

INSURING AGRICULTURE IN TIMES OF CLIMATE CHANGE

**A scoping study on the role of agriculture insurance in protecting
farmers of Asia and Africa from extreme weather events**



Centre for Science and Environment

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Contents

I. Introduction	7
Trends of loss and damage in developing countries	8
Agricultural insurance—global scenario	11
II. Agricultural insurance in Africa and Asia	17
Ethiopia	18
Mali	22
Mozambique	25
Nigeria	28
Tanzania	32
Kenya	34
Malawi	39
Ghana	43
Rwanda	45
South Africa	48
India	50
Nepal	54
Sri Lanka	58
Myanmar	61
Bangladesh	62
Conclusion and way forward	67
References	69

PART 1

Introduction

Scientific evidence has established that climate change is accelerating the frequency and intensity of extreme weather events like droughts, floods, unseasonal rainfall and extreme temperatures. Evidence also reveals that, globally, the poorest bear maximum losses and damage as a result of climate impacts, even though they have contributed least to the cause of climate change. Further, the impacts on the agriculture sector are felt most by developing countries since their economy is largely agro-based. This being the case, the importance of tools like climate risk insurance, that enable reducing, sharing and transferring the risks related to climate extremes is being increasingly recognized.

Developments in the past year have set a new agenda for sustainable development and capacity building. In March 2015, countries adopted the Sendai Framework for Disaster Risk Reduction (SFDRR). The Sendai Framework is a 15-year, voluntary, non-binding agreement which recognizes that though reducing disaster risk is primarily the burden of states, but the responsibility should be shared with other stakeholders including local government and the private sector.¹ In July 2015, the Addis Ababa Financing for Development Conference took place which gave a new direction to development finance.² In September, countries adopted Sustainable Development Goals (SDG) and the post-2015 development agenda which are global in nature and in December, world leaders negotiated a new global climate agreement in Paris (COP 21) to address climate change and prevent it from reaching hazardous levels in the atmosphere.

The global climate regime, the United Nations Framework Convention on Climate Change (UNFCCC), also has in place Warsaw International Mechanism for Loss and Damage since 2013, especially for the poor and vulnerable countries of the world. As part of a holistic approach, climate risk insurance is addressed in the working plan of the executive committee of the Warsaw International Mechanism for Loss and Damage.

According to the UN definition, loss and damage has been broadly defined as ‘the actual and/or potential manifestation of impacts associated with climate change in developing countries that negatively affect human and natural systems’. Broadly, it is understood to refer to negative residual impacts of climate change, such as those resulting from extreme weather events or slow onset events that cannot be avoided through mitigation and adaptation efforts.

Separately, loss is defined as (negative impacts in relation to which reparation or restoration is impossible, such as loss of freshwater resources) while damage (negative impacts in relation to which reparation or restoration is possible, such as damage to a building or crops, or damage to a coastal mangrove forest as a result of coastal surges). The definition has been given only as late as in 2012.

Trends of loss and damage in developing countries

Available data substantiates how developing countries' economies, including their agriculture sector, are most vulnerable to climate impacts. The Food and Agricultural Organization (FAO) reviewed 78 post-disaster assessments of developing countries in the aftermath of medium- to large-scale disasters in 48 developing countries in Africa, Asia and Latin America during 2003–13 to identify trends in the economic impact of disasters on crops, livestock, fisheries and forestry.³ Natural hazards, namely drought, floods, storms such as cyclones and hurricanes, earthquakes, tsunamis and volcanic eruptions were covered under this study.

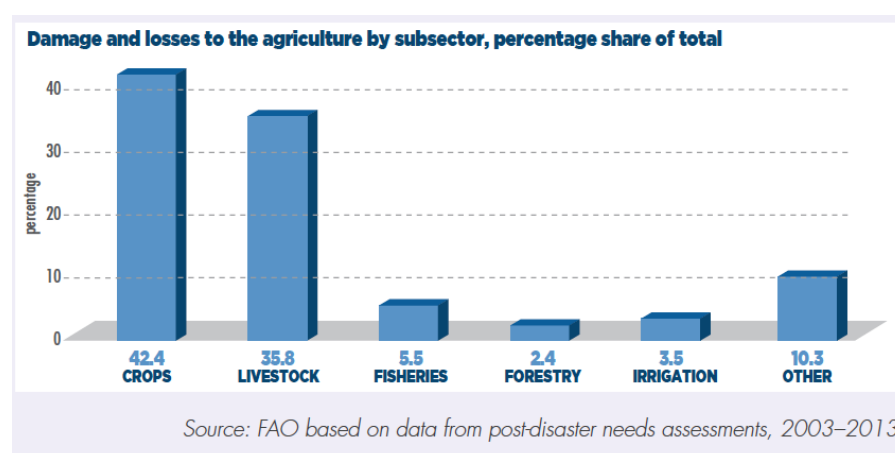
The findings revealed that:

- The 78 disasters caused a total of US \$140 billion worth damage and losses in all sectors, of which US \$30 billion was in the agriculture sector alone.
- On an average, agriculture sector—including crops, livestock, fisheries and forestry—absorbs 22 per cent of the total economic impact caused by natural hazards in these countries.
- For climate-related disasters such as floods, droughts and tropical storms, 25 per cent of all damage and losses was in the agriculture sector.
- Agriculture emerged as the sector most affected by droughts absorbing, on an average, 84 per cent of the economic impact.

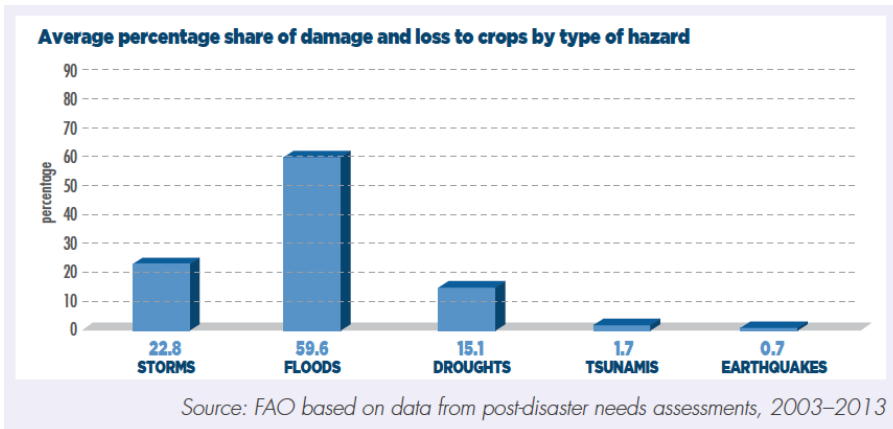
Distribution of damage and losses by sub-sector in agriculture

While the agriculture sector absorbed 22 per cent of the total economic impact, within the sector different sub-sectors were impacted differently.

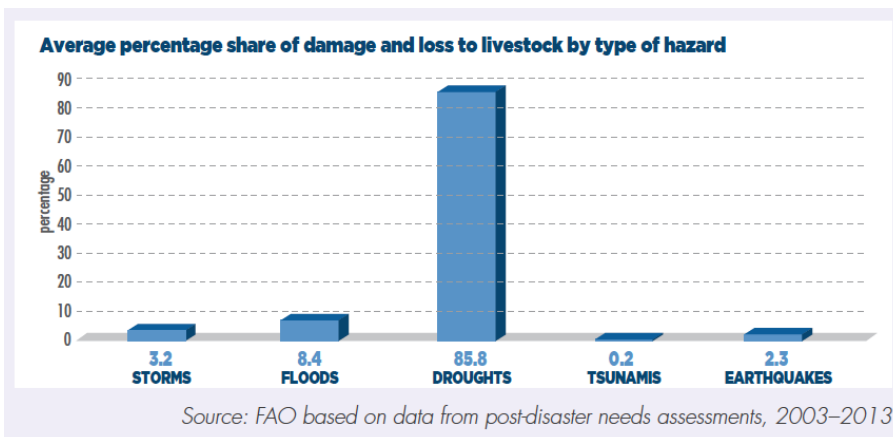
The graph below indicates that 42 per cent of all damage and losses is in the crops sub-sector, followed by livestock (36 per cent) and fisheries (5.5 per cent).



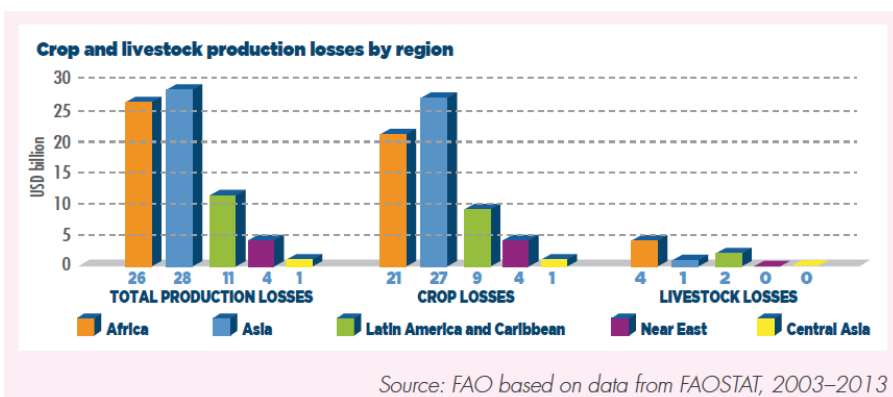
The graph below shows that the crop sub-sector has been affected the most by natural hazards, but if we study the impacts on crops by different types of disasters, almost 60 per cent of damage and losses have been caused by floods.



The graph below shows that livestock has been the second-most affected sub-sector after crops, accounting for 36 per cent of all damage and losses reported in the post-disaster needs assessments. This sub-sector has been worst impacted by droughts, followed by floods.



In terms of regional distribution of production losses, Asia is the most affected, with total crop and livestock losses amounting to US \$28 billion, followed by Africa with US \$26 billion. In relative terms, Africa is the most affected region, having lost 3.9 per cent of total expected crop and livestock production, followed by Central Asia, with 3.8 percent as shown in the graph below.



From this data and these figures, it is clear that the impacts on the agricultural sector in developing countries are significant; therefore the importance of disaster risk reduction mechanism and agricultural insurance to off-set risks becomes crucial.⁴

COST OF ADAPTING TO CLIMATE CHANGE

Insurance can compensate for loss and damage, but it is not the only risk management tool that we need to protect farmers from the impacts of climate change—adaptation is also very important.

Adaptation gap is the gap between the finance required to meet adaptation targets and actual availability of funds. The Paris agreement adopted at CoP 21 to UNFCCC saw 195 countries endorsing an ambitious climate change agreement that includes global goals on adaptation. We need to analyze the adaptation gap. Calculating this gap is a contentious issue and several estimates have been made.

The costs of adaptation are likely to be two-three times higher than current global estimates by 2030 and potentially four-five times higher by 2050.

- Previous global estimates of the costs of adaptation in developing countries were placed between US \$70 billion and US \$100 billion a year for the period 2010–50.
- United Nations Environment Programme (UNEP) adaptation gap report of 2016 indicates that the costs of adaptation could range from US \$140 billion to US \$300 billion by 2030 and between US \$280 billion and US \$500 billion by 2050.
- The costs of adaptation in developing countries are increasing, strengthening the case for immediate and enhanced mitigation action.⁵

Some key points about adaptation finance

- Total bilateral and multilateral finance for climate change adaptation reached US \$25 billion in 2014, US \$22.5 billion targeting developing countries, with a steady rise over the past five years.
- Most funds originate from development finance institutions (US \$21 billion, or 84 per cent of the total) and are delivered through low-cost or market-rate project debt (53 per cent and 26 per cent of the total, respectively).
- Developing countries in East Asia and the Pacific attract almost half of the funding.
- Over half of the total finance (55 per cent) is directed to water and waste water management projects.
- By the end of 2015, just over US \$35 billion, corresponding to 76 per cent of the resources pledged to adaptation-focused climate funds, had been approved for disbursement.
- Some of the poorest countries in sub-Saharan African and South Asia have been the main recipients of funding for adaptation from dedicated climate funds. Small-island developing states are among the main recipients of adaptation finance for disaster risk reduction.⁶

Adaptation finance gap

- Current adaptation costs are likely to be at least two to three times higher than international public finance for adaptation.
- Developing countries adaptation finance gap is large and likely to grow over the coming decades.
- In 2030, to meet finance needs and avoid an adaptation gap, the total finance for adaptation would have to be approximately six to 13 times greater than international public finance today.⁷

CoP 21 Paris Agreement and its implementation offer opportunities for significantly bolstering progress with adaptation to climate change and addressing the adaptation finance gap.

Agricultural insurance— global scenario

Agriculture is subject to a very wide range of risks only some of which can be dealt with under a crop or livestock insurance policy. Agricultural insurance has an important role to play in managing climatic and natural risks at different levels of aggregation, including at the individual farmer- or micro-level to smoothen production and offer protection to incomes against major weather shocks, at the meso-level as a business interruption cover to protect agricultural loan portfolios of financial institutions and input suppliers and, finally, at the macro- or government-level to ensure early relief and food security after natural disasters.⁸

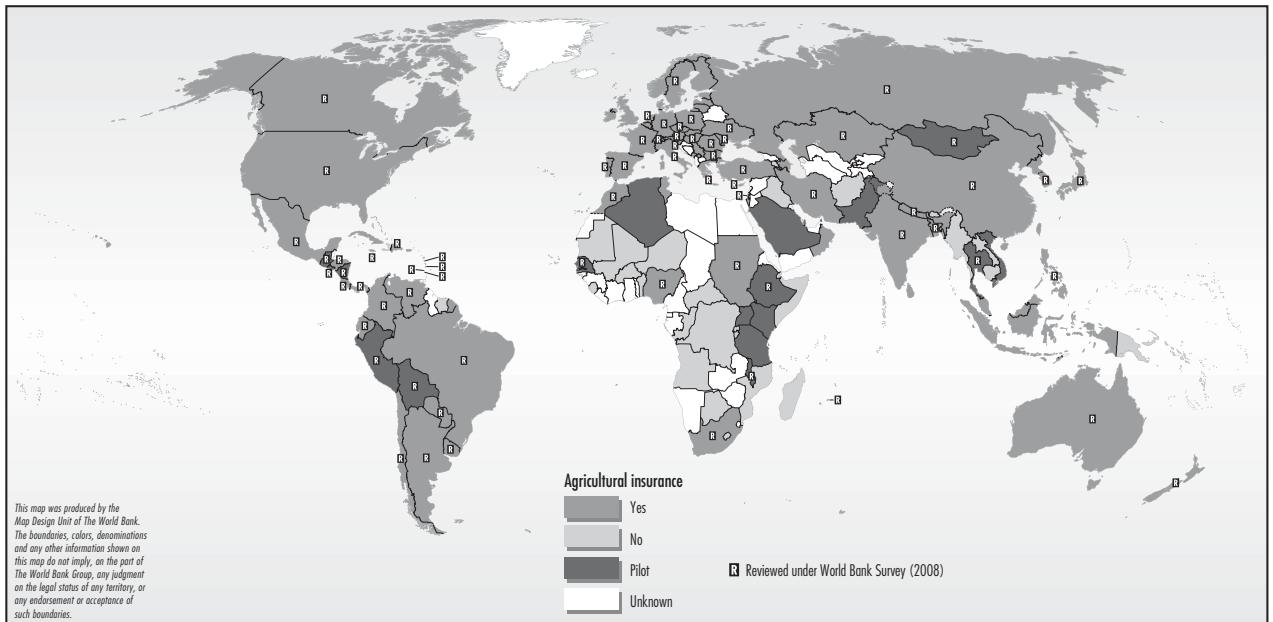
Agricultural (crop and livestock) insurance is currently available in more than 100 countries, either as well-developed programmes or pilots. The provision of agricultural insurance is dominated by high-income countries and crop insurance. Pilot programmes, which reach only a limited number of farmers and herders, are being implemented in various forms (including named-peril crop insurance, index-based crop insurance, or livestock insurance) in eight middle-income and eight low-income countries. The highest agricultural insurance penetration rates are found among high-income countries; within these countries, the highest penetration rates are in countries with very high levels of government premium subsidy support.⁹ In Asia and the Pacific, the highest insurance penetration rates are found in countries that have large national subsidized schemes and where crop and livestock insurance is either compulsory (e.g. Japan for cereals, China for livestock epidemic disease cover) or compulsory for crop-credit recipients (e.g. India under the NAIS scheme).¹⁰ Very limited data is available on agriculture insurance, and the available data is dated.

Geographical distribution of agricultural insurance

Despite the recent growth of agriculture insurance, penetration is still much lower than non-life insurance penetration in most countries, though this gap decreases with development level (see Map: Availability of agricultural insurance in 2008).

- Agricultural insurance takes a long time to take off. USA and many European countries have had some form of crop or livestock insurance for more than a century and now they are mature markets with high penetration rates.
- However, in many developing countries, agricultural insurance has been operating for only 10–15 years (even less in countries introducing index-based insurance) and agricultural insurance demand and uptake have yet to take off.

