Fact Sheet 1

Strengthening Financial Resilience in Agriculture
Knowledge Exchange Series Part 2

Disaster Risk Financing Solutions for Climate-resilient Livelihoods in the Agricultural Sector

Session 1: A brief history of index-based livestock insurance, the state of global evidence of its impact and implications for practitioners and policymakers

This Knowledge Exchange series builds on the successful Strengthening Financial Resilience in Agriculture Knowledge Series that was delivered in 2021-2022. Part 2 of the series aims to further deepen knowledge about agricultural insurance. It also enables global knowledge exchange and collaboration among practitioners, technical counterparts, and policymakers of developing countries in designing and implementing disaster risk finance solutions to enable climate-resilient livelihoods.

Disaster Risk Financing & Insurance Program

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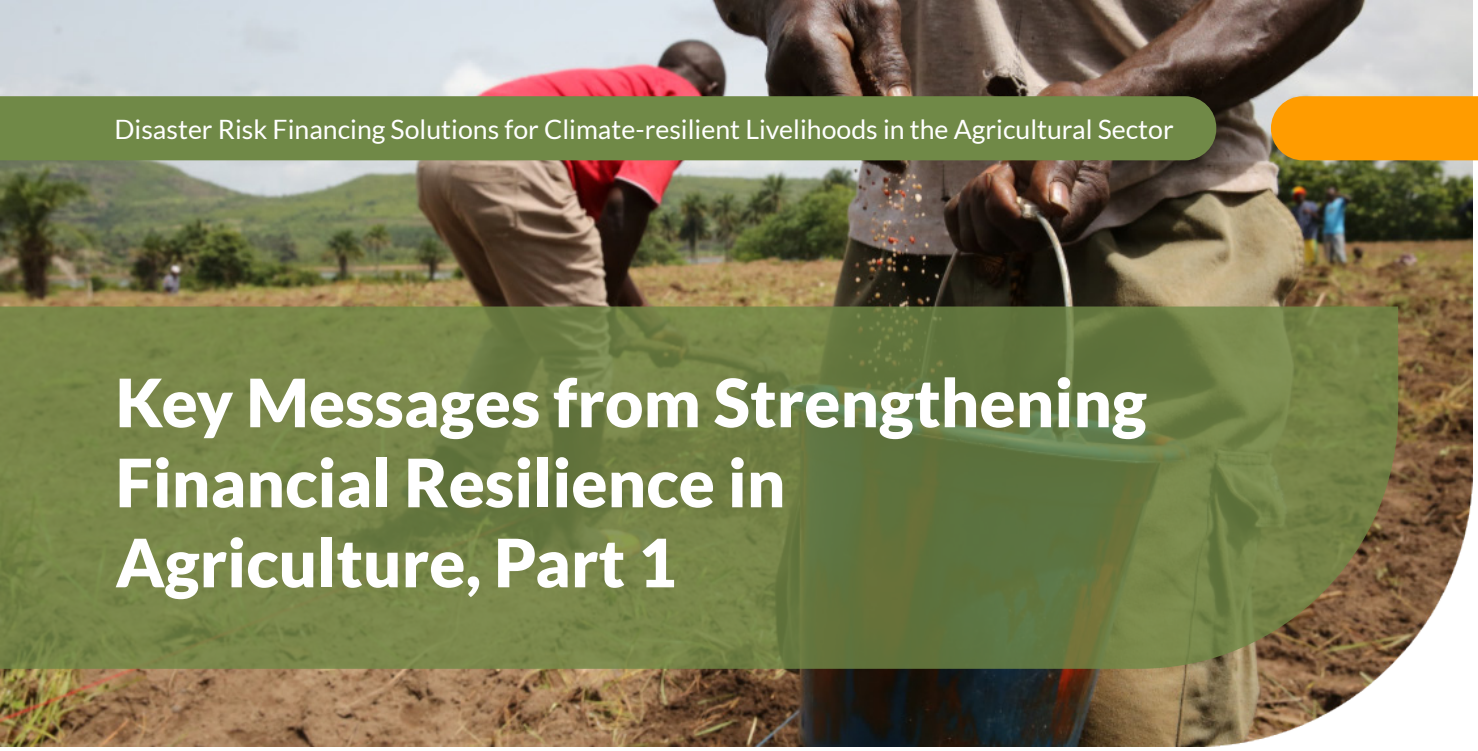
Introduction

Increasing climate variability and disasters resulting from climate change are posing a major challenge for developing countries. They are causing a threat to, or reversing, development gains, thereby hindering efforts to alleviate extreme poverty and foster shared prosperity.

In Sub-Saharan Africa, as in other low-income and lower middle-income countries, agriculture is a vital sector, accounting for an average of 17.2 percent of gross domestic product (GDP). The sector is highly susceptible to climate shocks and weather variability due to a heavy reliance on rain-fed farming. Rural and agricultural households and economies are particularly vulnerable to extreme weather events, such as droughts and floods. These events can damage their productive assets and result in poverty traps and food insecurity. According to the Food and Agriculture Organization (FAO), between 2008 and 2018, the entire Africa region experienced approximately US$30 billion in crop and livestock production losses, which is equivalent to the annual caloric intake of 82 days per capita. Furthermore, poor households suffer disproportionately more because of limited access to financial products and services to prepare themselves before a shock, to cope during a shock, and to recover after a shock. Thus, financial inclusion is crucial to improving the resilience of farmers and rural economies in the face of climate change.

Disaster Risk Financing and Insurance (DRFI) is a key instrument that can increase the financial resilience of rural households and businesses. However, governments and the private sector, and particularly domestic insurance markets, often have limited experience and expertise in designing and implementing effective and efficient disaster risk programs. This limited capacity constitutes a major impediment to the provision of a wide range of agriculture risk financing solutions.



Key Messages from Strengthening Financial Resilience in Agriculture, Part 1

What is Disaster Risk Financing for Agriculture?

Disaster Risk Financing for Agriculture (DRFA) refers to financial strategies and instruments designed to manage the financial costs resulting from disasters to the agricultural sector. DRFA involves putting in place financing instruments and identifying payment channels before the occurrence of a disaster event. This ensures that farmers, agricultural businesses, and governments have the necessary funds to cope with the immediate impact, resume agricultural operations, and maintain their livelihoods. This approach can help to increase the resilience of the sector by encouraging better risk management and reducing the uncertainty and financial variability associated with shocks.

Such financial risk management is vital for both individuals and businesses in the agriculture sector, due to that fact that the financial risk management functions as an enabler of growth and a safety net in times of adversity. By providing a financial buffer, it makes it easier for farmers and agricultural businesses to confidently make investments and undertake innovation, knowing that potential losses can be absorbed. This in turn leads to improved productivity. At the same time, financial risk management acts as a safety net, providing crucial support in the face of unforeseen crises. This security allows for a smoother recovery and the continuation of operations once the challenging conditions have passed.

Why DRFA?

Traditionally, farming households rely on their own networks of family, friends, and community members in managing minor and frequent risks through resilient farming practices, informal risk sharing, and limited savings. However, for larger, infrequent risks, farmers often resort to negative coping strategies, such as reducing consumption, selling assets, or even migrating, which can in turn lead to malnutrition in children, low school enrollment, and stunted welfare growth (See Figure 1). Ex-post disaster relief programs by the government and international humanitarian agencies often arrive too late, further delaying recovery. DRFA mechanisms, which are arranged in advance (ex-ante), can protect rural households against the negative impacts of large-scale disasters, preventing harmful coping mechanisms. Unfortunately, these tools are not always available or adequately implemented, leaving many households vulnerable to catastrophic events.

