First Meeting of the WMO Expert Advisory Group on Financial Risk Transfer (EAG-FRT I)

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http://www.wmo.int/pages/prog/drr/events/EAG-FRT/FRT1/index_en.html

BACKGROUND ON THE WMO INITIATIVE FOR PROVISION OF METEOROLOGICAL, HYDROLOGICAL AND CLIMATE SERVICES FOR FINANCIAL RISK TRANSFER

Managing risks of Weather, Water and Climate-Extreme Events in a Changing Climate

1. Nearly 90% of disasters caused by natural hazards are linked to weather, water and climate-related extremes. When a disaster happens, it not only threatens human life, but also has profound impacts on various economic sectors and social systems, setting back development in many countries, particularly those with least resources. Natural hazards pose a serious risk to the global society and inflict significant economic impact and loss of human lives. Over the period of 1980-2010, the total economic losses resulting from great and devastating natural disasters have amounted to US$ 2,500 billion (in 2010 values), of which US$ 600 billion were insured. The comparison of the losses over time shows a persistent trend for an increase in the number of events and their damage to the economy, with the atmospheric perils that include weather, hydrological and climate-related hazards have been increasingly dominating the global risk exposure and account for the lion's share of all events with 78% (Annex 1 – Figure 1). As demonstrated over and over again, geographic distribution of impact differs dramatically between developed and developing countries.[1]

[1] Sources:
Munich Re (2010). Natural Catastrophes 2010: Analyses, assessments, positions. Report published in Topic Geo 2010.

Swiss Re (2011). Natural Catastrophes and Man-made Disasters in 2010: A Year of Devastating and Costly Events. Sigma No.1/2011.

2. The IPCC Fourth Assessment Report and subsequently the recently released special report of IPCC on "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation" [2] have provided scientific evidence that the severity, intensity and frequency of hazards such as droughts, heat waves, floods, forest fires are increasing as a result of human-induced climate change.

3. Traditionally, many countries have been reactive to disasters experiencing significant losses in lives and livelihoods of their citizens. Adoption of Hyogo Framework for Action (HFA) 2005 – 2015 by 168 countries during the Second United Nation World Conference on Disaster Risk Reduction (2005, Kobe, Japan) has led to a paradigm shift in disaster risk management from emergency response to a comprehensive approach also encompassing preparedness and preventive strategies to reduce risk.[3] Effective implementation of a comprehensive disaster risk management framework (Annex 1- Figure 2) requires:

    a. Risk assessment to quantify and understand the risks associated with hazards and their impacts;

    b. Risk reduction through preparedness (including early warning systems for safety of lives) and prevention (including medium to long-term sectoral planning and risk management in areas such as land zoning, infrastructure development, agriculture, energy, water resource management, transportation, etc.);

    c. Risk transfer through the utilization of financial instruments and markets (e.g., catastrophe and weather-indexed insurance) to transfer the economic impacts of disasters at various levels and decision timescales.

    These components must be underpinned by appropriate policies, legal frameworks, organizational coordination and resource allocation from national to local levels. Implementation of DRR involves a variety of stakeholders from public and private sectors, NGOs, the general public, etc. Furthermore, effective information and knowledge sharing among the relevant players, supported by education and training programmes are required.

4. Given the extensive socio-economic impacts associated with hydro-meteorological hazards and conditions, availability of hydro-meteorological and climate information is critical for risk assessment and development of strategies for risk reduction and financial risk transfer.

5. Risk assessment requires quality assured historical and real time data on hazards, and socio-economic impact data and capacity to utilize hazard and risk analysis tools. However, analysis of hazard patterns from historical data is necessary but not sufficient for risk assessment. Changing patterns of hydro-meteorological hazards associated with climate variability and change are posing challenges with longer-term strategic planning and investments (e.g., infrastructure planning and retrofitting based on building codes) and specifications, using only historical records (e.g., 100 year flood may become a 30 year flood). Such climate analysis tools for assessing changes in severity, frequency, and occurrences of hydro-meteorological hazards at seasonal, inter-annual, decadal, and longer climate change time lines need to

[2] The Special Report on managing Extreme Events was released by of Working Group I and Working Group II of IPCC on 18 November 2011. IPCC 4th Assessment Report and the Special Report on Managing Extreme Events can be downloaded at: ttp://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

[3] Hyogo Framework for Action 2005-2015: http://www.unisdr.org/we/coordinate/hfa

become available operationally and applied for risk assessment and risk reduction and transfer strategies to reduce and redistribute the economic impacts of disasters at various levels and decision time scales (short-term operational to long-term strategic planning). All sectors require a wide range of meteorological, hydrological and climate information products and services, at different temporal and spatial scales, and with different information content.

