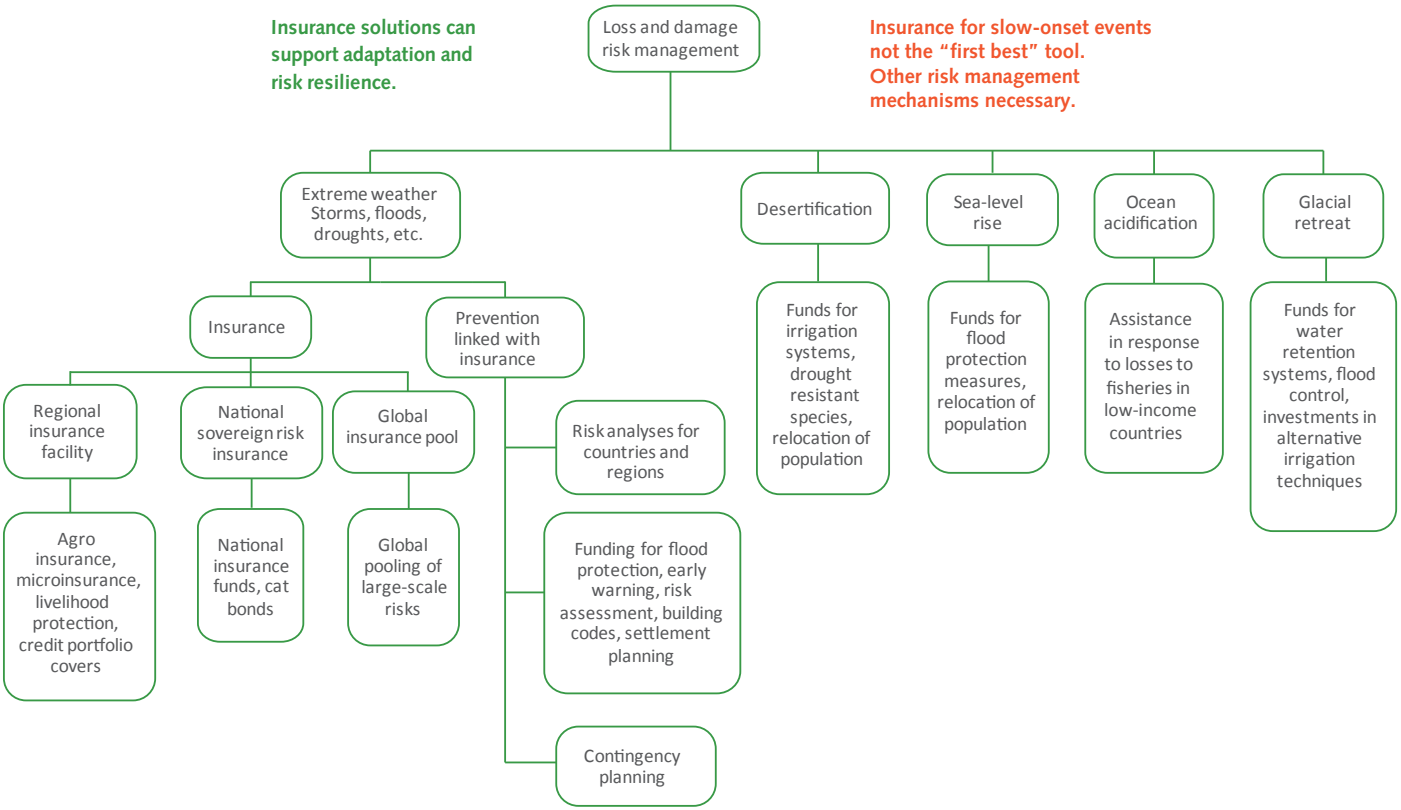

Figure 4: Tree of options for climate risk management.
Source: Derived from MCII Policy Brief: Warner et al., 2012.

3.2.5. Insurance for slow-onset events

In 2007, the Intergovernmental Panel on Climate Change's Fourth Assessment Report (AR4) showed with high or very high confidence that there is a general trend of slow-onset[16] hazards such as increasing temperatures, rising sea levels, glacial melt and the acidification of oceans. Despite appropriate mitigation and adaptation actions being taken, slow-onset events affect mainly developing countries (UNFCCC 2012, b; Siegele 2012). For countries highly exposed to slow-onset climatic processes, traditional risk transfer approaches, such as loss-based insurance, may be unsuitable to insure against longer-term foreseeable climatic stressors, such as sea level rise and desertification. This is because there are two preconditions for the insurability of disasters – namely the unpredictability of a specific event (i.e., losses occur suddenly and cannot be foreseen) and ability to spread risk over time and regions, between individuals/entities (UNFCCC 2012, b). Thus, sea-level rise and desertification already do not meet the insurability criteria as both processes are slow and involve continuous changes that potentially affect the population of one or more countries. Risk retention and transfer alone would be unlikely to sufficiently address some of the dire effects of climate change, which again points to the need for a holistic approach to managing climate risks.

