

Disaster Risk Financing and Insurance in Sub-Saharan Africa

Review and Options for Consideration

November 2012



Contents

Abbreviations and Acronyms.....	4
Executive summary.....	5
Section1.Introduction.....	6
Section 2.Assessing the Cost of Natural Disasters.....	12
Section 3. Fiscal Management of the Cost of Disasters.....	17
Section 4. Catastrophe Risk Insurance Markets.....	28
Section 5.Options for a DRFI Development Program in SSA.....	36
Glossary of Key Words and Definitions.....	41
Bibliography.....	43
Annex: Active World Bank Projects in the DRFI space relevant to Sub-Saharan Africa.....	44

Acknowledgements

This report has been prepared by a team comprised of Fadwa Bennani (MNSFP, principal author), Emily White (FCMNB and GFDRR, principal co-author), Julie Dana (FAB), Michel Noel (FCMNB) and Olivier Mahul (FCMNB). The note also benefited greatly from inputs and feedback provided by Samuel Munzele Maimbo (ECSFP), Michael Fuchs (AFTFP), Irina Astrakhan (AFTFE), Hector Ibarra Pando (FAB), Marc Sadler (ARD), Vikas Choudhary (ARD), Sofia Bettencourt (AFTN), Stephen Mink (AFTAR), Laura Boudreau (FCMNB) and Daniel Clarke (Consultant).

The team has made every attempt to verify the contents presented, but the information should be interpreted with due consideration to its limitations resulting from the fact that indirect sources have been used where primary sources were not available and that the collective knowledge in this area is limited.

Abbreviations and Acronyms

AU	African Union
AUC	African Union Commission
CAADP	Comprehensive African Agriculture Development Program
CCRIF	Caribbean Catastrophe Risk Insurance Facility
CERF	UN Central Emergency Response Fund
DRFI	Disaster Risk Financing and Insurance
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
FEWSNET	Famine Early Warning Systems Network
GDP	Gross Domestic Product
GFDRR	Global Facility for Disaster Reduction and Recovery
HFA	Hyogo Framework for Action
IFPRI	International Food Policy Research Institute
IGAD	Inter-governmental Authority on Development
PML	Probable Maximum Loss
PRSP	Poverty Reduction Strategy Paper
REC	Regional Economic Communities
SADC	Southern African development Community
UN	United Nations
UNDAF	United Nations Development Assistance Framework
UNISDR	United Nations International Strategy for Disaster Reduction
WFP	World Food Programme

Executive summary

Sub-Saharan African countries are highly exposed to a wide range of adverse natural events, with hydro-meteorological hazards (principally drought and flood) having the largest impact. Drought and floods together account for 80 percent of loss of life and 70 percent of economic losses linked to natural hazards in Sub-Saharan Africa¹, and a recent World Bank study based on Africa RiskView of 32 African countries indicated a 50% chance of a drought event in any given growing season leading to food security stresses².

Although total economic losses caused by disasters appear low in Africa relative to other regions, when these are considered in the context of total GDP, the financial impact of disasters is extremely high. Drought cost 8-9 percent of GDP in Zimbabwe and Zambia in 1992, and 4-6 percent in Nigeria and Niger in 1984. The 2000 floods in Mozambique cost an estimated \$550 million and lowered the GDP growth rate to 1.5 percent (Mozambique's growth averaged 7.5 percent annually during 1994-2003). A 2009 risk analysis for Malawi estimated average annual GDP contraction of 1.7% as a result of flood and drought.

Disaster risk financing and insurance (DRFI) instruments and strategies can help Sub-Saharan African countries increase their financial resilience to natural disasters, as part of their broader disaster risk management agenda. Strategies and mechanisms for financial protection against disasters can reduce the impact and overall cost of disasters by taking pressure off fiscal and individual budgets in the aftermath of a disaster. Mechanisms that provide rapid, cost-efficient liquidity to governments or individuals can reduce the cost of disasters by preventing a resort to adverse financial coping mechanisms such as high-interest borrowing, and by accelerating recovery. These would also help mitigate inefficiencies in emergency responses which often lead to loss of life and household asset depletion. DRFI has been highlighted by the African Union, Regional Economic Communities and countries as an area for regional financial cooperation.

A range of ex-post and ex-ante financing tools are used by governments for disasters in Sub Saharan Africa, but countries remain heavily dependent on external aid. The continent has seen considerable innovation in recent years in new contingent mechanisms to cover disaster-related losses. However, only a very small fraction of exposed countries are using contingent financing mechanisms to manage the fiscal impacts of disasters. Furthermore, where these mechanisms are in place, they are only covering a portion of the contingent liability of governments following a disaster – without a comprehensive strategy for financial protection – countries may still find themselves in a position of severe shortfall in the event of a disaster.

Catastrophe risk insurance has the potential to increase household resilience to disaster shocks in Sub-Saharan Africa, but penetration remains extremely low. Despite the implementation of a number of innovative insurance pilots, insurance penetration remains extremely low. A 2006 FinScope study found that less than 9% of adults in South Africa have any insurance cover for their assets; and this figure is likely to be significantly lower for other Sub-Saharan African countries where insurance markets are less developed. These low levels of uptake were confirmed by a 2010 Microinsurance Innovation Facility study which estimated that, across the continent, only 2.6% of the target consumer group is using microinsurance.

A number of options for engagement in the development of financial resilience in the region are presented for consideration. These include strategies for financial protection at the sovereign level to help governments meet their contingent liabilities; the promotion of catastrophe risk insurance markets for businesses and households; and the development of schemes that provide a financial buffer to the poorest households. Development of risk information and models is also put forward as a means of moving this agenda forward.

¹ African Union et al. (2008)

² African Risk Capacity: A Study on the Feasibility of a Regional Approach to Financing Drought Risk in Africa, World Bank (Draft, August 26, 2011)

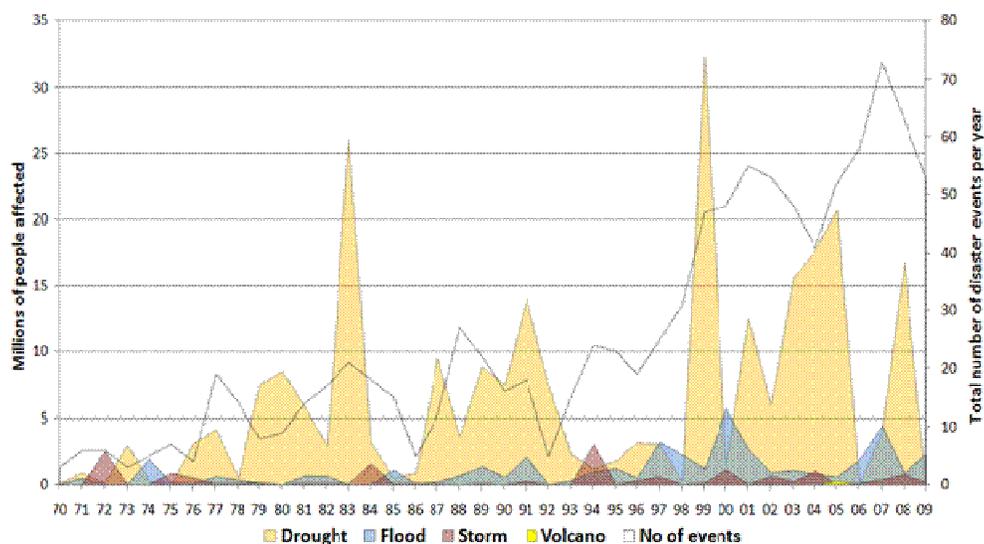
Section 1. Introduction

1.1. ***This policy note is a preliminary effort to present a body of knowledge on the state of disaster risk financing and insurance in Sub-Saharan Africa.*** It aims to contribute to a strengthened understanding and collective knowledge within Sub-Saharan Africa on disaster risk financing and insurance, and to encourage open dialogue between stakeholders on how strategies can best be developed to increase financial resilience against natural disasters. The report is targeted at policy-makers and actors in the international community with an interest in this agenda.

1.2. ***In the context of this report, disaster risk financing and insurance refers to instruments and mechanisms at the macro, market and micro level that provide financial resources to assist with response and recovery efforts in the aftermath of a disaster.*** There are many different definitions of ‘disaster’. This report focuses on natural disasters, which we can describe as unforeseen events driven by natural phenomena that cause serious disruption of the functioning of a community or a society causing widespread human, material, economic and/or environmental losses which overwhelm the capacity of the affected community or society. This report discusses rapid onset disasters such as cyclones, earthquakes and floods but also slow onset events such as drought.

1.3. ***Sub-Saharan African countries are highly exposed to a wide range of adverse natural events, with hydro-meteorological hazards impacting the largest number of people.*** Hydro-meteorological disasters in Sub-Saharan Africa comprise cyclones, floods, landslides, wild fires and droughts³. The region is also exposed to geological disasters, such as earthquakes and volcanoes, although these occur less frequently and impact fewer countries. Droughts affect the largest number of people on the continent, followed by floods and storms (Figure 1.1).

Figure 1.1: Number of reported disasters, type and number of people affected in Sub-Saharan Africa



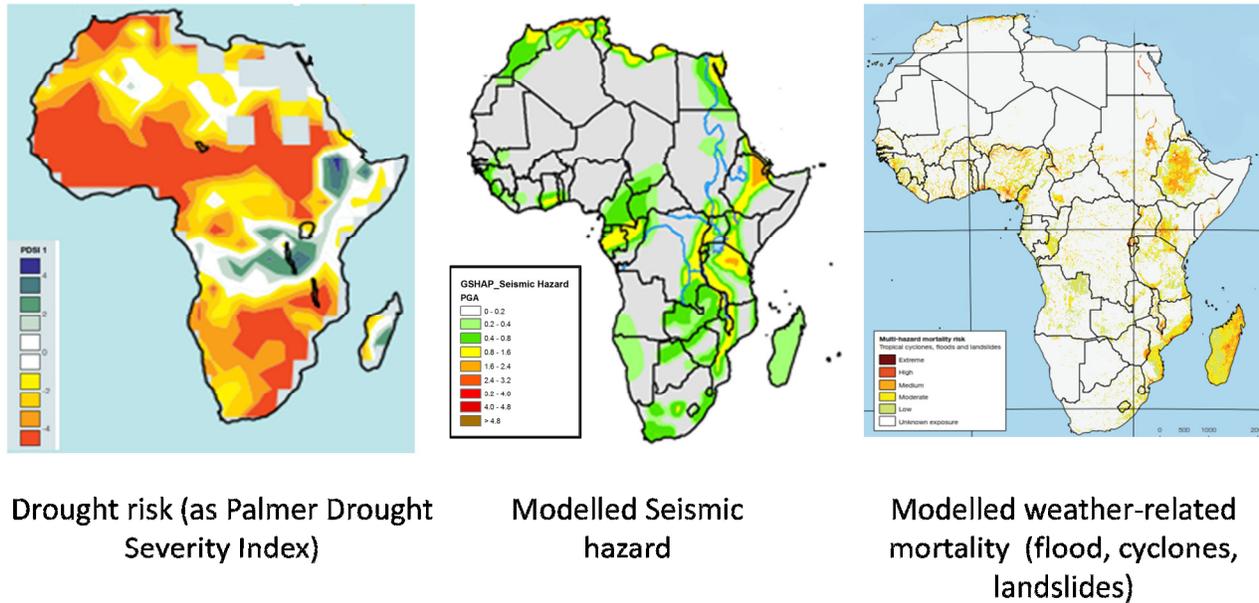
Source: EMDAT, 2010

1.4. ***Almost all countries in Sub-Saharan Africa are exposed to one or more natural hazards.*** Drought is particularly prevalent in the Sahel, Horn of Africa and countries in Southern Africa. River flooding impacts a number of countries across the continent due to the extent of basins such as the Congo, Niger, Nile and Zambezi. Flash flooding resulting from excess rainfall is also an issue as highlighted by the 2011 flooding disaster across

³ Beyond hydro-meteorological causes, droughts are further complicated by political economy issues in sub-Saharan Africa. Human hazards such as market behavior, political conflicts, policy regulations and trade barriers often play an equally important role in the impact of droughts and their management.

Southern Africa where the impacts of flooding were felt far beyond river basins. Cyclone risk is limited to the South-Eastern coast of the Indian Ocean with Madagascar, Mozambique, and the Indian Ocean islands at risk. Geological hazards such as earthquakes and active volcanoes are prevalent along the East Africa rift, which stretches from Eritrea to Mozambique, although risk and exposure is significantly lower for geological hazards relative to weather-related perils. The threat of tsunamis is present, but low. Madagascar and other Indian Ocean islands are identified as being at risk.

Figure 1.2. Distribution of disaster risk in Africa



Source: Authors reproduced from GAR downloaded 2012 and Guy Carpenter 2012 based on GSHAP

1.5. **Exposure to natural disasters in Sub-Saharan African countries is increasing.** The number of disasters reported in Africa has shown an upward trend since the 1970s (Figure 1.1). Over the last four decades, Sub-Saharan Africa has experienced more than 1000 disasters, with 300 disasters between 2005 and 2009 alone. This trend is largely attributable to an increasing amount and concentration of population and assets in zones at risk from natural hazards. Rapid population growth and urbanization are the key driving factors. Africa has 36 cities with more than one million inhabitants and the largest population growth rate of any region worldwide. With many urban areas located in low-lying river deltas or coastal areas, exposure to flood risk on the continent is increasing. Exposure and vulnerability to natural hazards is likely to be further exacerbated by environmental degradation and climate change, which will likely increase the frequency and magnitude of extreme weather events and expose more people and assets to an increased risk of inundation from sea-level rise.

1.6. **Disasters have major economic and social impacts in Sub-Saharan Africa.** While low income countries account for only 9% of the world’s disasters, they account for 47% of fatalities⁴. For the specific case of Africa, between 1975 and 2008, the continent experienced the highest loss of life resulting from disasters of any region worldwide. In addition, long-term development in the region has been hindered by the damage inflicted by disasters. Damage to assets from disasters have generated short- and long-term economic losses, increased pressure on fiscal budgets and diverted scarce financial resources from the development agenda. Although total economic losses caused by disasters appear low in Africa relative to other regions, when these are considered in

⁴ World Bank and GFDRR, 2012. *The Sendai Report, Managing Disaster Risks for a Resilient Future.*

the context of total GDP and the size of the fiscal budget in affected countries, the financial impact of disasters is extremely high.