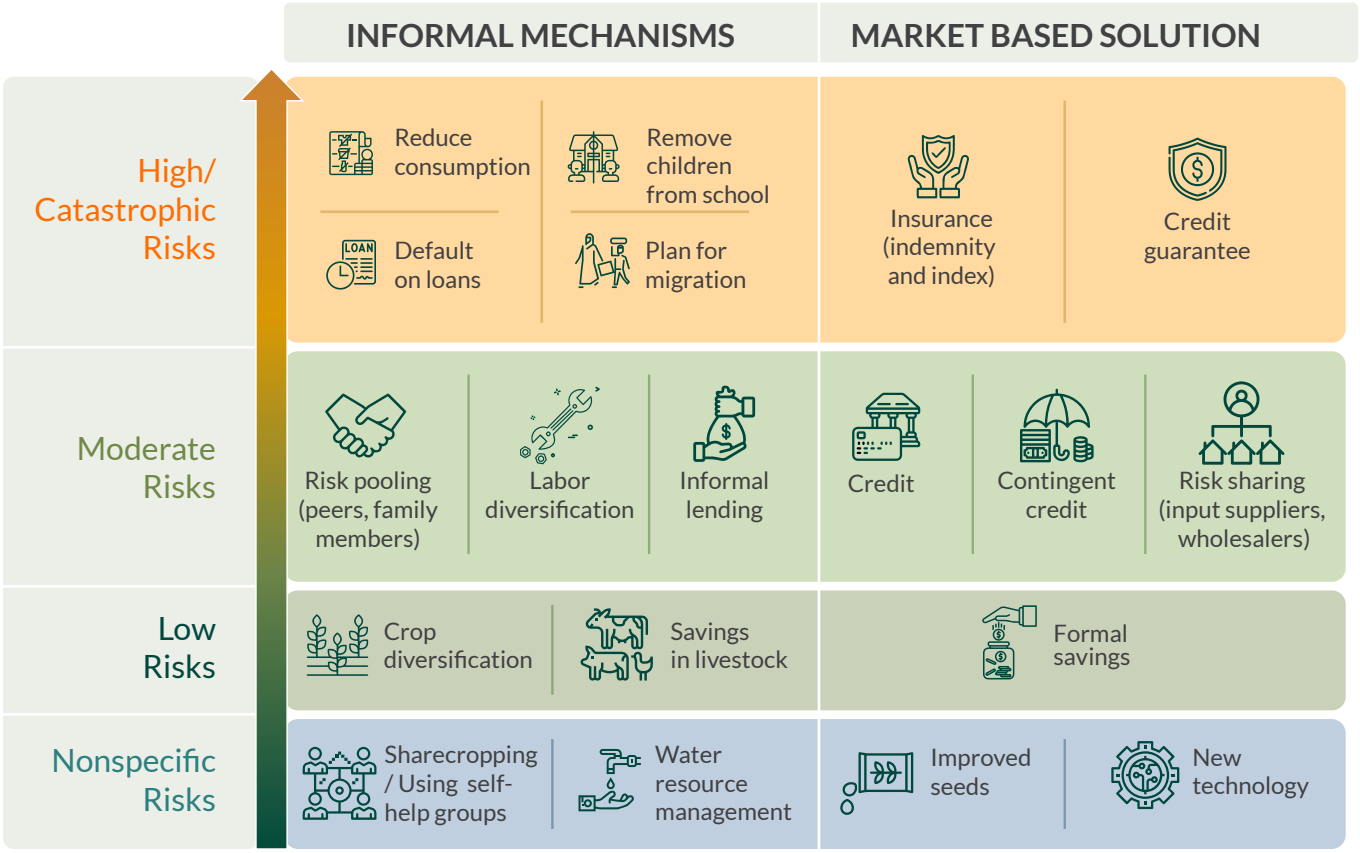
10 Key Messages from Strengthening Financial Resilience in Agriculture, Part 1

Key message (KM) 1: There is wide range of market-based solutions that correspond to different levels of risk and population segments.

KM1-1:

Market-based financial solutions can complement informal mechanisms, and they are more effective in building resilience to shocks when part of a comprehensive risk management strategy. However, financial products are complex, compounded by the reality that markets are imperfect and inefficient. Therefore, DRFA requires investment in financial literacy and capability, as well as in public goods, such as data to appropriately develop and price products.

Figure 1: Informal Risk Management Mechanisms and Market-based Solutions



Source: World Bank

To learn more, visit Part 1, Session 3" The Role of Financial Market Solutions for Building Resilience to Shocks in Agriculture".

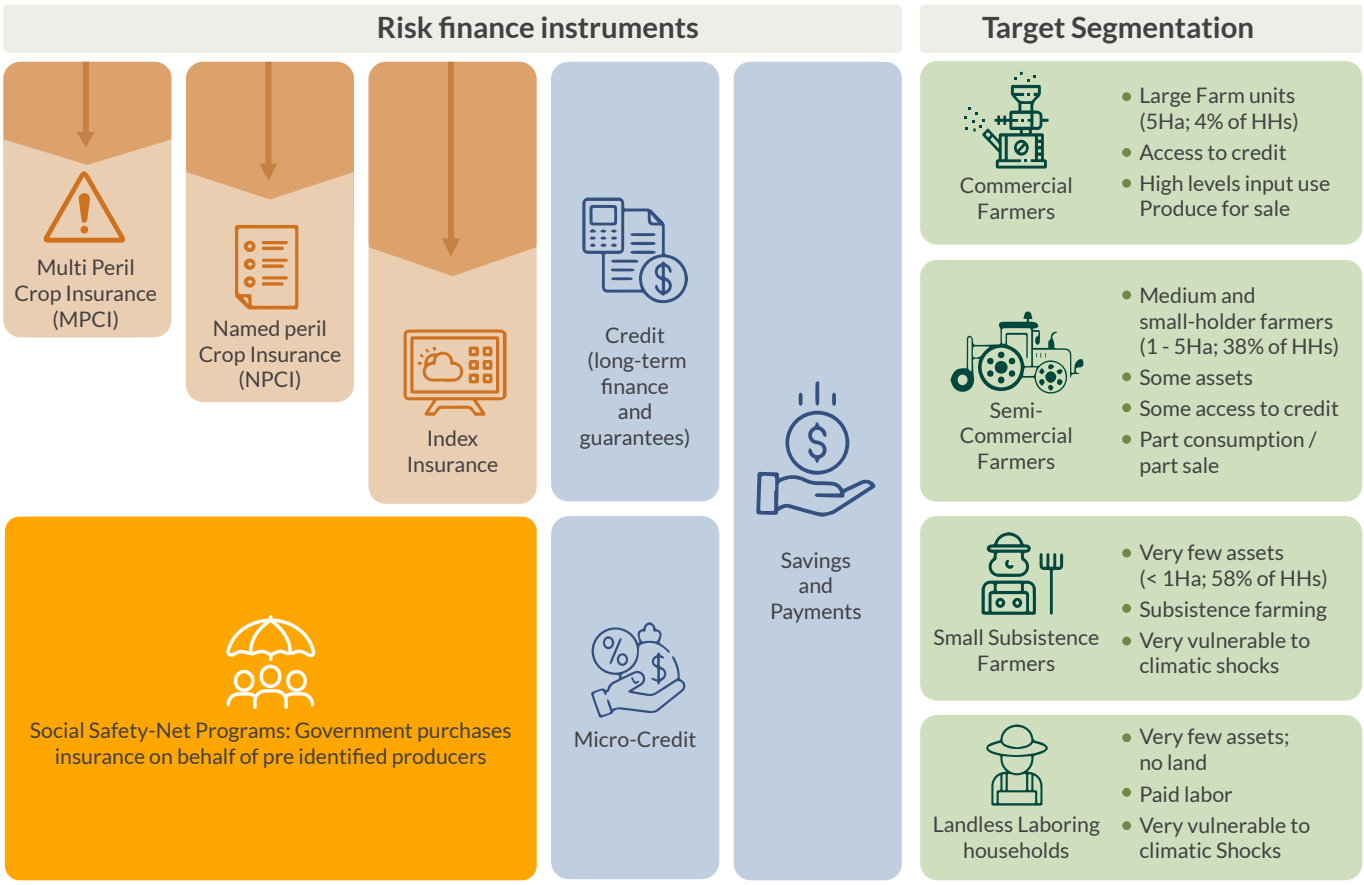
KM1-2:

No single financial instrument is adequate to manage the risks; instead, households require integrated financial services based on their risk profiles. As illustrated in Figure 1, Savings can be used to cope with frequent, yet non-severe events. Credit can be used for moderate events, and it can be arranged ex-ante (as a contingent credit). Credit-linked insurance or credit guarantees can be used to de-risk lending to farmers. It can also enable investments that improve productivity and enhance long-term resilience. Thus, insurance can be used to protect farmers against the adverse impacts of severe events. However, access to a full range of financial products is crucial for comprehensive financial protection for farmers and rural households.