6. The need for integration of disaster risk reduction as a critical component of climate risk management and adaptation and reference to HFA have been reflected in the outcomes of Bali (COP-13) and Copenhagen Conference of Parties meetings (COP 13 and 14) . Furthermore, the importance of insurance and financial risk transfer mechanisms has been highlighted in the outcomes of these negotiations. The Cancun Adaptation Framework (COP-15) established a work programme to consider approaches to address loss and damage associated with climate change impacts in developing countries that are particularly vulnerable to the adverse effects of climate change. Finally, the Third World Climate Conference (WCC-III, 2009) unanimously adopted a Declaration to establish a Global Framework for Climate Services that would strengthen the production, availability, delivery and applications of science-based climate prediction and services.[4]

Traditional and Alternative Financial Risk Transfer Markets and link to Weather, Hydrological and Climate Services [5]

7. While 75% of the FRT market share is located in the United States of America (USA), Europe and Japan, efforts have been made to extend these products to developing nations.[6] With technical assistance and financial guarantees from international development organizations such as the World Bank (WB), World Food Program (WFP), International Fund for Agricultural Development (IFAD) and others, governments of the developing countries have increasingly been able to secure greater access to the capital markets for managing the financial risks associated with disasters. With support from these agencies, over the last decade there have been significant efforts to pilot various parametric and weather-indexed programmes targeted at risk transfer related to agriculture, physical assets and government risk financing in a number of countries and regions. Furthermore, these agencies have carried out significant analysis of lessons learned and have developed various guidelines and training programmes, which can be leveraged for development and penetration of these markets. These markets can be divided into traditional and Alternative Risk Transfer (ART).

8. Examples of traditional FRT markets that hedge against extreme weather events, include, insurance and reinsurance, weather index insurance (WII), and national and regional insurance pools. To overcome the issues with availability of affordable (re)insurance as well as to access the capital markets (that have a greater capacity to

[4] WCC 3: http://www.wmo.int/wcc3/page_en.php

[5] Sources:
(1) The potential for scale and sustainability in weather index insurance for agriculture and rural livelihoods (2010). A joint publication of the World Food Programme (WFP) and International Fund for Agricultural Development (IFAD), Rome, Italy.
(2) Cummins, D., Mahul, O. (2008). Catastrophe risk financing in developing countries: Principles for public intervention. Washington, DC: The World Bank.
(3) World Bank Agriculture and Commodities Group

[6] Cummins, D., Mahul, O. (2008). Catastrophe risk financing in developing countries: Principles for public intervention. Washington, DC: The World Bank.

absorb financial risks associated with natural hazards) new alternative risk transfer (ART) instruments were developed in the last two decades, such as CAT bonds, CAT swaps, Industry Loss Warranty (ILW), weather derivatives, catastrophe deferred drawdown option (CAT DDO) and parametric CAT bonds, swaps and ILWS. Annex 2 provides a brief description.

9. Many FRT pilot projects have been implemented around the world addressing risks in agriculture, disaster relief and property sectors (Annex 3). Furthermore, Annex 1-Figure 3 provides a breakdown of the FRT in the last decade pilots by type and sector, whereby collective effort among international development agencies and financial institutions has facilitated delivery of benefits of FRT markets to developing countries.