1.7. **Furthermore, governmental financial support for disaster recovery can be variable and inconsistent.** High frequency/low magnitude disasters do not attract as much attention as large-magnitude events and tend to be ignored by politicians, particularly outside of principal cities. Poor communities end up bearing not only the cost of rebuilding their damaged assets, but also potentially the costs of rebuilding community schools, health centers and rural roads. Suffice to say, this only perpetuates their cycle of vulnerability.

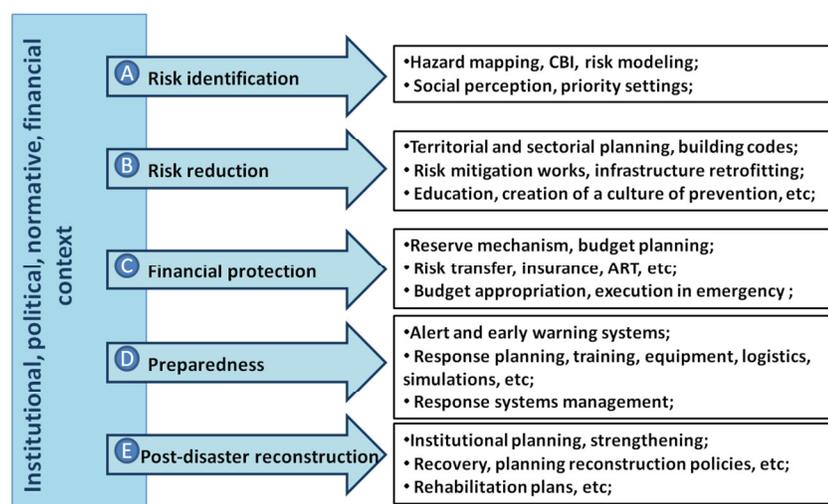
1.8. **Disaster risk management in Sub-Saharan Africa suffers from inadequate financial support and challenges in the deployment of those funds that are available.** This is due to the low priority accorded to disaster risk management in budgeting at the national and local levels of government, a lack of dedicated funding mechanisms for disaster risk management and limited insurance penetration restricting the contribution of the private sector to this agenda. Most national disaster risk management authorities have some provision for financing national disaster management plans but the approaches vary, reflecting the different national circumstances in the region. These range from mere indications of the intention to finance the disaster risk management system through to legislative earmarking of funding. A lack of ex-ante planning for the deployment of funds (e.g. contingency plans) is also a strong limiting factor in the development of resilience.

1.9. **Donors provide the bulk of financial resources for disaster management systems.** The World Food Programme spent approximately \$4.5 billion responding to weather-related food security problems in Africa from 2001-2008⁵. The current system for responding to disasters is a reactive one that relies primarily on declarations of emergency followed by international appeals for funds that are used to purchase food. In addition, only a small portion of international assistance resources is directed to prevention and preparedness. This overdependence on donor support has led to delays in the provision of funding for disaster relief and recovery, and has restricted development of countries' internal disaster risk management capacities.

1.10. **Mainstreaming disaster risk management in development planning - including the use of disaster risk financing and insurance (DRFI) instruments and strategies - can help Sub-Saharan African countries increase their financial resilience to natural disasters (see figure 1.3 below) and reverse the current trend of rising disaster impacts.** Strategies and mechanisms for financial protection against disasters can reduce the impact and even the overall cost of disasters on developing countries by taking pressure off fiscal and individual budgets in the aftermath of a disaster. Mechanisms that provide rapid, cost-efficient liquidity to governments or individuals can ultimately reduce the cost of disasters by preventing a resort to adverse financial coping mechanisms, such as high-interest borrowing, and by accelerating recovery. DRFI should be considered as one component within a broader DRM approach. Furthermore, timely liquidity can be critical in saving lives. This was evidenced by the Horn of Africa drought disaster of 2011, where an estimated 50,000 to 100,000 lives were lost as a result of the disaster, and according to multiple humanitarian agencies, the death toll was significantly increased by the delay in funding.

⁵Wiseman, W. and Hess, U., Reforming Humanitarian Finance in Ethiopia: A Model for Integrated Risk Financing, United Nations World Food Programme Working Paper, August 2007

Figure 1.3: Disaster Risk Management Framework



Source: GFDRR, 2011.

1.11. **Specifically, an ex-ante proactive approach towards disaster risk financing could not only potentially reduce human suffering but also the overall cost of the disaster response.** Disaster management in the SSA region has, up until recently, largely been viewed as an event-driven field focused on preparedness and response to emergencies. Evidence from Ethiopia shows that every \$1 secured in contingency financing for timely and predictable disbursement for emergencies can save \$5 over the long term⁶. Timely interventions also allow for more flexibility in the possible type of responses that can be implemented. Furthermore, financing mechanisms that are established ex-ante allow for better contingency planning due to the predictability of resource flows and can therefore improve response execution.

1.12. **Disaster risk financing and insurance (DRFI) has been highlighted by the African Union, Regional Economic Communities and individual countries as an area for regional financial cooperation.** African leaders have recognized the need to take steps to transition from ex-post disaster response to ex-ante emergency preparedness and weather resilience. The African Union Commission (AUC), in line with the implementation of the Comprehensive African Agriculture Development Program (CAADP), focuses on reducing hunger and improving responses to food emergency crises (CAADP Pillar III) through improved risk management at national and regional levels. The Regional Economic Communities (RECs) and some AU Member States have also been working towards more effective weather risk management. In line with the Hyogo Framework of Action through 2015, the proposed extended Programme of Action for Africa includes as stated objectives; improved identification and assessment of disaster risk and integrated Disaster Risk Reduction. A more practical step has been taken recently by the African continent with the establishment of a pan-Africa drought risk facility, called Africa Risk Capacity (ARC). The facility plans to offer countries access to timely funds based on objective triggers, with the overarching objective of reducing dependence on ad-hoc and unreliable international appeals for emergency food aid assistance.

Disaster risk management in SSA Countries

1.12 **The Africa Regional Strategy for Disaster Risk Reduction and the Extended Programme of Action for the Implementation of the strategy (2006-2015) provide a comprehensive regional framework to strengthen preventive, monitoring, and mitigation measures as well as regional and sub-regional coordination to reduce disaster losses in the region.** Under the leadership of the African Union (AU), and with the support of

⁶Wiseman, W. and Hess, U., Reforming Humanitarian Finance in Ethiopia: A Model for Integrated Risk Financing, United Nations World Food Programme Working Paper, August 2007

organizations such as the United Nations Inter-agency Secretariat for Disaster Reduction (UNISDR), the African Development Bank and the World Bank, the African Regional Strategy for Disaster Risk Reduction and an Extended Programme of Action for the Implementation of the Africa Strategy (2006-2015) have been developed. The strategy was first adopted by the African Ministerial Conference and endorsed by the AU Assembly of Heads of State in 2004. Substantive revisions were later introduced to extend the timeframe to 2015 and align it with the Hyogo Framework for Action. Reducing the impacts of natural disasters is also a core part of the second pillar – ‘vulnerability and resilience’ – of the World Bank’s Africa Region Strategy⁷.

1.13. ***At the sub-regional level, several Regional Economic Communities (RECs) have demonstrated strong commitment to the DRM agenda.*** The Economic Community of Central African States (ECCAS), the Economic Community of West African States (ECOWAS), the Inter-governmental Authority on Development (IGAD) and the Southern African Development Community (SADC) have established disaster risk reduction strategies based on the priorities for action of the Hyogo Framework for Action and the Africa Regional Strategy for Disaster Risk Reduction. Achievements include the formulation of a disaster risk reduction policy by ECOWAS and a strategic plan for disaster risk reduction by SADC.

1.14. ***Progress has been reported at the national level, where governments in Sub-Saharan Africa are working on implementation of the Hyogo Framework for Action (HFA) priorities for action and the related regional objectives⁸.*** Recent status updates on implementation of the HFA priorities for action and the Africa Regional Strategy for Disaster Risk Reduction indicate that countries are increasingly developing institutional, legislative and policy frameworks for disaster risk reduction. A national platform or a similar multi-sectoral coordination mechanism for DRR has been established in 25 countries⁹ with an additional three countries in the process of establishing platforms as of 2009 (Côte d’Ivoire, The Gambia and Namibia). Political commitment to DRM is growing.

Box 1.1: Hyogo Framework for Action (HFA)

The HFA is a results-based plan of action adopted by governments around the world to reduce disaster risks and vulnerabilities to natural hazards and to increase the resilience of nations and communities to disasters over the period 2005 to 2015.

HFA Priority #1: Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation

HFA Priority #2: Identify, assess, and monitor disaster risks and enhance early warning

HFA Priority #3: Use knowledge, innovation, and education to build a culture of safety and resilience at all levels

HFA Priority #4: Reduce the underlying risk factors

HFA Priority #5: Strengthen disaster preparedness for effective response at all levels

1.15. ***While progress has been made by SSA countries in all priority actions of the Hyogo Framework for Action (HFA), there is significant diversity in the progress of implementation and a number of challenges still remain.*** According to the most recent DRR progress report for the Africa region¹⁰, the lack of effective institutionalization of DRM as a priority at the national and sub-national levels is a particular challenge. Where platforms or coordinating mechanisms are established, they are frequently limited or inhibited in execution of their DRM mandate across sectors. In addition, risk identification and assessment across the region to support DRM activities remains limited – particularly for vulnerability and exposure assessment – limiting the political imperative to invest in disaster risk reduction (DRR). Cross-sector and cross-jurisdictional coordination, a current area of weakness often underlined by low capacity and limited resources, require strengthening. Finally, most disaster management institutions face financing constraints with the burden falling mostly on donors and event-driven responses from national governments. There is, however, considerable scope to explore alternative ways of financing the cost of DRM, for example through contingent financing mechanisms.

⁷ The World Bank, 2011. *Africa’s future and the World Bank’s support to it.*

⁸ UNISDR status update on implementation of the Hyogo Framework for Action in Sub-Saharan Africa (2009)

⁹ As of June 2009, Status Report on disaster Risk Reduction in Sub-Saharan Africa, UNISDR, AU, GFDRR

¹⁰ Report on the status of Disaster Risk Reduction in the Sub-Saharan Africa Region AU, UNISDR, the World Bank (2009)

1.16. **Disaster risk financing and insurance is a key component of HFA Priority #4 and is also one of the five pillars of the framework for disaster risk management (DRM) promoted by the World Bank.** These pillars are: (i) risk assessment; (ii) institutional capacity building; (iii) risk reduction investments; (iv) emergency preparedness; and (v) disaster risk financing and insurance.

Box 1.2: Progress toward the achievement of the HFA priorities as of June 2009 as reported by UNISDR

Progress on HFA priority #1. The importance of an institutional framework for DRM is widely accepted. A national platform or a multi-sectoral coordination mechanism for DRR has been established in 25 countries with an additional three countries¹¹ reported to be developing platforms as of 2009. However, participation in some national platforms is limited to governmental actors, with insufficient involvement of representatives of civil society organizations, agencies, media and the private sector.

Progress on HFA priority #2. In terms of risk identification and assessment, there is increased capacity in some countries of the region to carry out comprehensive, multi-hazard risk assessments and operate effective early warning systems. Progress in these countries is due, in part, to strong linkages with regional specialized institutions for climate risk management and effective utilization of their resources and services. However, in the majority of Sub-Saharan African countries, hazard mapping is incomplete, there is limited data on vulnerability, and national institutions do not yet take full advantage of the resources and services for climate risk management offered by their sub-regional counterparts. These gaps hinder the development of risk reduction programs and limit the function and scope of early warning systems.

Progress on HFA priority #3. There has been progress in the development of disaster risk information however, information dissemination remains a challenge. There have been efforts to include DRM into school curricula in a number of countries. However, a significant proportion of countries in SSA have not yet started this process. Furthermore, there is little reported activity in the region in terms of academic research into disaster risk assessment methodologies and cost-benefit analysis of disaster risk reduction.

Progress on HFA priority #4. Greater recognition of the relationship between poverty and vulnerability to natural hazards has resulted in the incorporation of DRR objectives into an increasing number of sectoral development policies (PRSP, UNDAF) and plans to address underlying risk factors. However, most governments are not yet implementing effective programmes to reduce the underlying risk factors of disasters, due to financial constraints or limited technical and operational capacity. Furthermore, development strategies in many countries are not keeping pace with physical and demographic growth in informal, unplanned urban settlements where multiple risk factors are present. Urgent and concerted action is required to tackle the underlying causes of vulnerability to disasters.

Progress on HFA priority #5. Disaster preparedness activities and the preparation of contingency plans have been undertaken in several countries. The development and use of contingency mechanisms and financial reserves is still at an early stage, as countries still focus mostly on post-disaster response.

¹¹Cote D'Ivoire, Namibia and the Gambia

Section 2. Assessing the Cost of Natural Disasters

Risk Assessment

2.1. **Accurate information on disaster losses, hazards, vulnerabilities and exposure is fundamental for designing and implementing DRM policies and programs, but risk assessment capacity in SSA is generally weak.**

Data collection on hazards and impacts, where it exists, is ad hoc and informal. Although a number of initiatives to map physical hazard have been completed in the region, these efforts are rarely undertaken systematically by countries and embedded into institutional processes. Furthermore, most of the physical mapping of hazards undertaken has been top-down with little participation by communities. Where local institutions are not brought into the process of risk assessment, opportunities to use investment in risk assessment to develop local technical capacity are missed.

2.2. **Assessment of natural disaster risk requires analysis of both historical data and probabilistic catastrophe risk models.** The latter capture the possibility of infrequent events, such as a one-in-100 year storm, even if they are not observed in the historical record supporting the analysis. Catastrophic probabilistic models have been developed and are available for certain perils (e.g. drought across the continent, and earthquake in South Africa). However, although probabilistic analyses for flood have been carried out in SSA, probabilistic catastrophe models for flood are not available, partly driven by the underlying complexity of the peril and lack of high resolution data needed for model development.

2.3. **A number of physical hazard assessments have been undertaken at both national and regional levels in Sub-Saharan Africa by a broad range of stakeholders, although very little of the information generated is being actively used for DRM decision-making.** Stakeholders that have undertaken hazard assessments include: international organizations such as the UN, WFP and World Bank; academic institutions; and government departments. However, a lot of this information is inaccessible for DRM decision-making as data has not been consolidated or put into a format suitable for sharing. Resolution of data has also presented an issue, where a top-down approach to risk assessment has not generated outputs at a sufficiently high resolution to support planning.

