

FACT SHEET 6

Disaster Risk Financing for Agriculture

Technical Learning Series

Disaster Risk Financing
& Insurance Program



Risk Finance Instruments: An in-depth look at agricultural insurance

Technical Learning Series

The 6th webinar of the Disaster Risk Financing in Agriculture Series deals with the role of agricultural insurance as a risk transfer instrument. It focuses on applications of micro-level individual farmer agricultural insurance products and programs. These are targeted to small farmers in developing countries (with meso- and macro-level risk transfer solutions to follow in module 7). This session provides a primer on the global agricultural insurance market, and how it has evolved over time. It also provides an overview of the different institutional models based on public sector and private sector agricultural insurance provision and public-private partnerships (PPPs). The suitability of different products (indemnity- and index-based) for various segments of the farming population is also examined. The session provides an in-depth overview of index-based crop insurance solutions for small-scale farmers, drawing on international experience from South Asia and Africa. It highlights the work of the World Bank, the Global Index Insurance Facility (GIIF), and the Mayfair Insurance Company of Zambia, primarily with indemnity- and index-based products. This session also addresses the ways in which the public sector can most effectively support the development of scalable and sustainable agricultural insurance products and programs.

1. Overview of the Global Agricultural Insurance Markets

History and Institutional Models

The origins of agricultural insurance date back several centuries to crop and livestock producers in Europe who elected to form mutual insurance societies. Collectively, they sought to insure against losses caused by hail to their high-value fruit and vine crops, as well as accidents and diseases causing the death of their animals. Many of these producers subsequently emigrated to Australia, New Zealand, North and South America, and South Africa. They took their knowledge of mutual insurance with them. Many of these mutual crop and livestock programs have now been privatized.

In the 20th century, significant growth took place in public sector-subsidized Multi-Peril Crop Insurance (MPCI) programs in Asia (China, Japan, India, Bangladesh, Sri Lanka, and Philippines); in Canada; in Latin America (Mexico, Brazil, Costa Rica, Panama); in Europe (most of the former Soviet bloc countries), and in the US (Figure 1). Many of these programs suffered from poor governance and high losses; as such, they were very expensive for governments to maintain due to a combination of high operating costs, premium subsidies and reinsured losses. They were subsequently terminated and replaced by public-private partnerships (including in Brazil, China, India, Mexico, Sri Lanka, and the former Soviet Union). (For further details, see Hazell, Pomareda and Valdes 1986; Hazel 1992; and Mahul and Stutley 2010¹).

Experience shows that agricultural insurance programs based on **Public-Private Partnerships** can often generate synergies that allow each partner in the system to contribute to a more effective and efficient intervention (Figure 1). PPPs are very appropriate in smallholder farming economies where governments can support private sector insurers in developing programs to cost effectively reach very large numbers of small-scale farmers. Under PPP arrangements, the most common form of government support is in the form of premium subsidies, followed by support for reinsurance and insurance legislation. In some cases, governments also contribute toward the operation and administration costs of the insurers (for example, in South Korea and the US)². The set of possible arrangements for an agricultural insurance PPP is broad, and there is no predefined approach. Therefore, each country should assess the solution which best suits its specific needs.

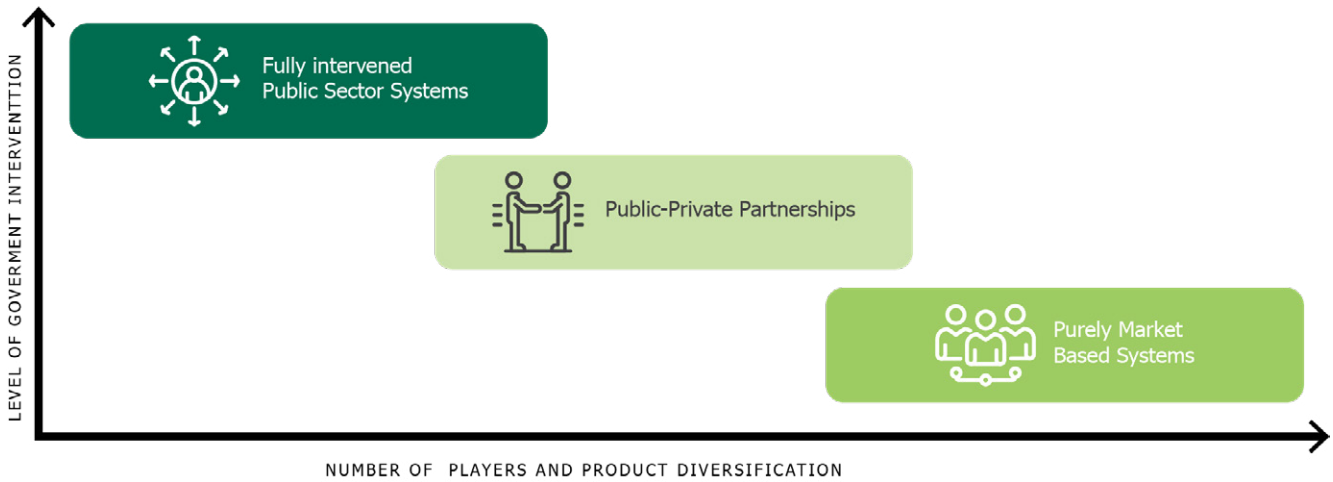
Many agricultural insurance markets have pure **market-based models** with no form of government support or intervention. The major private agricultural insurance markets are mainly found in high-income countries and include Argentina, Australia and New Zealand, Germany, the Netherlands, South Africa, Sweden and the US (private crop hail) (Figure 1). In the past 50 years, there has been a shift away from public sector provision of agricultural insurance to PPPs.

¹ When and How should Agricultural Insurance be Subsidized?

<https://documents1.worldbank.org/curated/en/330501498850168402/pdf/When-and-How-Should-Agricultural-Insurance-be-Subsidized-Issues-and-Good-Practices.pdf>

² For a detailed review of government support to agricultural insurance, see Mahul and Stutley (2010).

FIGURE 1: INSTITUTIONAL FRAMEWORKS FOR AGRICULTURAL INSURANCE



- ✓ High Level of Penetration of Agriculture Insurance
- ✓ Well Diversified Portfolios
- ✓ Social Criteria prevails over the technical and commercial criteria
- ✗ Poor services to the farmers (usually monopoly).
- ✗ These systems are usually not reinsured. Governments assume full liability
- ✗ High Fiscal Cost for Governments

Fully Intervened
Public Sector Systems

Examples: India (former NAIS); Mexico (former ANAGSA); China (former PICC); Panama (ISA); Philippines (PCIC); Canada (several provinces), Brazil (former COSEP)

- ✓ High Level of Penetration of Agriculture Insurance
- ✓ Well Diversified Portfolios
- ✓ Technical Criteria prevails over the Social and Commercial criteria
- ✓ Pool sets terms and conditions, Insurance companies competes for service.
- ✗ Pubic sector provides the plans /guidelines and financial stability
- ✗ Private sector provides know how and operations.

Public-Private Partnerships

Examples: Spain, Turkey, Italy, Mexico, Brazil, USA, China, India, South Korea

- ✓ No fiscal Cost for Governments
- ✗ Low to moderate levels of penetration.
- ✗ Low risk diversification.
- ✗ Usually these markets offer named-peril crop hail
- ✗ Commercial Criteria prevails over technical and social criteria (price war)

Purely Market
Based Systems

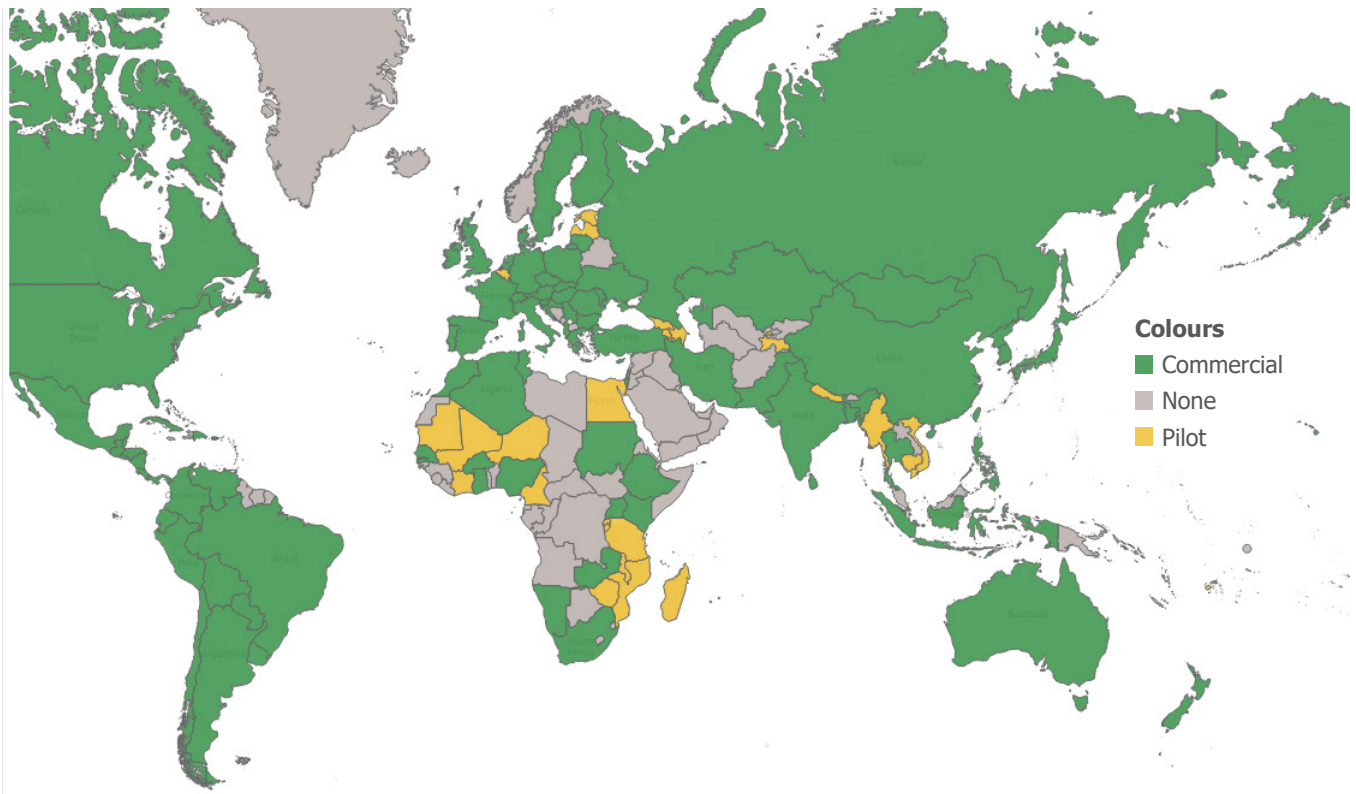
Examples: Germany, Austria, Netherlands, Sweden, Argentina, Uruguay, Australia, New Zealand, South Africa

Source: Iturrioz 2010

Global Coverage and Scale of Agricultural Insurance

The global agricultural insurance market is huge. In 2007, it was estimated that there was some form of crop, livestock, aquaculture or forestry insurance available in about 125 countries. The majority of high-income countries had well-established agricultural insurance markets. However, in 2007, only 35 percent of low- and middle-income countries offered such products and programs. Moreover, agricultural insurance was not available in most African countries (Mahul and Stutley 2010). **In the past 15 years, there has been major interest in agricultural insurance as a small-holder climate change adaptation tool. Indeed, coverage has expanded to about 125 countries. Most of the growth in the past 15 years has occurred in low- and middle-income agrarian economies in Africa and Southeast Asia (Figure 2).**

FIGURE 2: COUNTRIES WITH AGRICULTURAL INSURANCE PROVISION IN 2021



Source: World Bank (2021).

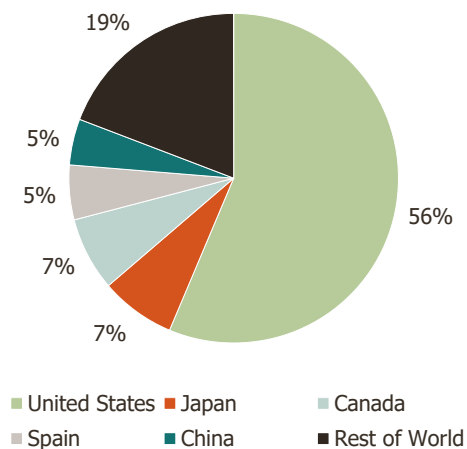
Note: It covers approximately 125 countries.

In 2007, global agricultural insurance premiums were estimated at about US\$ 15 billion, of which the US is the largest market. It accounted for more than half (56 percent) of total premiums (including private unsubsidized crop hail and the subsidized Federal Crop Insurance Program [FCIP], offering mainly MPCPI. Together with the US, Canada, China, Japan and Spain are the top 5 countries, accounting for 81 percent of global agricultural insurance premiums.

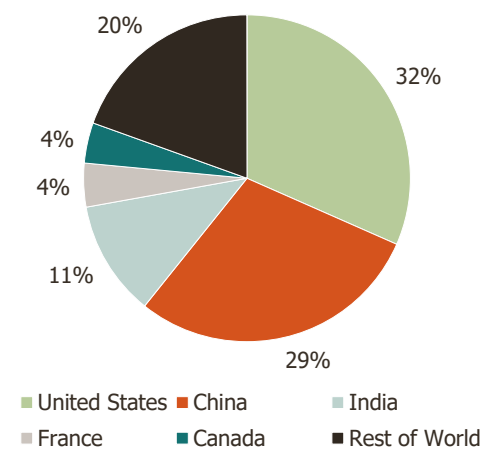
The market premium has more than doubled in the past 15 years, and in 2019 total agricultural insurance premiums were estimated at about US\$35 billion³. The major growth has occurred in China, which now accounts for nearly 29 percent of total global agricultural insurance premiums, and in India (11 percent). Also, growth has occurred in other Asian countries, such as the Philippines, South Korea, and Thailand. At the same time, there has been a corresponding decline in the share of the US to about one-third of total premiums (Figure 3).

FIGURE 3: COMPARISON OF THE TOP 5 AGRICULTURAL INSURANCE MARKETS IN 2007/08 AND IN 2019/20

5 Largest Agricultural Insurance Markets by Premium volume in 2007 (US\$15.1 billion)



5 Largest Agricultural Insurance Markets by Premium volume in 2019/29 (US\$ 35.0 billion)



Source: Mahul and Stutley 2010; various market sources.
 Note: The 2007 figures are based on Mahul and Stutley (2010), and the 2021 estimates are based on various market sources.

³ These are the World Bank Group's best estimates for 2019/20. The global crop insurance market size was valued at \$34.05 billion in 2019, and is projected to reach \$53.02 billion by 2027, growing at a compound annual growth rate (CAGR) of 6.1 percent from 2020 to 2027.

