

THE STAKEHOLDER LANDSCAPE IN EXTREME EVENTS AND CLIMATE RISK MANAGEMENT

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The Geneva Association

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The Stakeholder Landscape in Extreme Events and Climate Risk Management

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The Geneva Association

The Geneva Association is the leading international insurance think tank for strategically important insurance and risk management issues. It is a unique platform for dialogue between leaders of the insurance industry and key decision-makers at the international and national levels to evidence the important social and economic role of the insurance industry.

The Geneva Association identifies fundamental trends and strategic issues where insurance plays a substantial role or which influence the insurance sector. Through the development of research programmes, regular publications and the organisation of international meetings, The Geneva Association serves as a catalyst for progress in the understanding of risk and insurance matters and acts as an information creator and disseminator.

The Geneva Association membership comprises a statutory maximum of 90 chief executive officers (CEOs) from the world's top insurance and reinsurance companies. It organises international expert networks and manages discussion platforms for senior insurance executives and specialists as well as policy-makers, regulators and multilateral organisations.

Established in 1973, The Geneva Association, officially the "International Association for the Study of Insurance Economics", is based in Zurich, Switzerland and is a non-profit organisation funded by its membership.

Executive Summary

The threat of large-scale natural disasters and climate is growing across the world, leaving nations increasingly exposed to a myriad of risks. As a result, many initiatives are under way at the international, regional, national and local levels by a diverse range of stakeholders to find better ways to protect human lives and livelihoods, and reduce economic losses.

Human development and settlement patterns, such as growing urban population, wealth and concentration of assets in high-risk regions, determine if and how a natural hazard could turn into a disaster (World Bank Group and United Nations, 2010). These impacts are further exacerbated by climate change, through changing characteristics of weather-related extremes, sea level rise and other environmental changes (IPCC, 2014; IPCC, 2012).

Whilst for a long time dismissed as 'acts of God', these socio-economic impacts can only be reduced through proactive integrated risk management. Over the last three decades, international policy dialogue on disaster risk reduction (DRR), climate change and sustainable development has advanced, with the goal to address the underpinning causes of these risks. Golnaraghi et al. (2016) define 2015 as a landmark year in bringing clarity and coherence to reshape the global development pathway. In that year, over 190 Member States adopted three international agreements: (i) the Sendai Framework for Disaster Risk Reduction (2015-2030) (United Nations General Assembly, 2015a) (ii) the 2030 Agenda for Sustainable Development (United Nations General Assembly, 2015b) and (iii) the Paris Agreement (UNFCCC, 2015). They highlight that, whilst each has its respective priorities for action, their common threat is the recognition of the importance of a cohesive and integrated approach to managing the risks of extreme events and climate across different economic sectors, levels of government and the society as a whole. Such an approach is risk-informed, and includes *ex ante* investments, (i) to reduce risks through early warning systems, emergency preparedness, and preventive measures; and, (ii) distribute the residual economic risk through risk financing and risk transfer (e.g. insurance and alternative risk transfer). This should be augmented with effective post-disaster reconstruction plans to reduce further the risks and build resilience. Finally, the three framework agreements have, recognised, explicitly or implicitly, the important role of insurance in building economic resilience to extreme events and climate risks.

With governments at the centre of these issues, an increasing number of coordinated multilateral initiatives have been forged over the last decade to raise awareness and enable the implementation of disaster and climate risk management capacities at the international, regional, national and local levels. These efforts have engaged various stakeholders, including the United Nations, socio-economic groupings, international development community, NGOs, scientific communities and academia, media agencies and the (re)insurance industry. An analysis of the complex landscape of stakeholders and initiatives indicates progress along four main areas, namely: (i) enhancing risk knowledge and expansion of risk assessment capacities to the public sector, (ii) promoting the integrated approach to disaster and climate risk management, (iii) developing solutions in disaster risk financing and risk transfer and (iv) expanding innovative insurance products in the agriculture sector.

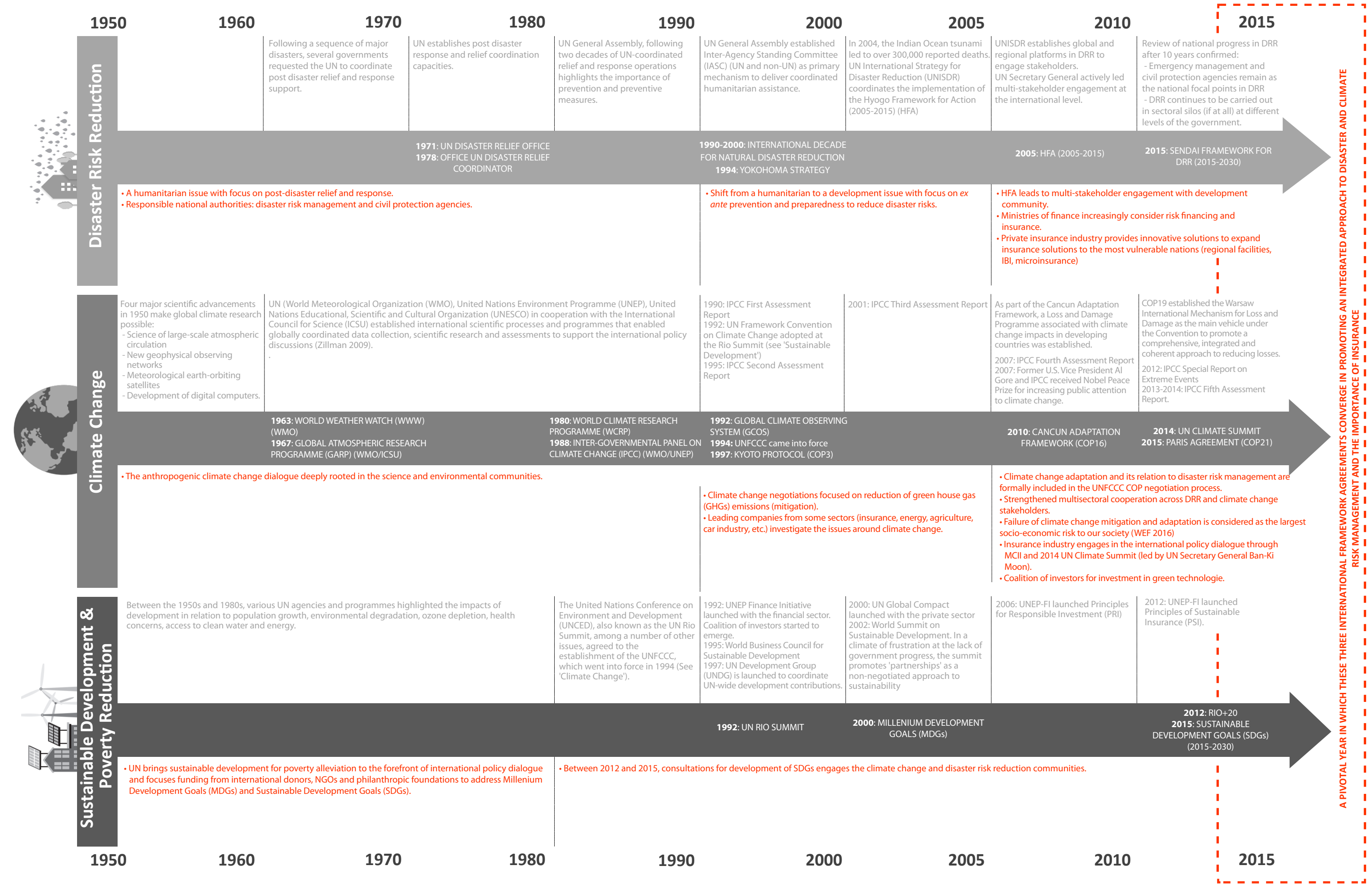
According to Golnaraghi et al. (2016), despite the evident progress and achievements, multi-stakeholder engagement and related initiatives remain highly fragmented. They stress that development of sustainable and scalable risk management practices could benefit from stronger strategic public-private partnerships that leverage stakeholders' strengths, avoid redundancies and align priorities.

