# THE STATE OF AGRICULTURAL INSURANCE:

## A Global Review of Agricultural Insurance in a Changing Climate

Environmental Defense Fund

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI

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## A Global Review of Agricultural Insurance in a Changing Climate


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# TABLE OF CONTENTS


# EXECUTIVE SUMMARY

Farmers depend on natural resources and predictable weather to grow our food. Yet those foundations of agriculture are being fundamentally disrupted by climate change. Extreme heat, droughts, floods, storms, pests and diseases have led to losses in crops, livestock and farm assets, affecting food security, farmers' livelihoods and rural financial systems (World Bank, 2021b). These shocks are increasingly systemic, overwhelming traditional coping strategies, especially in regions dominated by rainfed agriculture. As a result, additional risk protection is needed for farmers to continue farming and to maintain global food supplies.

The global expansion of agricultural insurance coverage is one tool that supports farmers in navigating increasing climate pressures. Agricultural insurance is a financial mechanism that transfers a portion of farmers' production and market risk to insurers and the broader financial markets. Agricultural insurance can protect farm income in the face of adverse weather events, enabling farmers to recover quickly and sustain investment in crop and livestock productivity.

While climate change is increasing risk and therefore increasing the attractiveness of risk protection provided by insurance, the systemic nature of climate change also threatens to overwhelm the insurance sector. Mounting pressures from climate change are straining global property, home and flood insurance markets (EDF, 2025). For this reason, insurance cannot be relied upon as the sole solution to protect farmers from growing risk. Risk protection tools, such as insurance, must also go hand-in-hand with efforts to reduce underlying risks by improving agricultural resilience.

**This global review examines agricultural insurance in light of increasing risk from climate change and presents opportunities to integrate insurance with climate adaptation and resilience efforts.**

Analyzes market size and performance of insurance markets across regions, the structure of insurance programs, and the role of the public sector.

Analyzes the extent to which insurance is becoming embedded within broader climate resilience and agricultural development strategies.

Uses global case studies to examine what enables agricultural insurance programs to establish, achieve viability, and scale, across three areas: government support, product design, and delivery mechanisms.

Building on these lessons, the report offers recommendations for both public and private stakeholders on how to strengthen agricultural insurance systems in the face of growing climate risks.

## Key findings include:

**Global agricultural insurance markets are deeply uneven.** North America, Europe, China, and India account for the vast majority of global agricultural insurance premiums. In many low- and middle-income countries, coverage is limited, fragmented or focused only on protecting loan repayment or input investments rather than insuring meaningful shares of crop or livestock value.

**Low farmer demand for insurance products remains a challenge, especially for smallholder farmers.** Even where insurance is subsidized, uptake is often low. This reflects a misalignment between available insurance products and farmers' financial realities and risk management needs. Challenges include premiums due at the start of the season when cash is tight, mismatches between actual losses and payments received, products that are not correctly targeted to smallholder needs, and limited trust in or understanding of available insurance products.

**Well-designed public sector support is key for scale and sustainability.** Large-scale programs in the U.S., Canada, China, India, Spain and Italy depend on public premium subsidies and reinsurance. Globally, agricultural insurance premium subsidies now exceed $30 billion annually, making it clear that large-scale agricultural insurance rarely develops without stable, long-term government support. However, those subsidies must be well designed to avoid market distortions and unintended negative consequences.

**Insurance product design and delivery mechanisms are as important as funding.** While indemnity insurance remains the most prevalent form of agricultural insurance globally, parametric insurance has expanded access, especially for smallholders in fragmented geographies. Public–private partnerships have proven more effective than purely state-run programs, and bundling insurance with credit, inputs, or extension services can strengthen both uptake and farmer outcomes.

**Agricultural insurance can de-risk lending to farmers and unlock investment in resilience that would otherwise be out of reach.** When insurance is bundled with credit, inputs or market access, it does more than manage risk. It also gives farmers expanded access to finance and the ability to invest in increasing their productivity and resilience.

**Advances in technology are helping to make insurance products more efficient and financially sustainable.** These technologies include remote sensing, crop simulation modeling, digital claim verification, improved models for yield estimation and climate forecasting, mobile-based payments and digital distribution. Such advances help to lower insurance products' costs and expand their accessibility.

**Insurance must be better integrated with broader climate adaptation and resilience efforts.** Innovators have expanded access and have begun addressing environmental challenges through new approaches to insurance design and delivery. However, no countries have yet scaled agricultural insurance programs in ways that systematically promote resilient and environmentally sustainable farming. Scaling up insurance alone is not enough — complementary investments in risk reduction, adaptation funding, and coherent disaster risk management frameworks are essential.

**Agricultural insurance is a critical post-disaster recovery mechanism for many farmers around the world, and it has the potential to grow in both scale and effectiveness.** Realizing that potential requires action across several interconnected fronts:

- Governments must strengthen their support through well-designed subsidies that improve affordability without distorting markets, integrate insurance within broader disaster risk and climate adaptation frameworks, and invest in the data infrastructure and regulatory environments that allow insurance markets to function and thrive.
- Insurers and insurance program designers must develop products that are better matched to farmers' financial realities and risk profiles — whether through multi-peril coverage, parametric approaches that minimize basis risk, or hybrid models — and deliver them through channels that reach farmers at scale, including public–private partnerships, farmer groups, and bundled financial and agricultural services.
- Across all of these efforts, insurance must be more deliberately linked to risk reduction and resilience building — connecting access and pricing on the adoption of resilient practices, and embedding insurance within the broader suite of investments and policies needed to help farmers adapt to a changing climate.

This report recognizes that insurance alone cannot solve the climate challenge facing farmers, but, when well designed and well supported, it can be a powerful component of the solution.

# INTRODUCTION

Farmers depend on natural resources and predictable weather to grow our food. Yet those foundations of agriculture are being fundamentally disrupted by climate change. As climate change progresses, it adds to production losses over time. Adverse impacts on crop yields arise through higher average temperatures, periods of extreme heat, more variable rainfall, and reduced water supplies for irrigation. Drought and heat stress, and the spread of pests and diseases can add to crop and livestock losses. Extreme droughts, floods and hurricanes are also becoming more frequent, causing catastrophic losses of production, assets, and lives. Many of these losses are systemic, affecting whole regions. These losses cause negative spillovers for the rural nonfarm economy, especially for businesses that supply farm inputs and process farm outputs, and for rural financial institutions. Agriculture itself contributes to greenhouse gas emissions, aggravating climate change and creating negative feedback loops to itself. Other forms of natural resource degradation (e.g., to soils, forest, waterways, and biodiversity) also compound the negative impacts of climate change on farm production, in many cases driven by agriculture. Taken together, the increasing risks from climate change and natural resource degradation are a challenge to farmers, especially the vast numbers of smallholders around the developing world whose very livelihoods and food security are at stake.

Governments, the international development community and the insurance industry recognize the negative impacts risk can have on farmers' welfare, agricultural development and the need for disaster assistance. These groups have a proactive interest in promoting additional and more inclusive risk management aids, including agricultural insurance. Agricultural insurance can: protect farmers from weather-linked financial damages and enable them to continue farming; facilitate the development of rural finance and financial inclusion; promote agricultural development and farmers' adaptation to climate change; and help reduce the need for disaster assistance. This growing interest has in turn spawned a surge in technological and institutional innovations and policy practices to help achieve these objectives.

Despite this interest, these developments have not yet reached a scale where agricultural insurance plays an important role in risk management for most farmers around the world, except in the few countries that heavily subsidize agricultural insurance.

**This report provides a global, comparative assessment of agricultural insurance in the context of climate change. We examine current coverage levels, product design, delivery models and public–private roles. We also identify how insurance systems can be adapted to manage climate risk while supporting farmer resilience and sustainable land use.**

### Defining resilience and sustainability in agricultural practice

**Farmers can reduce their exposure to climate risk and environmental harm through changes to how and what they grow. This report uses two related but distinct concepts:**

**Resilient agricultural practices** reduce farmers' vulnerability to climate shocks and help stabilize yields and income under variable or extreme weather conditions. Examples include planting drought tolerant crop varieties, diversifying crop rotations, improving drainage and irrigation efficiency, and using early warning systems to guide planting decisions.

**Sustainable agricultural practices** reduce agriculture's negative impacts on natural systems — including soils, water, biodiversity, and the climate — and preserve the long-term productive capacity of the land. Examples include cover cropping, reduced tillage, integrated pest management, precision fertilizer application, and agroforestry.

Many practices deliver both resilience and sustainability benefits: cover crops, for instance, improve soil water-holding capacity and reduce erosion and greenhouse gas emissions. However, depending on the region and production system, some practices may also involve tradeoffs between resilience and sustainability.

## Agricultural production risks and how they are changing

Farmers face many production and market risks that can make their incomes volatile from year to year. These risks include crop and livestock losses due to bad weather, pests and diseases; and post-harvest losses in storage and transport, drops in market prices, or interruptions to input supplies. Many farmers are also confronted by the risk of catastrophic losses from severe droughts, hurricanes, floods, fires or contagious pest outbreaks.

Farmers' risks can generally be segmented into three layers, based on the size of possible losses and their probability of occurrence (Sandmark et al., 2013; OECD 2016):

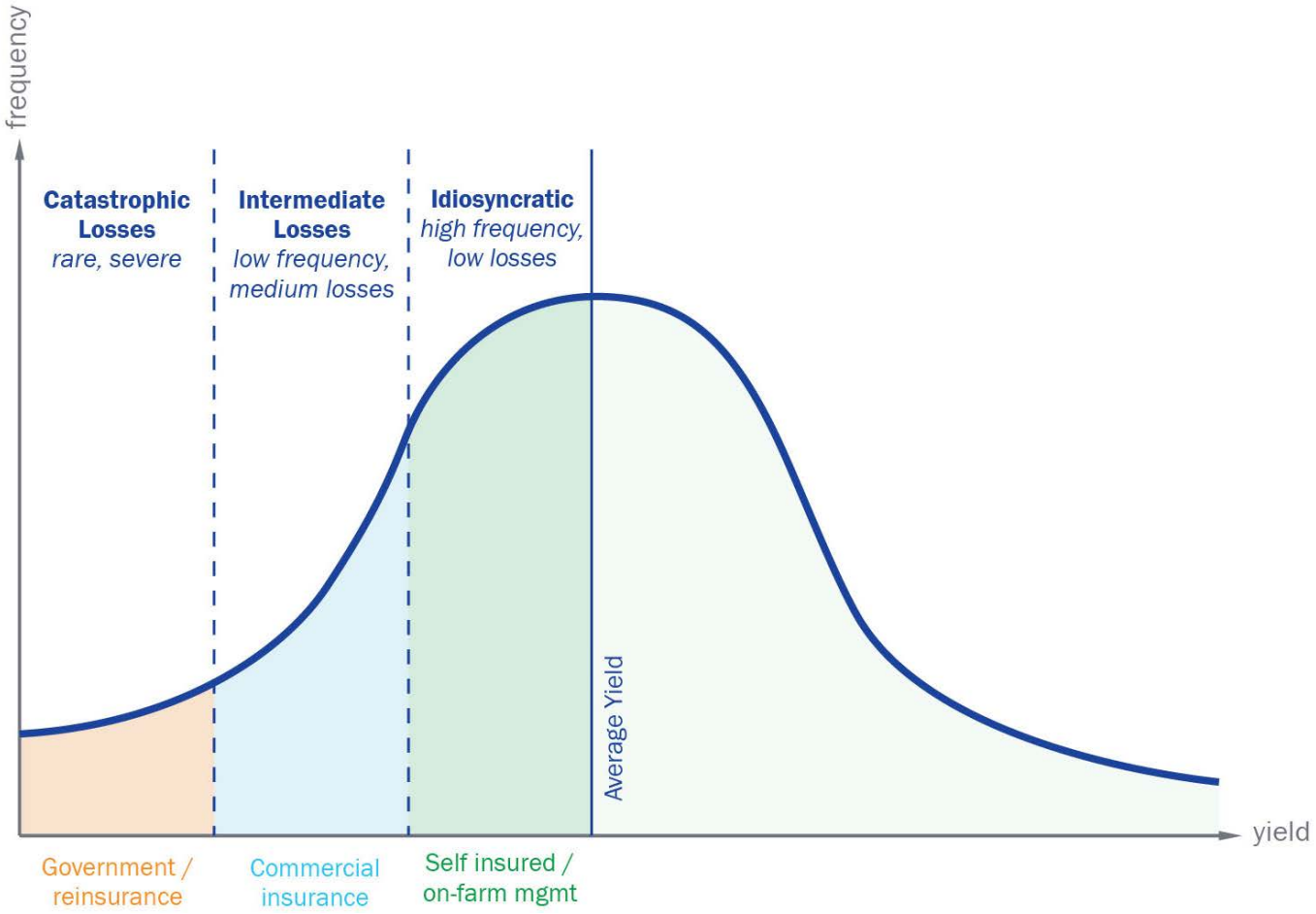
- **Idiosyncratic risks** comprise frequent but typically low-impact losses, such as yield and production losses at plot or animal levels. Since losses tend to be modest and independent between farmers, then except for the poorest farmers, these risks can generally be effectively managed through local risk-sharing arrangements.
- **Intermediate risks** involve less frequent but larger losses at farm levels due to bad weather or pest damage; or due to price, market access and input supply problems. As climate change may cause these risks to occur with more frequency, the pressure on farms can compound over time. On-farm and off-farm diversification strategies can be quite effective in managing these risks. However, diversification strategies sometimes come at a cost, because they prevent farmers from specializing in their most profitable alternatives, essentially

trading off higher expected income to reduce risk exposure. For many of these risks, farmers may be able to transfer part of the risk to financial markets through insurance, forward price contracts and similar strategies.