<https://www.alliedmarketresearch.com/crop-insurance-market-A06791>

2. Various Classes of Agricultural Insurance and Indemnity vs Index-based Insurance

Agricultural insurance is available for a wide range of sectors and commodities, including for annual and perennial food and cash crops; plantations; forestry; and specialist greenhouse crops. Insurance is also available for livestock and poultry, as well as aquaculture (including onshore and offshore fish farming). There are two basic types of agricultural insurance products or policies:



Indemnity-based agricultural insurance is a traditional insurance product offered by insurers for many years. It protects against physical loss or damage to the insured good (crop or animal), and in some cases, it also covers quality and price losses; and



Parametric or index-based agricultural insurance is a non-traditional insurance product that offers pre-specified pay-outs based on a trigger event (Table 1).

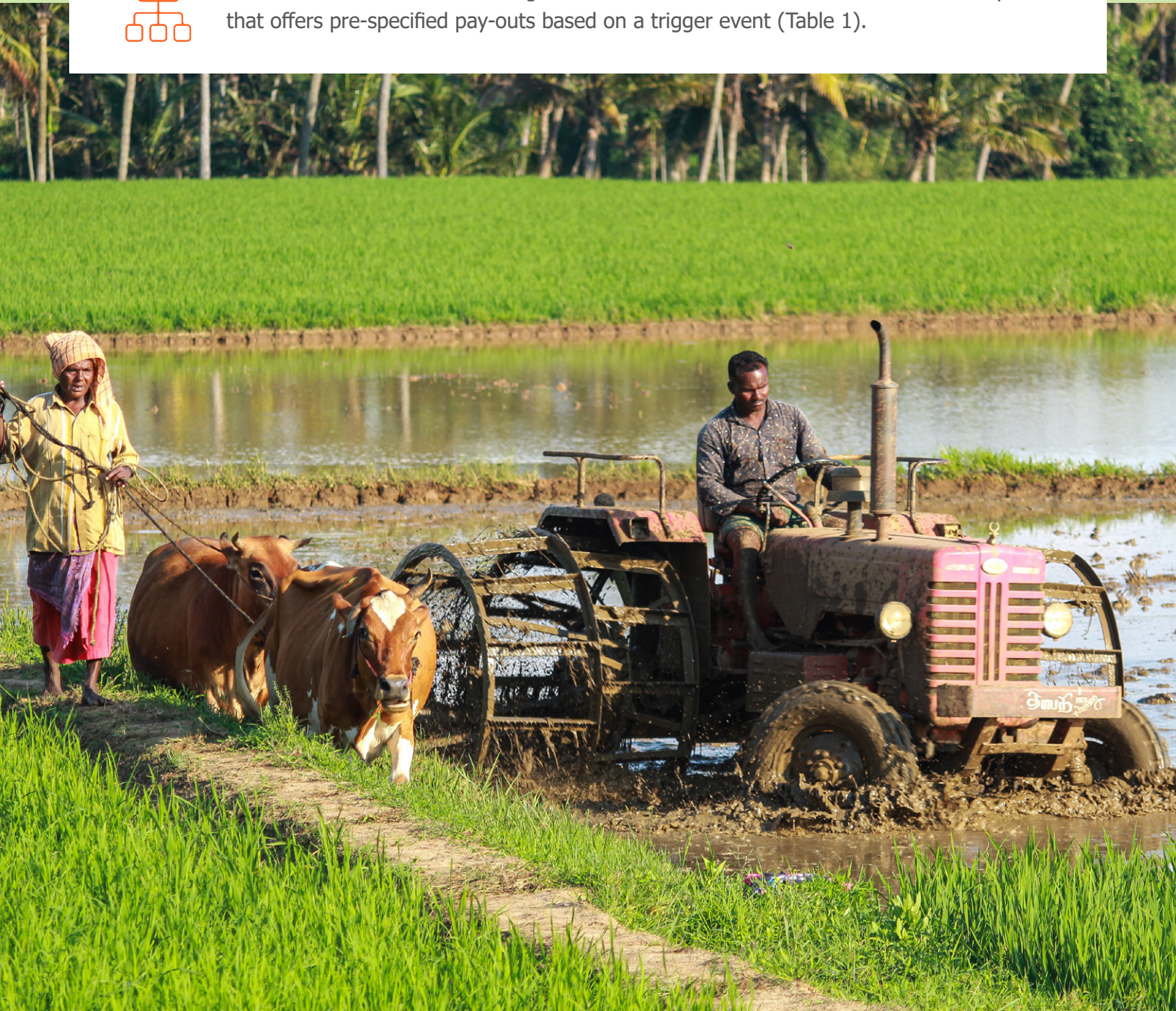


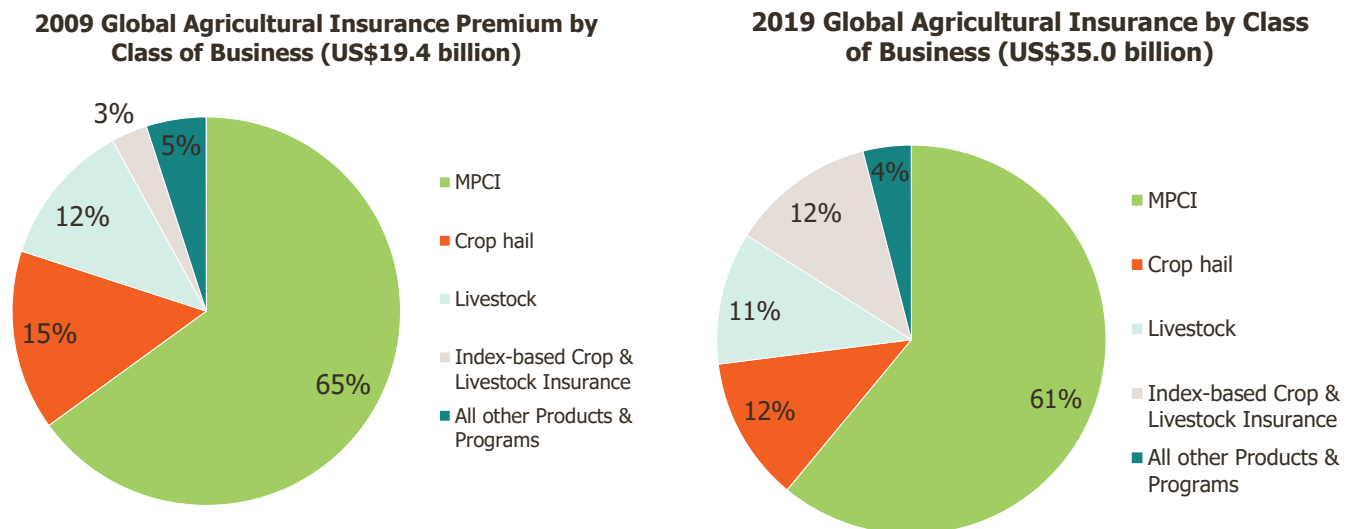


TABLE 1: TRADITIONAL INDEMNITY-BASED AND NEW-INDEX BASED CROP, FORESTRY, LIVESTOCK, AND AQUACULTURE POLICIES

|  Crop & Forestry Insurance Covers |  Livestock & Poultry & Aquaculture Covers |
|---|---|
| Indemnity-based | Indemnity-based |
| Named-peril Crop Ins. (NPCI) - hail + allied perils | Named-peril Accident & Mortality |
| Multi-peril Crop Ins. (MPCI) All natural, climatic and biological perils | All Risks Mortality including diseases |
| Crop Revenue Insurance (CRI) - loss of yield & price | Epidemic disease/ Business Interruption |
| Other specialist covers (e.g. Aggregate Production shortfall cover) | Bloodstock |
| Index-based | Index-based |
| Weather-Index Insurance (WII), based on Ground Weather Stations | Index-based livestock Mortality Insurance (IBLI) |
| Weather-Index Insurance (WII), based on Remote Sensing/Satellite Satellite Indexes | Satellite Index Insurance (NDVI for loss of pasture/grazing). Also termed IBLI |
| Crop Area Yield Index Insurance (AYII) | |
| Other (e.g. specialist Flood Index insurance) | |
| Other Crop | Other Livestock |
| Greenhouse (crops + buildings) | Aquaculture Insurance (fin fish) (Named-Peril and All Risks) |
| Forestry Insurance (Fire/wind, allied perils) | Aquaculture (shell fish) (Named-peril and All Risks) |
| Plantation/ Tree Fruit Insurance ((Fire/wind, allied perils) | Bee Insurance |

Source: World Bank.

FIGURE 4: GLOBAL AGRICULTURAL INSURANCE PREMIUMS BY CLASS OF BUSINESS/TYPE OF PRODUCT (2009 VS. 2019)



Source: 2009 figures Iturrioz & Stutley, 2019 figures Stutley

Traditional Crop Insurance (indemnity-based)

Traditional crop insurance products are an indemnity-based form of coverage, whereas insurance protects against physical loss or damage to the insured crop caused by natural and/or climatic (weather) and/or biological perils. **There are two main types of products: Named Peril Crop Insurance (NPCI), which is a damage-based indemnity product, including loss of crop yield-based policies; these are commonly termed Multi-Peril Crop Insurance (MPCI) policies.** In some countries, such as the US, it is possible for growers to purchase Crop Revenue Insurance (CRI), which combines protection against loss of physical crop yields and loss of market price. Other traditional indemnity-based crop insurance products include greenhouse insurance and standing timber or forestry insurance (Table 1).

Traditional individual grower MPCI is the most widely available type of crop insurance in the world. **It is demanded by farmers because it typically provides loss of crop yield protection against all uncontrollable risks; in other words, the MPCI policy operates as an "all risks" yield shortfall guarantee.** In 2009, it is estimated that MPCI policies accounted for two-thirds of all global agricultural insurance premiums (Iturrioz and Stutley 2011). This has declined to about 61 percent of total premiums in 2019 (Figure 4). MPCI cover is usually provided for cereals and oilseeds (for example, maize, rice, soyabean, sunflower, and wheat), but it can also be designed to cover a wider range of other crops.

With few exceptions, the international experience with individual farmer MPCl is poor. It is characterized by problems of **low uptake** (unless it is subsidized), high levels of **anti-selection**⁴ and **moral hazard**⁵, **high administration** and **operating costs**, and **poor underwriting results**. Many of the individual grower MPCl programs that are voluntary suffer from very high levels of adverse selection and moral hazard. Indeed, these programs are usually very exposed to systemic risks of droughts, floods and windstorms, which correlate at regional and national levels. In addition, the administrative costs of operating individual grower MPCl are usually very high because of the need to conduct pre-inspections on each insured farm. Also, the loss assessment requires the in-field measurement of actual yield at the time of harvest. The premium rates that must be charged to cover the combination of high losses and high administrative costs are often 7.5 to 10 percent or more.

Nearly all individual grower MPCl programs operate at a financial loss (negative underwriting results) and are usually dependent for their existence on government premium subsidies and/or government subsidies on excess claims⁶.

MPCl is not regarded by commercial insurers as a product that is suited to small-scale farmers. Globally, very few insurers are willing to offer MPCl coverage to small farmers, who typically farm no more than 5 to 10 hectares of land — and often much less. Small farmers are no more likely to select against insurers or to exhibit moral hazard behavior than medium and large commercial farmers. However, the costs of sending a qualified inspector to conduct pre- and mid-inspections, as well as individual field loss assessments at the time of harvest, prohibits insurers from covering their administration and operating costs on small farm units. MPCl coverage should be designed and rated according to the individual grower's historical yield performance for each crop. In designing coverage, commercial farmers are able to provide crop production and yield records for about the past 10 years. However, very few smallholder farmers maintain such written and verifiable records (Miranda and others 2016).

⁴ Adverse selection or anti-selection arises when an insured party has more knowledge about their risk exposure than the insurer. The insured party purchases insurance in the knowledge that their policy is likely to incur a claim. For example, with a MPCl policy, farmers in flood plain locations may tend to purchase coverage knowing their land is likely to flood, thus giving rise to a claim. However, those outside of the flood plain do not purchase coverage.

⁵ Moral hazard arises for a policy when the insured modifies their behaviour to the detriment of the insurer as a result of having coverage. MPCl policies that offer protection against uncontrollable pests and diseases tend to be open to moral hazard, whereby a farmer does not apply the recommended pest and disease control measures because they can claim on this policy.

⁶ For a comprehensive review of the performance of public-sector crop insurance, see Hazell and others (1986) and Mahul and Stutley (2010).

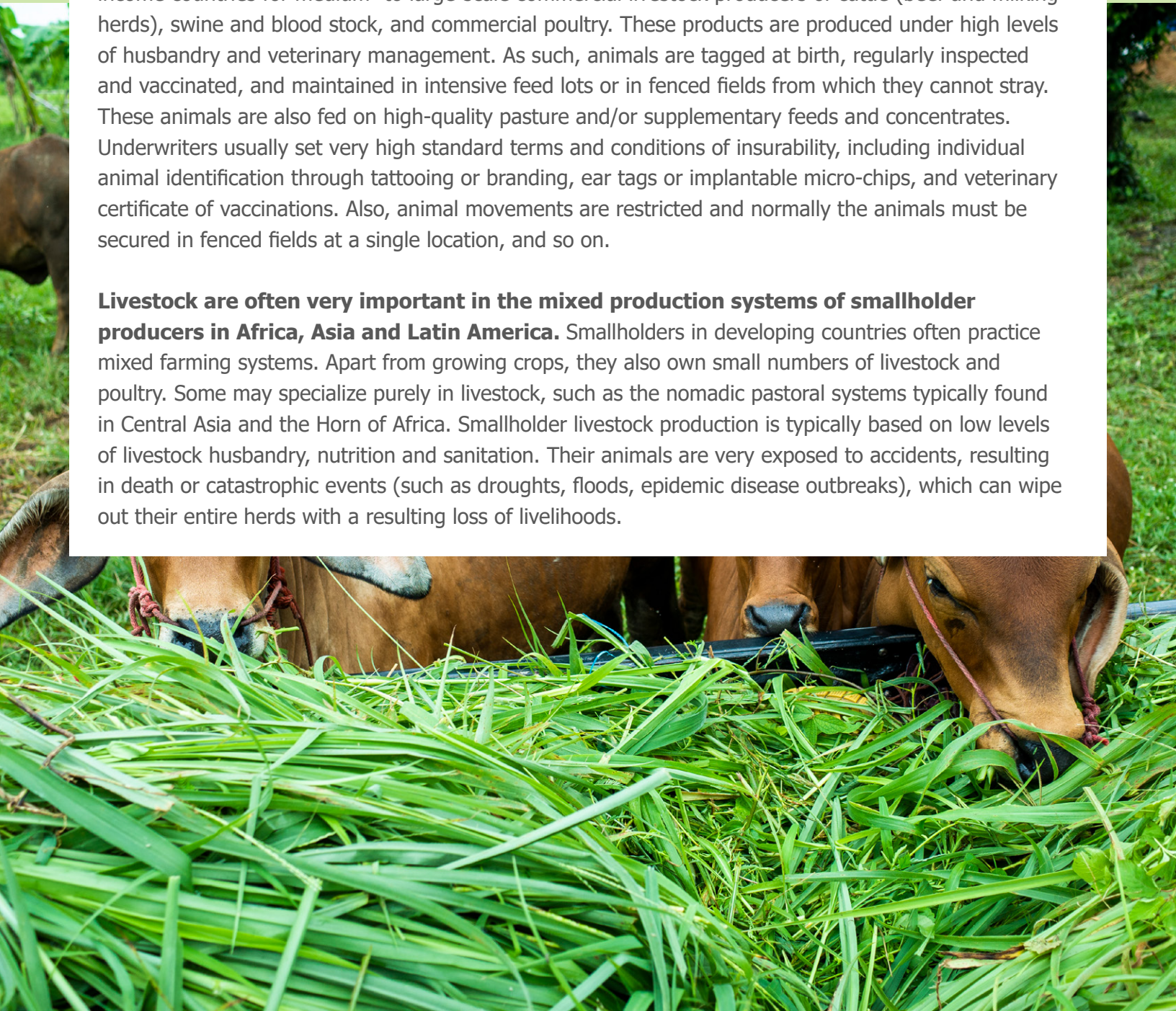
Traditional Livestock Insurance

There are two common indemnity-based livestock insurance products that insure against the death of the animal, namely: **Named-peril Accident/Mortality coverage, which is widely available; and All Risk Mortality coverage, including most notably epidemic diseases.** In addition, there are specialist livestock insurance kinds of coverage, such as bloodstock coverage for high-value breeding and show animals, as well as business interruption coverage against epidemic diseases of livestock (Table 1).