As mentioned above and illustrated in Figure 4, insurance is not generally feasible for slowly developing and foreseeable events or processes which occur with high certainty under different climatic scenarios, and therefore other risk management mechanisms are necessary.

Despite the challenge of insuring slow-onset events, discussions are ongoing on how to use innovative insurance approaches that may apply under certain climatic conditions. For instance, the African Risk Capacity (ARC) programme is a pan-African disaster risk pool that is managed by the African Union to address malnutrition and hunger using a combination of measures – risk transfer, risk retention and risk reduction.[17] The payouts are provided automatically in case of a drought and include an early warning system. The insurance payouts to countries are linked to an *ex ante* contingency plan carried out by the given country. This demonstrates the possible role that risk transfer instruments can play in leveraging the governments to take long-term measures to address climate change impacts as part of national risk management planning (ARC n.d).

16 Adopting the terms proposed by Siegele (2012; 4-5), the distinctions between a "rapid-onset" event and a "slow-onset" event is: "A rapid onset event may be a single, discrete event that occurs in a matter of days or even hours, whereas slow onset events evolve gradually from incremental changes occurring over many years or from an increased frequency or intensity of recurring events."

17 See: http://www.africanriskcapacity.org.


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4. Enabling environment for applying insurance as a tool to address climate risk

Insurance can play a meaningful role in managing climate-related risks if certain preconditions are satisfied: appropriate regulatory environment, long-term commitment of public champions, clear roles of the different public and private actors, cost-effective distribution channels, availability of data, appropriate back-up mechanisms, and investment in risk management education and capacity building of key stakeholders. This section will elaborate on each of these points.

4.1 Appropriate regulatory environment and oversight

Many developing countries with low non-life insurance penetration[18] lack well-functioning supervisory systems and effective regulatory frameworks according to international standards. This can hamper the development of sustainable insurance solutions which can function as climate risk transfer instruments. Therefore, an adequate regulatory and supervisory framework needs to be in place to ensure that insurance undertakings are financially viable and that products are designed and sold in a way that ensures value to the customer. The International Association of Insurance Supervisors (IAIS) established a set of essential principles, called Insurance Core Principles (ICPs), to be adhered to for an insurance supervisory system to be effective and which gives guidance on how these principles can be applied in low-income countries (see box 2).

18 See Figure 5 on Non-life insurance penetration worldwide for 2012.

Especially when dealing with innovations, such as index-based insurance products, or with underserved markets as it is the case in most developing countries and emerging market economies, insurance regulators are usually challenged with a need for assessing and improving their regulatory and supervisory systems and ensuring that proportionate approaches are taken that consider the innovative character of these products, the necessary consumer information and appropriate delivery mechanisms.

There are already some notable examples of countries which started making changes in national regulatory frameworks to enable the development and delivery of microinsurance and other forms of insurance to poorer households such as Ghana, Nigeria and India (Qureshi and Reinhard 2012), as well as Jamaica, Grenada and Saint Lucia (MCII 2013).

4.2 Public champions and the complementary role of key actors

Pro-active management of climate risks requires long-term commitment from public champions, e.g., relevant ministries and public climate and disaster risk management initiatives. This includes a sustained public engagement with relevant stakeholders like the private sector and civil society on building resilience and reducing exposure to climate-related risks. Public-private-partnership approaches, also with international support, are particularly important for low-income countries where pure market-based solutions are often not feasible due to high start-up costs, unavailability of data and limited access or low demand for standard insurance products from the low-income part of the society (MCII Policy brief: Warner et al.,2012). Thus, a joint effort from the public and private sector with support from international development partners, or through international climate financing sources such as the Green Climate Fund, is needed to approach climate-risk management more effectively.

Box 2: Insurance Core Principles (ICPs) – Application Paper on Regulation and Supervision Supporting Inclusive Insurance Markets

The ICPs established by the IAIS, comprise essential principles that need to be adhered to for an insurance supervisory system to be effective. In 2012 the IAIS published the Application Paper on Regulation and Supervision Supporting Inclusive Insurance Markets[19]. Recognizing the intent that the ICPs are universally applicable, the paper provides practical guidance for regulators and supervisors on how to apply an approach proportionate to the nature, scale and complexity of the risk in the specific market context. It shows that some approaches to implementation may be more conducive to enhancing inclusive insurance markets, particularly for those that are underserved. The Paper provides background material and discusses solutions relevant for supervisors, for example how supervisors can deal with innovation and pilot projects. It covers topics such as formalization of informal insurance and supervisory review and reporting that are high on the agenda of developing country supervisors, as well as the issue of how to define microinsurance and what the requirements are that have to be met at a minimum when following a proportionate approach.

19 The Application Paper has benefited much from the contribution of the Access to Insurance Initiative (A2ii) The A2ii is a global partnership with the mission to inspire and support supervisors to promote inclusive and responsible insurance, thereby reducing vulnerability. The Initiative is the implementation partner of the IAIS as Global Standard Setting Body for insurance on access to insurance. For more information, please visit www.a2ii.org.