- **Catastrophic risks** are infrequent but generate large losses in agricultural production, assets and sometimes lives. Floods, droughts, fires, sudden market disruptions and input supply failures are all examples of catastrophic risk. For many poorer farms, recovery from such shocks exceeds their coping capacity and can lead to persistent poverty (Carter and Barrett, 2006). Because these risks are typically systemic, affecting many farmers simultaneously, local risk-sharing mechanisms, credit markets and asset markets often break down, triggering price volatility, financial distress and the need for ex-post government disaster assistance. These types of risks go beyond what insurance and other financial market instruments can typically compensate for, often requiring governments to step in with disaster recovery funding.

FIGURE 1:

## Agricultural risk layering



Given their long experience living with these risks, farm households and rural communities have developed several strategies for risk management (Walker and Jodha, 1986). For example:

- To reduce the chance of major crop losses in any one season, farmers may spread their production risk by growing a mix of crops and crop varieties, staggering planting dates, or spreading crops among fields that have different risk exposures in the landscape.
- To reduce price risks at planting time, some farmers may use price risk management tools in commodity futures markets or may engage in contract farming arrangements with agents who can share the risks.
- To reduce their dependence on farm income and therefore risk exposure, many farm households also engage in off-farm employment, have a nonfarm business of their own, or receive remittances from family members (Hazell et al., 2024).
- To cope with losses when they occur, farmers carry assets that can be consumed or sold in times of need. In some societies, community organizations like credit groups, religious funds and kin support networks also play important roles in pooling risks locally, and for pastoralists, nomadic grazing practices can help reduce forage shortfalls in drought years.

**Farmers' conventional strategies are limited for managing many intermediate and catastrophic risks. For this reason, farmers need additional assistance to manage such risks and to reduce negative impacts on agriculture and rural livelihoods.**

In principle, private market institutions such as agricultural insurance, commodity futures markets, and longer-term contracts for farm outputs should play important roles in providing this external support. But in many countries, they are not adequately developed, and even where they are, they rarely meet farmers' full needs. Consequently, governments must often step in with various forms of support, including providing disaster assistance when catastrophic events occur.

## Climate risk

Climate shocks are a dominant source of risk for many farmers, and these risks are worsening with climate change. The Food and Agriculture Organization (FAO, 2023) estimates that over the past 30 years, $3.8 trillion worth of crops and livestock production was lost globally due to disaster events.[1] This is an average loss of $123 billion per year, or 5% of annual global agricultural GDP. This figure does not include the widespread production losses that occur because of unfavorable weather in less disastrous years, which are difficult to estimate.

Assessing the future impacts of climate change on agricultural production is inherently uncertain, and projections vary widely depending on assumptions about farmer adaptation (Thomas and Mukherji, 2025). More optimistic models assume widespread adoption of effective adaptation strategies, while pessimistic scenarios

1 Defined as serious disruptions to the functioning of a community or society.

assume limited adjustment. Even under relatively favorable assumptions, however, climate change is expected to reduce agricultural output overall.

Recent modeling that explicitly incorporates historical patterns of farmer adaptation finds that climate change will reduce global staple crop yields by 7.8% by 2050 and up to 24% by 2098 under high emissions scenarios (Hultgren et al., 2025). The largest regional losses are projected to occur in modern grain-growing areas in Europe and North America (e.g., the Corn Belt), and in some of the poorest farming areas in Africa. While crop yields are projected to fall for most regions of the world, some regions may experience localized yield gains.

Beyond average yield losses, climate change is increasing year-to-year yield variability, raising the likelihood of severe food production shocks in some regions (Thomas and Mukherji, 2025). Such shocks can destabilize food markets, drive price volatility and generate spillover impacts beyond the farm sector.

Climate risks are further amplified by feedback loops between agriculture, land degradation, and climate change. Globally, an estimated 30% of rainfed cropland and 44% of irrigated cropland have been affected by human-induced land degradation, including soil erosion, nutrient depletion, and salinization (FAO, 2021). Degraded soils retain less moisture, erode more rapidly during extreme rainfall and contribute to higher crop losses during droughts. Loss of soil carbon further exacerbates climate change by increasing carbon dioxide emissions. This cycle reinforces negative feedbacks that undermine long-term agricultural resilience.

Climate change is shifting agricultural risk toward larger, more systemic shocks. Models show that even with ambitious adaptation, losses will still be significant over the long term. This underscores the need for integrated risk management approaches where adaptation and insurance work together to stabilize global food

TABLE 1:

## Characteristics of insurable risks and challenges in agricultural insurance

| Risk characteristic | Meaning | Agricultural challenge |
|---|---|---|
| **Independent** | Incidences of the risk are not connected to each other. | Losses are often spatially correlated in regions. |
| **Stable over time** | Risks do not increase in frequency or magnitude over time. | Climate change is fueling more frequent and greater agricultural losses. |
| **Measurable** | Both the insurable risks and losses when they occur are easy to measure. | Farm-level data can be difficult to obtain and losses for setting premium rates and losses hard to verify, driving up costs; for index products, proxies (e.g., weather or satellite data) may not accurately reflect losses, leading to basis risk or financially unsustainable products. |
| **Out of control of the insured** | Insured do not control the risk, which avoids the problem of "moral hazard" to intentionally incur the risk for the payment. | Farm production depends on farm management, so in the case of indemnity insurance requirements for responsible farm management practices must be built into agricultural insurance policies and monitored to ensure they are followed. Index-based insurance does not contain yield-based triggers, and therefore avoids this challenge. |

production systems (Thomas and Mukherji, 2025). The increasing frequency and intensity of production shocks overwhelm household, community, and local market-based coping mechanisms. When crops fail more often and more severely, the informal safety nets that farmers have traditionally relied on, such as family savings, community support and local credit, are quickly exhausted and unable to cover the scale of losses. This increases the importance of other risk protection tools such as insurance. However, the growing impact of climate change also challenges the administration of effective agricultural insurance, as we will discuss in the following sections.

## Challenges to insuring agricultural risk

Agricultural insurance can help transfer many forms of intermediate and catastrophic risks from farmers to the financial markets by providing cash compensation when losses occur and reducing the need to borrow or liquidate assets. When used effectively, agricultural insurance is often more efficient than other climate risk management tools. However, in practice, most agricultural risks are poorly suited to private insurance and agricultural insurance rarely scales without government subsidies. Insurance markets function best when risks are independent, stable over time, objectively measurable, and largely outside the control of the insured, in order to avoid the so called "moral hazard" problem (Ahsan et al., 1982; Nelson & Loehman 1987). Many agricultural risks fail to meet these conditions (Table 1). Losses are often spatially correlated, driven by weather extremes that affect entire regions simultaneously — that is, not independent. They are also not usually objectively measurable: historical yield and loss data are limited or unreliable for many crops and locations; and on-farm loss verification is costly and prone to error. These features of agricultural risk raise premiums, limit coverage, and expose insurers to adverse selection and moral hazard, undermining commercial viability.

In addition to these structural challenges, in many countries there are additional barriers to agricultural insurance. They include:

- **Low and uneven farmer demand:** Even where insurance is subsidized, uptake is often low. This reflects a misalignment between available insurance products and farmers' financial realities and risk management needs. Premiums are typically due at the start of the season, when many farmers face tight cash-flow conditions. Farmers' trust in crop insurance can be shaped by past experiences with administrative complexity, settlement delays, and payouts that do not match individual loss experience, undermining the product's perceived value to farmers. In index-based programs, basis risk remains a persistent challenge affecting perceived value (Goodwin and Smith, 1995; Smith and Glauber, 2012; Platteau et al., 2017; Hazell and Timu, 2024). Smallholder farmers — despite being among the most climate-exposed — often encounter the greatest affordability and access barriers, while commercial farmers may draw on other financial tools or diversification strategies that reduce demand for subsidized insurance (Binswanger-Mkhize, 2012).

- **Inadequate delivery systems:** The potential market for agricultural insurance can also be constrained by lack of adequate delivery systems for writing and distributing contracts and settling claims at reasonable cost. Few insurers have widespread networks of their own in rural areas, especially in developing countries, and most have limited capacity to reach large numbers of disparate farmers.
- **Institutional and policy hurdles:** Agricultural insurance depends on an enabling legal, regulatory, and institutional environment, including effective supervision of insurers and access to established insurance markets. Many countries have restrictive licensing requirements, regulatory frameworks built around indemnity-based products, and a lack of provisions for cross-border reinsurance which can constrain market development. Additional legislation is needed to support innovative products such as parametric insurance and to allow foreign insurers and reinsurers to participate. Adequate public investment in data systems is also essential, yet often underfunded, limiting the viability and scale of agricultural insurance programs.

Climate change intensifies these challenges. Increasingly systemic and unpredictable losses weaken risk pooling, increase uncertainty around how to accurately set prices, and force private insurers to increase capital reserve requirements and purchase more reinsurance. As a result, private insurers may restrict coverage, raise premiums, or withdraw from high-risk crops or regions altogether.

These dynamics help explain why agricultural insurance has rarely scaled without public intervention, and why governments play a central role in supporting insurance markets through subsidies, farmer education, reinsurance, catastrophic risk protection, national adaptation frameworks, data infrastructure, and regulatory environments as preconditions for insurance markets to function and thrive. Given these structural constraints, agricultural insurance has evolved unevenly across countries, shaped by differing risk profiles, government support mechanisms, and delivery models.

Section 2 provides a comparative global snapshot of agricultural insurance systems today.

# GLOBAL AGRICULTURAL INSURANCE TODAY

Global agricultural insurance markets are highly concentrated, both geographically and institutionally. A small number of countries — most notably the United States, Canada, China, India, and several European Union member states — account for the vast majority of global premiums, insured area, and insured farms. Outside these systems, agricultural insurance remains limited in scale and fragmented across products and providers. Often it is focused narrowly on protecting credit repayment or input costs, rather than on farm income or asset values.

Due to fragmented and inconsistent data, it is challenging to estimate the global extent of agricultural insurance. Market size is typically measured by total annual premiums collected, but estimates vary in whether they include premium subsidies, insurance purchased by agribusinesses, or meso insurance bought by intermediaries on behalf of farmers. In many countries, the coexistence of public and private schemes further complicates comparability. To construct a global overview of agricultural insurance, Table 2 synthesizes data from international organizations and industry sources, inclusive of government subsidies where applicable.[2]

2 Sources: Reinsurance firms (Swiss Re and Munich Re), the World Bank, FAO, the European Commission, and national insurance agencies, supplemented by financial market research where needed.

TABLE 2:

## Estimates of the size of agricultural insurance markets (total premiums collected) by region, 2022–24

| Region / Country | Market size, 2023 (USD $ bn) | Share of global market (%) |
|---|---|---|
| **Asia–Pacific** | **26.7** | **41.7** |
| China | 18.1 | |
| India | 4.3 | |
| Japan | 2.7 | |
| South Korea | 0.9 | |
| Australia | 0.5 | |
| Philippines | 0.2 | |
| **North America** | **19.1** | **29.8** |
| United States | 17.7 | |
| Canada | 1.4 | |
| **Europe** | **9.0** | **14.1** |
| Germany | 2.3 | |
| United Kingdom | 1.9 | |
| Italy | 1.2 | |
| Spain | 1.1 | |
| France | 0.9 | |
| Austria | 0.3 | |
| **Middle East & Africa** | **4.2** | **6.6** |
| South Africa | 1.5 | |
| Nigeria | 0.6 | |
| Saudi Arabia | 0.5 | |
| Egypt | 0.1 | |
| Turkey | 0.1 | |
| United Arab Emirates | 0.1 | |
| **Latin America** | **3.0** | **4.7** |
| Brazil | 1.8 | |
| Mexico | 0.5 | |
| Argentina | 0.3 | |
| Chile | 0.1 | |
| Peru | 0.03 | |
| **Russia & Central Asia** | **2.0** | **3.1** |
| Russia | 1.8 | |
| **Global Total** | **64.0** | **100.0** |