This document:

- (i) highlights patterns of stakeholder engagement in the three international framework agreements,
- (ii) provides an overview of the complex global landscape of the stakeholders,
- (iii) gives examples of multilateral multi-stakeholder initiatives in disaster and climate risk management, and
- (iv) highlights the innovations and initiatives in disaster risk financing and insurance since 2005.

Patterns of International Development and Stakeholders Engagement in Disaster and Climate Risk Management Negotiation Processes Since 1950s

Since the 1950s, the UN and its institutions have been bringing the topics of disaster risk reduction; climate change and sustainable development to the forefront of international policy dialogue. This has been achieved through various mechanisms and engaging different stakeholders. These processes profoundly influenced how these topics were perceived and addressed by national governments over the last five decades.



The Stakeholder Landscape in Extreme Events and Climate Risk Management

With governments at the centre of these issues, over the last decade, increasingly more stakeholders have engaged in the implementation of disaster and climate risk management capacities at the international, regional, national and local levels.

The international development community has been segmented into three categories:

International and regional development banks: These multifaceted organisations traditionally work with finance and development ministries in middle- and low-income nations to provide various development loans and grants, whilst also offering a significant amount of educational and technology services, expertise and advice. Over the last decade, these organisations have increasingly mainstreamed DRR and climate change into their development work. They are also playing a critical role in catalysing the development of regional and national risk financing and transfer facilities and programmes in the most vulnerable countries and regions.

International development agencies (also referred to as international donors): Traditionally, international donors have supported funding needs of countries requesting support after a disaster, through their humanitarian budgets. However, the amount of donor support in post-disaster mode has been highly uncertain (Ghesquière and Mahul, 2010). Increasingly, these agencies have been redirecting portions of their development funding towards DRR and risk transfer capacity development, climate adaptation and mitigation but treating these issues within their institutional silos. Beyond bilateral funding arrangements, these agencies are directing their funding to countries through global and regional development banks, global and regional funds such as the Global Environmental Fund (GEF), the Green Climate Fund, etc. The G7 InsuResilience, Insurance development Forum (IDF) and GlobalParametrics are among latest initiatives to support risk transfer and insurance.

Other international development organisations such as the Organisation for Economic Co-operation and Development (OECD), which are providing a forum for governments to share experiences and seek solutions to common problems in these areas. However, issues of disaster resilience and climate change are addressed within different divisions.

Governments play a central role in managing risks of disasters and climate. Traditionally, at the national level, responsibility for disaster risk management has rested with civil protection and emergency management agencies. Issues related to climate change have generally been the responsibility of ministries of the environment, also engaging departments of foreign affairs, particularly in relation to international negotiations.

Whilst extreme events and climate change impact many sectors, managing the economic risks as well as related budgeting and planning are usually handled (if at all) within governmental and sectoral silos. Historically, low-income countries have reached out for international humanitarian intervention, whereas higher-income governments have had more financial flexibility to respond to disasters and often work with other nations on their mutual trans-boundary concerns.

Increasingly more governments are investing in emergency preparedness and early warning systems as a national priority, yet investment in preventive measures and risk transfer at different levels of the government and economic sectors is hampered due to many factors. In many high-income countries (e.g. Canada, the Netherlands, Poland, U.S.) managing risks of disasters and climate is being integrated into national security policies, particularly in relation to the protection of critical infrastructure. In the middle- and low-income countries, ministries of finance are increasingly engaging and adopting risk financing and risk transfer approaches, often driven by the interventions from the development banks. Overall, in most nations, managing risks of disaster and climate at the city level remains a major concern and challenge.

Government role is to (i) provide an enabling environment (sound policies and regulatory frameworks), (ii) lay out institutional foundations and priorities (enable better planning and budgeting across government layers and sectors), (iii) address and facilitate collection of reliable data (hazard, environmental and socio-economic data); (iv) realise opportunities for ex ante risk reduction and risk transfer through public-private partnerships; (v) Invest in education and raising awareness (Golnaraghi et al., 2016).

Non-governmental organisations (NGOs) and civil society organisations have been increasingly engaging in a variety of activities depending on the type and mandate of the organisation. These include influencing policy and regulatory issues, advocacy, developing knowledge and insights as well as educational programmes, facilitating industry, community and local-government participation in international policy dialogues, conducting community-based risk assessments, demonstrating the impacts of natural infrastructure in reducing risks and supporting the implementation of community-based solutions to build resilience to disaster and climate risks.