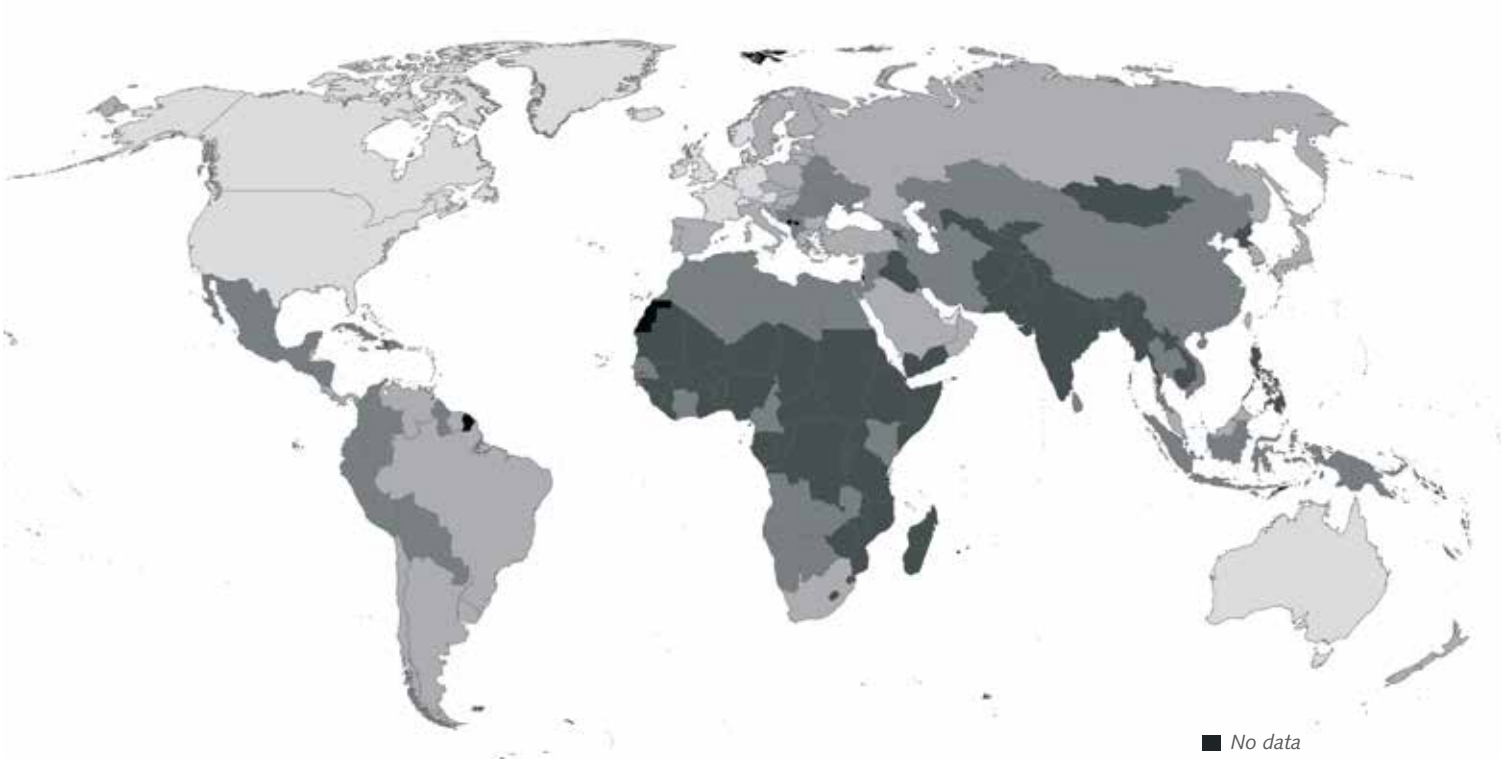

Figure 5: Insurance penetration worldwide 2012.
Source: Munich Re 2012.

4.2.1 Public sector

The importance of a supportive public engagement is emphasized by a study from Surminski and Oramas-Dorta (2011[20]), analysing more than 120 natural hazard risk transfer initiatives in developing countries. The study found that the public sector plays a larger role in countries where a direct link between risk transfer and risk reduction is recorded than in those countries where this link is missing. Public actors play a decisive role in laying the foundation and providing funds for wider operational and support functions. This includes funding of feasibility studies and technical assistance, development of tools such as actuarial models, educational campaigns, capacity building, shaping the regulatory and legal framework and development of data infrastructure. The study shows that in almost 70 per cent of the cases these support functions receive public funding. Apart from this, the public sector was often involved in designing more innovative approaches to overcome the obstacles faced by the private insurance sector (MCII Policy Brief: Warner et al., 2012). Prominent examples include the Ethiopian HARITA programme which takes a holistic approach by linking insurance with risk reduction measures and a social protection scheme and by the Livelihood Protection Programme in the Caribbean which links insurance with early warning and disaster risk reduction measures.