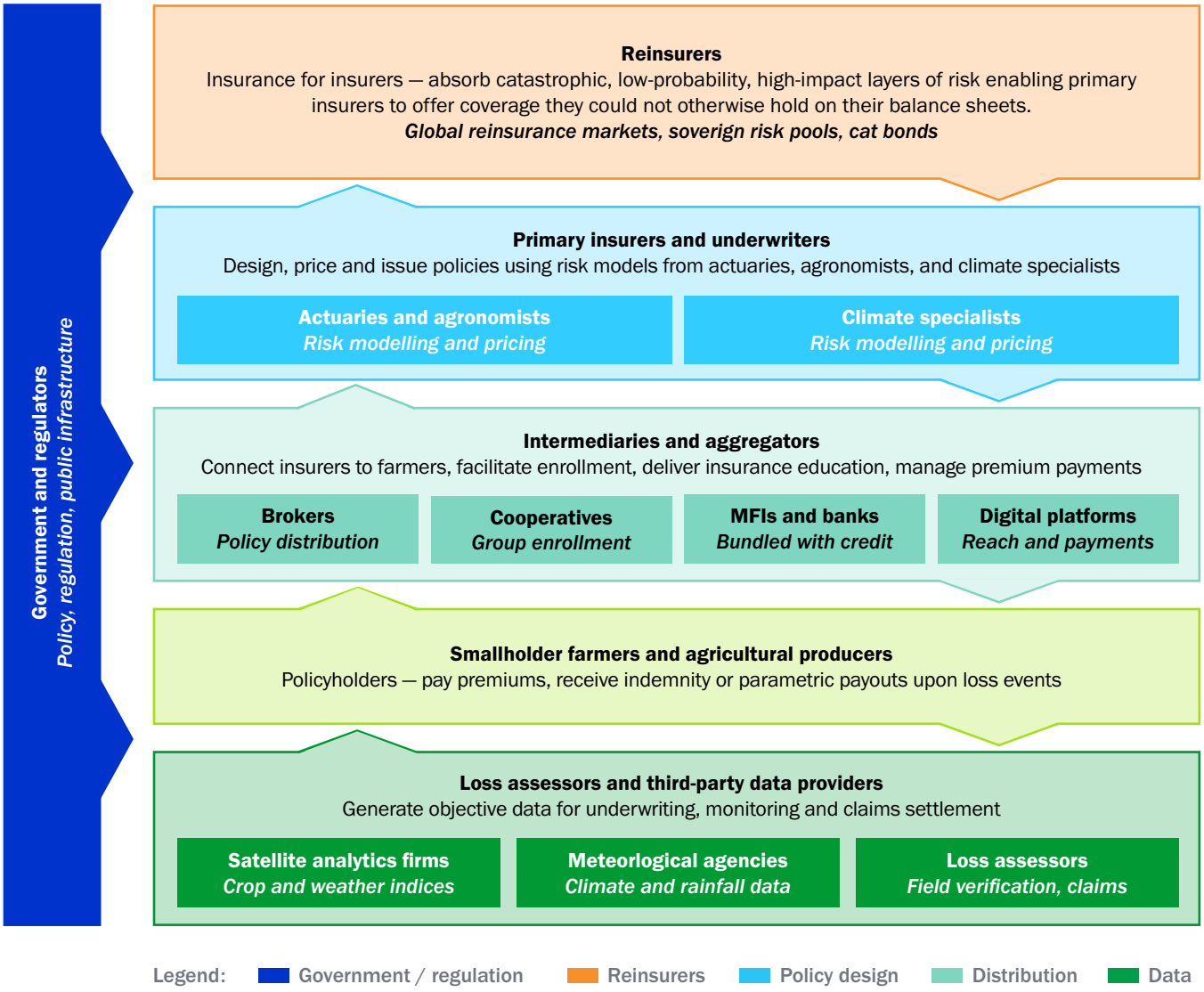
Note: The numbers for the countries within each region do not add up to the regional totals. This is because our regional estimates include all relevant countries, and we have only listed the major country insurance markets.

Table 2 demonstrates the uneven distribution of insurance. For example, the insurance markets in all the countries in Africa and the Middle East together account for only about 6.5% of the global premium total. Apart from significant growth in the size of the Chinese market, this distribution has changed little since a comprehensive World Bank survey of agricultural insurance programs in 2008 (Mahul and Stutley, 2010) and a later study by Swiss Re (2019).

This concentration reflects more than differences in farm size or income levels. Large insurance markets are typically anchored in long-standing public policy frameworks that combine premium subsidies, public reinsurance, and regulatory oversight. By contrast, many low- and middle-income countries lack the fiscal capacity, data infrastructure, or institutional arrangements required to support s uch systems, resulting in thin markets that are often donor-driven, pilot-based, or geographically limited.

FIGURE 2:

## Agriculture insurance ecosystem map



While private and unsubsidized insurance schemes do exist in many countries, they only cover a narrow range of production risks and rarely achieve scale. From a global perspective, they account for about 15–20% of global insurance products, and a small share of the total number of farms insured and premiums collected (Mahul and Stutley, 2010; GIZ 2021). In countries where agricultural insurance has achieved scale, this is because some form of government support exists.

At the same time, premium volumes provide an incomplete picture of risk protection: different insurance products serve different risk layers, vary widely in the losses they cover, and interact with other risk management tools in ways that shape outcomes for farmers. As a result, understanding the role and effectiveness of agricultural insurance requires looking beyond aggregate premiums. It is equally important to examine how insurance is designed, what risks it targets, and how it fits within wider resilience and support frameworks. Understanding these design choices is critical to assessing the role insurance can play under climate change, and motivates a closer examination of what agricultural insurance actually covers and how it is delivered in different contexts.

## How agricultural insurance works

Agricultural insurance is a financial mechanism that transfers a portion of farmers' production risk to insurers and the broader financial markets. In principle, agricultural insurance stabilizes farm income in the face of adverse weather outcomes and other biophysical shocks, enabling farmers to recover quickly and sustain investment in productivity. More broadly, insurance underpins the functioning of financial markets by absorbing and pricing risk, enabling capital to be deployed with greater confidence. In agriculture, this role is especially critical in enabling broader and more equitable access to credit by de-risking agricultural lending. In some countries, agricultural insurance is a standard requirement for farm loans.

Multiple forms of agricultural insurance exist, including crop insurance; farm assets and property insurance; and livestock, fishery and forestry insurance. Globally, crop insurance remains the most widely used option, particularly among smallholder farmers, where it protects against yield losses, weather variability and natural hazards.

Agricultural insurance is delivered through a range of models that differ in who purchases coverage, how risks are pooled, and the level at which losses are insured.

- **Individualized insurance:** Insurance contracts are written directly with individual farmers or households. Coverage is tied to farm-level production, yields or weather exposure (e.g., indemnity-based or index-based products).
- **Public–private partnerships (PPPs):** Governments and private insurers share risks and responsibilities to deliver insurance at scale — typically with the public sector providing regulation, subsidies and reinsurance, and the private sector underwriting, distributing and servicing products.

- **Farmer mutuals:** Groups of producers who collectively pool their risks. While the individuals typically self-insure some small share of their total risk exposure — covering small, frequent losses directly from their shared premium pool — the mutuals purchase insurance to cover much of their remaining exposure.
- **Meso insurance:** Rather than being purchased by individual farmers, insurance is purchased by an intermediary (e.g., bank, multilateral finance institution, cooperative, agribusiness, input supplier). This type of insurance indirectly protects farmers by stabilizing the balance sheets of institutions that lend to them, contract with them or serve them, and payouts are triggered by area-level losses or indices linked to the intermediary's portfolio.
- **Macro insurance:** Insurance is purchased by governments or regional risk pools to manage catastrophic agricultural or climate-related losses. Coverage focuses on systemic risks (e.g., drought, flood) affecting large geographic areas. This type of insurance is used to support disaster response, fiscal stability and emergency funding rather than individual loss compensation. Examples include sovereign drought insurance and regional risk pools in Africa, the Caribbean and South Asia.
- **Compulsory insurance:** Governments sometimes make insurance compulsory, a practice that has been most common for insuring agricultural credit provided by public lending institutions. Additionally, some countries require that all farmers growing certain crops purchase insurance as a way of creating a larger risk-sharing pool and for simplifying insurance marketing and distribution problems. For example, in Japan all commercial farmers growing staple crops must purchase insurance, as must all sugar growers in Mauritius.

## Types of insurance

Several types of agricultural insurance have evolved over the decades to meet the changing composition and needs of the sector.

**Indemnity insurance** is a broad category of agricultural insurance that compensates farmers based on actual losses incurred. It requires insurers to verify the existence of the insured crop or livestock and to assess damages when a claim is filed. To reduce moral hazard, insurers typically monitor whether farmers follow recommended production practices. Within indemnity insurance, products can be structured to cover either a single risk or multiple risks.

- **Indemnity-based multi-peril crop insurance (MPCI)** protects farmers against a broad range of production risks, including drought, excess rainfall, pests, disease, flooding, and other natural events that can reduce yields or farm revenue. MPCI indemnifies farmers based on actual losses relative to historical yields or expected revenue. This makes them more comprehensive than single-risk or parametric products, but also more complex to administer and often reliant on government support. However, there are also index-based forms of MPCI, such as area-yield insurance, which do not require individual farm-level loss assessments. MPCI is the most prevalent agricultural insurance model globally.

- **Indemnity-based single-peril insurance** covers losses arising from one specific risk, such as hail, frost, or fire. These products are relatively simple to design and administer because the insured event is clearly defined and easier to verify. As a result, they have historically been offered by private insurers on a largely unsubsidized basis, particularly for risks that are localized and less prone to moral hazard.

**Parametric insurance** is a type of insurance in which the policyholder receives a predefined payout when a specified trigger is reached. These triggers are based on independent measurements of a hazard, such as rainfall (precipitation index), temperature (heat stress index), or other observable indicators, rather than individual farm losses. Payouts are standardized per unit of insurance for all farmers within a defined area. Because parametric insurance relies on external data rather than farm-level verification, it reduces the need for household-level actuarial data collection and claims assessment, resulting in lower administrative and transaction costs (Barnett et al., 2004). As a result, it has emerged as a promising alternative to indemnity-based insurance. Two main forms of parametric insurance are commonly distinguished: weather or satellite index-based insurance and area-yield insurance.

- **Index-based insurance (weather/satellite index)** uses indicators such as rainfall, temperature, vegetation indices, or other remotely sensed data to trigger payouts. Early schemes relied on rainfall data from local weather stations (Miranda, 1997). Recent products increasingly use satellite data and crop models to construct more accurate and scalable indices (Ceballos et al., 2025). These products are particularly useful in areas where weather variability is the primary driver of agricultural risk.

- **Area-yield insurance** uses the average yield in a defined geographic area as the index. Payouts are triggered when area yields fall below a predetermined threshold, rather than based on individual farm losses. Individual farmers pay a premium to participate (often with subsidies). Payouts are calculated using yield data that is typically obtained through crop-cutting experiments on representative plots. Area-yield insurance was among the earliest forms of index insurance (Dandekar, 1976). It remains widely used, including as the predominant model in India's national crop insurance program.

Parametric insurance has several advantages. Because payouts are based on a predefined index instead of actual damages, there are lower administrative costs, simplified and faster claim processing, and increased speed and flexibility of payouts. There is also a reduced moral hazard because payouts depend entirely on an external index that is out of the farmers' control (Barnett et al., 2004; Hazell et al., 2010; Jensen et al., 2017).

The primary disadvantage of parametric is basis risk, which is the risk that the insurance payout does not match the losses experienced by the farmer. When payouts don't trigger or are too low compared to actual losses, farmers remain exposed to financial shocks and may lose trust in the product. Conversely, if payouts trigger when farmers have not experienced substantial losses, the

insurance becomes financially unsustainable, as repeated overpayments increase costs and premiums. Policies with well-designed triggers and accurate risk pricing can mitigate this risk but cannot eliminate it entirely.

**Indemnity-based MPCI dominates agricultural insurance markets.** Index-based insurance products account for a much smaller share of total premium volume, though the number of available index-based products is growing rapidly. According to GIZ (2021), 82% of the insurance programs surveyed in low- and middle-income countries were index-based, with little variation by region. About one third (32%) of all the index-based programs were also area-yield index schemes, though this varied by region; 50% in Latin America and the Caribbean, 37% in Africa, and only 18% in Asia. However, many index-based schemes are small compared to indemnity-based schemes, and hence account for much smaller shares of the premium collected and insured coverage.

CASE STUDY 1:
## Livestock insurance in a changing climate

**Livestock insurance provides financial protection to producers against the loss of animals or livestock-related income due to risks such as disease, mortality, extreme weather, theft, and price volatility.**

Products range from traditional indemnity-based mortality insurance — where payouts are triggered by verified animal losses — to index-based products linked to external indicators such as forage availability, drought conditions, or temperature extremes. Despite its benefits, livestock insurance remains far less prevalent globally than crop insurance: in many countries, coverage is limited to small pilot programs or niche commercial offerings, and only a small share of the world's herd is insured. Even in advanced markets, livestock products typically represent a modest portion of total agricultural insurance portfolios, reflecting high loss-adjustment costs, correlated risks, and challenges in verifying mortality and disease losses at scale (Mahul and Stutley, 2010; World Bank, 2013; Hazell and Varangis, 2020).

Interest in livestock insurance is growing as climate and market pressures intensify. Rising temperatures and more frequent droughts are increasing heat stress, forage scarcity, and disease risks across major livestock systems, while global demand for animal protein continues to expand alongside population and income growth. These trends are heightening the economic exposure of producers and supply chains, particularly in pastoral and mixed-crop livestock systems. In response, insurers, governments, and development partners are testing new approaches — including satellite-based pasture and heat stress indices, bundled credit–insurance products, and public–private partnership models — to improve scalability and affordability. While uptake remains uneven, livestock insurance is increasingly viewed as a critical component of climate resilience and sustainable livestock sector development (Chantarat et al., 2013; Greatrex et al., 2015; FAO, 2021).

# INSURANCE DESIGN CONSIDERATIONS INFORMED BY EXISTING PROGRAMS

Around the globe, agricultural insurance systems vary widely in their design, coverage and performance. This section examines a selected set of insurance programs from both high- and low-income countries. We identify the institutional arrangements, policy support and market conditions that have enabled insurance markets to develop and, in some cases, scale. The case studies span national programs; regional initiatives in Africa and South Asia; meso insurance schemes that insure farmers indirectly through financial institutions and other intermediaries; and macro insurance programs that pool catastrophic risks across countries. Together, the case studies capture the most common approaches to agricultural insurance.

The case studies and their key characteristics are summarized in Table 3, organized by crop, livestock, and macro insurance programs. They include the world's largest agricultural insurance markets — China, the United States, and India — as well as several medium-sized markets such as Canada, Japan, Germany, Italy, and Brazil. Taken together, these programs account for at least 75% of global agricultural insurance premiums and cover the vast majority of insured farmers worldwide; China and India alone insure approximately 285 million farms out of a global total of about 570 million. Within this overall concentration, however, coverage levels and the degree of risk protection vary substantially across countries and programs.