Livestock insurance is the third most important class of agricultural insurance, accounting for 12 percent of global premiums in 2007 and 11 percent in 2019.




Most traditional indemnity-based livestock insurance products have been designed in middle- and high-income countries for medium- to large-scale commercial livestock producers of cattle (beef and milking herds), swine and blood stock, and commercial poultry. These products are produced under high levels of husbandry and veterinary management. As such, animals are tagged at birth, regularly inspected and vaccinated, and maintained in intensive feed lots or in fenced fields from which they cannot stray. These animals are also fed on high-quality pasture and/or supplementary feeds and concentrates. Underwriters usually set very high standard terms and conditions of insurability, including individual animal identification through tattooing or branding, ear tags or implantable micro-chips, and veterinary certificate of vaccinations. Also, animal movements are restricted and normally the animals must be secured in fenced fields at a single location, and so on.

Livestock are often very important in the mixed production systems of smallholder producers in Africa, Asia and Latin America. Smallholders in developing countries often practice mixed farming systems. Apart from growing crops, they also own small numbers of livestock and poultry. Some may specialize purely in livestock, such as the nomadic pastoral systems typically found in Central Asia and the Horn of Africa. Smallholder livestock production is typically based on low levels of livestock husbandry, nutrition and sanitation. Their animals are very exposed to accidents, resulting in death or catastrophic events (such as droughts, floods, epidemic disease outbreaks), which can wipe out their entire herds with a resulting loss of livelihoods.

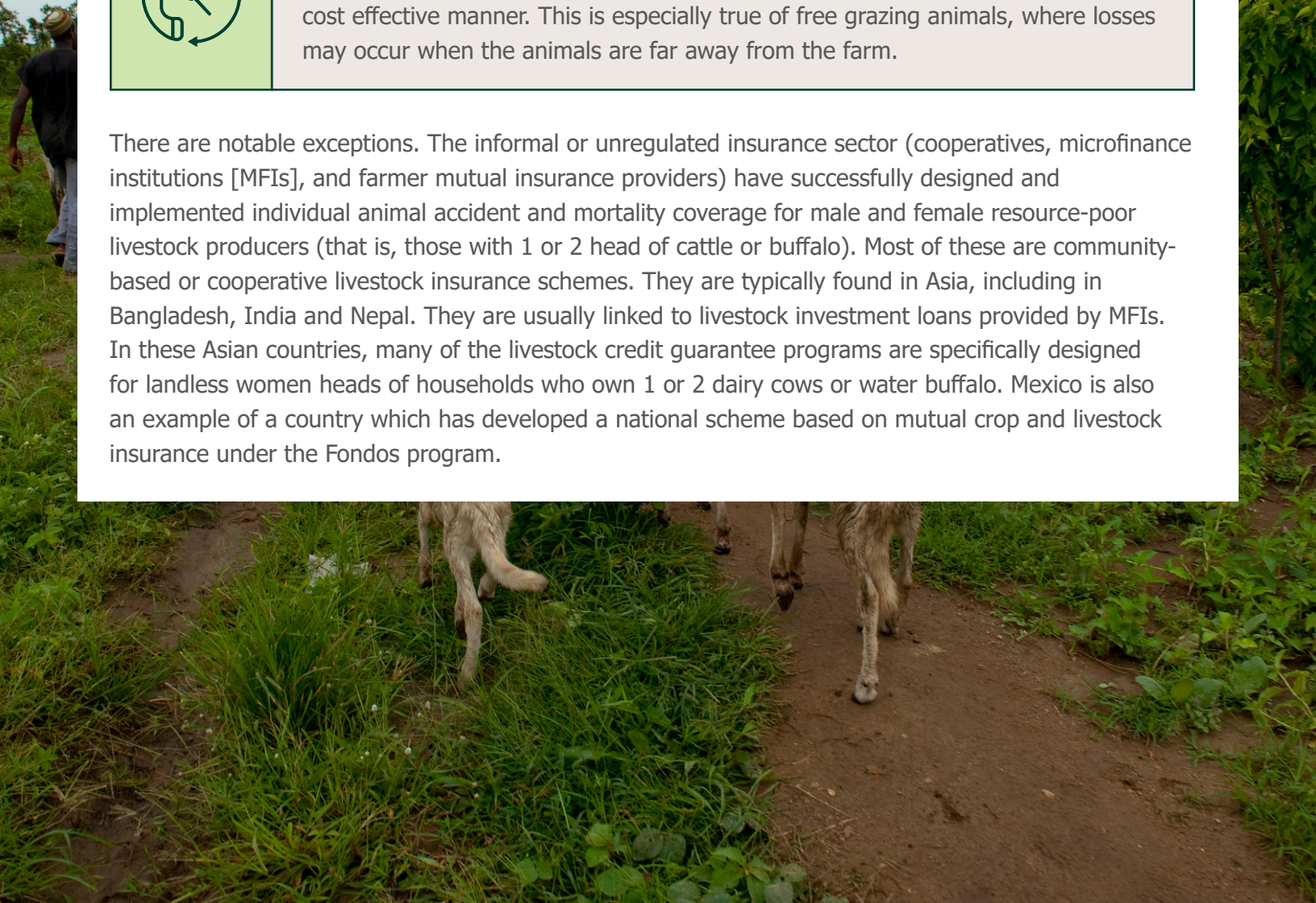


Most of the preconditions for the operation of individual animal mortality insurance are difficult for smallholder livestock producers to meet, especially for those operating under extensive pastoralist production systems. Therefore, there are few examples of successful commercial insurance schemes for poor small-scale livestock producers.

Typical issues faced by smallholders include:

| | |
|--|---|
|  | <p>Animals are free-grazing as opposed to being located within fenced farm boundaries;</p> |
|  | <p>It is often prohibitively expensive for the insurer to visit a producer in a rural location, with 1 or 2 animals registered and tagged, and to then conduct pre-inspections to confirm the health status and vaccination record for each animal; and</p> |
|  | <p>In the event of an insured animal(s) dying, the requirements of loss notification and then loss inspection by a certified veterinarian could not be implemented in a cost effective manner. This is especially true of free grazing animals, where losses may occur when the animals are far away from the farm.</p> |

There are notable exceptions. The informal or unregulated insurance sector (cooperatives, microfinance institutions [MFIs], and farmer mutual insurance providers) have successfully designed and implemented individual animal accident and mortality coverage for male and female resource-poor livestock producers (that is, those with 1 or 2 head of cattle or buffalo). Most of these are community-based or cooperative livestock insurance schemes. They are typically found in Asia, including in Bangladesh, India and Nepal. They are usually linked to livestock investment loans provided by MFIs. In these Asian countries, many of the livestock credit guarantee programs are specifically designed for landless women heads of households who own 1 or 2 dairy cows or water buffalo. Mexico is also an example of a country which has developed a national scheme based on mutual crop and livestock insurance under the Fondos program.



Aquaculture Insurance

Aquaculture insurance is a specialist class of livestock insurance, and availability of coverage is much more restricted than for cattle, shoats, pigs and poultry. According to a World Bank survey (2007), aquaculture insurance was available in about one-third of all countries surveyed. The largest markets have large marine salmon insurance programs (Canada, Chile and Norway). The highest concentration of aquaculture insurance is in Europe, where nearly one in two countries offers this class of insurance. Conversely, with the exceptions of China and Japan, aquaculture insurance was relatively poorly developed or not available in any Asian or Association of Southeast Asian Nations (ASEAN) country at the time (Mahul and Stutley 2010).

The international aquaculture insurance industry offers two main types of mortality coverage for fish stock:



Named-peril coverage: This is typically restricted to natural perils, such as storms, tidal waves, and flooding resulting in the death of the fish stock; it usually excludes all diseases.



All-risk coverage: It offers mortality coverage, typically including diseases of the fish stock, pollution, algae bloom, theft, machinery breakdowns, and so on.



New Crop and Livestock Index Insurance Products for Small-scale Farmers

CROP INDEX INSURANCE

Crop Weather Index Insurance (WII), and Crop Area Yield Index Insurance (AYII), (Table 1) represent alternative approaches to crop insurance for small farmers; such insurance aims to overcome many of the drawbacks of traditional individual grower MPCI crop insurance. The key feature of an index insurance product is **that payment to the insured is based on a pre-agreed index rather than an assessment of the insured's actual losses to their crops.**

As such, it should be more objective and independent. Carpenter and others (2012) classify index insurance products designed to protect against weather events into two categories: indexes that aggregate losses over a group (aggregate loss products); and indexes based on weather variables, such as temperature, wind speed or rainfall (weather index products). Aggregate loss products utilize an index that captures losses across many individuals, typically in the same geographic region. Examples are indexes of area crop yields or area livestock mortality. The index used for an aggregate loss product is designed to serve as a proxy for individual losses. Weather-based indexes are measurements of events that are highly correlated with the losses of the insured.

The most common application of WII is against rainfall deficits or droughts. Rainfall measurements are made at a reference weather station(s) during a defined period(s), and insurance pay-outs are made based on a pre-established pay-out scale in accordance with the insurance policy. **Area-yield index insurance, AYII, is a yield-based policy that provides comprehensive coverage against a wide range of natural, climatic and biological perils: however, it only insures for yield loss at the area level (such as a village, parish or county). Therefore, it does not insure individual farmers against losses in their own fields.**

The main advantages of WII are the elimination of adverse selection and moral hazard problems which are common to MPCI, as well as a reduction in administrative costs. Since pay-outs are made based on an objective measurement at the reference weather station, there are few information asymmetries to be exploited. Thus, the behavior of the insured cannot influence the extent of pay-outs. In addition, WII reduces administrative costs (particularly because it does not require in-field inspections or loss adjustments) for the insurer. In theory, this makes the premiums more affordable for small farmers. However, development costs for WII may be higher. Increasingly remote sensing, satellite indexes are being used in agriculture, including satellite rainfall indexes. These are an alternative to ground-based weather stations where these are not available, or the density is too low.



LIVESTOCK INDEX INSURANCE

Livestock Index Insurance has developed more slowly than crop index insurance. Today, there is only one smallholder livestock mortality index insurance operating in the world, namely the Mongolian Index-based Livestock Insurance (IBLI) program launched in 2005. The Mongolian IBLI product is designed to **compensate herders for livestock losses during exceptionally harsh winters.**

In addition, remote sensing Normalized Difference Vegetative Index (NDVI) insurance against drought in pastures has been widely implemented under commercial insurance programs in Canada, Spain, and the US. It has also been implemented as part of a disaster risk financing and social protection program in Mexico called the (CADENA). It is now also being piloted in Uruguay. In addition, NDVI is being implemented with vulnerable pastoralists in northern Kenya and Ethiopia, either on a voluntary micro-level basis (IBLI) or as part of a social protection program (Kenya Livestock Insurance program, KLIP) launched by the Government of Kenya with technical assistance from the World Bank in 2015.

Recent Developments in Micro-level Index Crop Index Insurance Initiatives

Between 2000 and 2016, there was a proliferation of mainly micro-level pilot crop weather index insurance projects in developing countries, with possibly as many as 150 donor-supported projects in up to 50 countries⁷.

The first WII program was for a rainfall deficit coverage. It was launched in 2003 for marginal farmers producing castor in the Gujarat province. It was offered by ICICI Lombard Insurance Company in conjunction with BASIX, a local MFI. By 2009, there were at least 30 micro-level developmental weather index insurance programs in 18 (mainly) developing countries, as well as 6 meso- or macro-level disaster-relief programs in 20 countries either under pilot implementation or commercial scale-up (WFP and IFAD 2011). Sandmark and others (2013) list agricultural index insurance programs in a total of 40 countries, including both developed and developing countries. The ClimateWise Compendium, which is updated to about 2012, also lists a total of 44 micro-level agricultural index-based insurance schemes either in operational or pilot stages; some are proposed and in development or discontinued⁸. By 2016, the number of micro-level index insurance projects and programs may have reached as many as 150 projects in 50 countries.