10. Applications of weather index insurance in the agricultural sector attract a lot of attention from international donors for several reasons: (i) insurance products for smallholder farmers target the most vulnerable segment of the society, whose livelihood is exposed to recurrent shocks from droughts and floods, (ii) WII have high promise to deliver multiple development benefits directly to individuals: they help alleviate poverty and food insecurity, improve access to rural credit and increase economic activity, instill a culture of disaster preparedness and financial planning, (iii) publically available satellite data complement historical weather data, there by improving feasibility and affordability of WII products for rural populations, and (iv) applications of weather derivatives to finance disaster relief operations share the same goal of mitigating the impact of droughts on the rural population. These products operate at a macroeconomic scale and rely on fiscal guarantees of governments and international donors as well as a delivery system for emergency assistance. On the other hand, projects that develop sovereign risk financing mechanisms (CAT bonds and swaps, CAT DDO and regional insurance pools) address contingent liability of governments to provide disaster relief and finance the recovery of physical infrastructure after earthquakes or hurricanes. The complexity and high transaction costs of these instruments place significant pre-requisites on the macroeconomic framework of the participating governments and the capacity of a domestic insurance industry. Therefore, applications of these markets in developing countries have been very limited.

11. One of the key requirements for success is the reliable and operational support of the National Meteorological and Hydrological Services. Extensive and operational observing and data management infrastructure and well-trained personnel are required to provide data services for the product design and management. Over the years, possible data sources have been expanded to include satellite imagery and second generation products such as reanalysis to augment insufficient data systems, but continuous and consistent weather observations remain to be the foundation of any FRT product. Projects undertaken in the middle-income countries (e.g., Mexico, India) often invest into commercial weather stations to complement the public networks. Merging data from different observation networks requires new methodology for extending historical datasets with commercial networks. Because many FRT markets are designed to provide immediate liquidity after a disaster,. NMHS must have a capacity to transfer data in real-time to the end users for verification of the qualifying weather events. Beyond data issues, additional challenges encountered in implementation of FRT pilot projects include the changing risk profile due to climatic trends (Morocco), poor technical capacity and undercapitalization of domestic insurance market, regulatory constraints, competition

with the government subsidized insurance programs, and limited penetration of insurance among the low-income population.

12. Over the last years, there is a wave of new legislation in the USA, United Kingdom and the European Union, requiring the insurance sector to regularly report on their climate risks associated with extreme events. To this end, climate modeling, forecasting and analysis provide an unprecedented opportunity to complement statistical data analysis for better understanding of future risks. In response, Willis Research Network was established under the umbrella of an industry-led research network involving a large group of insurance and reinsurance companies and associations, in partnership with a number of leading research and operational centers (such as UK Met Office, NCAR/UCAR, GFDL, U. of Reading, U. of Exeter, Scripts School of Oceanography, Princeton University, University of Oklahoma, Oxford University) and catastrophe risk modeling companies. The goals of WRN is to develop climate services based on various climate forecasting and analysis technologies, with a strong emphasis on understanding of the characteristics and patterns of extreme events on seasonal, inter-annual and decadal time frames and integrating this information to Catastrophe modelling.[7], [8]

1. Finally, a recent survey along with the annual Global Roundtables of UNEP FI, have confirmed the critical need of the various stakeholders involved in different segments of the financial sector (insurance/reinsurance, invest banking, trading, etc) for climate information.[9]

WMO DRR Programme and Related Initiatives in Addressing Meteorological, Hydrological and Climate Services for FTR

13. The Thirteenth World Meteorological Congress (May 2003) established the WMO Disaster Risk Reduction (DRR) Programme.[10] The main long-term objective of the DRR Programme is to strengthen institutional capacities and partnerships for provision of meteorological, hydrological and climate services to support risk assessment, risk reduction and risk transfer within socio-economic sectors for protection of lives, livelihoods and property and contributing to sustainable development. To this end WMO aims to assist its Members to provide and deliver services that are directed towards the protection of lives, livelihoods and property, in a cost-effective, systematic and sustainable manner. This is to be achieved through the crosscutting framework of the DRR Programme leveraging expertise, resources and capacities of WMO Members, its technical programmes (sponsored and co-sponsored) and global operational network and building strategic alliances (with the United Nations and other international and regional partners) to support capacity development for disaster risk reduction decision-making at all levels. The Strategic priorities of the DRR Programme are underpinned by the HFA (Annex 4).