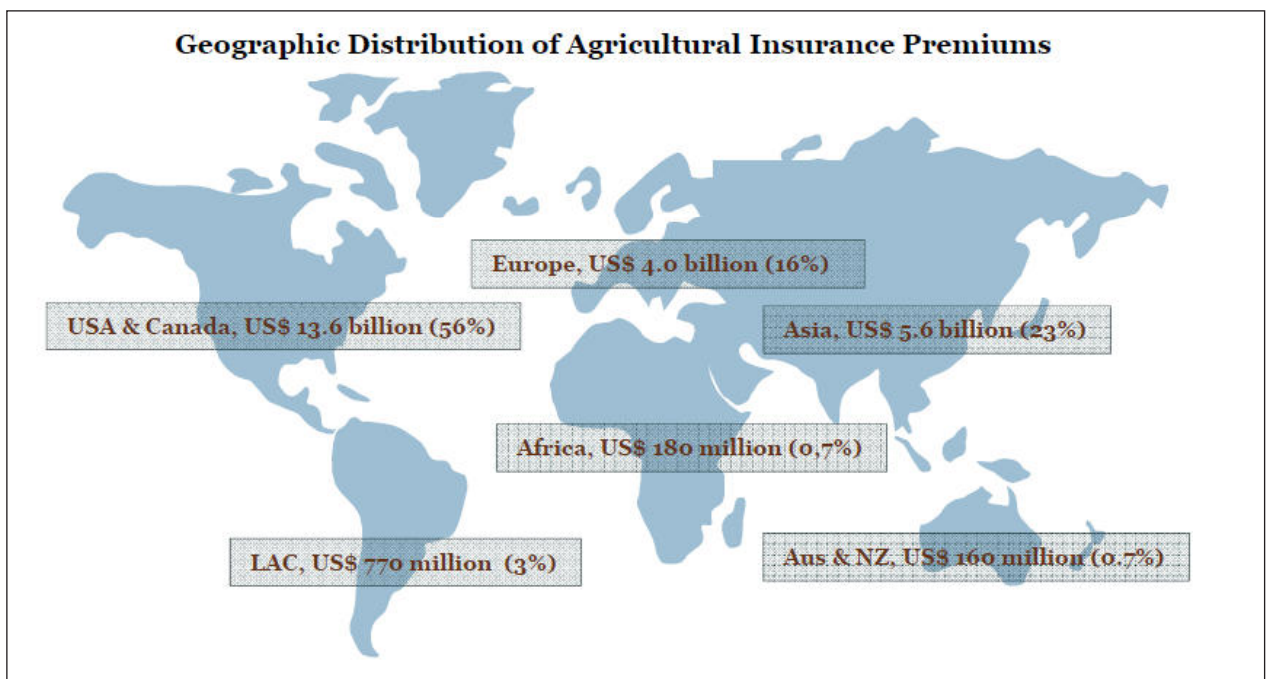
Availability of agricultural insurance in 2008



Source: World Bank Survey 2008

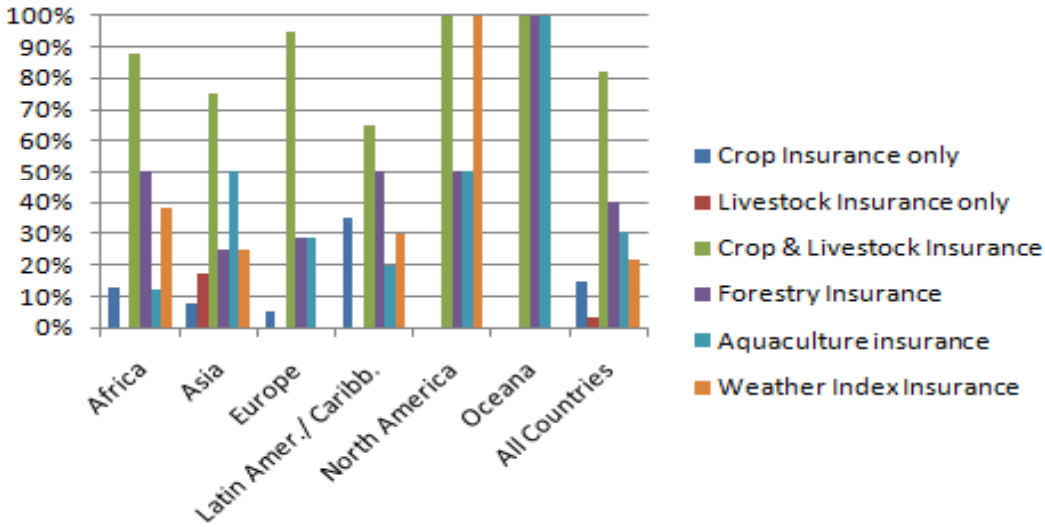
Agriculture insurance coverage in terms of premiums

The map below shows that 56 per cent of the global agriculture insurance premium comes from USA and Canada, followed by Asia with 23 per cent and Europe with 16 per cent.¹¹



Source: World Bank (2011)

Crop, livestock, aquaculture, forestry and weather index covers available globally



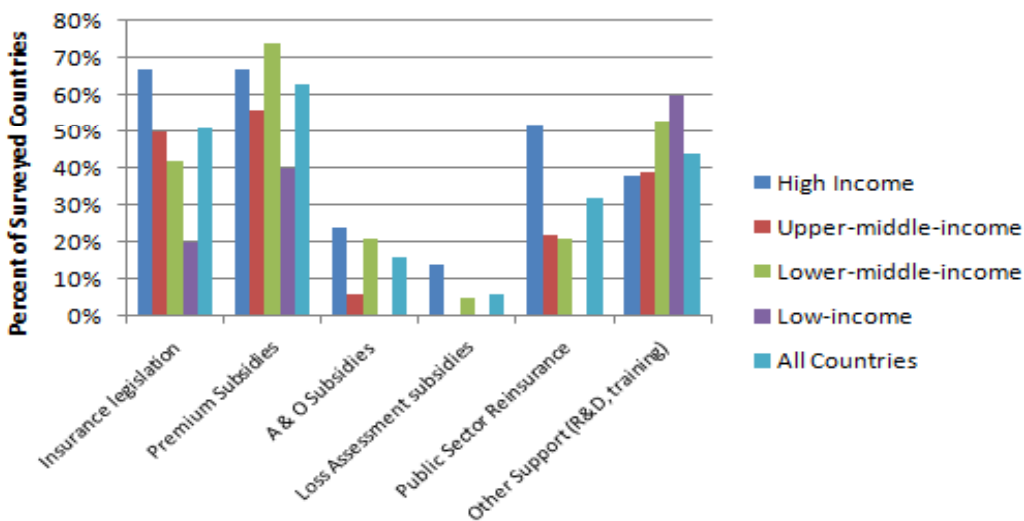
Source: Mahul and Stutley (2010)

Global government support for agriculture insurance

Governments have been supporting agriculture insurances in different forms like legislation, subsidies and re-insurance in developed countries as shown in the graph below.

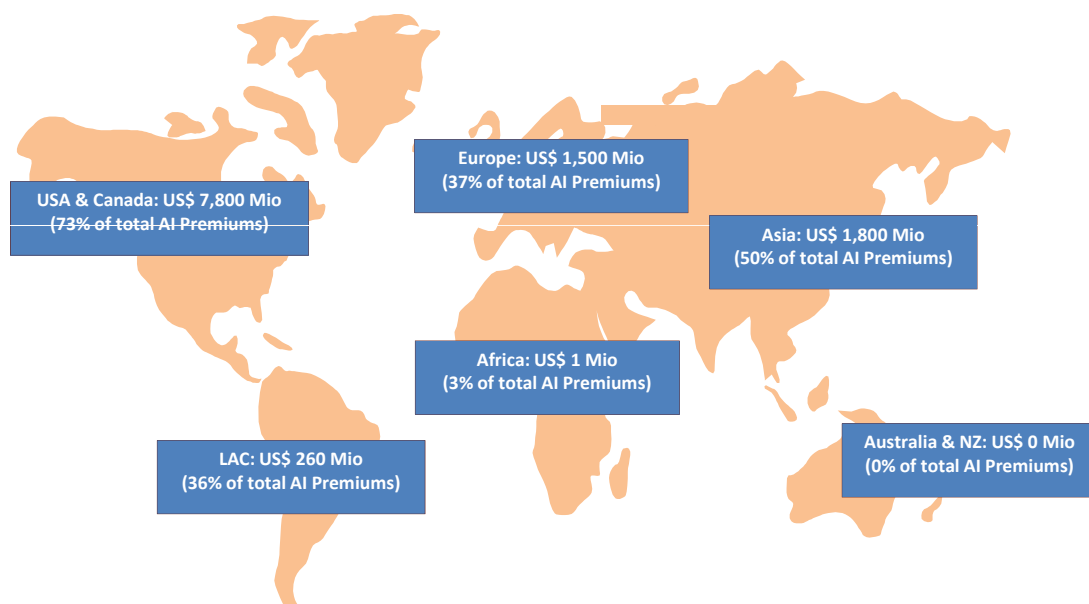
A World Bank survey, capturing almost 80 per cent of the estimated global agricultural insurance premium volume, shows that 91 per cent of the agricultural insurance business by premium volume comes from crop insurance.

Government support for agricultural insurance by country development status



Source: Mahul and Stutley (2010)

Government support for agricultural insurance



Source: Mahul and Stutley (2010)

USA and Canada are way ahead of other countries, providing 73 per cent support in agriculture insurance premium, followed by Asian countries, which provide almost 50 per cent of the premium (see map above).

Government support to total agriculture insurance premium in different regions is as follows:

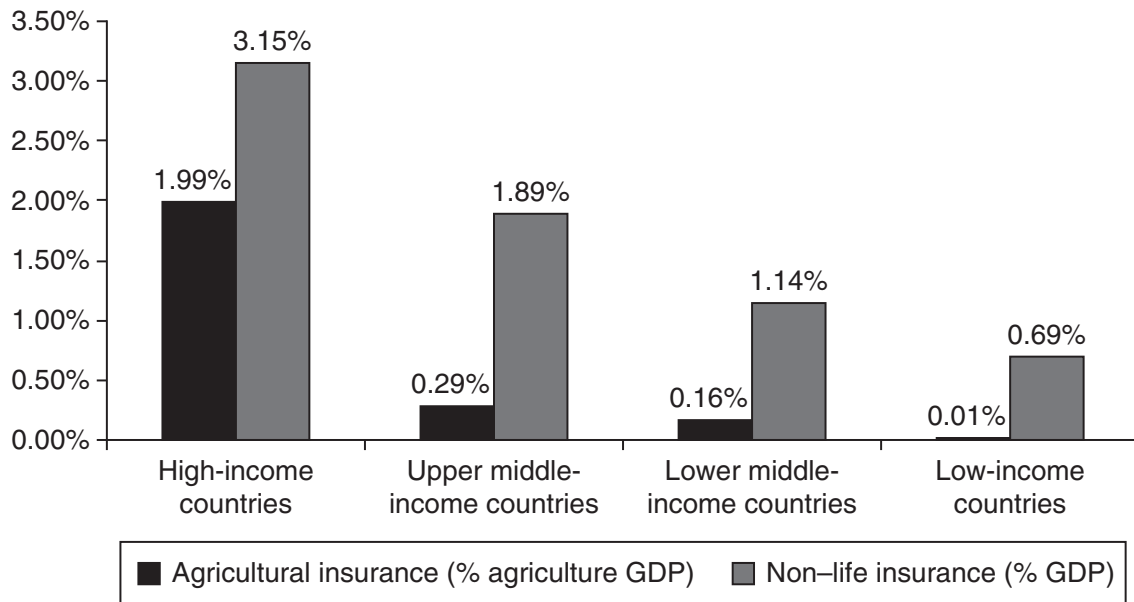
- USA and Canada—73 per cent
- Asia—50 per cent
- Europe—37 per cent
- Latin American countries—36 per cent
- Africa—3 per cent
- Australia—0 per cent

Penetration of agricultural insurance

Agricultural insurance has been offered in some industrial countries for more than a century. In contrast, the sector remains underserved in low- and middle-income countries.

Penetration of agricultural insurance exceeds 1 per cent (of agriculture GDP) in high-income countries but is still much lower than penetration of insurance products other than life insurance. In low- and middle-income countries, the agricultural insurance penetration is less than 0.3 per cent (of agriculture GDP). The gap between the penetration of non-life insurance and agricultural insurance increases as development status decreases.

Penetration of agricultural and non-life insurance, by development status 2007



Source: Authors, based on Cummins and Mahul 2009; World Bank Survey 2008

Note: Non-life insurance penetration is the ratio of the value of non-life insurance premiums to GDP, stated as a percentage. Agricultural insurance penetration is defined as the ratio of the value of agricultural premiums to agricultural GDP, stated as a percentage.

Livestock insurance scenario

Livestock insurance products include the traditional animal accident and mortality cover as well as an epidemic disease cover and a livestock index mortality product. Peril accident and mortality insurance for individual animals is the basic traditional product for insuring livestock. The cover includes death caused by natural perils such as fire, flood, lightning and electrocution. It normally excludes death due to diseases, specifically epidemics.

Availability of livestock insurance by region

Region	Number of countries	Accident and mortality	Epidemic disease	Mortality index	Other livestock insurance
Africa	8	88	50	0	13
Asia	12	58	42	8	17
Europe	22	82	50	0	14
Latin America	19	53	21	0	0
North America	2	100	0	0	0
Oceania	2	50	50	0	0
All countries	65	69	38	2	9

Source: World Bank survey 2008

AGRICULTURAL INSURANCE SYSTEMS OF THE WORLD

Presently, the following types of agriculture insurance systems exist in the world:

Single-risk insurance: Covers against one peril or risk, e.g. hail.

Combined (peril) insurance: A combination of several risks covered (two or more risks, mostly with cover against hail being the basic cover). In some countries, this type of insurance is also referred to as multi-risk insurance.

Yield insurance: Includes yield guarantee, based on regional average yield or on individual historic yield, where the main risks affecting yield (e.g. drought) are covered. In some countries (e.g. US) this type is also called combined or multi-peril insurance.

Revenue insurance: Combines yield- and price-risks coverage in a single insurance product. It can be product-specific or whole-farm.

Income insurance: Covers income, so it covers yield and price risks, but the costs of production are also considered. Usually, this type of insurance is not product-specific, but whole-farm income.

Whole-farm insurance: Consists of a combination of guarantees for different agricultural productions in a farm. Depending on the coverage of the guarantees, it can be whole-farm yield, revenue or income insurance.

Area yield index insurance: Indemnities are computed from the decrease in the average yield in an area.

Area revenue index insurance: Indemnities are computed from the decrease in the production of the average yields and prices in an area.

Indirect index insurance: Reports to those indices of yields or vegetation that are computed from weather-based indices, satellite images etc.

Stabilization accounts: A form of self-insurance. They consist of individual accounts where farmers put a certain amount of money every year which they can withdraw in a year of big losses. Stabilization accounts can be based on yield, revenue or other indices.¹²

Agricultural insurance and disaster risk management

The World Bank points out that financial protection in the form of disaster risk financing and insurance is not isolated and forms part of a larger disaster risk management framework. It sits at the nexus of four major policy practices:

- Disaster risk management, with regard to building resilience.
- Public financial management, in terms of how it addresses the impact of shocks on public finances.
- Financial sector development, regarding how it builds a strong financial sector for risk transfer.
- Social protection, in terms of how it supports contingent financing to reach the poorest.^{13,14}

PART 2

Agriculture insurance in Africa and Asia

The following section studies and explores the state of agricultural insurance and other disaster risk management tools in a few countries of Asia and Africa to establish how deep agricultural insurance has penetrated into the disaster risk management frameworks of the countries in question, understand the approaches used for such insurances and identify the challenges involved.

Since developing countries are most vulnerable to climate change related impacts in the form of extreme weather events, including floods, droughts, torrential rains etc., the regions of Africa and Asia become the focal point of any study to explore the mechanism of managing and coping with losses and damage due to climate extremes—agriculture insurance being one of the ways.

The case studies presented here highlight the new focus on adaptation in developing countries. Together they present a wide array of the development stages of agriculture insurance.

ETHIOPIA

Key information

- Ranks 23rd in the world for mortality risk from multiple hazards, with approximately 70 per cent of its population at risk.¹⁵
- Over 60 million people have been affected by droughts since 1980, floods are the second major challenge. Two million people are affected by them. It is also a zone of high seismic activity.
- Agriculture contributes 48 per cent of the country's GDP; 82 per cent of the population is rural-based.¹⁶
- Only 0.5 per cent of agricultural land is irrigated.
- Ministry of Agriculture holds the primary public financial responsibility for disaster relief, response and reconstruction.
- There is currently no national disaster risk financing strategy.
- Disaster Risk Management and Food Security Sector (DRMFSS) is the nodal agency responsible for disaster risk reduction and financing.

Disaster risk management in Ethiopia

The Ministry of Agriculture and Rural Development's DRMFSS is the primary agency responsible for disaster risk management in Ethiopia. The government has drafted a new National Policy on Disaster Risk Management (NPDRM) in 2009 for an integrated, multi-sectoral approach in the context of broader sustainable development efforts in Ethiopia. The policy was put in place in 2013 and includes disaster risk financing and insurance activities.