⁷ <https://www.worldbank.org/en/news/feature/2016/11/10/what-can-index-insurance-offer-to-development>

⁸ The ClimateWise Compendium is available at:

<http://www.cisl.cam.ac.uk/business-action/sustainable-finance/climatewise/pdfs/climatewise-compendium-of-disaster-risk-transfer.xlsm/view>

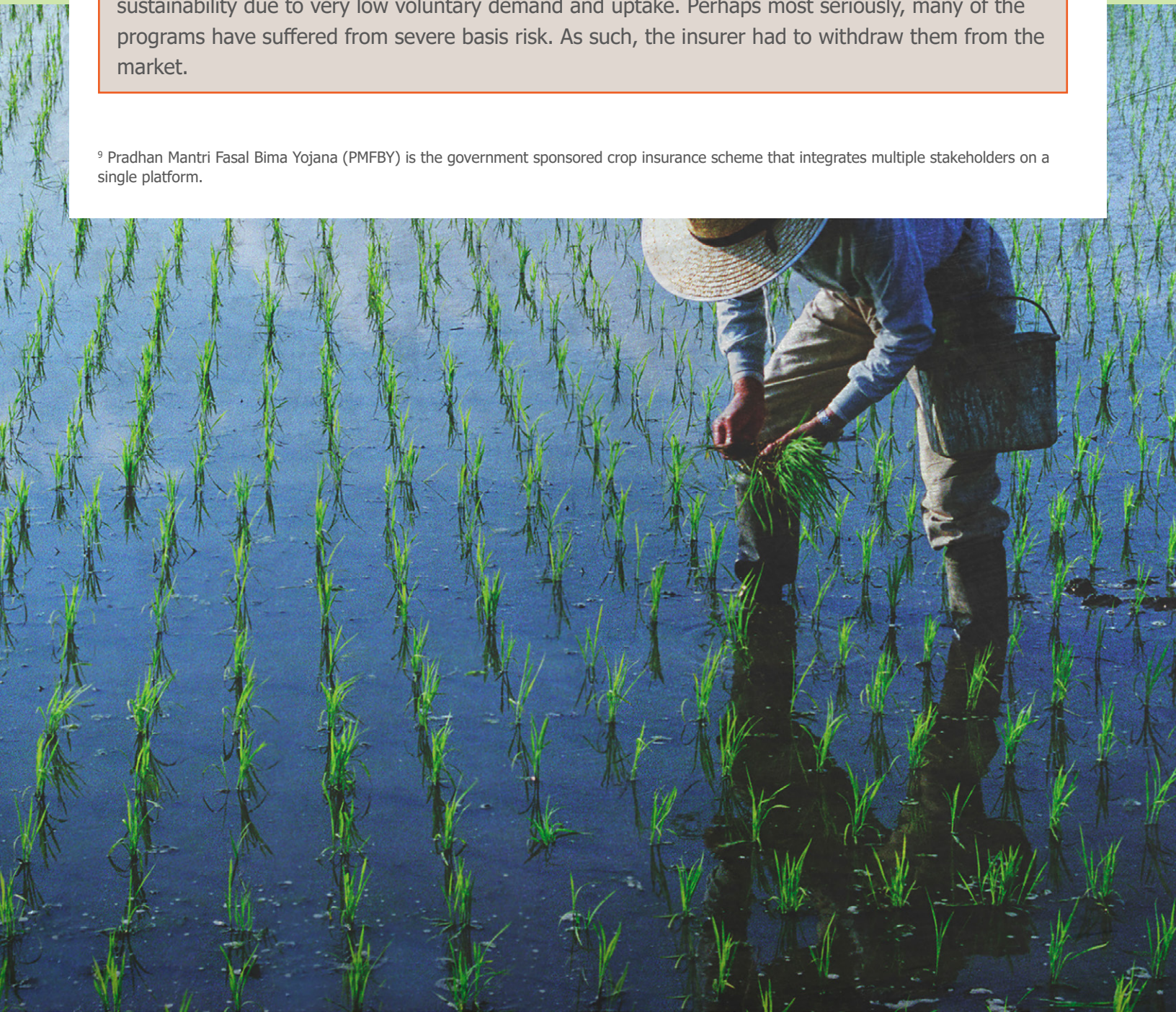


Crop and livestock index insurance was a very small sector in 2009, accounting for about 3 percent of total agricultural insurance premiums. However, there has been a huge expansion of index-based insurance in the past decade, particularly in India with the PMFBY⁹ AYII and WII programs. Together, they now insure in excess of 50 million small-scale farmers each year and account for more than US\$4 billion in premiums. Also, Mexico has seen major growth in index insurance, especially under the CADENA large-scale social programs. In addition, index insurance in 2019 accounted for about 12 percent of total global premiums, making it the second largest class of agricultural insurance after MPCl (Figure 4).

Many of these first-generation, micro-level weather index insurance (WII) programs have, however, failed to survive beyond the pilot project phase and have been closed.

Typical problems faced by these pilot crop WII projects include failure to achieve scale and sustainability due to very low voluntary demand and uptake. Perhaps most seriously, many of the programs have suffered from severe basis risk. As such, the insurer had to withdraw them from the market.

⁹ Pradhan Mantri Fasal Bima Yojana (PMFBY) is the government sponsored crop insurance scheme that integrates multiple stakeholders on a single platform.



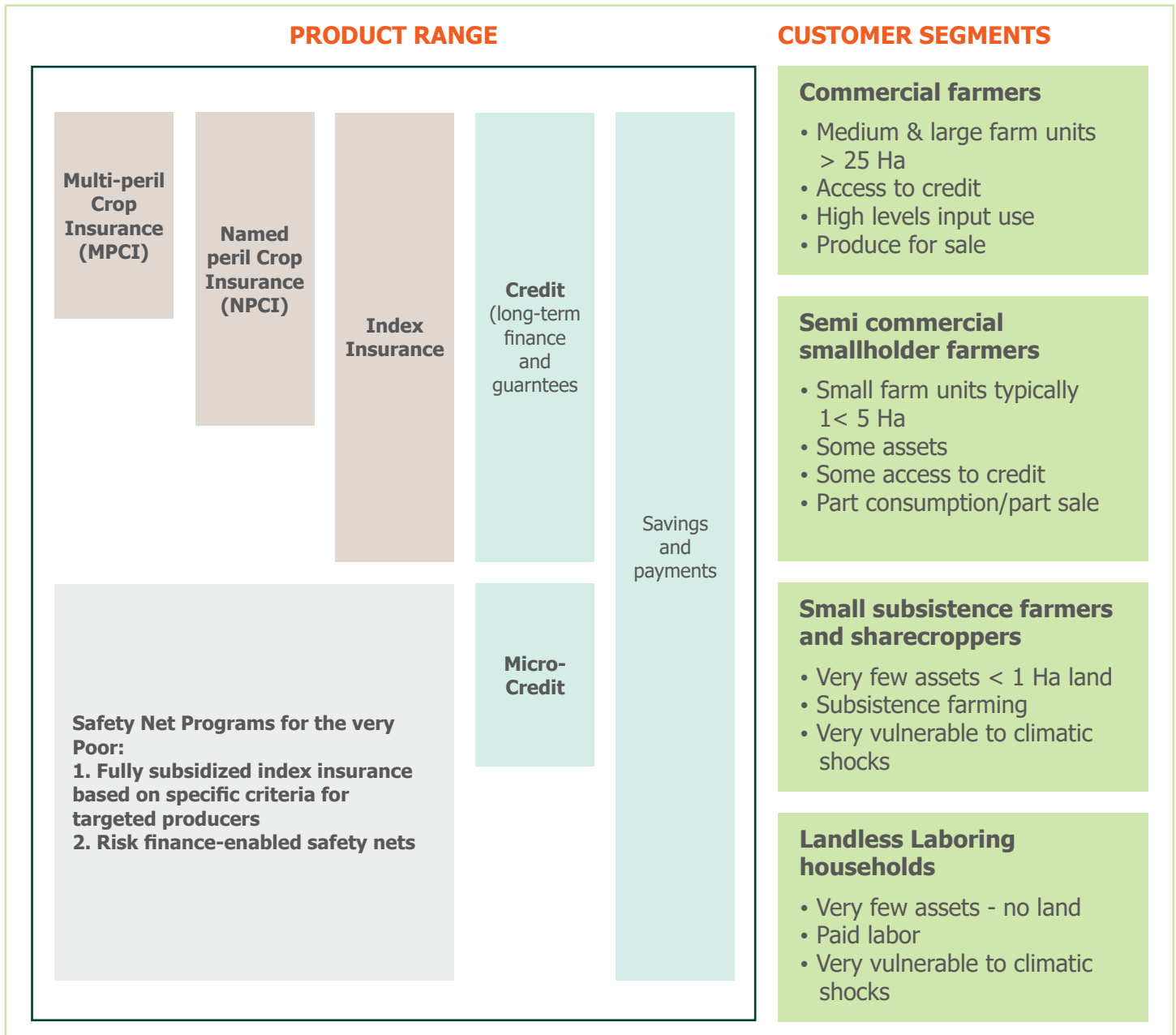
3. Tailoring Insurance Products/Programs to Farmers

In the past, much agricultural insurance product development has been supply-led by insurers who have offered their standard products to all farmers, irrespective of the suitability of the products to different socioeconomic segments of the farming population. The previous sections have highlighted the fact that MPCCI and NPCCI indemnity-based products are not suitable for small-scale farmers because of the very high administrative and operating costs associated with such products/programs. Conversely, index insurance appears to show promise for small-scale semi-commercial farmers (Figure 5).

Index insurance (WII or AYII) is, however, not a particularly suitable product for very poor subsistence farmers (as a micro-level, individual farmer policy). For these very poor farmers who can often barely produce enough food to consume, selling them an expensive WII product that protects against 1 or 2 perils only — or an equally expensive AYII product — does not meet their risk management needs. Rather, ways of promoting **savings** and **social protection** through **meso- or macro-level index insurance coverage** — or using **meso-level coverage to enable greater lending after a serious weather event** — may be more appropriate to meeting the needs of **subsistence farmers** (Figure 5).




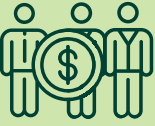

FIGURE 5: DESIGNING CROP AND LIVESTOCK INSURANCE TO MEET THE RISK TRANSFER REQUIREMENTS OF FARMERS



Source: World Bank, adapted from Skees and others (2009).
 Note: ha= hectare.

4. Flexibility of Index Insurance at Various Levels of Aggregation

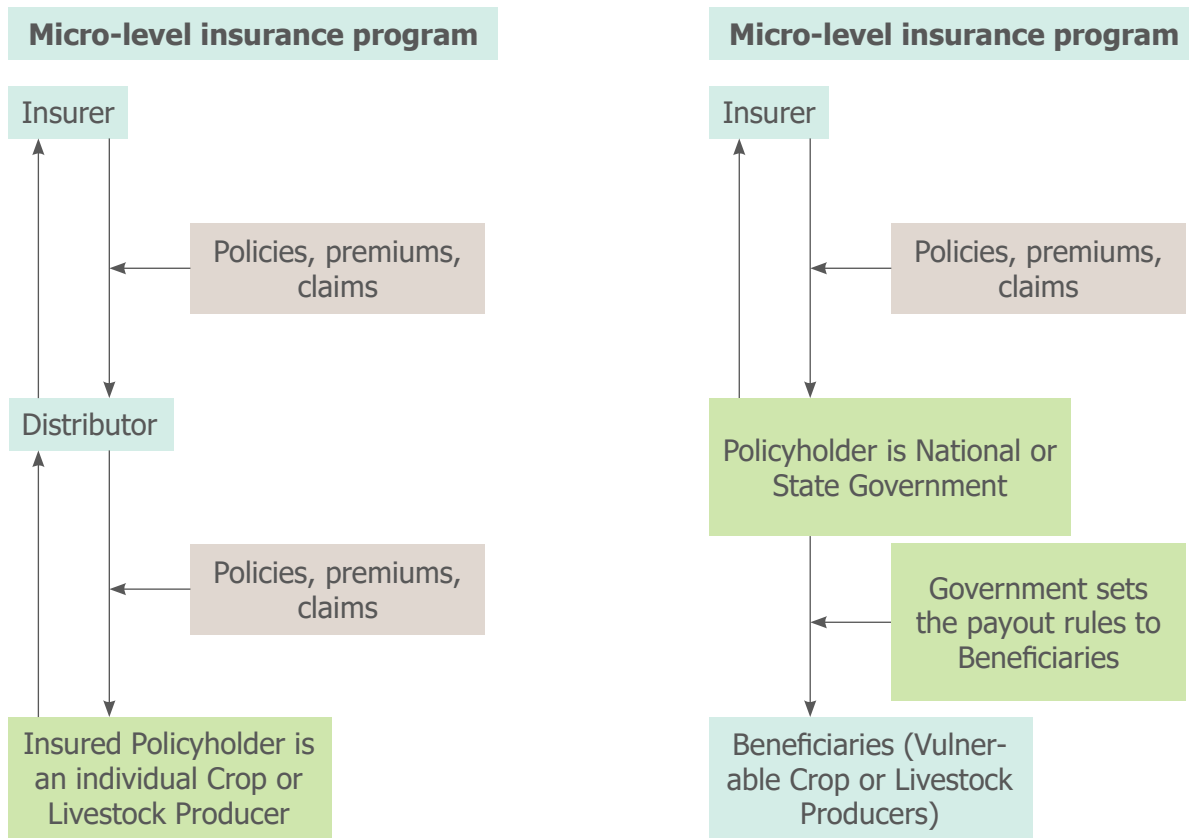
Parametric or index insurance is a very flexible insurance product that can be offered to clients at different levels of aggregation including:

| | |
|---|---|
|  | <p>Micro-level policy (direct): Policyholders are individuals, for example, farmers, market vendors or fishermen, who hold policies and receive pay-outs directly. Policies are often sold at the local level and retailed through a variety of channels, including microfinance institutions, farmers' cooperatives, banks, non-governmental organizations (NGOs) and local insurance companies. Premiums are either paid in full by clients or subsidized (or both).</p> |
|  | <p>Meso-level policy (indirect): Policyholders are risk aggregators such as rural banks, MFIs, farmer associations, cooperatives, mutuals, credit unions or NGOs, whereby a (re)insurer makes payments to the risk aggregators, which then provide services to individuals.</p> |
|  | <p>Macro-level policy (indirect): Policyholders are governments or other national agencies. Pay-outs can be used to manage liquidity gaps, maintain governmental services, or finance post-disaster programs and relief efforts for predefined target groups. Beneficiaries of these programmes can be individuals. These schemes can be operationalized through regional risk pools (MCII 2016).</p> |

The institutional and operational differences between a conventional micro-level policy purchased by an individual farmer and a macro-level policy are illustrated in Figure 6. Under a micro-level index policy, the individual farmer is the policy holder. The payment is for a pre-agreed, up-front premium; as such, the policy holder would receive a policy to protect them against a specific peril(s) as stated in the policy. In the event that the index is triggered, they would receive a pay-out from the insurance company (micro-insurer). Under a macro-level policy, a state or national government is the insured policy holder, and they are responsible for the payment of the premium. In the event that the index is triggered, the government receives a lump sum pay-out, which it can then use for whatever purposes it chooses.

Macro-level programs have been designed to enable governments to effect immediate post-disaster response activities at a regional level; support cash or in-kind transfer programs; and provide general budgetary support in the event of a natural disaster. Another option is for the government and insurers to pre-agree on the beneficiaries and the individual sums insured. Then, in the event of the policy being triggered, the pay-outs would be made directly to the individual beneficiaries.