14. Under the crosscutting framework of its DRR Programme, WMO in cooperation with a number of partners has initiated a number of thematic activities for provision of meteorological, hydrological and climate services to support hazard/risk assessment, Multi-Hazard Early Warning Systems and emergency preparedness, sectoral risk management and FRT markets. Underpinned by analysis of good practices, WMO is

[7] Douglas, R. (2011). « Financial Markets Drive Demand for Climate Services, » WMO Bulletin 60 (1), Pp 34 -37.
[8] http://www.willisresearchnetwork.com
[9] UNEP FI Survey of Financial Firms Outlines Climate Information Needs (2011), WMO Bulleting 60 (1) Pp 19 – 22.
[10] The former title of the programme was the Natural Disaster Prevention and Mitigation Programme. In 2007, programme was renamed to the Disaster Risk Reduction Programme by the 57th session of the WMO Executive Council, in 2007.

working with a variety of partners to develop knowledge products (e.g., guidelines and background materials) and training programmes targeted at the National Meteorological and Hydrological Services related to the development and delivery of meteorological, hydrological and climate products and services to support DRR decision making in the target sectors. These are complemented with national/regional projects for development of the capacities and services to meet the needs of the DRR stakeholders. To date, such projects have been initiated in South East Europe, South East Asia, the Caribbean and Central America.

15. Since 2007, a number of consultations related to the development of meteorological, hydrological and climate services to support the Financial risk transfer markets have been held, including:

    a. *Expert Meeting on "Requirements of the Catastrophe Insurance and Weather Risk Management Markets for National Meteorological and Hydrological Services' Products and Services", 5 - 7 December 2007, WMO Headquarters (Geneva, Switzerland).* The meeting involved representatives from the World Bank, the World Food Programme (WFP), the Weather Risk Management Association (WRMA) and representatives from the reinsurance sector, Cat modeling and trading. Furthermore representatives from the National Meteorological and Hydrological Services (NMHS) of 13 countries from all six WMO regions participated.[11] The meeting recommended that the following:

        i. The results of the meeting to be published formally as a reference for future collaboration of WMO with the World Bank, WFP, WRMA and reinsurance sectors. This should include case studies, and guidance on requirements for products and services as well as service delivery models to assist NMHS to better understand the needs and requirements of the financial risk transfer markets.

        ii. WMO to raise awareness among NMHS of the emergence of these markets, related opportunities for their capacity development, particularly in developing and least developed countries.

        iii. WMO to follow-up with the World Bank, WFP, WRMA and reinsurance sector to develop a concrete work plan with clear deliverables and timelines for support of these markets and present it to the relevant WMO advisory, governing and implementing bodies for review, approval and implementation.

        iv. WMO to work with the World Bank, WFP and other partners to facilitate participation of NMHS in these markets.

        v. The meeting recommended that WMO could host annual of representatives from the catastrophe insurance and weather risk management markets and NMHS to advance the work initiated in this expert meeting. Goals of such a meeting would be to review the current state of the financial risk transfer markets and to identify emerging needs, gaps and

[11] The final report of the Expert Meeting on "Requirements of the Catastrophe Insurance and Weather Risk Management Markets for National Meteorological and Hydrological Services' Products and Services", and other related materials are available at: http://www.wmo.int/pages/prog/drr/events/cat-insurance-wrm-markets-2007

opportunities with regard to meteorological, hydrological and climate products and services.

b. *Plenary Panel on Climate Extremes, Early Warning and Disaster Risk Reduction at WCC-III (31 August – 4 September 2009)*[12] - Among other issues, the panel highlighted the importance of availability and accessibility to historical and real-time climate data, stressed that new climate prediction and forecasting technologies (e.g., seasonal, inter-annual, decadal and longer-term forecasting and projections) provide an unprecedented opportunity to support decision-making in DRR in areas such as medium and long-term sectoral planning and financial risk transfer. These capacities should be developed through a systematic demand-driven approach engaging the users of information from various sectors.

c. *Panel on "Climate Services, Catastrophe Risk and Capital Markets – How Climate Services are Set to Become Embedded with Insurance Regulation and Markets"* at the Third Global Platform for Disaster Risk Reduction, 11 May 2011 (Geneva, Switzerland)[13] **–** WMO in cooperation with a number of partners from the industry and UN agencies, convened a panel of expert to discuss the critical need for climate services for the Financial Risk Transfer Markets linked to extreme weather. This panel stressed the importance and benefits of new public-private partnerships involving the climate research community, NMHS, the government and the private sector to leverage resources, expertise and information to advance climate modeling and forecasting and integrate this information in risk modeling tools for the finance and (re)insurance sectors. The panel also discussed the challenges, gaps and needs to access the relevant science-based information by the private sector for development of these markets and recently imposed reporting requirements in some countries.