20 This study was performed for the ClimateWise Compendium of Disaster Risk Transfer Initiative. See the following for more details: http://www.climatewise.org.uk/climatewise-compendium

4.2.2 Private sector

In implementing climate risk insurance solutions, the role of the private insurance industry usually comprises of product design, marketing, underwriting, distribution and claims management. According to Surminski and Oramas-Dorta's study (2011), the private sector assumes in almost 90 per cent of all examined cases these core functions. It also shows that the role of the private sector, beyond the core underwriting function, is growing. An integrative risk management approach, i.e., a link between risk information, prevention, reduction and transfer is evident in those countries where the public sector is involved. Nevertheless, the private insurance sector needs to offer long-term commitment in implementing the approach over time. (MCII Policy Brief: Warner et al., 2012; Churchill and Matul, 2012).

4.2.3 Public-private partnership

While public-private partnerships involving insurance companies and governments are common in developed countries, they are more recent in developing countries. However, low-income countries are beginning to experiment with schemes that extend beyond the traditional form of public-private partnerships and include international development partners (Linnerooth-Bayer and Mechler, 2007). For instance, CCRIF's institutional set up is a public-private partnership, in which World Bank instruments and donor funds are accessed by a private company owned and operated by its regional members to support its not-for-profit goals. Strong initial capitalization allows CCRIF to access global private reinsurance markets only where it is cost-effective to do so (Young, 2009).

Box 3: Financial public sector support to climate risk insurance

Governments can provide financial support to climate-related insurance in different forms such as direct premium subsidies, financial support for reinsurance facilities or operational cost subsidies. Subsidies can benefit the customer and target the initial motivation of insurance companies to enter and serve the market. They prove to be especially important for the catastrophic risk layer (see section 2.1) where private reinsurance market costs could be prohibitive (Chantarat et al., 2012). However, there is a controversial discussion on whether sustainable climate-related insurance solutions in developing countries can work without governments financing part of the costs to share catastrophe losses in order to keep insurance affordable and support a large market penetration. A World Bank study of government support to agricultural insurance – an insurance type which is often offering protection from adverse weather events – showed that premium subsidies were the most common form of public intervention provided in almost two thirds of all the 65 surveyed countries (Mahul and Stutley 2010). However, the introduction of subsidies to a market needs to be handled carefully: once a market is subsidized, it will be politically very difficult for the government to reduce its intervention. Furthermore, providing subsidies puts a fiscal burden on national budgets and thus, they should only be used very selectively for those target groups that are in real need of it. It also needs to be carefully considered that subsidies have a potential to distort the market and provide adverse incentives: The Indian agricultural insurance system is one prominent example where the government approved subsidies up to 50 per cent of the premium on crop weather index-insurance business in 2007. In the beginning, public premium subsidies have only been channelled through the Agricultural Insurance Company of India Ltd but in order to create a level playing field on the market, several private sector programmes have also been approved for public premium subsidies (Stutley, 2012).

Box 4: Risk pooling in the Caribbean

Some governments (particularly in small countries), individuals and primary insurers may or do need to rely on a multi-region or multi-country approach that diversifies their risks regionally and even globally. Caribbean island states were the first to form a multi-country (16 Caribbean countries) catastrophe insurance pool for immediate liquidity in the aftermath of hurricanes and earthquakes. It is an example of a private-public partnership as it was developed through funding from the Japanese Government and was capitalized through contributions to a multi-donor Trust Fund by the Government of Canada, the European Union, the World Bank, the governments of the United Kingdom and France, the Caribbean Development Bank and the governments of Ireland and Bermuda, as well as through membership fees paid by participating governments.[21] Other multi-country examples include the African Risk Capacity, the Pacific DRFI Program which builds on the Pacific Catastrophe Risk Assessment and Financing Initiative and the European Solidarity Fund. Some of the lessons learned from implementing a regional risk pool such as CCRIF include:[22]

- Regional pools need to hold a lot of capital to operate and it may divert funding from disaster risk management and climate change adaptation Thus, governance and trust issues arise around using capital to underpin a sustainable insurance mechanism. Another issue relates to the source of initial capital as modalities for donor contributions are evolving but they still require governance controls;

- During the initial stages, there is usually a need for a critical mass of countries – both to make the economics work but also to demonstrate to donors that the countries really want the pool to happen;

- Risk assessment and parametric model needs to be in place before countries can join the pool;

- The Caribbean countries will not be strictly in a single pool – there will be some segregation of risk so that the exposure of one region to the other is separated. Although this somehow diminishes the diversification benefits, there are many other benefits to joining an existing pool to both new countries coming in and existing Caribbean countries such as helping to overcome the political and governance challenges.

Source: Simon Young, independent interview

21 See: http://www.ccrif.org/content/about-us.
22 Simon Young, independent interview.

4.2.4 Development partners

Many international development partners, i.e., bilateral and multilateral donors and Non-Governmental Organizations are playing a role in supporting developing countries in designing and implementing risk transfer solutions (Surminski and Oramas-Dorta, 2011). Their roles include:

- Initiating the risk transfer schemes;
- Funding high initial investments such as improving the data collection network coverage or developing an information technology which supports data collection, product development and management;
- Providing organizational and technical capacity building for local key stakeholders;
- Supporting the development of an enabling legal and regulatory framework for climate insurance (see section 3.1);
- Facilitating the access to global reinsurance markets;
- Supporting awareness creation and client education;
- Strengthening international dialogue and disseminating best practices.