The case studies drawn from the countries in Table 3 provide useful insights into three key factors enabling the establishment, financial viability and scaling of insurance programs around the world. These factors are: government support, product design and delivery mechanisms.

TABLE 3:

## Characteristics of insurable risks and challenges in agricultural insurance

| Region & country | Program & institutional structure | Who is insured? | Average premium subsidy | Type of risks insured | Total insurance premium (US $ millions) | Coverage | Program initiator | How are catastrophic risks handled? |
|---|---|---|---|---|---|---|---|---|
| **Crop Insurance Programs** | | | | | | | | |
| ***North America*** | | | | | | | | |
| USA | The Federal Crop Insurance Program is a national program that operates as a public–private partnership | Farmers | ~60% | Various MPCI and index products | 17,700 | 90% acreage of 8 major field crops, 80-85% value of insured crops, 60-80% farms | National government | Ad hoc disaster assistance by states and federal governments |
| Canada | AgriInsure is a national government run program | Farmers | 60% | MPCI | 1,400 | 75% value insured crops, 50% acreage all crops, 25% all farms | National government | Disaster assistance is provided by AgriRecovery |
| ***Europe*** | | | | | | | | |
| Germany | Insurance is offered by private insurers | Farmers | 30–50% | Named perils | 2,300 | 65–70% total crop area, 75% commercial farms | Private sector | State-level disaster relief |
| Italy | A hybrid of private and publicly supported insurance delivered through farmer mutuals | Farmers and Condifesa mutual funds | >50% | Single peril and MPCI | 1,200 | 42% value total crop production, 65% crop acreage, 55% commercial farms | National government | The Agricat fund compensates for catastrophic losses not covered by insurance |
| ***Asia & Pacific*** | | | | | | | | |
| Australia | Insurance is offered by private insurers | Farmers | None | Area-yield index and weather indices | 480–500 | NA | Private insurers | NA |
| China | A national insurance program operates as a PPP | Village mutuals | 80% | MPCI | 18,140 | 90% all farms, 70% area main cereals, 30% agri-GDP | National government | NA |
| India | The Pradhan Mantri Fasal Bima Yojana is a state-run area-yield index insurance that operates as a PPP | Farmers | 85% | Area-yield index | 4,252 | 80% all farms, 15% total value crop production | National government | |
| Japan | A multi-layered and government supported system in which ZENKYOREN and prefecture federations reinsure farmer mutuals | Farmers through cooperatives | 70% | MPCI | 317 | 100% of crop area for staples, 100% commercial farms | National government | The government reinsures the crop insurance system against catastrophic losses |
| Philippines | Philippine Crop Insurance Corporation is a state-run MPCI | Farmers | 60–70% | MPCI | 190 | 35–40% of farms, 38% harvested area, 30% value total crop production | National government | Fully subsidized catastrophe insurance |
| ***Latin America*** | | | | | | | | |
| Brazil | There are two government supported programs: PROAGRO and PSR | Farmers PROAGRO targets borrowers | ~45% for PROAGRO, ~25% for PSR | MPCI | 1,800 | 3% total value crop production, 5% farms | National government | |

| Region & country | Program & institutional structure | Who is insured? | Average premium subsidy | Type of risks insured | Total insurance premium (US $ millions) | Coverage | Program initiator | How are catastrophic risks handled? |
|---|---|---|---|---|---|---|---|---|
| Mexico | Agroasemex is a state-run agency that reinsures farmer mutuals | Fondos (farmer mutuals) | Up to 60% | MPCI | 552 | 20% farms, 10% crop area | National government | CADENA is a meso insurance program for states to help finance disaster assistance |
| Peru | NETS and SAC operate as PPPs and are coordinated within a National Risk Transfer System | Farmers | 60–80% | MPCI and parametric | 35 | 33% of small & medium-sized farms, 40% total arable area | Evolved from a private-sector initiative | There is a CAT insurance program (SAC) for vulnerable smallholders |
| ***Africa*** | | | | | | | | |
| Mauritius | Operated by the SIFB, a marketing monopoly | Sugar growers & mills | 0% | Primarily hurricane risk | 9.2 | 100% sugar growers and mills | National government | The insurance covers catastrophic losses |
| East and West Africa's R4 Rural Resilience | Partnership of non-state agencies and private insurers | Smallholders | NA | Index insurance | NA | 180,000 farms in 7 countries | Oxfam & World Food Program | Varies by country |
| ACRE Africa | Partnership of non-state agencies and private insurers | Smallholders | NA | Index insurance, hybrid weather-MPCI | NA | Over 5 million contracts in 10 countries | Syngenta Foundation & Global Index Insurance Facility | Varies by country |
| **Livestock Insurance Programs** | | | | | | | | |
| Mongolia | State led on a PPP basis | Herders | 50% | Livestock mortality Index | NA | 16.6% of all herders in 2020, 7.1 million livestock | State and World Bank | Disaster assistance program for losses >30% |
| Kenya | Initially an unsubsidized microinsurance scheme but became a state sponsored macro insurance that works on a PPP basis | Pastoralists | 100% for 5 TLUs, zero thereafter | Drought index as proxy for livestock mortality | 8.8 | As of 2019/20, about 20,000 beneficiaries and 90,000 insured livestock | Began as a research initiative led by ILRI, Cornell and UC Davis | Catastrophe insurance program |
| **Macro Insurance Programs** | | | | | | | | |
| Africa | African Risk Capacity | Governments of 14 African countries | NA | Major natural disasters | NA | Between 2014 and 2024, ARC provided over $150 million in payouts benefiting more than 12 million people | National governments | Catastrophe insurance program |

# Role of government support

To address affordability, market failures, and systemic risks that the private sector alone is often unable to manage, governments use a range of public support mechanisms to strengthen, stabilize, and scale agricultural insurance markets. The main mechanisms of government support are:

- **Insurance subsidies**
- **Reinsurance, catastrophic risk-sharing support, and national adaptation planning**
- **Regulatory frameworks and enabling environment, data infrastructure, farmer education and awareness**

The case studies in this section demonstrate the pivotal role that government support plays in global crop insurance through these provisions.

## Enabling farmer access to insurance through subsidies

**Large-scale agricultural insurance programs have rarely developed without support from subsidies, and many countries subsidize a large share of farmer premiums to improve affordability and participation.** This section examines the role of subsidies in agricultural insurance, weighing both the benefits and risks of sustained public financing. We will look at start-up support and long-term premium subsidies, and their integration into broader safety net programs and national insurance schemes.

Subsidy levels vary widely, averaging 80–85% in China and India, around 60% in the U.S. and Canada, and up to 65% under the EU's Common Agriculture Policy. Some countries have additional national top-ups. Globally, premium subsidies cost roughly $30 billion per year, with particularly rapid growth in China, and some governments also contribute to administrative costs. Countries with little or no subsidy — such as Australia and some private European markets — tend to show lower uptake or narrower coverage, though some have achieved strong farmer penetration rates and financial sustainability without government support. Across most of the case studies examined in this report, subsidies consistently played a key role, both in establishing agricultural insurance programs and in scaling them up.

**Sometimes temporary subsidies are used to overcome initial start-up problems.** These problems may arise when farmers or insurers are initially uncertain about a new type of insurance product because they lack sufficient knowledge to assess its real risks and benefits. Subsidies are also widely used to make insurance more accessible to subpopulations who face structural barriers to purchasing coverage, such as poor and women farmers.

**Long-term subsidies play an important role, but can also cause distorted incentives.** Many countries subsidize insurance for the longer term to offset the generally low demand for insurance by farmers when priced at its full cost. These

long-term subsidies can quickly become costly to the national budget, and undermine efficiencies and incentives within the insurance industry (ILO & IFC 2017). They may also encourage farmers to overinvest in risky and sometimes environmentally damaging agricultural activities, and may discourage the adoption of more climate-resilient farming practices (see Section 4).

**Widespread insurance coverage and high levels of government subsidy — on their own — do not ensure that insurance programs are effective, or that they deliver strong environmental or socially equitable outcomes** (Hazell and Varangis, 2020). Subsidies should be designed and implemented in smart ways that are cost-effective. Existing agricultural insurance systems often influence production decisions in ways that lead to unintended consequences, or may still leave large coverage gaps. Historically, many programs have disproportionately favored intensive, large-scale production systems, while failing to reflect the risk-reducing benefits of resilient farming systems in pricing and eligibility criteria.

CASE STUDY 2:

## Subsidies for scale: Coverage, gaps and lessons from India's crop insurance program

### India's national crop insurance program is the second largest crop insurance market in the world.

The government launched the nationwide Pradhan Mantri Fasal Bima Yojana (PMFBY) scheme in 2016 to provide comprehensive, affordable insurance to farmers. Since then, the program has delivered transformative scale and meaningful risk protection, while also revealing important areas for continued refinement and strengthening (Government of India, 2016).

The insurance is an area-yield index product that covers standard costs of production as estimated for each crop at district levels. It is implemented via public–private partnerships (PPPs). There is no additional compensation for income loss. Average yields are determined each season for clusters of villages through state operated crop-cutting methods. The premium rates that farmers pay (before subsidies) are fixed at 2% for monsoon season (Kharif) crops, 1.5% for winter seasons (Rabi) crops, and 5% for horticulture and commercial crops. The government subsidizes the remaining premium, sharing the cost between central and state governments (Divi et al., 2025).

Since its launch, PMFBY has reached significant scale: over the period 2016/17 to 2022/23, it insured an average of 65.2 million farmers each year and 45.8 million hectares of crop land. Claim payments varied widely but averaged $2.4 billion per year, with an average insured sum of $27.2 billion (Government of India, 2024). Evidence suggests that insured farmers experience lower income volatility and, in some cases, higher productivity compared to uninsured farmers, indicating meaningful risk management benefits (Jain et al., 2021).

A World Bank Environment & Social Systems Assessment found that PMFBY's current design and implementation do not explicitly incorporate environmental or social sustainability criteria, and operate largely in isolation from programs that promote sustainable farming practices (World Bank, 2018).

Despite its scale, PMFBY continues to navigate efficiency constraints and protection gaps that limit its effectiveness as a risk management instrument. Chronic delays in claim settlement, complex and largely manual yield assessment processes and procedural complexity have weakened farmer confidence. The program is also hampered by limited local-level support and opaque claim decisions. Coverage gaps remain substantial: program participation varies widely across states, and several large agricultural states have opted out altogether. The program was compulsory for all farmers borrowing from state banks until recently, when the insurance was made voluntary for loanee farmers due to pressure from stakeholders. Because of this, overall insurance penetration remains low, with less than a quarter of gross cropped area insured (Nirmal and Babu, 2021).

To address these challenges, the program has taken steps to improve operational efficiency. The adoption of digital tools such as YES-TECH for yield estimation and WINDS for weather data have enhanced the accuracy and timeliness of loss assessment. The expansion of online platforms and Direct Benefit Transfer mechanisms has further strengthened delivery by reducing administrative errors and ensuring that payouts are transferred directly to farmers' bank accounts (Government of India, 2024).

In many countries, insurance subsidies are a small fraction of the total value of their agricultural support. The annual support given to agricultural producers globally from 2016 to 2018 averaged $638 billion (about 15% of global agricultural GDP). The global value of insurance subsidies accounts for less than 5% of this, or around $30 billion (Gautam et al., 2022). These government support policies influence farmers' choices about land use and farming practices, meaning that insurance design alone has limited power to drive farmer behavior toward resilience and sustainability.

The larger body of agricultural support policies, such as price supports, input subsidies and trade measures, shapes land use and farming decisions far more powerfully. As FAO, UNDP and UNEP (2021) have documented, those policies remain heavily biased toward measures that are market-distorting, inequitably distributed and harmful to the environment. For example, price support policies and input subsidies that aim to increase food production can work against policies and investments intended to support resilient and sustainable farming practices. In many countries, governments must think about how to reform the landscape of agricultural support in a way that treats climate resilience as a core objective of agricultural policy, rather than an add-on to it.

Achieving both financial sustainability and inclusivity with an insurance program requires differentiated products, layered financing and smart subsidies tied to social and environmental outcomes. Government subsidies are often required to reach the poorest farmers. Insurance companies would rather insure larger commercial farms than large numbers of spatially dispersed smallholders, many of whom are poor and vulnerable and operate at subsistence levels of production. The programs that have achieved scale with smallholders are invariably heavily subsidized and are reinsured by the public sector; these programs often operate with some of characteristics of a social safety net program.

CASE STUDY 3:

### Social protection through insurance: Lessons from the Philippine crop insurance corporation

The Philippine Crop Insurance Corporation (PCIC) operates a government-owned and administered multi-peril crop insurance program that is heavily subsidized and focused primarily on staple crops. More than 80% of the insured area is planted with rice and corn, although coverage also extends to selected high-value crops, livestock, fisheries and noncrop agricultural assets (U.S. Department of Agriculture 2022; PCIC 2021). Losses are assessed through traditional indemnity-based methods, with PCIC adjusters and local agricultural technicians conducting in-field inspections to estimate damage. Through government initiatives such as the Expanded Survival and Recovery Assistance Program and the Rice Competitiveness Enhancement Fund, coverage is automatically provided at no cost to resource-poor farmers and those in disaster-prone areas. These farmers also receive fully subsidized catastrophic insurance against extreme weather events (PCIC 2021).

**Over the past 15 years, the government has allocated approximately $500 million USD in premium subsidies, enabling the program to reach substantial scale.**

PCIC now covers roughly one-third of all Philippine farmers and fishers, with 2.49 million policies sold in 2021 and a total sum insured of $1.17 billion. Empirical studies found that insurance participation has reduced income volatility and supported higher average farm incomes (Reyes et al., 2021). Insurance coverage has also facilitated access to agricultural credit, as policies are commonly accepted by lenders as collateral (World Bank, 2021a).