FIGURE 6: CONTRACTUAL FRAMEWORK FOR MICRO-LEVEL INDEX INSURANCE FOR INDIVIDUAL FARMERS VERSUS MACRO-LEVEL GOVERNMENT DISASTER RISK FINANCING SCHEME



Source: Adapted by author based on Dick (2009).



There is a growing body of international experience to show that, over time, governments can purchase macro-level, ex-ante catastrophe climatic and natural peril index insurance as a complement to — or even as a substitute for — their ex-post natural disaster relief programs.

The most common use of index insurance to date has been as a contingent or disaster risk financing instrument to provide governments with an immediate source of financial liquidity in a post-disaster situation. It can be used to purchase emergency relief and food aid assistance. Such insurance is commonly termed sovereign risk insurance.

Some examples of sovereign risk insurance include:

2006

The Ethiopian government purchased drought index coverage based on rainfall deficits measured over a basket of ground-based weather stations.

2008

The Malawi government purchased macro-level rainfall deficit coverage to protect against shortfalls in production and yields of maize (the national staple food crop).

2011

Over the last decade, the Mexican government has substituted ex-post disaster relief funding for subsistence crop, livestock and fisherfolk, with macro-level social protection, that is, parametric (index) insurance coverage under the CADENA¹⁰ Program. Under this program, the federal and state governments offer subsidies for the insurance premiums.

**2015/
2016**

The Kenyan government has been using satellite-based pasture drought index insurance as a risk financing mechanism to trigger timely pay-outs to vulnerable pastoralists. This would enable them to purchase fodder and water for their livestock in times of severe El Niño/La Niña (ENSO) droughts. This program is 100 percent financed by the Kenyan government.

2017

The World Food Program (WFP) has been collaborating with a regional government in Ethiopia to provide macro-level satellite drought index insurance to vulnerable pastoralists in selected locations of the Somali Region¹¹.

¹⁰ CADENA (Component for the Attention of Natural Disasters).

¹¹ This program is known as Satellite Index Insurance for Pastoralists in Ethiopia (SIPE). The World Food Program funds the premiums, and pastoralists are expected to participate in public risk management works to contribute toward the costs of their premiums.

The potential advantages of a macro-level approach to weather index insurance for poor people include:



The **ability to protect a very large number of poor people under a single insurance policy**, which is purchased by the national government;



Reduced operational costs as awareness creation and education, sales and marketing to individuals insured is eliminated; the government can use existing disaster relief distribution infrastructure to channel pay-outs **to the beneficiaries; and**



In theory at least, **basis risk poses much less of a problem to governments under a macro-level index insurance program than to individual farmers buying a micro-level policy.**

In practice, basis risk can still be an issue resulting from product design, calibration and communications and understanding of what is covered.

Insurance practitioners are also promoting the concept of meso-level index insurance to protect the financial exposure of regional aggregators, such as input suppliers and agricultural banks and microfinance institutions. Potentially, this is a much cheaper and more cost-effective way of insuring the financial sector and input suppliers that service the small-scale farming sector in developing countries — rather than trying to promote, distribute and manage individual farmer, micro-level voluntary programs. However, to date, there are very few examples of meso-level index insurance programs that have been expanded.



5. GIIF Experience with Micro-crop Index Insurance for Small Farmers

The Global Index Insurance Facility (GIIF) is a multi-donor program managed by the World Bank Group, and supported by the governments of Germany, Japan, the Netherlands, and the European Union. Its main objective is to strengthen the resilience of smallholder farmers against climatic and other catastrophic risk by developing markets for suitable insurance products. To achieve this objective, GIIF typically partners with and offers different types of support to insurance market stakeholders (e.g. (re) insurance companies, insurance intermediaries, regulators, ministries of agriculture and other farmer aggregators) in developing and emerging markets.

GIIF support is aimed at addressing key barriers to entry into the index and catastrophic insurance market, and consists of:



Market assessments such as feasibility studies, value chain assessments, and impact studies. These provide insurance market stakeholders with information on potential demand for index insurance in a particular market across different agricultural value chains, existing constraints and recommended solutions, as well as partnerships that could be leveraged to sustainably develop and distribute insurance products.



Operational or technical support in the development of products, distribution channels, and awareness raising programs.



Capacity building support to strengthen insurers' and regulators' capacity to develop or evaluate index insurance products.



Knowledge products such as technical handbooks, and platforms that facilitate the exchange of information on lessons learnt and best practice.



GIIF insurance partners underwrite a wide range of index-based products. Weather index insurance (WII) is typically the first product rolled out during the pilot and early scale-up phases of their index insurance programs, especially in countries where weather-related risk is the main concern for smallholder farmers. This was the case in countries such as Senegal, Mozambique, and Zambia which are prone to drought and excessive rainfall, and the Philippines which is highly exposed to typhoon risk. Once the insurers gain more experience (in product design and other types of non-climatic risks that their clients might be exposed to), other types of indices such as soil moisture indices (based on the amount of moisture available to crops in the soil), area yield, and even combinations of different indices are eventually rolled out. This has been observed in countries such as Kenya, where rainfall-based WII was pilot tested in 2009 and was the main product offered up until 2013, when area yield index insurance was introduced to address pest and disease risk.

GIIF partners in various countries leverage partnerships to achieve scale. This occurs on the product distribution side, through partnership with meso- and macro-level (government) farmer aggregators. It also occurs on the risk sharing side, through partnerships between insurers to share risk, knowledge and awareness raising costs, and through partnership with a range of regional and international reinsurers.

GIIF was established in 2010 and has facilitated over 9.6 million index insurance contracts to date.

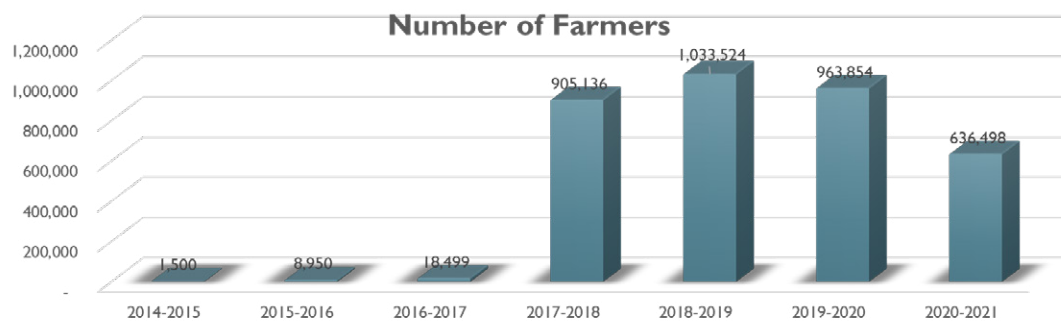


Case Study: Weather Index Insurance in Zambia

In 2015, GIIF partnered with Mayfair Insurance to scale up index insurance in the Zambian market. Mayfair is a general insurance company which received its Zambian insurance license in March 2010. It began to offer agricultural index insurance in 2014 (on a pilot basis), recognizing the importance of the agricultural sector in the country and the need for more inclusive insurance products. The insurer has since grown this portfolio to cover about 636,000 smallholder farmers by 2020. Mayfair is the leading agriculture underwrite in Zambia, with agri-insurance contributing to about 33% of its total business.

Mayfair offers both MPCl and index insurance products. Most of Mayfair's index insurance portfolio is based on weather indices. A livestock insurance product based on NDVI was also introduced in 2020.

FIGURE 7. GROWTH OF MAYFAIR'S INDEX INSURANCE PORTFOLIO: 2014 - 2020



Mayfair attributes the growth of its index insurance portfolio to:



Strong partnerships (especially public-private partnership) and the bundling of products with credit and conservation agriculture advisory services. Mayfair has also developed good relationships with a panel of reinsurers, the insurance regulator, and product development specialists.



Farmer and field staff **sensitization**.



Digitization for premium collection and claims payment using Mobile Money.



A **customer centric approach** to product development and improvement, through field verification, validation of weather data, and the exploration of different types of products.

The Mayfair index insurance business line has also been affected by various challenges, which the insurer continues to address to sustain the business:



Awareness raising logistics: Mayfair has traditionally applied a training-of-trainers sensitization model. For instance, under Mayfair's ongoing partnership with the Ministry of Agriculture (MoA) through which insurance is bundled with input subsidies, farmer sensitization is conducted by MoA field agents who receive product training from Mayfair. However, due to COVID-related social distancing requirements, the insurer has recently been forced to consider other approaches.



It is difficult to offer agricultural insurance as a stand-alone product. Therefore, the insurer continues to develop and maintain partnerships that allow for the bundling of insurance with other products and services.

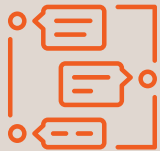


The need for end-to-end process digitization. This would allow for efficient farmer registration and sensitization.

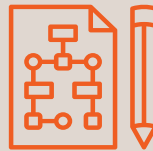


Basis risk, which Mayfair continues to address through field verifications (both physical and using remote sensing) and product improvement.

Going forward, Mayfair's business model will continue to be centred around two key pillars:



Client value through ongoing collection of client feedback and development of partnerships that make products more accessible to end beneficiaries.



Business viability through increased product and risk diversification, and scale.

6. Area Yield Index Insurance as an alternative to MPCI for Small Farmers

AYII is a loss-of-crop-yield policy that aims to overcome many of the drawbacks of traditional individual farmer MPCI crop insurance; as such, it is suited to the needs of small-scale farmers. The key feature of this product is that it does not indemnify crop yield losses at the individual farmer or field level. Rather, an area yield index product makes **indemnity payments to farmers according to yield loss or shortfalls against an average area yield (the index) in a defined geographical area** (for example, a district, subdistrict, parish, or village). This is commonly referred to as the Unit Area of Insurance (UAI).




The key advantages of the area yield approach are that **moral hazard and anti-selection are minimized**. Also, administrative costs are significantly reduced, making this product much more suitable to offer to small-scale farmers. Under an AYII policy, yield losses are settled against the area average yield index; thus, there is no settling of losses on individual farmer fields. This means that individual farmers cannot influence the yield outcome, for example by purchasing cover only for fields in low-lying areas subject to flooding and water logging (anti-selection), or by applying sub-optimal levels of husbandry and pest, disease, and weed control (moral hazard) in the expectation of then claiming the yield loss on their crop insurance policy.

The costs of operating AYII are much lower than for a MPCI policy, especially because individual farm pre-inspections and in-field crop loss assessments are not required. It also offers the potential to market this product at lower premium costs to small and medium-size farmers (see Table 2 for further advantages of AYII).

The main disadvantage of an area yield index insurance policy is basis risk, namely the difference in the actual yield outcome achieved by individual farmers on their own fields and the average area yield. For example, an individual farmer may incur severe crop production and yield losses due to localized perils (for example, hail or flooding by a nearby river). However, because these localized losses do not impact the county or departmental average yield, the grower does not receive any indemnity. Other problems include the need for an accurate procedure to measure the average area yields in the defined UAI (Table 2).



TABLE 2: AREA YIELD INDEX INSURANCE: PRECONDITIONS FOR OPERATIONS, ADVANTAGES, AND DISADVANTAGES

|  <p>Preconditions</p> |  <p>Advantages</p> |  <p>Disadvantages</p> |
|---|--|--|
| <ul style="list-style-type: none"> • Homogeneous cropping systems in the defined geographical area (for example, region, district, county) that form the Unit Area of Insurance. • Accurate historical regional yield data. • Timely, accurate, and impartial procedures for estimating actual average yield in the Unit Area of Insurance. • In some cases, special insurance regulation(s). | <ul style="list-style-type: none"> • Individual-grower time series yields are not needed. • Data are available: regional yield statistics are recorded in most countries. • Delivery cost to growers is lower. • Product is suited to systemic risk (for example, drought). • Adverse selection and moral hazard are minimized. • No in-field loss assessment is required. • Cost of loss assessment is reduced. • It is yield-based, so it picks up all weather risks and other causes of shortfalls. | <ul style="list-style-type: none"> • Basis risk is an issue (although the risk is lower than for Crop Weather Index Insurance [WII]). • The product is not suitable for localized perils (for example, hail). • Accurate measurement of actual average yields in insured units may be difficult. • Farmers' acceptance may be difficult. |

Source: World Bank Group.

To operate an AYII cover, it is necessary to have:



Accurate historical yield data (with a minimum of 10 to 15 years) at the local area level (UAI) as the basis on which to construct a yield index; and



An objective and accurate method of establishing the actual average yield in the insured growing season to determine if a pay-out is due.

In most developing countries where AYII is being commercially implemented (including India and now Pakistan, as well as Ghana, Kenya, and Uganda), the government agricultural extension services are involved in the implementation of seasonal crop yield surveys through crop-cutting experiments (CCEs). In these experiments, crops are harvested from randomly located subplots (for example, 5 meters x 5 meters) in randomly selected farmers' fields. They are then threshed and weighed; once fully dried, the average yield for that plot can be estimated. Typically, between 15 and 20 CCEs will be taken in the defined UAI, and the yields will be averaged to determine the actual average yield for that UAI. Where the average actual yield is below the insured yield coverage level, all insured farmers receive a pay-out based on the amount of yield shortfall in the UAI.



7. Bundling of Micro-level Crop Insurance with other Products/Services

Crop and livestock insurance can be bundled with credit, thereby unlocking access to credit for small emerging farmers. Many financial institutions are reluctant to lend seasonal crop credit or livestock investment loans to small farmers/herders because they often lack collateral and are seen as posing a high risk. By bundling crop or livestock credit with an agricultural insurance policy, the financial institution's loans can be protected against default in the event of major climate-induced crop failure or the death of the animal. Experiences from Brazil, India, Kenya, Malawi, Mexico, Pakistan, Thailand, and Zambia demonstrate that when bundling is adopted, banks are generally more comfortable in extending seasonal crop loans to small farmers.

From an insurer's perspective, bundling can be a highly cost-effective way of distributing their crop and livestock insurance products to the financial institution's existing client base of borrowers, thereby enabling them to achieve higher penetration and participation than if they were to sell insurance directly to individual farmers. The bundling of credit and insurance also reduces issues of adverse selection for insurers.



Case Study 1: One-Acre Fund in East Africa

Farmers are usually agreeable to bundling when it clearly represents a value-added proposition to them. For example, since 2012, the One Acre Fund (1AF) has been providing seasonal crop production loans to small farmers in Burundi, Kenya, Rwanda, Tanzania and most recently Uganda. The 1AF provides a package of products and services to these small farmers. Crop credit is provided in kind in the form of improved seeds and fertilisers, which are purchased in bulk by the 1AF. They are then delivered to the farmer's village, and farmers are provided with education and training in the improved crop technology by the 1AF employed extension officers. Following the harvest, farmers can elect to market their crops to the 1AF or to other marketing outlets to repay their loans. In Kenya and Rwanda, the 1AF also purchases crop WII or AII as part of the bundled crop credit package. In Kenya nearly 500,000 1AF small-scale maize farmers were protected with government-subsidized crop AYII in 2018. The 1AF program of bundled inputs, credit and crop insurance is leading to significant increases in production and yields, as well as returns (income) for its participating male and female farmers.