16. With the consideration for these developments and consultations and futher discussions at the 58th, 59th and 60th Executive Councils of the WMO (2008, 2009, 2010), the sixteenth session of the World Meteorological Congress (May 2011) requested the WMO Secretary-General to facilitate the development of weather, hydrological and climate services for insurance and other financial risk transfer markets, under the crosscutting framework of WMO DRR Programme and as a contribution to the Global Framework for Climate Services (GFCS)[14]. Specifically, the WMO Expert Advisory Group on Financial Risk Transfer (EAG-FRT) is established, for the period 2012- 2015. The EAG-FRT will meet annually to provide strategic guidance and to facilitate the development of concrete activities related to this initiative.

17. The membership will engage internationally recognized experts from the insurance and other financial risk transfer communities, international agencies that are facilitating these markets in the developing countries, as well as experts from the climate research community and a number NMHSs with experience in serving these markets.

[12] http://www.wmo.int/wcc3/page_en.php
[13] http://www.preventionweb.net/globalplatform/2011/programme/side-events/v.php?id=194
[14] Some Frequently Asked Questions: GFCS (2011), WMO Bulletin 60(1), Pp 5-8.

18. The first meeting of the EAG-FRT will be held on 13-14 December 2011[15], to scope out the priorities, finalize the Terms of Reference and draft a work plan with deliverables and timelines for 2012-2015.

[15] First EAG-FRT Meeting webpage: http://www.wmo.int/pages/prog/drr/events/EAG-FRT/FRT1/index_en.html

ANNEX 1

Figures

Figure 1: Number of catastrophic events globally from 1980 to 2010 (Source: Munich Re Topics Geo 2010)

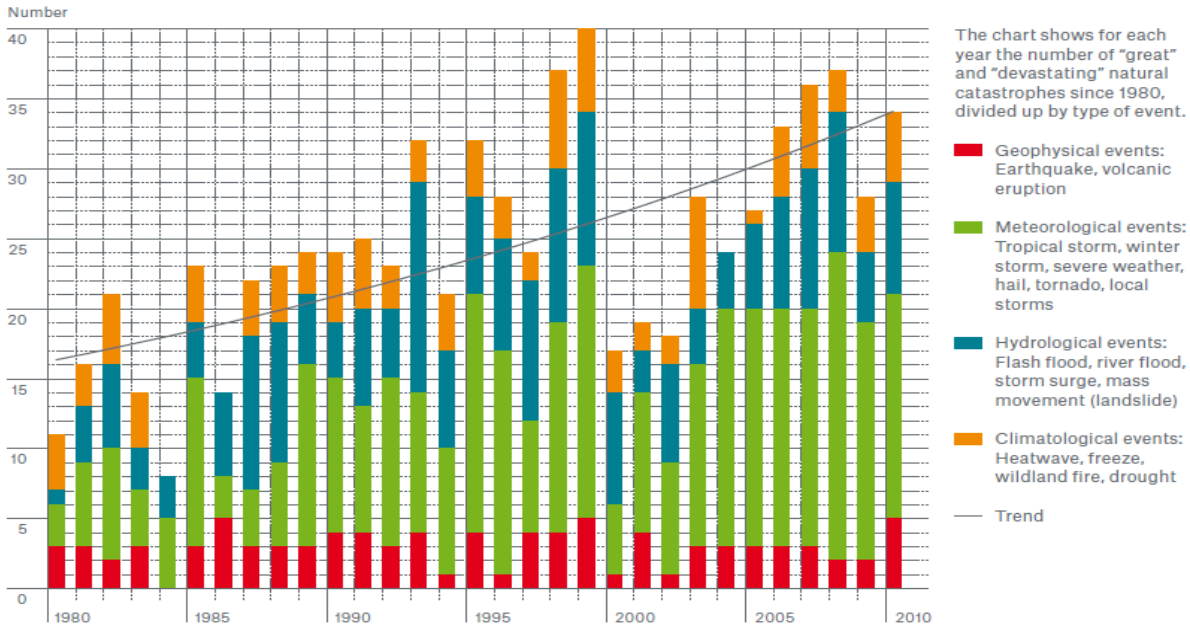


Figure 2: Components of an effective disaster risk management framework as derived from HFA