KM1-3:

One size does not fit all: Different segments of farmers need different solutions. To ensure effective DRFA, it is essential to understand the specific needs of farmers to be targeted by a program. Farmers can be segmented based on their existing vulnerabilities. They can access to financial services, after which the program can prioritize and align interventions in accordance with their needs (See Figure 2).

Figure 2: Target Segmentation and Potential Layered Risk Finance Instruments



Source: World Bank, adapted from Skees and others (2009).

To learn more, visit Part 1, Session 4" Structuring a Financial Protection Scheme for Agriculture."

The Importance of Increasing Physical Resilience

Recognizing the importance of strategic planning in mitigating the disastrous effects of climate change, the first critical step in risk management is enhancing physical resilience. This approach primarily involves the adoption of climate-conscious strategies, such as implementing better cropping practices and more efficient water resource management. These measures can enhance the capacity to withstand and recover from shocks. Therefore, heightened physical resilience helps in reducing the vulnerability to climate-related risks. As such, it takes precedence in the climate change risk management and disaster mitigation process.

However, financial protection remains essential, as it is designed to address residual risk after all other risk management strategies have been deployed. Thus, integrating enhanced physical resilience with financial protection provides a more comprehensive and robust response to the complex challenges of climate change.

Source: Mahul and Stutley (2010)

Key message 2: Digital technologies have helped agriculture insurance evolve, enabling index-based insurance and making it more affordable and accessible; however, basis risk remains a challenge.

KM2-1:

Agriculture insurance is a major DRFA instrument with ample global experience and a long history of innovation from which to learn and continue to innovate. Agriculture insurance is the most widely used instrument, and it is available across a wide range of commodities, including for annual and perennial food and cash crops; forestry; livestock and poultry; as well as aquaculture (including onshore and offshore fish farming). There are two basic types: **indemnity insurance,** in which a payout is determined through a physical loss assessment of the crop or animal, and **parametric or index-based insurance,** in which the payout is pre-specified and based on a trigger event. The pros and cons of each are summarized in Figure 3 below.

Figure 3: Comparison of Index-based and Indemnity Insurance

	Index-based Insurance	Indemnity Insurance
Pay-out basis	• Predetermined index (for example, rainfall, vegetation, soil moisture, evapotranspiration, and area yield). • Not based on actual loss or damage to assets.	• Payout after losses incurred. • Based on actual losses or damages to assets, or reinstatement/rebuilding costs.
Payment speed	• Trigger based. • Fast payout.	• The need for in-field assessment and adjustment • Slower payout after loss in-field
Pros	• Efficient, attracts wider capital markets. • No claims handling / objective payouts. • Reduced moral hazard and adverse selection. • Can be used for asset protection (more cost-effective and efficient at protecting livelihoods).	• Tailored to specific risk profiles. • Used for asset replacement. • In some cases, can cover price and quality losses, offering additional protection to farmers.
Cons	• Basis risks – potential mis-triggering. • Usually covers one peril (Although AYII covers multiple perils, it tends to be costly to implement).	• Potential moral hazard and adverse selection. • High administration and operating costs. • Limited availability for small-scale farmers.

Source: World Bank
Note: AYII= Area Yield Index Insurance

KM2-2:

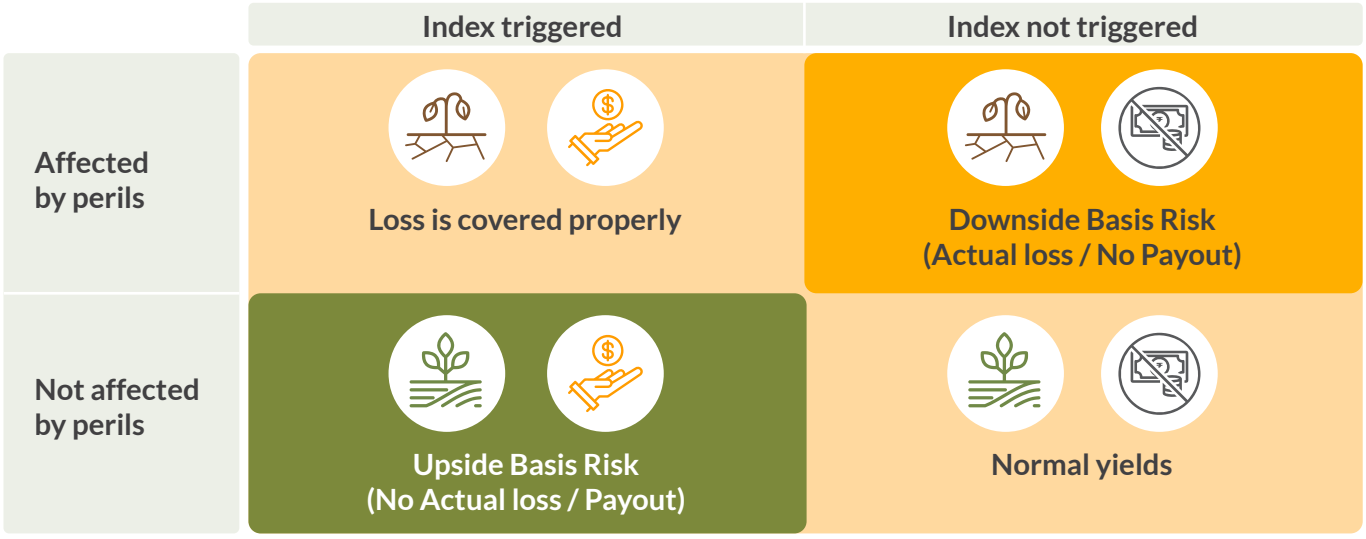
Index insurance helps to address the major challenges of traditional insurance, but the imperfect relationship between the actual loss and the index can create a significant basis risk for farmers. Index insurance has enabled the provision of more affordable products. As a result, costs are significantly reduced due to the replacement of a loss assessment with a proxy for loss. Secondly, the index is objective and independent of the farmer's behavior, which limits moral hazard and adverse selection. As such, it further reduces the costs of insurance, as insurers need not add significant loadings to the premium for these risks. Nevertheless, challenges persist with index insurance due to basis risk, complexity, and underdeveloped financial infrastructure in many low-income countries.

To learn more, visit Part 1, Session 6 " Deep Dive into Risk Finance Instruments: Agriculture Insurance".

KM2-3:

Both downside and upside basis risk can damage trust in insurance, further depressing demand for and limiting the supply of agriculture insurance; however, technology development can minimize this basis risk. The downside basis risk occurs when a farmer suffers a loss, but the index does not trigger a payout. This can make things tough for the farmers because the farmers have paid a premium, which takes away from their yearly incomes. The downside risk could leave them in a tougher spot than if they had had no insurance at all for that year. However, the upside basis risk occurs when the insurance index triggers a loss, even though the farmer has not suffered any losses, thereby leading to an unnecessary payout (See Figure 4). If not managed well, both types of risk can cause problems. A poorly designed index could hurt the well-being of those insured through downside risks. At the same time, it could lead to wasted resources because of upside risks.