Financing disaster management (ex-ante and ex-post)

Basically, two approaches exist to finance disasters management:

Ex-ante financial management of natural disasters

- The National Disaster Prevention and Preparedness Fund (NDPPF) is a financial reserve for immediate disaster response and for funding of emergency employment schemes to support food security. It provides interest free loans and grants to government ministries and NGOs. Raised with an approximately US \$14.74 million initial funding in 2002 by the Ethiopian and Irish governments, substantial progress has been made towards raising more money. The government has allocated US \$8.3 million, and US \$287,400 has been secured from other donors. Currently, funds available for loans are US \$13,269,455.¹⁷
- There is also a regional Disaster Early Response (DER) Fund under Ethiopia's Pastoral Community Development Project which currently stands at a meager US \$4.1million
- The country also started the Public Safety Net Programme (PSNP) in 2005 which is one of the largest food security programmes in sub-Saharan Africa, covering 7.57 million people in 290 of the country's 710 districts. The funds from this programme are also used for disaster risk financing. Some 8.3 million people benefitted from the PSNP by 2015.¹⁸ Ten development partners, including Department for International Development (DFID), World Bank etc. have provided US \$2.3 billion for the third phase of the implementation (2011-15).

- A contingent financing window of US \$25 million as a pilot project was put in place in 2007 under the PSNP, which could be used when funds at district and regional level provided by the PSNP were exhausted.

The window was triggered for the first time on August 2011 due to crop failure and high livestock mortality. The PSNP federal-level contingent financing window was budgeted at US \$160 million for five years, it actually stood at US \$155.4 million. The contingent fund was not very effective following the Horn of Africa drought in 2011, as a lot of time was spent on contingency planning for the release of funds. However, it is still a significant mechanism to respond to humanitarian crises in Ethiopia.¹⁹

- Further, a risk financing mechanism is being established through the LEAP (Livelihoods, Early Assessment and Protection) index, supported by the World Food Program and the World Bank. The LEAP index is intended to harmonize key components of a risk management framework designed to translate early warning information into early emergency response.²⁰

The new NPDRM policy mentions that these reserves would be required for all districts, those under the PSNP and outside it, and accessible for all types of natural disasters. Additionally, the DRMFSS's Strategic Programme and Investment Framework includes the establishment of a reformed national contingency fund for disasters and the study of the establishment of a national insurance programme.²¹ However, these are yet to be established.

Ex-post financial management of natural disasters

Ethiopia heavily depends on international aid to mitigate its losses and damage due to natural disasters. The Ethiopian government has also mobilized financial resources following disasters through budget reallocation, deficit financing and collection of donations from the Ethiopian public (domestic and the diaspora) and the diplomatic community in Ethiopia. A good example of such mobilization was following the massive drought of 2011. However, this has been more of a response measure.

The technical and financial capacity of the domestic private insurance market to underwrite catastrophic risk is extremely limited, at less than US \$5 million.

Agricultural insurance

Very little agriculture insurance exists in Ethiopia. Domestic insurers largely lack access to rural areas and the technical capacity to underwrite agricultural risks. Nyala Insurance Company (NISCO) is the lead company in developing agricultural insurance products for the low-income market. NISCO has developed two innovative insurance products: Double Trigger Multi-peril Crop Insurance in 2007 and Weather Index Crop Insurance (WICI) in 2009.²²

The policy has an intention of indemnifying farmers at times of loss in crop yield caused by a wide range of natural and man-made perils including variability in rainfall, fire and transit risks. Claim payments are effected when an area records unusual rainfall accompanied by loss of crop yield.

In 2009, NISCO introduced WICI to insure small-holding poor farmers (with an average holding of 0.5 hectare) against droughts. For weather index insurance products, losses are assessed based on the measurement of a certain weather parameter (e.g., rainfall, temperature, etc.) according to an agreed payout scale that is assumed to proxy actual losses. Indemnity insurance products, on the other hand, rely on loss assessments at individual farmer or herder level to determine when and at what level an insured farmer will receive a payout.²³ Some pilot projects have been undertaken but nothing substantial has been achieved at the national level.

Two kinds of insurances exist within the agriculture sector in Ethiopia, though only as pilot projects—level weather index insurance and indemnity insurance. Table below shows various pilot projects related to agriculture insurance.

Latest developments

In 2012, the International Livestock Research Institute (ILRI) started an index-based livestock insurance project in Borana region of Ethiopia.²⁴ It is funded by United States Agency for International Development (USAID) and two Consortium of International Agricultural Research Centers (CGIAR) research programmes on climate change, agriculture and food security (CCAFS).²⁵ In the case of the index-based livestock insurance (IBLI) project, satellite-based measurements of the forage quality in a given area are used as an efficient indicator of the condition of the livestock living there. If forage quality falls below a certain level, the insurance policy will pay out to policyholders. Over the past three years, roughly over 2,500 policies have been sold.²⁶

In 2016, The Public Financial Enterprises Agency of Ethiopia, Ethiopian Insurance Corporation, Agricultural Transformation Agency, Kifiya Financial Technology, National Metrology Agency and ITC University of Twente (the Netherlands) launched a new crop insurance called Normalized Difference

Pilot projects related to agriculture insurance

	Weather index insurance	Indemnity insurance
Crop	<ul style="list-style-type: none"> • 2006 World Bank/EIC for maize in Alaba woreda • 2009 NISCO/WFP/Lume-Adama Farmers' Cooperative/MoARD/NMA /Swiss Re for haricot beans in Bofa (Boset woreda) • 2009-present HARITA Program of Oxfam America and consortium of partners in Tigray Region • 2010-present International Food Policy Research Institute and consortium of partners for bundle of prevalent crops in SNNPR and Oromia regions 	<ul style="list-style-type: none"> • 2008-2009 NISCO multi-peril crop insurance (MPCI) for teff, wheat, lentil, haricot beans, and chickpeas in Oromia Region
Livestock	<ul style="list-style-type: none"> • 2010 International Livestock Research Institute begins preparations to expand index-based livestock insurance pilot in Kenya to Ethiopia; not yet implemented 	<ul style="list-style-type: none"> • <i>Planned for 2012</i> World Bank/Association for Ethiopian Microfinance Institutions pilot of high-value livestock insurance, based on feasibility study completed in 2011

Source: Disaster Risk Financing and Insurance Programme- Ethiopia, 2013

Vegetation Index (NDVI) that intends to cover 15 million small-holder farmers in five years against weather related risks. NDVI's crop insurance is applied based on the inputs the small-holder farmers spent to produce their crops. The farmers are expected to pay a risk premium of around 10 per cent of the total cost of the inputs such as fertilizer, basic seeds, herbicides and pesticides they use to producing crops. Upon the loss of crops, the farmers get their entire investment on inputs.²⁷

Disaster micro-insurance

Iddir, informal burial societies, provide micro-insurance for agriculture and insurance and are expected to play a crucial role in the development of micro-insurance market, which is extremely underdeveloped in the country currently.

Challenges

- The agricultural sector, which represents nearly half of Ethiopia's GDP, is primarily comprised of subsistence farmers and herders located in rural areas, where traditional insurers lack distribution networks.
- Information on the financial impacts of natural disasters in Ethiopia remains limited. There does not appear to be any systematic data gathering on the financial impacts of natural disasters. The primary application of disaster-related data collected in Ethiopia is in early warning systems which are still mentioned only as objectives of NPDRM.
- There is no centralized catalogue of data and government agencies which collect data related to disasters are National Meteorological Agency, Central Statistics Agency of the Ministry of Finance and Economy Development, and Hydrological Department of Ministry of Water and Energy.
- Insurers understand the market opportunity in agricultural insurance, but remain uncertain on how to access markets and to assess and price the risk.
- More research needs to be conducted on the efficiency of weather index insurance schemes. Because the satellites that track rainfall levels are not always reliable, there can be gaps in the data.

HORN OF AFRICA RISK TRANSFER FOR ADAPTATION (HARITA) PROGRAMME

This programme, led by Oxfam America, started a new scheme of insurance-for-work for farmers who could offer labour instead of cash for premiums in the village of Adi Ha, located in the Tigray region. It is a pilot program to address the needs of small-scale farmers through drought insurance, credit and risk reduction.²⁸ In 2009, the take-up rate for the weather index insurance was 20 per cent, with 200 farmers participating in the pilot and 65 per cent of farmers paid in labour. In subsequent years, the programme expanded to more villages. In 2011, the programme expanded to 43 villages in the Tigray region, with more than 18,000 farmers buying policies and 90 per cent choosing labour over cash. The insurance was paid out for the first time in 2011 with 1,800 farmers being paid less than US \$10 each. A total of 18,959 farmers from 76 villages purchased insurance for the 2012 agricultural season.²⁹ Swiss Re is the sole re-insurer in this programme.

MALI

Key information

- The country has a high poverty rate with a Human Development Index score of 0.419.³⁰
- 1.8 million people were food insecure at the end of 2015 and over 300,000 people will need emergency food assistance during 2016's lean season.³¹
- Agriculture sector makes up 42 per cent of the GDP and accounts for 60–70 per cent of all employment.³²
- Farmers grow subsistence crops and cotton. Cotton is often their only sources of cash. These crops are mostly rain-fed and, therefore, vulnerable to climatic variations.³³
- Agriculture sector is held up by heavy government subsidization of inputs that has replaced the demand for credit.³⁴
- Due to disaster risks and drought prone conditions, agricultural insurance has been a difficult business proposition.³⁵
- Climate-related insurance for farmers is being trialed in Mali, but so far on a small scale.
- A national fund for agricultural risks is yet to come up.³⁶
- Index insurance is available mostly for the maize crop.
- Agriculture insurance is not available for even large farms, unlike in some other African countries.

Disaster risk management

In 27 years (1980–2007) droughts, floods and epidemics affected nearly three million people and killed about 3,300 people in Mali. The coordinating body for disaster and risk prevention and management interventions is called Directorate General of Civil Protection (DGPC). DGPC follows the National Civil Protection Policy and leads relief and rehabilitation efforts after disasters.

Mali's disaster and risk management financing mechanism is underdeveloped. The Agricultural Orientation law provides for the establishment of a National Fund for Agricultural Development, amounting to about CFAF7 billion, part of this is supposed to be used for disaster management, but the fund has not yet been operationalized. Besides specific federal relief funds, funds for disaster management are supposed to come from state budgets by reallocating or creating new budget lines. Ministries and municipalities also have funds that can be allocated for relief needs.

Mali has a high number of donor engagements on disaster management. The main actors include the World Bank, Global Facility for Disaster Risk Reduction (GFDRR), United Nations Development Programme, Danish International Development Agency (DANIDA) and German Agency for Technical Cooperation (GTZ), all of whom have committed millions of dollars to disaster mitigation and response in Mali.

In 2006, the Framework Law on Agriculture was passed, which delineates the modernization of farming as a voluntary, state goal, despite a lack of fiscal resources at this level of governance. The plan also advocates the privatization

of the agriculture sector. The National Plan for Investment in the Agriculture Sector was passed in 2011, in an effort to strategically channel agriculture investment and align Mali's domestic efforts with the efforts of various donors. Agricultural insurance has not been a focus of any of these plans.³⁷

Mali is a member of the Conference Inter-africaine des Marchés d'Assurances (CIMA). The 14 member countries of CIMA share the same insurance legislation and supervision since 1992.³⁸

Agricultural insurance

There are no national agricultural insurance schemes or domestic companies that offer insurance. Instead, agricultural inputs are subsidized to the extent that the demands for credit and insurance are low. Most of the rural finance is received through informal networks and federations like Kondo Jigima and Coordination Nationale des Organisations Paysannes du Mali which is the national coordination for peasants' organizations.

Agriculture index insurance has been piloted in Mali for some time, with mixed experience.

PlaNNet Guarantee (an internationally-experienced micro-insurance facilitator and the project manager for index insurance in Mali), first sold insurance products in 2011 against maize crops, in partnership with Allianz: Swiss Re, Africa Re, Cica Re while the Delivery Channels: Cooperatives were the micro-financial institutions (MFIs). Roughly, 14,000 farmers were insured in 2014.³⁹

A second product was also launched in 2011, which was satellite-based index insurance for maize and cotton in partnership with Allianz. 17,481 policies of this product were sold in 2014.⁴⁰ A third product is also being implemented by PlanNet Guarantee for maize.⁴¹

In addition to the pilot projects by insurance practitioners, there have also been feasibility studies and experiments by researchers dedicated to agricultural insurance in Mali.

- International Labour Organization's Micro-insurance Innovation Facility to produce a report on the possibilities of micro-insurance for cotton farmers in Mali was funded PlanNet Guarantee.
- USAID and Save the Children commissioned a study in 2009 on the feasibility of index-based weather risk transfer in Mali from Global Ag Risk Inc.
- In 2011, USAID supported Index Insurance Innovation Initiative, which resulted in the proposal of a double trigger—a unique and very innovative way to address basis risk—and made specific policy proposals.

However, the inputs from these proposals are yet to be taken into account by the government of Nigeria.

A UNIQUE AGRICULTURE FINANCE AND INSURANCE PROJECT

The project “Financement agricole et rural au Mali” of Développement international Desjardins (DiD) and Financière agricole du Québec—Développement international (FADQDI) has also started in Mali with funding from Canada. This has the potential to be transformative to agriculture finance and also to agriculture insurance, where it can provide another powerful proof of the concept to further attract commercial interest.

Under this project, rice, maize, potatoes, millet, sorghum and vegetables are the focal crops, while the areas include Koulikoro, Sikasso, Segou and peri-urban Bamako.⁴² The impacts of this project are yet to be seen. Mali is also involved in a small pilot project in agricultural leasing (e.g. milling equipment, water pumps, small tractors and tools), mainly by MFIs, though it is at an extremely primitive stage.⁴³

Challenges

- The principal obstacle to providing agriculture insurance is information asymmetry. Insurers do not have much knowledge about crops and data about losses.
- One obstacle to the growth of agriculture insurance is that it is expensive. Depending on circumstances, it can cost 10 per cent or more of the sum insured (that is, the maximal expected payout amounts), compared to less than 1 per cent for life insurance, for example.
- The relatively high tax rate of 20 per cent on agriculture insurance in Mali is a particular obstacle to affordability—and thus to scale and sustainability.⁴⁴
- Micro-finance is currently experiencing alarming default rates and some of these organizations have collapsed. Nevertheless, some large cooperative networks, such as Kondo Jigima, have been at the forefront of developing value chain financing for small-holder farmers.⁴⁵

MOZAMBIQUE

Key information

- Agriculture employs 80 per cent of the country's workforce and generates 29 per cent of its GDP.⁴⁶
- Mozambique ranks third among African nations most threatened by weather hazards.
- Insurance penetration is extremely low.
- Since 1990, Mozambique has been hit by natural catastrophes potentially relevant for agricultural insurance 26 times, out of which only three were insured.
- 88 per cent of Mozambique's arable land is still uncultivated, agriculture itself is highly undeveloped.
- More than 90 per cent of crop losses are due to deficient rainfall.
- Maputo City, Gaza, Zambezia and Inhambane provinces were affected the most by floods of 2013; loss of 110,000 hectares of cultivated agricultural land.
- The drought of 2016 affected 59,000 farmers,⁴⁷ funding gap to assist drought-hit farmers is US \$179.6 million.⁴⁸
- Mozambique is heavily dependent on foreign aid, with one of the highest aid to gross national income ratios in sub-Saharan Africa at 20.8 per cent;⁴⁹ foreign aid accounted for 46 per cent of the state budget in 2010.⁵⁰
- Annual crop losses are approximately 5.4 per cent in yield with each °C increase in average temperature. The overall projected reduction for maize between 2040–65 is approximately 11 per cent of the present yield.⁵¹

The National Institute for Disasters Management (INGC) was founded in 1999 and operates under the Ministry of State Administration with a mandate to coordinate emergencies, promote disaster prevention through population and government mobilization, protect human lives, ensure multi-sectoral coordination in disaster emergency, coordinate early warning systems, carry out public awareness, and reutilize arid and semi-arid zones. It is responsible for coordinating disaster risk management at the national, provincial and district levels.⁵² Mozambique also has the Sustainable Development Council on the one hand, for climate change and the environment, and the Coordinating Council for Disaster Management (CCGC) on the other hand, for climate change and disaster risk. It shows that institutions are in place but suffer from deficits in terms of capacity and coordination.⁵³

In 2013, flooding affected over 18,000 people throughout the country.⁵⁴ The government, in its initial response and recovery proposal, sought US \$30.6 million from the international community including UN agencies, NGOs etc. However, only US \$4.3 million were received.⁵⁵ In 2016, there has been another massive flood and the government has issued a "red alert" in June 2016.⁵⁶

Latest developments

- German-Brazilian-Mozambican Triangular Cooperation Programme: Mozambique has partnered with Brazil and Germany to increase its resilience and risk preparedness. The most important results achieved so far are the installation of automatic climatological and hydrological

stations, the establishment of a hydrometeorological database and technical training courses for engineers of the Mozambican National Institute for disaster Management in the fields of weather observation, maritime rapid alert systems, disaster management etc. The contribution from Germany has been €1.7 million from 2011–14.⁵⁷

- INGC developed a national strategy on disaster risk reduction, approved by CCGC, in June 2012.⁵⁸ The budget required to implement the national strategy on disaster risk reduction and climate change adaptation over the first five years (2012–16) of its 25-year lifespan is in the order of US \$324 million which comprises (i) disaster risk preparedness, (ii) capacity-building and institutional coordination, (iii) planning, budgeting and financing, (iv) communication and information, and (v) building resilience in partnership with the private sector.