Despite these achievements, PCIC faces persistent operational and financial challenges such as settlement delays for claims, and poor accuracy and credibility of loss assessments. In addition, sums insured for major crops frequently cover only a fraction of actual production costs, limiting the program's effectiveness as a true risk-transfer mechanism. Rising subsidy requirements — now exceeding $75 million USD per year — further raise concerns about fiscal sustainability. From an environmental and social perspective, PCIC plays an important role in climate adaptation by helping farmers manage increasing exposure to typhoons, floods and droughts. But its current design does little to actively incentivize more sustainable or resilient production practices.

## Incorporating insurance in broader risk management policies through reinsurance, catastrophic risk protection, and adaptation funding

**Recent signals from the global insurance and reinsurance sector suggest that climate-related pressures are intensifying across insurance markets.** Reinsurers and rating agencies report tightening capacity, rising reinsurance costs and greater scrutiny of climate-exposed portfolios, particularly for highly correlated risks such as drought, flood and heat. In its most recent insurance market trends report, OECD (2025) stated that "reinsurance prices rose significantly in 2023 due to both inflationary effects and more frequent and costlier natural hazards." It found that insurance policy rates increased in 2024 as a result. In response to these compounding pressures, insurers may also be increasing deductibles and in some

cases limiting exposure or withdrawing from the most climate-vulnerable segments. This shift reinforces the need for stronger public–private risk-sharing frameworks to maintain affordable coverage and avoid widening protection gaps (Swiss Re, 2022).

These dynamics are playing out across sectors, but also within agricultural insurance, where commodity price volatility compounds climate-driven pressures. In the U.S., for example, reinsurance rates increased by approximately 20% in 2023 as capacity tightened and reinsurers revised their risk assessments (Leahey, 2025). Given the systemic nature of agricultural risks, where large-scale weather events can generate simultaneous losses across regions, insurers face heightened challenges in diversifying risk.

**Insurance works best as one layer in a risk management system, not a standalone solution. Governments play a critical role in making that system viable by absorbing the catastrophic risk that are too much for private insurers.**

Ad hoc, ex-post emergency interventions strain public finances, and are more expensive than investing in risk management through insurance. Catastrophic losses due to natural hazards are often handled through ad hoc disaster assistance programs. These are not only costly to governments in years when losses occur, but if the relief operates independently of insurance, it may undermine incentives for farmers to purchase insurance (Kramer et al., 2022). However, if designed to complement each other, disaster assistance can help remove some of the more catastrophic risks from the insurance market. This can reduce the cost of insuring more intermediate risks. **Governments can improve resilience through public reinsurance mechanisms, and through underwriting catastrophic risk using tools such as macro insurance and CAT bonds.**

In Germany, a broader risk management framework combines insurance coverage with state-level disaster relief funds to address catastrophic losses not covered by insurance. In a similar scheme in Italy, the Agricat fund compensates farmers for catastrophic losses not covered by their agricultural insurance. In Canada, the federal and state governments operate AgriRecovery, a disaster relief agency, that helps farmers recover from major natural disasters not covered by the AgriIsure program. In Japan the government underwrites the crop insurance system so that it can pay out against catastrophic losses.

**Public reinsurance mechanisms allow insurers to transfer catastrophic risks to the state, improving market stability and insurer participation.** Programs such as the U.S. Federal Crop Insurance Program and Spain's Agroseguro rely on strong government reinsurance backstops, while countries like Mexico and Brazil operate public reinsurance facilities. In contrast, many African and some Asian markets lack public risk-sharing arrangements and depend on costly international reinsurance. Where governments have built public reinsurance backstops, markets are more stable and accessible; where they haven't, insurers either don't participate or pass the cost of expensive international reinsurance on to farmers.

**To help offset the lump sum costs of disaster assistance, some governments purchase macro insurance policies that pay out when disasters occur.** These are typically index-based schemes that track natural disasters at regional or national

levels. An example is the CADENA program in Mexico, which insures state governments (Case Study 4).

**The use of catastrophe (or CAT) bonds can also transfer some of the risks to foreign investors, but these add to a country's debt burden and bear relatively high interest rates.** CAT bonds are largely used for disasters like earthquakes, hurricanes and floods, and funds are used by governments for general disaster relief and recovery. To date, there have not been agriculture-specific CAT bonds issued, but for countries with large rural populations and large agricultural economies, these instruments play a role in helping the agricultural sector recover after disasters. Jamaica sponsored a catastrophe bond in 2021, with the World Bank issuing a bond providing up to $185 million in protection against named storms. In 2025 Hurricane Melissa triggered a full payout of Jamaica's $150 million catastrophe bond, with preliminary damage assessments covering residential, infrastructure and agricultural sectors (Evans, 2020; World Bank, 2025).

**Another way for indexed instruments to reinsure disaster assistance is through sovereign risk pools.** For example, the Caribbean Catastrophe Risk Insurance Facility, established in 2007, pools risk using parametric policies. It is capitalized by a multi-donor trust fund and by membership fees of its 20 Caribbean and Central American partners. It offers five different products that cover risks due to earthquakes and those from excess rainfall and hurricanes, and has considered covering drought (Kramer et al., 2022). A similar trust funded the Pacific Catastrophe Risk Insurance Company. The African Union established the African Risk Capacity (ARC) in 2014, which provides countries not only with catastrophe insurance but also technical assistance and capacity building (Case Study 4).

CASE STUDY 4:

## Macro insurance programs that insure governments against disasters

**The Component for Attention to Natural Disasters in the Agricultural Sector (CADENA)** program in Mexico operated as a macro level insurance scheme in which individual Mexican states purchased indemnity-based insurance policies covering catastrophic climate-related agricultural losses. When a qualifying disaster occurred, the insurance payouts were used by the states to compensate smallholders for their losses. This allowed governments to avoid the budgetary uncertainties of more traditional ad hoc post-disaster relief programs, and instead preemptively invest in a mechanism to support farmers after catastrophic events. The premiums were paid by the state governments, but with very substantial subsidies from the federal government. The insurance policies were issued by Agroasemex and several private insurance companies, all of which were internationally reinsured. In 2018 CADENA was replaced by a new approach in which smallholders are encouraged to purchase weather and satellite index-based products directly via mobile phones. The new model is coordinated at the federal level by the Secretariat of Agriculture and Rural Development (SADER) and Agroasemex.

**The African Risk Capacity (ARC)** is a regional facility that pools sovereign drought risks across countries. At the sovereign level, governments and

development agencies have adopted index-based insurance as a fiscal risk management tool for financing national disasters. Facilities like ARC enable governments to finance rapid responses to disasters without diverting resources from long-term development. Using satellite-based rainfall data and drought indices, ARC enables payouts within weeks of a shock, helping governments protect vulnerable populations before humanitarian crises escalate. The facility combines three components: ARC Agency, which provides technical assistance and capacity building; ARC Limited, which underwrites the insurance; and ARC Replica, which allows humanitarian agencies and donors to purchase coverage on behalf of countries. Between 2014 and 2024, ARC provided over $150 million in payouts to 14 African governments and partners, benefiting more than 12 million people through early interventions in food and livelihood support (ARC 2025).

**The Catastrophic Agricultural Insurance (CAT)** in Peru provides insurance against catastrophic weather events for the poorest and most vulnerable farmers. The premiums for CAT are fully subsidized by the government and the insurance covers losses up to 50% of the predetermined value of the crop — mostly food staples such as potatoes, maize, and other indigenous tubers. The scheme operates as a PPP in which the government contracts private insurers to deliver and service the insurance. Data from Peru's Ministry of Agriculture and Irrigation shows that the program currently insures about 1.6 million hectares across all 24 regions of Peru, and between 250,000 and 300,000 farmers (AgroPeru, 2023). There is also an expanded version of CAT called the National Expansion of the CAT System (NETS) which offers a variant of CAT on a semi-commercial basis to farms of all sizes.

**Integrating insurance into national disaster risk and adaptation planning allows scarce public resources to stretch further by shifting from reactive disaster relief to ex-ante risk management (Ahmed et al., 2021).** When insurance is embedded within national climate and disaster risk financing frameworks, disaster response mechanisms become more predictable, coordinated and fiscally sustainable, reducing the inefficiencies and political volatility of large ad hoc post-disaster payments. For example, in the Philippines, agricultural coverage through the Philippine Crop Insurance Corporation is aligned with a broader sovereign risk-layering strategy, linking farm-level protection to national disaster financing tools (Case Study 3). In Mexico, the CADENA program institutionalized publicly financed index insurance for smallholders as part of disaster risk management reform (Case Study 4). And in Kenya, the Kenya Livestock Insurance Program embeds subsidized livestock insurance within climate adaptation planning to protect pastoralists from recurrent drought (Case Study 6). These examples demonstrate that when governments co-finance insurance premiums — sharing costs with farmers rather than absorbing the full fiscal burden after shocks — they can strengthen resilience, stabilize public budgets and ensure disaster responses operate cohesively.

## Strengthening the enabling environment for insurers through data infrastructure, supportive regulation and education

**Governments play an important role in ensuring a strong enabling environment for functional insurance markets.** Subsidies, reinsurance and public–private partnerships contribute to positive enabling environments for insurance. Beyond this, governments also influence the enabling environment through:

- **Legal and regulatory frameworks:** Governments establish the "rules of the game" by defining what constitutes insurance, ensuring contract enforcement, and setting quality standards. Governments can regulate which types of insurance products are allowed to be sold, and govern how companies operate, in order to protect consumers.

- **Investment in public infrastructure and data:** Governments provide "public goods" that private insurers often cannot afford to build independently, such as weather station networks, remote sensing data systems and high-resolution flood or seismic maps. Access to reliable historical data is essential for accurate risk pricing. Whether designing indemnity-based or index-based crop insurance products, time series data are needed on crop area, production and yields at individual farmer levels and for more aggregate spatial units (e.g., districts or parishes). Meteorological weather station data is also necessary, and must be collected at sufficient sites to capture important spatial variation. These kinds of data are needed anyway for many other government purposes, so the payoff from such investments can be much broader than from insurance alone.

- **Mandating that farmers purchase insurance:** Governments sometimes make insurance compulsory, a practice that has been most common for insuring agricultural credit provided by public lending institutions. This practice helps increase participation and enlarges the risk pool, improving risk diversification and making insurance markets more financially viable and stable.

- **Farmer education and extension services** are an important tool for enabling access to insurance and educating farmers on risk management options. Low awareness and limited understanding of insurance products remain major barriers to uptake, particularly among smallholders. Governments often support training, extension and outreach efforts, sometimes alongside insurers, donors or NGOs. Examples include U.S. federal risk management training programs and farmer education delivered through extension services under Kenya's Agricultural Insurance Program.

- **Aligning disaster management policy with insurance markets:** If governments provide frequent post-disaster relief, farmers may lack the incentive to purchase insurance (OECD, 2021), hindering growth and the insurance market. Therefore, clear disaster management policies that work in tandem with insurance, rather than competing with it, are important for functioning insurance markets.

Australia is a good example of how government interventions focused on improving the enabling environment helped nurture several successful and unsubsidized private agricultural insurance programs. Agricultural insurance in Australia operates through competitive private insurers under state and federal regulations. The government provides almost no direct premium subsidies. Instead, public interventions have focused on improving the enabling environment through investment in data infrastructure, open weather and yield datasets, farmer education on risk management and facilitating reinsurance through the Australian Reinsurance Pool Corporation. There are now several private insurance schemes operating at scale.

Other examples include:

- Nigeria, in which the Lagos State Government launched an Open Geospatial Data Initiative, which provided hydrological datasets that allowed insurers to model flood risk accurately. This initiative reduced technical premiums by 25% and enabled the city's first parametric flood policy for 25,000 households (UNDP, 2025).
- Thailand made insurance coverage mandatory for borrowers from the Bank for Agriculture and Agricultural Cooperatives, which also subsidizes part of the premium (GIZ and ASEAN Secretariat, 2022). This intervention achieved high penetration, insuring 76% of national rice area in 2020.

Lastly, government regulation of crop insurance programs — through measures such as eligibility rules, compliance requirements and approved practice lists embedded in subsidized schemes — can directly influence farmers' cropping and management decisions. For example, purchasing a subsidized crop insurance policy in the U.S. Federal Crop Insurance Program requires farmers to meet planting date requirements and follow approved good farming practices. The intention of these requirements is to lower the risk of mismanagement. Unfortunately, these requirements can also prevent innovation and the adoption of risk-reducing practices. For example, planting cover crops — a practice that improves soil health and water-holding capacity — was not approved as a good farming practice until 2019.

## Role of insurance product design

**Multi-peril crop insurance (MPCI) remains the dominant form of agricultural insurance globally.** This aligns closely with farmers' underlying risk exposure. Crop losses are rarely driven by a single peril; instead, they result from interacting weather shocks, pests, diseases and management constraints over the course of a season. MPCI products are designed to address this reality by covering a broad set of risks under a single contract, providing more comprehensive income or yield protection than single-peril or narrowly defined index products. When well designed, MPCI can offer meaningful risk protection that farmers understand and value, which is essential for sustained uptake. Good design includes clearly defined insured perils, transparent loss assessment protocols, appropriate deductibles and coverage limits.