Case Study 2: Oxfam America/World Food Program R4 Program in Africa and Asia

The R4 Rural Resilience Initiative is supported by Oxfam America and the World Food Program. It began in Ethiopia in 2009. The R4 aims to build resilience to climatic shocks of food-insecure smallholder farmers through integrated risk management combining the following 4 strategies:



Risk reduction works: Risk reduction is achieved through better soil and water management and improved agricultural practices.



Credit: This entails prudent risk-taking and easier access to credit to enable better investments in improved seed and fertilizer technology.



Group savings: This enables farmers and communities to absorb low-impact climatic shocks.

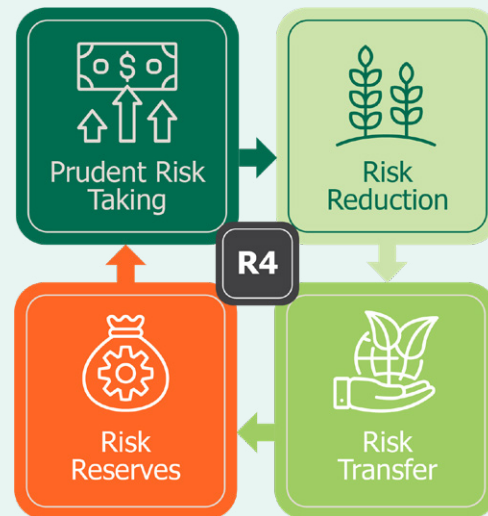


Risk transfer: This involves the transferring of risk of potentially catastrophic climate hazards to the private insurance markets (Figure 7).

The R4 started in the Amhara and Tigray provinces of Ethiopia in 2009. It offered weather index insurance (WII) against rainfall deficits (droughts) in rain-fed teff and wheat. The WII product covered early and late season rainfall deficits.

In Ethiopia, the program suffered from severe product-design basis risk in 2015. As such, farmers incurred severe drought losses in their crops, but only received small pay-outs. Subsequently the R4 has branched out, developing AYII and a hybrid WII/AYII product, NDVI insurance, and flood index insurance in Bangladesh.

FIGURE 8: R4 BUNDLED APPROACH TO RISK REDUCTION AND RESILIENCE BUILDING



Source: R4 Annual Report 2020

The R4 program has expanded considerably over the past 12 years. In 2020, it was implemented in 10 countries (including 9 African countries and Bangladesh), and it insured a total of 173,279 mainly very small-scale vulnerable farmers and their families, thereby protecting about 900,000 people. The program is reaching out to women farmers who accounted for 55 percent of all insured individuals in 2020. Over the past 12 years, the program has generated premiums of US\$ 9.2 million and made pay-outs of US\$ 4.2 million, with a long-term average loss ratio of 45 percent. In addition, the R4 has been very successful in forming savings groups: in 2020, 4,000 savings groups supported 85,000 farmers, and prudent loans of US\$ 400,000 were provided to farmers for productive investments (WFP 2020).





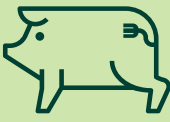
A unique feature of the R4 is that resource-poor farmers have the option to pay their premiums in cash or in kind through the provision of their labor for drought risk reduction programs. In Ethiopia, farmers are required to pay a minimum of 15 to 20 percent of their premiums in cash. Beyond this, they may elect to pay for their premiums in kind through their labor under what is termed the Insurance for Assets (IfA) Program, which is linked to the government's Production Safety Net Program (PSNP). The PSNP provides conditional food and cash transfers to chronically poor Ethiopian families. Because the R4 program allows farmer to pay their premiums through labor, farmers and communities benefit through the risk reduction public works programs, even when there is no insurance pay-out. This is in contrast to conventional insurance, where the payment of cash premiums is non-refundable in the event of no pay-out on claims.

8. Government Support for Agricultural Insurance

Why Governments Intervene to Support Agricultural Insurance

Most life and non-life insurance are provided by private commercial insurers. Therefore, they do not attract any form of government financial support. **However, agricultural insurance is unique in attracting very high levels of government support, particularly in the form of premium subsidies.**

Governments often intervene in agricultural insurance markets for the following reasons:

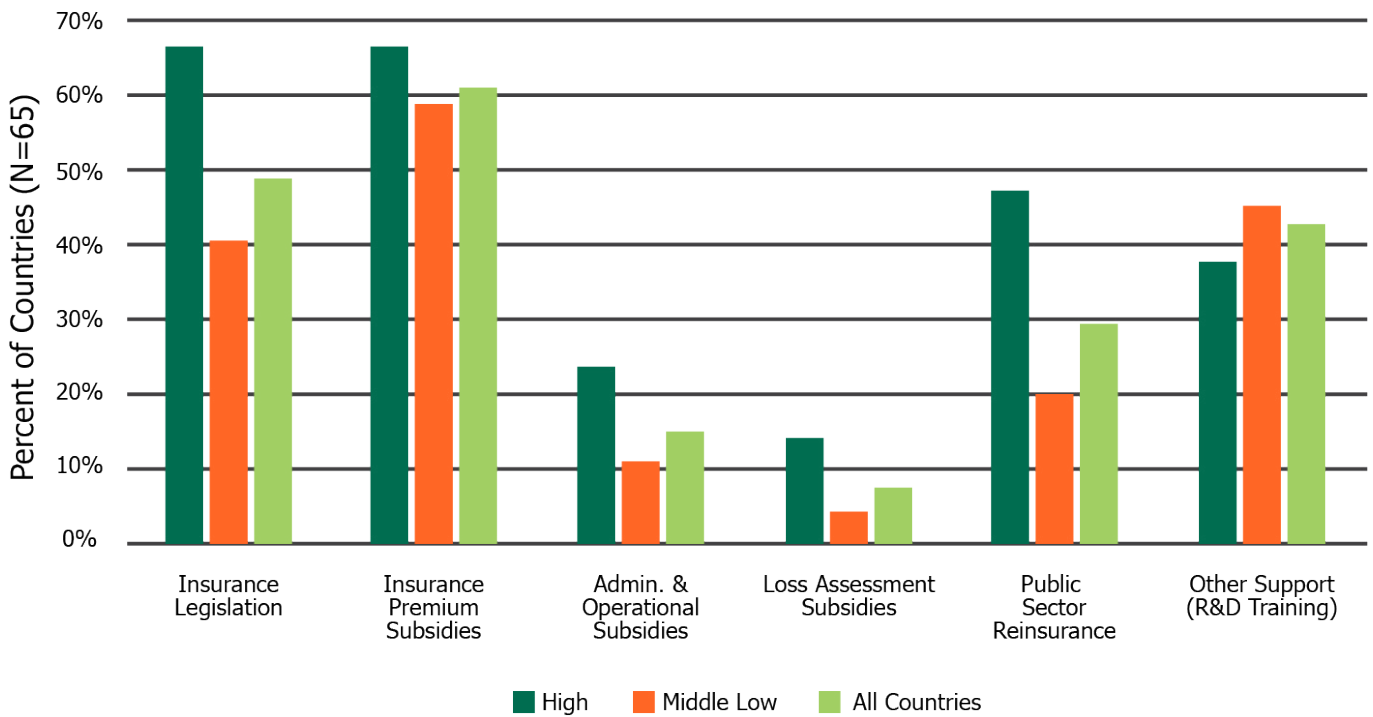
| | | | | |
|---|---|--|--|---|
|  |  |  |  |  |
| <p>Market failure due to poorly developed insurance markets and the lack of availability of private-sector agricultural crop and livestock insurance;</p> | <p>Reluctance of commercial insurers to develop agricultural insurance programs because of the prohibitively high start-up costs;</p> | <p>Financial capacity constraints faced by private commercial insurers, particularly for systemic risks (such as droughts, floods, epidemic diseases, and so on);</p> | <p>High costs of insurance administration for small farmers; and</p> | <p>Inability of small and marginal farmers to afford agricultural crop and livestock. (Mahul and Stutley 2010).</p> |

There are benefits for both governments and farmers from partaking in agricultural insurance. For farmers, these advantages are centred around stabilizing consumption and income in the event of crop failure, as well as improving creditworthiness. In addition, there is an improved ability to repay agricultural credit. For governments, the advantages are similar but on a larger scale. By providing access to insurance, governments can stabilize agricultural incomes and reduce the need for ad-hoc disaster relief. This can also lead to the fulfillment of social objectives by reducing rates of rural-urban migration.

Forms of Government Support for Agricultural Insurance

The 2008 World Bank survey of 65 countries showed that levels of government support to agricultural insurance was extremely high in both the developed and emerging and low-income countries. The most common forms of government support included **premium subsidies, which were** provided in nearly two-thirds of surveyed countries (63 percent), followed by **agricultural insurance legislation** (49 percent of countries), and **government financial support for agricultural reinsurance**, usually through a national reinsurer (29 percent of all countries) (Mahul and Stutley 2010). See Figure 9 and Box 1 for further details.

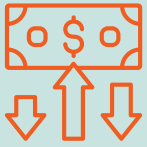
FIGURE 9: TYPES OF GOVERNMENT SUPPORT TO AGRICULTURAL INSURANCE BY COUNTRY INCOME STATUS



Source: Mahul and Stutley (2010)



Box 1. Types of Government Financial and Other Support to Agricultural Insurance (2007)



Premium subsidies applied to two-thirds of the surveyed countries, that is, 63 percent of countries with crop insurance programs and 35 percent of countries with livestock insurance programs. The provision of crop premium subsidies was similar across regions irrespective of economic status, except for the poorest low-income countries. In this case, only 40 percent were provided with agricultural insurance premium subsidies. In 2007, agricultural insurance premium subsidies cost governments US\$6.6 billion or 44 percent of global agricultural insurance premiums. Of this amount, US\$5.8 billion went toward crop insurance premium subsidies.



Agricultural insurance legislation had been enacted in half of the surveyed countries (51 percent). In Europe, this was as high as 71 percent of countries. However, in Latin America and the Caribbean (LAC), it was only 30 percent.



Government financial support to agricultural reinsurance applied to one-third of the surveyed countries (32 percent), and it was very high in North America (100 percent of countries), Asia (70 percent of countries) and Europe (38 percent of countries). However, government support for reinsurance was very low in Africa (13 percent of countries) and in LAC (5 percent of countries). In addition, no low-income governments were involved in funding crop reinsurance, which is not surprising given the very high costs of catastrophe claims in agriculture.



Administration and Operational (A&O) cost subsidies. Governments subsidised A&O costs in 16 percent of the surveyed countries, especially in Asia. Also, 6 percent of countries subsidized loss-adjusting expenses.



Other forms of government support included: research, development and training in 44 percent of the crop programs reviewed, as well as 33 percent of livestock programs.

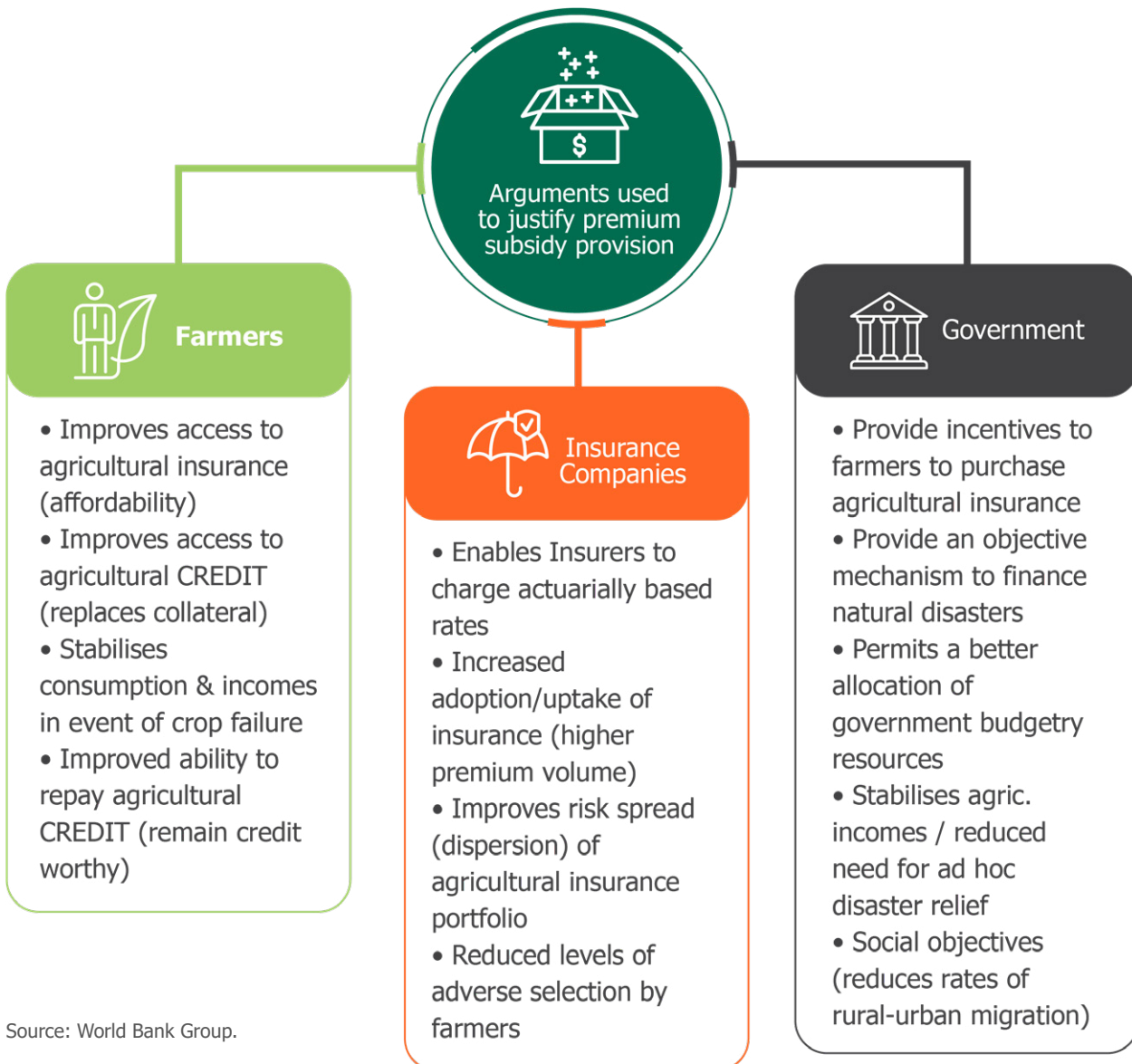
Overall, the total costs to governments of premium subsidies were estimated at 44 percent of total premiums, and all forms of subsidy were estimated at 68 percent of total global agricultural insurance premiums in 2007.