Since the 1950s, through its complex and multifaceted processes, programmes and specialised agencies, the UN has facilitated international consultation and cooperation to identify common challenges and priorities of action related to the three international framework agreements in disaster risk reduction (DRR), climate change and sustainable development. Various UN processes include the General Assembly, UN Secretary General's Office, the UN Economic and Social Council (ECOSOC), the Chief Executives Board (CEB), the UN Specialised agencies and programmes, various inter-agency coordination platforms, and the UN country offices. The General Assembly is the main deliberative, policymaking and representative organ of the UN.

The UN currently has 15 specialised agencies, which are independent (self-governing) organisations. They have their own designated focal points from the Member States, governance mechanisms, planning and budgeting cycles, and institutional processes at international, regional and (in some cases) national levels. Their contributions may include developing international standards, guidelines, treaties and resolutions, leading global campaigns, and supporting institutional and operational capacity development, for specific themes or sectors (<http://www.un.org/en/sections/about-un/funds-programmes-specialised-agencies-and-others/index.html>).

Other programmes and offices of the UN (not officially categorised as specialised agencies) include the UN Environment Programme (UNEP), UN Development Programme

(UNDP), and UN Office for Coordination of Humanitarian Affairs (UNOCHA). The UN Office for Disaster Risk Reduction (UNISDR) and the UN Framework Convention on Climate Change (UNFCCC) secretariat coordinate the consultations and negotiations for DRR and climate change, respectively.

Two interagency forums, namely The UN Development Group (UNDG) (overseen by the CEB) and the Inter-Agency Standing Committee (IASC), with later also including non-UN NGOs, coordinate UN-wide development and humanitarian activities, respectively. Furthermore, UN Global Compact (UNGC) was established to engage the private sector and local business in a more systematic fashion to create a sustainable and inclusive global economy that delivers lasting benefits to people, communities and markets.

Traditionally, this complex UN machinery has addressed crosscutting issues such as DRR, climate change adaptation and mitigation in a fragmented manner, within and across the UN agencies, programmes and offices. These topics are increasingly mainstreamed into the strategies, budgeting and work planning owing to a number of factors, including: coordination efforts of UNISDR and UNFCCC, leadership of the UN Secretary-Generals Kofi Annan and Ban Ki-Moon, the One-UN: Delivering as One initiative, and ultimately the convergence of three international framework agreements in 2015. WFP, ILO and IFAD have engaged in risk transfer and insurance mechanisms for protection of the livelihoods of most vulnerable.

Socio-economic groupings are intergovernmental organisations that have become critical platforms for governments to discuss disaster risk reduction, climate change and sustainable development issues in linkages to the groupings' mutual socio-economic and political interests. Increasingly, risk financing and risk transfer issues have become a priority for action, through these mechanisms. Examples include the G7 InsuResilience programme, APEC's Asia-Pacific Financial Forum (APFF) activities on Disaster Risk Financing and Insurance (DRFI), CARICOM's CCRIF, African Unions' African Risk Capacity (ARC).

Primary insurers, reinsurers and brokers

With centuries of experience in transferring risk, over the last decade, the insurance industry has engaged actively in the consultations and implementation of the three international framework agreements. Main stakeholders involved along the transactional process of risk transfer include:

- **Primary (direct) insurers:** insurance is generally an agreement of risk transfer between the insured and the insurance company. However, the insurer is the main bearer in terms of underwriting risk. They have the responsibility to manage, diversify and absorb the risks of policyholders.
- **Reinsurers:** direct (or primary) insurers can also purchase insurance from the reinsurers to transfer part of their own risks, which can enable reducing the high financial impact of catastrophes on their portfolio. In other words, reinsurers act as insurers of direct insurers. With their diversification capacity globally, reinsurers are instrumental in efficiently spreading extreme event risk globally.
- **Brokers:** although some insurers sell their insurance products directly to the public, in many segments of the market, brokers play an important role as intermediaries between the policyholder and primary insurer and as well as between the primary insurer and reinsurer. Being an intermediary, brokers receive compensation and bear almost no risk in terms of underwriting as opposed to (re)insurers.

Fundamentally, one can distinguish between a (re)insurer's underwriting and investment activities. The core business of insurers is to assess, price, assume and transfer risk on behalf of their customers. In fact, the insurance policy is a mutual agreement whereby the insured transfers the risk of an uncertain loss to the insurer by paying a certain and fixed amount. Subsequently, in the occurrence of a covered event, the insurance company indemnifies the policyholder. For the provision of this service, insurers receive premiums. The pooling of risks lies at the heart of the underwriting function. When aggregating many individual risks, insurers harness the 'law of large numbers', which allows them to make reasonably accurate estimates as to the risk group's overall expected losses. Technically, insurance prices are based on risk (along with a number of other factors) and can provide governments, businesses and individuals with reasonably accurate signals as to the impacts and characteristics of the hazards they face. Product innovation promises improvements in insurance coverage and accessibility. Traditional (non-life) insurance products have a one-year contract period and cover one specific line of business such as motor, homeowners' insurance or professional liability. Innovative variations include multiyear, multiline covers which can lead to risk diversification across various lines and periods. An even more important distinction is between indemnity-based and parametric insurance. Insurance-linked securities (ILS) (e.g. catastrophe bonds) have also emerged. Since the 1990s, a number of 'alternative risk transfer' (ART) capital market instruments have been developed to complement the more traditional (re)insurance solutions by providing substantially more reinsurance capital to cover catastrophe losses and by transferring risks to the capital markets.

The Insurance industry can support disaster and climate resilience agenda through a number of services, including: (i) Share risk knowledge and risk pricing expertise; (ii) Share research and knowledge in risk reduction (preventive measures); (iii) Innovative market-based risk transfer products and programmes with incentives to change behaviour (to build financial protection for governments, business, communities, individuals), (iv) Faster and more efficient claims settlement ; and, (v) Advise and support national risk transfer programmes through public-private partnerships (Golnaraghi, et. al 2016).

Multilateral industry platforms, international think tanks and associations

Over the last decade, the insurance industry has also initiated or supported various multi-lateral industry platforms and initiatives, such as Munich Climate Insurance Initiative (MCII), ClimateWise and OASIS.

Through platforms such as The Geneva Association (the leading international insurance think tank), International Insurance Society and International Cooperative and Mutual Insurance Federation (ICMIF), and the recently established Insurance Development Forum (IDF), industry executives and experts are working on achieving industry-wide strategies and more systematic engagement in the international policy dialogues and implementation.

