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Policy paper

December 2011

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Grantham Research Institute on Climate Change and
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Building Effective and Sustainable Risk Transfer Initiatives in Low- and Middle-Income Economies: what can we learn from existing insurance schemes? A contribution to the United Nations Framework on Convention Climate Change (UNFCCC) Work Programme on Loss and Damage

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EXECUTIVE SUMMARY AND KEY MESSAGES

Risk transfer is widely recognized as a tool for increasing financial resilience to severe weather events. But the penetration of risk transfer instruments in developing countries is still comparatively low. Negotiators for Parties to the United Nations Framework Convention on Climate Change (UNFCCC) are currently exploring if and how risk transfer mechanisms could enhance adaptation efforts in those countries that are most vulnerable and exposed to the impacts of extreme weather events that are expected to be affected by climate change. One concept that is being investigated is a climate insurance facility.

This paper is intended to inform the UNFCCC's discussions about 'Loss and Damage' by providing evidence-based information about existing risk transfer schemes in developing countries. We examine 123 natural hazard risk transfer initiatives from the ClimateWise Compendium of Disaster Risk Transfer Initiatives in the Developing World, collated by the ClimateWise insurance initiative. This new database has been created to bring together the existing knowledge about risk transfer schemes in developing countries and offers a snapshot of current risk transfer activities in low- and middle-income countries. This paper contains a high-level analysis of the database content with a focus on scope and operational features, the linkages between risk transfer and risk reduction, and the roles of private and public sector players. The key findings can be summarised as follows:

1. Existing risk transfer schemes come in many different forms - they often have very different objectives and operational approaches. A range of schemes exist that are specific to one particular locality, sector or country. This supports the view that there is no 'one-size-fits-all' solution.
2. There is very limited evidence of existing schemes taking into account the risk of climate change. Only one of the operational schemes listed in The Compendium explicitly addresses the impacts of climate change. There are 35 schemes that show an explicit link to the concept of disaster risk reduction: 40% of those state a direct operational link, for example through incentives and insurance terms,

while the other 60% show an indirect link to a broader disaster risk reduction program.

3. The roles played by public, private and third sector players differ from scheme to scheme. The private sector provides risk transfer in 89% of schemes, and dominates this function across all regions and scheme types. Public funds are being used for implementation and operational functions in 68% of all schemes.
4. For the majority of schemes (14 out of 16) where a direct link between risk transfer and risk reduction has been identified, the public sector is involved in financing. This suggests that broad partnerships are key to unlocking the adaptation potential of risk transfer schemes.
5. Assessing the effectiveness and sustainability of a risk transfer scheme, particularly in the context of climate adaptation, remains a challenge. This goes beyond pure economic cost-benefit analysis, and it needs to include the recognition of the different stakeholder objectives such as vulnerability reduction, commercial viability, affordability, and the financial sustainability of a scheme in the context of changing risk levels due to climate change. The Compendium sheds some light on this, but further work is required.

We consider this paper to be a first attempt to analyse information contained in The Compendium. Learning from existing risk transfer schemes can be very valuable, and we see scope in the future to link The Compendium with the growing case study literature that has become available for some risk transfer schemes. This may ultimately aid the development of a methodology to assess the effectiveness and sustainability of risk transfer schemes under a global adaptation framework.

I. INTRODUCTION

Developing countries are already heavily exposed to the impact of extreme weather events, and often lack the resources and expertise to respond to the risks posed by drought, floods, windstorms and other meteorological phenomena. Climate change is expected to change the intensity, frequency and distribution of extreme weather events in many parts of the world, causing an increase in risks for many low-income countries which has led to an intensification of international efforts to respond to this challenge over the last few years. The United Nations Framework Convention on Climate Change (UNFCCC) has now recognised the importance of assisting vulnerable countries with the management of climate risks. The Cancùn Adaptation Framework, an outcome of the 16th session of the Conference of Parties to the UNFCCC, highlights the need to strengthen international cooperation and expertise to understand and reduce loss and damage associated with the adverse effects of climate change¹. The Subsidiary Body for Implementation (SBI) has initiated a new work programme on 'Loss and Damage'. One particular focus of this work stream is the proposal to create a climate insurance facility. This constitutes a recognition that risk transfer is still in its infancy in most developing countries, with most low-income countries showing very low insurance penetration rates.²

Risk transfer has been used for centuries as a tool to manage the risk of uncertain losses. Its most basic and common used form is insurance, a mechanism whereby an individual or organisation (the insured) transfers part of their risk to another party (the insurer) in return for a payment (the premium); if the insured experiences a loss or if a certain pre-defined event occurs, the insurer pays out a previously agreed amount.³ More recently a range of new risk transfer instruments have been developed allowing insurers and reinsurers to use capital markets as an alternative to traditional types of cover. This securitization of risk allows insurance-related risks to be transferred to capital markets through bonds, options or other financial instruments.

While risk transfer is no 'magic solution' for all climate risks faced by developing countries, there is evidence that it can play a cost-effective role in a country's efforts to increase its resilience, especially when compared to ex-post disaster aid. If applied correctly, risk transfer has the potential to be an important part of a country's adaptation and economic development plan.⁴

During the process of shaping the SBI 'Work Programme on Loss and Damage', a range of open questions emerged about the potential utilisation of risk transfer for climate

¹ Contained in /CP.16 (UNFCCC/AWGLCA/2010/L.7), paragraphs 25-29, http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf

² Closing the financial gap. New partnerships between the public and private sectors to finance disaster risks. Swiss Re 2011

³ Ranger, Surminski and Silver - http://unfccc.int/parties_observers/ngo/submissions/items/3689.php

⁴ For example: Linnerooth-Bayer et.al. (2011): Insurance against losses from natural disasters in developing countries. evidence, gaps, and the way forward. Journal of Integrated Disaster Risk Management 1(1).

adaptation. While most of these questions address technical and operational considerations, two overarching themes have emerged: the consideration of the roles of public and private players and the linkage between risk transfer and risk reduction.

Guided by these open questions, this paper provides evidence-based information about existing risk transfer schemes in developing countries, with the aim of informing the current discussions on 'Loss and Damage' as part of the UNFCCC process, and providing analysis about how to build effective and sustainable risk transfer initiatives.

To obtain evidence, we examine 123 risk transfer initiatives presented in the Compendium of Disaster Risk Transfer Initiatives in the Developing World that has been collated by the ClimateWise insurance initiative. This new database has been created to bring together the existing knowledge about risk transfer schemes in developing countries.⁵ The Compendium, while not complete and being constantly updated and extended, does provide a unique overview of the design and operational features of existing schemes, and offers evidence of the different roles of private and public players. The database provides a snapshot, drawing together relevant analysis. It captures a key aspect identified under the Work Programme on Loss and Damage - the pooling of expertise and the sharing of knowledge about existing initiatives and schemes.

The objective is to enhance the knowledge base for donors, insurers, governments and broader practitioners operating in disaster risk management and insurance in low and lower-middle-income economies. While we believe that risk transfer solutions can play an important role in increasing a country's climate resilience and supporting its economic growth, we are concerned that, if wrongly designed, they could actually aggregate risks, create moral hazard, and lead to a waste of public funds.

The paper is organised as follows: after a brief description of the methodology, our analysis is presented in three subsections

- design and operational issues;
- the linkage between risk transfer and risk reduction; and
- the roles of the public and private sectors.

We conclude by discussing the implications of our findings for the current discussions about the Work Programme on Loss and Damage.

This paper offers the first high-level analysis of The Compendium dataset, but a more detailed analysis of some of the schemes, carried out in close collaboration with Parties, stakeholders and experts will complement this process and provide further insights. This work will continue as more evidence about schemes becomes available.

⁵ Compendium of Disaster Risk Transfer Initiatives in the Developing World. ClimateWise, 2011

II. METHODOLOGY AND APPROACH

This paper provides an empirical assessment of existing disaster risk transfer schemes in developing countries, based on analyses of a representative subset of those initiatives as recorded by the Compendium of Disaster Risk Transfer Initiatives in the Developing World, generated by ClimateWise, an international organisation drawing together members of the private insurance industry, and facilitated by the Cambridge Programme for Sustainability Leadership (CPSL).