4.3. Availability of data and hazard mapping

Reliable data is essential for pricing risk and for understanding the different options for managing climate risks (including insurance). Ideally, the data is of high quality, uninterrupted and open source for historical data sets (minimum 20-30 years), current weather data (ground and satellite) and future climate modelling. However, countries interested in exploring risk transfer solutions frequently have to deal with inhomogeneous, inadequate or inappropriate data (MCII Policy Brief: Warner et al., 2012). By exploring ways for appropriate risk transfer solutions, governments and supporting international development partners, including the private sector, can benefit from an open and regular exchange of relevant data. There are other preconditions that need to be in place to overcome the aforementioned obstacles:

- Insurance risk assessment can facilitate regional data analysis and help establish data standards, methods and data repositories;
- Open-source initiatives for catastrophe risk models along with standardized hazard maps (e.g., providing river flood zones, extreme precipitation estimation, wind speed zones) are a further step toward reducing the cost of risk analysis in both the traditional and alternative risk transfer areas. Access to pricing tools underpinned by free open source risk data can cut the cost of underwriting for insurers operating in both high-income and developing countries (World Bank 2011);
- New technologies such as satellite data and simulation models are being explored to overcome data limitations and basis risk as is the case in the HARITA project, index-based livestock insurance in Nigeria or the RIICE project in Asia;
- With regard to infrastructure costs, weather stations can be used for multiple services (e.g., some data providers sell data to commercial farmers, newspapers, media companies, agricultural processors, etc.) to further reduce the costs of collecting data (Hazell et al., 2010).

Box 5: Use of innovative technologies: Satellite Data

In 2010 an innovative index-based livestock insurance (IBLI) was introduced in Nigeria. It is based on satellite data which provide a measurement of the quality of the pastureland every 10–16 days. The data is then incorporated into a statistical model of livestock mortality that the IBLI team developed using historical data from the region. When the statistical model predicts livestock mortality in excess of a critical threshold (15 per cent) over a predetermined area, the pastoralists receive a payout, thereby allowing them to manage their individual risk (Carter et al., 2011).

Data from remote sensing has two advantages: firstly, it cannot be easily tampered with and secondly, it is available across large areas of the globe in real time via the Internet. However, data from satellites can be of limited quality, and the satellites with the highest resolution often do not have global coverage and might come at a high cost. New technology such as the Normalized Difference Vegetation Index (NDVI) comes from satellite measures of vegetative "greenness", which should correspond to the level of photosynthesis on the ground (and thus help calculate the healthiness and abundance of crops). In India in 2005, the Agricultural Insurance Company of India Ltd introduced an index insurance product in Haryana and Punjab States to cover wheat using NDVI, though this faced problems because of cloud cover during critical growth periods. This example illustrates why remotely sensed data may be most useful when they complement other types of information (Hazell et al., 2010). In Asia, the RIICE project makes use of innovative remote sensing technology to increase information on rice growing areas and expected rice yields as well as provide access to insurance solutions based on this technology. In contrast to most projects which use "traditional" image-based satellite data, the RIICE technology is radar-based and hence works regardless of weather conditions such as clouds.

4.4. Establishment of cost-effective distribution channels

Experiences have shown that finding efficient and cost-effective distribution channels is often one of the main limitations to scale-up existing pilot initiatives. In order to effectively reach a large client base, cost-effective distribution channels have to be created. For example, the Livelihood Protection Policy (LPP) in the Caribbean Island of St. Lucia sells their product through a number of distribution channels such as "credit unions and cooperative banks to better reach the target clients".[23]

Ideally, distribution partners also contribute to risk reduction measures such as through education and outreach along with timely information about approaching weather systems (e.g., dissemination of early warning).

4.5. Appropriate back-up mechanisms

Appropriate "back-up" mechanism such as reinsurance or a safety net to meet exceptionally high claims is important for the primary insurance provider. Often, the private sector reinsurance markets are involved in covering some portion of the largest risks a country or sector may face from extreme weather events (MCII Policy Brief: Warner et al., 2012; Michel-Kerjan and Morlaye, 2008). The Munich Re Foundation (in Churchill and Matul, 2012) provides the following ways in which reinsurance can help reduce volatility and can be a prerequisite for sustainability in the context of climate change:

- In the case of high severity events, reinsurers can support insurers by sharing the losses and thus, stabilizing the financial conditions of the insurance company;
- Reinsurance can enable insurance companies to increase their underwriting capacity and to meet the regulatory capital requirements;
- Reinsurers can support insurance companies and markets especially in low-income countries and emerging markets by providing additional services to them including technical assistance, training and support in the product development stage.