INTERNATIONAL DEVELOPMENT COMMUNITY

- International and regional development banks such as The World Bank Group (WBG) , Asian Development Bank (ADB), Inter-American Development Bank (IDB), African Development Bank, Caribbean Development Bank (CDB)
- International development agencies (also referred to as international donors) such as United States Agency for International Development (USAID), The U.K. Department for International Development, DfID), the German Development Agencies (GIZ and KfW), Agence Française de Development, Swedish International Development Cooperation Agency (SIDA), European Commission (EC), and Japan International Cooperation Agency (JICA)
- Others such as OECD

UNITED NATIONS

- Key mechanisms: General Assembly, UN Secretary General's Executive Office, the UN Economic and Social Council (ECOSOC), the Chief Executives Board (CEB), UN specialised agencies and programmes, various interagency coordination platforms and UN country offices

SOCIO-ECONOMIC GROUPINGS

- Intergovernmental organisations such as the G7, the G20, the Asia-Pacific Economic Cooperation (APEC), the Association of Southeast Asian Nations (ASEAN), the South Asian Association for Regional Cooperation (SAARC) and the Caribbean Community (CARICOM)

INSURANCE INDUSTRY AND ITS AFFILIATES

- Primary (direct) insurers, reinsurers and brokers
- Multilateral industry platforms, international think tanks and Associations

OTHERS

- Among these are:
- Catastrophe risk modelling community
 - Traditional and social media organisations
 - Other institutions such as World Economic Forum (WEF)

Catastrophe risk modelling community: Following a series of natural and man-made disasters in the late 1980s and early 1990s, a number of multidisciplinary risk modelling firms set off to build models, with funding from the reinsurance industry. These are known as the catastrophe risk models (CAT risk models). Over the last 20 years, these models have revolutionised the (re)insurance industry's approach to pricing, underwriting and

managing their portfolios of risk. Over the years, emergence of new potential markets has led to other commercial, academic and non-profit CAT modelling entities, targeting different sectors, applications and stakeholders.

Active engagement of the traditional media organisations and access to social media has been instrumental in educating and informing the general public.

WEF has tackled issues of extreme event and climate risks in its Global Risk Reports and is increasingly organising high-level panels during its annual meeting in Davos, Switzerland and its regional workshops.

GOVERNMENTS (national to local levels, different ministries and public-sector institutions)

NON-GOVERNMENTAL ORGANISATIONS (NGOS) AND CIVIL SOCIETY ORGANISATIONS

- There are different types of organizations, examples include:
- International Federation of Red Cross and Red Crescent Societies (IFRC), The Rockefeller Foundation, Save the Children, Oxfam, World Vision, and CARE
 - Environmental NGOs such as The Nature Conservancy, Environmental Defense Fund, and the World Wide Fund for Nature
 - Knowledge-based think tanks such as The Geneva Association, Ceres, World Resources Institute (WRI)
 - World Business Council for Sustainable Development (WBCSD)

SCIENTIFIC COMMUNITY, ACADEMIA AND CENTRES OF EXCELLENCE

- International scientific contributions are coordinated by the UN through WMO, UNESCO and its Intergovernmental Oceanographic Commission, UNEP and the non-governmental International Council for Science (ICSU) and the Inter-governmental panel on Climate Change (IPCC). These have connected scientists, academia, and centres of excellence around the world to conduct and share research in a more coordinated manner
- The UNISDR Science and Technology Advisory Committee to guide the development of HFA and subsequently Sendai Framework
- Academia, centres of excellence, research labs and engineering associations

Dating back to 1960s, climate research and development have underpinned the international policy negotiations on climate change (Zillman, 2009). International scientific contributions are coordinated by the UN through WMO, UNESCO and its Intergovernmental Oceanographic Commission, UNEP and the non-governmental International Council for Science (ICSU) through a number of international programmes. The UNISDR has established a Science and Technology Advisory Committee to guide the development of HFA and subsequently Sendai Framework.

Beyond these internationally coordinated efforts, numerous academic organisations, research labs, centres of excellence and international engineering associations (e.g., International Association for Wind Engineering (IAWE), and firms have developed dedicated programmes and are actively engaging in this area.

Highlights of Major Initiatives in Disaster and Climate Risk Management Since 2005

Since 2005, there has been a burst of multi-lateral multi-stakeholder initiatives in disaster and climate risk management. These are categorized under four main areas: (1) enhance risk knowledge and risk assessment capacities, (2) promote an integrated approach to managing disaster and climate risks, (3) initiatives and innovation in risk transfer solutions; and, (4) facilitate risk transfer solutions (or mechanisms) for the agriculture sector. These areas remains highly active but fragmented; thus, implementing the integrated approach to disaster and climate risk management requires a new path to strategic partnerships that leverage the strengths of the engaged stakeholders, avoid redundancies and align priorities (Golnaraghi, et. al, 2016).

I. EXAMPLES OF INITIATIVES TO ENHANCE RISK KNOWLEDGE AND RISK ASSESSMENT CAPACITIES

RISK KNOWLEDGE DEVELOPMENT

- Global:
 - Global Risk Assessment Report (GAR) (<https://www.unisdr.org/we/inform/gar>)
 - World Economic Forum Report (WEF) (<https://www.weforum.org>)
 - Global Earthquake Model (GEM) (<https://www.globalquakemodel.org>)
 - Index for Risk Management (InfoRM) (<http://www.inform-index.org/>)
 - Disaster Risk Management Knowledge Centre (DRMKC) (<http://drmkc.jrc.ec.europa.eu>)
 - Global Flood Partnership (GFP) (<http://gfp.jrc.ec.europa.eu/>)
 - Global Volcano Model (GVM) (<http://globalvolcanomodel.org/>)
 - World Meteorological Organization's "Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970 - 2012)" (<http://www.uncclern.org/sites/default/files/inventory/who002.pdf>)
 - Inter-Governmental Panel on Climate Change (IPCC) Global Assessment Reports (<https://www.ipcc.ch>)
 - Global hazard maps published by Munich Re and Swiss Re
 - Climate Risk Index by Germanwatch (<https://germanwatch.org/en/cri>)
- Country: studies by Risk Management Solutions (RMS) and AIR Worldwide Corporation (AIR) (with development banks)
- Local: Risky Business Initiative (<http://riskybusiness.org>)