Agricultural insurance

- At an estimated 0.69 per cent of the GDP, the Mozambican non-life insurance market is less developed than the African average (1.11 per cent of the GDP) and considerably below the more developed African markets.⁵⁹
- In late 2012, two pilot projects were started—the insurance products were designed and developed by Guy Carpenter Company limited, in conjunction with the Asia Risk Centre Inc.
- The weather index-based insurance products cover two crops—maize and cotton. Maize farmers in the district of Chimoio and cotton farmers in the districts of Lalaua and Monapo.
- As a result, 43,000 cotton farmers and a handful of maize farmers were insured in 2012–13; a total of 43,500 policies were sold.⁶⁰
- In future, the Cotton Institute of Mozambique plans to expand index insurance coverage to all cotton farmers in Mozambique—approximately 200,000 farmers.⁶¹

Disaster funding

Government spending on disasters takes a number of forms including ex-ante and ex-post budgetary provisions for disaster response, recovery and reconstruction and temporary tax suspensions and subsidized access to credit to promote recovery post-disaster.

- A National Contingency Plan is prepared annually to estimate annual spending needs for disaster response and early recovery based on population exposure, historical activity and seasonal meteorological forecasts. Development of this plan is led by National Institute for Disaster management.⁶²
- Since 2008, the government has made around US \$3.5–4 million available for the implementation of the contingency plan as an initial fixed amount.⁶³
- The Ministry of Planning and Finance withholds 10 per cent of each sector and local government budget as a central reserve provision for unforeseen expenditure, such as disaster losses.
- A national productive safety-net scheme is also under consideration, which could reduce the burden of post-disaster response execution on the Central government. This would take the form of a National Programme for Productive Social Action.

Challenges

- Disaster micro-insurance is not yet available in Mozambique
- Currently, no major insurance player has a real presence in Mozambique. The opportunity in Mozambique for insurance companies compared to the lack of understanding and uncertainty makes working in the country a difficult proposition.⁶⁴
- Poor funding of the National Institute for Disaster Management restricts the agency's ability to execute its full disaster risk management mandate. Regulatory mechanism is also weak.
- The lack of data regarding historical exposure and crop yield is one of the biggest challenges since it increases uncertainty surrounding product design and associated basis of risk. There is also a need to understand farmers' needs.
- Weather index-insurance has its limitations as it covers only weather-related perils. Additionally, there is a need to develop weather infrastructure, which is initially expensive.
- The impacts of disaster events are multiplied by limitations in the agricultural supply chain. Producers experience difficulties in storage, processing, marketing and transporting surpluses.

NIGERIA

Key information

- About 70 per cent of Nigerians are employed in the agriculture sector, which makes up more than 40 per cent of gross domestic product.⁶⁵ Small farms account for 80 per cent of food produced in the sector.⁶⁶
- Nigeria is prone to natural disasters, prime being floods and droughts.
- Before the country's civil war and oil boom, Nigeria was self-sufficient in its food supply. Development in the oil sector slowed progress in the agriculture sector and Nigeria now relies on imports to sustain itself.⁶⁷
- Nigeria is one of the world's fastest growing and largest economies. The 2016 GDP is US \$484.895 billion, up from US \$92.81 billion in 1960.⁶⁸ Despite this growth, absolute poverty is rising—100 million people live on less than US \$1.25 a day.⁶⁹ The country has a Human Development Index score of 0.514, ranking 152 among 188 countries.⁷⁰
- 3.5 million Nigerians are experiencing crisis-level food insecurity and require urgent food assistance.⁷¹ In 2013, Nigeria was seventh in the world for the amount of official development assistance (ODA) received, at about US \$2.5 billion.⁷²
- Access to formal financial services is limited. Only about a third of the population has formal banking accounts.⁷³ This is reflected in the agricultural insurance market. Market penetration is low and insurance remains a costly venture for both companies and consumers.
- Ongoing Boko Haram attacks continue to displace millions in Northeastern Nigeria⁷⁴
- Transparency International ranks the country 136th out of 175 countries due to high levels of corruption. The World Bank's 2015 *Doing Business Survey* ranked Nigeria 170th out of 189 countries for high levels of bureaucratic red-tapism.⁷⁵
- In 2015, US \$137,172,928 were provided by USAID to deal with the crisis of insurgency.⁷⁶
- The National Insurance Commission (NAICOM) regulates the Nigerian insurance industry.⁷⁷

Floods are by far the most common and detrimental natural hazard in Nigeria. From 1990 to 2014, floods accounted for 88.3 per cent of the number of and 99.8 per cent of the economic losses due to natural disasters.⁷⁸ The most recent and devastating of these events occurred in 2012, displacing 1.3 million and claiming 431 lives nationwide.⁷⁹ Rates of the rise in sea level, soil erosion and flooding are predicted to increase with climate change.⁸⁰

Disaster risk management in Nigeria

The National Emergency Management Agency, established in 1999, leads Nigeria's national disaster response and has been tackling disaster related issues. Additionally, Nigeria also has State Emergency Management Agencies and Local Emergency Management Authorities.⁸¹ The National Policy on Disaster Management, which came out in 2012, has a multi-sectoral approach to disaster management.

Additionally, there is a National Disaster Response Plan, but implementation of its policies has been weak and uncoordinated. Audits and reviews of the response to the 2012 floods revealed barriers to efficient disaster risk management in Nigeria. Federally funded efforts were delayed and an excess number of distribution streams lead to leakages. A significant amount of promised relief never materialized.⁸²

In 2013, Nigeria stood seventh in the world for amount of ODA received, about US \$2.5 billion. Thus, a significant portion of its disaster relief-related funds come from outside sources. For example, after the 2012 floods, the federal government provided about N17.6 billion in relief funds while the Canadian government donated US \$50,000, European Commission gave US \$9.4 million, Government of Japan donated US \$649,270, Government of Norway gave US \$30,000 and the Government of Sweden provided US \$490,000.⁸³

Agricultural insurance in Nigeria

Nigeria's agricultural sector is under-financed and under-performing. Agricultural lending accounts for only 2 per cent of the total lending of banks in Nigeria.⁸⁴

The Nigeria Agricultural Insurance Corporation (NAIC) is the primary insurance providing agency. Private companies have only emerged in the last three–five years.

The perils covered under crop insurance are fires, lightning, windstorms, floods, droughts, pests and diseases while the perils covered under livestock insurance include accidents, diseases, fires, storms and floods. Crop insurance packages cover 17 crops including maize, rice, cassava, yam and sorghum. Livestock insurance packages cover 14 types of livestock including cattle, poultry, pigs, rabbits and sheep.⁸⁵ In May 2013, NAIC paid over N500 million in claims to insured farmers who had suffered losses in the floods in 2012. More recently, NAIC paid N80 million in compensation to a sugar farm in Adamawa state following natural disasters.⁸⁶

The most notable agricultural insurance policy is the linking of NAIS to the Agricultural Credit Guarantee Fund Scheme operated by the Central Bank of Nigeria (CBN). It is mandatory for farmers with loans to obtain insurance under NAIS.⁸⁷ The mandatory cover also applies to all agricultural and agro-related projects which are assisted, supported or fully funded by public funds and all Bank of Agriculture or the Nigerian Agricultural Cooperative and Rural Development Bank loan schemes.^{88, 89}

Among the private insurance companies, Industrial and General Insurance Plc. is the foremost private insurance company licensed by NAICOM to underwrite agricultural investments. However, it has less than 1 per cent of the total share of agricultural insurance in Nigeria.

The current indemnity-based insurance policies in the country are:

1. Poultry Insurance Policy
2. Fish Farming Insurance Policy
3. Livestock or Bloodstock Insurance Policy

Each of the following animal insurance policies indemnifies against death due to diseases and accident of any sort:

4. Multi-crop Peril Insurance Policy
5. Plantation fire Insurance Policy⁹⁰

Unlike its neighboring countries, there have been no successful efforts to pilot micro-insurance programmes for agriculture through outside insurance companies. This is likely because agencies like the World Bank, DFID and USAID have other priorities in the country, and because of the historical dominance of NAIC as the one agricultural insurance distributor.

Recent developments

- In 2011, a feasibility study was conducted for index-insurance and awareness raising which recommended investigating possible applications of remote-sensing for the development of Normalized Difference Vegetation Index (NDVI) products, just like it is being developed in Ethiopia at the meso- and macro-level in the northern arid and semi-arid areas.⁹¹
- In 2015, NAIC got approval for US \$5 million from Minister of Agriculture and Rural Development. About 15 million farmers are expected to get the products in the next three years.⁹² The government is also supporting the development of weather index insurance products for farmers.

OTHER PROGRAMMES INITIATED BY FEDERAL MINISTRY OF AGRICULTURE AND RURAL DEVELOPMENT

The Nigeria Incentive-based Risk-sharing System for Agricultural Lending

CBN, in August 2010, engaged the Alliance for Green Revolution in Africa to develop the Nigeria Incentive-based Risk-sharing System for Agricultural Lending (NIRSAL). This is a mechanism aimed at de-risking lending to the agriculture sector. The goal of NIRSAL is to trigger an agricultural industrialization process through increased production and processing of the greater part of what is produced to boost economic earnings across the value chain.⁹³

The Rural Finance Institution Building Programme

The Rural Finance Institution Building Programme (RUFIN) is a loan agreement of US \$27.2 million between the International Fund for Agricultural Development and the Federal government of Nigeria. The central objective of the programme is to develop and strengthen micro-finance banks, other member-based MFIs, with a view to expand and improve agricultural productivity and micro-small rural enterprises.

The Ministry also intends to transform the Agricultural Research Council to a National Agricultural Transformation Agency.

Disaster related funds

The National Policy on Disaster Management of 2012 directs the Federal, state and local governments to ensure that they fund their disaster management agencies for the purpose of providing effective and efficient disaster management from:

- Funds allocated to them from the Federation account.
- 20 per cent of their shares from the ecological fund.
- Such money as may from time to time be granted or received from private sector and donors.⁹⁴

However, this is yet to be operationalized.

- In the aftermath of the disastrous 2012 flood, the Federal government established a Presidential Committee on Flood Relief and Rehabilitation and released a sum of N17.6 billion for disbursement to the affected states and relevant Federal agencies.⁹⁵ Thus, most of the funds related to disaster relief are ad hoc in nature.

Challenges

- Very few farmers in Nigeria have agricultural insurance or access to credit.⁹⁶ Most of those who have insurance have larger, non-subsistence farms. One of the reasons for this abysmal rate of participation is lack of awareness. Farmers are also skeptical about the benefits of the insurance schemes and the problems they might face in settling claims.⁹⁷
- There is low institutional capacity for disaster management in the country.
- There are problems with data collection to assess crop losses and provide insurance.
- Ecological fund for addressing environmental problems exists in Nigeria but is fraught with huge corruption charges.⁹⁸

Tanzania

Key information

- Tanzania is an East African country with a population of 47.78 million (2012) and a national GDP of US \$28.24 billion.
- Agriculture is the largest sector of the economy in Tanzania. The majority of the population (about 75 per cent) lives in the rural areas where their livelihoods depend on agriculture either directly or indirectly.
- Agriculture provides a livelihood to about 80 per cent of Tanzanians, with the sector being dominated by small-holder farmers cultivating an average farm size between 0.9 and 3.0 hectares.
- Agriculture contributes actively to the GDP at 26.8 per cent.
- With agriculture contributing significantly to the country's economy and 38 per cent of adults reporting hunger due to droughts as their third biggest risk, the value of having an agricultural insurance product is evident.

Disaster Management Act, 2014

Disaster management has been institutionalized only recently in Tanzania. The Disaster Management Act, 2014 sets out a comprehensive legal framework for disaster risk management. It provides for the establishment of the Disaster Management Agency for disaster risk management; the National Disaster Management Plan, a coordination mechanism for disaster prevention, mitigation, preparedness, response and recovery; establishment and management of a Disaster Management Fund; and to provide for other related matters.⁹⁹

Agricultural insurance

- With the exception of some pilot projects, agricultural insurance for small-holder farmers is absent from the market.
- Tanzanian government is planning to draw up an insurance strategy on agriculture; as of now, no state agriculture insurance policy exists.
- The absence of agriculture insurance is in spite of 38 per cent of adults reporting hunger due to droughts as the third biggest risk they face, after the risk of having to be admitted to a hospital for medical care.¹⁰⁰
- Potential agriculture insurance schemes can be introduced for maize, coffee, sunflower, sorghum, rice, tobacco, cotton and dairy livestock.^{101, 102}

Livestock insurance

The National Insurance Corporation launched a product on livestock insurance in 1996 designed to cover a select few diseases. It targeted only zero-grazing livestock keepers. This led to the failure of the programme as a majority of livestock herders were migratory pastoralists. Dairy insurance products from local insurance companies currently exist on the market, but they have had limited uptake because of the requirement of vaccines written into them. Access to vaccines is very difficult, so many farmers do not see the value in these insurance products.¹⁰³

Challenges in agriculture insurance

- Even though the insurance sector in general is expanding, agricultural insurance is only at the pilot project stage.
- There is lack of awareness about insurance among the uninsured population. Of this population, 60 per cent indicate that they do not have insurance because they cannot afford it, 24 per cent do not know how insurance works, 18 per cent do not know how to find out where to buy it and 14 per cent do not know what insurance means.
- There is a lack of funds available to the government to support agriculture insurance.

Kenya

Key information

- Kenya's geographical spread covers the savannah lands, comprising of arid and semi-arid areas, the coastal margins, the rift valley, the Highland valley, and the Lake Victoria basin.¹⁰⁴ The country is affected by a wide range of natural disasters, including droughts, floods, storms and landslides.
- Nearly 70 per cent of the districts in the country fall under the dry category and are impacted by droughts.¹⁰⁵
- In January 2014, the government of Kenya declared a drought, which impacted an estimated 1.6 million people. The impact of the drought continued in 2015, affecting the pastoral and marginal agricultural zones—North, Northwestern, Northeastern, Southeastern and some coastal areas—as food availability and livestock productivity declined.¹⁰⁶
- Decline in yield is a cause of concern, as agriculture forms the backbone of Kenyan economy. Agriculture contributes about 24 per cent of the GDP and approximately 45 per cent government revenue.
- More than 60 per cent of the Kenyan population depends on agriculture for their living.¹⁰⁷ The agriculture system in the country is primarily divided into rain-fed and irrigated agriculture, with more than 70 per cent agriculture being rain-fed.¹⁰⁸ Since agriculture is highly dependent on sufficient rainfall, Kenya's GDP is, therefore, sensitive to variations in climate as well.
- The government of Kenya is estimated to have spent more than US \$69.4 million (KSh7 billion approximately) per year for disaster relief from 2005 to 2011.¹⁰⁹

Disaster policy

Most of the disaster response initiatives in Kenya have tended to be ad hoc, uncoordinated and short-term measures mainly in the form of emergency relief services to the worst affected areas.¹¹⁰

The National Risk Reduction Policy, 2009 is the principle document which outlines the “guiding principles and architecture for disaster management in Kenya”. It provides an overarching legal and institutional framework for decision making and coordination across disaster management sectors and actors, which include the ministries, civil society organizations, private sector and international organizations.

The policy specifies that floods, droughts and pest attacks do not result in a disaster on their own, instead it is the “inability of the population to cope with the hazards that transforms them into a disaster”. The policy is designed to work as a basis to establish mechanism to increase the resilience of the Kenyan population.

The policy also mentions resource mobilization through the National Disaster Management Fund, used to facilitate funds aimed at disaster response and management, with 2 percent of the public budget attributed to it. In the event of a weather-related disaster such as a drought, the government mobilizes resources to provide relief to those affected. The expenses incurred for ex-post

CATASTROPHE FUND: SCENARIO

Africa Risk Capacity initiative

The Kenyan government is still weighing its options on whether to set up catastrophe funds or transfer weather risks to insurance and capital markets. In the meanwhile, the African Risk Capacity (ARC), an agency of the African Union, has launched the first African catastrophe insurance pool in May 2014.¹¹¹ ARC agency aims to help member states become more resilient to extreme weather events and protect food insecure population vulnerable to climate change. This catastrophe insurance has been launched under the specialist hybrid mutual insurance company—ARC Insurance Company Limited (ARC Ltd)—and is capacitated to issue policies to a group of African governments. Kenya is part of this scheme, along with 21 other countries. Germany and United Kingdom had contributed to initial capital and were the founding members of the scheme. But the fund pool has expanded to include other donor governments and organizations.

Under the ARC insurance programme, the participating countries pay premiums into the insurance pool and when disaster strikes, ARC Ltd makes a payout after assessing the weather data (through the Africa Risk View Software—a tool used for quantifying and monitoring weather related data).¹¹² Kenya had taken an insurance policy from ARC Ltd for the drought of 2015–16.¹¹³

support are paid. The losses incurred are provided for through the government budget by curbing funds available for other purposes.