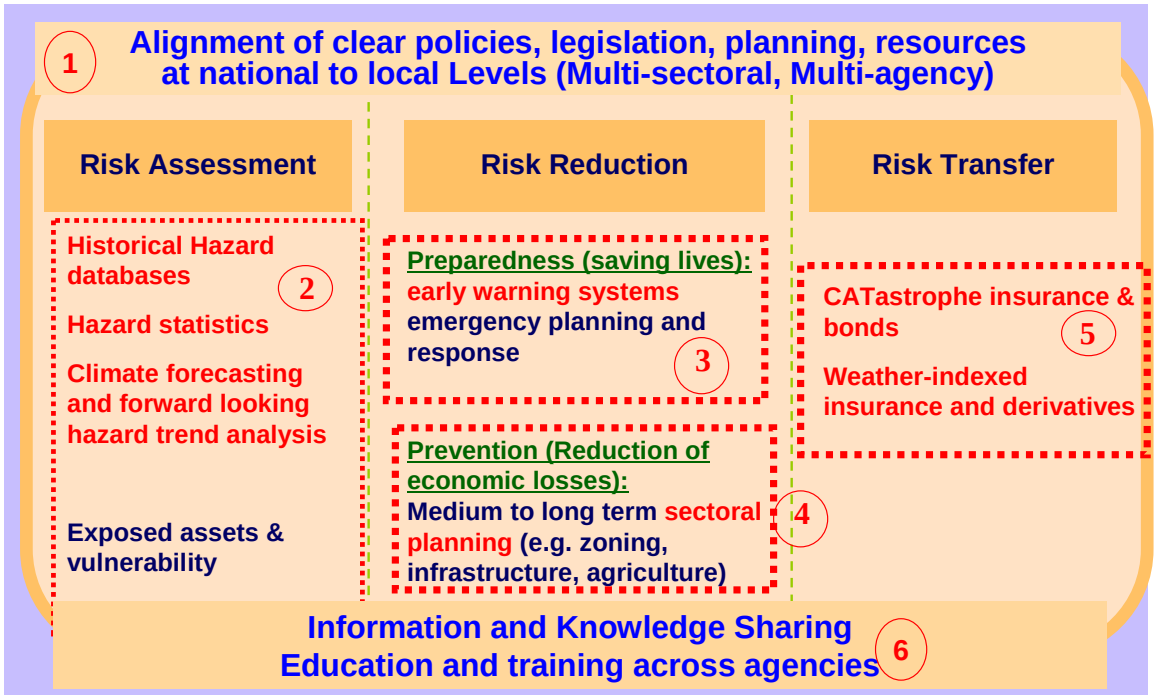
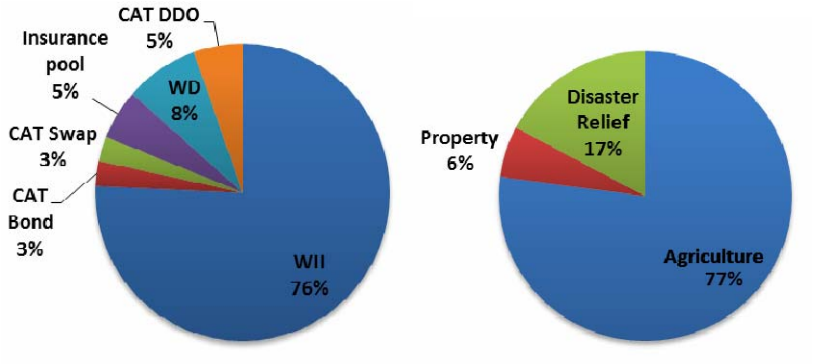


Figure 3: Breakdown of the FRT in the last decade, there has been a collective effort among international development agencies and financial institutions to deliver benefits of FRT markets to developing countries pilots by type and sector (Source: TBC).