REGIONAL AND NATIONAL INSTITUTIONAL CAPACITY DEVELOPMENT

- Central American Probabilistic Risk Assessment (CAPRA) (<http://www.ecapra.org>)
- Caribbean Catastrophe Risk Insurance Facility (CCRIF) (<http://www.ccrif.org>)
- The African Risk Capacity (ARC) (<http://www.africanriskcapacity.org>)
- Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) (<http://pcrafi.sopac.org>)

RISK MODELLING PRODUCTS/TOOLS

- Industry-funded OASIS (open source) (<http://www.oasislmf.org>)
- Various proprietary models (e.g. risk modelling firms such as Risk Management Solutions, AIR Worldwide Corporation; CoreLogic, and AgRisk; insurance brokers such as AON, Guy Carpenter, Willis Towers Watson)
- World Bank Group's support tool for development practitioners: ThinkHazard (<http://thinkhazard.org>)

PLATFORMS

- Understanding Risk Forum (<https://understandrisk.org>)
- The Geneva Association Extreme Event and Climate Risk Forum: (<https://www.genevaassociation.org/events/2017/2017-extreme-event-and-climate-seminar>)
- Various industry risk modelling conferences

LOSS AND DAMAGE DATABASES AND ANALYSIS

- Munich Re's NatCatSERVICE (<https://www.munichre.com/en/reinsurance/business/non-life/natcatservice/index.html>)
- Swiss Re's sigma (<http://www.swissre.com/sigma>)
- Centre for Research on the Epidemiology of Disasters (CRED) EM-DAT (<http://www.emdat.be>)
- DesInventar by LA RED (<http://www.desinventar.org>)
- The Integrated Research on Disaster Risk (IRDR) programme of The International Council for Science (ICSU) IRDR Disaster Loss Data (DATA) (<http://www.icsu.org>)

RISK REPORTING

- Financial Stability Board's Task-Force on Climate Related Financial Disclosure (<https://www.fsb-tcfd.org>)
- Rating Agencies (e.g. S&P and Moody's)
- Climate Risk Reporting to NAIC (http://www.naic.org/cipr_topics/topic_climate_risk_disclosure.htm)

II. EXAMPLES OF INITIATIVES PROMOTING AN INTEGRATED APPROACH TO MANAGING DISASTER AND CLIMATE RISKS

UNITED NATIONS AND RELATED GLOBAL CAMPAIGNS

- UNISDR Safe Schools and Hospitals Global Campaign (<https://www.unisdr.org/we/campaign/schools-hospitals>)
- UNISDR-UN-Habitat Making Cities Resilient Global Campaign (<http://www.unisdr.org/campaign/resilientcities>)
- International Recovery Platform (<http://www.recoveryplatform.org>)
- UNISDR ARISE initiative with the private sector (<http://www.preventionweb.net/arise>)

REGIONAL

- Climate-KIC (<http://www.climate-kic.org>)

NATIONAL AND LOCAL

- 100 Resilient Cities, Rockefeller Foundation Initiative with many partners (<http://www.100resilientcities.org>) with Compact of Mayors (<https://www.compactofmayors.org>) and Local Governments for Sustainability (ICLEI) (<http://www.iclei.org>) (Also under NGOs)
- Build Back Better, Build Back Smarter by a variety of local, regional, state, and national public agency participants following the aftermath of Super Storm Sandy (U.S.) (<http://postsandyinitiative.org>)

INSURANCE INDUSTRY

- (Re)Insurance company's R&D programmes, centres of excellence and bi-lateral cooperation with international agencies—Examples are:
 - Swiss Re's Economics of Climate Adaptation (ECA) (<http://www.swissre.com/eca>)
 - Intact Centre on Climate Adaptation in Canada (<http://www.intactcentreclimateadaptation.ca>)
 - Zurich Flood Resilience Alliance & IFRC flood insurance (<https://www.zurich.com/en/corporate-responsibility/flood-resilience>)
 - AXA-UNEP FI Initiative: BUSINESS UNUSUAL: Why is the climate changing the rules for our cities and SMEs? (http://www.unepfi.org/psi/wp-content/uploads/2015/12/AXA_PR_20151029.pdf)
- Multilateral R&D:
 - Insurance Institute for Business and Home Safety (U.S.) (<https://disastersafety.org>)
 - Insurance Research Lab for Better Homes (Canada) (<http://www.eng.uwo.ca/irlbh>)
 - ClimateWise (<http://www.climatewise.org.uk>)
 - Institute for Catastrophic Loss Reduction (ICLR) (<https://www.iclr.org>)
- High-level forums with governments and international partners:
 - The Geneva Association and OECD Event (3 December 2015, Paris) (<https://www.genevaassociation.org/events/2016/joint-oecd-geneva-association-roundtable-2015>)
 - The Geneva Association with IIS and ICMIF—High Level Forum on Resilience, hosted by the UN Secretary General (13 April 2016, UN HQ, NYC)
 - Insurance Development Forum with the UN and World Bank Group (<http://theidf.org>)
 - The Munich Climate Insurance Initiative (MCII) (<http://www.climate-insurance.org>)

NGOs

- 100 Resilient Cities, a Rockefeller Foundation Initiative with many partners (<http://www.100resilientcities.org>), Compact of Mayors (<https://www.compactofmayors.org>) and Local Governments for Sustainability (ICLEI) (<http://www.iclei.org>)
- Initiatives by The Nature Conservancy, Environmental Defence Fund, etc. to promote the role of natural infrastructure in reducing risks of extreme events and climate change
- The Munich Climate Insurance Initiative (MCII) (<http://www.climate-insurance.org>)

III. EXAMPLES OF INITIATIVES AND INNOVATIONS IN RISK TRANSFER

NATIONAL

- UK Flood Re (<http://www.floodre.co.uk>)
- Netherlands Flood Insurance
- Australian Flood Mitigation Infrastructure (http://minister.infrastructure.gov.au/pf/releases/2016/May/budget-infra_02-2016.aspx); and Australian Flood Insurance (<http://www.depi.vic.gov.au/water/floods-and-floodplains/Flood-insurance-and-building>)
- Turkey Turkish Catastrophe Insurance (<http://www.tcip.gov.tr>)
- Mexican Fund for Natural Disasters (FONDEN) (http://www.proteccioncivil.gob.mx/en/ProteccionCivil/Reconstruccion_FONDEN)
- New Zealand Earthquake Authority (<http://www.eqc.govt.nz>)
- Philippines Risk and Insurance Scheme for Municipalities (PRISM) (<https://www.unisdr.org/archive/36205>)
- Earthquake Insurance for residential properties in Japan (www.mof.go.jp)