2.4. **Of all the components of risk assessment, the gap is biggest for the translation of physical hazards into impacts.** There is very little data available on potential costs to governments, donors and - more broadly - economies in the region arising from natural hazards. However, initiatives such as the WFP's Africa RiskView platform and flood and drought economic and vulnerability assessments for Malawi and Mozambique by the World Bank and partners, have sought to reduce this gap.

Box 2.1. The Africa RiskView platform – quantifying the cost of drought response

The Africa RiskView platform was developed by the World Food Programme in support of the African Risk Capacity project. The tool generates estimates of food insecurity impacts and response costs across the African continent with the aim of informing and thereby increasing financial preparedness for drought response.

The tool combines satellite rainfall-based early warning models on agricultural drought in Africa with data on vulnerable populations to estimate impacts and response costs. The Africa Risk Capacity pan-African drought risk financing facility proposes to use Africa RiskView platform estimates as the basis of release of funds to participating countries. This facility is discussed further under Box 3.4.

Source: WFP

2.5. **Methodologies and outputs from the types of risk assessment undertaken in SSA vary significantly as illustrated by some examples:**

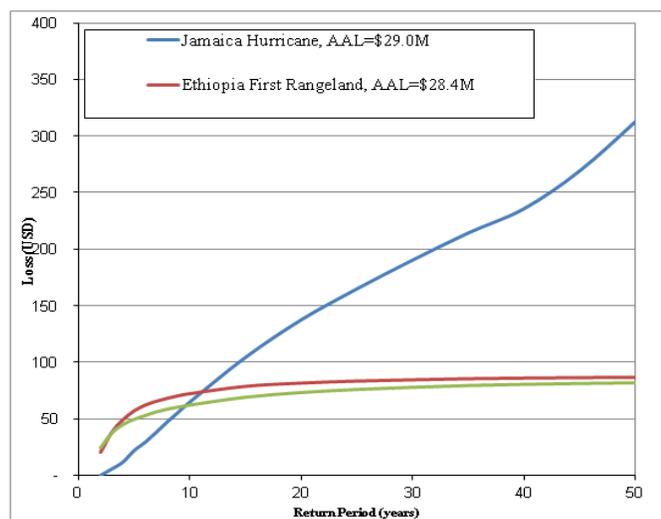
- In Tanzania, a national initiative took a survey approach to identify hazards and associated vulnerabilities at the household, village and district levels. The generalized zone data was then used to produce hazard

maps for the three most common hazards, and a National Vulnerability Index was developed based on the hazard assessment and assessment of management capacities. The Index was used to determine the vulnerability to different hazards and the result for the most frequent hazards (droughts, disease outbreak, and pests) was presented in terms of agro-ecological zones.

- In Ethiopia, for areas where flood hazard is frequent and impacts communities and their livelihoods, risk is identified through a process undertaken at the national level by analyzing historical records.
- Some disaster risk management authorities such as INGC (the national authority for disaster management) in Mozambique use scenario analyses as part of contingency planning for disasters. These scenarios project potential disaster extents and impacts for different levels of severity using a combination of seasonal forecasting, historical hazard experience and assessments of total exposed population.

2.6. ***There are significant differences in the risk profiles of different perils in SSA. Different risk profiles call for different DRFI instruments and strategies.*** The risk profiles for the perils of drought and flood tend to be characterized by a large portion of losses through high frequency and lower severity events. This is different from the risk profile of other natural disaster events such as cyclones or earthquakes, which are typically characterized by large events with high costs incurred on an infrequent basis. Figure 2.1 shows the difference between the risk profiles of hurricanes in Jamaica and the First Rangeland season for drought in Ethiopia. As can be seen in the chart, for Jamaica hurricane risk, costly events happen at the longer end of the return period scale. For Ethiopian drought risk, the curve is flatter, with costly events happening more quickly in the shorter end of the return period scale. Similarly, there are important distinctions between droughts and flood, including: (i) drought is a slow and delayed onset event, whereas floods have the potential to onset rapidly (ii) floods are often characterized by infrastructure damage while drought is not. The management solutions to both these risks will therefore be quite different. As discussed under the Economic Assessment of Natural Disasters section, different risk profiles require different financing strategies.

Figure 2.1. Risk Comparison: Jamaica hurricane risk vs. Ethiopian drought risk



Source: *African Risk Capacity: A Study on the Feasibility of a Regional Approach to Financing Drought Risk in Africa*, World Bank (Draft, August 26, 2011)

Box 2.2: Global Risk Identification Programme (UNDP)

The Global Risk Identification Programme (GRIP) is a global initiative with the potential to improve availability and use of disaster risk data worldwide, including Sub-Saharan Africa. GRIP is a UNDP sponsored program, involving stakeholders from research, insurance, emergency response, public outreach and operational hazard monitoring and risk management, who are working together to improve capacities at the national and regional levels for risk assessment methodologies and their use.

GRIP aims to expand and improve the evidence base for disaster-related losses, historical loss data, and promote the systematic organization of loss data into databases. GRIP will also assist in linking risk assessment results to decision processes.

Source: GRIP

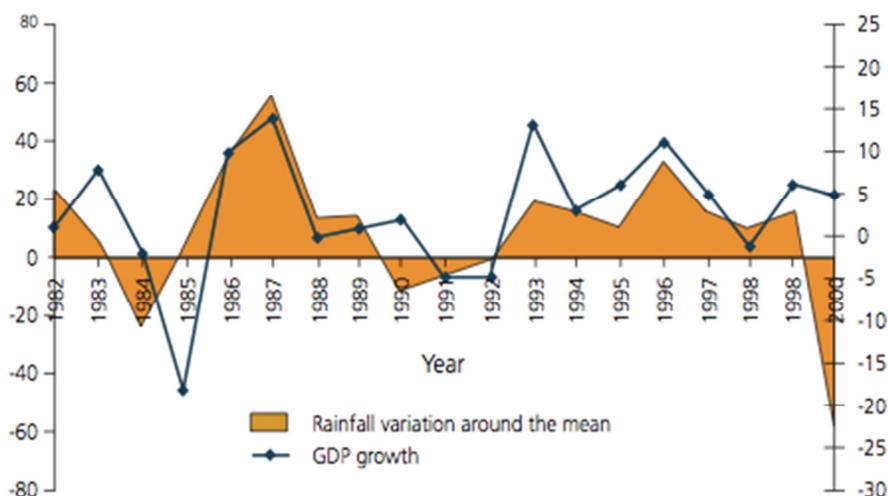
Economic assessment of natural disasters

2.7. **Disasters have major economic impacts in Sub-Saharan Africa.** Damage to assets such as buildings, crops, infrastructure and livestock from disasters have generated short- and long-term economic losses, increased pressure on fiscal budgets and diverted scarce financial resources from the development agenda. Although total economic losses caused by disasters appear low in Africa relative to other regions, when these are considered in the context of total GDP and the size of the fiscal budget in affected countries, the financial impact of disasters is extremely high. Disasters severely impact households and livelihoods, resulting in additional people falling into poverty.

2.8. **The aggregate impact of disasters on the economies of Africa can be large:** drought cost 8-9 percent of GDP in Zimbabwe and Zambia in 1992, and 4-6 percent in Nigeria and Niger in 1984. Floods have also had a significant impact on countries' GDP. The 2000 floods in Mozambique cost an estimated \$550 million and lowered the GDP growth rate to 1.5 percent (Mozambique's growth averaged 7.5 percent annually during 1994-2003)¹². Estimates of damage from the 2011 flooding across Southern Africa are in excess of \$200mn, driven primarily by crop losses. Figure 2.2 illustrates how GDP growth in Ethiopia has largely followed rainfall variation in the past, being a typical example for the many economies on the continent that depend on rain-fed agriculture.

¹² Report on the status of disaster risk reduction sub-Saharan Africa, January 2008

Figure 2.2: variability of GDP with rainfall in Ethiopia



Source: World Bank 2008

Box 2.3. Economic and vulnerability assessment for drought and flood in Malawi

A World Bank-GFDRR supported project undertaken by RMSI and IFPRI in 2009 quantified potential drought and flood impacts in probabilistic financial terms for Malawi and Mozambique. Risk was expressed in terms of the probability of exceeding specific levels of direct losses (in physical and monetary terms). The initiative was further developed for Malawi to apply the probabilistic drought and flood risk assessment within a broader macroeconomic model and calculate probable impacts to the economy.

The analysis revealed that floods and droughts are estimated to contract GDP by 1.7% per year in Malawi. Droughts contribute an estimated expected loss of 1% of GDP on average every year, while floods contribute an estimated 0.7%. These losses came almost entirely from the agricultural sector. The analysis also showed that economic losses are much higher during extreme droughts; for example, during a one-in-twenty five year drought, such as the drought of 1991-92, GDP contracts by as much as 10.4 percent.

Source: World Bank Disaster Risk Financing and Insurance Program

2.9. **Disasters in Sub-Saharan Africa affect multiple sectors, but due to the prevalence of perils that impact crops and livestock (drought, flood) and the dominance of countries' agricultural sectors, losses through the productive sector dominate for the majority of countries.** Disaster impacts are felt through the productive sector (agriculture, tourism, commerce and industry), infrastructure sector (housing, transportation, power, communication, sanitation and water supply), social sector (education, health, governance), and others. Different perils impact different sectors to varying degrees and in different ways. For example, perils that impact buildings and infrastructure (particularly flood and cyclone in SSA) have more pronounced impacts on the infrastructure sector than drought.

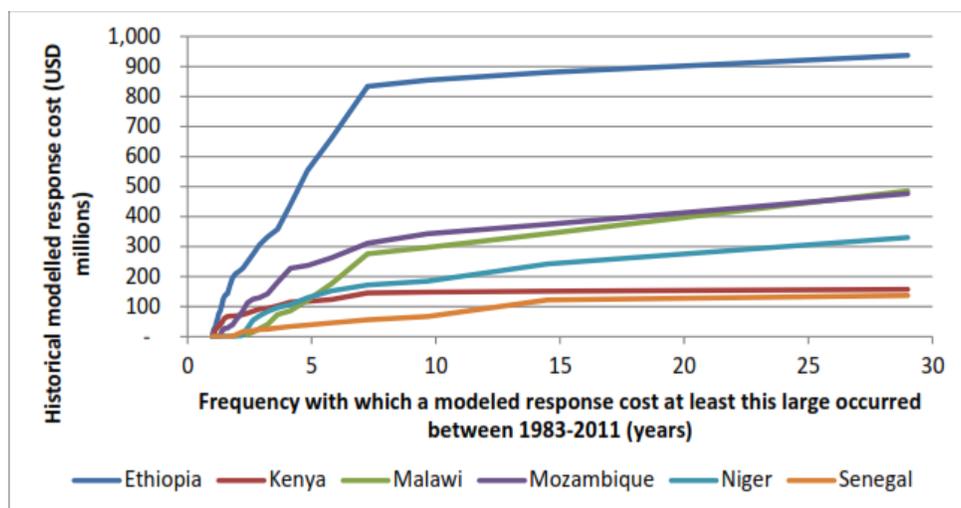
2.10. **Recent modeling in a World Bank study based on Africa RiskView of a group of 32 African countries indicated around a 50% chance of a drought event in any given growing season leading to food security stresses¹³.** The estimated cost of drought response derived from WFP experience is \$100 per person and per

¹³ African Risk Capacity: A Study on the Feasibility of a Regional Approach to Financing Drought Risk in Africa, World Bank (Draft, August 26, 2011)

drought event. The high frequency of drought occurrence combined with the cost of response amount to extremely large costs of response on the continent to drought events.

2.11. A 2012 IFPRI analysis¹⁴ also based on the Africa RiskView model and historical data between 1983 and 2011 (Clarke and Vargas, 2012) estimated annual average response costs of between \$US 26 million and \$US 319 million for a set of six drought-exposed countries (Ethiopia, Kenya, Malawi, Mozambique, Niger and Senegal). The analysis also showed that drought in these countries is a high-frequency phenomenon, with risk concentrated in the shorter return periods – according to the analysis, three quarters of the average long term food security response cost needs come through smaller, more frequent drought events (see figure 2.3).

Figure 2.3. Historical modeled drought response costs (1983 – 2011),



Source: IFPRI (Clarke and Vargas)

¹⁴Clarke and Vargas, 2012

Section 3. Fiscal Management of the Cost of Disasters

Overview

3.1. ***It is difficult to obtain precise information on the financing of disaster management mechanisms but what evidence there is suggests that disaster management structures in SSA suffer from inadequate financial support.*** Disaster risk management agendas in Sub-Saharan Africa depend heavily on donor support. This is due to the low priority accorded to disaster risk management in budgeting at the national and local levels of government, a lack of dedicated funding mechanisms for disaster risk management and limited insurance penetration restricting the contribution of the private sector.

3.2. ***The fiscal impacts of disasters have been particularly prominent in drought-affected Sub-Saharan African countries.*** A series of case studies (Benson and Clay, 2004) revealed that amongst those developing countries examined, drought-affected Sub-Saharan African countries experienced the most significant disruption to fiscal budgets. The studies showed that following severe droughts through the 1980s and 1990s a number of SSA countries experienced sharp increases in public deficit, resulting from reduced government revenue generally driven by the impact of drought on the balance of exports and imports, and rapid growth in public expenditure.

3.3. ***The fiscal impacts of disasters on Sub-Saharan African countries are varied, but heavily shaped by the continent's economic dependence on agriculture.*** Following a disaster, the fiscal budget experiences direct pressure from a number of areas, including:

- *Increased population dependence on public relief programs following displacement, loss of livelihood and/or food scarcity*

The heavy livelihood dependence on agriculture in Sub-Saharan African countries forces a significant number of people into dependency on public relief programs following severe droughts or flooding due to the impact on agricultural production. Countries with populations affected in this way face an increased burden on public expenditure, and potential reallocation of external aid resources from longer-term development initiatives.

Population displacement from disaster events has also placed a significant burden on public finances in Sub-Saharan Africa. As populations are disconnected from their livelihoods and homes, they depend on relief from government or NGOs. Populations have been displaced following all types of disaster including both hydro-meteorological and seismic perils – such as the 2009 series of Karonga earthquakes.

Disasters that impact agricultural production increase both the size of the population dependent on food aid, and the cost of providing such assistance as food prices are driven up by scarcity.

- *Reduced revenue*

Public finances are directly impacted by the inevitable reduction in economic activity that results from severe disasters. These impacts are felt most severely through the productive sectors due to high economic dependence on these. Disasters can hit production directly (e.g. the impact of drought on crop yields) or can cause damage along the supply chain leading to business interruption. Public enterprises may also be impacted. All these factors combine to reduce government revenue during the recovery period, when demands on expenditure are at their highest.