Annex 2

Table 1: Example of different types of FRT markets

Type	Brief Description
Traditional	
Insurance and Reinsurance	Insurance companies usually seek access to international reinsurance, which allows them to write more business and meet solvency requirements by transferring part of their portfolio to another insurer. Access to reinsurance becomes crucial for domestic insurers in developing countries where extremely high and correlated risk exposure is compounded with the underdeveloped and undercapitalized insurance industry. The price of reinsurance can fluctuate widely depending on the market conditions and can be prohibitive for the insurance products sold in developing countries. For example, the Caribbean island nations have experienced an insurance rate increase between 200-300% in the middle of 1990s due to high hurricane activity worldwide that exhausted insurance and reinsurance reserves.[16]
Weather Index Insurance (WII)	is a well-established instrument that transfers risk to the insurers who agree to indemnify insured for losses resulting from catastrophic weather events. It is the only market that provides crucial financial protection directly to individuals. Being a highly versatile instrument, WII products play a prominent role in many economic and public service sectors that sustain damages due to natural hazards. WII is designed around a parametric index that correlates losses in agricultural production or property assets with attributed weather parameters. It has high requirements for the local data systems, density coverage of the weather observation network, and institutional infrastructure to administer insurance products to customers. WII products rely on the availability of and access to high quality historical meteorological data and the capacity of the National Meteorological and Hydrological Services to maintain operational station networks and to

[16] Pollner, J.D., (2001). Catastrophe risk management: using alternative risk financing and insurance pooling mechanisms. Policy Research Working Paper Series 2560, Washington, DC: The World Bank.

	transfer weather observations in real-time. Depending on the targeted economic sector and the type of a hazard, the methodology for WII design can be based on regression and probabilistic modeling for agricultural insurance and catastrophe risk modeling for property insurance.
National and Regional Insurance Pools:	To address the problem of fluctuating rates and reduce the price of insurance coverage, national and regional insurance pools were developed. Essentially, they represent financial risk management portfolios, whose core component is assigned to WII and reinsurance in addition to retention and contingent credit. Insurance pools are developed to provide coverage in geographic areas that share the same risk profile and no single insurer can retain all the risk. By spreading the risk among a wide customer base and several participating insurance companies, an insurance pool manages to provide the necessary coverage. Turkish Catastrophe Insurance Pool (TCIP) and Caribbean Countries Risk Insurance Facility (CCRIF) are the most notable examples of this mechanism.
Alternative Risk Transfer	
CAT Bonds	CAT bonds are insurance-linked securities sponsored by (re)insurance companies and/or governments and sold to investors on the capital market in order to raise funds to pay out insurance claims or finance post-disaster relief and recovery. A parametric bond is written on an index that specifies a covered event. If the index is triggered, the investors lose part or all of the principle plus the interest to the bond sponsors. Cat bonds are commonly designed to provide reinsurance cover against losses from hurricanes, earthquakes and severe storms in Japan, USA, and Europe. Since 2006, the Government of Mexico with the assistance from World Bank has successfully issued CAT and Multi CAT bonds.
Weather Derivatives	Weather derivatives are unique in the suite of FRT markets as they do not necessarily hedge against extreme weather conditions but help smooth earnings or excessive costs of business operation due to unfavorable weather conditions. Pay out on a weather derivative contract occurs every time when a specified weather parameter of the underlying index falls above or below a monthly or seasonal average. Rainfall and temperature including its derivatives (e.g., heating or cooling degree days) are the most common

	weather parameters. For example, since 2008 the Government of Malawi has purchased weather derivative contracts designed around a maize production index, which links the amount of rainfall to maize growth. The government receives a payout if the index falls 10% below the average and uses this money to lock in the price of maize. Because their main purpose is to provide fiscal stability, WD contracts in developing countries found a new niche in financing post- disaster recovery where they are designed to stabilize prices of essential commodities that tend to escalate after natural disasters.
CAT Swaps	CAT swaps allow exchanging blocks of insurance policies between (re)insurance companies that want to lay off some of the core risks and diversify their portfolios. For example, an insurer in Japan wants to exchange typhoon risk in his portfolio for earthquake risk in California, USA. The key to a CAT swap is to achieve a parity of expected losses between the parties; therefore, the units of exchange are standardized in terms of equivalent risks and exposure. A trading unit has a nominal monetary value and risks are classified by location and peril. Swaps are facilitated by CATEX, a web-based exchange where (re)insurers can choose from available risks and execute a transaction.
Industry Loss Warranty (ILW):	ILW is a double-trigger insurance contract that covers losses from a single catastrophic event or series of events where the industry-wide loss and the insured company's loss exceed pre-determined thresholds. The triggers specified in the contract can vary by geography, level and peril. The purpose of ILW is to reduce an insurer exposure to excessive losses from large catastrophic events at a reasonable price. ILWs are subject to basis risk when the company's losses do not accurately correlate with the industry-wide losses.
Catastrophe Deferred Drawdown Option (CAT DDO)	CAT DDO is a contingent line of credit that provides immediate liquidity to a country following a natural disaster. This instrument is offered by World Bank to the IBRD countries subject to qualification. To qualify for CAT DDO, a country has to have an adequate macroeconomic framework and a viable disaster risk management program. In order to determine the amount of a loan, a fiscal impact study is conducted. CAT DDO usually complements