SOCIO-ECONOMIC GROUPINGS - WORKING GROUPS AND INITIATIVES

- The Association of Southeast Asian Nations (ASEAN) - Natural Disaster Research and Works Sharing (ANDREWS) (<http://asean.org>)
- Asia-Pacific Economic Cooperation (APEC) - Asia-Pacific Financial Forum (<http://www.apec.org>)
- The Caribbean Community Market (CARICOM) (<http://www.caricom.org>)
- G7 InsuResilience (http://www.bmz.de/g7/en/Entwicklungspolitische_Schwerpunkte/Klimawandel/index.html)

REGIONAL RISK TRANSFER FACILITIES

- Caribbean Catastrophe Risk Insurance Facility (CCRIF) (<http://www.ccrif.org>)
- The African Risk Capacity (ARC) (<http://www.africanriskcapacity.org>)
- Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI) (<http://pcrafi.sopac.org>)
- Europa Reinsurance Facility Ltd. (Europa Re) (<http://www.europa-re.com>)
- Asian Region Disaster Insurance Scheme (ARDIS) of the VisionFund (<http://www.visionfund.org/202/media/news/article/visionfund-wins-adb-civil-society-partnership-award>)

INSTITUTIONS AND PROGRAMMES WITH GLOBAL REACH

- World Bank Group's Disaster Risk Financing and Insurance Program (DRFIP) (www.worldbank.org/en/programs/disaster-risk-financing-and-insurance-program) and Global Index Insurance Facility (GIIF) (<https://www.indexinsuranceforum.org>)
- International Labour Organisation's (ILO) Global Action Network (GAN) to Advance Agricultural Insurance (<http://www.impactinsurance.org/partner/gan>)
- The World Food Programme (WFP) (<http://www.wfp.org>)
- The Access to Insurance Initiative (A2ii) (<https://a2ii.org>)
- 5-5-5 Mutual Microinsurance Strategy of the International Cooperative and Mutual Insurance Federation (ICMIF) (<https://www.icmif.org/5-5-5-introduction>)
- Global Parametrics (<http://www.businessinsurance.com/article/20160614/NEWS09/160619949>)
- The Munich Climate Insurance Initiative (MCII) (<http://www.climate-insurance.org>)

INSURANCE INDUSTRY

- Insurance Development Forum (with United Nations and The World Bank Group) (<http://theidf.org>)
- Lloyd's Syndicate Disaster Risk Finance Facility for Developing Economies (<http://www.phoenix-re.co.uk/2015/11/27/lloyds-to-pool-400m-catastrophe-capacity-for-developing-economies>)
- Microinsurance: Blue Marble (<http://bluemarblemicro.com>), LeapFrog (<http://www.leapfroginvest.com>)

IV. EXAMPLES OF INITIATIVES TO FACILITATE RISK TRANSFER SOLUTIONS FOR THE AGRICULTURE SECTOR

INITIATIVES FROM GOVERNMENTS AND NGOs HAVE LED TO A RISE IN THE USE OF AGRICULTURE INSURANCE IN SEVERAL DEVELOPING COUNTRIES.

The total number of insured smallholders worldwide is 177 million divided into ~440,000 in Africa, ~3.3 million in Latin America and the Caribbean, ~173 million in Asia (of which 140 million are in China and 33 million in India)

NATIONAL AGRICULTURAL INSURANCE PROGRAMMES

- Examples include: U.S., India, Mexico, etc.

INSTITUTIONS AND PROGRAMMES WITH GLOBAL REACH

- World Bank Group's Global Index Insurance Facility (GIIF) (<https://www.indexinsuranceforum.org>)
- International Labour Organization's (ILO) Global Action Network (GAN) to Advance Agricultural Insurance (<http://www.impactinsurance.org/partner/gan>)
- World Food Programme's Initiatives (<http://www.wfp.org>)
 - The R4 Rural Resilience Initiative (WFP & Oxfam America)
 - The Livelihoods, Early Assessment and Protection (LEAP) (Ethiopia & WFP)
 - The Food Security Climate Resilience Facility (FoodSecure) (WFP)
 - Weather Risk Management Facility (WRMF) (WFP & International Fund for Agricultural Development)
- International Fund for Agricultural Development's (IFAD) Platform for Agricultural Risk Management (PARM) (<http://www.p4arm.org>)

Highlights of Major Developments in Disaster Risk Financing and Risk Transfer

The rapid increase in global economic losses from disasters has put the spotlight on insurability. Since 2005, there has been a notable increase in innovations and initiatives in disaster risk financing and risk transfer (including insurance) targeting new markets. With a number of factors hurdling the expansion of risk transfer around the world, scalability and sustainability remain a central concern (Golnaraghi et al., 2016).

HISTORICAL EVOLUTION OF DISASTER RISK FINANCING AND RISK TRANSFER DEVELOPMENTS IN MIDDLE- AND LOW-INCOME COUNTRIES (1996– PRESENT)

1996: Mexican Fund for Natural Disasters (FONDEN).

1999: UN Office for Disaster Risk Reduction (UNISDR) established.

2000: Turkish Catastrophe Insurance Pool (TCIP).

2001: Taiwan Residential Earthquake Insurance Programme.

2003: India's first weather index insurance pilot by ICIC Lombard General Insurance co.; Indonesian Earthquake Reinsurance Pool (MAIPARK).

2005: MCII established.

2006: Mexico's first Sovereign Catastrophe Bond; Mongolia's Indexed Based Insurance (IBI) for livestock.

2007: Caribbean Catastrophe Risk Insurance Facility (CCRIF), India's large-scale weather indexed crop insurance; first disaster linked-contingent financing protection for Productive Safety Net Programme (PSNP) in Ethiopia.

2008: World Bank launches 'Cat DDO'; indexed-based Weather Derivative in Malawi; Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI); Romanian Cat Insurance Scheme, OASIS Multi-Window Mechanisms to address losses from climate change.

2009: GIIF launched; Indonesia's flood microinsurance; Manizales, Colombia's Earthquake Property Insurance; HARITA pilot in Ethiopia.

2010: Kenya and Ethiopia: index-based livestock insurance.