- *Additional expenditure for reconstruction of damaged public assets*

Countries impacted by those perils that damage physical infrastructure (floods, windstorms and earthquakes) must also deal with additional public expenditure relating to the reconstruction of damaged public infrastructure. In the majority of Sub-Saharan African countries, the lack of disaster-resistant building guidelines or lack of adherence to building codes leaves public assets highly vulnerable to natural hazards.

3.4. ***A range of ex-post and ex-ante financing tools are used by governments for disasters in Sub Saharan Africa, but countries remain heavily dependent on external aid (see box 3.1).*** The international community and development partners play an important role in helping Sub-Saharan African governments respond to disasters. However, overdependence on external assistance can result in delays in recovery due to uncertainty in aid flows and can also result in a reduction in external funding for development projects as resources are diverted. Furthermore, such dependence can inhibit countries from developing internal capacity for disaster risk management. This is particularly true for contingency planning, where the uncertainty in aid flows post-disaster can inhibit countries in their planning processes. Furthermore, although coordination of donor resources is improving in Africa, countries dependent on post-disaster aid still face the challenge of executing funding from multiple, separate channels, often with each aid flow carrying its own specific conditionality of use. This additional complexity in post-disaster funding can delay execution of funds and subsequently the overall response.

Box 3.1. Ex-ante and Ex-post financing sources

Ex-ante financing mechanisms are those established in advance of an event, i.e. contingent mechanisms. These include instruments such as insurance, contingent credit and grants, annual budget allocations for unforeseen expenditure, and reserve funds.

Ex-post sources of financing are sought reactively - after the occurrence of the event. These include international aid, credit, emergency budget reallocations and tax increases.

Ex-post sources of financing comprise the vast majority of post-disaster funding in developing countries, and particularly on the African continent, where there is therefore a need to promote the use of appropriate ex-ante financing tools alongside ex-post options. Heavy dependence on ex-post mechanisms carries a number of disadvantages relative to mixed strategies that include ex-ante sources of financing. Although it is typically not cost-effective to use ex-ante financing sources to cover the complete loss from a disaster event, balancing the cost between ex-post and ex-ante is critical in ensuring that countries have access to definite, rapid liquidity in the immediate aftermath of a disaster.

In addition to ensuring rapid liquidity, ex-ante mechanisms are also important in promoting better management of disaster risks. The establishment of ex-ante mechanisms forces quantification of disaster risk, thereby raising risk awareness, increasing political imperative to invest in disaster risk management and building technical capacity. Ex-ante financing mechanisms can also be structured to provide direct financial incentives to invest and engage in risk reduction. Insurance provides a relevant example, where the cost of cover is linked to risk, which encourages investment in risk reduction to reduce premiums.

3.5. ***Where ex-ante disaster risk financing instruments are in use in Sub-Saharan African countries, they do not account for a significant portion of the funds required for response.*** A number of Sub Saharan African countries make some regular budgetary provision for unforeseen circumstances including disasters – however these resources are often severely inadequate compared to expected losses and are frequently appropriated for other purposes leaving funds depleted at the time of occurrence of a disaster.

3.6. ***The rate of purchase of catastrophe risk insurance for public assets is low in Africa.*** Even where government policy obliges all managers of public assets to ensure that cover is in place, it is difficult to enforce and monitor the purchase of insurance. Compliance with policy is therefore, typically poor.

3.7. ***The continent has seen considerable innovation in recent years in new contingent mechanisms to cover disaster-related losses.*** However, only a very small fraction of exposed countries are using contingent financing mechanisms to manage the fiscal impacts of disasters. Furthermore, where these mechanisms are in place, they are only covering a portion of the contingent liability of governments following a disaster (see Box 3.2) – without a comprehensive strategy for financial protection – countries may still find themselves in a position of severe shortfall in the event of a disaster.

3.8. ***Risk pooling for African countries has been considered as a mechanism to finance the cost of drought in a more cost-effective way.*** Initial analysis shows it is unlikely that extreme weather events will happen simultaneously in the same year in every country since there is some diversification in the performance of rainfall seasons across Africa. Therefore, the sum of the contingent funds each country would need to have in reserve in order to be able to respond to an extreme drought emergency within a year is substantially greater than the contingency funds required by a group of countries to respond to its worst case scenario. Such diversification benefits have been leveraged in the Caribbean’s risk pool (see Box 3.5) and being explored by the Africa Risk Capacity (ARC) facility. However, a number of studies have concluded that the additional operating costs associated with the establishment of a pooling facility must be managed carefully in order to realize the cost savings achieved through pooling of risk¹⁵.

3.9. ***IFPRI Analysis on a set of six African Countries¹⁶ indicated that pooling between sub-national units within countries confers the largest diversification benefit, concluding therefore that the largest potential welfare gains from a drought financing facility would be from better allocation of resources within countries.*** According to the study, the average per-capita variance in food security needs across the six countries examined can be reduced by 66% through pooling within countries, between sub-national units. This can be further reduced by 25% through pooling between the six countries. The analysis therefore concluded that the largest potential welfare gains from a drought financing facility would be from better allocation of resources within countries in addition to pooling between countries.

3.10. ***The existence of pre-established programs to reach vulnerable households is critical if the benefits of rapid liquidity through financing instruments are to be realized.*** Without effective mechanisms in place to reach vulnerable, affected households post-disaster, the speed benefits from early payouts through ex-ante financing instruments such as insurance or contingent financing cannot be realized. This fact has been highlighted by IFPRI in a recent study of African countries which found that post-disaster, the benefits of early payouts from ex-ante financing instruments were largest when funds were distributed via scaling-up of existing safety net programs. Contingency planning is therefore key to effective disaster risk financing strategies. Community Driven approaches and social protection mechanisms have also a crucial role to play. The importance of such schemes was also highlighted in a statement made by Save the Children and Oxfam that “long term programs are in the best position to respond to forecasts of a crisis”.

¹⁵CCRIF’s operational budget runs at a voluntary cap of 5% of net premium income. A recent World Bank study noted that keeping operational costs below this threshold had proved a challenge to the facility.

¹⁶ Ethiopia, Kenya, Malawi, Mozambique, Niger and Senegal.

Box 3.2. Mechanisms for fiscal management of disaster risk in Sub-Saharan Africa

Ethiopia – contingent financing window

Contingent financing mechanisms were first trialed at the sovereign level by the government of Ethiopia for drought response in 2006. In 2010 a contingent financing window was made a permanent feature of the productive safety-net program, intended to provide funding in the event of intermediate-severity drought to scale up the existing safety net program to reach transiently food-insecure populations.

The contingent financing window received US\$155.4 million from USAID, IDA, and the United Kingdom Department for International Development (DFID) in 2010. In 2011 \$134 million was drawn down from the window and deployed through the productive safety-net program to respond to the drought. At the time of writing it is understood that plans were in place to replenish the window from a number of donor sources.

Malawi – sovereign weather derivative

For the agricultural seasons 2008/9 through 2011/12, the Government of Malawi purchased severe drought protection in the form of weather derivative contracts which provide coverage against the risk of severe drought during the critical rainfall season. The contract used by Malawi to transfer the risk is based on a weather index that incorporates the Malawi Meteorological Services Department's national maize yield assessment model which uses daily rainfall as the only varying input to predict maize yields and therefore production throughout the country.

The World Bank has played an intermediation role to assist Malawi in accessing the market. During the first three years of the program, co-financing of the premium was provided by the UK Department for International Development (DfID). In 2011/12, cofinancing of the premium was supported through an IDA credit, the Malawian Agricultural Development Program Support Project.

Following a review of the project undertaken in March 2011, a number of options for the future development of the program were identified based on the Government's future priorities including: financing for more frequent, less severe events (lower layers of risk); the possibility of a disaggregated index operating on a sub-national regional basis; and the option to connect sovereign level financing directly to farmers at the micro-level (as has been done in Ethiopia using the productive safety net program).

Madagascar - social development fund (Fonds d'Intervention pour le Développement - FID)

Established in 1993 with the support of the World Bank, the objective of the FID is to mobilize funding for community-based infrastructure projects to increase and also restore access to social and economic services in the aftermath of catastrophic events. The FID pioneered the use of cyclone-resistant norms in schools and health centers. After the 2008 cyclones, the program also became involved in food security, funding cash-for-work programs to increase access to short-term employment in targeted food-insecure areas.

More recently, Madagascar adopted mandatory cyclone resistant norms for all its public buildings (and recommended norms for private buildings). These norms are now being comprehensively mainstreamed into urbanization and local area development plans. Under the leadership of the Unit for Management of Disasters (CPGU) of the Prime Minister's Office, Madagascar is also completing provincial-level risk mapping, identifying physical assets and populations at risk.

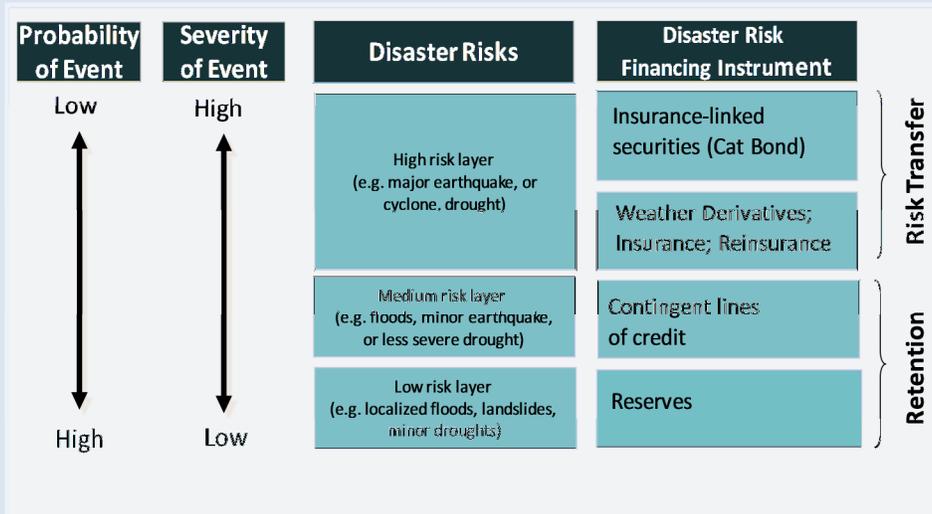
3.11. ***A recent quantitative study by the World Bank based on the Africa RiskView model supported a layered approach to financing the cost of disasters in Africa, involving the application of different financing tools for different layers of risk (layers being differentiated by the frequency and severity of the events)***¹⁷. This included tools such as reserve/savings accounts to deal with the most frequently occurring events, a regional contingent credit facility to deal with the intermediate layer of risk and an insurance program for the highest layer of risk (infrequent, catastrophic events). The appropriateness of different instruments for different layers is determined by the cost of use, speed of deployment and total amount of funds available through each tool. For example, as highlighted by Clarke and Vargas (2012) insurance is not the right financial mechanism for managing recurrent losses such as those that are expected to occur once every five years or less, on average¹⁸. For such events, risk retention mechanisms (e.g. a regular budget allocation) are more appropriate. This approach was derived based on the drought risk profile of the countries examined and also the World Bank's framework for disaster risk financing and insurance (see Box 3.3).

17 African Risk Capacity: A Study on the Feasibility of a Regional Approach to Financing Drought Risk in Africa, World Bank (Draft, August 26, 2011)

18 Cost Benefit analysis of the African risk capacity facility, Clarke and Hill, June 2012

Box 3.3. The World Bank framework for sovereign disaster risk financing and insurance

The World Bank advocates a three-tiered layered approach to the development of financing arrangements to cover disaster losses. Different disaster risk financing instruments will be suitable for different layers of risk, depending on their cost of use, speed of disbursement and the volume of funds that can be made available through the mechanism. The following diagram outlines the World Bank framework for DRFI at the macro level.



Analysis of the costs and benefits of instruments concludes that risks associated with high-frequency, lower-cost events occurring on a near-annual, recurrent basis should be met via regular annual budget allocations or the establishment of reserve facilities using budgetary (and other) resources.

Further funding for slightly larger events can be raised via the post-disaster reallocation of budgetary resources and the realignment of national investment priorities, although this can carry a higher opportunity cost and detract from the development agenda. There are a number of options for intermediate level events including the use of contingent credit and contingent grant windows, depending on the borrowing capacity of the country in question. The highest layers of risk associated with low-frequency, high-cost events should be transferred to third parties via a mixture of more expensive insurance or alternative risk transfer tools such as derivatives. It is important to recognize the market risk transfer is not designed to provide complete coverage for extreme events, but to provide immediate liquidity. For the most extreme events, reliance on international assistance is also often necessary.

In October 2012, Executive Directors of the World Bank approved a proposal to extend intermediation of natural disaster risk management products. This proposal, which is part of the broader agenda of mainstreaming disaster risk management, complements existing tools such as IBRD’s Catastrophe Deferred Draw-Down Option and IDA’s Crisis Response Window and Immediate Response Mechanism. Specifically, the new authorizations allow the Bank to expand intermediation services to include derivatives to hedge geological and meteorological events, in addition to weather events, and to expand the offer of these products to client countries, their sub-national entities, and regional and international organizations. When intermediating on behalf of countries, the Bank stands between the member country and the private sector, engaging in back-to-back transactions with both parties to pass on the terms of the risk protection from the market counterparty to the client while providing protection to the member country against the counterparty credit risk of the private sector counterparty. Member countries benefit by being able to leverage private sector risk capital to manage the impact of natural

disasters and by being able to make use of the World Bank's technical expertise and standing in the financial markets.

Governments, the private sector and the international community play important roles within all of these layers. For example, for intermediate and higher layers of risk, the private sector and international community provide additional risk-bearing capacity, where it is not cost-effective, or feasible, for disaster losses to be managed using governments' available financial resources. There are also examples of the international donor community using national reserve funds as channels to contribute to countries' financial resilience, as is the case for the Disaster Assistance Emergency Fund of the Republic of Marshall Islands.

Source: World Bank

Box 3.4. Africa Risk Capacity

The African Union Commission (AUC), in collaboration with the World Food Programme (WFP), the Rockefeller Foundation, the UK Department for International Development, the World Bank and other partners, is exploring ways to establish and operationalize a regional financing facility for drought risk management in Africa.

The aim of the facility would be to improve African governments' access to more predictable, quick-disbursing, regionally managed funding for drought risk reduction and recovery. The financing facility would provide participating African Union members with contractually guaranteed contingency funding in the event of drought. This activity supports the AUC's commitment to the Comprehensive African Agriculture Development Program's (CAADP) Pillar III, which focuses on reducing hunger and improving responses to food emergency crises. An integral part of this pillar is enhancing risk management and improving crisis response at the national and regional levels.