The government has recently come out with the National Drought Management Authority Act, 2016.¹¹⁴ Prior to this, there were a series of short-term project-based interventions which were carried out during the drought period.

Domestic insurance scenario

Agricultural insurance has begun to surface very recently as a more regional presence. The challenge in case of agricultural insurance is the low skill level of human resource and qualified personnel. Few people have knowledge about specialized topics such as index-based insurance.

For many years, agricultural insurance was not available in Kenya, except for a few large commercial farmers. There had been a few government-led pilot initiatives previously, the last one being the Guaranteed Minimum Return scheme. This scheme guaranteed farmers a minimum price for their produce, insuring their produce against unavoidable failure. This scheme was loan linked, i.e. every farmer who received an agricultural loan under the scheme was obliged to purchase insurance cover against fire and other risks that could impact agricultural production. But the insurance scheme was discontinued in the 1970s due to exploitation by farmers and politicians.¹¹⁵

Agricultural insurance made a comeback in Kenya on a large scale in 2000s when insurance companies began to take interest in the market potential of

agricultural insurance. Commercialization of dairy farming created a demand for livestock insurance. In 2005, some leading insurance companies began to offer both livestock and agricultural insurance. The products available are multi-peril crop insurance and name-peril crop insurance. As the products offered require pre-emergency and pre-harvesting crop inspection as well as physical loss inspection, the administrative costs are too high for small-holder farmers.

A majority of the farmers in Kenya are small-holder, with the farm size ranging from 0.2–3 hectare. They contribute 75 per cent of the total agricultural output and 70 per cent of the marketed agricultural produce.¹¹⁶

A study conducted by Swiss Re in 2006 to assess the market potential for agricultural insurance was followed by a pilot project in 2011 of insuring 1,000 farmers in 15 districts, targeting medium and commercial farmers for traditional indemnity based, multi-peril coverage.¹¹⁷

The Kenyan government has recently come up with crop insurance to provide a financial safety cover for agricultural producers. Insurance in Kenya is governed by the Insurance Act (1984) (which was amended in 2006), and is regulated by the Insurance Regulatory Authority (IRA), but agricultural insurance continues to remain subsumed under “miscellaneous”. Since 2012, IRA has been supportive of index-based insurance products and has introduced the Kenya Micro-insurance Policy Framework for “socio-economic empowerment and risk management for low income households in Kenya”.

In March 2016, the government of Kenya came out with an agricultural insurance programme with the support of the World Bank. This programme derives from similar experiences of agriculture insurance in Mexico, India and China.

Agriculture insurance

The government of Kenya launched the Kenya National Agricultural Insurance Program (KNAIP) on 12 March 2016. The programme has been designed based on public–private partnership facilitated by the World Bank. Under this umbrella programme, there would be focus on insurance cover for maize and wheat crops and for livestock insurance.

KNAIP for maize and wheat crops is aimed to safeguard farmers from production losses due to the impact of droughts and crop diseases. The insurance programme will follow the area yield-based approach, i.e. the farming area is divided into insurance units, if the average production in one insurance unit falls below the threshold yield (based on the historical average yield for a number of years), the insured farmers within the insurance unit will receive a payout. Implementation of the programme has begun in three counties: Bungoma, Embu and Nakuru from March 2016 and there are plans to upscale it to 33 counties (out of the total 47 counties) by 2020.¹¹⁸ The agriculture insurance programme will engage statistical sampling methods, GPS tracking devices and mobile phones for collection of crop yield data.

KILIMO SALAMA: CELLPHONE NETWORK FOR AGRICULTURE INSURANCE

In 2009, Syngenta Foundation for Sustainable Agriculture (SFSA) and Syngenta East Africa Ltd started an initiative in Kenya aimed to promote agricultural development of rural poor farmers by introducing modern agricultural techniques, conservation of agriculture and improved market access. Through interactions with the farmers, SFSA realized that weather risks were perceived as the greatest risk by small-holder farmers. Based on this field research outcome SFSA, in partnership with the insurance company UAP and telecommunication provider Safaricom launched the first index-based weather insurance product—Kilimo Salama (Kiswahili for Safe Agriculture).

Kilimo Salama grew into what is called the Agriculture and Climate Risk Enterprise (ACRE). ACRE is the largest agricultural index insurance programme in sub-Saharan Africa in which the farmers pay a market premium. The programme now spans across Kenya, Rwanda and Tanzania.¹¹⁹

Kilimo Salama began as a pilot initiative in Laikipia district where 200 maize farmers insured their farm input against drought. Weather data was taken from two weather stations. Since the year witnessed a drought, all farmers received payout of either 30 per cent or 80 per cent of the insured maize seeds. In the following season (2010), around 12,000 farmers were covered through 27 weather stations with only 10 per cent farmers receiving payout within the range of 10–50 per cent.

The insurance product was channelized through an agro-dealer who acted as sales distributor. The product comes along with farm inputs, thus access to insurance is made easy. This model also reduces the marketing cost as input dealers act as agents which are tasked with providing product information. Similar is the case with livestock index-based insurance, wherein insurance was channelized through local agro-vets and agro-dealers that the farmers are familiar with.

Important features of Kilimo Salama

- **Use of weather data:** Collection and storage of weather data forms the back bone of Kilimo Salama. Rainfall measurements are used to calculate premiums and payouts, so it has to be accurate.
- **Product distribution:** Kilimo Salama is the first micro-insurance product which is distributed and implemented based on a mobile phone network. Safaricom is the largest mobile network in Kenya (covers 80 per cent of the market). It therefore provides the network to reach even small farmers. Safaricom's mobile banking system M-PESA enables transferring of premiums and payouts.

Livestock insurance

Kenya's landmass constitutes of nearly 80 per cent of arid and semi-arid areas which harbour almost half of its livestock population.¹²⁰ Droughts are the single greatest cause of livestock mortality in Northern arid and semi-arid lands. To safeguard against the negative impact of droughts—and driven by commercialization of dairy farming—the ILRI sought solutions to improve risk management for livestock farmers. In 2009, ILRI, with support from DFID in partnership with insurance company Union des Assurances De Paris (UAP) and Equity Bank, set up the first index-based weather insurance against livestock mortality for Marsabit district. The product was designed to indemnify pastoralists in case of livestock death because of lack of pasture due to drought. NDVI was the indicator of the vegetation available in the area for the livestock to consume, which was linked to livestock mortality. The index was calibrated based on the relationship between predicted livestock mortality and forage availability.

SwissRe provided the reinsurance coverage under this programme. In the first year, the insurance was purchased by 2,000 farmers in the district and the premium amount collected was KSh5 million (around US \$50,000). The following year (2011), the number of farmer enrolments slumped to 625.¹²¹

Now, the government of Kenya has announced the Kenya Livestock Insurance Programme (KLIP) to safeguard vulnerable pastoralists. Under this programme, the government will purchase drought insurance from private insurance companies for the pastoralists. Satellite data would be used to estimate the availability of pastures on the ground and if the availability of these pastures falls, payouts would be triggered.¹²² The KLIP was initiated in October 2015 for 5,000 pastoralists in Turkana and Wajir counties and is envisioned for upscale by 2017.

Malawi

Key information

- Malawi has an agro-based economy with the agricultural sector contributing over 35 per cent to the country's GDP. According to the 2008 Population and Housing Census, the country has a population of 13.1 million, of which over 80 per cent are rural-based and depend on subsistence farming as their main source of livelihood.
- Due to over-reliance on rain-fed agriculture, people's livelihoods and the economy as a whole are very vulnerable to droughts and floods, the most frequently occurring natural hazards in Malawi. From 1979 to 2010, natural disasters cumulatively affected nearly 21.7 million people and killed about 2,596 people.¹²³
- People are most vulnerable to droughts, followed by earthquakes and floods.
- Natural disasters have seriously impacted Malawi's economic development. Droughts and dry spells in Malawi cause, on an average, a 1 per cent loss of GDP annually. Most drought episodes have occurred in El Niño years, during which the country experiences rainfall deficits.¹²⁴
- The country also sustains an average 0.7 per cent loss of the annual GDP due to flooding of the lakes and overflowing of the rivers. Flooding results in sediment deposit in river channels, reservoirs and floodplains. In turn, this causes catchment degradation, loss of arable land and damage to irrigation infrastructure.
- According to a global open-source risk assessment for humanitarian crisis and disaster,¹²⁵ the vulnerability profile of Malawi stands at 5.4 on a scale of 10, with a greater lack of coping capacity scaled at 6.7.
- About 51 per cent of the country's population is poverty struck.¹²⁶
- Massive floods in January 2012 affected more than 10,000 people and caused US \$3 million worth of damage to households and infrastructure. In January 2015, heavy rains triggered significant flooding in the southern and eastern districts of the country. The districts of Nsanje and Chikwawa in the south and Phalombe and Zomba in the east experienced the largest impacts of the flooding. Statistics suggest that the event affected more than 600,000 people, displaced over 170,000, and damaged agricultural crops covering more than 60,000 hectares.¹²⁷

Disaster policy

The National Adaptation Programmes of Action (NAPA) for Malawi was prepared in 2006 to identify the immediate adaptation measures that need to be taken and to understand the changes in the nature and pattern of the hazards, and the impact of climate change on disasters.

The country came out with a National Disaster Management (NDRM) Policy in 2015. Prior to this, there was the Disaster Preparedness and Relief Act of 1991, enacted by the parliament to make provisions for the coordination and implementation of measures to alleviate the effect of disasters.¹²⁸ For each fiscal year, a sum was allocated from the national budget for disaster preparedness and mitigation through the Department of Poverty and Disaster Management Affairs. However, Malawi remained highly dependent on development

partners for financing national response measures during times of crisis and emergency. The new policy was put forth in alignment with the Hyogo Framework for Action (HFA: 2005–15) adopted by the United Nations World Conference on Disaster Reduction in 2005, of which Malawi is a signatory, and the Africa Regional Strategy for Disaster Risk Reduction and the South African Development Community Disaster Risk Reduction Strategy.

The new NDRM Policy for Malawi serves the following purposes:

- Enhances mainstreaming of DRM in development planning and programming in order to integrate it into sustainable development.
- Enhances coordination in the implementation of DRM programmes by various stakeholders in the country.
- Ensures adequate budgetary processes which will allow Department of Disaster Management Affairs (DoDMA) to effectively implement disaster risk management programmes in order to fulfil its core mandate of achieving enhanced disaster resilience.
- Promotes enforcement of buildings and other infrastructure standards which will lead to a reduction in disaster losses.

The NDRM Policy is intended towards resulting in three outcomes:

- To mainstream disaster risk reduction in sectoral plans, policies and budgets at all levels.
- Increase disaster resilience among communities.
- Improve preparedness, response and recovery from disaster. DoDMA is the responsible authority for coordinating and directing the implementation of disaster risk management programmes in the country.

Current challenges that the country is facing with respect to disaster preparedness include inadequate funding, logistical limitations and limited capacity in assessment. Also, the absence of emergency operation centres has hindered effective early warning dissemination, preparedness, and response and recovery initiatives. Under the new policy, financial resources for the implementation of the policy will be an integral part of the budgets of ministries and departments, as well as those of the city, municipal and district assemblies (responsible for implementing the devolved disaster risk management functions).

Catastrophe insurance

Like Kenya, Malawi is also part of the ARC catastrophe insurance programme. ARC provides parametric weather insurance coverage to African governments in case of drought. In return for premium payments into the mutual, governments are eligible to receive a payout of up to US \$30 million. With Malawi's significant exposure to catastrophic drought events, the ARC is expected to provide financial risk coverage to improve the management of this risk and, if disaster strikes, enable a more timely humanitarian response.¹²⁹

Agriculture insurance

Droughts and dry spells are the key hazard affecting most rural households. Droughts affect on local, regional and national scales, causing food shortages, water scarcity, decline in national maize production and reduced harvests. Malawi has witnessed a succession of national level droughts in the last 20 years. The most notable of these were the droughts that occurred during 1991–

92, 1993–94, 2001–02 and 2004–05. The 2004–05 drought was one of the worst Malawi had suffered in a decade, more than five million people, out of a population of 12 million, experienced food shortages.¹³⁰

Approximately 38 per cent of Malawi's economy constitutes of agriculture, comprising of mostly small-holder farmers. Banks in Malawi are unwilling to lend to small-holder farmers, primarily because of the risk of non-repayment in case of a drought. Prior to 2005, only 50,000 of the millions of small-holder farming households in the country were able to secure credit from formal financial institutions.¹³¹

The World Bank, in close collaboration with Malawi's National Association of Small Farmers (NASFAM), developed an index-based crop insurance contract that is more efficient and cost-effective than traditional crop insurance and can easily be distributed to individual small-holder farmers to increase their access to finance and to protect farmers and loan providers from weather risk. The programme was piloted in 2005.

The model opted for was index-based crop insurance, as opposed to traditional crop insurance. Under index-based crop insurance, the administrative costs are lower and the process of assessment is technically less complex than traditional crop insurance. The risk coverage provided was for a selected peril—drought.

The initial pilot was undertaken in Kasungu, Nkhokotakota, Lilongwe North, and Chitedze areas. The contracts were designed to provide compensation when rainfall during a crop growing cycle was insufficient for farmers to grow crops and to optimize their yields. Weather index insurance measures changes in rainfall, assuming that if rainfall is low, then farmers' yields will also be poor.

In case of Malawi, the index-based crop insurance measured the amount of rain recorded at local meteorological stations. In case of severe drought, it is assumed that all farmers within a 20–30 kilometre radius will be similarly affected. The insurance contract is bundled with loans to farmers that cover the cost of high-quality seeds. The insurance pays off part or whole of the loan in case of severe drought. The sum insured is the loan amount and interest payable. Payouts are automatically made to the bank if the index hits the specified contract threshold at the end of the contract.

In 2005, 892 groundnut farmers purchased weather-based crop insurance policies for a total premium of US \$36,600. As the crop insurance contracts mitigated the weather risk associated with lending, local banks came forward to offer loans to insured farmers. The farmers used these loans to purchase certified groundnut seed. In 2007, the pilot was expanded to cash crops. By 2008, the number of participants had increased significantly, with 2,600 farmers buying policies worth US \$2.5 million.

Challenges of index-based crop insurance

1. **Effective index-based weather insurance contracts require reliable, timely, and high quality data weather station networks:** A committed meteorological services authority is essential to ensure adherence to strict quality requirements, including trustworthy daily collection and

reporting procedures, quality control and cleaning, and an independent source of data for verification. Also required is a long, clean, and internally consistent historical record to allow for a proper actuarial analysis of the weather risks involved.

2. **An enabling legal and regulatory framework is necessary for the expansion of the programme:** Nine insurance companies worked together to underwrite the risk from the programme in Malawi. If the private sector is interested in expanding the programme, it will need to engage regulatory authorities in revising the existing legal and regulatory insurance framework to explicitly reference weather-based index insurance.
3. **Client/stakeholder education and outreach is essential to establish successful micro-level insurance programmes:** Lack of understanding of insurance can lead to dissatisfaction with the programme and resistance to insurance purchase. In Malawi, monthly meetings are held with small-holder farmer groups to disseminate financial education and technical agricultural knowledge.

LIVESTOCK INSURANCE: NEW PILOT

Malawi Dairy Development Alliance (MDDA) was a pilot initiative funded by USAID Office of Foreign Disaster Assistance (OFDA) from 2007 to 2012. The MDDA programme supported 23 milk bulking groups (MBGs), through which farmers accessed credit, inputs and markets across the dairy value chain. Land O'Lakes, an agricultural cooperative, partnered with NICO General Insurance Company, a Malawian firm, to develop an appropriate insurance product tailored for local small-holder dairy farmers organized through MBGs in early 2008. This initiative helped to develop domestic economies of scale in milk production, collection and processing. Land O'Lakes partnered with NBS Bank to bring a mobile bank to the MBGs, a service that allowed them to access banking at their front door.¹³² By expanding access to mobile banking services and developing the country's first livestock insurance, MDDA facilitated livestock insurance for 1,655 farmers, valued at US \$879,000.¹³³

The challenges which the programme faced were primarily interlinked to the milk supply chain process as follows:¹³⁴

- i. Lack of investment in small-holder dairy farms including lack of financial resources to purchase livestock/ limited access to credit.
- ii. Only a relatively small percentage of milk produced by small-holders is sold through formal channels.
- iii. Weak institutional structures (little or no contact between the key stakeholders in the dairy sector).

Ghana

Key information

- Ghana has experienced two decades of persistent growth and is one of the very few African countries with a record of positive per capita GDP growth over the past 20 or more years.
- The country is also on path to becoming the first sub-Saharan African country to achieve the first Millennium Development Goal (MDG) of halving poverty and hunger before the targeted year of 2015. This is clearly reflected in their disaster policy and proactive approach towards agriculture.
- According to a global open-source risk assessment for humanitarian crisis and disaster,¹³⁵ Ghana has a vulnerability scale of 3.6 with a coping capacity of 5.4 at a scale of 10. The country is rated among the lower risk countries in Africa.
- Ghana is exposed to floods and droughts, particularly in the Northern Savannah belt. Epidemics, pests, infestations and wildfires occur across the country.
- The catastrophic floods in the north in 2007 affected more than 325,000 people with close to 100,000 requiring assistance in some form or another to restore livelihoods.
- Between 1991 and 2008, the country experienced six major floods; the largest number of people affected being in 1999—two million.
- Climate change is expected to expose people to higher rainfall variability, water stress, drop in agricultural yields and depletion of resource-based livelihoods.