The Compendium documents existing initiatives in middle-income and lower-income countries that involve the transfer of financial risk associated with the occurrence of natural hazards.⁶ The Compendium captures:

- schemes that make use of ex-ante risk transfer instruments, including indemnity and index-based insurance and insurance-linked securities (e.g. catastrophe bonds, catastrophe swaps, and weather hedges);
- schemes in which the public sector, the private sector or both (as public-private partnerships) play a role in their set up and operation; and
- schemes that have been implemented (fully operational or as pilots) and proposed schemes that are at a reasonably advanced conceptual stage.⁷

The current version of The Compendium corresponds to the first iteration of the information-gathering process, and therefore provides an illustrative subset of the total of risk transfer initiatives in the countries of interest. A total of 123 schemes have been recorded so far.⁸ Table 1 below shows the breakdown of these schemes according to their operational status. The present study focuses on operational, pilot and discontinued schemes (a total of 101 initiatives) and does not consider proposed schemes.

Operational status	Number of schemes
Operational	76 (61.8%)
Pilot	17 (13.8%)
Discontinued	8 (6.5%)
Proposed	22 (17.9%)

Table 1: Operational status (operational, pilot, discontinued or proposed) of schemes contained in The Compendium.

Our analysis in this paper provides the first high-level application of the data to the needs of the UNFCCC Work Programme on Loss and Damage. We have been guided by the open

⁶ The Compendium mainly includes schemes that cover weather-related hazards, as well as three earthquake schemes.

⁷ While The Compendium includes 'proposed' schemes that are at an advanced conceptual stage, they have not been considered in the analyses presented here.

⁸ Compendium of Disaster Risk Transfer Initiatives in the Developing World. ClimateWise, 2011

questions listed under the work stream, which can be broadly divided into three different groups:

- scope and operation of risk transfer schemes;
- links from adaptation and physical risk reduction to risk transfer; and
- roles of public and private sector.

Our analysis is purely based on information provided in The Compendium. We recognise that this approach comes with a range of limitations, mainly including a possible reporting bias. The Compendium is a snapshot and is not complete; new schemes will be emerging, others may be closing or refocusing. And, for those schemes that are included, the publicly available information might not be comprehensive enough, and detailed data gathering would be required.⁹ Recognising these limitations we will conduct a more in-depth analysis of a range of schemes listed in The Compendium, involving stakeholder interviews, to gain more insight into the roles of public and private players and the potential for linking risk transfer and risk reduction, as well as the question of effectiveness.

III. EVIDENCE FROM THE DATABASE

A Scope and operation of risk transfer schemes

In this section we summarise our findings about the geographical reach and scope of the risk transfer schemes included in The Compendium.

Geographical reach

Looking at the number of schemes by geographical reach and by country income level¹⁰ (Figure 1), we find that national level schemes dominate in upper-middle-income economies, while most schemes in low-income economies operate at the local level. Lower-middle-income economies show a more balanced mix.

⁹ According to ClimateWise, The Compendium is considered to be a 'live document', which includes information that is as complete as possible about existing schemes in the considered countries. The present version of The Compendium corresponds to the first iteration of the information-gathering process, and therefore provides an illustrative subset of the total of risk transfer initiatives in the countries of interest.

¹⁰ The classification of income groups in the database is based on the World Bank's income group classification of economies (January 2011), based on 2009 gross national income (GNI) per capita, and calculated using the World Bank Atlas method.

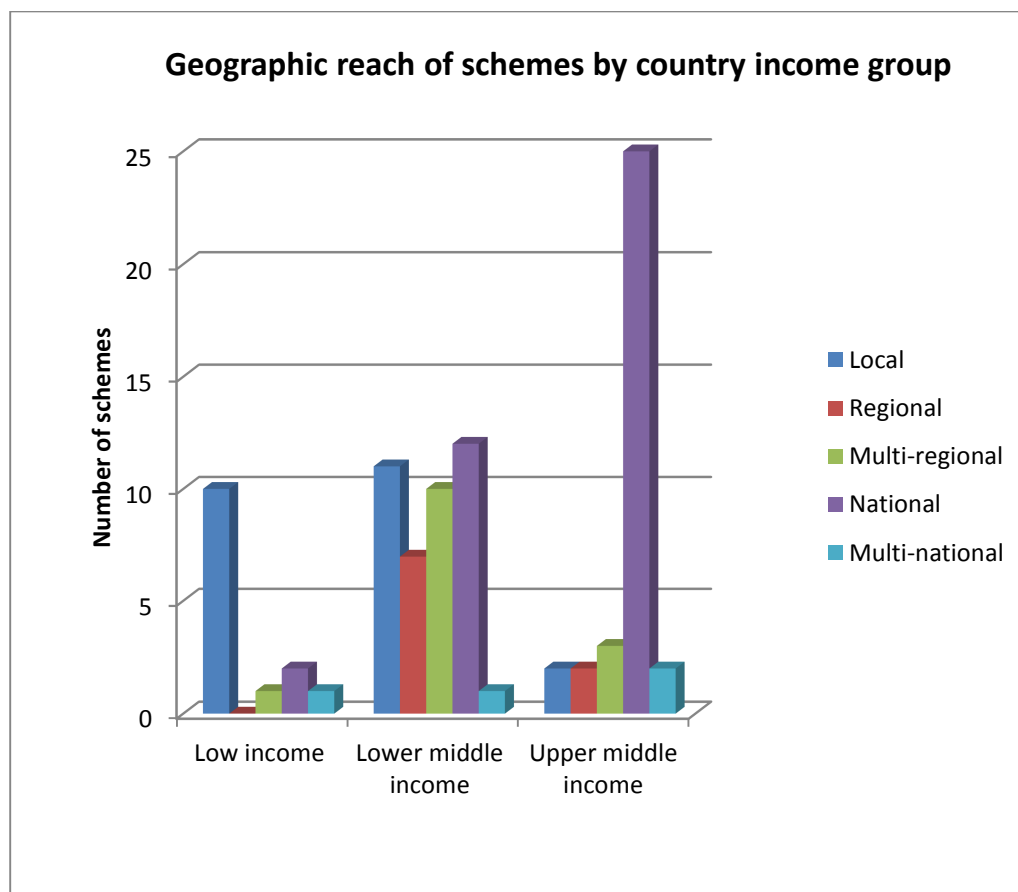


Figure 1: Number of schemes by geographical reach/ scale and by country income level. Legend indicates the different geographic levels considered.

Our analysis of the different types of risk transfer schemes¹¹ and their geographical reach (Figure 2) shows a significant dominance of agricultural schemes in all regions (68 of 93

¹¹ Classification of schemes (based on World Bank definitions):

- *Sovereign disaster risk transfer*: strategies that aim to increase the financial response capacity of governments in the aftermath of natural disasters, while protecting their long-term fiscal balances, through the use of risk transfer instruments including insurance and insurance-linked securities (e.g. catastrophe bonds, catastrophe swaps, and weather hedges).
- *Property catastrophe risk insurance*: these schemes aim at developing catastrophe insurance markets and increasing property catastrophe insurance penetration among homeowners, small and medium enterprises, and public entities.
- *Agricultural insurance*: these schemes aim at developing programs for farmers, herders and agricultural financing institutions (e.g. rural banks, microfinance institutions) to increase their financial resilience to adverse natural hazards. These schemes have been sub-classified as “index-based” or “indemnity-based”, according to the type of insurance instrument used. Agricultural insurance schemes covering low income farmers have been classified as “agricultural insurance”, rather than under “disaster micro-insurance”.
- *Disaster micro-insurance*: schemes that facilitate access to disaster insurance products to protect the livelihoods of the poor against extreme events.

operational schemes i.e. 73%). This is not surprising, as agriculture is the largest sector in most developing countries and is also highly exposed to natural hazards.

For the East Asia & Pacific and South Asia regions, we note a high proportion of index-based insurance and micro-insurance schemes. It is important to note that in some countries index-based risk transfer is not permitted by the insurance regulator. Across all regions property catastrophe risk transfers are the least common. The Latin America and the Caribbean region shows the highest concentration of schemes.