4.6. Risk management education

Investment in risk management education and responsible management of clients is necessary to increase insurance literacy of both consumers and providers. This includes training on insurance approaches and risk reduction, financial risk management, as well as on the use of early warning systems. Along with this, it is necessary to make clients understand the benefits and costs of the coverage they are about to purchase before potential clients sign up. Clear rules and regulations on responsible finance are needed to ensure that providers of risk transfer solutions have a sound understanding of the tools, the underlying technical issues and how to educate and protect consumers at the local level.

23 See: http://www.microensure.com/news.asp?id=265&start=0

Box 6: Insurance literacy – an example from Peru

The "Insurance for Climate Change Adaptation Project", implemented by GIZ on behalf of the BMU, in Peru[24] has developed several financial literacy materials and methods. Through the website of the project, international workshops and capacity-building events, the technical information regarding insurance products for climate change adaptation is made available. Additionally, there are several technical papers on index insurance for climate change adaptation in English and Spanish, which help to spread knowledge on risk transfer and index insurance. With the collaboration of the University for International Cooperation of Costa Rica, a Diploma Course on Index Insurance for Risk Management and Adaptation to Climate Change is being carried out. The Superintendence of Banking, Insurance and private pension funds (SBS) in Peru in Cooperation with the Inter-American Institute for Cooperation on Agriculture in Uruguay and GIZ developed an online course on agricultural insurance. Additionally, insurance awareness campaigns using brochures, posters, theatre and radio programmes were carried out in rural areas targeted at producer associations and regional governments and in schools together with the Superintendence for Banking and Insurance.

24 See http://seguros.riesgoycambioclimatico.org/index.html

5. Considerations on the role of the international community

5.1. Current international governance and current risk management initiatives

UNFCCC, which includes adaptation to the adverse effects of climate change, and the Hyogo Framework for Action (HFA), set-up to reduce disaster risk, are the two prominent processes for current risk management initiatives (Burton et al., 2012). In this context, UNFCCC and HFA have increasingly expressed their intention to integrate risk transfer and other risk financing mechanisms into climate risk management. The Cancun Adaptation Framework, which resulted from the 2010 United Nations Climate Change Conference, invites Parties to the Document to enhance action on climate change adaptation through nine action areas. One of these action areas is enhancing climate-related disaster risk reduction strategies, taking into the account the Hyogo Framework for Action 2005–2015. This action area specifically promotes risk assessment and management as well as risk sharing and transfer mechanisms such as insurance at local, national, sub-regional and regional levels. Furthermore, it suggests the possible development of a climate risk insurance facility to address impacts associated with severe weather events (United Nations 2010).

Additionally, the HFA 2005–2015 identifies the need to promote the development of financial risk transfer mechanisms, including insurance, as a priority action for building the resilience of nations and communities to recover after disasters (World Bank, 2011). With this, the Global Facility for Disaster Reduction and Recovery (GFDRR) Disaster Risk Financing and Insurance (DRFI) Program[25] was established to support the implementation of the HFA 2005–2015. Priority Action Number Four of the HFA's five priority actions to reduce disaster losses is to reduce underlying risk factors. A key activity under this priority action is the promotion of the development of financial risk management mechanisms. While this recommendation is only one among many, the need for innovative risk financing and insurance mechanisms is relevant to developing countries exposed to natural hazards[26].

5.2. Opportunities and strategies for the international community in linking climate risk insurance into an integrated climate risk management approach

There are options for the international community to support the design and implementation of country-driven comprehensive climate risk management strategies and approaches that include risk transfer and risk-sharing mechanisms. These approaches particularly try to help overcome some of the current obstacles (see section 3.2) for countries to employ risk transfer solutions in a broader toolset for climate risk management.

It is recommended that the international community engages in the following activities:

- Fostering a better understanding on combination of tools and approaches. For instance, risk retention and risk transfer alone would be unlikely to sufficiently address some of the dire effects of climate change, therefore more information is needed on combinations of existing approaches and innovations to manage loss and damage associated with extreme events and slow onset climatic processes;

- Facilitating a regional and international dialogue to advance policy coherence on integrated climate risk management, including risk transfer and risk sharing instruments. This can improve the conditions under which decision makers and regulators can make appropriate regional and national financial risk management tools;

- Many innovative risk transfer mechanisms are currently being designed in a way that meets the needs and priorities of low-income and vulnerable people. The international community can help to replicate good practices across and between countries;

- Providing guidance on how to overcome operational challenges (such as lack of technical expertise) in setting up weather-based insurance in developing countries. This will require technical assistance to facilitate dialogue between and across countries on experiences in designing and implementing insurance instruments in combination with other tools to address the impacts of extreme weather events;

- Financial support to advance a climate insurance approach through existing adaptation programmes: Countries and international bodies such as UNFCCC can consider including

25 Disaster Risk Financing and Insurance can be broadly defined as financial protection against natural disasters. The DRFI Program promotes the GFDRR's mission to mainstream disaster risk reduction and climate change adaptation in country development strategies by supporting a country-led and managed implementation of the HFA. GFDRR promotes DRFI as one of five pillars in its comprehensive disaster risk management framework. GFDRR supports developing countries in incorporating disaster risk financing and insurance as part of their national disaster risk management strategies by providing capacity building and technical assistance for the design and implementation of affordable and cost-effective disaster risk financing and insurance programmes. See this link for additional information https://www.gfdrr.org/node/337.