Disaster policy

In the context of Ghana, the National Disaster Management Organization (NADMO) is responsible for the management of areas affected by disasters and similar emergencies, and for the rehabilitation of persons affected by disasters. NADMO prepares national disaster plans for preventing the consequences of disasters. The country sets aside an annual budget for disaster and risk reduction through the NADMO. As for catastrophe insurance, unlike Kenya and Malawi, Ghana has not opted for ARC insurance pool for catastrophes.

Agriculture insurance

Agriculture provides 36 percent of Ghana's GDP and is the primary income source for 60 per cent of the population.¹³⁶ Ghana's stable government, yet vulnerable agricultural economy, makes it a good country for an indexed insurance product.

Only 0.2 percent of farmland in Ghana is irrigated, therefore correlation between rainfall and crop production is expected.

Index-based insurance product, based on local weather indices (rainfall and temperature) that are correlated with local crop yields and economic losses has been proposed in the country. Unlike individual indemnification insurance mechanisms, which have high administrative costs, moral hazards, and adverse

selection, this type of financial product yields payouts based on pre-determined indices (such as the amount of rainfall in a particular time and location) which historically is correlated with economic loss and humanitarian need.

Under the Ministry of Food and Agriculture, the government launched the Ghana Agricultural Insurance Pool in 2011. It has developed the first agricultural insurance for Ghana, thereby initiating a key adaptation measure to climate change. Nineteen Ghanaian insurance companies, which form the Ghana Agricultural Insurance Pool, ensure a solid financial foundation. The product range currently focuses on drought index insurance for maize, soya, sorghum and millet. There are also a few multi-peril crop insurance coverage schemes for risk experienced by commercial farmers and plantations.¹³⁷

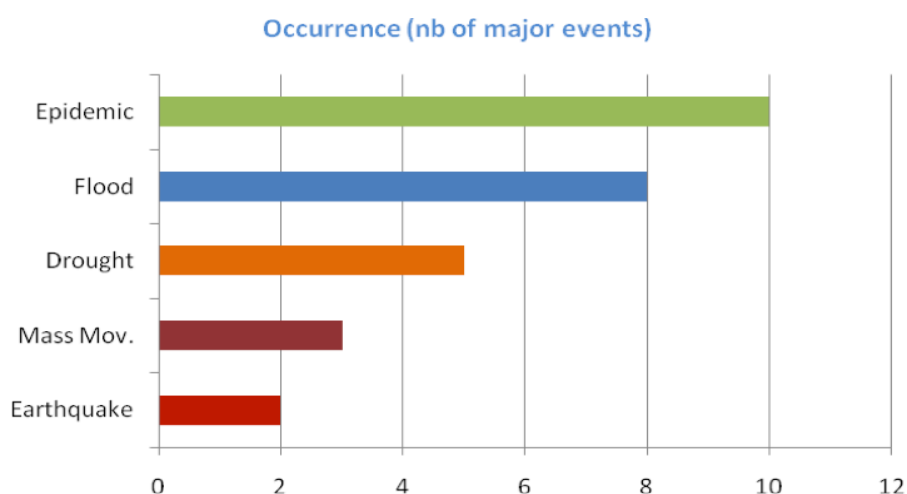
In the past, insurance companies were reluctant to provide cover for agricultural activities because of the enormous risks associated with it. The Ghana Agricultural Insurance Pool currently faces challenges with funding and discussions are currently taking place between the companies and the ministries of agriculture, finance and other donor agencies to fix problems in this regard.¹³⁸

Rwanda

Key information

- Rwanda—the land of a thousand hills—is a small, densely populated, mountainous country at the heart of Africa. With a stable government and extensive development policies, the country is thriving. However, like many countries in Africa, it faces potentially large risks from climate change. What is different in Rwanda is that the government is already developing progressive climate policies and investing in climate change adaptation.
- Agriculture is a vital industry in Rwanda that employs 90 per cent of the country's population and provides for a third of its GDP as well as a large percentage of its foreign income through exports.¹³⁹ The sector is dominated by tea and coffee production.
- Small-holder farmers in rural areas are subject to crop damage caused by a variety of adverse weather conditions and, as a result, are largely excluded from access to finance.
- Rwanda is impacted by disasters such as droughts, floods, landslides, windstorms and earthquakes. Rwanda has been experiencing growing number of disasters in recent years—the landslide in 2011 and the drought of 2014.
- The National Risk Atlas of Rwanda indicates that the country is vulnerable to all the five disasters mentioned above.¹⁴⁰

Occurrence of disasters in Rwanda (1996–2013)¹⁴¹



Source: National Disaster Risk Management Plan, Ministry of Disaster Management and Refugee Affairs, 2013

Disaster policy and funds

In 2002, the National Policy for Disaster Risk Reduction and Prevention in Rwanda was formulated. This policy was approved by the cabinet in July 2003. A national body on DRM was put in place in July 2004. The DRM functioned as an autonomous body under the Ministry of Local Government.¹⁴²

KILIMO SALAMA IN RWANDA—A PRIVATE INITIATIVE

The first agricultural insurance scheme in Rwanda was initiated by the Syngenta Foundation for Sustainable Agriculture's. Kilimo Salama extended its reach from Kenya to Rwanda in 2013. The scheme was modeled along the same lines as Kenya. The insurance scheme focused on maize and beans farmers in the beginning. It gradually moved on to consider coffee and tea farmers and other crops as well. Rwanda Society Insurance Company insured a total of over FRw200 million through Kilimo Salama. This was a weather index insurance project, which enabled and followed up on small-holder farmers to verify their losses in calamities like the drought they have experienced in 2014 season. Following the drought of 2014, 7,086 maize farmers from Bugesera, Ngoma and Kirehe districts in Rwanda received insurance payout totaling FRw42.1 million on 4 February 2014.¹⁴³

The policy was revised in 2009, under the Ministry of Disaster Management and Refugee Affairs (MIDIMAR). The revised policy emphasized on the preparedness of the government, communities and other stakeholders in disaster management. In September 2013, Rwanda came out with the National Disaster Management Plan aiming at strengthening DRM in the country, to minimize suffering by providing sufficient and timely warning and relevant information to the population on potential hazards that may result in disasters.

At the national level, government institutions take the leading role in responding to disasters. The primary source of funding for disaster responses is local (district) administration. The executive committee of the government has a pre-requisite to mobilize relief assistance if the affected communities are unable to cope with the disaster situation.

Requests for international assistance are submitted when there is a declaration of state of emergency by the President of the Republic of Rwanda or a declaration of a local emergency by the minister of MIDIMAR.

As for catastrophe insurance, after the first round of success of the ARC, Rwanda, along with eight other countries, signed for the capacity building services of the ARC in 2015 and began the Africa Riskview customization process in the first phase of the programme.

Agriculture insurance

MicroEnsure, an insurance intermediary, and the International Finance Corporation (IFC)'s Global Index Insurance Facility (GIIF) programme are working together with the objective to bring forth an affordable, flexible and responsive weather response system.

In November 2010, IFC's GIIF entered into an agreement with MicroEnsure providing a grant to incentivize MicroEnsure to:

- i. Design new and affordable index-based insurance products.
- ii. Develop an effective distribution network expanding outreach to low income farmers.

- iii. Scale up agricultural index insurance into a commercially viable and sustainable product

In March 2012, 6,208 maize and rice farmers were covered with weather station and satellite index products in the country. The project aims to provide insurance coverage to 24,000 farmers by the end of December 2013. MicroEnsure is partnering on the ground in Rwanda with Urwego Opportunity Bank (which is a subsidiary of Opportunity International and is working with loans, savings, and insurance products), the Rwandan Ministry of Agriculture and the Rwandan Meteorological Agency and local insurance companies Sonawara and Soros to facilitate the agricultural insurance scheme.

Challenges with weather-based index insurance in Rwanda

Weather index-based insurance in Rwanda faces challenges both from the supply and demand side. Some of the major challenges faced are as follows:¹⁴⁴

- i. **Satellite data is a challenge:** Rwanda's landscape makes it challenging for satellites to accurately capture rainfall data. The use and maintenance of automatic weather stations (AWS) is limited by cost. Often, data discrepancy is reported as the micro-climates vary widely within the country.
- ii. **Lack of product knowledge:** Product knowledge not filtering down to the individual level plays a big role in deciding the uptake of insurance. Since farmers are not familiar with the product and related information, they do not understand how the payouts get calculated.
- iii. **Tax concerns:** Tax is a large factor in the cost of insurance products and taxes levied on agricultural insurance premiums in Rwanda are greater than regional peers: Kenya, Uganda and Tanzania all waive VAT and WHT taxes on agricultural insurance premiums.
- iv. **Competition within the market is limited:** In Rwanda, only SwissRe plays a role in reinsurance, and domestic reinsurers are not yet confident in their ability to assume the risk of an index-based weather insurance product.

Rwanda livestock insurance

Livestock insurance initiatives have been piloted under the Project for Agricultural Transformation Strategic Plan (PAPSTA). The government of Rwanda, through the Ministry of Agriculture and Animal Resources, decided to invest in agriculture to ensure food security and release the surplus to markets.

PAPSTA was set to pilot innovative action, approaches and models suitable for a sampled geographically cultivable space, with the potential for upscale with consideration for the national crops adaptability. Under the PAPSTA, residents of Nyange sector, Ngororero district agreed to set up a livestock insurance fund in part to help poor residents treat livestock diseases in 2010. Each resident was required to pay FRw2,000 per animal per year under the insurance scheme. The objective was training small farming families in modern agricultural practices and methods.¹⁴⁵ The project tested a good number of rural models with a focus on quick increase in yield, disease coverage for livestock and continuing farmers' interest in the future of the project.

However, the biggest challenge towards the successful implementation of livestock insurance is the lack of data in the livestock sector. The only useful livestock data for insurance purposes was collected by EADD in 2009.

South Africa

Key information

- South Africa is subject to a wide variety of natural and human-induced hazards, the three that occur most frequently are floods, droughts and fires.¹⁴⁶
- The country is water-stressed and lack of water is the most significant resource constraint on development. Climate change projections over the next 50 years, moreover, predict that the western parts of the country will become drier and the eastern parts wetter, with an increase in temperatures in the interior and increased frequency of extreme weather events.
- According to a global open-source risk assessment for humanitarian crisis and disaster, South Africa has a vulnerability scale of 3.9 with a coping capacity of 4.6 at a scale of 10.¹⁴⁷ In spite of being an upper middle income country, it is still rated among medium risk countries in Africa.

Disaster policy and fund

The Department of Cooperative Governance is responsible for disaster management in South Africa.

The Disaster Management Act, 2002 was promulgated in 2003. Under it, the National Disaster Management Centre, with functional disaster-management centres and advisory forums, was established in eight provinces.¹⁴⁸ The Act was amended in 2015. The amendment includes the following:

- Clarification of the policy focus on rehabilitation and functioning of disaster management centres.
- Alignment of the functions of the National Disaster Management Advisory Forum to accommodate the South African National Platform for Disaster Risk Reduction.
- Providing for the South African National Defence Force and South African Police Service to assist in disaster management structures.
- Providing for an extended reporting system by various organs of state on information regarding events leading to declarations of disasters, expenditure on response and recovery, actions pertaining to risk reduction, and particular problems experienced in dealing with disasters.
- Strengthening of reporting on implementation of policy and legislation relating to disaster risk reduction and management of funds allocated to municipal and provincial intergovernmental forums established in terms of the Intergovernmental Relations Act of 2005.
- Expanding the contents of disaster management plans to include conducting disaster risk assessments for functional areas, mapping of risk areas and communities vulnerable to disasters, to provide measures to reduce the risk of disaster through adaptation to climate change and developing of early warning mechanisms.
- Providing for regulations on disaster management, education and training matters.¹⁴⁹

The national organ of the state already has a responsibility to develop a disaster management plan. Funds for disaster management activities in municipalities

are currently allocated through a number of conditional grants, equitable shares and own budgets of municipalities.¹⁵⁰

Agriculture insurance

Agriculture in South Africa operates at two levels—well-developed commercial farming and subsistence farming. Agriculture insurance began in the 1970s. The South African government subsidized insurance scheme was a provision made to farmers with the objective to provide cover against droughts. The scheme was based on a rand for rand subsidy by the government through private insurance companies. It did not come across as viable due to financial implication on members and many farmers preferred opting for assistance through drought and other disaster relief schemes.

In 1996, the Strauss Commission (appointed for an inquiry into the provision of rural financial services) made a recommendation for the government to enter into a risk sharing agreement with the private sector to assist farmers, producers and agricultural community. This recommendation was accepted by Agri-SA, an agriculture industry association.

In 2002, the National Department of Agriculture conducted a study to establish risk management strategies for the agricultural sector in South Africa. The study was jointly conducted by the government, insurance industry and Agri-SA, with the support of the USA/SA Bi-National Commission on Risk Management). One of the primary objectives of the programme was the development of a legislative framework for crop insurance

It was only in 2013 that the Department of Agriculture, Forestry and Fisheries started a process to develop the terms of reference for an agricultural insurance policy framework via a public–private partnership model. The company Andisa (partnering with Agrista) was contracted for the purpose.

The government has made efforts to put subsidized crop insurance in place, to assist farmers to afford insurance schemes. Affordability can be difficult to gauge and it is mainly maize and wheat farmers in marginal areas (poor soils/low rainfall) who want government assistance to ease on the premiums.

As of date, South Africa has insurance for hail, wind and crop loss, but not for droughts. Under the existing scenario, farmers in good agricultural areas with low risk actually do not need subsidized insurance. The government feels that emerging or small-scale farmers (presently numbering about 250,000—farming between 5 to 50 hectares each) need a separate coverage or scheme. Agri-SA is currently focused on commercial farmers, who are the real producers of food and keep the food security of the nation intact. About 40,000 such farmers exist. They constitute 20 per cent of the farming population but produce 80 per cent of the food. Arguments are, therefore, made in favour of providing agricultural insurance to these people, because it is said that they deserve risk coverage. Among private initiatives, crop hail insurance and multi-peril crop insurance are available through a well-developed market. Standard hail cover is sometimes extended to include frost as well. The livestock insurance market in South Africa, although limited, is growing. Racehorses are insured, and there is a market for insurance of wildlife in game parks.¹⁵¹

India

Key information

- The GDP of India was \$2.074 trillion in 2015.
- Indian agriculture is dependent on monsoons, with over 60 per cent of the crop area under rain-fed agriculture, which is highly vulnerable to climate variability and change
- Due to its physiographic and climatic conditions, the country is one of the most disaster prone areas of the world.
- More than 40 million hectares (12 per cent of land) is prone to floods and river erosion. Of the nearly 7,500 km long coastline, close to 5,700 km is prone to cyclones and tsunamis.
- Nearly 68 per cent of the cultivable area is vulnerable to drought. Large tracts in hilly regions are at risk from landslides and some are prone to snow avalanches.
- The agricultural insurance programme in India is one of the largest in the world.

Agricultural insurance overview

- The Comprehensive Crop Insurance Scheme (CCIS), the first nation-wide insurance scheme, from kharif 1985 to kharif 1999, was replaced by the National Agricultural Insurance Scheme (NAIS). The Agriculture Insurance Company of India Limited (AICI), the largest insurance provider to the agricultural sector in India, is responsible for implementing NAIS. In addition to NAIS, there are two other schemes: the Modified National Agricultural Insurance Scheme (MNAIS), a modification of the NAIS that is area-based, and the Weather-Based Crop Insurance Scheme (WBCIS), which is based on weather data, with rainfall and temperature being the primary parameters.
- NAIS, MNAIS and WBCIS were the three predominant crop insurance schemes being implemented in most states of India. NAIS, MNAIS and WBCIS are AICL-based—government-run. But several private insurance companies, too, have been allowed to operate MNAIS and WBCIS.¹⁵²
- A new crop insurance scheme named Pradhan Mantri Fasal Bima Yojana (PMFBY) has been launched by the government of India in April 2016. The new scheme will replace NAIS and MNAIS. In the case of WBCIS, the government has declared that premium rates would be rationalized on par with PMFBY.

