Policy Note
16
September 2025

Crop Insurance for Climate Resilience: Priorities for South Africa's G20 Presidency

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Crop insurance in the G20 agenda

Climate change is increasing the frequency at which African countries experience extreme weather events, with severe consequences for people's livelihoods. Agriculture is one of the sectors most affected by climate change, and climate change is projected to impact especially African economies, which are heavily reliant on rain-fed agriculture while lacking safety nets to strengthen climate resilience and risk mitigation. The World Bank estimates that globally nearly one in five people (18%) are at risk from a severe weather event from which they will struggle to recover, and this proportion is more than double in Africa.[1]

Risk transfer instruments such as crop insurance have become an increasingly important policy issue for the G20, given their strong potential to provide a safety net and contribute to food security, economic inclusion and climate resilience. By offering financial protection against losses from floods, droughts, pests and diseases, crop insurance helps farmers manage production risks and climate shocks. Insurance can help smallholder farmers protect their livelihoods from extreme weather events, but the associated risk reduction can also improve access to credit and increase risk-averse farmers' willingness to invest in productivity-enhancing technologies, thereby improving revenue and agricultural output.

Under Brazil's G20 presidency, inclusive insurance was identified as a critical tool for advancing Sustainable Development Goals (SDGs) 1 and 2, highlighting its role in supporting smallholder farmers, pastoralists and small and medium-sized enterprises.[2] South Africa's G20 presidency, guided by its theme 'Solidarity, Equality, Sustainability', explicitly calls for improved risk transfer solutions in its Environment and Climate Sustainability Working Group (ECSWG) and Disaster Risk Reduction Working Group (DRRWG).[3] At the same time, the Agriculture Working Group has endorsed solutions to build climate resilience as a key priority and sustainable food systems have been prioritised through the establishment of a Task Force on Food Security.[4]

Under South Africa's G20 presidency, one of the priorities for the ECSWG is climate change adaptation through both local-level adaptation measures (eg, the cultivation of drought-resistant crops, regenerative agriculture, water management and infrastructure to withstand extreme weather events) and national and international measures (eg, early warning systems, insurance for climate risks and protections for ecosystems). The DRRWG envisions accelerating implementation of the Sendai Framework, including its priority area related to addressing inequalities and reducing vulnerabilities. This working group aims to advance a compendium of risk transfer solutions targeting vulnerable populations, such as microinsurance, given that these instruments are often not accessible or affordable for the most vulnerable people.

The Agriculture Working Group recognises that building climate resilience for sustainable agricultural production requires climate financing mechanisms that enable farmers to improve agricultural productivity and reduce food insecurity. This working group aims to identify enablers that can improve the resilience of agriculture in a changing climate and to establish national climate financing mechanisms specific to the agricultural sector to reach small farmers and vulnerable populations. It also aims to develop climate-resilient policies, approaches and inclusive strategies that put climate actions at the heart of all agricultural

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[1] Ruth Hill et al., "One-Fifth of the World's Population at High Risk from Climate-related Hazards", *Nature Portfolio* preprint (2024).

[2] Global Alliance Against Hunger and Poverty, "Policy Instruments: Inclusive Insurance", accessed August 12, 2025, https://globalallianceagainsthungerandpoverty.org/policy-instruments/inclusive-insurance/

[3] Environment and Climate Sustainability Working Group, "December 2024 Issue Note" (G20 South Africa, 2024); Disaster Risk Reduction Working Group, "December 2024 Issue Note" (G20 South Africa, 2024).

[4] Agricultural Working Group, "December 2024 Issue Note" (G20 South Africa, 2024).

activities. Crop insurance is one of the solutions that may contribute to these aims and help operationalise resilience.

A major challenge is that agricultural risks are inherently difficult to insure against, and farmers' insurance preferences and capacity to pay differ widely. As a result, despite the potential of crop insurance to strengthen climate resilience, adoption remains low across Africa. The G20 can play a catalytic role in expanding access to insurance and supporting the design of inclusive, effective insurance models tailored to those who need them most. In doing so, it is important to understand what has been learned from decades of work on crop insurance.