However, MPCI is operationally complex and costly to implement. It requires reliable historical data on yields and losses; robust infrastructure for individual farm-level loss assessment; and strong institutional capacity to manage complex contracts. These conditions are difficult to meet in many low- and middle-income countries. In smallholder systems, fragmented landholdings, the high number of farmers and limited data make accurate underwriting and claims verification prohibitively expensive. Some countries have made adaptations to traditional MPCI insurance in order to address these challenges: India's national program, one of the largest in the world, relies not on individual farm assessments but on area-yield indices measured at the regional level — which blends the use of parametric tools with traditional indemnity-based MPCI.

Over time, MPCI has also proven adaptable to a wide range of agro-ecological and institutional contexts. Advances in data systems, remote sensing and yield estimation have improved loss assessment and reduced administrative costs. Hybrid designs increasingly combine traditional indemnity approaches with area-yield or weather indices to mitigate basis risk and moral hazard. As a result, MPCI continues to underpin the largest agricultural insurance markets worldwide, accounting for the majority of insured liability in both high- and middle-income countries.

CASE STUDY 5:

## China's MPCI system: How China leveraged public private partnerships to rapidly scale the world's largest crop insurance program

China's crop insurance system is a classic example of an MPCI program delivered through a public–private partnership (PPP) model. Under this structure, farmers retain responsibility for frequent, low-severity losses. Insurance pools, supported by both commercial insurers and global reinsurance markets, cover moderate but financially damaging production losses from multiple named perils such as drought, flood, pests, and extreme weather. The state serves as a financial backstop for catastrophic losses, ensuring solvency across the system. Premiums are heavily subsidized by central and provincial governments, enabling broad participation and reducing adverse selection by making coverage affordable across risk profiles. This layered approach allows China to shift from unpredictable ex-post disaster aid toward structured ex-ante risk financing, while maintaining insurer viability. China's system demonstrates several successes, including rapid scale-up, improved fiscal predictability through prearranged risk financing, and strengthened farm-level resilience to climate shocks.

**Since launching pilot programs in 2007, China has rapidly scaled its indemnity-based MPCI into the largest agricultural insurance systems in the world. Today, the national program covers more than 70% of sown area for staple crops such as rice, wheat, and maize.**

The government has leveraged lessons from other universal coverage programs to close affordability gaps and create diversified risk pools. The government has also invested in increased digitalization through remote sensing, mobile platforms, and data-driven pricing to improve loss assessment, transparency, and farmer awareness.

The program's loss assessment model is also distinctive: rather than indemnifying individual farmers, payouts are determined at the community or village level, with distribution handled within the community. While this reduces administrative costs, it raises questions about whether indemnity payments consistently reach those who suffered the greatest losses, and whether social and political dynamics within communities influence who benefits. These governance dimensions have not been well studied.

China's scale is impressive, but comes at considerable fiscal cost. Premiums are heavily subsidized by central and provincial governments — currently at around $18 billion per year, making it one of the most heavily subsidized agricultural insurance programs in the world. Rising climate volatility, environmental degradation and urbanization are increasing the underlying risk profile and cost of coverage, placing pressure on subsidy budgets and insurer profitability. The program's long-term financial sustainability will depend on addressing some of these challenges. Overall, China's experience illustrates both the potential and the fiscal and environmental constraints of scaling MPCI nationally as a cornerstone of agricultural risk management, especially regarding the high administrative costs required.

**While MPCI is the backbone of most established systems, index-based insurance presents a promising opportunity due to its lower administration and transaction costs, simplified claims processing and faster payouts. It also has the potential for increased affordability for farmers, due to:**

- **Reduced moral hazard:** payouts under index insurance depend solely on an external index, so it does not matter whether an insured farmer follows recommended practices or not. As a result, there is less need for deductibles, copayments, or monitoring farm practices.
- **Simplified and faster claim processing:** Index insurance enables quick compensation based solely on index readings and a pre-established payout schedule. Moreover, advances in technology, such as automatic weather stations reporting real-time data, allow daily index computation and immediate payout calculations. Use of mobile banking among farmers allows compensation to be deposited directly into their accounts as soon as authorization is granted by the insurer and bank.
- **Flexibility:** Because payouts are triggered by an index rather than assessed losses, farmers can use funds as needed to cover a range of costs and damages.

These attributes also enable more novel and small-scale agricultural insurance products. Insurers can pilot, iterate and scale innovative coverage for new crops, regions and risks more quickly than with indemnity products. However, moving from pilot to scale is a barrier. Index pilots have proliferated, but only a few have scaled up successfully. A recent analysis of index insurance experiments found that pilots often succeed under tightly managed conditions. However, scaling failed when programs confronted real-world constraints such as higher basis risk, weaker farmer demand, greater distribution costs, and the withdrawal of donor support (Castaing and Gazeaud, 2025).

**The main challenge for parametric insurance is that the index must be carefully designed to closely track losses for individual farms.** Otherwise, any mismatches between payouts triggered by the index and a farmer's actual loss (i.e., basis risk) will make the insurance less reliable as a financial instrument for stabilizing farm income. Basis risk includes "downside basis risk," when a farmer suffers losses but receives too little or no payout, and "upside basis risk," when payouts are higher than the loss or occur without any loss. Despite many efforts to develop indices with low basis risk, it continues to be a major impediment to farmer demand for parametric insurance.

**The success of parametric insurance depends heavily on the careful design of its payout triggers and the quality, accuracy and availability of the underlying data (such as weather, yield or satellite indicators) used to model losses.** As remote sensing, climate data, crop modeling and digital infrastructure continue to improve, insurers and governments are increasingly able to design more precise and responsive models and indices. These technological advances make it increasingly feasible to develop index insurance products that can meet farmers' risk management needs and remain financially viable.

In Australia, YieldShield, an index-based program is operating as the country's largest unsubsidized insurance product. YieldShield uses satellite-based crop growth modeling, rainfall data, and soil moisture indices to estimate district-level yields and automatically trigger payouts when observed yields fall below benchmark thresholds (Hatt, et al., 2012). IBLI Kenya (Case Study 6) is an example of an index insurance product used to insure pastoralists using satellite-derived vegetation data to trigger payouts when drought causes livestock mortality. Its success demonstrates how well-designed indices can protect assets and support resilience. Additionally, both the R4 Rural Resilience Initiative (Case Study 10) and Mongolia's Index-Based Livestock Insurance program (Case Study 9) pair index insurance with programs that incentivize farmers to reduce underlying climate and production risks. These case studies demonstrate how index insurance products can be designed and bundled to help support farming practices that improve resilience.

The private sector and NGO community have an important role to play in demonstrating the viability of new insurance approaches before governments commit to subsidizing and scaling them. Initiating agricultural insurance programs often requires this kind of sequenced investment, where early-stage pilots absorb the risks of testing new products and delivery models, and build the evidence base that governments need to act. There are some cases where private insurers or agribusinesses have initiated small insurance programs which have proved sufficiently successful for governments to scale them up on a subsidized basis. Good examples are the ACRE Africa program in East Africa (Case Study 7) and the La Positiva Insurance Company in Peru (Case Study 8), which demonstrate how collaborative efforts in the NGO sector can help agricultural insurance move beyond small pilots toward more stable and sustainable programs that farmers can rely on.

CASE STUDY 6:

## From pilot to policy: Scaling index-based livestock insurance in Kenya

**The Index Based Livestock Insurance (IBLI) in Kenya is designed to insure pastoralists against drought-related livestock losses in the northern arid and semiarid lands.**

The insurance uses satellite-based observations of the NDVI (Normalized Difference Vegetation Index) for spatially disaggregated areas, which was shown during a research phase to be highly correlated with livestock losses in drought years. The insurance was initially piloted on a voluntary and unsubsidized basis beginning in 2010, but despite demonstrated potential in several countries the scheme did not take off at scale (Chantarat et al., 2013).

However, in 2015 the Kenyan government added the insurance to its social protection program by launching a macro-level insurance scheme called the Kenya Livestock Insurance Program (KLIP). KLIP provides fully subsidized insurance for up to 5 Tropical Livestock Units (TLUs) for targeted households. Like IBLI, the insurance pays out against the same NDVI triggers measured within individual insured areas. It is a macro insurance in which the government is the sole policyholder, but it is administered under contract by private insurance companies. These companies also distribute the indemnities through mobile money or banks to targeted households when a drought occurs. The insurance companies contracted to implement KLIP are also required to offer IBLI on a voluntary and unsubsidized basis to households who wish to top-up their insurance beyond 5 TLUs, as well as to non-KLIP beneficiaries (Fava et al., 2021).

The IBLI and KLIP model has been adopted by the World Bank under the De-Risking, Inclusion, and Value Enhancement of Pastoral Economies (DRIVE) program. DRIVE is designed to strengthen climate resilience and financial inclusion among pastoralist communities in Kenya, Ethiopia, Somalia and Djibouti. Beyond insurance, DRIVE links pastoralists to financial services such as credit, savings and investment. DRIVE aims to reach over 1.6 million pastoralists and mobilize private sector participation in risk financing (Fava et al., 2021).

CASE STUDY 7:

## Bridging the gap: How ACRE Africa connected smallholders to insurance markets across ten countries

**The emergence of PPPs, index-based insurance, and regional risk pooling facilities has begun to reshape the agricultural insurance landscape, as illustrated by the experience with the Agriculture and Climate Risk Enterprise Ltd. (ACRE Africa) program.**

The ACRE Africa program in East Africa evolved from the Kilimo Salama project, which was established in 2009 and funded by the Syngenta Foundation and the Global Index Insurance Facility (GIIF). ACRE is not an insurance company itself, but a licensed not-for-profit intermediary that works with local insurers and stakeholders to provide insurance products suitable for smallholders. ACRE offers three products. The core product is a weather index cover using satellite-based rainfall data, which enables farmers to cover certain growing phases or the whole season, or to select a specific severity of losses for coverage. Second, ACRE offers hybrid weather index and MPCI coverage, which enables clients to insure crops against risks beyond their control. Innovatively, this also covers the germination phase, and the hybrid nature allows for a more comprehensive coverage of the crop. Third, dairy cows and risks associated with pregnancy losses are covered by livestock insurance. ACRE also piloted a blockchain solution, enabling payouts to be sent to eligible farmers' mobile accounts within seconds. The program has grown rapidly, and by 2024 it had operations in ten African countries and was reaching over 5 million farmers. In 2024, ZEP-RE (a reinsurance company) acquired a major stake in ACRE, a move that has strengthened the organization's regional reinsurance capacity within the broader African insurance ecosystem.

Source: Key Informant interview with ACRE representative.

CASE STUDY 8:

**Credit as a delivery channel: How embedding insurance in credit built a viable market in Peru**

**La Positiva Insurance Company successfully developed multi-peril indemnity-based crop insurance for small, commercially oriented farms on an unsubsidized basis.** The insurance was available to farmers who were trusted borrowers from financial institutions associated with the insurance company. The insurance was available for any crop for which a loan was made, and covered a range of named perils including drought, excess and untimely rain, flood, landslides, strong wind and fire. The insurer relied on the lenders to monitor crop performance and assess damage. Claim payments were limited to 50% of the value of a farmer's expected crop yield, as determined by the lender at the time of issuing a loan. Indemnity payments were paid directly to the financial institutions who used them to offset farmers' loans. Any surplus payment beyond the value of a loan went to the farmer for their own use. The insurance program covered an average of about 14,600 farmers per year from 2013/2014 to 2019/2020, and had a viable average loss ratio of 0.65 over that period. Inspired by this success and wanting to scale up the number of insured farmers, the government of Peru began offering a 50% premium subsidy for this and similar schemes in the 2020/2021 crop season. This approach evolved into the current National Risk Transfer System.

## Delivery models to reach farmers and unlock finance for investing in resilience

Agricultural insurance is embedded in the broader systems, financial relationships and institutional structures through which farmers manage risk and access resources; therefore, effective agricultural insurance systems are not built on government support or product design alone. They depend equally on how insurance reaches farmers. Effective delivery models should embed insurance within financial relationships farmers already have, and in doing so, unlock expanded capacity to invest in productivity and resilience. This section examines the models and intermediaries that shape how insurance is delivered to farmers as well as how insurance serves as a gateway to credit, inputs and broader financial inclusion.

**Public–private partnerships (PPPs) have emerged as the predominant delivery model for agricultural insurance, replacing the state-owned programs that predominated through the 1980s.** Those earlier systems were phased out due to inefficiencies, fiscal exposure and weak incentives for cost control. PPPs resolve this by separating roles: governments provide oversight, regulation, subsidies and often catastrophic reinsurance, while private insurers are responsible for underwriting, product delivery, servicing and claims management. This division of labor harnesses private-sector operational capacity and innovation while recognizing that public intervention is necessary to address affordability, correlated risk,

equity, and market failures. This division has proven more fiscally sustainable and operationally effective, and now underpins the world's largest programs in the U.S., China, India, Spain and Brazil.

The widespread adoption of PPP delivery reflects a central lesson from global experience: agricultural insurance is most viable when public and private actors play distinct but complementary roles within a clearly defined institutional framework. PPPs establish the institutional architecture for insurance, but these models still encounter challenges to scaling coverage and reaching farmers, especially smallholders. The intermediaries who sit between insurers and farmers — such as farmer mutuals, agricultural finance institutions, agri-dealers and cooperatives — can play a role in improving the delivery of insurance to farmers.

**Delivering insurance to groups of farmers is an effective way to expand coverage while reducing adverse selection, moral hazard and high transaction costs.** This can be done through farmer mutuals and meso-level insurance (e.g., through microfinance institutions, cooperatives, or aggregators). These routes embed insurance delivery within existing community and lending relationships.