Figure 4: Scenarios of Farmers Experiencing Upside and Downside Risks



Source: World Bank

KM2-4:

Recent technological advancements have greatly enhanced the effectiveness of index-based insurance. Remote sensing technology, such as satellite imagery and drones, is now being used to monitor various climatic and environmental conditions from a distance. These technologies can accurately measure parameters such as rainfall, soil moisture, temperature, and vegetation health. This is crucial in designing index that precisely reflects the risks and avoids basis risk, as well as monitoring and assessing it almost in real-time. Furthermore, machine-learning algorithms and artificial intelligence can analyze the data, predicting trends and potential risks, thus aiding in the constant refinement of insurance products.

Key message 3: International experience shows that delivering solutions at scale requires public-private partnerships (PPPs) to sustainably address market failures effectively and sustainably.

KM3-1:

Programs are as important, as products and international experience suggests that public-private partnerships (PPPs) are the most efficient and sustainable arrangement to address market failures (for example, poorly developed insurance markets and the lack of availability of private-sector agricultural crop and livestock insurance). The operational aspects are as much or even more important than the product in the provision of disaster risk finance solutions for farmers. There is often a need to establish institutional agreements and build technical and operational capacity for efficiency. The selection of the distribution channel for the registration of farmers and for the distribution of payments in a timely manner and at a "reasonable" cost are key. Figure 5 illustrates the comparison of an agriculture insurance system at the different levels of government intervention.

Figure 5: Institutional Frameworks for Agricultural Insurance

Fully Intervened Public Sector Systems

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

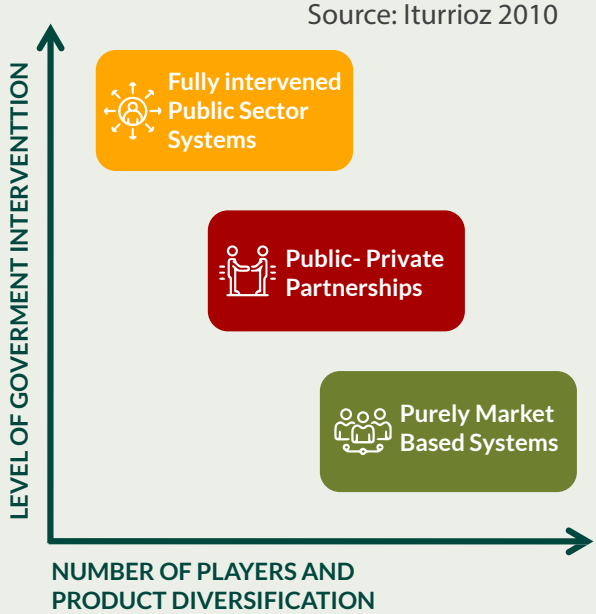
Public-Private Partnerships

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

Purely Market Based Systems

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

Source: Iturrioz 2010



Source: World Bank, adapted from Iturrioz (2010)

To learn more, visit Part 1, Session 6 " Deep Dive into Risk Finance Instruments: Agriculture Insurance."

KM3-2:

Premium subsidies are the most widely practiced form of government support for agricultural insurance programs operating in both developed and developing countries. Unlike most life and non-life insurance provided by private commercial insurers, agricultural insurance is unique in attracting very high levels of government support. Subsidies reduce the cost of premiums, making insurance more affordable and quickly building up volumes needed for private insurers to offer these products. By providing access to insurance, governments can stabilize agricultural incomes and reduce the need for ad-hoc disaster relief. However, they are controversial. Non-discriminatory premium subsidies disproportionately benefit larger farmers. Poorly designed subsidies can undermine ex-ante benefits of insurance, including increasing risk awareness and improving risk management. A subsidy should be designed with a clear, evidence-based objective. Ideally, it should address a market failure or equity concern. Smart subsidies are designed with a clear exit strategy or long-term financing strategy in mind, as well as a good monitoring and evaluation (M&E) system that tracks subsidy performance. Indeed, this is paramount for the success of any subsidized insurance scheme (Hill and others 2014).

KM3-3:

DRFA and insurance can be provided at the macro-, meso- and micro-levels, depending on policy priorities; of these, micro is the best at enabling ex-ante benefits, but it is often the hardest to implement in many country contexts. Products can target individual farmers (micro-level), the government or other public interest organizations (macro) and financial institutions, or farmer aggregators, such as cooperatives (meso). Micro insurance can enable financial inclusion, but it is difficult to implement due to limited distribution channels to reach remote farmers. The costs of insurance relative to the amount covered tends to be high, which creates pressure for products to pay out while also exacerbating already high costs. Macro covers support for government budgets, and payouts can be distributed to individual farmers, particularly in countries where social protection and payment systems are well developed. However, the lack of a direct link between insurer and farmer limits the ex-ante benefits of insurance, such as improved risk awareness and risk management, leading to more resilient livelihoods. Meso approaches offer promise, but they have yet to attract significant interest by financial institutions.

To learn more, visit Part 1, Session 7 " Deep Dive into Risk Finance Instruments: Macro and Meso-level Risk Transfer for Agriculture."

History of Index-Based Livestock Insurance (IBLI) and Lessons Learned

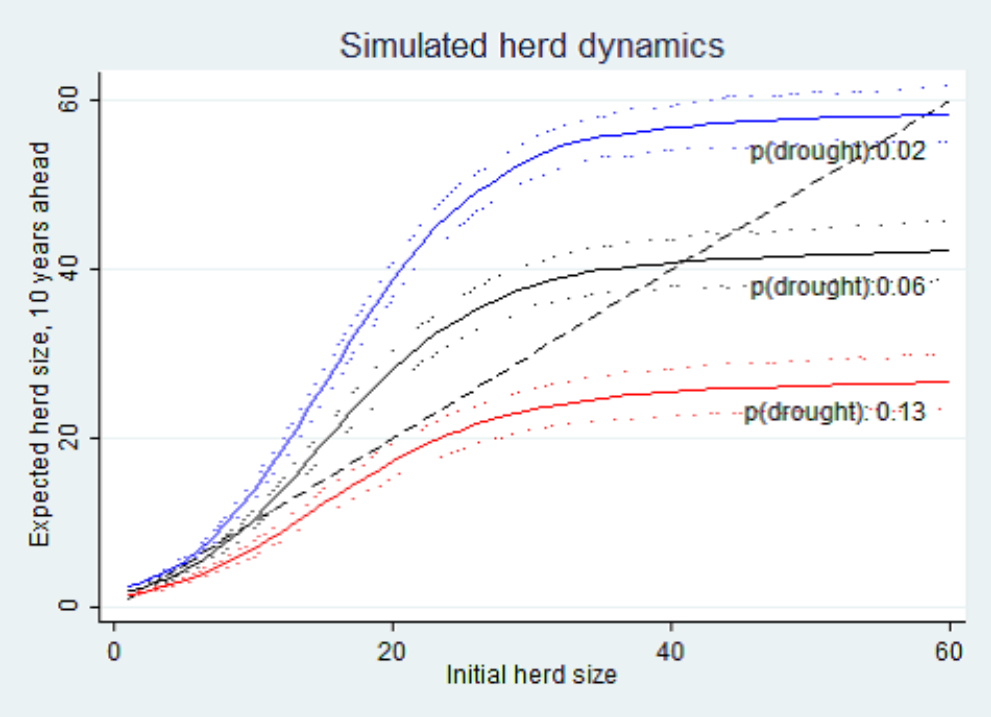
Why IBLI?

Poverty traps are a significant challenge in arid and semi-arid lands (ASAL). For example, in Kenya and Ethiopia, it is an issue predominantly driven by the catastrophic risk of herd loss due to recurrent major droughts. These regions are inhabited predominantly by pastoralist communities whose livelihoods heavily depend on livestock production, which is a volatile occupation given the extreme weather conditions. Common strategies employed to manage the aftermath of substantial drought events include destocking and food aid. Post-drought restocking is an attempt to replenish livestock herds decimated by the arid conditions. However, research suggests this method is rather futile when conducted on a minor scale. Meanwhile, the process of delivering food aid is often protracted and costly. Furthermore, it can inadvertently force the nomadic communities to settle down, disrupting their traditional lifestyles — even resulting in high rates of excess mortality (Jensen and others, forthcoming). This places a high premium on effective drought risk management strategies, not only for individuals residing in these harsh environments, but also for the broader society.