Crop insurance

Funds released by government of India for agriculture insurance schemes till 2015

Between 1997 to 2015, the total funds released for agricultural insurance schemes by government of India amount to Rs 18,839.61 crore.¹⁵³

Agricultural insurance coverage till rabi season 2014-15

Schemes/items	NAIS (since rabi 1999-2000)	WBCIS (since kharif 2007)	MNAIS (since rabi 2010-11)	CPIS (since 2009-10)	Total
Farmers insured (lakh)	2,558	688	211	0.73	3,457.73
Area insured (lakh ha)	3,733	892	233	0.3	4,858.3
Premium collected (Rs in crore)	12,836	11,539	4,202	2.66	28,579.66
Claims paid (Rs in crore)	38,697	8,457	3,673	3.26	50,830.26
Farmers benefitted (lakh)	663	438	57	0.07	1,158.07

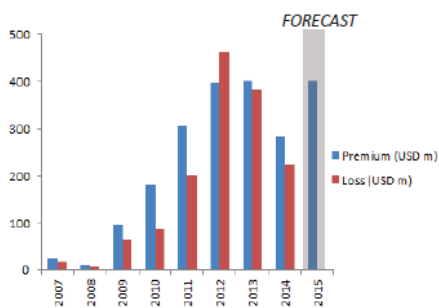
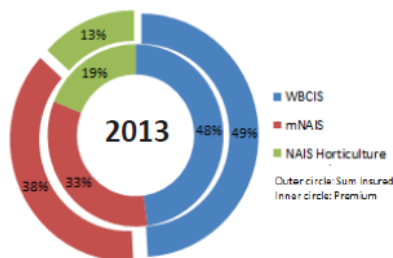
Source: Ministry of Agriculture and Farmers Welfare, Government of India, 2013-14

In 2014-15, the number of farmers covered was 370.5 lakh and the cropped area coverage was 454.2 lakh hectare.¹⁵⁴

The graphs below clearly show the premium collected and losses made by India's premier agriculture insurance company AICI.

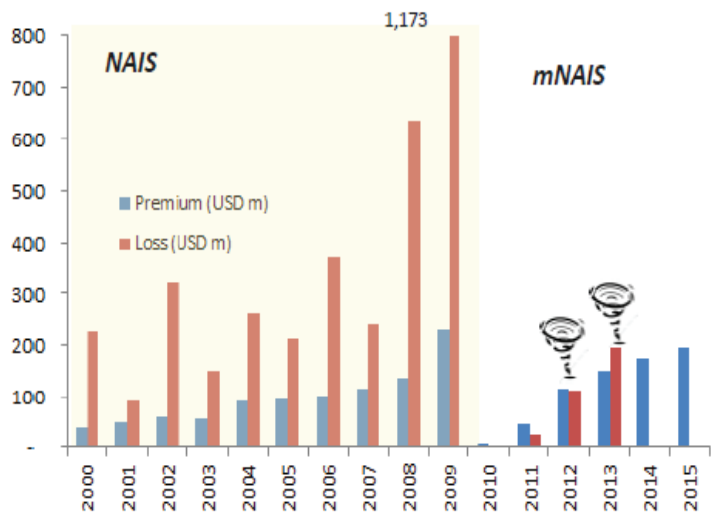
Performance of crop insurance scheme by AICI¹⁵⁵

EPI/TIV and growth projections (AICI)



AICI Historical Premiums and Losses

Performance of NAIS and MNAIS (AICI)



Note: NAIS is a non-actuary based yield index program where the government absorbs losses above L/R 100 per cent and does not provide premium subsidies. MNAIS was piloted besides NAIS (2009-12), replaced NAIS in 2013 but NAIS reemerged in 2014.

Source: Asia Risk Centre, 2014

PRADHAN MANTRI FASAL BIMA YOJNA

PMFBY implementation started from kharif season of 2016

Premium amount to be paid by farmers have been made uniform and relatively lower (1.5, 2 and 5 per cent, as the case may be). Any additional subsidy for the premium can be provided by state governments.

Use of innovative technologies like smart phones, satellite-based remote sensing etc. will improve the accuracy, efficiency and timeliness of insurance procedure. Mandatory use of technology for verification of crop cutting experiments (CCEs) will improve the situation relatively.

Livestock insurance

Livestock Insurance Scheme

- The Centrally-sponsored Livestock Insurance Scheme has been in place since 2008–09 in 100 select districts of the country.
- Under the scheme, crossbred and high yielding cattle are being insured at their highest current market price.
- The premium of the insurance is subsidized by 50 per cent. The entire cost of the subsidy is borne by the Central government. The benefit of the subsidy is provided to a maximum of two animals per beneficiary for a policy duration of maximum three years.
- The scheme has been implemented in all states except Goa through the State Livestock Development Boards of respective states.¹⁵⁶

The National Livestock Policy, 2013

The National Livestock Policy, 2013 has been formulated to have a policy framework for improving productivity of the livestock sector in a sustainable manner, taking into account the provisions of the National Policy of Farmers, 2007 and the recommendations of various stakeholders.¹⁵⁷

Livestock insurance market

Of the livestock insurance products in India, 90 per cent are delivered through the bancassurance model with financial institutions such as cooperative banks, commercial banks and MFIs serving as distribution channels.

In 2005–06, public insurers covered approximately 80 per cent of the 7.9 million insured cattle. In 2007, after the insurance regulators removed the restrictions on premium rates, six private insurers entered the livestock insurance market.^{158,159}

CASE OF UTTAR PRADESH LIVESTOCK DEVELOPMENT BOARD

Insurance companies involved have charged premium rates (percentage of sum insured) 2.07 to 4.50 for one year coverage and 4.50 to 11.50 for three year coverage during 2006–07 to 2013–14. Between 2006–07 to 2013–14, the cost of livestock insurance was Rs 186,410 lakh, subsidy premium collected was Rs 892.26 lakh and the total expenditures made by companies was Rs 1,078.16 lakh.¹⁶⁰

Challenges

Key concerns and challenges observed in MNAIS and WBCIS crop insurance schemes

- Penetration of insurance schemes is low, i.e. only about 20 per cent farm households and 23 per cent of gross cropped areas annually are covered. There is low awareness about crop insurance among farmers.
- Participation of non-loanee farmers are still not encouraging.
- Under MNAIS, the number of CCEs increased manifold (from about five to 25 lakh) which requires more infrastructure and manpower.
- Under WBCIS, poor density of automated weather stations (only 2,500 functional against a requirement of 15,000) resulted in incomprehensive data in terms of yield.
- Triggers for WBCIS are inadequately designed.
- There is a comparatively higher farmers' share of the premium.
- A reduced sum is insured due to capping on the premium.

Challenges in livestock insurance

- Livestock insurance in India has a history of high claims ratios. While it is difficult for private insurers to get historical claims data, it is acknowledged that public insurers frequently experience claims ratios of 150 to 350 per cent, thereby discouraging insurance companies to increase the coverage.
- Fraud and malpractices in implementation of livestock insurance on the part of customers is a major challenge.

Nepal

Key information

- Nepal remains a predominantly agrarian economy. About 66 per cent of its population is involved in agriculture, which accounts for 35 per cent of the GDP.
- It is one of the least developed countries in the world. In the fiscal year 2012–13, its per capita income was US \$721, with an annual economic growth rate estimated at 3.56 per cent.
- People below the national poverty line constitute 23.8 per cent of the total population.
- The country is a hotspot for geophysical and climatic hazards and ranked very high in terms of vulnerability to natural calamities.
- In the past 100 years, floods have cost the most in damages at upwards of US \$1 billion for a total of 50 reported events. In terms of total persons affected, drought is the most severe, having affected nearly five million people since 1915.
- A National Strategy for Disaster Risk Management (NSDRM) is in place in Nepal to deal with natural disasters.

Disaster management

The Government of Nepal established the NSDRM in 2009, which describes the government's vision for disaster management.¹⁶¹

Public disaster assistance programmes

The Ministry of Agriculture and Cooperatives provides limited ad hoc disaster relief for crops and livestock. Compensation for catastrophic events (e.g. floods) is usually paid in kind in the form of free seeds or other crop inputs.

Fiscal arrangements for disaster risk reduction and response

The size of the Central Disaster Relief Fund has increased rapidly in recent years, rising from NRS10 million a few years ago to NRS50 million in 2007–08. In 2008–09, NRS1.32 billion was allocated for development and recurrent contingency expenses under the Ministry of Finance budget, of which NRS100 million was apportioned for the Central Disaster Relief Fund.¹⁶²

Nepal has 2.65 million hectare of agricultural land, of which 1.7 million hectare is irrigable, but less than 1.1 m hectare is actually irrigated.

Historical overview of agricultural insurance

Nepal has 3.4 million agricultural households, cultivating an average of 0.79 hectare per household. About 90 per cent of these own livestock, with cattle being the most important class of animals, followed by sheep, goats, and buffaloes. A typical household owns one or two large ruminants.

Livestock insurance

- Livestock insurance dates back to 1987 when the Central Bank of Nepal and the public sector Deposit Insurance and Credit Guarantee Corporation (DICGC) jointly developed an individual animal all risks mortality livestock insurance scheme, designed to protect the livestock investment

loans provided by the public sector banks to small-scale farmers.

- At the same time, the private cooperative (mutual) sector also developed a very similar livestock-credit all risks mortality insurance cover operated by the Small Farmer Cooperatives Limited (SFCL).
- Subsequently, other organizations have also developed livestock insurance. The government provides limited financial support to the programme in the form of a fixed 50 per cent premium subsidy for livestock insurance through DICGC and SFCL.
- Livestock is a part of agriculture of the rural economy and its contribution accounted for 40 per cent of the total agricultural GDP.

Crop insurance

Crop insurance in Nepal is in its infancy, having first been introduced in 2007–08 on a very small pilot-scale by two cooperatives in conjunction with the Department of Agriculture. Nepal government has introduced an agriculture insurance policy in 2013.

Agricultural Insurance Policy, 2013

The focus of agriculture insurance policy is on a few key crops and livestock, e.g., rice, wheat, vegetables, dairy animals, goats etc.

Some distinct features of agriculture insurance directives are as follows:

- Crops insurance covers the production cost (including purchase of seedlings, fertilizers, labour charge) incurred till the crops or horticulture produce is ready for harvest.
- Livestock and poultry insurance will be wide-ranging and based on the sum insured fixed by the insurance board.
- The premium rate for livestock and crop has been fixed at 5 per cent.
- Government subsidy on the premium has been zero per cent in 2012–13, 50 per cent in 2013–14 and 75 per cent in 2014–15 and 2015–16.

The volume of agriculture insurance has increased because of the increase in subsidy to 75 per cent in 2014–15. The amount allocated by Nepal government for agriculture insurance subsidy for 2015–16 was NRS120 million.

To implement crop insurance effectively, strong technical capacity for monitoring and implementing insurance schemes is needed. Crop insurance policy has to be made farmer friendly. Crop insurance in Nepal is still at a very early stage and will require huge reforms to make it affordable and attractive to farmers and subsequently spread its coverage to the entire country.

Agricultural insurance market structure

- The Nepalese insurance market is regulated by the Insurance Board (Beema Samiti), Ministry of Finance. In 2008, the Nepalese insurance market consisted of 22 registered life and non-life insurance companies.
- To date, none of the regulated insurance companies have insured agriculture, and any livestock or crop insurance available has been implemented by the non-regulated or informal sector including the DICGC, SFCL, the Community Development Programme, and the Centre for Self Help. The livestock and crop insurance products offered by these companies are not approved by the Insurance Board and are, therefore, considered to be

- credit-guarantee protection covers.
- There are about 400 individual cooperatives in Nepal offering livestock insurance to their members.¹⁶³
 - There is no tradition of crop insurance in Nepal. However, since 2007 two cooperatives have commenced pilot crop insurance schemes for named crops and perils.
 - The Insurance Board has released the Crop and Livestock Directives in January 2013, a significant step in agriculture insurance sector of Nepal. However, unregulated and informal type livestock insurance has been in practice for a long time. Non-governmental social organizations, cooperatives and financial institutions have been selling micro-insurance products for many years.¹⁶⁴

Agricultural insurance products available in Nepal

At present, the range of livestock and crop insurance products offered by the non-regulated sector is very restricted.

Livestock insurance

The livestock-credit insurance cover offered by all non-regulated insurers is an all risks mortality policy for individual animals. The cover also includes loss of use of the animal. Cattle and buffaloes account for most of the livestock underwritten in Nepal, but under the Community Livestock Development Programme (CLDP), financed by the ADB, and with technical assistance from FAO, there is a small ruminant (goats) insurance programme as well.

Premium rate for livestock insurance

In 2008, premium rates for livestock insurance varied from 10 per cent charged by the SFCL programme to 6 percent by DICGC and 3 percent for the CLDP programme. Named-peril crop insurance is currently being pilot tested by two cooperatives in Nepal for wind-storm in bananas and for drought, flood, frost and hail in paddy, maize and vegetables.

Voluntary versus compulsory insurance

The DICGC Livestock Insurance Programme is compulsory for farmers wishing to access livestock investment loans from the rural development banks and a single MFI. The cooperatives link livestock loans and livestock insurance, although this is not mandatory in most cases. Crop insurance is voluntary in Nepal.

Public support for agricultural insurance

The following types of government support to agricultural insurance exist:

- 50–75 per cent premium subsidies on the DICGC and SFCL livestock insurance programmes.
- Capital start-up costs for the two pilot cooperative mutual crop insurance schemes.
- Technical support and training from the Departments of Livestock and Agriculture, Ministry of Agriculture, and Cooperatives.

Agricultural insurance penetration rate

Livestock insurance figures for the whole market are not available. The DICGC and SFCL combined programmes have insured an average of about 12,500 livestock (cattle and buffaloes) over the past five years, which represents only 0.1 per cent of Nepal's cattle and buffalo herd of 11.4 million heads in 2006–07. Crop insurance started very recently and has not penetrated much. Insurance penetration and density in Nepal is lowest among Asian countries. Penetration in Nepal in 2009–10 was merely 1.1 per cent.

Financial performance

- Livestock insurance: Livestock insurance results from 2004 to 2007 show a very low long-term average loss ratio of 18.2 per cent.
- Crop insurance: This started very recently and significant data is not yet available.

Challenges in agriculture insurance in Nepal

- Lack of availability of funds for agricultural insurance is a big obstacle.
- Infrastructural challenges, lack of awareness among farmers, issues with affordability of premium by farmers, poor implementation of agriculture insurance etc. have been major obstacles in increasing agriculture insurance coverage.

Sri Lanka

Key information

- Agriculture employs one in three people in Sri Lanka and contributes over 10 per cent to the export income. This sector depends on rain and is vulnerable to droughts and floods.
- Floods comprise 70 per cent of natural disasters, followed by droughts.
- Sri Lanka being a small island in the Indian Ocean in the path of two monsoons is highly affected by weather related hazards.
- The agriculture sector employs 31.8 per cent of the labour force. Forests cover around 33 per cent of the area of the country, arable land is 21 per cent and permanent crops cover 16 per cent of the area.
- Livestock products make up around 1.2 per cent of Sri Lanka's overall GDP.
- Sri Lanka is a lower middle-income country with a total population of 20.8 million and a per capita income of US \$3,912 in 2015.^{165, 166}

Disaster management and response

Sri Lankan government provides food and other necessary relief besides helping in the early recovery of disaster victims.¹⁶⁷

Based on previous experience of dealing with disasters, global developments in disaster relief reduction and recommendations of the United Nations Disaster Assessment and Coordination (UNDAC) Assessment, Sri Lanka's government has approved the development of the Sri Lanka Comprehensive Disaster Management Programme (SLCDMP), 2014–18. Its goal is ensuring the safety of Sri Lanka by reducing direct and associated potential risk in the country and minimizing impacts on people, properties and the economy.

Overview of agricultural insurance

- Agrarian Insurance Board (AAIB—a public insurance company) has been the main agricultural insurer in Sri Lanka. It has offered a wide range of crops (including cereals, perennial crops, medicinal plants), fisheries, livestock and forestry insurance products, farm package insurances including machinery and equipment cover, post-harvest grain storage insurance, as well as farmers' and fishermen's pension and social security benefit schemes, medical insurance cover and, most recently, life insurance products.
- Some private commercial insurance companies have also offered traditional indemnity-based crop insurance for rice in the past. While the country has had agro-insurance policies in place for over forty years, the majority of farmers have no protection against droughts or floods.¹⁶⁸

PILOT PROJECTS

In 2009, the SANASA Insurance Company Limited (SICL) entered into an agreement with BASIX, a Hyderabad-based MFI that specializes in crop weather index insurance. The purpose of this agreement was to conduct a feasibility study for the design and implementation of weather index insurance in Sri Lanka.

Agricultural insurance market structure

- Currently, indemnity type products for crop, livestock and plantation insurance are available in Sri Lanka. Weather index-based insurance is also available for certain crops such as paddy and tea, although its outreach is limited.
- AAIB, is the main agricultural insurer in Sri Lanka, with a network of 26 district offices in Sri Lanka plus 550 individual service centres serving about 15,000 villages. AAIB agricultural crop insurance is linked to bank loans and other inputs and services.

Agricultural insurance products available

- AAIB's field row crop policy is an individual grower loss of yield multi-peril crop insurance cover. The most important insured crop is paddy rice. The company also provides named peril crop insurance and livestock mortality insurance.
- Animals covered are cattle, goats and sheep within the livestock policy and the sum insured for them range from Rs 5,000–Rs 50,000 with premium rates for them. The perils covered under the crop insurance policy cover are floods, droughts, deficient or excess water, pests and diseases.
- Multi-peril crop insurance products are available in Sri Lanka. Accidental mortality and epidemic disease have been covered under livestock insurance products.