**Farmer mutuals** are groups of producers who collectively pool their risks. While they typically self-insure some small share of their total risk exposure, farmer mutuals purchase insurance to cover much of their remaining exposure. This model has been successful in several regions:

- In Mexico, local farm mutuals called Fondos provide insurance to their members. The Fondos typically self-insure about 5% of their total liability. They depend on affordable reinsurance from Agroasemex, a state reinsurer, and private insurers to cover the remaining risk, the cost of which is partially subsidized by the government.
- In Italy, most insurance is procured for farmers through farmer insurance mutuals, called Condifesa.
- In China, insurance is sold to village mutuals who purchase a single contract on behalf of all their members. Losses are assessed by government inspectors, and indemnities are distributed within the group.

Beyond serving as a more efficient delivery channel compared to a collection of individual farmer policies, mutuals are also performing a layered approach to risk management by absorbing the small, frequent, predictable losses locally (where assessment costs are low and trust is high), and only transferring the correlated, catastrophic tail risk upward to the formal insurance market.

**Meso insurance** is a delivery model for insurance which has emerged in over the last 20 years. It enables intermediaries to purchase a single insurance contract that pays out directly to the farmers when an insured event occurs (Kramer et al., 2022). Meso insurance is often purchased by public agencies, but can also be purchased by financial institutions and agri-dealers to protect their own credit portfolios, with borrowers benefiting indirectly through debt forgiveness when an insured event occurs.

For example, rural banks in India and the Philippines have taken out rainfall-index meso insurance to safeguard their agricultural loan portfolios. When drought triggers a payout, the bank uses the indemnity to restructure, reduce or forgive outstanding farm loans, effectively passing the benefits to borrowers without requiring each farmer to hold an individual insurance policy. This approach to insurance embeds insurance delivery into existing lending relationships, and helps de-risk lending to farmers, facilitating greater access to credit.

**Beyond risk mitigation, insurance can also unlock increased access to finance for farmers.** Agricultural insurance is required by many agricultural lenders because it enables loan repayment. However, there are still finance providers that do not link loans to insurance. According to UNDP, value chain actors — traders, processors, and commercial producers — provide more than 40% of total smallholder lending, yet most of this lending is uninsured. Integrating insurance into these lending relationships can reduce defaults, expand credit access, and increase the lending capacity of both formal financial institutions and value chain actors.

**Insurance can enable improved access to finance through explicitly linking insurance to microcredit, input subsidies, support for resilience-building practices, or market access via value chain or aggregator-based distribution models.** This helps extend coverage to poorer and riskier farmers, as well as increasing access to finance, by effectively embedding insurance into existing input and market transactions. These models demonstrate that the actors best positioned to deliver insurance to smallholders are often the same actors who are lending to them and buying their output.

By bundling insurance with existing services, providers can offer farmers more value while using established distribution networks. A clear example is NWK Agri-Services in Zambia, which provides cotton farmers with seeds and equipment on credit at the beginning of the growing season. Farmers can choose to add insurance to these loans without paying anything up front, solving the common problem of limited cash flow. If the harvest is successful, the insurance costs are simply bundled with the farmer's loan repayment. If a loss occurs, the insurance covers the debt so the farmer doesn't have to repay the loan, though the cost of the insurance premium still applies (Hazell and Timu, 2024).

Bundling agricultural insurance with credit, inputs, and market access can introduce risks of power imbalances and opaque pricing, requiring safeguards such as transparent terms, fair treatment, and accessible grievance mechanisms, consistent with guidance from the FAO's *Guiding principles for responsible contract farming operations* and OECD's *Principles on Financial Consumer Protection*. These types arrangements depend on mutual trust: farmers must be protected from exploitation, while lenders and value chain partners must have confidence in repayment and performance to function effectively at scale (FAO, 2012; OECD, 2011).

Another example of how insurance can expand access to credit is via risk-contingent credit, which links agricultural loans with index insurance so that adverse shocks automatically trigger repayment. This reduces the loan obligation of the farmers and the default risk for lenders. It makes credit more accessible to many smallholders, while simultaneously encouraging greater investment in higher-yielding but riskier technologies (Shee et al., 2019).

The case studies in this section demonstrate that scaling effective agricultural insurance relies on a combination of enabling policy, well-designed products and delivery models that embed coverage within existing financial relationships. Well-designed insurance has the potential to build the capacity of farmers, governments and the private sector to invest in resilience, a dynamic the following section examines directly.

# INSURANCE, CLIMATE RESILIENCE AND SUSTAINABLE FARMING

Climate change is a growing concern for most insurance programs. Some governments are now trying to incorporate agricultural insurance into more holistic approaches to managing climate risk. These approaches include tying insurance subsidies to the adoption of climate-smart land use and farming practices that encourage climate mitigation, adaptation, or both.

Evidence on the environmental impacts of crop insurance is mixed. Some studies find that participation in subsidized insurance programs can reduce input use and associated pollution — for example, through lower fertilizer and pesticide use and reduced nitrogen runoff. This is particularly seen where insurance enables shifts toward less input-intensive or more biologically based practices (Lu et al., 2023; Tang and Luo, 2021; Biagini, 2025). However, these benefits can also be offset by broader production responses that ultimately raise aggregate environmental pressures despite per-acre efficiency gains (Lubowski et al., 2006; Lu et al., 2023; Deryugina and Konar, 2017; Möhringa et al., 2020). Insurance subsidies can incentivize cropland expansion onto marginal lands, shifts toward more input-intensive or water-demanding crops, increased irrigation withdrawals, and reduced adoption of conservation practices.

At the farm, landscape or regional level, if insurance subsidies make input-intensive crops more profitable, that can encourage farmers to grow more of them, sometimes expanding their cultivation onto environmentally fragile lands. For livestock insurance, indemnities that lower the private cost of holding animals can weaken incentives to manage herd size and grazing pressure. This creates risks of overgrazing, rangeland degradation, soil erosion and reduced biodiversity,

especially in fragile dryland systems where carrying capacity is limited. Insurance can also encourage stocking practices that raise disease transmission risks or increase pressure on scarce water resources (Bulte and Haagsma, 2021). Given these complex relationships, it is not surprising that researchers have found mixed results.

Insurance products can be designed to incentivize farmers to reduce underlying risk through adoption of resilient practices. For example, crop insurance can be bundled with improved inputs such as drought tolerant seeds and fertilizers (Boucher et al., 2024). Newer innovations have integrated insurance with agricultural advisory and extension services, whereby farmers not only receive coverage but also benefit from information on optimal agronomic practices, weather forecasts and pest management (Greatrex et al., 2015). Insurance eligibility can also be tied to the implementation of risk reduction activities, demonstrated by the Case Studies 9, 10 and 11. However, many of these activities are still at the pilot stage, and our case studies do not provide any examples where successful scaling of such new approaches has yet been achieved.

CASE STUDY 9:

### Conditional insurance models: How Mongolia tied livestock insurance to sustainable herding practices

**Extensive livestock production through herding in common pasture lands accounts for about 90% of agricultural GDP in Mongolia, and is the main livelihood for most of the poorest people.** In 2008, severe and frequent winter droughts called dzuds were causing major livestock losses. As part of a larger strategy for managing climate risks, the government, with World Bank support, developed and piloted an index-based livestock insurance (IBLI) scheme for herders. IBLI is a livestock mortality index that is calibrated against an annual census of livestock taken within specified geographic areas. Indemnities are paid whenever livestock mortality in an insured area reaches a threshold level (initially 6%). The insurance is voluntary and delivered through private insurers on a PPP basis. The government provides a 50% premium subsidy for IBLI, contributes to the administrative and operational costs of the scheme, and acts as a reinsurer to the insurance companies in case of extreme losses. The program was supported by herder education programs, and by complementary government programs to build more climate-resilient systems at community levels (Adaptation Fund, 2025).

The scheme has been successful. In 2020, about 28,500 herder households (16.6% of the total) purchased IBLI policies, covering about 7.1 million livestock. However, in 2025, in the face of worsening climate change, the government began to reform the system, with assistance from the International Fund for Agricultural Development and the United Nations Industrial Development Organization. The reforms conditioned the purchase of IBLI on herder participation in sustainable herding practices, including pasture restoration, solar-powered water infrastructure, early warning systems for dzuds, and participation in herders' field schools (World Bank, 2024).

Scaling up agricultural insurance on its own is not an adequate approach to adapting to climate change. Addressing these increasing risks requires complementary efforts to support farmers in adapting and building resilience to climate change, as well as appropriate funding resources for catastrophic disasters. Insurance products can be structured in a way that reduces underlying risks by incentivizing farmers to adopt climate-resilient practices and sustainable land use. In some cases, such practices can also come with climate mitigation co-benefits. As discussed in Section 1, environmental degradation can exacerbate climate-related risks; addressing both environmental degradation and climate vulnerability can help reduce losses and contain the cost of insurance. If insurance programs are well designed, they can lead to win-win outcomes, but if poorly designed they can lead to undesirable outcomes that also increase farmers' risk exposure. This section discusses these relationships in more detail.

**Both insurance and climate-smart farming can reduce a farmer's financial risk exposure.** Farmers who are able to implement both will have complementing risk reduction benefits. Other farmers may be unable to implement both, and may deprioritize climate-smart practices since insurance covers the majority of their financial risk. This substitution effect will be greater if adaptation requires investments that are more costly than insurance. Therefore, insurance that is heavily subsidized or otherwise underpriced (e.g., if the premium rates are based on historic weather patterns that do not reflect more recent climate changes) can potentially disincentive farmers' investment in building resilience. However, as discussed in Section 3.3, the opposite effect is equally possible. Insurance can encourage investment in climate-resilient practices by reducing the financial risk of adoption; by expanding access to credit for improved inputs; and by creating the conditions for farmers to try new practices or technologies that have some transition risk but could pay off with increased productivity.

Government policies that restrict subsidized insurance to certain crops may also discourage farmers from switching to other crops that may become more appropriate as their local climate changes. For example, the PSR program in Brazil restricts subsidized insurance to certain crops, especially soybeans. The design of insurance products and the level of policy subsidization can also affect amounts of inputs used, crop planting decisions, and decisions about whether or not to plant on marginal land.

**There are several ways to use insurance to encourage farmers to adopt more resilient and environmentally sustainable land use and farming practices:**

- **Adjust the level and targeting of premium subsidies.** If farmers do not pay at least the actual risk cost of their insurance premium, they may have incentive to expand the area of risky crops, leading to environmental damage and increased dependence on future subsidies. If insurance is to be heavily subsidized, then the subsidy should be targeted to farmers below certain income thresholds or capped at a fixed amount per recipient (Hazell and Varangis, 2020). Premiums should also be updated to reflect changes in

regionally specific, forward-looking climate risk assessments to encourage long-term planning and adaptation to climate change.

- **Provide insurance-based incentives for sustainable practice uptake.** Insurance products can be designed to actively incentivize environmentally friendly farming practices by making financial benefits contingent on sustainable behavior. This might include offering premium discounts or rebates for adopting practices such as reduced tillage, cover cropping, crop rotation, integrated pest management, precision fertilizer application and use of drought tolerant seed varieties.

- **Make insurance eligibility conditional on implementation of specific practices.** Insurers and governments can require farmers to implement specific sustainability practices as a condition of accessing insurance coverage. Examples include adherence to nutrient management plans, or restrictions on cultivating highly erodible or ecologically sensitive land. When paired with technical support to help farmers meet those standards, conditionality can shift baseline practices across a wide coverage area rather than relying solely on voluntary uptake.

- **Bundle insurance with climate-smart inputs or credit,** such as drought tolerant seeds or credit for improved irrigation and soil conservation practices. This is best done using intermediaries like financial institutions or agri-dealers who can bundle the insurance with the credit or inputs they provide to farmers. Extension services can also play complementary roles. An example is Africa's R4 Rural Resilience Initiative (Case Study 10). This program combines index insurance with risk reduction strategies, and allows farmers to pay premiums through labor on community resilience-building projects like soil and water conservation. The bundling of insurance with input credit means farmers can invest in inputs they couldn't afford upfront, and the loan is protected against the risk that a bad season makes the loan unpayable. The insurance makes the investment in inputs for improved yields viable.

- **Broaden insurance eligibility** to include diversified, regenerative and urban agriculture systems, which are often excluded under subsidized insurance programs whose rules favor monoculture commodity crops. Education programs for insurance agents and farmers about the agronomic and risk-mitigating benefits of conservation practices can also help.

- **Use destocking instruments.** Livestock insurance providers can pair insurance with destocking support that makes it financially attractive to sell animals before severe droughts. This reduces herd pressure at critical moments and stabilizes local markets.

- **Targeted insurance products to de-risk new practice uptake.** Transitioning to unfamiliar or unproven farming practices carries financial risk — yields may dip during the learning period, or new methods may perform poorly in bad weather years. Specialized insurance products can absorb some of that

transition risk, making farmers more willing to experiment. This might include short-term yield-gap coverage that compensates farmers if a new practice underperforms relative to their historical baseline, or pilot programs that offer free or subsidized coverage for the first one to three seasons of a practice change. By reducing the downside of trying something new, insurance can accelerate voluntary adoption of practices that might otherwise take decades to diffuse.

CASE STUDY 10:

## The R4 Program's bundled approach to rural resilience

An NGO and donor agency, Oxfam and the World Food Programme, launched the R4 Resilience program as a regional initiative to catalyze the development of agricultural insurance in several African countries. It was launched in Ethiopia and Senegal and later expanded to Malawi, Zambia, Kenya, Zimbabwe, Burkina Faso, Mozambique, Bangladesh and Madagascar.

The initiative has achieved substantial scale by combining index insurance with risk reduction strategies such as credit, savings and the Insurance-for-Assets mechanism. This mechanism allows farmers to pay premiums through labor on community projects like soil and water conservation (WFP, 2018).