Key lessons learned about crop insurance in Africa

Design matters

In the 20th century, many governments sought to support farmers through multi-peril crop insurance (MPCI) programmes, providing comprehensive coverage against a wide array of production risks on an indemnity basis. By the 1970s, there were many such programmes around the world, often tied to farm loans from state-owned agricultural development banks. Because these programmes insured crop yields – a combination of effort and risk – they did not provide farmers with incentives to prevent crop losses. Instead, they encouraged farmers to take excessive risks (moral hazard) and undermined good insurance and bank lending practices.[5] Most MPCI programmes were phased out or revamped by the end of the century.

This prompted the pioneering of index-based insurance (IBI) products in the early 1990s. By basing insurance payouts on an objectively measured index beyond a farmer's control, such as readings from a local weather station, satellite imagery or average crop yields in a geographic area ('area-yield insurance'), the premise of IBI was to reduce the cost of providing insurance by eliminating moral hazard and the need for assessing farm-level losses. But unless heavily subsidised or tied to credit (as in India), these schemes rarely achieved scale. Low demand for IBI was attributed to liquidity constraints at the start of the agricultural season, gender dimensions, limited education, lack of trust and basis risk – the difference between insurance payouts and actual losses.[6]

To make insurance products more attractive to farmers, several innovations have focused on reducing basis risk. 'Gap insurance' combines low-cost weather index-based insurance with conditional audits.[7]

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[5] Peter Hazell, Carlos Pomareda and Alberto Valdés, eds., *Crop Insurance for Agricultural Development: Issues and Experience* (Johns Hopkins University Press, 1986).

[6] Daniel J. Clarke, "A Theory of Rational Demand for Index Insurance", *American Economic Journal: Microeconomics* 8, no. 1 (2016): 283–306; Ruth Hill, Marcos Robles and Francisco Ceballos, "Demand for a Simple Weather Insurance Product in India: Theory and Evidence", *American Journal of Agricultural Economics* 98, no. 4 (2016): 1250–70.

[7] Guush Berhane et al., "Formal and Informal Insurance: Experimental Evidence from Ethiopia" (Paper, International Association of Agricultural Economists Conference, Milan, Italy, August 8–14, 2015); Jon Einar Flatnes, Michael R. Carter and Rachel Mercovich, "Improving the Quality of Index Insurance with a Satellite-Based Conditional Audit Contract" (Feed the Future Innovation Lab for Markets, Risk and Resilience Working Paper, University of California, Davis, 2018); Ruth Hill et al., "Ex Ante and Ex Post Effects of Hybrid Index Insurance in Bangladesh", *Journal of Development Economics* 136 (2019): 1–17.

'Insurance coupons', each covering a narrow region of risk, allow farmers to purchase a combination or bundle of coupons best suited to their needs.[8] Marketing insurance to existing informal insurance networks such as funeral groups can help leverage informal transfers to manage basis risk.[9] Picture-based insurance (PBI) relies on smartphone pictures of crop fields to assess damage remotely and at a low cost, thereby combining features of indemnity (field-level damage estimation) and index products (lower cost) to reduce basis risk[10] and increase demand.[11]

Beyond basis risk, various studies have looked at other avenues for fostering farmer demand for agricultural insurance products. For instance, innovations that consider gender roles, such as reformulating insurance products to directly address the risks that women face,[12] hold promise to increase the reach and inclusivity of insurance.[13]

Where crop insurance is best suited to make a difference

Experiments with crop insurance showed that such insurance programmes have an important role to play.[14] Farmers who were confident of being covered by crop insurance substantially increased farm investments, including in higher-return activities, leading to an average increase in income growth of 1–9% even when assuming a relatively low average return to input use. These findings supported the notion that by covering those most at risk, inclusive and reliable insurance can enable investment and reduce economic disparities.