For ages, herding communities, or pastoralists, have adapted to climate patterns. However, the already evident rapid changes in climate could pose a threat to their livelihoods. If droughts start happening more often in areas where rainfall is already low (that is, less than 250 millimeters a year), the time for these communities to recover and rebuild shortens, which could change pastoral systems drastically.

Modeling work combining what herders expect their livestock numbers to be in the next year with data concerning past rainfall patterns allowed researchers to simulate future scenarios (See Figure 6). When applying this model to southern Ethiopia, a concerning result was found. If the risk of drought doubles, the herding system could collapse completely in the absence of any changes in the way herds are managed or how they respond to droughts. This shows how crucial it is for all concerned to understand and respond to the impacts of rapid climate change.

Figure 6: Simulation of Expected Herd Size at Different Probabilities of Drought Occurrence



Source: Barrett and Santos (2014)

Product Design of IBLI

Index-based Livestock Insurance developed for northern Kenya and Ethiopia uses the Normalized Difference Vegetative Index (NDVI) collected by satellite. Pastoralists can obtain this insurance either on their own or through a social protection program, namely the Kenya Livestock Insurance Program (KLIP) in Kenya and the Satellite Index Insurance for Pastoralists in Ethiopia (SIIPE) in Ethiopia.[1]

If the NDVI data indicates that conditions have become so bad that they would likely cause more than 15 percent of a herder's animals to die, then the insurance policy pays out. The amount of the payout depends on the value of the livestock that the herder has insured. The insurance is sold in yearly contracts during two-month windows just before the usual start of the rainy season. Under the KLIP, originally, payouts would be made on March 1st or October 1st, but now they occur earlier. This change was made to help herders protect their animals, rather than to replace them after they have died. The SIIPE pays out more frequently, including an early and an end-of season payout.

[1]The KLIP was started by the Kenyan government with help from the World Bank in 2015. The SIIPE was developed by the World Food Programme (WFP) and the Regional Government of the Somali Region in Ethiopia in 2017.

Positive IBLI Impacts

The research indicates that IBLI has several positive effects, as follows:

Those covered by the IBLI can spend more on veterinary care, which can help keep their livestock healthy and productive. In turn, this results in increased incomes from milk production per unit of livestock, as well as overall household income. Even in years of drought, families with IBLI coverage can maintain their income and milk production.

When payouts from the insurance are triggered, families are less likely to resort to desperate measures, such as selling their livestock at low prices; reducing the size of their herds; slaughtering their animals for food; or even skipping meals.

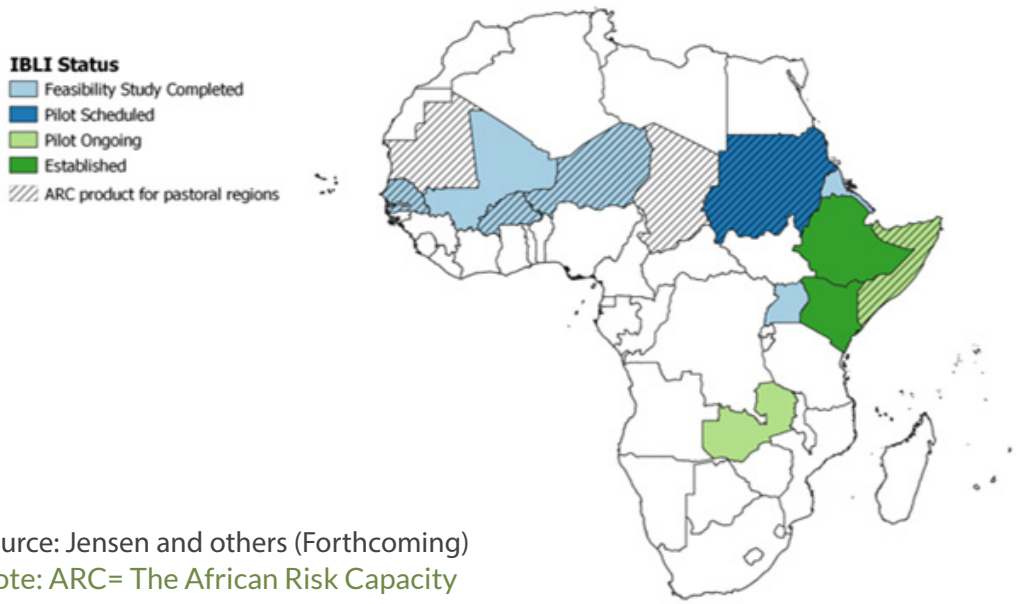
IBLI does not just impact practical matters, it also influences people's happiness. Those with coverage feel better about their circumstances, despite the occasional loss from the basis risks.

Another benefit is that IBLI seems to encourage more support within communities, helping to manage risks that the insurance does not cover — and perhaps even strengthening social bonds and traditional ways of resolving conflicts.

The impact of IBLI on income and nutrition is huge, as measured by the Mid-Upper Arm Circumference (MUAC) of children, a common indicator of nutritional status. Indeed, it is 6 to 45 times greater than that of cash transfers from the Hunger Safety Net Program (HSNP).

These findings underscore the potential of innovative solutions, such as IBLI, in addressing the challenges faced by farming and herding communities. As indicated in the map below (Figure 7), large IBLI scale-up/adaptation is occurring in several countries in Africa.

Figure 7: Status of IBLI Projects in Africa



Source: Jensen and others (Forthcoming)
Note: ARC= The African Risk Capacity

Using Economic Measures of Index Insurance Quality to Craft Better Contracts

Challenges of index-based insurance products and why quality matters

As index-based insurance always carries the risk that it will fail to pay out accurately (basis risk), there is uncertainty in the quality of the insurance. Thus, oftentimes, farmers, donors, and governments are unable to effectively gauge the potential performance and reliability of index-based insurance. For example, a poorly designed index-based insurance product can inadvertently affect the livelihood of farmers and herders in a negative way. Moreover, it can undermine current and future insurance demand, threatening the growth trajectory of the agricultural insurance market.

Another source of basis risk is the area over which the index is measured (spatially driven basis risk). Historically, the delineation of unit areas of insurance (UAIs) was based on agro-ecological zones, species compositions of pastoralists and ethnic fault lines. Over time, though, methodologies evolved to include remote-sensing analysis and ground validation. However, the analysis of remote-sensing data is still reliant on existing administrative boundaries, which are not scientific. Often, this results in a payout in one region being based on the experience of a different region within the same UAI, particularly if the areas are relatively large. Although the process has come a long way, there is need and room for further improvement to enhance the quality of index insurance products.