Since early 2010, the project partners mentioned above have been working to establish the institutional framework of this project. The facility design is currently underway, led by the WFP, and aims to cover the risk of severe drought events. ARC achieved a major milestone on 27 March 2012 at the AU's annual conference in Addis Ababa, where African Ministers of Finance and Economic Planning unanimously adopted a resolution to establish the African Risk Capacity as a Specialized Agency of the African Union. –The ARC is moving ahead with implementation, with Pre-Participation Agreements (PPA) from six countries having been signed. The PPA is a Memorandum of Understanding committing the Government to work closely with the ARC for a period of up to 12 months. The PPA does not commit the Government to the risk pool.

Studies on the proposed facility have been completed by institutions including the World Bank and the International Food Policy Research Institute and are referenced in the bibliography for further reading.

Source: <http://www.africanriskcapacity.org> and African Risk Capacity: A Study on the Feasibility of a Regional Approach to Financing Drought Risk in Africa, World Bank (Draft, August 26, 2011)

Box 3.5. Caribbean Catastrophe Risk Insurance Facility

The Caribbean Catastrophe Risk Insurance Facility is the result of collaboration between CARICOM governments, donor partners, and the World Bank Group. The Facility became operational in 2007 in response to an identified need for a regional risk pooling mechanism for the small island states in the Caribbean that lack capacity to diversify risk geographically, due to their small size, and across time, due to their budget and borrowing constraint. Since then, the Facility has disbursed more than US\$30 million to the participating Caribbean countries affected by natural disasters to help them finance their immediate post-disaster expenditures.

The CCRIF functions as a mutual insurance company controlled by participating governments. The facility was initially capitalized by participating countries, with support from donor partners.

CCRIF helps Caribbean countries lower the cost of insurance by pooling risks and taking advantage of economies of scale in operating costs. Insured countries pay an annual premium commensurate with their own specific risk exposure and receive compensation based on the level of coverage agreed upon in the insurance contract upon the occurrence of a major disaster.

A portion of the pooled risk is retained through reserves, which significantly reduces the cost of insurance premiums. The CCRIF transfers the risks it cannot retain by purchasing reinsurance and catastrophe swaps.

Coverage provided by the Facility is “parametric”. Unlike traditional insurance settlements that require an assessment of losses on the ground, parametric insurance payouts are contingent on the intensity of an event (e.g., wind speed, ground acceleration). These instruments pay out faster than traditional triggers, but have associated basis risk – the risk that payouts do not match losses sustained on the ground.

Source: World Bank Disaster Risk Financing and Insurance Program from CCRIF

Box 3.6. Pacific Catastrophe Risk Insurance Pilot

In November 2012, five Pacific Island Countries (PICs) accessed catastrophe risk insurance in the form of catastrophe swaps under the Pacific Catastrophe Risk Insurance Pilot. The pilot offers immediate liquidity to the PICs in the aftermath of a severe natural disaster that disrupts the provision of government services. It offers both earthquake and tropical cyclone risk coverage.

The policies do not pay based on actual losses incurred. Instead, to ensure speed of payout, the policies are triggered by modeled emergency losses calculated using an event footprint. Catastrophe risk models have been developed for this purpose.

The World Bank takes the role of intermediary for the transaction, sitting between participating countries and the international reinsurance market that has taken the risk. The portfolio of catastrophe risk transfer policies for the first pilot season has an aggregate limit of about US\$45 million. By approaching the market as a group, countries have benefited from a lower cost of risk transfer due to economies of scale in a combined approach, and also the benefits of diversification in presenting the risk as a portfolio.

Participating countries for the 2012-2013 pilot years are the Marshall Islands, Samoa, the Solomon Islands, Tonga and Vanuatu. The pilot is a joint initiative between PICs, the World Bank and the Ministry of Finance of Japan. It builds on models developed under the broader Pacific Catastrophe Risk Assessment and Financing Initiative, a partnership between the Asian Development Bank, the Government of Japan, SOPAC, and the World Bank GFDRR.

Source: World Bank Disaster Risk Financing and Insurance Program

Sources of financing for disaster-related public expenditure in Sub Saharan Africa

Ex-post sources

1. International aid

3.12. Dependence on international aid remains extremely high in Sub-Saharan Africa. The 2011 Horn of Africa drought crisis highlighted the challenges that result from dependence on external aid for disaster response. The 2011 Horn of Africa drought impacted more than 13 million people. Despite early indications of the drought event from early warning systems such as FEWSNET¹⁹, funding from the international donor community was not mobilized until the crisis point was reached – the delay largely attributed to the time it took to generate sufficient public attention through the media, following which donors significantly increased the funds available for response. An estimated 50,000 to 100,000 lives were lost as a result of the disaster, and according to multiple humanitarian agencies, the death toll was significantly increased by the delay in funding.

3.13. International aid will always have a role to play in disaster response in Africa. However, overdependence on this as a source of post-disaster financing can slow recovery and inhibit the longer term development of resilience due to delays and uncertainty associated with external aid flows, and the resulting ‘crowding out’ of local capacity to manage disaster risk.

2. External credit

3.14. Case studies examined in a report by Benson and Clay (1998) showed a sharp increase in government borrowing following severe drought events in Sub-Saharan Africa. There will be cases where external credit is a viable option for governments to spread the cost of the disaster over time. However, for Sub-Saharan African countries with limited fiscal resources, this borrowing can come at a high future cost due to the burden of debt servicing and existing high levels of indebtedness. Increasing external borrowing can have other negative impacts on public finances, such as appreciation of the country’s exchange rate which can damage government revenues by affecting the export-import balance.

3. Emergency budget reallocation

3.15. Governments regularly make use of budget reallocation to deal with disaster-related expenditure, although the full extent of this practice is difficult to track as funds may come under general budget headings. For example, in Malawi, ministries regularly make use of their ‘Other Recurrent Transactions’ line to deal with additional disaster-related expenditure.

3.16. In the event of a severe disaster, countries may need to free up resources from committed funds under the fiscal budget – even where the item of expenditure is considered non-discretionary. For example, arrangements to defer debt-servicing have been used to free up resources for disaster response: in the aftermath of devastating floods in 2000 Mozambique, the World Bank and the IMF arranged 12 months of post-disaster debt servicing relief for the country in the context of the Heavily Indebted Poor Countries Initiative.

3.17. Whilst emergency budget reallocation can be a quick and relatively cheap way to finance the cost of disasters, it carries a high opportunity cost for Sub-Saharan African countries with limited budgetary resources; diverting funds from the longer-term development agenda. In addition, the difficulties of tracking emergency

¹⁹ USAID’s Famine Early Warning System Network

budget reallocation can obscure the true cost of disasters and inhibit countries in developing both the capacity and political imperative for disaster risk management.

4. Tax increases

3.18. Although most Sub Saharan African countries do not have access to the wide and deep tax revenue catchments of more developed economies, tax increases have been used to finance part of the cost of post-disaster reconstruction.

3.19. Zimbabwe provides one such example, where a special 5% drought levy was introduced for individuals in the higher tax brackets following 1982/83 drought. The country also applied a 2.5% increase to corporate tax in the aftermath of the 1986/87 drought (Benson, 1998).

Ex-ante sources

5. Annual budget allocations and national reserve funds

3.20. Although some Sub-Saharan countries have established reserve funds or annual budget allocations for disaster-related expenditure, this is not common practice, and those contingent budget facilities that do exist are typically underfunded.

3.21. Where contingent budgets are made available for all unforeseen/contingent spending, funds are often appropriated for other uses leaving nothing left for disaster response when an event does occur.

6. Contingent loans and grants

3.22. Contingent loans and grants are being increasingly used by developing countries to finance disaster losses. The government of Ethiopia has utilized a contingent financing window (comprising grants from international donors) as a means of responding to drought events for a number of years (see Box 3.2). Outside of Africa, contingent credit for disaster response has grown significantly in popularity amongst IBRD-eligible countries, with facilities in place in a number of countries in Latin America and South-East Asia. The World Bank's contingent credit facility for IBRD countries is the Catastrophe Deferred Drawdown Option or Cat DDO, which allows countries to access a pre-established credit facility in amounts of up to US\$500 million or 0.25% of GDP, whichever is less. The Cat DDO has a 'soft' trigger, as opposed to a parametric trigger; funds can be drawn down upon the occurrence of a natural disaster resulting in the declaration of a state of emergency.

3.23. Furthermore, with increasing acknowledgement of the inter-linkages between development and disaster response, more flexible development investment is arising, with built-in mechanisms to divert undisbursed resources to crisis windows in the event of a disaster during the project lifetime. These contingency mechanisms are already widespread in development lending by international financial institutions (IFIs), and may become a standard feature in the near-term. This will facilitate the portfolio restructuring that IFIs undertake after a disaster, to divert development financing to the immediate crisis.

7. Insurance and alternative risk transfer

3.24. Products that transfer risk such as insurance or alternative risk transfer mechanisms such as weather derivatives and catastrophe bonds are rarely used by developing countries in their fiscal management of disaster risk – principally due to the high cost of use and perceived high opportunity cost given the frequency of recurrence of covered events. The cost of transferring risk via these mechanisms is typically a number of multiples of the expected payout that will be received. This is because the insurer must be compensated for uncertainty and volatility in the risk they are taking, the cost of holding the capital required to meet their obligations to the policy/contract holder and the cost of administering the product.

3.25. However, despite the high cost, transferring a portion of risk can be of huge benefit to developing countries that require quick liquidity post-disaster and are unable to otherwise source the large amounts of funding required to deal with infrequent, catastrophic events. Risk transfer can be extremely valuable in averting post-disaster liquidity crunches and helping countries to spread the cost of severe events over time.

3.26. One example is the weather derivative which has been in use by the government of Malawi for a number of years. This contract (see Box 3.2) is used to transfer part of the cost of extreme drought events into the financial markets. The government of Malawi has received assistance in the payment of the associated premiums from donors and the World Bank.

3.27. Rate of insurance of public assets is particularly low in Sub-Saharan African countries for a number of reasons, including the difficulties associated with enforcing purchase by the units or individual manager responsible for the asset, and the perception of a high opportunity cost associated with the payment of insurance premiums that will only result in cash-flow on an extremely infrequent basis, as insurance is most cost-effectively used for infrequent, remote catastrophic events.

Section 4. Catastrophe Risk Insurance Markets

Overview

4.1. ***Catastrophe risk insurance has great potential to increase the financial resilience of households in Africa, to disaster shocks.*** Informal savings and loans mechanisms are widely used in Sub-Saharan African countries to manage the impact of unexpected shocks on income and assets. However, these community-level mechanisms are not suitable for severe disasters that impact a large area, as they are unable to spread risk beyond the community. Insurance products have the potential to fill this gap, providing much-needed liquidity in the immediate aftermath of a disaster. There is a very real need for these products; surveys by FinScope published in 2009 of seven Sub-Saharan African countries, revealed that low-income African households are extremely concerned about the impact of crop and property damage from disasters, ranking damage to or destruction of property or crops in the top five risks to household finances.

4.2. ***Catastrophe risk insurance markets also contribute to countries' disaster resilience at the sovereign level.*** Where penetration is high, insurance markets have the potential to absorb a significant portion of post-disaster losses, and can thereby reduce the contingent liability of the state by:

- (i) reducing the need for post-disaster assistance; and
- (ii) transferring some of the cost of rebuild of government assets to the private sector (where those assets are insured).

4.3. ***Developed insurance markets also contribute to resilience by disseminating risk information to policyholders.*** Where the cost of insurance (premiums) is linked to risk, these products also provide financial incentives for policyholders to invest in risk reduction activities. The private insurance sector can also contribute to the development and enforcement of safer building codes, for example by working with governments to develop rating programmes that correspond to building and fire prevention codes, thus providing insurance pricing incentives for better construction design.

4.4. ***Catastrophe risk insurance can be categorized into three key non-life insurance product lines; agricultural insurance, property catastrophe risk insurance and disaster microinsurance.***

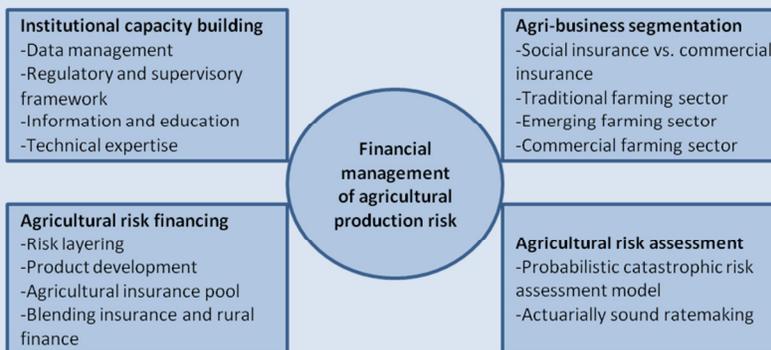
- **Agricultural insurance** provides cover for catastrophes that impact crops and livestock and is most effective when applied within a framework for agricultural risk management (see Box 4.1). In Sub-Saharan Africa, severe drought and flooding events are the principal disasters resulting in payouts from these policies. Agricultural insurance policies come in many forms, including named-peril or multiple-peril crop insurance and livestock accident and mortality insurance. Of all insurance lines, agricultural insurance has seen the most widespread use of index-linked insurance.
- **Property catastrophe risk insurance** policies cover disaster-related damage to physical assets or loss of income arising from damage to a physical asset. These may take the form of household and contents insurance, or cover for commercial and industrial assets (typically as an 'All-Risks' policy). Loss of income and alternative living expenses can be covered although these covers are not as widespread. Underwriters tend to be selective in granting cover where disaster risk is high.
- **Disaster microinsurance** refers to policies specifically designed for low-income populations, providing cover for physical assets or livelihoods in the event of a disaster. Disaster microinsurance can be considered as a subset of agricultural and property catastrophe risk insurance lines, targeting a specific consumer segment; the poor. The World Bank has developed a comprehensive microinsurance development strategy outlined in Box 4.2 below.

Box 4.1. Insurance within the framework for Agricultural Risk Management

Insurance is one tool for mitigating the negative impact of disaster risks, and should be applied within a broader framework for agricultural risk management alongside other financial tools for the mitigation of disaster impacts, physical mitigation measures and institutional and market development initiatives.