However, insurance is an expensive way to manage risk. Insuring production costs could therefore be a more feasible proposition than insuring agricultural income in full. Tying insurance to other products or services to cover aspects of the production process (whether that is credit, inputs such as seeds, fertiliser or pesticides, or irrigation costs) appears more commercially promising than insuring crop production more generally.[15]

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[8] Francisco Ceballos and Marcos Robles, "Demand Heterogeneity for Index-Based Insurance: The Case for Flexible Products", *Journal of Development Economics* 146 (2020): 102515; Ruth Hill and Marcos Robles, "Flexible Insurance for Heterogeneous Farmers: Results from a Small-Scale Pilot in Ethiopia" (Discussion Paper 01092, IFPRI, 2011).
[9] Stefan Dercon et al., "Offering Rainfall Insurance to Informal Insurance Groups: Evidence from a Field Experiment in Ethiopia", *Journal of Development Economics* 106 (2014): 132–43.
[10] Francisco Ceballos, Berber Kramer and Marcos Robles, "The Feasibility of Picture-Based Insurance (PBI): Smartphone Pictures for Affordable Crop Insurance", *Development Engineering* 4 (2019): 100042.
[11] Berber Kramer et al., "See It Grow: A Randomized Evaluation of Digital Innovations in Crop Insurance to Increase Insurance and Fertilizer Demand in Kenya" (Paper, Agricultural and Applied Economics Association Annual Meeting, New Orleans, July 28–30, 2024), 343861; Berber Kramer, Michael Porter and Sintayehu Wassie Bizuayehu, "Basis Risk, Social Comparison, Perceptions of Fairness and Demand for Insurance: A Field Experiment in Ethiopia" (Paper, Allied Social Sciences Association Annual Meeting, San Antonio, TX, January 5–7, 2024), 339075.
[12] Jessica Arteaga, Michael Carter and Andrew Hobbs, "Insuring Those Who Bear the Risk: The Impact of Gender-Inclusive Insurance in Kenya" (Working Paper 31639, National Bureau of Economic Research, 2023).
[13] Anne G. Timu and Berber Kramer, "Gender-Inclusive, -Responsive, and -Transformative Agricultural Insurance: A Literature Review", *Global Food Security* 36 (2023): 100672.
[14] Berber Kramer et al., "Is Agricultural Insurance Fulfilling Its Promise for the Developing World? A Review of Recent Evidence", *Annual Review of Resource Economics* 14, no. 1 (2022): 291–311.
[15] Xavier Giné and Dean Yang, "Insurance, Credit, and Technology Adoption: Field Experimental Evidence from Malawi", *Journal of Development Economics* 89, no. 1 (2009): 1–11; Richard Meyer, Peter Hazell and Panos Varangis, "Unlocking Smallholder Credit: Does Credit-Linked Agricultural Insurance Work?" (Working Paper, International Labor Organization and International Finance Corporation, 2017); Michael K. Ndegwa et al., "Uptake of Insurance-

Although insurance can play a role in insuring incomes, it will need to be aligned to complement, rather than substitute for, other public social protection mechanisms, as well as remittances, transfers between family and friends, and savings and credit. Insurance can help strengthen many of these risk management instruments to shield farmers' incomes from shocks. Governments can, for instance, obtain insurance for an increase in public spending that occurs when safety nets are scaled up after a weather shock. The African Risk Capacity (ARC) is an example of such sovereign insurance.

The impacts of sovereign insurance will be largest if funds are disbursed quickly, with adequate targeting, and with beneficiaries being aware of when a safety net will be scaled up.[16] If sovereign insurance comes with clear rules on when a farmer will receive transfers, or as a free insurance contract as a specific guarantee to farmers of what they will be covered for, they can have peace of mind, which can have positive impacts even before an event occurs. This approach has helped strengthen social protection for pastoralist farmers in northern Kenya.[17] And just like governments can insure an expansion of social protection, migrant family members may want to insure an expansion of remittances in the face of weather shocks.[18]