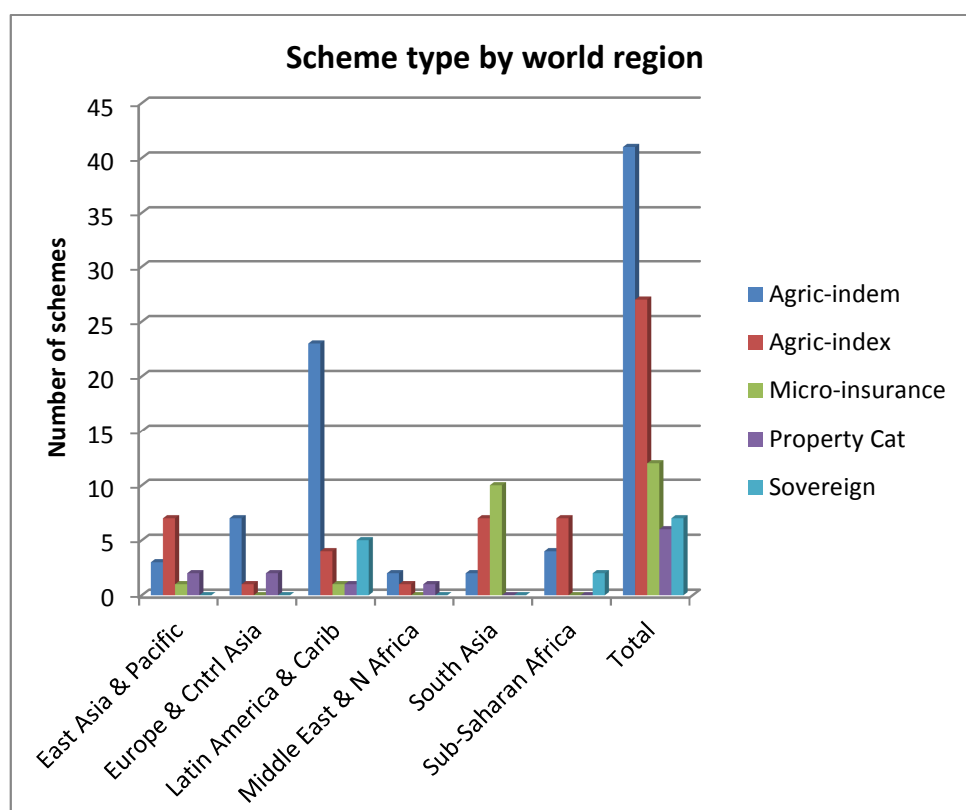


Figure 2: Number of schemes by scheme type and by world region. Legend indicates the broad scheme types/ categories considered.

There is a wide range of scheme volumes. For 66 schemes we found information on the number of insureds. Figure 3 summarizes scheme volume in terms of insured numbers, for the most recent years available.¹² The majority of schemes are relatively small – which can present a challenge for the effectiveness and sustainability of the risk transfer.

Source: Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions. The World Bank, March 2011. Produced by a team lead by Olivier Mahul and comprising Laura Boudreau, Morton Lane (Lane Financial LLC), Roger Beckwith (Lane Financial LLC), and Emily White.

¹² 70% of recorded information corresponds to years within the period 2007-2010; the rest to earlier years.

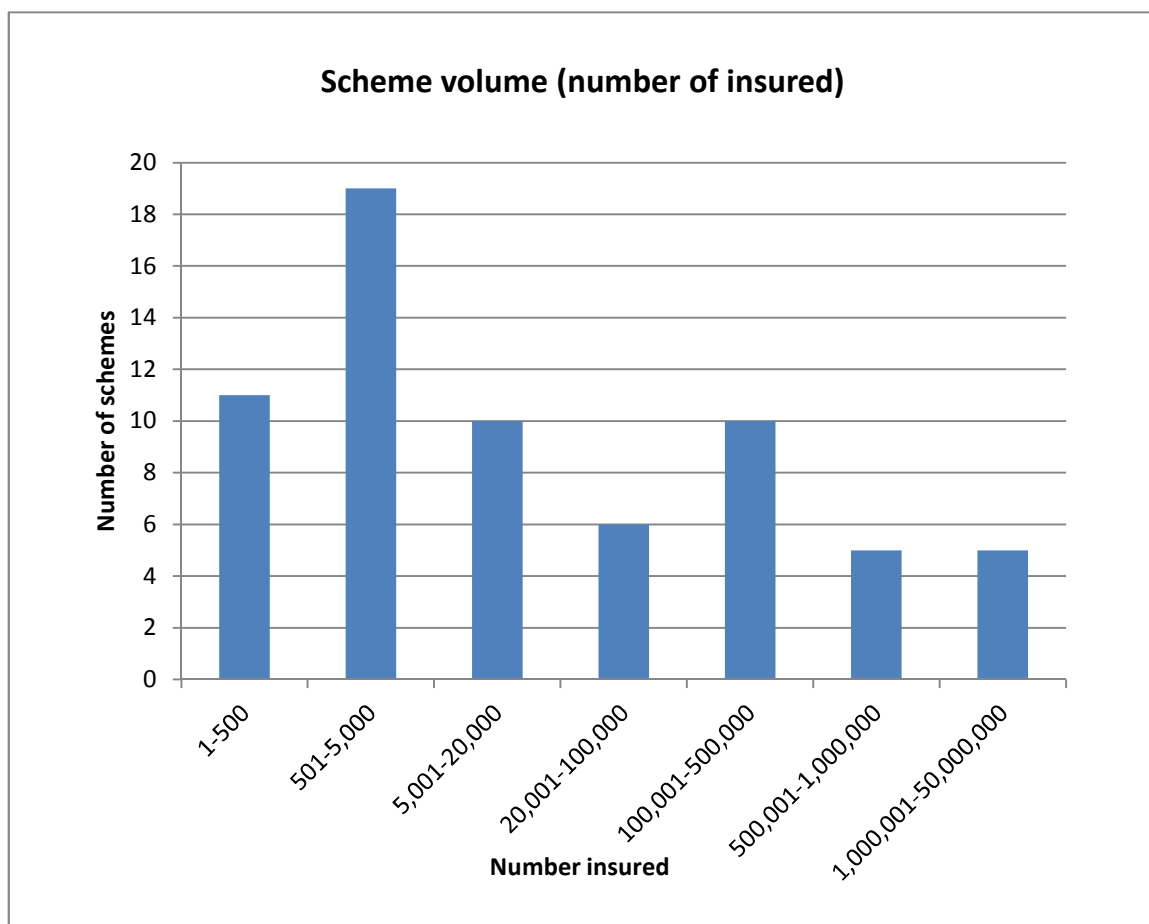


Figure 3: Number of schemes according to scheme volume ranges (insured numbers).

If we look at the type of scheme in the context of country income level (Figure 4), the following picture emerges. Agricultural insurance is the most common type in all income categories. Traditional indemnity-based schemes are the dominant type in upper-middle-income countries, and newer index-based schemes have a larger share in low- and lower-middle-income countries. This could be related to the fact that schemes in those two income groups have only emerged recently and are often specifically designed to test the use of index-based risk transfer. Disaster micro-insurance is common in low-income and lower-middle-income countries, but property catastrophe insurance schemes are almost absent from these countries.

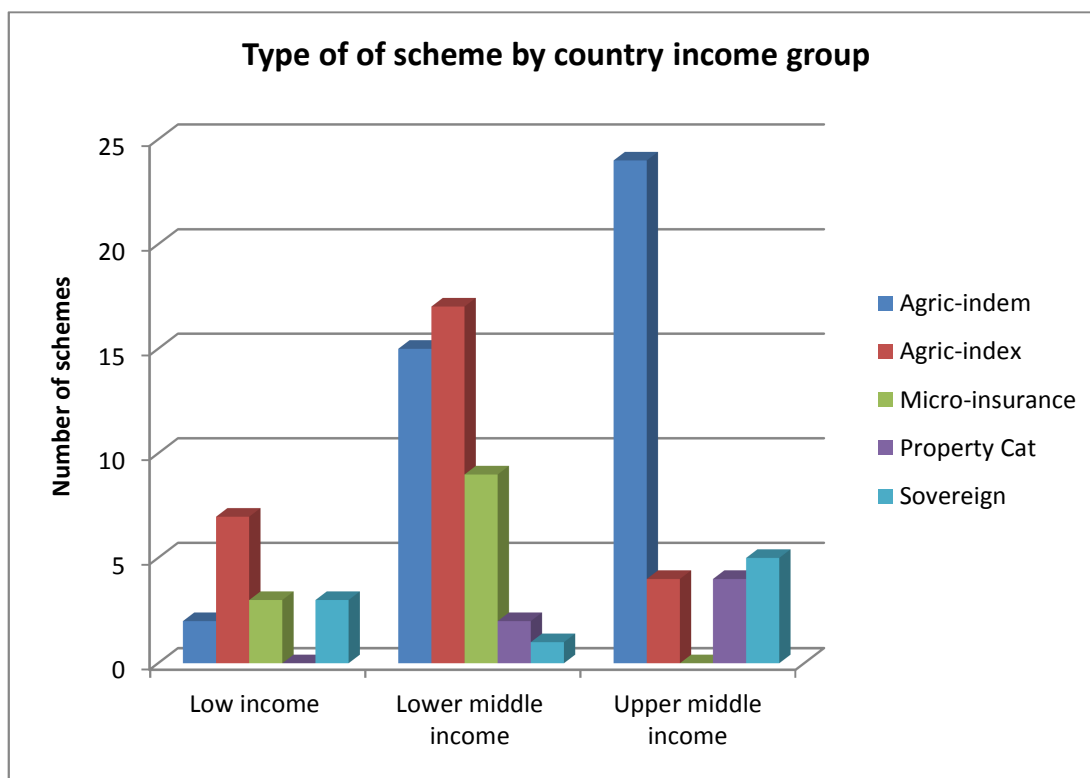


Figure 4: Number of schemes by scheme type and by country income group. Legend indicates the broad scheme types/ categories considered.