2011: Mexico's indemnity-based excess of loss insurance for public assets Vietnam's agriculture insurance pilot; India's Modified Area Yield Crop Insurance Scheme; Micro-Insurance Catastrophe Risk Insurance (MICRO) established; Philippines' CLIMBS (microinsurance), HARITA in Ethiopia expands; World Economic Forum publishes Vision for Managing Natural Disaster; ASEAN Roadmap for Disaster Risk Financing and Insurance (DRFI).

2012: Inter-American Development Bank launches contingent credit product for natural disasters; Sendai dialogue on DRR launched; G20 adopt the concept of DRFI.

2013: Pacific Catastrophe Risk Insurance Pilot Program Project (PCRIP), Japan International Cooperation Agency (JICA) launches contingent credit products for natural disaster (SECURE); weather derivatives with Uruguay (intermediated by the World Bank); Political Champion Group for Resilience insurance initiative established.

2014: Africa Risk Capacity (ARC) sells first policies for sovereign drought risk insurance; Kenya crop and livestock insurance; South East Europe and Caucasus Catastrophe Risk Insurance Facility, role of DRFI encouraged in the World Development Report 2014; The Philippines Risk and Insurance Scheme for Municipalities (PRISM).

2015: Nicaragua joins CCRIF, Sendai Framework for Disaster Risk Reduction (2015–2030), adopted with clear reference to importance of risk transfer solutions (paragraph 30); G7 launches a climate insurance initiative (InsuResilience), APEC finance ministers Cebu Action Plan (CAP) for DRFI; 2030 Agenda for Sustainable Development adopted at the 70th UN General Assembly with reference to resilience and role of insurance; several international conferences are held to take stock of the progress, gaps and opportunities in DRFI and IBI for agriculture; Climate Change Paris Agreement adopted with reference to insurance.

2016: VisionFund's Asian Region Disaster Insurance Scheme' (ARDIS).

Sources: World Bank (2014) and The Geneva Association Extreme Event and Climate Risks Programme.

A SUMMARY OF INNOVATION, TRENDS AND CHALLENGES IN AGRICULTURAL INSURANCE

Agricultural risks associated with extreme event and climate and economic risks—In the agriculture sector typical risks are yield losses due to bad weather, pests and diseases; post-harvest losses during storage and transport; unexpectedly low market prices, as well as further supply chain issues, affecting logistics and food security across many parts of the world. The IPCC's Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (IPCC, 2012) illustrates past and projected impacts across different regions, for example:

- Africa is particularly exposed, as 50 per cent of its total export value is based on agriculture. As an example, the projections of climate change impacts for Namibia indicate annual losses of 1 to 6 per cent of GDP by 2050, with livestock production, traditional agriculture, and fishing expected to be hardest hit, with a combined loss of USD 461 to 2,045 million per year by 2050.
- In New Zealand, the 1997-1998 severe drought conditions across large areas led to losses estimated at NZD 750 million (2006 values) or 0.9 per cent of GDP.
- For Asia about 15 per cent (23 million ha) of Asian rice areas already experienced frequent yield loss due to drought.
- Droughts are currently the third costliest natural disasters in the United States, with crop losses being the dominant type of economic impact. Future projections indicate increase in heat wave frequency and duration and increasing dryness for some U.S. regions.

Latest developments with the expansion of insurance in agriculture—Agriculture insurance is widely used across the world to protect the income of farmers and the operations of agro-businesses and co-operatives, mainly through crop and livestock cover. Insurance penetration is highly biased towards high-income countries, who account for 88 per cent of global agriculture insurance premiums. Initiatives from governments and NGOs have led to a rise in the use of agriculture insurance in several developing countries. So far, the private sector has played only a minor role in insuring farmers and rural communities against agricultural risks in the developing world. Most recently, there is growing private sector involvement in agricultural insurance, attracted in part by the development of index-based insurance (IBI) but also by a shift towards more public-private and non-profit-private partnerships in the delivery of insurance.

Product innovation through indexed based insurance (IBI) and challenges with their scalability—IBI is considered as the most promising new type of agriculture risk transfer, designed to address many of the above challenges. It can reduce the costs and difficulties of administering and delivering agricultural insurance and remove many of the negative incentive problems as well as provide a speedy and reliable source of funding once an insured catastrophe has occurred. The Global Index Insurance Facility (GIIF) of the World Bank/IFC and the International Labour Organization (ILO) in cooperation with several private insurers have contributed to the development of these solutions. Using satellite-based data for the implementation of the Mongolia's IBI for livestock is noteworthy. The Community of Index Insurance Practitioners ('Index Insurance Forum'), formed by GIIF and ILO in September 2014 and The Global Action Network (GAN) on Agricultural Insurance was formed in November 2014 and is hosted by the ILO's Impact Insurance Facility. Several private insurers joined the Index Insurance Forum and launched an advocacy coalition in July 2015 that brings together public and private sector actors.

However, main challenges for expansion of IBI and its scalability in developing countries include: (i) problems of weak demand by farmers, (ii) difficulties in developing appropriate indices and distribution networks, (iii) coping with climate change, (iv) insufficient public investments in necessary public goods, (v) first-mover problems, and (vi) data availability and reliability for index setting. Basis risk is another key problem that arises if an individual farmer who experiences crop losses due to an insured weather event that is too localised to trigger a regionally based insurance payout.