The World Bank promotes a proactive approach to the financial management of risks to agricultural production, as one component of a comprehensive disaster risk management approach. This focuses on dealing with the impact of residual risks that remain after cost-effective risk mitigation techniques (e.g., irrigation, pest treatments) have been implemented. In this framework, agricultural risk financing – including insurance, credit and products to manage price risk (forward sales, futures contracts and options) – is presented as one key risk management pillar alongside institutional capacity building, quantitative assessment of risks to agricultural production and agri-business segmentation.

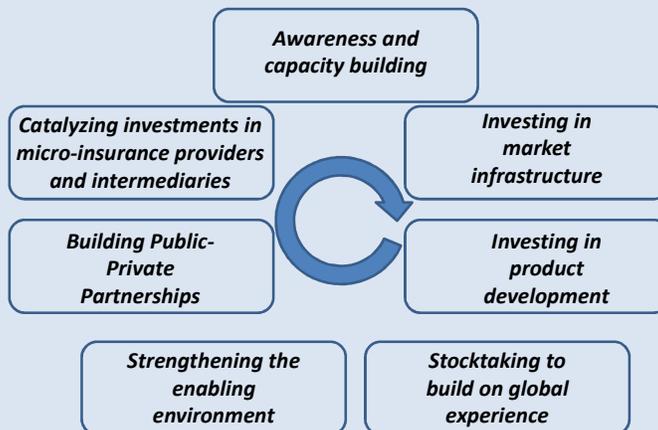
World Bank framework for the financial management of agricultural production risk



Source: World Bank Disaster Risk Financing and Insurance program

Box 4.2. The World Bank strategy for microinsurance development

The growth of micro-insurance markets in developing countries faces a number of key challenges which have been identified as: (i) weak distribution and service delivery channels and high transaction costs; (ii) poor product design and low value proposition from the perspective of the insured; (iii) lack of financial literacy, consumer awareness and trust in the insurance sector and similarly lack of capacity and understanding of microinsurance within insurance companies; (iv) inadequate legal, regulatory and supervisory framework; and (v) high risks of investment in the micro-insurance business line. In response to these challenges the World Bank has outlined a strategy for microinsurance development, based on seven pillars:

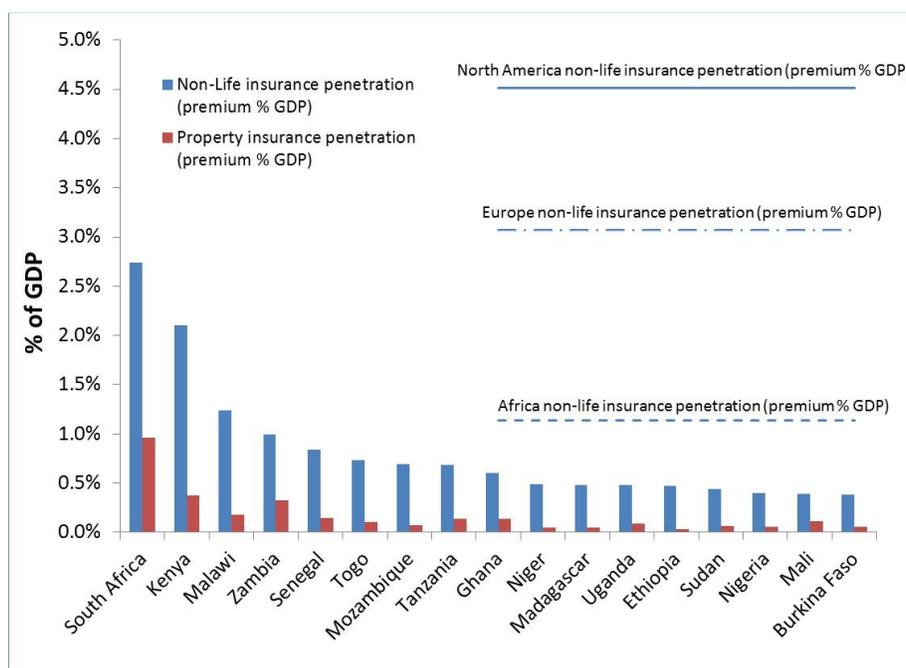


Source: World Bank Group Micro Insurance Development Program, Concept Note

Current state of the market

4.5. **Insurance penetration for catastrophic perils in Sub-Saharan Africa is limited by the relatively limited development of markets for non-life insurance more generally.** The non-life insurance market in South Africa is significantly more developed than the market in any other Sub-Saharan African country, yet South African non-life insurance penetration is still below levels for developed markets in North America (4.51% of GDP) and Europe (3.07% of GDP)²⁰, and penetration levels for other Sub-Saharan African countries are significantly lower (see Figure 4.1).

Figure 4.1. Non-life insurance penetration of selected African countries²¹



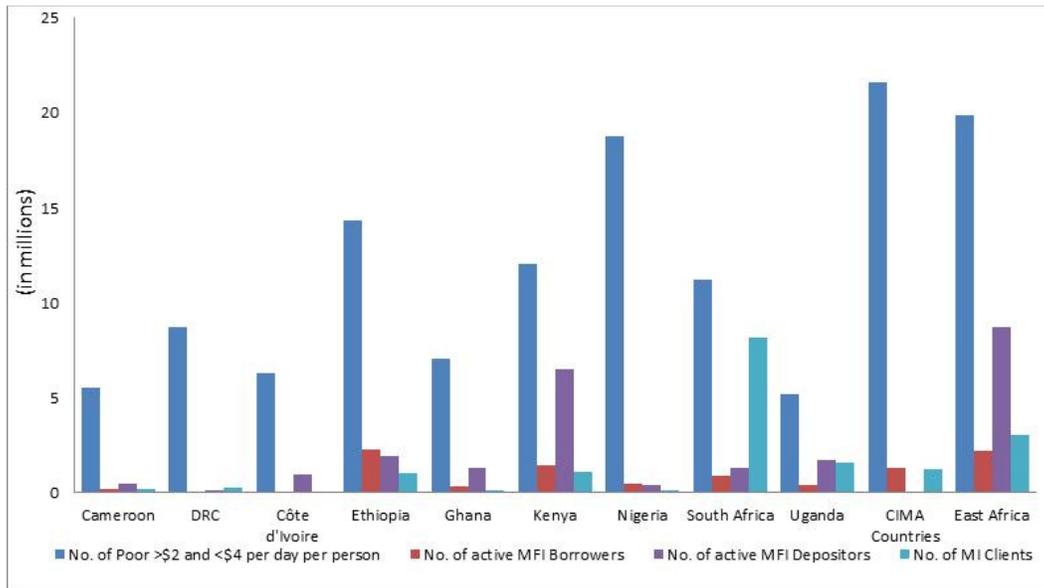
Source: Authors from multiple sources, principally Swiss Re, AXCO

4.6. **Very few households, farms and businesses in Sub-Saharan Africa have insurance in place to cover catastrophe risk.** The limited uptake of catastrophe risk insurance is particularly highlighted by looking at the number of people who have an insurance policy in place covering damage to property, crops or income. A 2006 FinScope study found that less than 9% of adults in South Africa have any insurance cover for their assets; and this figure is likely to be significantly lower for other Sub-Saharan African countries where non-life insurance markets are less developed. These low levels of uptake were confirmed by a 2010 study by the Microinsurance Innovation Facility which estimated that, across the continent, only 2.6% of the target consumer group is using a microinsurance product (including life and health lines and non-life covers including disaster microinsurance). These findings were also supported by a recent World Bank analysis examining microinsurance activity on the continent relative to microfinance activity and the size of the target consumer group (see figure 4.2).

²⁰ Insurance penetration figures from Swiss Re Sigma, 2009 data

²¹ Multiple sources for non-life insurance penetration; World Bank, Swiss Re Sigma 2009 data, AXCO. Note that property insurance penetration is calculated using an estimated share of the non-life insurance market. Principal source of property share is AXCO.

Figure 4.2. Microinsurance (MI) activity in relation to microfinance activity and target consumer group size in Africa



Source: World Bank, 2012. World Bank Group Micro Insurance Development Program: Concept Note.

4.7. ***There is a need for development of all lines of business for catastrophe risk insurance in Sub-Saharan Africa, although products targeting the agricultural sector are likely to have a particularly large impact on disaster resilience in the region.*** This is due to the large proportion of the population that depends on the agricultural sector for its livelihood (an estimated 70%), the widespread and severe impacts of drought (and to a lesser degree flood) on crops and livestock in the region and the limited penetration of agricultural insurance.

4.8. ***New models for insurance provision are being piloted in a number of Sub-Saharan African countries to try and increase the use of insurance by vulnerable populations.*** Although the spread of microinsurance in Sub-Saharan Africa has centered on life and health insurance as opposed to non-life covers for catastrophe risk, a number of pilots providing innovative index-linked cover to farmers for extreme weather have been launched across the continent (see box 4.3). These index-linked insurance schemes have sought to provide cover to hard-to-reach segments of the population at lower cost by reducing the need for extensive insurance infrastructure. However, none has yet proved its potential to scale and a number have failed. A number of factors have been cited as inhibiting the growth of these pilots including: lack of demand; issues with index data provision or reliability; and lack of suitable distribution networks.

Box 4.3. Innovations in index-linked insurance for African farmers

Traditional indemnity insurance that compensates the policyholder for losses incurred can be expensive to deliver to rural populations, as individual losses need to be verified post-disaster. Products that link insurance payouts to some proxy for incurred losses (in the form of an index) can reduce the cost of providing cover by removing the need for on-the-ground claims verification. Insurance premiums can be reduced as a result.

The key disadvantage of these products is 'basis risk'. This is the risk that payouts do not match losses – for example where losses are incurred, but no payout is received. Basis risk is an inherent feature of any index-linked insurance product as no index can correlate perfectly with losses incurred.

A number of types of index have been piloted for risk transfer for farmers in Sub-Saharan Africa:

Area-yield based indices for Senegalese farmers

Following the authorisation of Senegal's national agricultural insurer (Compagnie Nationale d'Assurance Agricole du Senegal – CNAAS) in 2009, area-yield index based insurance is available to farmers in the country. Area-yield based indices designate a unit area in which a crop cutting experiment is performed to determine yield relative to a historical baseline or predetermined yield threshold for the contract. The contract assumes that the production outcome of insured farmers within the unit is highly correlated. If the crop cutting experiment for the unit indicates a yield significantly below expected levels (as defined at the inception of the policy) then payments are made to all covered farmers within the unit.

Area-yield based contracts can significantly reduce the cost of providing crop insurance as they obviate the need to verify individual farmer's losses. These indices have proven their potential to scale through their use in schemes such as the National Agricultural Insurance Scheme in India which is the largest agricultural scheme globally.

As CNAAS is still at a very early stage in the piloting of these products, the current client base is reported to be limited. However, the company is working with a number of partners to examine options to increase uptake.

Weather-based indices for agricultural borrowers in Malawi

In 2005 the World Bank worked with the National Smallholder Farmers' Association of Malawi to design a weather index insurance product for drought which covered groundnut crops. The product has since evolved and now covers tobacco and maize.

The index-linked insurance product utilizes rainfall data from stations managed by Department of Climate Change and Meteorological Services and provides cover for outstanding agricultural loan amounts for farmers in the event of a drought. The product essentially serves to reduce the risk of lending to smallholder farmers and to thereby promote agricultural lending.

The basis of the contract is the correlation between rainfall as measured by weather stations, and crop yields. When a covered drought occurs, rainfall levels drop below historical levels and payments under the contract are made to the financial institution offering the agricultural loan to write off the farmers' debt. The product has been offered through the private insurance market under consortium acting through the Insurance Association of Malawi.

The normalised dry vegetation index (NDVI) for Kenyan herders

The International Livestock Research Institute (ILRI) is leading a project in Northern Kenya to offer index-linked insurance for livestock mortality. An insurance product has been designed using an index based on satellite data; in the event of a drought, the satellite data will indicate changes in the state of the vegetation. As the availability

of forage correlates strongly to livestock mortality in the event of a severe drought, the satellite data serves as a proxy for herders' livestock losses. Contracts based on satellite data have broad applicability as third party data providers such as NOAA (the National Oceanic and Atmospheric Administration) provide extensive global coverage of this data and make it widely available.

Source: World Bank Disaster Risk Financing and Insurance Program compiled from multiple sources

Box 4.4. The HARITA pilot; insurance for labor

In 2009 Oxfam America and partners (Swiss Re, REST, IRI, Nyala Insurance and others) piloted the Horn of Africa Risk Transfer for Adaptation (HARITA) program in Ethiopia. The pilot included risk reduction activities, drought insurance, and credit for farmers in five selected villages. It sought to leverage the existing productive safety net program (PSNP) in place in Ethiopia by adding an "insurance for labour" option for farmers under the PSNP who were unable to pay for premiums.

The labour exchanged by farmers for insurance was directed towards risk reduction. Qualifying tasks under the program included activities such as composting and cleaning teff seeds, designed to increase the drought resilience of the participating communities. In return, coverage was granted in the form of weather index insurance.

In 2009, the take-up rate for the weather index insurance was 20 percent, with 200 farmers participating in the pilot. 65 percent of participants paid in labour. The program has since completed two more growing seasons and available insurance products have been expanded to include additional crops. During the last growing season in 2011, HARITA expanded to 43 villages, covering 13,195 farmers. More than 90 percent paid for their insurance in labour. The insurance policies paid out for the first time in 2011 with more than 1800 farmers receiving payouts averaging just under \$10 per claim.

Oxfam America has recently partnered with the WFP to scale up the program in the form of the R4 resilience initiative, applying the same principles of work-for-insurance and the application of weather-based indices for insurance to other regions in Ethiopia and additional countries.

Source: World Bank Disaster Risk Financing and Insurance Program compiled from Oxfam America and other sources

Areas of challenge and potential for growth

4.9. ***Challenges on both the supply and demand side must be overcome to increase catastrophe risk insurance penetration in Sub-Saharan Africa.*** The lack of demand for products has been a key inhibiting factor in the increased uptake of catastrophe risk insurance. This can be attributed to multiple factors including: issues with product suitability; lack of understanding of products and a perception of product complexity; limited trust in institutions offering insurance products; and the absence of a 'culture of insurance'. On the supply side, challenges arise from sources such as inadequacies in data required for the development, pricing and accumulation management of products and the limited technical and financial capacity of domestic insurers to underwrite catastrophe risks.