Risk transfer trigger mechanisms

Risk transfer can indemnify for a loss (indemnity) or allow a payment upon the occurrence of a trigger event based on a pre-agreed parameter or index. Our analysis (Figure 5) shows that, as expected, the majority of risk transfer schemes are based on the concept of indemnity. Index-based mechanisms are common in agriculture, and dominate the sovereign risk transfers.

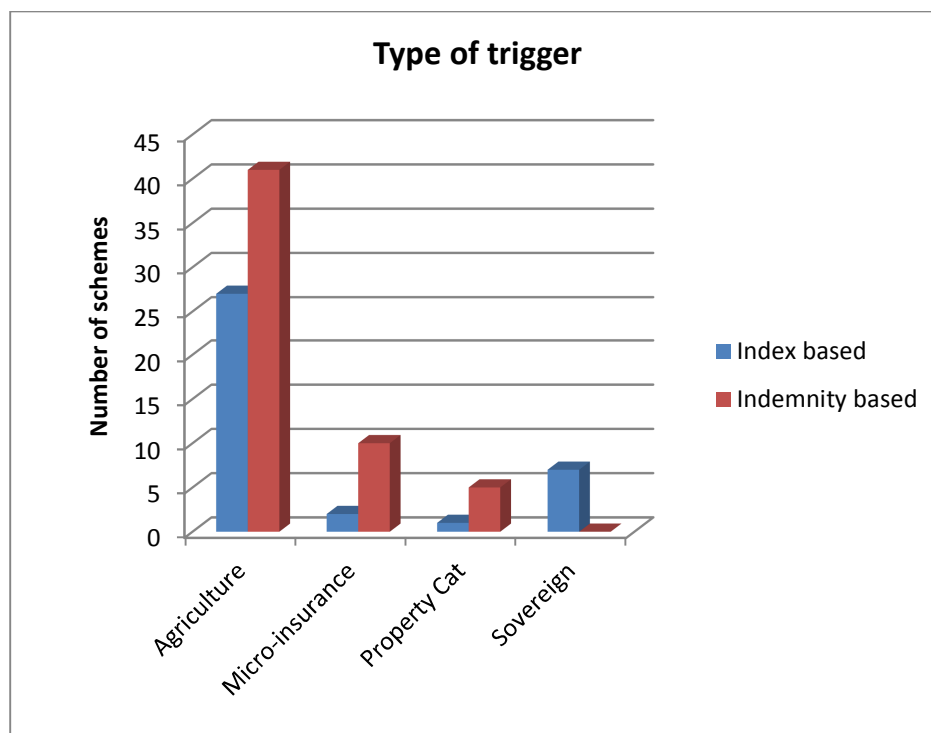


Figure 5: Number of schemes by scheme type and by risk transfer trigger mechanism (shown in the legend).

Types of risks covered

The Compendium contains schemes for risk transfer for natural hazards, including those that only cover a single type of hazard (19 schemes) and multiple hazards (74 schemes). We note that 58% of all schemes do cover weather- and non-weather-related hazards, such as earthquakes. Because of their potential relevance for questions about design, operation, public/private involvement and risk reduction, The Compendium also includes three operational schemes that do only provide cover against non-weather risks: the Residential Earthquake Insurance Pool of Taiwan (TREIF)¹³, the Turkish Catastrophe Insurance Pool (TCIP), and the Indonesian Catastrophe Reinsurance Pool (MAIPARK).

A mixed picture emerges when assessing the level of risks covered: 27 schemes define themselves as offering cover for catastrophe events, 20 schemes appear to cover both catastrophe and more frequent events, and 45 schemes focus on more frequent events only.

Scope of the schemes

In the database we find evidence of a range of different scopes of coverage: 75 out of 93 operational schemes provide cover for individuals, such as farmers and property-owners, while 8 offer risk transfer for sovereigns (national or multi-national government bodies). In

¹³ Refer to section VII (List of schemes referenced in the analysis) for the complete list of examples of schemes referred to in the text.

between these two groups are schemes aimed the ‘meso-level’, defined in The Compendium as insurance of risk aggregators such as banks, insurers, and cooperatives. Examples are the flood index crop insurance scheme in Vietnam and the Indonesian Catastrophe Reinsurance Pool (MAIPARK) - 15 out of the 93 operational schemes fall into this category. This figure includes some double-counting, as there are five schemes that effectively cover two levels i.e. meso-level and individuals (4 schemes), and sovereign and meso-level (1 scheme).

B Linking adaptation and physical risk reduction with the risk transfer

Fundamentally, risk transfer removes or reduces the risk of experiencing an uncertain financial loss. But it is widely recognised that risk transfer, if designed and operated appropriately, can play a role in physical risk reduction and adaptation. This potential is particularly relevant to the UNFCCC’s Work Programme on Loss and Damage, because public funds for adaptation may be used to finance or subsidize risk transfer schemes. There is a semantic challenge one must consider when analyzing the link between risk transfer and risk reduction and adaptation: stakeholders do not always speak the same language and may use terms such as loss prevention, risk engineering, risk reduction, vulnerability reduction and climate adaptation, all in the same context. Without going into greater detail about the different concepts and definitions used, it is important to highlight that relevant activities may not be considered under the headings of risk reduction or adaptation.

The Compendium includes only one explicit climate change reference within an operational risk transfer scheme - The Horn of Africa Risk Transfer for Adaptation (HARITA) (Box 1).¹⁴

Box 1: the Horn of Africa Risk Transfer for Adaptation (HARITA)

The HARITA program is an agricultural insurance scheme that provides cover against drought for Ethiopian farmers growing teff, wheat and barley. HARITA intends to facilitate adaptation to climate change by integrating index insurance with other risk reduction activities such as small-scale water harvesting, improved agronomic practices, conservation measures, and seasonal and daily weather forecasting. Following the example set by the Productive Safety Net Program (Ethiopia’s social protection scheme), HARITA allows poor farmers to pay for premiums with their labor. The scheme promotes the link between insurance and adaptation by enabling farmers to pay insurance premiums through their contribution to develop community assets such as water harvesting structures and other long-term risk reduction measures.

One scheme – Fondo de Mitigacion del Riesgo Agrario in Bolivia - explicitly addresses adaptation to environmental factors, including weather risks, but does not specifically refer to the impacts of climate change.

¹⁴ HARITA quarterly report: January 2011–March 2011 by Oxfam America. Rural Resilience Series. HARITA quarterly report: October 2010–December 2010 by Oxfam America. Rural Resilience Series.

Despite the lack of references to climate change, we can still find evidence of linkages between risk transfer and risk reduction. The most basic form is the creation of at least some form of risk awareness, which is common to all ex-ante risk management measures and not just risk transfer. Examples from The Compendium that specifically mention *activities to improve understanding and awareness of risks* include the national index-based disaster insurance program (weather derivative) for Malawi, where Malawi Meteorological Services' national maize yield assessment models are used to calculate the value of projected losses if precipitation falls below a certain level. Another example is the Weather Based Crop Insurance Scheme (WBCIS) in India, which attempts to improve risk assessments by applying new simulation models and by supporting the expansion of weather network stations.

But beyond this basic level of linkage to risk reduction there appears to be a wider potential for risk transfer to become an integral part of risk reduction efforts.