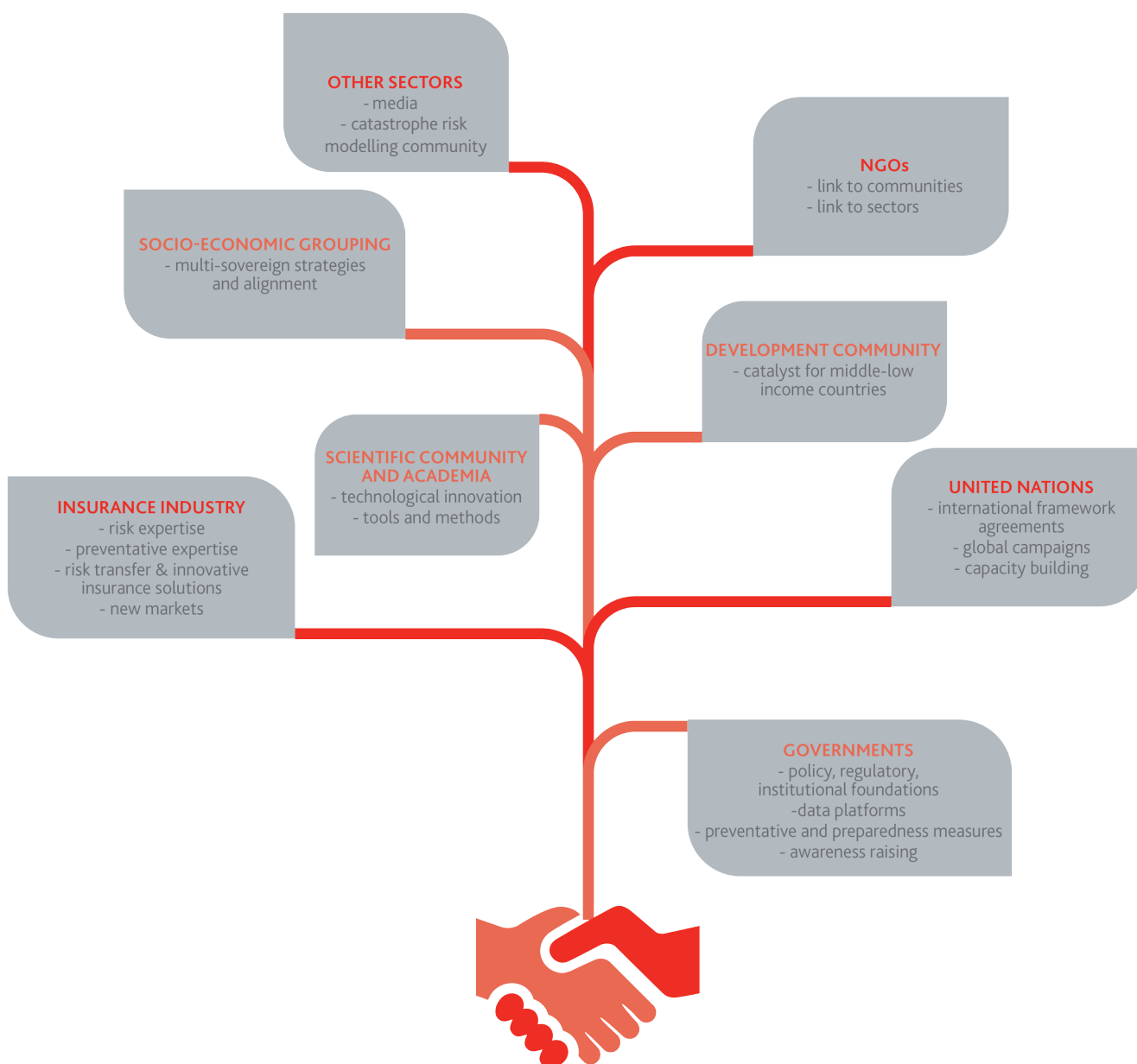
Furthermore, filing for payouts without incurring damages (fraud) by the insured could be a major concern.

Country examples for scaling up the use of agriculture insurance:

India: Evolution with National Agriculture Insurance Scheme (NAIS) since 1999.

Mexico: Mexican Agricultural Fund for Natural Disasters (CADENA) aims to internationally reinsure part of the costs of its state managed relief programmes. CADENA was launched in 2003 by the Government and insures 2.5 million small-scale farmers.

Source: Hess and Hazell, 2015 and The Geneva Association Extreme Event and Climate Risks Programme.



EFFECTIVE PUBLIC-PRIVATE PARTNERSHIPS ARE AT THE CENTRE OF DEVELOPING EFFECTIVE AND SUSTAINABLE RISK TRANSFER AND INSURANCE PROGRAMMES

References

Ghesquière, F. and Mahul, O. (2010) 'Financial Protection of the State against Natural Disasters: A Primer', Policy Research Working Paper 5429. Available at <http://documents.worldbank.org/curated/en/2010/09/12788964/financial-protection-state-against-natural-disasters-primer>

Golnaraghi, M., Surminski, S. and Schanz, K. (2016) 'An Integrated Approach to Managing Extreme Events and Climate Risks', The Geneva Association, Zurich. Available at https://www.genevaassociation.org/media/952146/20160908_ecoben20_final.pdf

Hess, U. and Hazell, P. (2015) 'Innovations and Emerging Trends in Agricultural Insurance', discussion paper for the Roundtable on Innovations in Agricultural Finance, Antalya, 9 September 2015, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the Federal Ministry for Economic Cooperation and Development. Available at https://www.researchgate.net/profile/Peter_Hazell2/publication/283089244_Innovations_and_emerging_Trends_in_Agricultural_Insurance/links/567ebcdd08ae051f9ae657d2.pdf

IPCC (2014) 'Climate Change 2014: Impacts, Adaptation, and Vulnerability', Summary for Policymakers, Stanford, CA: Intergovernmental Panel on Climate Change Working Group II. Available at http://www.ipcc-wg2.gov/AR5/images/uploads/WG2AR5_SPM_FINAL.pdf

IPCC (2012) 'Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation'. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor and P.M. Midgley (eds)], Cambridge, U.K./New York, NY: Cambridge University Press, available at https://www.ipcc.ch/pdf/special-reports/srex/SREX_Full_Report.pdf

UNFCCC (2015) 'Conference of the Parties, 21st Session, Paris, 30 November to 11 December 2015, Adoption of the Paris Agreement, United Nations Framework on Climate Change', FCCC/CP/2015/L.9/Rev.1. Available at <http://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

United Nations General Assembly (2015a) 'Sendai Framework for Disaster Risk Reduction 2015-2030', UN Doc. No. A/CONF.224/L.2, New York: United Nations General Assembly. Available at <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/097/43/pdf/N1509743.pdf?OpenElement>

United Nations General Assembly (2015b) 'Transforming Our World: the 2030 Agenda for Sustainable Development', UN Doc. No. A/70/1, New York: United Nations General Assembly. Available at <https://documents-dds-ny.un.org/doc/UNDOC/GEN/N15/291/89/PDF/N1529189.pdf?OpenElement>

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

Zillman, J. (2009) 'A History of Climate Activities', World Meteorological Bulletin n° Vol 58 (3). Available at: <http://public.wmo.int/en/bulletin/history-climate-activities>



This report provides insights about the patterns of stakeholder engagement in the international framework agreements related to disaster risk reduction, climate change and sustainable development over the last five decades. It presents the complex stakeholder landscape, multi-stakeholder initiatives in extreme event and climate risk management as well as highlights major developments in expanding risk transfer and insurance, over the last decade.