4.10. ***Affordability of products poses a significant challenge to insurance uptake, although product simplicity and anticipated speed of payout are also cited as important considerations by consumers.*** For some consumer segments in Sub-Saharan Africa, standard catastrophe risk insurance products available through the commercial markets will meet their needs. However, for the majority of potential consumers, the affordability of insurance presents a problem; diverting limited financial resources to pay insurance premiums carries a high opportunity

cost for low-income households. A number of models have been tested to reduce the cost of cover in Sub-Saharan Africa, with varying degrees of success. These include initiatives that aim to reduce operating costs (such as index-linked products that reduce monitoring costs or the use of alternative networks to bring down distribution costs) and initiatives that cede part of the cost of cover to governments and donors (such as premium subsidies see box 4.5).

Box 4.5. Premium subsidies in agricultural insurance

Agricultural insurance has a long tradition of government support through premium subsidies. In 2007 the total public cost of agricultural insurance programs worldwide was estimated at 68% of global premium volume²² with premium subsidies for agricultural insurance being offered in almost two-thirds of countries surveyed by a 2008 World Bank survey. However, incidences of government support to agricultural insurance are not as common amongst low-income countries.

Nigeria, Senegal and Sudan all have national agricultural schemes featuring heavy levels of subsidy; government subsidies through national agricultural insurers account for around 50% of gross premiums for most classes of agricultural insurance.

It should be noted that whilst premium subsidies support some of the largest agricultural insurance schemes worldwide (e.g. the US and India), they are not a prerequisite for high agricultural insurance penetration and have not had universal success. A number of countries have achieved high agricultural insurance penetration without subsidy, such as Germany, Argentina and Australia.

Source: Authors

4.11. ***In 2010, the Microinsurance Innovation Facility estimated a potential \$25 billion market in Africa for microinsurance, covering a potential consumer base of 700 million people***²³. Within the range of microinsurance products, those products providing catastrophe risk cover (agricultural insurance and property insurance) are estimated by the Facility to have a potential consumer base of 165 million in Africa.

4.12. ***The development of catastrophe risk insurance markets for non-poor households and the commercial sector will indirectly benefit the most vulnerable households by liberating government and donor resources.*** In helping to ensure business continuity and reducing the pool of households requiring financial aid post-disaster, the burden on government and donor resources is reduced, freeing up funds to target the poor. There are a number of ways in which governments can support the growth of their domestic insurance markets. Some of these are discussed in Section 5.

4.13. ***Difficulties of product distribution are exacerbated by the high proportion of the population that is financially excluded and living in difficult to reach rural areas.*** Sub-Saharan Africa has the largest proportion of financial exclusion of any region worldwide - only 12%²⁴ of the population of Sub-Saharan Africa has access to a bank account. With the majority of the population living in rural areas, disconnected from financial services infrastructure, distribution of all financial services including insurance, poses a significant challenge.

4.14. ***A number of non-traditional distribution channels have been tried as a way to increase access to insurance in Africa, including social safety nets (see HARITA box 4.4) and mobile phone networks with varying degrees of success.*** The productive safety net program in Ethiopia has been used to reach more than 13,000 farmers with weather index insurance. Mobile phone networks were being used to deliver insurance (principally

²²Source: Government Support to Agricultural Insurance, Mahul and Stutley.

²³Market size based on definition of target consumers for microinsurance as the working poor, and the vulnerable non-poor. \$25 billion market size extrapolated from the assumption of potential insurance expenditure at 5% of GDP.

²⁴CGAP and World Bank analysis 2010

life and health covers as opposed to catastrophe risk) as part of pilots or live schemes in at least eleven Sub-Saharan African countries as of 2011. The networks of banking institutions – particularly agricultural banks and microcredit institutions – have also been leveraged to try and reach the rural poor with insurance products, although the high levels of financial exclusion have limited the outreach of these networks. Informal financial networks, such as community savings and loans groups have significant potential as distribution channels and merit further investigation as a way to provide catastrophe risk insurance in Sub-Saharan Africa.

4.15. **Many domestic insurers in Sub-Saharan Africa lack the technical capacity to underwrite catastrophe risk.** Many domestic insurers in Sub-Saharan Africa have limited experience in offering products that cover catastrophe risk, and therefore often lack the technical expertise required to develop, price and market these products. However, the growing presence of international reinsurers in the region, and recent initiatives to bring external product expertise into less developed markets, have begun to address these issues by connecting domestic insurers with a broader pool of expertise.

4.16. **Lack of information also presents a challenge.** It is difficult for insurers to develop and price insurance products for regions where no data is available to indicate the magnitude and type of potential losses that could be sustained under the policies. This data is simply not available for large parts of Sub-Saharan Africa where loss records do not exist, vulnerability is poorly understood, and infrastructure to capture hazard levels (e.g. networks of weather stations) is sparse or not fully mobilized.

4.17. **Experience shows that public-private partnerships may be an effective approach to establish sustainable and affordable catastrophe risk insurance programs.** Governments can establish an enabling environment with a supportive legal and regulatory framework, for example, by setting requirements for premiums to reflect risk (where appropriate) and by adequately supervising insurers' solvency. The provision of basic risk market infrastructure as public goods also catalyzes growth, building domestic insurers' capacity while supporting the sale of reliable, cost-efficient insurance products. The government can also facilitate catastrophe risk pooling mechanisms that help local insurers aggregate and structure risks and transfer them to the international reinsurance market. In order to reduce uncertainty for insurers and insureds, governments may also want to consider providing a sovereign guarantee as reinsurer of last resort for only the most catastrophic losses, while at the same time clearly delineating its contingent liability for private losses.

Section 5. Options for a Disaster Risk Finance and Insurance Development Program in Sub-Saharan Africa

5.1. It is evident that Sub-Saharan Africa is highly exposed to the risk of disaster losses, and highly vulnerable to the impacts of these losses. Furthermore, very few financing mechanisms are in place, or even available, to individuals, companies and governments to help them manage the resulting pressure on their finances. International experience in the development of financial resilience to disasters indicates that this can be achieved through engagement in a number of parallel strands: strategies for financial protection at the sovereign level to help governments meet their contingent liabilities; the promotion of catastrophe risk insurance markets for businesses and households; and the development of schemes that provide a financial buffer to the poorest households. Successful engagement in any of these areas is dependent on access to reliable risk information and modeling systems; quantification of risk is critical to effective disaster risk management, and particularly to the effective financing of disaster losses. Four complementary pillars for engagement in the development of disaster risk financing and insurance in Sub-Saharan Africa are outlined below.

Recommendation 1: Development of risk information and modeling systems to assess the economic and fiscal impacts of natural disasters

5.2. Despite the large number of risk assessment initiatives that have been rolled-out on the continent, the integration of risk information into DRM decision-making is extremely limited. This is due to a number of reasons including the absence of information, lack of standardization making existing datasets difficult to use, lack of understanding of the data and its potential value and the absence of data stewardship. Options to promote wider and better use of risk information include:

- **Development of catastrophe risk models that articulate disaster risk in terms of ultimate impacts** (e.g. direct financial and broader economic losses). This would require development of exposure datasets detailing assets, livelihoods and population at risk, and models of the vulnerability of these exposures to the prevailing physical hazards. Partnerships with the private sector and academia could be considered as one method to develop models and technical capacity in this field whilst maintaining local ownership;
- **Investment in infrastructure to monitor and record hazards** to support risk assessment, and potentially, index-linked insurance products;
- **Fiscal disaster risk analyses for governments** to quantify the contingent liability of the State arising from natural hazards;
- **Development of policies and capacity-building initiatives to mainstream disaster risk information into decision-making processes within government institutions with DRM responsibilities.** This specifically includes the integration of disaster risk information into fiscal and public debt management; and
- **Development of national or regional platforms to consolidate and standardize risk information.**

Box 5.1. R-FONDEN: The financial catastrophe risk model of the Ministry of Finance in Mexico

The Government of Mexico developed a catastrophe risk model called R-FONDEN for its national disaster fund, FONDEN. This probabilistic risk model offers catastrophe risk analysis for four major perils (earthquake, floods, tropical cyclones, and storm surge) for infrastructure in key sectors (education, health, roads, and low-income housing) at national, state, and sub-state level. The analysis can be performed on a scenario-basis or on a probabilistic basis.

R-FONDEN takes as input a detailed exposure database (including details of buildings, roads, and other public assets) and produces as outputs risk metrics including AEL and PML. This model is currently used by the Ministry of Finance, in combination with actuarial analysis of historic loss data, to monitor the disaster risk exposure of FONDEN's portfolio and to design disaster risk transfer strategies, such as the placement of indemnity-based reinsurance and the issuance of catastrophe bonds.

Source: World Bank and GFDRR, 2012. Advancing Disaster risk financing and insurance in ASEAN member states.

Recommendation 2: Development and implementation of disaster risk financing and insurance strategies for governments

5.3. Over-dependence on external aid post-disaster is inhibiting development in the region. As demonstrated by the recent drought in the Horn of Africa, the current systems in place to help governments meet the cost of disasters are not adequate and can result in significant delays in response and recovery. A number of options are presented below to promote better management of the impact of disasters at the fiscal level, based on the principal of layering of sovereign DRFI instruments in accordance with risk frequency and severity.

5.4. ***Governments should integrate natural disaster risks into fiscal risk assessment and management.*** Fiscal disaster risk analyses could be used to quantify the State's contingent liability and take a proactive approach to reducing budget volatility from disasters. Systems to track disaster-related public expenditure should also be established. Tracking systems are essential in order to effectively manage disaster response efforts, identify gaps in funding, support accountability, and draw lessons learned for potential improvements in disaster risk financing arrangements.

5.5. ***Countries should develop national strategies for financing the cost of disasters to the fiscal budget, matching appropriate instruments (retention, transfer) to layers of risk and specific perils*** (see box 5.2. for illustration from Mexico). These strategies should be tailored to the specific circumstances of countries including a country's level of income, the disaster risks faced, the scale and nature of public contingent liability, government fiscal capacity, and the level of access to international capital markets. This would allow governments to increase their financial response capacity in the aftermath of a disaster, allowing them to execute timely and effective responses. Such strategies could include action at the national and sub-national level (e.g. municipal/regional).

Box 5.2. Mexico's Natural Disaster Fund (FONDEN)

FONDEN, Mexico's Fund for Natural Disasters, was established in the late 1990s as a mechanism to support the rapid rehabilitation of federal and state infrastructure affected by adverse natural events. Created as a budget line in the budget law in 1996, it became operational in 1999. Funds from FONDEN's Program for Reconstruction can be used for the rehabilitation of (i) public infrastructure at the three levels of government (federal, state and municipal); (ii) low-incoming housing; and (iii) forestry, protected natural areas, rivers, and lagoons.

The FONDEN Program for Reconstruction is FONDEN's primary budget account, which is linked with the FONDEN Trust. The FONDEN Program for Reconstruction channels resources from the Federal Budget to specific

reconstruction programs. In the aftermath of a disaster, funds committed to a specific reconstruction program will be transferred to a dedicated sub-account in the FONDEN Trust for execution. The FONDEN Trust holds these resources until these programs are fully implemented. It also acts as the contracting authority for market-based risk transfer mechanisms, including insurance and catastrophe bonds.

As part of the Government of Mexico's effort to move toward a proactive approach to disaster risk management and financing, another budget account, the FONDEN Program for Prevention, or FOPREDEN, was established in the early 2000s. FOPREDEN promotes investment in risk reduction by funding (i) risk assessment, (ii) disaster risk reduction activities, and (iii) capacity building on disaster prevention. FOPREDEN requires states to complete a risk assessment (including the development of a risk atlas) before being eligible for financing. Although resources for prevention remain significantly less than those for reconstruction, the GoM continues its effort to shift focus and funding from ex post response to ex ante disaster risk management.

Source: "FONDEN: Mexico's Natural Disaster Fund – A Review," *The World Bank and the Government of Mexico (2012)*.

5.6. **A "bottom-up" disaster risk financing approach should be considered.** Governments should first secure financing for recurrent events (bottom risk layer) through risk retention (e.g. reserves and /or contingent credit) and then move up to increase their levels of financial resilience through disaster risk transfer instruments. Instruments such as insurance for public assets, or budget support to governments through mechanisms such as the Africa Risk Capacity project should then be considered within this layered framework.

5.7. **Given the potential welfare benefits of pooling risk between subnational units within a country,** mechanisms for better allocation of resources within countries should be also a priority consideration within a sovereign DRFI strategy.

Recommendation 3: Development of schemes to buffer the poorest households from disaster shocks

5.8. **For the poorest households, even microinsurance may not be a viable option due to cost. Therefore, development of other micro-level contingent financing schemes such as conditional safety net programs could be examined.** Contingent financing that is not market-based can still confer some of the key benefits of insurance if structured carefully. These might include rapid payouts through the use of 'hard triggers' such as weather or yield-based indices, or the promotion of risk reduction activities as demonstrated by the HARITA scheme.

5.9. **As highlighted by a recent IFPRI study, strong welfare benefits can be derived from the establishment of safety net schemes and their subsequent use post-disaster.** The pre-existence of distribution mechanisms that effectively target the poor is vital if the benefits of rapid liquidity through disaster risk financing instruments are to be fully realized.

Recommendation 4: Promotion of catastrophe risk insurance markets

5.10. Insurance penetration for those of lines of business covering catastrophe risk is extremely low in Sub-Saharan Africa. This can be attributed to issues on both the supply side (e.g. lack of infrastructure, unsuitable products) and the demand side (e.g. lack of awareness of the value of products, affordability issues). As noted under section 4 above, suitability of products is a critical driver in the uptake, or lack of uptake for insurance products and a careful assessment is required of the needs of the consumer in order to determine what types of insurance product may be appropriate, and indeed whether insurance is the right tool when considered relative to other coping measures and options for investment.

5.11. A considerable amount of innovation has been applied to the problem of increasing access to insurance in Africa, with mixed success. A stock-taking exercise examining the successes and failures of catastrophe risk insurance pilots across the region would be a good starting point. Other options to increase access to and uptake of insurance for catastrophe risk include:

- **Development of distribution channels for insurance to increase outreach.** This could include investigation of alternative routes (such as the use of mobile phone networks to distribute insurance as described in section 4, or use of informal community networks) or expansion of existing infrastructure;
- **Development of public goods such as catastrophe risk models, standardized products, development of claims databases and other underwriting tools.** These should aid the development of a cost-effective, affordable, and sustainable insurance markets. The Southeastern Europe and the Caucasus Catastrophe Risk Insurance Facility (SEEC CRIF) provides an interesting example of how governments and international donors can collaborate to create public or shared market goods for insurance (see Box 5.4.);

Box 5.4. The Southeastern Europe and the Caucasus Catastrophe Risk Insurance Facility (SEEC CRIF)

The Southeastern Europe and the Caucasus Catastrophe Risk Insurance Facility (SEEC CRIF) project is facilitating the development of national catastrophe and weather risk markets in SEEC through the design and introduction of innovative, low-cost insurance products, insurance business production technologies, regulatory reform, consumer education, and provision of reinsurance services. The project is supported by the World Bank, UNISDR, the European Commission, the Swiss State Secretariat for Economic Affairs, and the Global Environment Facility.