Delivery channels for crop and livestock insurance

- AAIB's crop and livestock insurance products and services are marketed through its network of 26 regional offices and 550 agricultural service centres. If farmers access subsidized bank loans, crop insurance is mandatory.
- SICL has one of the most extensive cooperative networks in Sri Lanka comprising more than 8,400 community-based financial institutions operating at the village level. It is proposed to distribute the crop weather-index insurance products through the SANASA cooperative network.

The AAIB crop and livestock insurance programmes have not been reinsured.

Public support for agricultural insurance

- AAIB is a public sector insurer and excess losses are borne by the company and, therefore, by government.
- **Premium subsidies:** It is understood that government provides crop-credit insurance through AAIB at subsidized credit interest rates. It is also understood that AAIB does not offer premium subsidies, but its average rates are believed to be below the technically required (and higher levels) to cover actual claims and administrative and operative expenses.

Financial performance of crop and livestock insurance (2004–07)

AAIB's crop and livestock insurance show a long-term loss ratio of 44 per cent for crops, 57 per cent for livestock and 49 per cent overall. These underwriting results are sound. It is, however, apparent that the programme in 2010–11 was very small with an annual premium of only about US \$150,000 on an average. So, these programmes are loss making with a loss ratio of 49 per cent.¹⁶⁹

Challenges

- Government support for the insurance programme needs to be strengthened to increase crop insurance coverage.
- The involvement of private insurance companies has not reached the desired level.
- Farmers have lost confidence in crop insurance schemes and their voluntary participation has dropped drastically due to the inadequacy of indemnities and delay in indemnity payments.
- The underestimation of crop losses too causes dissatisfaction among farmers
- Most farmers joined crop insurance scheme merely to obtain a crop loan.

Myanmar

Key information

- Myanmar, with a total area of 676,578 sq km, is the largest country in mainland Southeast Asia.
- It is exposed to natural disasters such as flooding, drought, earthquakes, cyclones, and infectious diseases epidemics.
- It ranks as one of the most vulnerable countries to climate change, and the incidence and impacts of natural disasters are expected to increase in coming years.
- It has been affected by ongoing conflicts for the past 40 years, which have resulted in large-scale population displacements and accompanying humanitarian crises.
- The country has made progress in its disaster management policies, plans, and procedures since 2008, when Cyclone Nargis devastated the coastal areas of the country.
- UNDP HDI categorizes Myanmar as one of the world's least developed states. It ranks 149 out of 187 in the 2012 ranking.

Provision of agricultural insurance

As of now, the Myanmar government has no national level policy or support on agriculture insurance. Negotiations are underway with the world's second biggest reinsurer SwissRe group to initiate a crop insurance system for Myanmar's agriculture sector.

Recent developments

A pilot crop insurance programme project by Network Activities Group (NAG), an NGO has been started in two villages. Private players have also shown some interest in the sector, however the insurance programme right now is community-based. There are still a number of problems, some of which may reduce as the number of insures rises. Insurance as a concept is new in Myanmar, so agriculture insurance may take time to become a mainstream norm.

Challenges

Agriculture insurance has not been able to become a priority in Myanmar so far. Availability of funds has also been a major concern.

Bangladesh

Key information

- Bangladesh is one of the world's most populous countries; with a population density of 1,218 per sq km.¹⁷⁰ Most of the population is concentrated in the Ganga–Brahmaputra delta,¹⁷¹ formed by the confluence of Ganga (local name: Padma), Brahmaputra (local name: Jomuna) and Meghna rivers and their respective tributaries.
- The country's total area is 147,570 sq km and the main source of livelihood is agriculture. The land use pattern can be divided as: i) 52.9 per cent arable land—for crops like wheat and rice that are replanted after each harvest; ii) 6.2 per cent for permanent crops—land cultivated for crops like citrus, coffee and rubber that are not replanted after each harvest, excluding land under trees grown for wood or timber; iii) 40.7 per cent for other crops—any land not arable or under permanent crops, this includes pastures, forests, built-on areas, roads, barren land, etc.¹⁷²
- With limited land area, about two million people being added to the total population every year, and around 47 million people still below the poverty line,¹⁷³ the country remains vulnerable to extreme weather events.
- In 2007, cyclone Sidr exposed 3.45 million households to inundation.¹⁷⁴ Damage worth US \$552.6 million was reported post the cyclone Aila in 2009 with more than 400,000 people were isolated by severe flooding in coastal regions of Bangladesh.¹⁷⁵
- Extreme weather events such as heat waves and very high rainfall are likely to become more frequent. The cyclone intensity in the region is expected to rise by 10–20 per cent. There has been severe and recurrent flooding in Bangladesh over recent years and decrease in frequency (but increase in intensity) of monsoon depressions in the Bay of Bengal since 1970.
- The report by the Potsdam Institute for Climate Impact Research and Climate Analytics for the World Bank states that flood areas could increase by as much as 29 per cent in Bangladesh for a global rise in temperature by 2.5°C.¹⁷⁶
- Rice production could fall by 8 per cent and wheat production by 32 per cent as early as 2050. Flood water and saline intrusion will also undermine agricultural productivity.¹⁷⁷
- The Climate Vulnerability Index for 2015 mapped by Verisk Maplecroft declared Bangladesh as the most vulnerable country to climate change and food insecurity.¹⁷⁸

Disaster policy and fund

National Adaptation Programme of Action (NAPA) for Bangladesh was prepared by the Ministry of Environment and Forest (MoEF), Government of Bangladesh in November 2005. This was in response to the decision taken in the seventh session of Conference of Parties (COP-7) of the United Nation Framework Convention on Climate Change (UNFCCC).

Following this, Bangladesh came up with the Bangladesh Climate Change Strategy Action Plan in 2009. Six thematic areas were identified, among which food security, social protection and health, and comprehensive disaster management were strongly highlighted. Monetization and channelization

of funds for the Bangladesh Climate Change Strategy Action Plan in 2009 was broadly done under two funds: Bangladesh Climate Change Trust Fund (BCCTF) and Bangladesh Climate Change Resilient Fund (BCCRF). BCCTF is funded by the Bangladeshi government.

Established in May 2010, BCCRF is funded by international grants and financial aid. International donor organizations like DFID, SIDA and support from countries like Denmark, Sweden, United States, Australia and USA has pledged US \$190 million as grant. Due to the misuse of the Fund and corruption in the process of fund allocation, the World Bank has been brought in to monitor its utilization.

The country also has a Disaster Management Act 2012 wherein the government addresses and provides for risk reduction and immediate response after a disaster, which is channelized through methodical institutional structure and programmes.¹⁷⁹ The Act also clearly defines the role of different stakeholders and chalks out the Standing Order on Disaster formulated by the Ministry of Food and Disaster Management. The mandate of the Act is carried at two levels: National Disaster Management Committee at the country level, and the Disaster Management Committees and the local level.

Bangladesh had introduced a comprehensive Disaster Management Programme for mainstreaming disaster management in development plans and programmes even before the Hyogo Framework for Action under United Nations International Strategy for Disaster Reduction. It is called the Comprehensive Disaster Management Programme (Phase I and Phase II).

Agriculture insurance

With an increasing number of people facing loss of arable land, climate change aggravates the risk to the already malnourished population of Bangladesh. Climate change threatens the agricultural economy which accounts for only 20 per cent of the GDP but engages half the country's work force.¹⁸⁰ There has also been a decline in availability of agricultural land at the rate of 0.26 per cent annually between 1976 and 2010.¹⁸¹ Crop land has declined by one million hectare from 8.8 million hectare since 2000. The decline is mainly of crop land switched over to rural settlement. Although crop land has declined, the crop productivity per person has increased at 1.2 per cent in tonnage. However, different parts of the country face different land pressures due to the increase in frequency and impact of extreme weather events in an ever-growing population and shrinking agricultural space.

In such a scenario, agricultural insurance becomes an important aspect to address, as farmers gamble through each season. Agricultural insurance in the context of Bangladesh has been divided to look as the public sector initiatives—schemes and challenges, private initiatives or the lack of it and the non-regulated initiatives of MFIs.

Public-sector involvement

Sadharan Bima Corporation (SBC), the public-sector non-life-insurance company introduced a pilot crop insurance scheme in 1977, and then a pilot livestock (cattle) insurance scheme in 1981. SBC adopted a conventional

individual-grower multiple-peril crop insurance yield-shortfall policy. The SBC pilot crop insurance programme operated for 19 years on a voluntary basis. During this time, the uptake rates were consistently low and the programme incurred major underwriting losses. The reasons for the failure could be attributed to low demand for the voluntary programmes, technical drawbacks in the policy design, operational challenges, and lack of financial support from the government.

Private commercial sector involvement

There is no involvement of the private commercial insurance sector in agricultural crop, livestock, forestry or aquaculture insurance. The general belief of private companies was that agriculture is too risky to underwrite, particularly in view of the very poor underwriting results of one pilot scheme which operated during the 1970s and 1980s. There is a lack of awareness on the part of insurers about crop and livestock insurance products and operating systems and procedures. Also, there is lack or unavailability of an accurate time-series animal mortality data and crop production loss or damage data on which to establish technical premium rates. Apart from this, the administrative costs for dealing with small-holder individual farmers is very high, in particular the costs associated with pre-inspections and adjusting crop or livestock losses. Lastly, there is unavailability of agricultural reinsurance protection.

Non-regulated crop insurance

- Currently none of the MFIs are offering crop insurance products and services to their grower members.
- In 2009, the International Network of Alternative Financial Institution (INAFI) Foundation proposed to form a mutual crop insurance company. Since 2007, INAFI Bangladesh has been working with various aid donors, international NGOs, and banks to develop mutual insurance for the NGOs/MFIs in Bangladesh.¹⁸²

Livestock insurance

Similar to the agricultural insurance scenario in Bangladesh, the livestock insurance in the country can be divided into public sector initiatives and that of the micro-finance institutions. Private players have stayed off-course with respect to livestock insurance in Bangladesh.

SBC livestock insurance programme (1981-2009)

- In 1981, SBC launched a pilot cattle mortality cover policy covering accidental death and diseases. The programme was offered only to livestock projects financed by Bangladesh Krishi Bank and other nationalized banks. The SBC livestock insurance pilot project has operated since 1981 with a long-term loss ratio of 56 per cent, but it has never achieved a high degree of small-holder market penetration. Over 24 years of operation, the programme has insured a total of 7,591 head of cattle, or an average of only 330 cattle per year, and generated an average annual premium of slightly below Tk240,000 (about US \$3,500).
- The average premium rate levied by SBC since 1998 is 5 per cent. The long-term loss ratio for the livestock insurance program is only 56 per cent, but due to the very small scale of the programme, once administrative and operational costs are included, it is unlikely it has operated profitably.

CROP INSURANCE PILOT PROJECT BY ADB

In April 2014, ADB and the government of Bangladesh signed a grant agreement of US \$2 million to develop innovative new crop insurance products that will give small-holder farmers in Bangladesh income protection from increasingly severe storms and natural disasters. This is a weather index-based crop insurance project which ADB will administer the fund for and provide technical support in its implementation. The weather index-based crop insurance in Bangladesh will function as an adaptation tool to reduce the climate variability and extreme weather vulnerability of agriculture sector, especially impacting small-farm households.¹⁸³

- The project is operating on a pilot basis in select districts for a period of three years. The risk coverage has been planned for 12,000 farm households. The government of Bangladesh is providing in-kind support of US \$420,000 for the project.
- This project will involve collaboration of different partners such as agricultural banks, multi-lateral financial institutions and farmers' cooperatives to develop and pilot new models of distribution that reduce transaction costs and make businesses sustainable.
- It will also provide income support to farmers during lean period, access to credit, and a buffer against loan defaults, along with reduced premiums and improved distribution. The project will also support the development of a regulatory and legal framework to accommodate the new non-traditional insurance products.¹⁸⁴

MFIs—non-regulated livestock insurance in Bangladesh

Several MFIs have provided their own informal livestock mortality micro-insurance products in Bangladesh. These include: Proshika (since 1990), Grameen Fisheries and Livestock Foundation (since 2001), Palli Bikash Kendra, Dustho Shasthya Kendra, and Gana Unnayan Kendra.

Proshika Participatory Livestock Compensation Fund

- Livestock Development Program (LDP) has been a core component of Proshika's development activities since 1976 for resource-poor farmers and rural landless households, especially women. Three main components of LDP are: (i) livestock production (cattle, sheep and goats), (ii) poultry production, and (iii) livestock support services. Proshika was the first MFI to introduce a livestock mortality loan protection scheme in 1990 under its Participatory Livestock Compensation Fund (PLCF).
- The rates charged by the PLCF are between 3-5 per cent of the purchase price (or loan amount) for cattle and sheep/goats and 10 per cent for poultry.
- Over the 19 years that the PLCF has been operational, a total of 11,739 livestock producers' groups have been insured under this programme and a total of 140,439 head of livestock have been insured, of which 87 per cent have been cattle and a smaller number of sheep and goats, and 13 per cent poultry. Claims have been paid out on the death of 4,855 heads of animals/poultry with an implied average mortality rate of 3.5 per cent

with claims valued at Tk21.3 million against premium receipts of Tk 31.4 million, equivalent to an average loss ratio of 68 per cent.

- The loss ratio since its inception in 1990 till 21 March 2009 has been 67.9 per cent.

Grameen CLDDP Livestock Insurance Fund (LFI)

- The Grameen Fisheries and Livestock Foundation (Grameen Moshto Pashusampad Foundation) is a sister organization of the Grameen Bank. In 1999, GMPF added livestock and dairy activities to its fisheries programme for small rural households under the UNDP-funded Community Livestock and Dairy Development Project (CLDDP).
- The LIF program insures against death of the dairy cow where this is “outside the control of the owner” and in effect it is an all risks livestock mortality policy.
- The sum insured is equivalent to the amount of loan taken out to purchase the cow and the premium is currently charged at a rate of 3 percent of the value of the loan.
- The programme has been operational for eight years, during which a total of slightly over 7,000 dairy cows have been insured with an average mortality rate of 2.8 per cent.
- The overall loss ratio from 2001–05 was 75 per cent and that from 2006–08 was about 45 per cent.

Conclusion and way forward

Scientific projections of climate scenarios reveal that developing countries and their agriculture sector would continue to remain vulnerable and bear maximum losses and damage. Adaptation measures that can raise the adaptive capacity and build greater resilience in the agricultural systems in developing countries thus become critical. Such measures are related to risk management, policy and regulatory frameworks, risk insurance, incentives, finance and technology transfer. This Report has specifically focused on agricultural insurance as a financial coping mechanism.

Overall, the findings of the Report reveal that the penetration of agricultural insurance in African and Asian countries is extremely low. The major reason for this is that government support in the form of subsidy is extremely low. For greater penetration and availability of agricultural insurance, more government support is imperative. However, a major problem that governments themselves face is lack of funds. There is a dire need of channelizing and pulling in more funds towards agricultural insurance. There needs to be greater fostering of public—private and public—public partnerships to increase agricultural insurance coverage. Presently, the involvement of private insurance companies, cooperatives and farmers' associations has not attained the desired level.

The level of awareness among farmers with regard to the prevailing agricultural insurance schemes in their country is also very low. In this regard, government support in the form of legislations, incentives, regulations and subsidies is critical for the insurance markets to develop properly. One plausible step to increase the uptake of insurance is that governments can work towards making insurance cover universal and should also pay the premium for small subsistence farmers and subsidies for other farmers. Without support and subsidies, agricultural insurance is not viable in even developed countries.

Another big challenge is proper information and data in terms of yield, claims (especially with regard to livestock insurance), and also the financial losses due to climate impacts. The number of weather stations meant for recording conditions is not enough, and even many of those already installed are dysfunctional. In India, for example, there are only 2,500 functional automated weather stations against a demand of 15,000. Therefore, provincial and national repositories and catalogues of reliable data with regard to claim, yield and losses incurred will serve as an important measure for insurers and need to be prioritized.

There are also operational challenges in the proper implementation of agricultural insurance schemes. Currently, farmers face challenges of delay in payments of indemnities which shake their confidence in agricultural insurance mechanisms. There are also reports of malpractices and fraud taking place in implementation of these schemes. Hence, strong technical capacity for monitoring and regulation is required to avoid delays and malpractices. Traditional crop insurance relies on direct assessment of the losses or damage

suffered by farmers. This assessment can often be a costly and time consuming affair. Index-based insurance, on the other hand, relies on an objectively measured index that is correlated with farmers' losses, rather than actual losses. Nevertheless, index-based insurance also primarily suffers from the challenge of reliable weather data. Both types of insurance are important and must be encouraged so that they can complement each other to help farmers cope with and prosper in the face of weather-related risks.

To sum up, for insurance mechanisms to find widespread application in these regions, addressing issues related to funds and government support, access to credible weather data, methodologies to calibrate data and development of supporting infrastructure are imperative.

Since, lack of funds emerges as the major problem for development and implementation of agricultural insurance schemes in the studied African and South Asian countries, there is a need for globally coordinated agricultural insurance funding mechanism which can address agriculture related risks of farmers in developing countries. Such a mechanism can serve as a way to address losses and damage due to climate impacts in developing countries under the UNFCCC framework. It can also foster knowledge and expertise sharing and help create partnerships for capacity building and increasing resilience of developing countries to better adapt to climate impacts. A global support for such agricultural insurance mechanisms, therefore, becomes very crucial.

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