26 See: https://www.gfdrr.org/node/337.

elements of a climate insurance approach in their concrete adaptation activities. There are proposals on how to raise money for these funds that are guided by Art. 3.1 of the Framework Convention, which states that "Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities."[27] In keeping with this principle, this can be translated to adaptation financing based criteria such as capability ("ability to pay") and responsibility ("polluter pays") (MCII, 2008). In turn, with regard to equity, countries with larger per capita emissions can contribute to the insurance premium, which also sets an incentive for mitigation of climate risks. However, to avoid the incentives for maladaptation through lowering the price of risk, the financial support can target administrative and capital costs (MCII policy brief: Warner et al., 2012). For example, the Green Climate Fund, Adaptation Fund and other measures might provide medium and long-term funding for risk transfer mechanisms for developing countries to address adaptation needs. Additionally, possible loss and damage initiatives or existing national funds that have been set up to support adaptation related measures can be used to complement insurance-related activities, but without undermining traditional coping mechanisms.[28]

27 See: http://unfccc.int/essential_background/convention/background/items/1355.php

28 For example, in 2008, the German Federal Environment Ministry (BMU) established the International Climate Initiative (ICI) to strengthen cooperation between the German Government and developing and transition countries and emerging economies, in order to mitigate and adapt to climate change, and preserve biodiversity. This innovative financing mechanism has enabled Germany to support projects such as the "Climate Risk Adaptation and Insurance in the Caribbean project,"Innovative Insurance Products for the Adaptation to Climate Change" in Ghana, "Adaptation to Climate Change and Insurance" in Kenya, and further measures in the areas of climate change around the world. A similar model and process can be initiated by the UNFCCC to bring risk transfer solutions to vulnerable countries against the impacts of climate change.

Glossary of Terms[29]

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.

Adverse selection: Adverse selection may occur, if the customers are better informed about their individual risk profile than the insurance company. Thus, potential customers with a higher-than-average risk profile are more likely to buy insurance coverage while low-risk profile customers might not take up insurance as a means to manage their low risk.

Basis risk: This technical term is a major constraint of index insurance products and describes the potential difference between the payout triggered and actual loss experienced by the farmer on the field.

Catastrophe bond: High-yielding debt instrument, usually insurance-linked, which gives the issuer the right to defer or even cancel the payment of either the interest and/or principal in the event of a pre-specified catastrophe such as an earthquake.

Climate change: UNFCCC defines climate change as: "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods".[30] Thus, UNFCCC makes a distinction between climate change attributable to human activities altering the atmospheric composition, and climate variability attributable to natural causes.[31]

Indemnity: The amount paid by the insurer to the insured, this can be in the form of cash, repair, replacement or reinstatement, in the event of an insured loss.

Moral hazard: The term "moral hazard" describes undesired or "maladaptive" behaviours on the part of the insured, i.e., reduced efforts in risk prevention because of insurance coverage.

Weather-based-index insurance: Index insurance products are a type of insurance which does not indemnify the pure loss, but *ex ante* agree to make a payment based on a proxy for the loss, i.e. a triggering event is pre-defined in the contract. In the case of weather-based-index insurance this triggering event could be for example based on a certain amount of rainfall or windspeed.

Premium: The monetary sum payable by the insured to the insurer for the period (or term) of insurance granted by the policy.

Reinsurance: When the total exposure of a risk or group of risks presents the potential for losses beyond the limit that is prudent for an insurance company to carry, the insurance company may purchase reinsurance (that is, insurance of the insurance).

Resilience: The ability of a system and its component parts to anticipate, absorb, accommodate or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration or improvement of its essential basic structures and functions.

Risk pooling: The aggregation of individual risks for the purpose of managing the consequences of independent risks.

Risk transfer: The process of shifting the burden of financial loss or responsibility for risk financing to another party, through insurance, reinsurance, legislation or other means.

29 Source: World Bank 2011; IPCC 2012
30 see Article 2 of UNFCCC: http://unfccc.int/essential_background/convention/background/items/2536.php.
31 IPCC 2012

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About UNU-EHS

The United Nations University (UNU) – the academic arm of the United Nations system – implements research and educational programmes in the area of sustainable development, with the particular aim of assisting developing countries.

The United Nations University Institute for Environment and Human Security (UNU-EHS) addresses risk and vulnerability aspects of human security and the consequences of complex environmental hazards for sustainable development.

For more information, please visit: *http://www.ehs.unu.edu*

About MCII

The Munich Climate Insurance Initiative (MCII) was launched in April 2005 in response to the growing realization that insurance-related solutions can play a role in adaptation to climate change, as advocated in the Framework Convention and the Kyoto Protocol. This initiative brings together insurers, experts on climate change and adaptation, NGOs and policy researchers who intend on finding solutions to the risks posed by climate change. MCII provides a forum and gathering point for insurance-related expertise on climate change impact issues. MCII is hosted at UNU-EHS in Bonn, Germany.