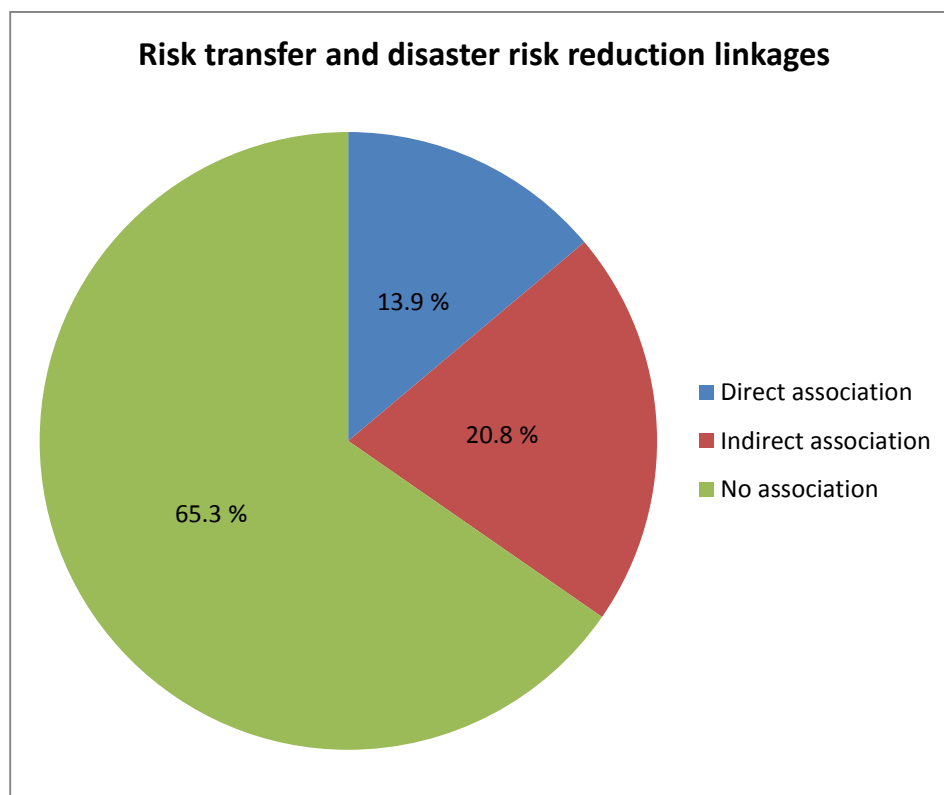


Figure 6: Proportion of schemes contained in The Compendium where risk transfer has some type of association (direct or indirect) to risk reduction measures; or has no association to risk reduction (as shown by the legend).

Analyzing the evidence in The Compendium (Figure 6), two main categories can be identified:

Indirect linkage - where risk transfer is considered as one element within the overall policy framework for disaster risk reduction or adaptation. The Compendium provides 21 examples where risk transfer and risk reduction are not operationally linked, but where both feature

as elements of an overall disaster risk reduction strategy or an adaptation plan. An example for this is the national index-based disaster insurance program (weather derivative) for Malawi, which is part of the national agricultural risk management framework for food security (Agricultural Development Programme, ADP). The weather derivative product transfers the financial risk of severe national drought that adversely impacts national maize production. It complements other tools within the ADP to manage maize production risk such as agricultural technology, investments in irrigation, and the development of grain markets. Another example is PepsiCo's index weather insurance scheme for potato contract farmers in India. The risk transfer is part of PepsiCo's 360-degree farmer connect program, which intends to reduce the risk of crop loss and to ensure the supply of quality crop to the company. Risk reduction measures implemented under the program, besides the facilitation of crop/weather risk insurance, include the supply of high-quality agricultural inputs to farmers, the provision of technical know-how, and the provision of access to soft loans and to other financial incentives for farmers following the program's recommended practices.

Direct linkage – where a risk transfer scheme explicitly supports risk reduction efforts as part of its operation. The Compendium contains 14 examples, which are analyzed here.

Risk reduction scales for schemes with a direct risk reduction linkage

Analysing the evidence from The Compendium, a picture of different 'adaptation and risk reduction scales' emerges (Figure 7):

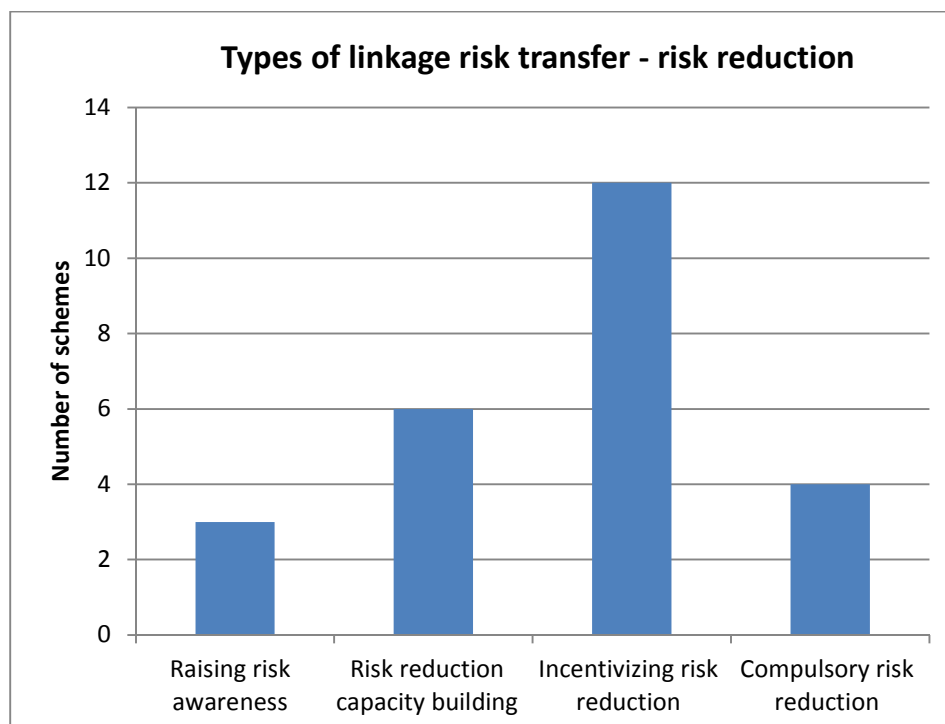


Figure 7: Number of schemes according to different types/ degrees of direct linkage between risk transfer and risk reduction.

The Compendium records evidence of **specific risk awareness-raising** initiatives driven by the parties involved in the risk transfer, for three schemes (see Figure 7). One example is the Horn of Africa Risk Transfer for Adaptation (HARITA) program in Ethiopia, where seasonal and daily weather forecasts are provided. We suspect that there are more schemes engaged in these activities than are recorded in The Compendium, and so this relatively low number is the result of information bias as not all schemes may publicly disclose these types of activity.

For 6 schemes there is evidence of **capacity-building** through knowledge transfer and educational elements (see Figure 7). One example is Fondo de Mitigacion del Riesgo Agrario (FMRA) in Bolivia, where “reference farmers also serve as technical assistance agents to promote ideas for increasing yields and reducing disaster risks and impacts.”¹⁵ Another example is the Hurricane-Resistant Home Improvement Program (HRHIP), a discontinued scheme in St. Lucia, through which “minimum building standards were developed for reference by homeowners, and builders and local builders were trained in safer construction”. The Flood Index (ENSO) insurance in Peru also records educational efforts to help farmers with risk reduction efforts, such as clearing drainage systems.

We found 12 schemes with explicit **incentive structures** for risk reduction in place (see Figure 7). One example is the National Agricultural Insurance Scheme (NAIS) and the modified NAIS (mNAIS) project in India, where “the mNAIS scheme aims at encouraging the farmers to adopt progressive farming practices, high value in-puts and better technology in agriculture. In particular a premium structure is worked out with a discount provision on the premium in respect of a unit area where all farmers have adopted better water conservation and sustainable farming practices for better risk mitigation.”¹⁶ The most common incentive tool is risk-based pricing, where the premium is set to reflect risk levels. This differentiation between risk categories can send a signal about risk reduction and adaptation. An example from The Compendium is the state-subsidised index weather crop insurance in India, where the premium to be paid by the farmer depends upon factors such as the type of crop cultivated and the geographical location of the farm. Another example is the agricultural insurance scheme in Costa Rica, in which the “original gross rates vary from 3% to 8%, depending on the crop and location. For forestry plantations original gross rates vary from 2.0% to 3.5% of TSI depending on the region, type of plantation, protection measures, contingency plans implemented by the insured, deductibles, and indemnity limits.”¹⁷ The Compendium provides evidence of risk-based pricing for a total of 9 schemes – but we would expect this number to be higher and suspect some reporting bias, as not all risk transfer schemes may have publicly referenced their pricing approach.