To more effectively enhance quality and address these problems, it is crucial to:

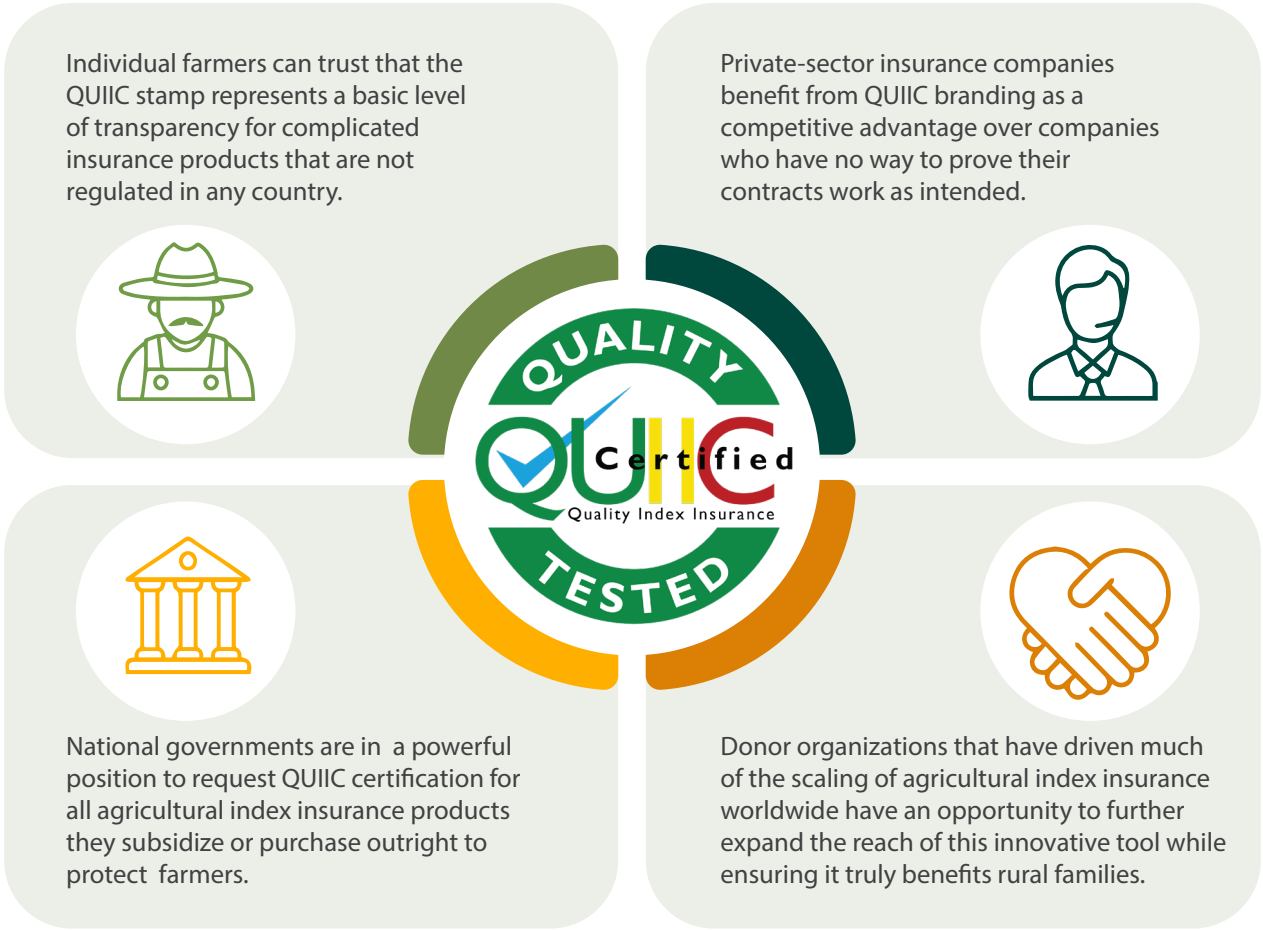
- establish robust metrics for accurate measurement and assessment;
- adopt quality certification practices to ensure that products meet a minimum level of quality;
- optimize insurance zones.

Development of the Quality Index Insurance Certification (QUIIC) and how it works

To tackle the prevalent issue of low-quality agricultural index insurance contracts, **Quality Index Insurance Certification (QUIIC)** was developed in East Africa as a collaborative initiative by the University of California, Davis and the United States Agency for International Development (USAID). Partnering with the Regional Center for Mapping of Resources for Development (RCMRD)[2] and the Consultative Group for International Agricultural Research through the International Center for Tropical Agriculture (CIAT), QUIIC seeks to establish the world's first board for quality index insurance certification.

QUIIC pairs index insurance and household data with statistical and economic quality measurement tools to estimate the likelihood that an insurance product will fail — including whether it will fail when families are most in need. Based on this analysis, the QUIIC team can certify whether a product meets a minimum level of quality by not leaving a family worse off than if they had no insurance at all. QUIIC is designed for farmers and herders, insurance companies, governments, and donors. It can also be utilized by anyone using index insurance to ensure their products do no harm (See Figure 8).

Figure 8: How QUIIC Benefits All Stakeholders of Index-based Insurance Products



Source: World Bank, based on information by The Feed the Future Innovation Lab for Markets, Risk and Resilience (MRR) at the University of California, Davis.

[2]The RCMRD is a Nairobi-based organization providing geo-information to 20 national governments in Africa. It will lead the QUIIC board and technical lab by 2022.

Although the first certifications for index insurance are underway, further testing of the business case for voluntary certification is still needed. There is a significant opportunity for donors and governments supporting or subsidizing index insurance to require index insurance standards and certification. This could stimulate the market for individual insurance contracts and help vulnerable populations manage the impacts of climate change.

Application of the Minimum Quality Standard (MQS) and the Relative Insurance Benefit (RIB)

An integral part of QUIIC is **the Minimum Quality Standard (MQS)**, a measure that compares the value of an agricultural index insurance contract against having no insurance or an equivalent cash transfer. Defining, measuring, monitoring, and improving the quality of index insurance involves ensuring that the insurance contract meets a MQS to protect farmers from the risk of product failure.

An index insurance product is considered to meet the Minimum Quality Standard (MQS) if the expected economic well-being of the insured is no lower with the insurance than without the insurance (that is, insurance meeting the MQS does not hurt people by making them worse off).

To learn more, visit Part 1, Session 5 " Structuring a Financial Protection Scheme for Agriculture."

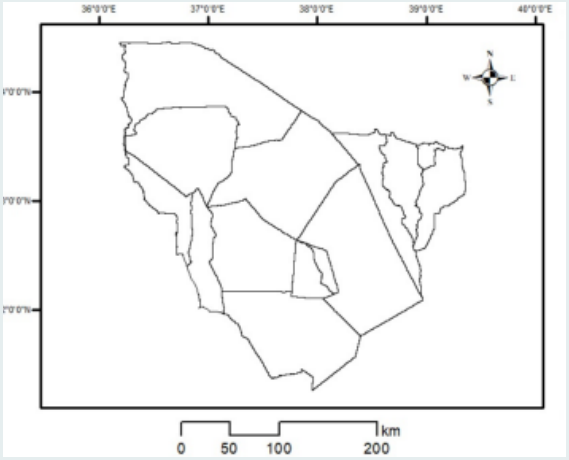
The **Relative Insurance Benefit (RIB)** is a metric designed to measure how good an index-based insurance contract is compared to a "hypothetical" contract that perfectly measures losses. In other words, the RIB measures the effectiveness of an insurance contract compared to an ideal or "perfect" insurance contract that accurately pays out in every situation where there is a loss and never pays out when there is no loss. If the insurance contract is as good as the ideal (that is, it perfectly matches the losses), then the RIB is 1 (100 percent). If the insurance contract is no better than having no insurance at all (that is, it provides no benefits), then the RIB is 0. If the insurance contract leaves the insured worse off than having no insurance, then the RIB is negative.

Optimizing insurance zones

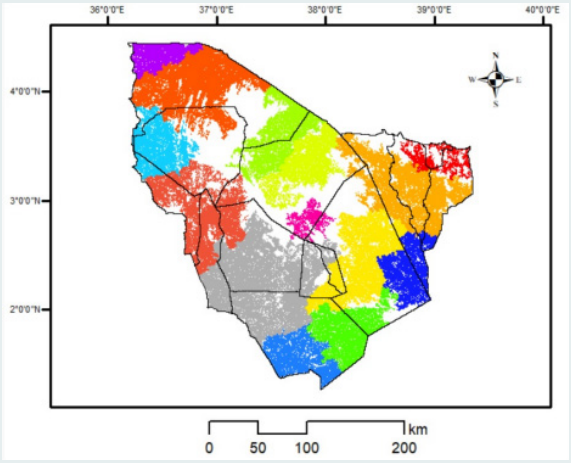
This involves taking a scientific approach using satellite data to form contiguous zones that minimize the probability of a spatially driven, basis risk event. There are 14 insurance zones or Unit Areas of Insurance (UAIs) currently used for IBLI in Marsabit County (left map in Figure 9) largely based on wards. These are optimized into 14 zones (right map in Figure 9) using the latest Optimal Zone Algorithm that groups together pixels to minimize the problem of error. The algorithm maximizes the conditional probability that the insurance index for all pixels within the same zone is below the insurance trigger value when it is below the trigger value for a central pixel. This ensures that the payout in each zone is based on the conditions within that zone rather than an average of the conditions across a larger area.