For more information, please visit:
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About GIZ:

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH offers customized solutions to complex challenges. GIZ is an experienced service provider and assists the German government in achieving its objectives in the field of international cooperation. GIZ offers demand-driven, tailor-made and effective services for sustainable development.

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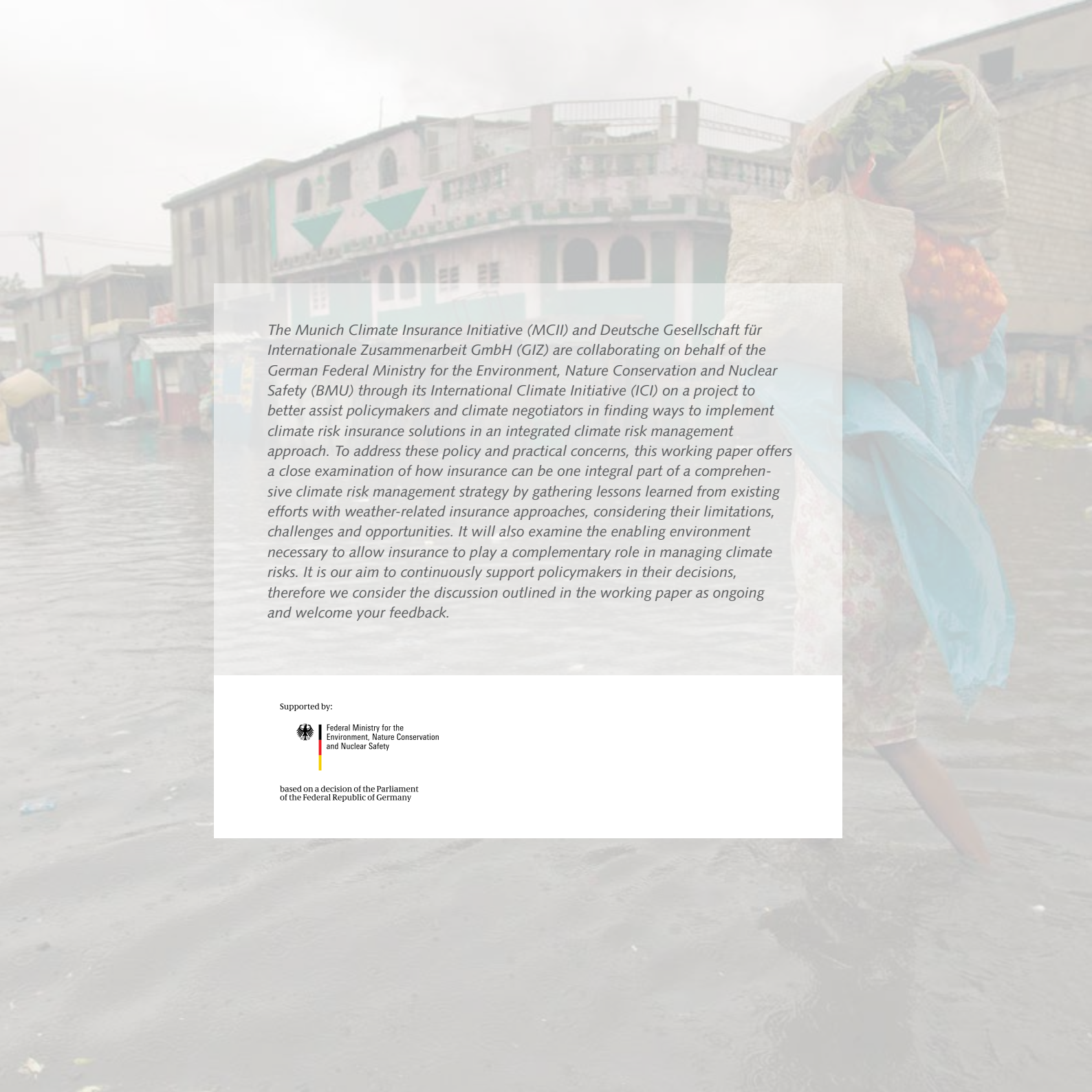

The Munich Climate Insurance Initiative (MCII) and Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) are collaborating on behalf of the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) through its International Climate Initiative (ICI) on a project to better assist policymakers and climate negotiators in finding ways to implement climate risk insurance solutions in an integrated climate risk management approach. To address these policy and practical concerns, this working paper offers a close examination of how insurance can be one integral part of a comprehensive climate risk management strategy by gathering lessons learned from existing efforts with weather-related insurance approaches, considering their limitations, challenges and opportunities. It will also examine the enabling environment necessary to allow insurance to play a complementary role in managing climate risks. It is our aim to continuously support policymakers in their decisions, therefore we consider the discussion outlined in the working paper as ongoing and welcome your feedback.

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