**The R4 program grew from covering about 26,000 farmers in 2014 to nearly 180,000 farmers by 2020, with over half of participants being women.**

## Promising new technological and institutional innovations

**Private-sector innovation can catalyze public-sector scale.** Private insurers, reinsurers, brokers and insurance-tech firms are often better positioned to invest in research and development, test new underwriting and modeling approaches, deploy advanced data analytics and pilot novel product structures at relatively small scale. Examples of these technological advancements include innovations in parametric triggers, remote sensing loss assessment and bundled risk management services. When these pilots show viability, governments can integrate successful features into national schemes through subsidies, regulatory frameworks or formal public–private partnerships (PPPs).

In this model, the private sector serves as the innovation engine and risk manager, while the public sector provides enabling policy, premium support and systemic risk backstops to ensure affordability and broad coverage. Well-structured PPPs are therefore critical: they help maintain private-sector participation and discipline in agricultural insurance markets, while leveraging public resources to achieve scale, stability, and inclusion. Additionally, as climate change drives losses outside the bounds of historical experience, investing in predictive analytics and forward-looking climate modeling can help the insurance industry more accurately price climate-related risks and resilience measures.

Some of the most promising technological innovations, which have the potential to transform the agricultural insurance landscape through improved efficiency, accuracy, and reach, are:

- **Remote sensing data:** Advances in satellite remote sensing have enabled higher-resolution loss assessment and more sophisticated index design in agricultural insurance (Black et al., 2016; Heiss et al., 2025). Many widely used products, including index-based livestock insurance and rainfall-indexed guarantees, now integrate vegetation, rainfall, temperature, and soil moisture indicators. These indicators reduce basis risk by requiring co-movement across multiple indices (Chantarat et al., 2013; Jensen et al., 2017; Vroege et al., 2019). Dynamic triggers that align insurance coverage with actual crop growth stages — rather than fixed calendar windows — have been shown to significantly reduce spatial and temporal basis risk in Europe and Africa (Dalhaus and Finger, 2016; Vroege et al., 2019). However, remote sensing remains less effective for small, fragmented, or intercropped farms, and weather-related indices cannot fully capture yield variability, leaving some basis risk unavoidable.

- **Drones:** Drones offer high-resolution, plot-level imagery that improves loss verification, reduces assessment costs, and accelerates claims settlement, particularly for smallholder systems that satellites struggle to capture accurately (Kramer et al., 2022). Pilot programs such as YES-TECH and HDFC Ergo are increasingly combining drone data with satellite and index-based products to validate payouts and calibrate indices under index-based and area-yield schemes (Kramer et al., 2022). Evidence from India shows

that drones can shorten claims settlement by supplementing crop-cutting experiments (Times of India, 2021). While regulatory barriers and operating costs remain constraints, advances in AI-enabled image analysis are making drone-based insurance assessments more scalable and cost-effective.

- **Mobile phone technologies:** Mobile phones, mobile money and digital platforms have transformed agricultural insurance delivery by sharply reducing transaction costs and enabling scalable enrollment, premium payment and rapid payouts (Munyegera and Matsumoto, 2016; GSMA, 2020). Mobile-enabled insurance models pioneered in Kenya allow farmers to enroll at input purchase points and receive automated payouts through mobile money, strengthening trust and timeliness (GSMA, 2020). Innovations such as picture-based insurance use GPS and time-stamped smartphone images to verify crop losses directly, significantly reducing spatial and idiosyncratic basis risk with limited fraud (Ceballos et al., 2019; Ceballos and Robles, 2020). Evidence suggests these tools can increase insurance demand in some contexts, though willingness to pay and productivity effects remain mixed and context-specific (Ceballos and Kramer, 2019; Kramer et al., 2024).

- **New modeling approaches to area-yield index insurance:** Area-yield insurance links payouts to average yields within a defined zone, reducing moral hazard and adverse selection relative to farm-level indemnity insurance. When agro-ecological zones are well defined and yield measurement is sufficiently dense, area-yield contracts can exhibit substantially lower basis risk than weather-based indices (Ceballos et al., 2025). However, traditional approaches to area-yield insurance are characterized by high basis risk, delayed payouts, and costly crop-cutting experiments. Recent innovations combine remote sensing, crop models, and targeted sampling to reduce the cost and delay associated with traditional crop-cutting experiments. Hybrid approaches use weather indices as primary triggers, while selectively applying area-yield assessments where reported losses diverge from index signals. These approaches — such as gap insurance or conditional audits — preserve coverage accuracy at lower cost (Flatnes et al., 2018).

CASE STUDY 11:

## Modernizing U.S. crop insurance to help farmers adapt to changing climate and water risks

Crop insurance plays a critical role in supporting the financial health of U.S. farms and ranches through the U.S. Federal Crop Insurance Program. The program is a public–private partnership in which RMA — the government regulator — approves multi-peril insurance products that are sold and serviced by approved insurance providers. The federal government subsidizes roughly 62% on average of the premiums farmers pay (USDA, ERS 2026). Farmers receive yield or revenue coverage that is most frequently based on their individual historical crop yields. In 2022, the federal government paid $12 billion in premium subsidies and covered approximately 298 million acres across 370,000 enrolled farms, with coverage concentrated heavily among large-scale operations growing corn, soybeans, wheat and cotton (Atkins, Karina. 2025). The USDA's Risk Management Agency holds broad statutory authority over the program: setting premium rates, subsidy levels, actuarial standards and approved product offerings, while also determining what qualifies as an insurable commodity, a good farming practice and an eligible loss.

However, the Federal Crop Iinsurance Program's reliance on historical data to project rapidly changing risks can lock farmers into increasingly unsustainable production systems in areas facing extreme heat and water stress. A new wave of innovation — driven by modern weather and water data, advanced predictive modeling and artificial intelligence — can help reshape agricultural insurance to be more adaptive to the risks farmers face today. These technologies can empower farmers to respond more effectively to climate change while also conserving natural resources.

Innovators at Praedictus Climate Solutions, Descartes and other companies are developing parametric insurance products using predictive models and up-to-date weather data. These products aim to provide flexible protection against climate risks while enabling faster financial recovery tailored to farmers' specific management decisions. EDF and partners in Kansas are exploring how evapotranspiration data from OpenET can speed up crop insurance adjustments, enabling crop producers using irrigation to reduce water use without risking loss of insurance coverage.

Significant efforts are also underway to incorporate the risk reduction value of conservation practices into federal crop insurance. The Illinois Corn Growers Association and the University of Illinois are advancing the Conservation Practice Rating Adjustment proposal through the USDA Risk Management Agency. This proposal aims to adjust insurance rates for producers in select states who plant cover crops before commodity row crops, based on the risk reductions identified by University of Illinois research using USDA data.

Private-sector partners are also working on insurance solutions tailored to emerging market opportunities. The MBOLD Coalition is leading a new initiative to craft crop insurance solutions that support Upper Midwest farmers who grow winter camelina — a cover crop that protects soil over winter and can be used to produce renewable fuels, animal feed and other products. Additionally, Growers Edge is collaborating with food companies to offer crop plan warranties that shield farmers from the financial risks of adopting conservation practices.

Taken together, these innovations can give farmers greater flexibility to adapt to shifting weather conditions, recover more quickly from disasters and receive insurance pricing that reflects the risk reduction value of soil and water management. Insurers, reinsurers and producer organizations should invest now in the research, development and pilots needed to bring these solutions to scale.

Source: Gauthier, 2025.

# ADAPTING INSURANCE TO FUTURE NEEDS

Insurance systems must evolve to confront climate change directly. The increasing systemic nature of risk undermines existing insurance systems. Numerous innovations have emerged to expand access, improve resilience and enhance the effectiveness of agricultural insurance — and some pilots have demonstrated potential to address environmental challenges at small scale.

**However, we have not identified any countries that have successfully scaled agricultural insurance systems in ways that consistently encourage resilient and environmentally sustainable farming practices.**

There are countries where reforms to agricultural insurance are being contemplated. But this is not being done within a broader context, that considers how other forms of agricultural support are impinging on farmers' incentives to adopt more resilient and sustainable farming practices.

As climate volatility intensifies, agricultural insurance can play a role in stabilizing food production and unlocking investment in agricultural markets. Insurance can also create incentives for the adoption of more resilient and environmentally sustainable farming practices. The evidence reviewed in this report makes clear that agricultural insurance rarely develops without sustained government commitment, and that government commitment alone is not enough. Scale requires the right products, delivered through the right channels. In countries like United States, China, India and Japan, and increasingly in parts of Africa and Latin America, insurance has demonstrated its capacity to stabilize farm incomes, de-risk agricultural lending and reduce the fiscal burden of post-disaster relief. In most developing countries, insurance is delivered through donor-dependent pilots.

**The challenge remains to integrate insurance strategies into more holistic country strategies for agricultural adaptation to climate change. The path forward requires deliberate action from both the public and private sectors.**

## For governments and the public sector

- **Create an enabling business environment for viable insurance markets.** This is achievable through clear legal and regulatory frameworks, accessible climate data and crop modeling, and agricultural policies that work in tandem with crop insurance systems. These are essential for allowing insurers to participate in markets and accurately measure changing environmental risks. Furthermore, governments can support agriculture by funding awareness campaigns and providing localized weather forecasts to help farmers understand risk mitigation opportunities and plan for the season ahead.

- **Design subsidies that minimize market distortion and support resilient farming practices.** Country experiences consistently show that insurance subsidies are necessary for scaling up agricultural insurance, particularly in countries with many spatially dispersed smallholders. However, subsidies should be used in ways that encourage the adoption of more resilient and sustainable farming practices, and that minimize market distortions.

- **Move from reactive disaster assistance to ex-ante risk financing.** Insurance that is embedded within national climate and disaster risk frameworks is more fiscally predictable and more effective than ad hoc post-disaster payments, and reduces the political volatility that comes with them. Agricultural insurance can help countries convert uncertain, large post-disaster liabilities into more predictable public expenditures.

- **Layer catastrophic risk management to make intermediate insurance more viable.** Removing some of the extreme weather risks from the insurance market can enable insurers to offer more affordable insurance against some of the remaining intermediate layer risks. This can be done through disaster assistance or social protection programs, by offering heavily subsidized index insurance against catastrophic events or by offering subsidized reinsurance to insurers.

- **Integrate insurance with broader agricultural policy.** Insurance subsidies represent less than 5% of agricultural support provided globally each year (Gautam et al., 2022). The larger body of support policies — price supports, input subsidies, and trade measures — remain heavily biased toward market-distorting and environmentally harmful measures. Governments must treat climate resilience as a core objective of agricultural policy broadly, not just within insurance programs.

## For the private sector: insurers, reinsurers, agribusinesses, and financial institutions

**Invest in technologies that lower the costs of insurance, speed up claim payments, and better reflect climate-related risks.** As the experience of ACRE Africa shows, it is now possible to offer weather index insurance contracts without any physical contact between the insurer and farmers. Insurers can expand parametric products that rely on remotely sensed data at appropriate scales to reduce basis risk. But there are also opportunities for improving indemnity-based insurance by using satellites, drones and mobile-enabled picture-based insurance (PBI) to reduce costs and help overcome moral hazard problems.

**Improve the insurance value proposition for smallholders by bundling with credit, inputs, market access and education.** Bundling the insurance can make more valuable business propositions for farmers than offering insurance on its own. Insurance can be bundled with credit, modern farm inputs, or access to a valued market through intermediaries like financial institutions and agribusinesses. Insurance can also be bundled with services like farmer education, advertising campaigns and seasonal weather forecasts that help farmers better manage underlying climate risks to reduce their losses. Other opportunities arise through innovations in delivering insurance to groups of farmers organized into mutuals or cooperatives. This can reduce costs and delegate the management of some moral hazard or basis risk problems to the group.

**Update underwriting models and premiums to reflect both changing climate risks and the risk-reducing value of resilient farming practices.** Accurately pricing climate-related risks will increasingly require moving beyond historic weather data toward predictive analytics and forward-looking climate modeling. At the same time, premium structures should reward farmers who implement resilient practices that reduce underlying risk — through discounts or rebates tied to practices such as cover cropping, reduced tillage, or diversified rotations — since these practices can reduce the frequency and severity of claims over time.

**Harness and expand reinsurance capacity.** The role of international reinsurers such as Swiss Re, Munich Re, and Allianz is more important than ever in providing reinsurance coverage for catastrophic risks. Equally important is their role in contributing technical expertise to program design and risk modeling. Not-for-profits like ACRE Africa also play important catalytic roles in helping to establish agricultural reinsurance markets in many low- and middle-income countries.

- **Catalyze international support through participation in international networks** like the Insurance Development Forum (IDF), the Platform for Agricultural Risk Management (PARM), and the Global Index Insurance Facility (GIIF). These networks can help share knowledge and experience about insurance across countries and between private and public players and donor agencies. They can also provide technical assistance and finance to countries for developing their insurance markets.

- **Innovate to demonstrate product viability as a path to scale through national programs.** Private pilots that generate evidence of scale, financial sustainability, and farmer benefit are what create the political conditions for public investment.

Agricultural insurance alone will not solve the climate challenge facing farmers. Complementary investments in adaptation, resilient infrastructure and risk reduction remain essential. But well-designed insurance, deployed at scale and integrated into the broader architecture of climate finance, can do far more than cushion losses after they occur. It can change what farmers are willing to invest in, what lenders are willing to finance and what governments are able to plan for. That is the case for treating agricultural insurance not as a legacy development tool, but as a live instrument of climate resilience — and for giving it the institutional attention that role demands.

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