Figure 9: Comparison of Existing UAIs and Optimized Insurance Zones for Marsabit, Kenya

Current 14 insurance zones for IBLI



14 optimized insurance zones

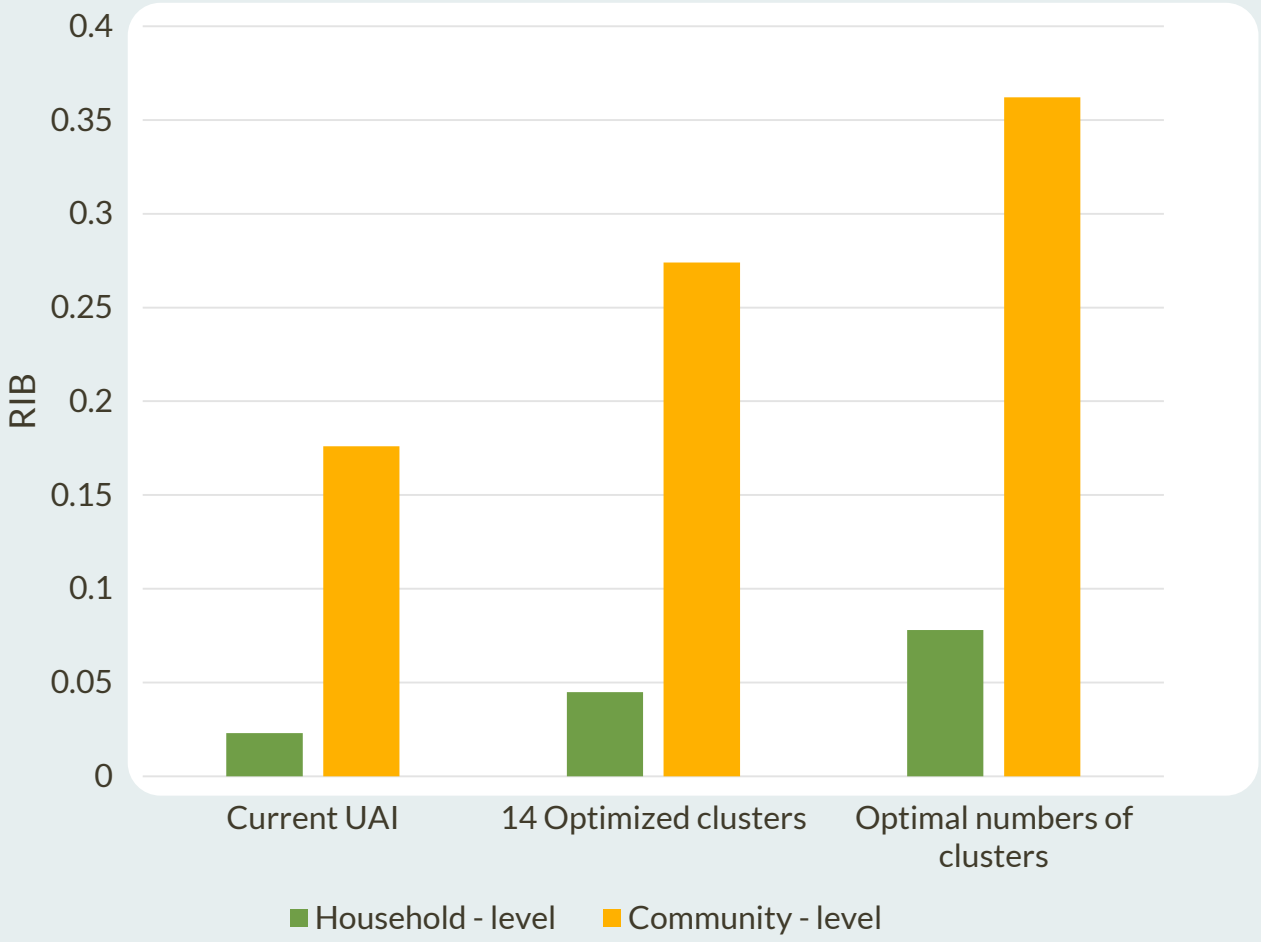


Note: white areas are non-grazing land areas (according to the Sentinel satellite) and are masked out

Source: Carter (2023)

To illustrate how the RIB can be used to evaluate the quality of insurance — and to demonstrate the economic benefit of optimizing insurance zones — researchers simulated and compared the RIB of index-based insurance based on the current UAIs and optimized zones in Marsabit County, Kenya. Researchers found a 100 percent gain in insurance quality. As such, the RIB increases from 13 to 27 percent. Further analysis to fully optimize the UAIs, that is, to increase the number of insurance zones, resulted in a further 33 percent gain in the RIB (Figure 10).

Figure 10: Comparison of RIBs, and Different Current Insurance Zones and Optimized Insurance Zones



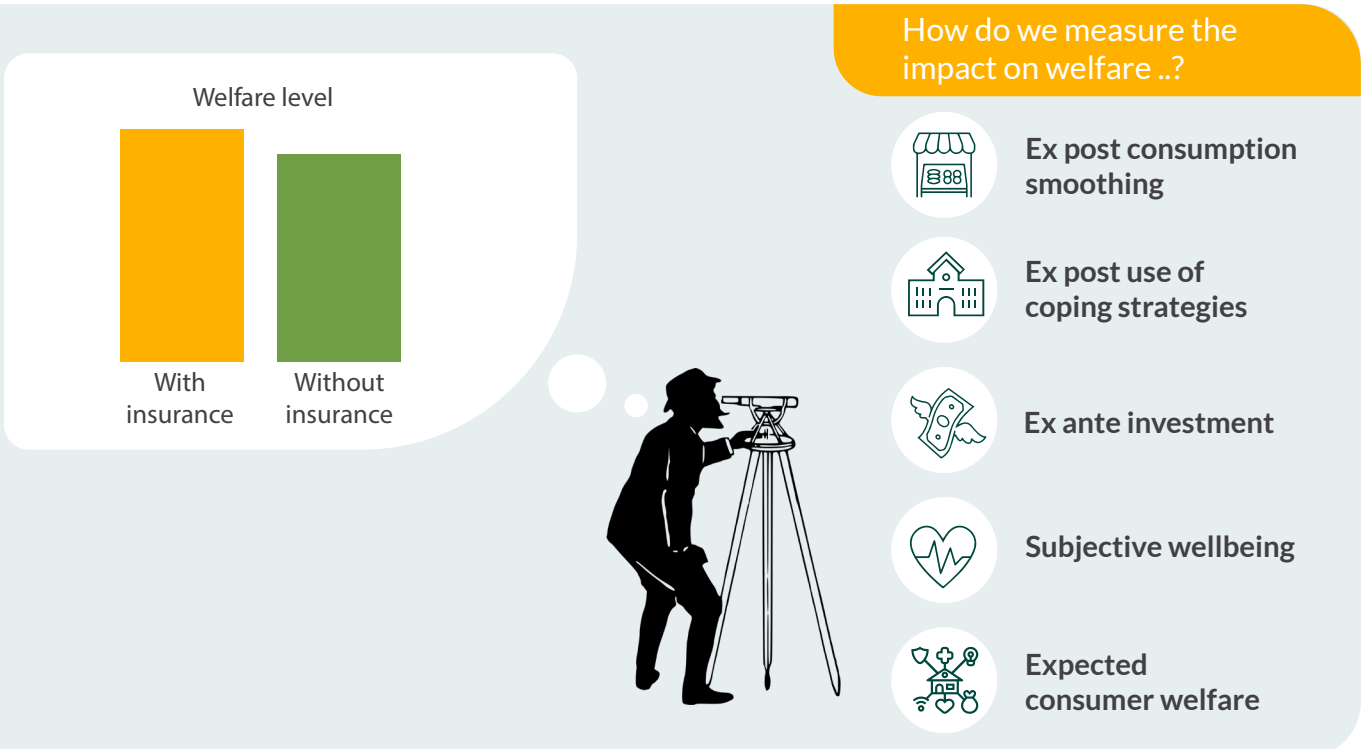
Source: Carter (2023)