Elements of **compulsory risk reduction** are recorded for four schemes (see Figure 7). Here the risk reduction link is driven by the terms and conditions of the risk transfer scheme, with

¹⁵ Compendium of Disaster Risk Transfer Initiatives in the Developing World. ClimateWise, 2011

¹⁶ Compendium of Disaster Risk Transfer Initiatives in the Developing World. ClimateWise, 2011

¹⁷ Compendium of Disaster Risk Transfer Initiatives in the Developing World. ClimateWise, 2011

compliance being a prerequisite for participation in the risk transfer. An example is the Crop-Credit Insurance Guarantee Program for Small and Marginal Farmers (SEAF) in Brazil, in which the farmer must commit to applying risk reduction methods and technology in order for the risk transfer to be valid. A similar approach is taken by the agricultural insurance scheme in Sudan, where farmers are also required to adopt more resilient farming practices to gain access to the risk transfer scheme.

Scheme type	Number of schemes
Agricultural insurance (indemnity- based)	6
Agricultural insurance (index- based)	5
Disaster micro-insurance	1
Property catastrophe risk insurance	2
Sovereign disaster risk transfer	0

Table 2: Schemes with a direct link between risk transfer as risk reduction, classified according to scheme type.

Table 2 above shows the number of schemes of each type that possess a direct link to risk reduction as part of their operation. Agricultural schemes are the largest group (76% of identified schemes). The other schemes that directly support risk reduction are disaster micro-insurance and property catastrophe insurance.

Measuring the effectiveness of any of the risk reduction measures described above is a challenge. Quantifying and verifying any increased climate resilience does require extensive data collection on the ground and sophisticated modeling. Monitoring the compliance with and implementation of risk reduction activities is necessary, but this can be very costly. New technologies such as remote sensing may help overcome some of the practical challenges. Given the variety of schemes and the range of risk reduction support measures, a case by case analysis appears to be the only valid approach to quantifying a scheme’s actual contribution to adaptation and disaster risk reduction.

C The roles of public, private and third sectors

One aspect frequently discussed in the context of the Work Programme on Loss and Damage is the balance between public and private involvement in risk transfer initiatives. Our analysis finds that a large majority (82%) of schemes include some form of public and private involvement. No reference is made to any public role for 19, while 3 schemes appear not to involve the private sector. We treat this finding with caution and expect that the number of recorded initiatives with no involvement from the public sector is not a true representation, compared with the number of recorded public or public-private initiatives, as it is often difficult to obtain data about purely private schemes.

The Compendium differentiates between the risk transfer role and other roles, such as operational support functions. For the provision of the actual risk transfer the following picture emerges:

The private sector is providing the actual risk transfer in 89% of schemes, with varying risk levels and volumes of insurance and reinsurance layers included in the different schemes. In the majority of cases where the public sector is involved in risk transfer, it does so in partnership with the private sector. For property catastrophe insurance schemes, partnerships between the public and private sectors are more frequent than the provision of risk transfer by the private sector on its own. The role of the third sector in the provision of risk transfer is comparatively small.

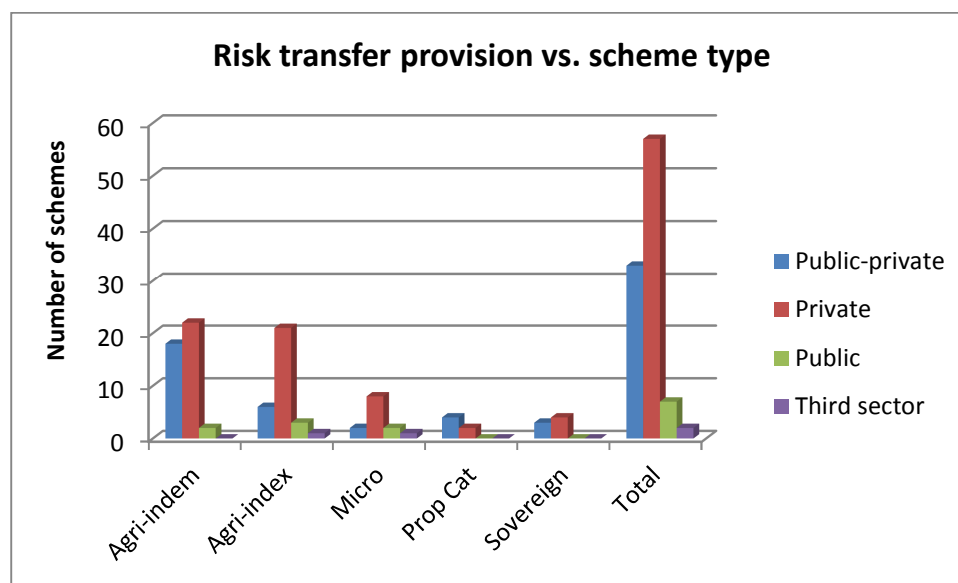


Figure 8: Number of schemes by scheme type and by sector providing risk transfer (indicated in the legend).

Notes for Figure 8:

- **Private provision of risk transfer:**
 - Domestic: includes the provision of primary cover by domestic private insurers, mutual insurance companies and Micro Financing Institutions, and the provision of reinsurance by domestic private reinsurers.
 - International: includes an insurance company from a foreign country providing insurance in the considered country, the provision of reinsurance by international reinsurers, and initiatives where risk is transferred to the capital markets.
- **Public provision of risk transfer:** includes the provision of insurance by a public insurer and the provision of reinsurance by a public reinsurer or by the Government.
- **Public-private provision of risk transfer:** refers to cases where both the public and the private sector are involved in risk transfer, as follows:

- Public sector provides insurance but there is a secondary level of risk transfer to private reinsurers, to protect the program.
- Insurance is provided by the private sector, but the Government acts as the reinsurer of last resort (for losses beyond the highest layer of the insurance program), or the Government reinsures a specific risk layer of the program.
- **Third sector:** the risk transfer function is provided by NGOs.

When assessed against country income groups, the following picture emerges in terms of the provision of risk transfer: in low-income countries, the majority of schemes have largely private provision of risk transfer, with relatively small numbers of public-private partnerships and pure public schemes. In lower-middle-income countries, a picture similar to that in low-income countries emerges, but the public sector plays a relatively bigger role in the risk transfer provision, particularly in partnership with the private sector. In upper-middle-income countries, the risk transfer function is almost equally divided between private and public-private partnerships. In upper-middle-income countries, the risk transfer function is almost equally divided between private and public-private partnerships.

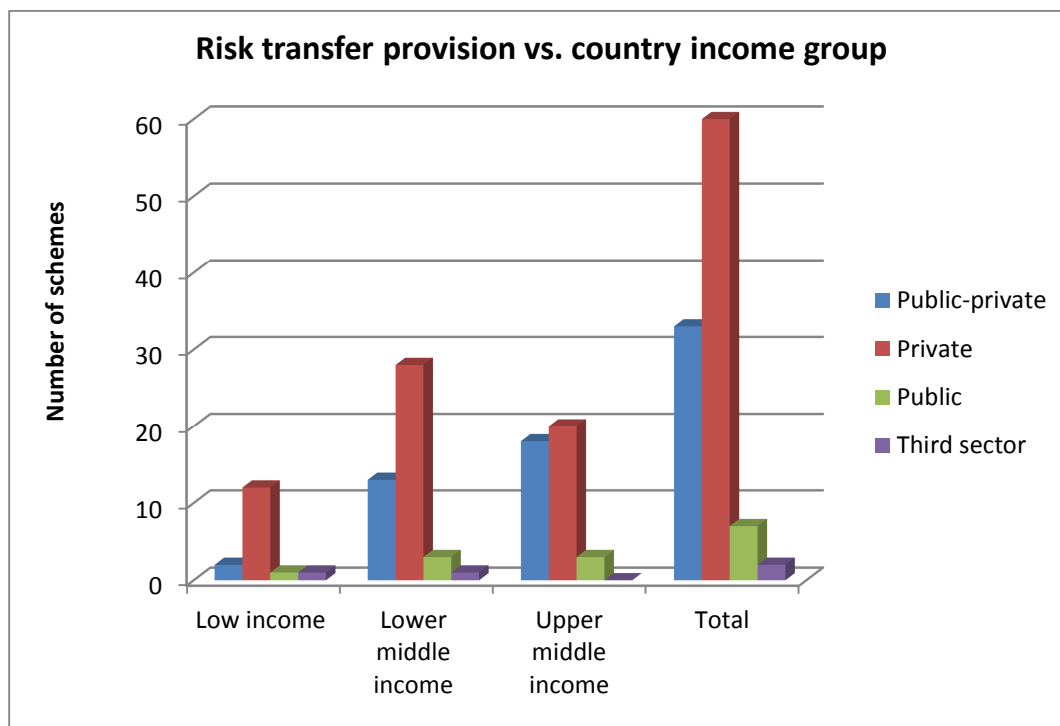


Figure 9: Number of schemes by country income group and by sector providing risk transfer (indicated in the legend).