	other markets in a risk financing portfolio including reserves and insurance. CAT DDO has been used by Costa Rica and Guatemala to finance disaster recovery operations.
Parametric CAT bonds, swaps and ILWs	These are tied to an index, which defines a qualifying hazard event that triggers a payout. To determine the trigger and price the risk, catastrophe risk models are used to develop probability distributions for earthquakes, hurricanes, tornado, wind storms, hail, wildfires, and floods. The model combines data characterizing the hazard (probability, location, magnitude and duration) and the risk exposure (location, construction, age, and building code) to predict physical damages to assets and estimate the insured losses. It requires massive weather and economic loss data and a sophisticated modelling technology

Annex 3

Examples of Financial Risk Transfer Programmes and Pilots around the world

Instrument	Risk	Risk Bearer	Risk Taker	Examples in Low and Medium Income Countries
CAT/ Multi CAT Bonds	Multi-peril, mostly hurricane and earthquake	Governments, (re)insurers	Investors	Mexico
CAT Swaps	Multi-peril	Governments, (re)insurers	(Re)insurers	Part of the CCRIF portfolio
CAT DDO	Multi-peril	Governments	Banks	Costa Rica, Guatemala. A Fiscal impact study completed for Vietnam.
Weather Index Insurance (WII)	Drought, excess or deficit rainfall, flood	Farmers, agricultural value chain members, rural credit institutions, governments	(Re)insurers, governments	Brazil, China, Ethiopia, Honduras, India, Indonesia, Jamaica, Kenya, Malawi, Mali, Mexico, Mongolia, Nicaragua, Peru, Philippines, Rwanda, South Africa, Tanzania, Thailand, Ukraine, Vietnam.
Regional or National Insurance Pools	Multiple peril: hurricane, earthquake, flood, fire	Governments, homeowners	(Re)insurers, governments	Caribbean Catastrophe Risk Insurance Facility (CCRIF) and Turkish Catastrophe Insurance Pool (TCIP). A risk assessment study is completed for South Pacific Islands.
Industry Loss Warranty (ILW)	Multi-peril	(Re)insurers	Hedge funds	n/a
Weather Derivatives	Multiple weather parameters	Businesses, governments	Investors	Ethiopia, Mali, Malawi

Annex 4

WMO Disaster Risk Reduction Programme Strategic Goals

The Scope of the DRR Programme is defined through its five strategic goals underpinned by the Hyogo Framework for Action 2005-2015 and approved by the WMO Cg-XVI in 2011:

(a) Development, improvement and sustainability of early warning systems in particular related to scientific and technical infrastructures, systems and capabilities for research, observing, detecting, forecasting and warnings of weather-, water- and climate-related hazards;

(b) Development, improvement and sustainability of standardized hazard databases and metadata, systems, methods, tools and applications of modern technologies such as geographical information systems for recording, analyzing and providing hazard information for risk assessment, sectoral planning, financial risk transfer and other informed decision-making;

(c) Development and delivery of warnings, specialized forecasts and other products and services that are timely, understandable to those at risk and driven by requirements of disaster risk reduction decision processes and operations engaging socio-economic sectors;

(d) Stimulate a culture of resilience and prevention through strengthening of capacities for better integration of meteorological, hydrological and climate' products and services in disaster risk reduction across all socio economic sectors, such as land use planning and infrastructure design and continued public education and outreach campaigns; and,

(e) Strengthening cooperation and partnerships of WMO and NMHSs in national, regional and international user forums, mechanisms and structures for implementation of disaster risk reduction.