The State of Evidence regarding the Impact of IBLI

Findings from evidence and evidence gaps: Measuring the impact of index-based insurance on welfare

There is a global momentum among governments, donors, and multilateral development banks to invest in index insurance as a risk management tool. The main aim is to enhance and safeguard the well-being of households. Therefore, it is paramount to examine the available evidence from implementing index insurance, specifically by focusing on its impact on pastoralists and farmers in developing nations.

Figure 11: Various Approaches to Measure/Infer the Impact of Insurance on the Welfare of Households



Source: World Bank, based on Morsink and Plevin (Forthcoming)

Various methods have been used to evaluate the well-being of households in relation to index insurance (See Figure 11). These include:

1. **Take-up of the product** is commonly used as an outcome indicator in studies that investigate insurance. Research indicates that the conditions necessary for take-up to accurately reflect welfare are typically not being met. These conditions include knowledge of basis risk, a comprehensive understanding of the insurance product and its supporting services and infrastructure, and the relationship between these aspects of the product and the individual's welfare function.

2. **Ex-post consumption smoothing and the use of "harmful" coping strategies** are important factors to consider when evaluating the impact of insurance. Only a limited number of studies, mostly focused on the IBLI program in Kenya and Ethiopia, have examined the effects of index insurance on these outcomes. Findings indicate that index insurance
   i. mitigates the negative effects of shocks on distress livestock sales;
   ii. helps maintain production and income levels;
   iii. minimizes herd losses;
   iv. reduces the cutting of food consumption;
   v. lowers child labor.

   These indicators for household welfare may work poorly in contexts where households are already at subsistence level.

3. **Ex-ante productive investments** may also serve as outcome indicators related to household welfare. Without insurance, risk-averse smallholder farmers may be hesitant to invest in higher-risk but higher return productive technologies due to the inherent uncertainty in agricultural activities. However, with insurance coverage, farmers may feel more confident and less constrained to invest, as they may be better protected against potential losses. The findings from studies suggest that by removing risk, insurance increases productive investments in veterinary expenditures, fertilizer, area under cultivation, higher return crops, irrigation. Insurance may also increase educational investments. Using these indicators as proxies for welfare should be done with caution. It assumes that farmers, when they made the investment decision, had fully internalized that they may invest, experience a loss, but not receive a claim payment as a result of basis risk.

4. **Subjective wellbeing (SWB)** is another methodology that can be used to measure welfare by directly asking individuals about their well-being. SWB questions, such as asking about the frequency of smiling, life fulfillment, and optimism about the future, are used to gauge the overall satisfaction of individuals. However, critics argue that SWB is heavily influenced by individuals' emotional states at a particular moment, rather than reflecting their overall living conditions or average satisfaction with material, social, and health aspects. Furthermore, there is a concern that individuals who purchased insurance without fully understanding the product, or perhaps due to a mistake, may have a misplaced sense of enhanced wellbeing. Only one study by Tafere and others (2019) has examined the causal effects of index insurance on subjective well-being. The results indicate that index-based insurance coverage improves subjective well-being and outweighs the negative effects caused by buyer's remorse.

Each approach to measure welfare reflects different assumptions about individual decision-making and welfare that may or may not be plausible. It can be concluded that easily collected proxies, such as take-up, should be avoided when assessing index insurance welfare because they rely on implausible assumptions. More informative measures require additional data collection through surveys and experiments. More realistic measures include effectively estimating expected consumer welfare, as well as measuring consumption smoothing and coping strategies. However, they require more extensive data collection efforts. Therefore, measuring a portfolio of welfare measures, some at larger and some at smaller scale, is the optimal research strategy.

The gap in data collection on welfare has prevented systematic learning about index triggers, products, and product delivery. The IBLI program is an exception, as it has invested in learning about index insurance and its welfare implications, showing some evidence of positive effects on household welfare.

Key Takeaways from Fact Sheet 1

Disaster Risk Financing for Agriculture (DRFA) helps to increase the resilience of the agricultural sector by encouraging better risk management and reducing uncertainty and financial variability associated with shocks.

Agriculture insurance, both indemnity-based and index-based, is a major DRFA instrument. Indeed, it has a history of innovation with ample global experience. Index insurance provides more affordable products than indemnity insurance, reducing costs by replacing the physical loss assessment with a proxy for loss. However, challenges remain, including basis risk and underdeveloped financial infrastructure.

Index-Based Livestock Insurance (IBLI) has positive impacts, including increased income from milk production; reduced resorting to negative-coping strategies; improved well-being; and a strengthening of social bonds within communities.

However, there remains a significant gap in the evidence about impacts at household, community and market levels, as well as other aspects of resilience, including adaptation to climate change, mitigation of conflict, and so on.

Quality certification is essential to enhancing the quality of index insurance products, as well as to assuring farmers, donors, and governments about the reliability and effectiveness of the insurance product.

The positive economic gains from optimized UAIs in Kenya could be leveraged to improve existing index insurance products and programs in the region, as well as to advance research in closing the current evidence gaps.

Evaluating the impact of index insurance on welfare requires the consideration of factors, such as, consumption smoothing, coping strategies, and subjective well-being. A combination of multiple welfare proxies provides more comprehensive insights into the impact of index insurance on welfare. However, additional data collection efforts are needed to accurately assess the expected consumer welfare.

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Work Sheet 1:

A brief history of index-based livestock insurance, the state of global evidence of its impact and implications for practitioners and policymakers

Test your knowledge and record your insights through this easy, DIY worksheet!

Drawing on your understanding of the content in this fact sheet, attempt the following activities.

Activity 1: From the key features listed below, identify which of the following are features of index-based insurance and indemnity insurance.

#	Feature	Index-based Insurance	Indemnity Insurance
1	Payout not based on actual loss or damage to the asset		
2	Slower payout after loss in-field assessment and adjustment		
3	Trigger based payout		
4	Higher potential for moral hazard and adverse selection		
5	Can be tailored to specific risk profiles		

Activity 2: Identify which of the following statements about Index-Based Livestock Insurance (IBLI) are true or false.

#	Statement about IBLI	True	False
1	Those covered by the IBLI can spend more on veterinary care, which can help keep their livestock healthy and productive.		
2	The impact of IBLI on income and nutrition is limited, if at all any.		
3	IBLI always carries the risk that it will fail to pay out accurately (basis risk).		
4	The impact of IBLI at household, community, and market level is similar.		
5	IBLI seems to promote more support from communities, helping to manage risks that insurance does not cover.		

Activity 3: Identify the target segments that each of the following risk finance instruments cover.

#	Risk finance instrument	Target Segmentation			
		Commercial Farmers	Semi-Commercial Farmers	Small Subsistence Farmers	Landless Laboring Households
1	Multi Peril Crop Insurance (MPCI)				
2	Named Peril Crop Insurance (NPCI)				
3	Index Insurance				
4	Credit				
5	Micro-Credit				
6	Savings and Payments				
7	Social Safety-Net Programs				

Activity 4: Reflections

[1] These are my top two take-aways from this fact sheet.

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