Notes for Figure 9: The figures contain ‘double counting’ for two multi-national schemes that are implemented across countries belonging to different income levels.

The Compendium also provides information about the ‘recipients’ (the insured) in the risk transfer schemes. In considering this in relation to the risk transfer providers the following picture emerges (Figure 10).

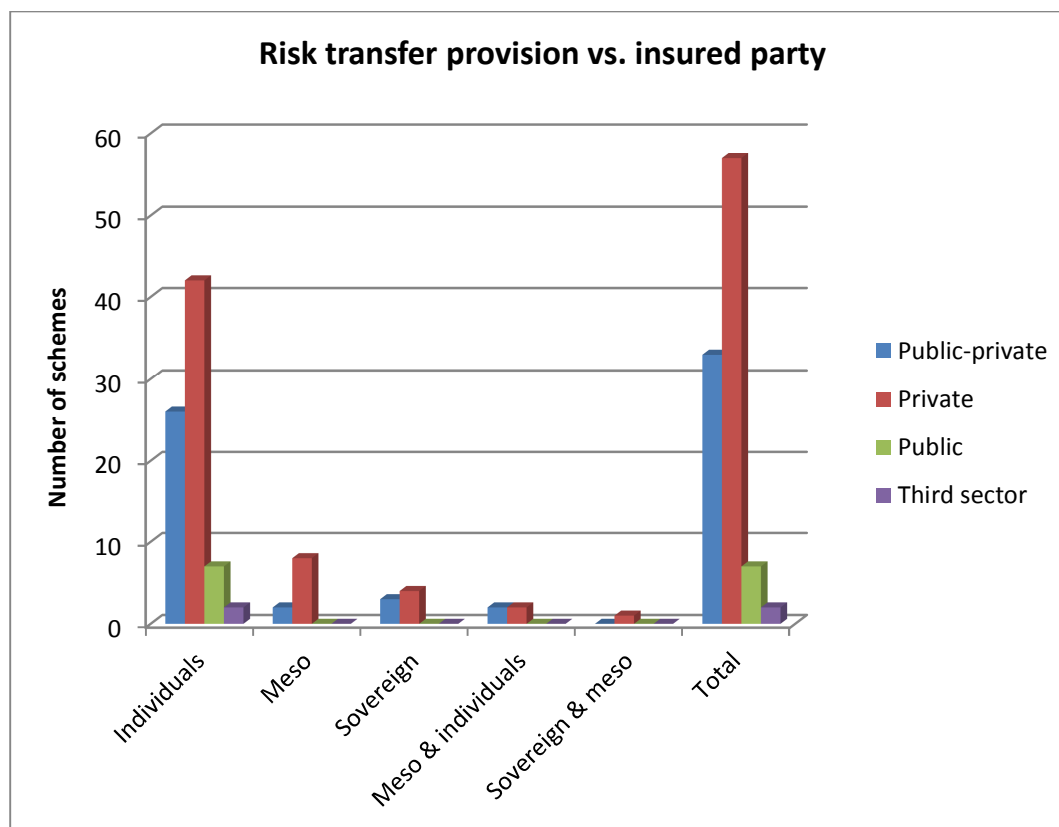


Figure 10: Number of schemes by insured parties and by sector providing risk transfer (indicated in the legend).

Notes for Figure 10:

- **Individuals:** farmers, herders, homeowners etc.
- **Meso-level:** banks, rural financial institutions, insurance companies, cooperatives, NGOs, MFIs, etc.
- **Sovereign:** national and regional governments.

The large majority (80%) of schemes provide cover for individuals, of which 54% are covered by the private sector, and 35% by public-private schemes.

The clearest concentration of private sector risk transfer provision can be found for those schemes at the ‘meso-level’ (71%). All of the schemes where the public sector provides the risk transfer are aimed at individuals.

While the provision of risk transfer is the core element of any scheme, a range of wider operational and support functions exist, which all require some form of funding. The Compendium provides references to the following functions, but gives no indication about the size of the investments required:

- Funding of technical assistance projects.
- Financing of scheme feasibility studies.
- Financing the development of tools such as risk and actuarial models.
- Financing the development of new insurance products, and the design and structuring of insurance facilities.

- Funding the provision of education and capacity building.
- Financing the development of infrastructure such as weather station networks.
- Provision of start-up capital, provision of capital support.
- Financing program start-up costs.
- Financing operational costs (e.g. insurer's administrative and operating expenses, loss adjustment expenses, etc.).
- Subsidizing insurance premiums.
- Provision of funding for reinsurance purchase.

In 68% of the schemes, we found evidence of public funding for support and operational functions. One example of a scheme that does not appear to use any form of public funding is the typhoon index crop insurance in the Philippines.

The role of the international public sector

The Compendium provides evidence of the roles played by the international public sector: 36% of the schemes involve international governmental donors in a variety of roles, such as:

- initiating schemes – illustrated by the index weather crop insurance in Ethiopia: the Horn of Africa Risk Transfer for Adaptation (HARITA) program [Initiator: World Food Programme (WFP)].
- premium payment - for example, the national index-based disaster insurance programme (weather derivative) for Ethiopia, where, in the first phase of the project, the premium was paid by the United States Agency for International Development (USAID).
- technical assistance provider – an example is the Caribbean Catastrophe Risk Insurance Facility (CCRIF), where the World Bank Treasury assisted CCRIF in completing a risk swap transaction with the financial markets; another example is the agricultural insurance scheme in Ukraine, where international donor agencies were involved in the drafting of insurance laws.

The role of the Third Sector

For 8 schemes there is evidence of NGOs being involved in the operation. An example is the Disaster Preparedness Program in India (Andhra Pradesh), where Oxfam sponsored 50% of the premiums in the first year, provided technical support, and trained 'village disaster management volunteers' for distributing the risk transfer, so that operational costs could be reduced. We have found two examples where there is evidence of NGOs providing risk transfer: The Fondo de Mitigacion del Riesgo Agrario (FMRA) in Bolivia and the Centre for Self-Help Development (CSD) disaster microinsurance program in Nepal. Other roles associated with NGOs include the provision of start-up capital (4 schemes), initiation and development (1 scheme), management of the scheme, and the provision of technical assistance and information (4 schemes).

An interesting picture emerges when analysing the roles of different stakeholders in the context of risk reduction linkages. For those schemes where a direct link between risk

transfer and risk reduction is recorded, we notice that the public sector plays a larger role than in those schemes without risk reduction linkage: in 10 of the cases the public is involved in the provision of risk transfer (55 %), which compares to the 40 % based on the whole Compendium. The public sector provides financing beyond its risk transfer role for 14 of the schemes (78% of the total, which compares to 61% based on the whole Compendium).

IV. CONCLUSIONS

Our analysis has provided some insights into the structure, design and operation of existing risk transfer schemes. There appears to be potential in many places and a growing recognition of the possible roles for risk transfer, with the existing schemes providing useful examples of different approaches and strategies. We conclude that there is no 'one-size-fits-all' solution; the design and operation of risk transfer schemes are often closely linked to local specifications. Closer examination shows that the schemes are hugely diverse, often created to meet very specific needs in a particular community, with a wide range of stakeholders being involved, and differing levels of risk transfer being provided.

While agricultural insurance is the most common form in all countries, we note particular geographical preferences for other types of insurance – such as micro-insurance in Asia. This may reflect local tradition and possibly also cultural differences, while other factors, such as links to micro-finance schemes, may influence this. The dominance of local-level schemes in low-income countries highlights a current gap in coverage at the sovereign-level for those countries. It is also important to note that the existing local schemes are not broadly spread and replicated across a country, but often take the form of local pilot projects. A key issue to explore is how to bring these schemes to scale and how to overcome the challenges faced by existing schemes.

Out of 123 in the Disaster Risk Transfer Compendium, 51 provide evidence of challenges to scheme development and sustainability, which have been explored by ClimateWise on a preliminary basis. Commonly referenced challenges are low penetration rates, lack of risk information, the affordability of insurance, the availability of local insurance delivery channels, lack of financial capacity, small scheme sizes and reliance on donor funds. The Compendium also provides some insights on 8 schemes that have been discontinued, of which 5 mention lack of demand and 2 refer to supply-side issues. But the information provided is, to a large extent, subjective – exploring the failings and unlocking the lessons learned is a very sensitive issue and further in-depth investigations would be required.