SEEC CRIF is being implemented through the creation of a specialty government-owned catastrophe risk reinsurer, Europa Reinsurance Facility Ltd. (Europa Re), with the view to improving access to weather risk and catastrophe risk insurance for millions of households, small businesses, and governments in the Facility's member states. Established in 2009 in Switzerland, Europa Re employs an independent Board of Directors and is managed by a professional management team. SEEC member governments are Europa Re's shareholders; currently, Albania, the Former Yugoslav Republic of Macedonia, and Serbia have joined the Facility, with others in discussions to join. Operations are set to commence in September 2013.

Europa Re is currently completing probabilistic high resolution regional earthquake and flood risk models for the SEEC member countries. The models will be used for the purposes of underwriting and pricing flood and earthquake risk in these countries. It is also developing a web-based underwriting and risk pricing platform that will provide insurers with automated real-time underwriting, pricing, and reinsurance decisions for all risks assumed through the sales of approved catastrophe insurance products in member countries. This platform will allow participating insurers to keep track of all policies issued through the portal and will enable them to report, and Europa Re to settle, insurance claims. Finally, Europa Re will utilize the platform to track its risk accumulations by location and type of risk.

Source: World Bank and GFDRR, 2012. *Advancing Disaster risk financing and insurance in ASEAN member states.*

- **Support to financial literacy programs** to increase awareness of the role and value of insurance;
- **Creation of regulatory environments to promote expansion and sustainability of catastrophic insurance**, supporting emerging products (such as microinsurance and index-linked insurance) and emerging providers, but also enforcing capital adequacy; and

- Investigation of the potential to create ***structures within markets to accelerate development such as public-private partnerships and risk pools***. See box 5.5.

Box 5.5. Turkish Catastrophe Insurance Pool

Turkey provides an interesting example of a pooled homeowner's catastrophe insurance program to overcome problems of market failure in Turkey, namely a lack of local market earthquake capacity and low voluntary demand for earthquake insurance. By aggregating risks into one single insurance portfolio, insurers can approach the international reinsurance market with a larger, more diversified portfolio, which should lead to lower reinsurance prices and reduced transaction costs. By aggregating risks through a vehicle or facility, a single point of entry is created through which the international donor community and/or the government can inject financial and technical capacity to support the risk. This point of entry can be used to develop capacity of the domestic market to underwrite catastrophe risks while simultaneously protecting the domestic insurance market from the threat of insolvency due to large correlated losses.

The Turkish Catastrophe Insurance Pool (TCIP) is a public sector insurance company that is managed on technical and commercial insurance principles. The TCIP purchases commercial reinsurance and the Government of Turkey acts as a catastrophe reinsurer of last resort for claims arising out of an earthquake with a return period of greater than 300 years.

The TCIP policy is a stand-alone property earthquake policy with a maximum sum insured per policy of US\$65,000, an average premium rate of US\$46 per annum, and a 2 percent of sum insured deductible. Premium rates are based on construction type (two types) and property location (differentiating between five earthquake risk zones) and vary from less than 0.05 percent for a concrete reinforced house in a low risk zone to 0.60 percent for a house located in the highest risk zone. Since inception, TCIP has averaged a penetration rate of about 20 percent, or 3 million domestic dwellings.

Source: World Bank and GFDRR, 2012. Advancing Disaster risk financing and insurance in ASEAN member states.

Glossary of Key Words and Definitions

Basis Risk: Basis risk in the context of risk transfer refers to the risk that an index used for risk transfer provides an imperfect hedge for losses incurred. In this context it refers to the difference between the payout under an index-linked risk transfer contract and the payout that would have been made if the risk had been transferred on an indemnity basis i.e. based on a measure of actual incurred loss. Basis risk is an inherent feature of any index-linked insurance product as no index can correlate perfectly with losses incurred.

Catastrophe Bond: A high-yielding, insurance-linked security that provides a collateralized insurance function. Investors put up principal as collateral for the duration of the risk period in exchange for a regular payment. If the covered party (issuer) suffers a loss from a particular pre-defined catastrophe, then the issuer's obligation to pay interest and/or repay the principal is either reduced or completely forgiven.

Climate Risk: The possibility that overall weather patterns are changing. Climate risk has the potential to change the reliability of using historical weather data as an indicator of what may happen in the future.

Derivative: A financial instrument which has a price "derived" from the value of one or more underlying instruments, for example debt instruments, commodities, or any agreed upon pricing index. Derivative contracts have a legal basis and use standard documentation produced by the International Swaps and Derivatives Association (ISDA).

Disaster: There are many different definitions of 'disaster'. This report focuses on natural disasters, which we can describe as unforeseen events driven by natural phenomena that cause serious disruption of the functioning of a community or a society causing widespread human, material, economic and/or environmental losses which overwhelm the capacity of the affected community or society

Ex ante Risk Management: A risk management strategy developed prior to the occurrence of the potential events that it would address.

Ex ante Risk Financing: The process of establishing financial mechanisms to manage the impacts of events prior to their occurrence. This includes the use of tools such as reserve funds, contingent financing, or market risk transfer instruments such as insurance contracts, catastrophe bonds, reinsurance, or options contracts.

Ex post Risk Management: Coping actions taken in response to an event, without prior planning.

Ex post Risk Financing: The process of managing the financial consequences of events after event occurrence through tools such as donor assistance, budget re-allocation, or tax increases.

Index Insurance: Index insurance makes payments based not on an assessment of policyholders' individual losses, but rather on measures of an index that is correlated with losses. Parametric insurance, which transfers risk through an index based on hazard parameters (such as cyclone category) is an example of index insurance.

Indemnity insurance: An insurance policy which pays out based on estimates of the actual economic losses incurred, subject to policy conditions such as deductibles and limits.

Insurance: A contract that provides compensation for specific potential future losses in exchange for a periodic payment.

Premium: The monetary sum payable by the insured to the insurer in exchange for coverage granted under the policy.

Reinsurance: Insurance purchased by insurers. When the total exposure to a risk or group of risks presents the potential for losses that go beyond a prudent limit for an insurance company to carry alone, the insurance company may purchase reinsurance to transfer risk onto a third party.

Return period - Risk is also expressed by measuring the expected frequency of the loss level, also referred to as the return period. For example, the 100 year return period loss is the loss level which is expected to be exceeded once every 100 years. Put another way, this is the loss level which has a probability of 1% of being exceeded in any given year.

Risk Assessment: The qualitative and quantitative evaluation of risk, a process which includes describing potential adverse effects, evaluating the magnitude of each risk, estimating potential exposure to the risk, estimating the range of likely effects given the likely exposures and attempting to describe the probabilities associated with various events.

Risk Financing: The process of managing the financial consequences of events through financial instruments such as reserve funds, contingent financing, or market risk transfer instruments such as insurance contracts, catastrophe bonds, reinsurance, or options contracts. Risk financing arrangements ensure access to financing for potential losses that may arise under specific conditions.

Risk Layering: The process of separating risk into tiers that allow for more efficient financing and management of risks. As an example, events that have a high probability of happening and relatively low impact may be retained or managed by holding reserves designed to manage such an event. Events that have a lower probability of happening but are more severe and have a more serious impact can be effectively managed through market risk transfer tools.

Risk Pooling: The aggregation of individual risks for the purpose of managing the consequences of these risks. Risk pooling effectively disperses losses incurred by a few over a larger group..

Risk Profile: The risk profile of an individual, organization, or country details the potential frequency and severity of adverse events to which the relevant entity is exposed.

Risk Transfer: Risk transfer instruments transfer risk to third parties, replacing the burden of potentially substantial and volatile losses with a relatively more predictable flow of expenditure in the form of fixed, regular payments. Risk transfer is an ex ante risk management strategy used to mitigate the potential financial impact of risks. Market risk transfer involves risk transfer to market counterparty such as an insurance company, capital markets entity such as a hedge fund, or other market entity.

Weather Risk: The risk of physical damage and/or financial loss from adverse weather events such as hurricanes, flooding, or drought.

Bibliography

- Africa Re, 2010. *Annual Report and Accounts*.
- African Union Commission and UNISDR, 2010. *Extended Programme of Action for the Implementation of the Africa Regional Strategy for Disaster Risk Reduction*.
- African Union et al., 2004. *Africa Regional Strategy for Disaster Risk Reduction*.
- Benson and Clay, World Bank, 2004. *Understanding the Economic and Financial Impacts of Natural Disasters*.
- Clarke and Vargas, IFPRI, 2012. *Cost Benefit Analysis of the African Risk Capacity Facility*.
- Desjardins, 2011. *Etude sur la Microassurance dans la Zone CIMA*.
- Devereux, 2007. *The Impacts of Droughts and Floods on Food Security and Policy Options to Alleviate Negative Effects*.
- Ethiopian Ministry of Agriculture, 2011. *The State of Affairs of Operationalizing the New DRM Approach in Ethiopia*.
- Finscope, 2009. *Finscope Surveys (multiple)*.
- GFDRR, 2010. *Report on the Status of Disaster Risk Reduction in Sub-Saharan Africa*.
- Gross, Microensure, 2011. *Reaching the Poor at Scale through Mobile Phones*.
- Karuaihe, Wang and Young, 2006. *Weather Based Crop Insurance Contracts for African Countries*.
- Mahul and Stutley, World Bank, 2010. *Government Support to Agricultural Insurance*.
- MIX and CGAP, 2012. *Analysis of Key Trends: 2011 Sub-Saharan Africa Regional Snapshot*.
- Multiple country authors, retrieved from www.prevention.web. *Reports on Progress Towards Implementation of the Hyogo Framework for Action*.
- Oxfam and Save the Children, 2012. *A Dangerous Delay; The Cost of Late Response to Early Warnings in the 2011 Drought in the Horn of Africa*.
- Republic of Kenya, 2012. *Post-Disaster Needs Assessment 2008-2011 Drought*.
- Swiss Re, 2009 and 2010. *Sigma World Insurance reports*.
- The Microinsurance Innovation Facility and ILO, 2010. *The Landscape of Microinsurance in Africa*.
- UNISDR, 2009. *Status Report on Disaster Risk Reduction in Sub-Saharan Africa*.
- UNISDR, 2011. *Global Assessment Report on Disaster Risk Reduction*.
- UNISDR, 2009-2011. *Global Assessment Report 2009-2011*.
- UNOCHA, 2011. *Southern Africa Regional Flood Update*.
- Vargas Hill, IFPRI, 2010. *Agricultural Insurance in Sub-Saharan Africa; Can It Work?*
- White and Nkoka, World Bank, 2012. *Malawi Disaster Risk Financing and Insurance Review*.
- World Bank ARD, 2011. *Weather Index Insurance for Agriculture*.
- World Bank Disaster Risk Financing and Insurance Program. Multiple retrieved from <http://www.gfdr.org/gfdr/node/272>.
- World Bank IEG, 2007. *Disasters Climate Change and Economic Development in Sub-Saharan Africa*.
- World Bank and GFDRR, 2012. *Advancing Disaster risk financing and insurance in ASEAN member states*.
- World Bank, 2012. *Africa Can Help Feed Africa: Removing barriers to regional trade in food staples*.
- World Bank, 2011. *African Risk Capacity: A Study on the Feasibility of a Regional Approach to Financing Drought Risk in Africa*.
- World Bank, 2012. *World Bank Group Micro Insurance Development Program: Concept Note*.
- World Bank and GFDRR, 2012. *The Sendai Report, Managing Disaster Risks for a Resilient Future*.

Annex: Active World Bank Projects in the DRFI space relevant to Sub-Saharan Africa.

Activity	Country	Lead World Bank departments	Description	Status
Africa Risk Capacity Feasibility Study	Africa	Treasury, AFTFP, FCMNB	Feasibility study for the design of a regional mechanism for sovereign disaster risk financing in SSA countries	First draft feasibility study completed and transmitted to the client (AUC)
Disaster Risk Financing and Insurance Country Reviews	Ethiopia, Malawi, Mozambique, Senegal, Togo.	AFTWR, GFDRR.	Reviews of disaster risk financing and insurance in GFDRR priority countries including fiscal management of disaster losses and insurance markets. Options for future development in this area are laid out.	First drafts of reviews completed with dissemination planned in autumn 2012.
South Africa Disaster Risk Financing and Insurance Program	South Africa	FCMNB	Feasibility study for disaster risk financing and insurance in South Africa	Activity at concept stage
Regional Approach to developing the Insurance Sector	Africa	AFTFP, FCMNB	Technical assistance project that focuses on addressing the following areas for insurance development in SSA countries: regulatory reforms, institutional capacity building; market infrastructure and capacity; and consumer awareness and protection	Activity is at concept stage
Micro-insurance Development Program (MIDP)	Global	FCMNB, IFC	<p>Technical assistance and investment program aimed at improving access to transparent and reliable micro insurance products and services.</p> <p>The MIDP will support five mutually reinforcing sets of activities:</p> <ul style="list-style-type: none"> (i) consumer Awareness; (ii) investing in new product development and building market infrastructure (including building a global database on Micro-insurance); (iii) building Public Private partnerships (PPPs) to deliver micro-insurance services for the poor; (iv) strengthening the enabling legal, regulatory and supervisory 	Activity is at concept stage

			environment for inclusive insurance markets; (v) catalyzing investments in micro-insurance providers and/or intermediaries.	
Global Index Insurance Facility (GIIF)	ACP countries	FCMNB, IFC	The objective of this program is to fund country-level technical assistance programs that develop solutions that enable the scale-up of index insurance, design new index insurance products, and build the capacity of insurance and distributors in the field to be able to offer index insurance products on a sustainable commercial basis.	Sub-projects are active in Kenya, Rwanda, Mozambique, Senegal, Burkina Faso, Mali, Cote d'Ivoire, Niger, Benin and Togo
Africa insurance instruments for climate adaptation	Africa	SDN	This is a study that will undertake a detailed assessment of climate risk exposure and vulnerability information (focusing on drought and flood), and existing insurance instrument foundations. This is expected to inform a more detailed technical assistance phase of work on facilitating the further development and adoption of such instruments to improve climate resilience in Africa.	Phase 1 has started in June 2012 and is expected to be completed by September 2012