Source: Mahul and Stutley (2010).

Rationale for and Challenges in Providing Agricultural Insurance Premium Subsidies

In developing countries, the rationale for governments to provide financing for agricultural insurance premium subsidies centers on arguments that small-scale farmers are often too poor to buy expensive agricultural insurance. If they have access to insurance, this in turn **can leverage the farmer’s access to finance** by acting as a form of collateral, helping to ensure loans are repaid in the event of crop failure. It also provides potential benefits for insurers (subsidies lead to higher participation and adoption, as well as risk spread). Finally, the benefits to governments include: premium subsidies lead to **higher participation in agricultural insurance by farmers, as well as risk transfer to the international reinsurance markets**. This reduces pressure on government budgets to finance ad-hoc disaster relief and compensation schemes, and so on (See Figure 10 for further details).

FIGURE 10 : RATIONALE FOR PROVIDING PREMIUM SUBSIDIES IN AGRICULTURAL INSURANCE



Source: World Bank Group.

Premium subsidies are the most widely practiced form of government support to the (mainly) individual farmer micro-level agricultural insurance programs operating in both developed and developing countries. However, they are controversial. **The provision of nondiscriminatory premium subsidies is regressive because it disproportionately benefits the larger farmers to the detriment of small and marginal farmers.** Also, subsidies that cover a large part of the overall premium tend to promote moral hazard, thus encouraging farmers to grow high-risk crops in regions that are not technically suited to the crop. Once premium subsidies have been introduced by governments, it is politically very difficult to reduce or to withdraw them. **In many of the countries that offer nondiscriminatory premium subsidies, the fiscal costs to the government are extremely high; furthermore, as insurance penetration increases, subsidies place an increasing burden on the national budget** (Mahul and Stutley 2010).

The cost of agricultural insurance premiums is very high and is increasing over time. In 2007, agricultural insurance premiums amounted to 48 percent of agricultural insurance premiums in the top 10 countries by market share (and 44 percent of total global agricultural insurance premiums). However, by 2019, it is estimated that premium **subsidies in the top-10 countries amounted to 70 percent of total premiums** (Table 3). In practically all of the top-10 countries, governments have increased their levels of premium subsidies to encourage higher participation of insurance by farmers. Nevertheless, in emerging markets such as India, the costs of premium subsidies are now placing a major strain on the budgets of the state governments that are responsible for funding premium subsidies on a 50:50 basis with the central government.

The analysis in Figure 9 also shows that many governments in high income countries provide huge premium subsidies to their farmers, although issues of affordability do not apply to rich farmers in these countries.



TABLE 3 - AGRICULTURAL INSURANCE PREMIUMS AND PREMIUM SUBSIDIES FOR THE TOP 10 COUNTRIES (2007 AND 2019)

| Agricultural Insurance Premium & Subsidies 2007 | | | | | Agricultural Insurance Premium & Subsidies 2019/20 | | | | |
|---|---|-----------------------|--|-------------------|--|---|-----------------------|--|-------------------|
| Country | Total Agricultural Insurance Premium (US\$ Million) | Global market share % | Total Premium Subsidies (US\$ Million) | % Premium Subsidy | Country | Total Agricultural Insurance Premium (US\$ Million) | Global market share % | Total Premium Subsidies (US\$ Million) | % Premium Subsidy |
| United States | 8,511 | 56% | 3,823 | 45% | United States | 11,063 | 32% | 7,191 | 65% |
| Japan | 1,111 | 7% | 549 | 49% | China | 10,200 | 29% | 8160 | 80% |
| Canada | 1,090 | 7% | 546 | 50% | India | 4,000 | 11% | 3,400 | 80%,90% |
| Spain | 809 | 55 | 581 | 72% | France | 1,509 | 4% | 906 | 60% |
| China | 682 | 5% | 283 | 41% | Canada | 1,400 | 4% | 840 | 60% |
| Italy | 383 | 3% | 280 | 73% | Japan | 1,200 | 3% | 600 | 50% |
| Russia | 315 | 2% | 156 | 50% | Spain | 910 | 3% | 287 | 32% |
| France | 241 | 2% | 146 | 61% | Italy | 665 | 2% | 399 | 60% |
| Mexico | 142 | 1% | 62 | 44% | Brazil | 571 | 2% | 166 | 29% |
| South Korea | 93 | 1% | 34 | 37% | South Korea | 468 | 1% | 383 | 82% |
| Top Ten Countries | 13,375 | 89% | 6,460 | 48% | Top Ten Countries | 31,986 | 91% | 22,331 | 70% |
| Other 55 Countries | 1,727 | 11% | 135 | 8% | Other 115 Countries | 3,014 | 9% | n.a. | |
| Total World | 15,102 | 100% | 6,595 | 44% | Total World | 35,000 | 100% | 0 | n.a. |

Source: World Bank Group.



A growing consensus has emerged in development circles that subsidies that reduce the cost of premiums are required to make micro-level index insurance more widely accessible to and affordable by the rural poor. A recent series of publications dealing with micro-level premium subsidies includes Hill and others (2014); MCII (2016); and a macro-level study commissioned by the U.K. Department for International Development (DFID) through Vivid Economics and others (2016). In addition, the World Bank conducted a study concerning the role of premium subsidies in making agricultural insurance more accessible to small farmers (World Bank Group 2017).

Smart subsidies are designed and implemented in ways that provide maximum social benefits while minimizing distortions in the market as well as the mis-targeting of clients.

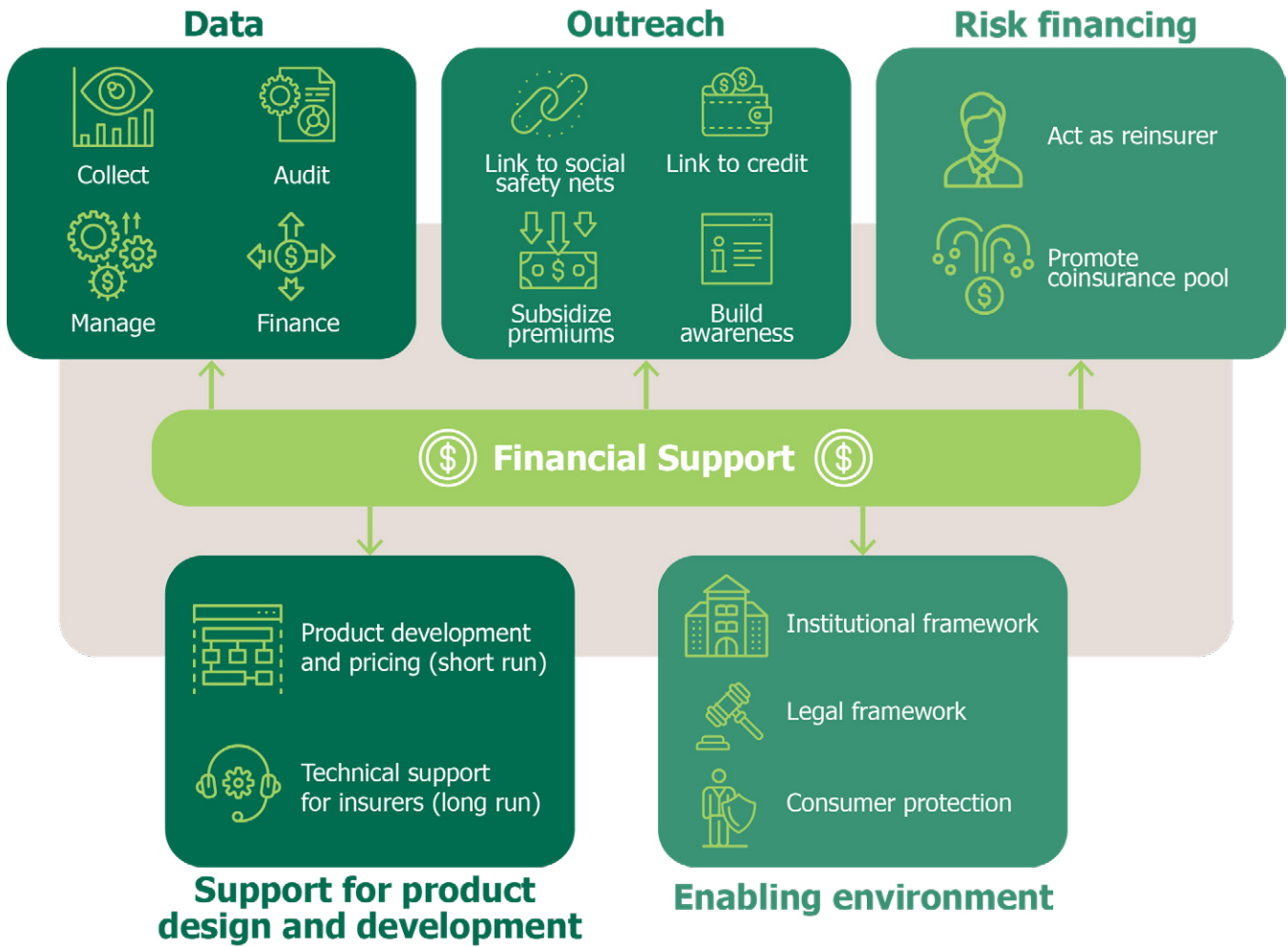
Poorly designed subsidies can undermine efficiencies and incentives within the insurance industry; for example, they can encourage the overuse of health care by beneficiaries, as well as the over-investment in risky, sometimes environmentally damaging agricultural activities. A subsidy should be designed with a clearly stated and well-documented purpose. It should address a market failure or equity concern. It should also successfully target those in need with minimum inefficiency. Smart subsidies are designed with a **clear exit strategy or long-term financing strategy in mind**, as well as a good monitoring and evaluation (M&E) system that tracks subsidy performance. Indeed, this is paramount for the success of any subsidized insurance scheme (Hill and others 2014).



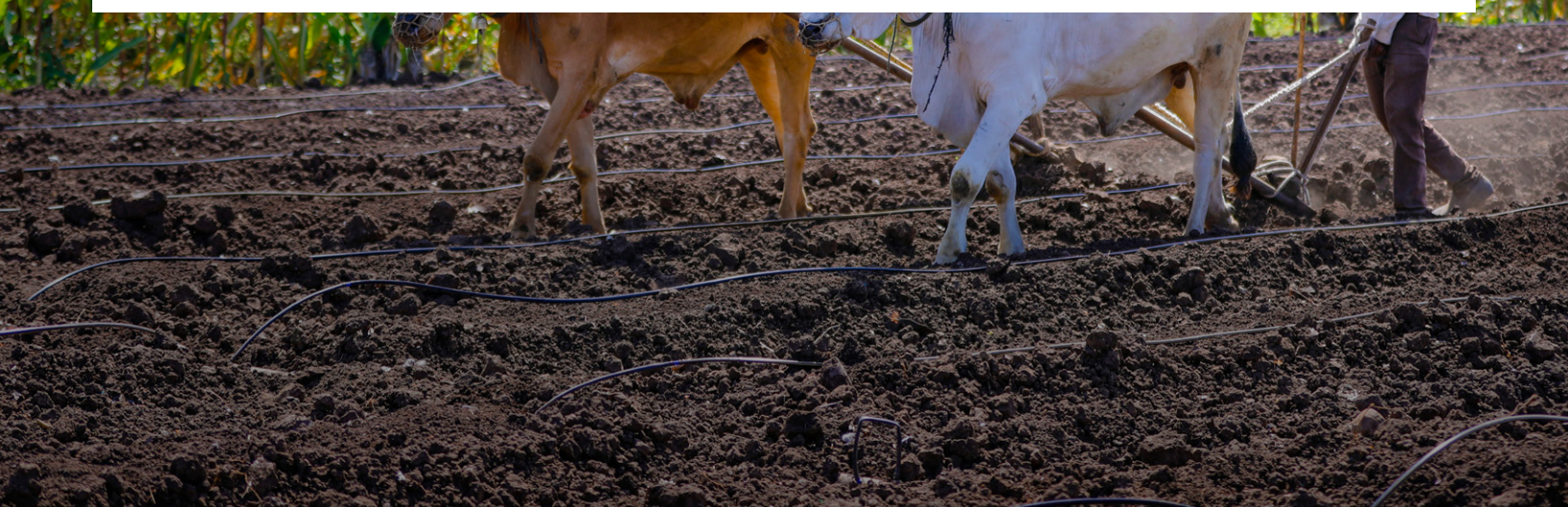
Additional Ways Governments can Support and Expand Agricultural Insurance

In addition to premium subsidies there are many other ways in which governments in developing countries can support the development and expansion of agricultural insurance, as shown in Figure 11 and Box 2.

FIGURE 11 - HOW GOVERNMENTS CAN SUPPORT THE DEVELOPMENT AND EXPANSION OF AGRICULTURAL INSURANCE



Source: World Bank Group.



Box 2. The Role of Governments in Supporting Agricultural Insurance

Governments have an important role in supporting agricultural insurance and can do so through a variety of means as follows:



Provision of an enabling legal and regulatory environment. Governments can often usefully support the introduction of agricultural insurance by creating an enabling legal and regulatory environment. In the case of index insurance, changes to the conventional insurance law may be required to permit this kind of coverage. Legal and regulatory issues should therefore be addressed at the start of the process in designing any WII product. Also, if a government is promoting a PPP framework, legislation will be required to identify the roles and functions of both public and private partners, including financial support.



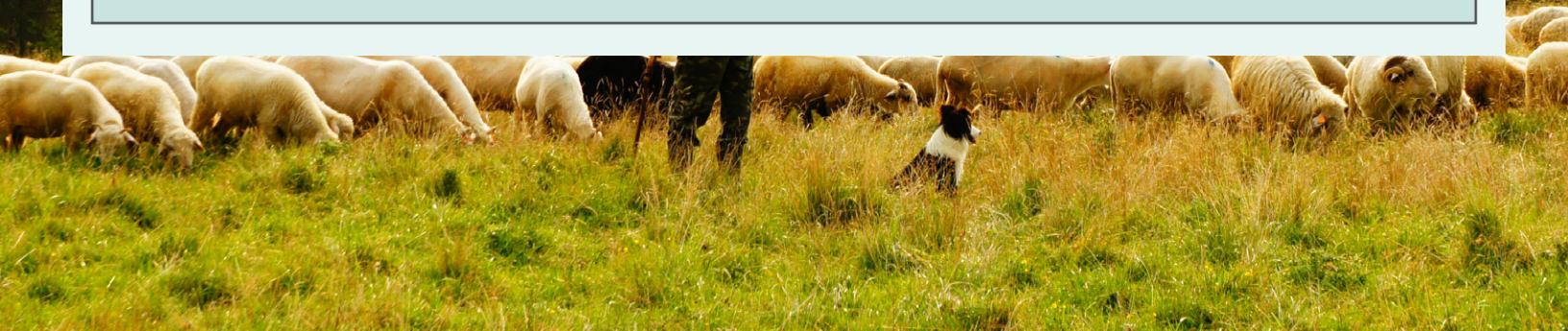
Enhancing agricultural insurance infrastructure and data and information systems. There are important roles for governments in developing countries to play in investing in the upgrading of the national meteorological weather stations in their countries to introduce weather index insurance. Furthermore, if area-yield index insurance (AYII) is to be expanded in developing countries, there appears to be a very important role for governments to strengthen their seasonal crop yield estimation survey procedures.