In the context of the discussion about the Work Programme on Loss and Damage, this leads to the challenge of agreeing how a global facility or governance structure could assist with local delivery - a common dilemma faced by adaptation policy-makers. Here the key consideration is if and how risk transfer schemes fit into the overall adaptation framework,

and if there is a need for new mechanisms to foster the application of risk transfer in vulnerable countries.

Our analysis shows that the full potential for utilizing risk transfer for adaptation is far from exhausted – in fact only very few schemes show a direct operational link between risk transfer and risk reduction, and only one appears to have explicitly taken into account the impact of climate change on risk levels. Not surprisingly, the large majority of risk transfer schemes focus on today's weather risks. This can capture a lot of experience and knowledge suitable for adaptation efforts, as resilience to today's weather is a step towards adaptation to a changing climate. But risk transfer schemes that do not recognize future risks may even lead to mal-adaptation. This seems to be a well-recognized shortcoming, as most of the proposed schemes featured in the database (which have not been part of our analysis) show signs of capturing the challenges of climate change.

Our analysis shows a clear dominance of the private sector in the provision of risk transfer, either alone or through public-private partnerships. This suggests that more emphasis needs to be placed on the issue of commercial viability when considering the extension of the scope and reach of risk transfer schemes. This becomes particularly relevant at a time of constrained public finances, where private sector engagement is a growing paradigm. But we note that within the 'Loss and Damage discussions', no clear consensus about the extent of private sector engagement has emerged; with concerns about the lack of commercial viability and the crowding out by public schemes on the one hand, and worries about profit-making elements and a potential short-term view of private sector players surfacing on the other. Common reservations about the utilization of private risk transfers for adaptation policy are being aired – such as a level of mistrust towards the private sector and ethical concerns about the use of public adaptation money to create new markets for private insurers. Interestingly we have found that the public appears to play a disproportionately large role in those few cases that explicitly link risk transfer and risk reduction. We are already conducting further work, engaging with stakeholders to shed more light on the public and private roles.

Ultimately all this points to the question of effectiveness – what makes a risk transfer scheme effective and sustainable? This is a normative question, and the database does not provide an answer, but does offer several pointers.

Assessing the effectiveness of any risk transfer scheme is a challenge, but this becomes even more difficult in the context of climate change adaptation. At first glance, the 123 examples captured by the database give the impression that it may just be a question of supply and demand to bring these efforts to scale and to roll them out across a larger number of countries.

But to what extent do these schemes support adaptation in vulnerable countries? While we found evidence of varying levels of risk reduction support, it is almost impossible to assess the effectiveness of these efforts. Measurement of the risk reduction achieved through the risk transfer schemes creates several challenges: success or failure often only become

evident after another risk event, and it requires in-depth data collection on the ground. Efforts have been made to explore this for particular cases – such as exploring actual risk reduction activities through surveys and on-the-ground verification activities. But a general high-level assessment of what works and where the most effective linkages are is still missing at this stage.

Our analysis of the Compendium has provided some valuable insights, but it also has clear limitations. Some of the key questions being asked in the context of the discussion about the Work Programme on Loss and Damage do require a continuing effort to further collate the level of analysis and knowledge that already exists for specific schemes in the form of case studies and analytical assessments. We see the Disaster Risk Transfer Compendium as a useful first step and suggest that this could be developed into a continuously-updated source of evidence about risk transfer schemes.

V. ACKNOWLEDGMENTS

The authors wish to thank Nick Silver, Nicola Ranger and Katharine Thoday for their helpful comments. The contributions of Dr Surminski and Dr Oramas-Dorta have been supported by the Centre for Climate Change Economics and Policy and the Grantham Research Institute on Climate Change and the Environment, which are funded by the Grantham Foundation for the Protection of the Environment, the UK Economic and Social Research Council (ESRC) and Munich Re. The views expressed in this paper are our own.

VI. REFERENCES

ClimateWise (2011): The ClimateWise Compendium of Disaster Risk Transfer Initiatives in the Developing World.

Munich Climate Insurance Initiative (2009): Frequently Asked Questions about an International

Insurance Mechanism for Climate Adaptation: responses to Party questions posed to MCII at Poznan COP14. 6th February 2009, <http://www.climate-insurance.org>

Linnerooth-Bayer et.al. (2011): Insurance against Losses from Natural Disasters in Developing Countries. Evidence, Gaps, and the Way Forward., *Journal of Integrated disaster Risk Management* (2011)1(I)

Outcome of the work of the Ad Hoc Working Group on long-term Cooperative Action under the Convention. UNFCCC/AWGLCA/2010/L.7.

http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf

Oxfam America (2010): HARITA quarterly report: October 2010–December 2010. Rural Resilience Series.

Oxfam America (2011): HARITA quarterly report: January 2011–March 2011. Rural Resilience Series.

Ranger, N., Surminski, S., and Silver, N. (2011): Submission by the Grantham Research Institute on Climate Change and the Environment and The Centre for Climate Change Economics and Policy to the United Nations Framework Convention on Climate Change.

http://unfccc.int/parties_observers/ngo/submissions/items/3689.php

Swiss Re (2011): Closing the financial gap. New partnerships between the public and private sectors to finance disaster risks.

Warner, K., Ranger, N., Surminski, S., Arnold, M., Linnerooth-Bayer, J., Michel-Kerjan, E., Kovacs, P. and Herweijer, C. 2009a. Adaptation to Climate Change: Linking Disaster Risk Reduction and

Insurance. A paper prepared for the United Nations International Strategy on Disaster Reduction

(UNISDR). http://www.preventionweb.net/files/9654_linkingdrrinsurance.pdf

Warner, K., Loster, T., Zissener, M., Kreft, S., Linnerooth-Bayer, J., Bals, C., Hoeppe, P., Gurenko, E., Burton, I. and Haas, A. 2009b. Vulnerable Countries and People: How Disaster Risk Reduction & Insurance Can Help Manage the Risks from Climate Change.

http://www.climateinsurance.org/upload/pdf/MCII_Policy_Brief.pdf

http://www.climateinsurance.org/upload/pdf/MCII_Policy_Brief.pdf

Warner, K and Spiegel, A. 2009. Insurance and Climate Change: What is the role of the insurance

industry in climate risk management in emerging markets? Chapter 7 of the Geneva Association's Research Project on Climate Change and its Economic Impact on Insurance (CC+I Project).

The World Bank (2011): Innovation in Disaster Risk Financing for Developing Countries: Public and Private Contributions. Produced by a team lead by Olivier Mahul and comprising Laura Boudreau, Morton Lane (Lane Financial LLC), Roger Beckwith (Lane Financial LLC), and Emily White.

VII. LIST OF SCHEMES REFERENCED IN THE ANALYSIS

Compendium ID	Risk transfer scheme
8	Flood index crop insurance in Vietnam
15	Fondo de Mitigacion del Riesgo Agrario (FMRA) in Bolivia
26	State-subsidized index weather crop insurance in India
27	PepsiCo's index weather insurance for potato contract farmers in India
30	National Agricultural Insurance Scheme (NAIS) and the modified NAIS (mNAIS) project in India
32	Weather Based Crop Insurance Scheme (WBCIS) in India
35	Index weather crop insurance in Ethiopia: Horn of Africa Risk Transfer for Adaptation (HARITA)
57	Crop-Credit Insurance Guarantee Program for Small and Marginal Farmers (SEAF) in Brazil
64	Agricultural insurance in Costa Rica
83	Agricultural insurance in Sudan
85	Agricultural insurance in Ukraine
88	Hurricane-Resistant Home Improvement Program (HRHIP) in St. Lucia
95	Centre for Self-Help Development (CSD) disaster microinsurance program in Nepal
98	Disaster Preparedness Program in India (Andhra Pradesh)
101	Residential Earthquake Insurance Pool of Taiwan (TREIF)
102	Turkish Catastrophe Insurance Pool (TCIP)
107	Indonesian Catastrophe Reinsurance Pool (MAIPARK)
114	National index-based disaster insurance program (weather derivative) for Malawi
115	National index-based disaster insurance program (weather derivative) for Ethiopia
116	Caribbean Catastrophe Risk Insurance Facility (CCRIF)
123	Flood Index (ENSO) insurance in Peru