Support to product research and development. Few of the private insurance companies in developing countries in Asia, Africa and Latin American and the Caribbean have any experience with the design and rating of traditional crop insurance products or new crop weather index products. Local governments can usefully support the provision of specialist technical assistance from international sources to assist their insurance associations in designing, rating and preparing policy wordings for these new agricultural insurance products. Currently such technical assistance is mainly funded by the international development agencies and NGOs.



Education, training and capacity building for farmers, distributors and insurers. Governments can also play a key role in supporting farmer awareness and education programs, capacity-building workshops and technical training programs for key agricultural insurance staff. Insurance company staff will also need specialist training in product design, actuarial and rating, underwriting and claims administration, as well as loss assessment systems and procedures. Similar training also needs to be provided to staff in the banks, MFIs, and input suppliers if these organizations become involved as delivery channels/agents.





Premium subsidy support. Governments should always budget their premium subsidies at least 10 years ahead to address issues of cost and affordability as programs expand. Governments should avoid providing 100 percent of premium subsidies for micro-level voluntary agricultural insurance programs. Governments can use smart subsidies to promote specific commodities or segments of farmers – that is, the higher levels of premium subsidies for small farmers, as well as caps on premium subsidies for large farmers.



Catastrophe risk financing. Regarding start-up agricultural insurance schemes where premium volume is too small to attract reinsurance support at competitive terms, government support for such schemes may be more cost effective. However, in all cases, it is recommended that the private insurers should first seek to place their reinsurance requirements with local and international reinsurers and only turn to the government in the event that they cannot place their reinsurance programs.



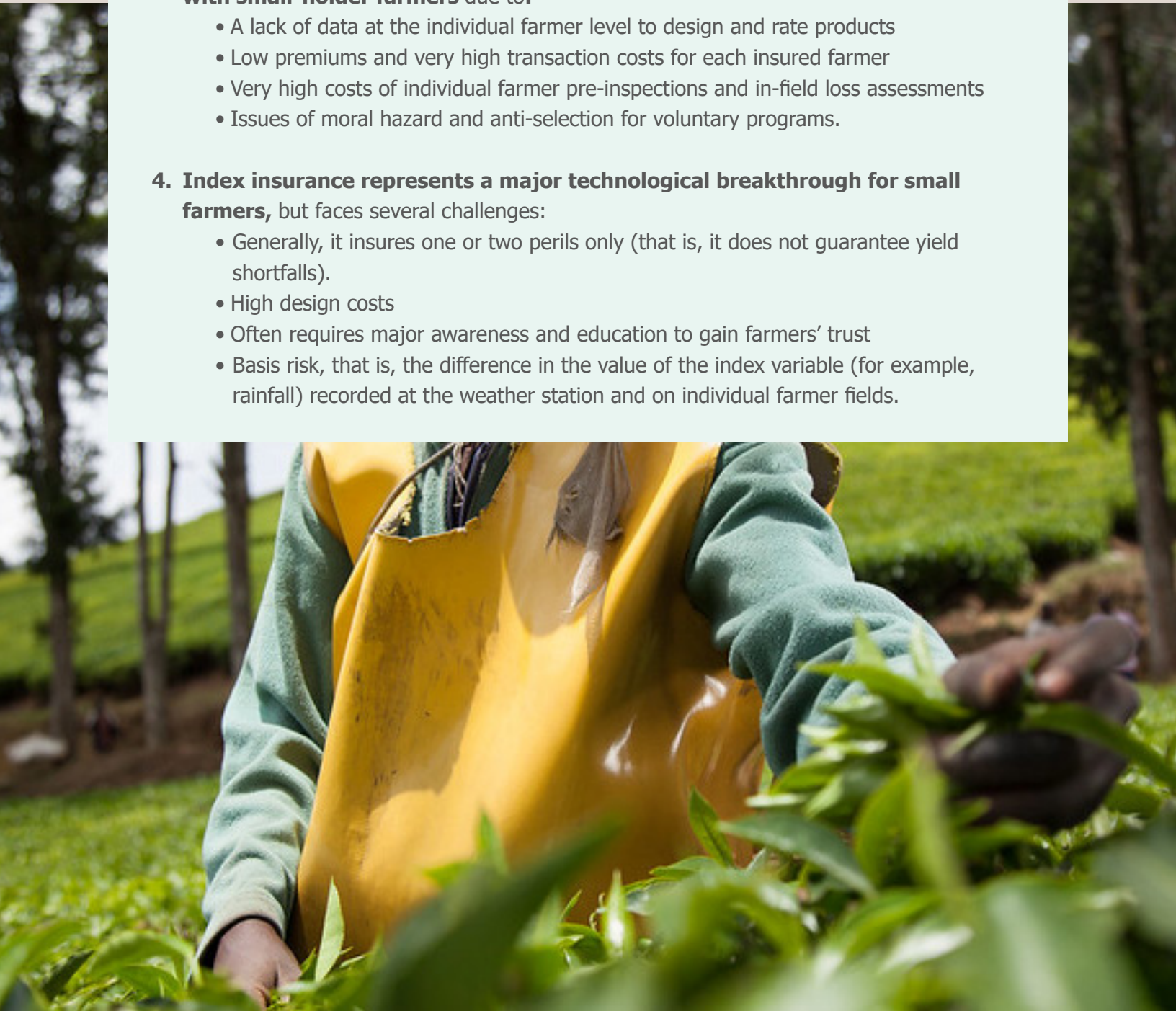
Promotion of coinsurance pools for agricultural insurance. There are many potential benefits of promoting agricultural insurance pools, ranging from economies of scale in sharing the costs of product design and operating costs to increased risk retention and pooling of risk/risk diversification at a reinsurance level.



Lessons and Conclusions

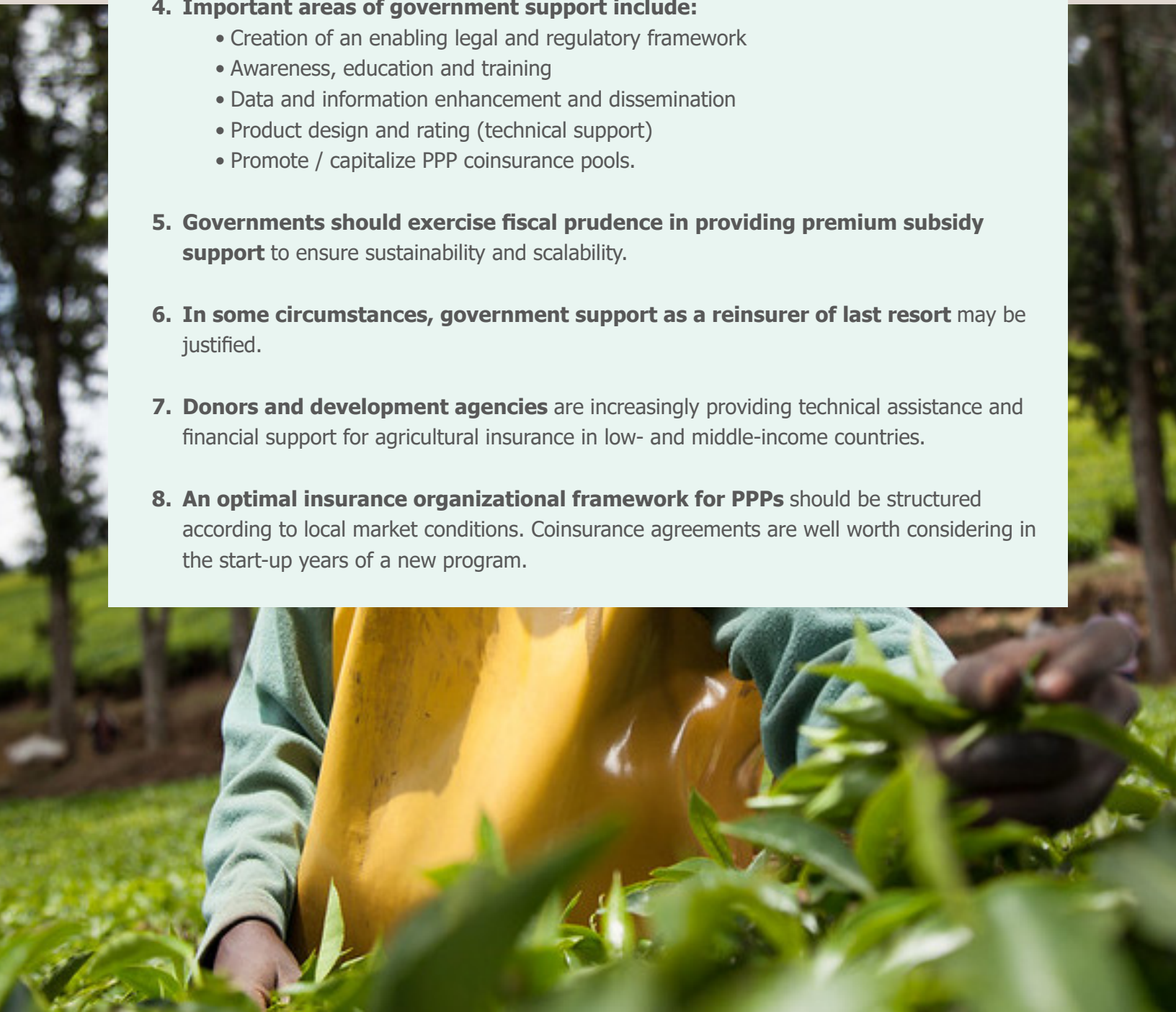
Suitability of Agricultural Insurance Products and Programs for Small Farmers

- 1. Agricultural insurance is not a panacea for all small farmer development problems.** Rather, it is a tool to transfer unmanageable risk from farmers to insurers.
- 2. Agricultural insurance works best when bundled with other value-added interventions for farmers,** for example, credit, input supply, and output marketing.
- 3. Traditional indemnity-based crop and livestock insurance is difficult to implement with small-holder farmers** due to:
 - A lack of data at the individual farmer level to design and rate products
 - Low premiums and very high transaction costs for each insured farmer
 - Very high costs of individual farmer pre-inspections and in-field loss assessments
 - Issues of moral hazard and anti-selection for voluntary programs.
- 4. Index insurance represents a major technological breakthrough for small farmers,** but faces several challenges:
 - Generally, it insures one or two perils only (that is, it does not guarantee yield shortfalls).
 - High design costs
 - Often requires major awareness and education to gain farmers' trust
 - Basis risk, that is, the difference in the value of the index variable (for example, rainfall) recorded at the weather station and on individual farmer fields.



How Governments in Developing Countries can Best Support Agricultural Insurance

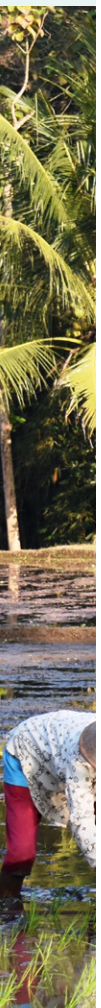
- 1. In low- and middle-income countries, agricultural insurance markets tend to be poorly developed. Government support through PPPs can stimulate market development.**
- 2. Underwrite agricultural insurance through private commercial insurers** wherever possible.
- 3. Promote agricultural reinsurance through local and global international reinsurance markets.**
- 4. Important areas of government support include:**
 - Creation of an enabling legal and regulatory framework
 - Awareness, education and training
 - Data and information enhancement and dissemination
 - Product design and rating (technical support)
 - Promote / capitalize PPP coinsurance pools.
- 5. Governments should exercise fiscal prudence in providing premium subsidy support** to ensure sustainability and scalability.
- 6. In some circumstances, government support as a reinsurer of last resort** may be justified.
- 7. Donors and development agencies** are increasingly providing technical assistance and financial support for agricultural insurance in low- and middle-income countries.
- 8. An optimal insurance organizational framework for PPPs** should be structured according to local market conditions. Coinsurance agreements are well worth considering in the start-up years of a new program.



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Work Sheet 6 – Risk Finance Instruments: An In-depth Look at Agricultural Insurance

Test your knowledge and record your insights through this easy, do-it-yourself (DIY) work sheet!

Activity 1: Identify which of the following statements about agricultural insurance are true or false.

| | Statements | True | False |
|----|---|------|-------|
| 1. | Traditional crop insurance products are index-based forms of coverage. | | |
| 2. | Indemnity-based agricultural insurance protects against physical loss or damage to the insured good (crop or animal). | | |
| 3. | Index-based agricultural insurance offers pre-specified pay-outs based on a trigger event. | | |
| 4. | The Crop Area Weather Index Insurance insures individual farmers against losses in their own fields, but it does not insure yield losses at the area level. | | |
| 5. | The advantage of Crop Weather Index Insurance is the elimination of adverse selection and moral hazard problems. | | |
| 6. | Parametric or Index Insurance is a very flexible insurance product that can be offered to different clients at different levels. | | |

Activity 2: Three types of frameworks for agricultural insurance are listed below. Match the characteristics to the framework.

| Characteristics | Purely Market-Based Systems | Public-Private Partnership | Fully Intervened Public Sector System |
|--|-----------------------------|----------------------------|---------------------------------------|
| Commercial criteria prevails over technical and social criteria. | | | |
| Technical criteria prevails over social and commercial criteria. | | | |
| Social criteria prevails over commercial and technical criteria. | | | |
| Low risk diversification. | | | |
| Well-diversified portfolio. | | | |
| High fiscal costs for the government. | | | |
| Low to moderate levels of penetration. | | | |

Activity 3: Can you identify three advantages and three constraints in implementing index-based insurance in your country?

| | Advantages | Constraints |
|----|------------|-------------|
| 1. | | |
| 2. | | |
| 3. | | |

Activity 4: Reflections

[1] These are the most important things I learned from this Fact Sheet.

[2] Here are two concepts or ideas about which I would like to have more information.