Using public funds carefully

When MPCI programmes were first introduced, substantial subsidies were needed to make insurance premiums affordable and achieve the desired scale of coverage. By the late 1970s, several billion dollars were spent globally each year on public subsidies for MPCI programmes. In the case of index insurance as well, there is considerable literature showing that price subsidies are needed to increase demand. When thinking about how to use public funds to support the development of insurance markets, it is important to consider the lessons learned on how to subsidise. The rationale for premium subsidies should be different for commercial and smallholder farmers.[19] Subsidies for smallholders, especially those below or near the poverty line, might best be formally linked to safety net and public relief programmes. For commercial farmers, subsidies should be directed at overcoming market development problems like insufficient weather stations, helping to educate farmers about the value of insurance, underwriting some of the more extreme catastrophic events or investing in the digital information and banking infrastructure needed for insurance markets to work cost-effectively. Another alternative to subsidising insurance premiums is the provision of public funds to bring down the cost of reinsurance.

Embedded Credit in Presence of Credit Rationing: Evidence from a Randomized Controlled Trial in Kenya", *Agricultural Finance Review* 80, no. 5 (2020): 745–66; Steve R. Boucher et al., "Bundling Genetic and Financial Technologies for More Resilient and Productive Small-Scale Farmers in Africa", *The Economic Journal* 134, no. 662 (2024): 2321–50; Berber Kramer, Claire Waweru and Jonathan G. Malacarne, "Summing the Parts: How Does 'Bundling' Affect Willingness-to-Pay for Seeds and Insurance in a Sample of Kenyan Farmers?" (Paper, Agricultural and Applied Economics Association Annual Meeting, Washington, DC, July 23–25, 2023).

[16] Daniel Clarke and Ruth V. Hill, "Cost-Benefit Analysis of the African Risk Capacity" (Discussion Paper 1292, IFPRI, 2013); Berber Kramer, Rob Rusconi and Joseph W. Glauber, "Five Years of Regional Risk Pooling: An Updated Cost-Benefit Analysis of the African Risk Capacity" (Discussion Paper 1965, IFPRI, 2020).

[17] Nathaniel D. Jensen, Christopher B. Barrett and Andrew G. Mude, "Cash Transfers and Index Insurance: A Comparative Impact Analysis from Northern Kenya," *Journal of Development Economics* 129 (2017): 14–28.

[18] Harounan Kazianga and Zaki Wahhaj, "Will Urban Migrants Formally Insure Their Rural Relatives? Family Networks and Rainfall Index Insurance in Burkina Faso", *World Development* 128 (2020): 104764.

[19] Berber Kramer et al., "Is Agricultural Insurance Fulfilling Its Promise for the Developing World? A Review of Recent Evidence", *Annual Review of Resource Economics* 14, no. 1 (2022): 291–311.

Recommendations for South Africa's G20 presidency

South Africa's G20 presidency creates a unique political and institutional entry point for mainstreaming crop insurance in building resilience across the continent. This will involve moving from pilot projects to continent-wide risk pooling and transfer systems that are integrated into climate adaptation policy. Building on insights from past work on crop insurance in Africa, recommendations for doing so include:

Designing the right product for the right context

It is important for crop insurance to provide farmers with added value. This means designing high-quality products with limited basis risk. Use of artificial intelligence (AI) – for instance, image recognition to operationalise indemnity-based claims settlement and large language models to facilitate client–insurer interactions at scale – can help improve index accuracy, reduce basis risk, encourage insurance understanding and boost farmer trust and inclusion. The diversity of farmers' insurance needs also deserves greater recognition, as publicly supported programmes often take a one-size-fits-all approach in their quest for scale. Integrating insurance with agricultural digital tools can help increase access for underserved populations, reduce costs and contribute to the scaling of insurance products. To promote the design of more inclusive insurance products, South Africa's G20 presidency can:

- Call for the establishment of a body that monitors product quality by providing information on how well different policies perform on basis risk. This can build on work undertaken by others such as UC Davis, NASA and RCMRD efforts to establish a board for Quality Index Insurance Certification (QUIIC), the International Food Policy Research Institute (IFPRI), the InsuResilience Global Partnership (IGP) and ARC. This body could also report on insurance purchase statistics to help assess inclusion.
- Establish partnerships with existing donors and funds aimed at strengthening agricultural risk management, such as the IGP, the World Bank's Global Index Insurance Facility (GIIF), the Lloyd's of London Foundation, the Green Climate Fund (GCF) and the Global Environmental Facility (GEF), to provide seed funding to public research and private sector partners to integrate technology in the design of insurance products, particularly focusing on utilising the power of AI.
- Partner with countries' insurance regulatory bodies and initiatives with policy baskets for lesson sharing, such as the Global Alliance Against Hunger and Poverty, the IGP and IFPRI, to support capacity sharing of regulators.

These recommendations align with the shared G20 vision and the mandate of South Africa's presidency by focusing on inclusive solutions that reach previously excluded groups and sustainability by leveraging technology to tailor products to farmers' needs. Working with organisations such as InsuResilience contributes to the solidarity principle. The recommendations align with the priority of the ECSWG to advance insurance for climate risks and the DRRWG's vision to address inequalities and reduce vulnerabilities, as well as its aim to develop a compendium of risk transfer solutions. For the Agriculture Working Group, high-quality insurance can strengthen impacts on resilience and investments in agriculture.

Promote insurance as one part of a holistic risk management approach

Reducing risk (as opposed to risk transfer through insurance) is often the most cost-effective approach to managing risk, making it a first priority for public policy. This will require scaling up risk-reducing technologies and practices, such as the use of climate information, stress-tolerant varieties and conservation agriculture. Even then, insurance alone cannot cover against the full spectrum of remaining agricultural production risks. Building resilience will require multiple risk management instruments, including credit, savings, informal transfers and income diversification. Insurance products need to be designed such that they complement these other ways of managing risk and are only used when they are cost effective. To advance holistic risk management approaches, South Africa can:

- Document key successes in bundling crop insurance with credit, agricultural inputs, information services (including early warning systems) and irrigation to encourage further take-up by other private sector actors.
- Learn from programmes that have taken an integrated risk management approach, such as the DRIVE programme for pastoralists in the Horn of Africa and the Platform for Agricultural Risk Management (PARM).
- Consider using insurance instruments to provide guaranteed support to small-scale South African farmers facing extreme weather shocks. Insuring more extreme risks at national or subnational level, for instance through ARC, can enable the private sector to enter local markets to insure more moderate risks.
- Recommend that regulatory frameworks allow migrants to insure remittances against weather shocks in their origin region, so that private insurers can market their insurance products to a new market segment of migrants.
- Emphasise interconnectedness of the DRRWG, Agriculture Working Group and ECSWG and ensure they coordinate with one another on approaches to foster better climate risk management.

These recommendations align with the shared G20 vision and the mandate of South Africa's presidency through their strong focus on sustainability. They are highly relevant to the Agriculture Working Group and ECSWG through their focus on climate adaptation, encouraging insurance that is designed to be used alongside climate-smart inputs, climate information and climate-smart agricultural practices. The recommendations' emphasis on linking micro- and macro-level risk management instruments is aligned with the DRRWG.

Foster learning around a smart subsidy approach

Despite the sizable funding that has moved into public subsidies, there is surprisingly little empirical evidence on cost–benefit ratios or impacts of insurance subsidies for various types of households and other actors in the agricultural sector, or on how the impacts and cost-effectiveness of insurance subsidies compare to alternative ways of reducing and managing risk. Such evidence is critical to better inform policy choices, particularly considering that different types of farmers will require different solutions. Most insurance schemes rely on publicly financed subsidies to reach scale. As a result, key recommendations are to leverage technical expertise from global and continental platforms for better disaster and agricultural risk management, including the IGP, PARM and IFPRI/CGIAR, as well as the African Development Bank, Global Shield against Climate Risks and the Centre for Disaster Protection (CDP), to:

- Establish knowledge-exchange platforms to develop guidelines around the design of smart subsidies, including those that target public goods such as information needed for insurance

markets to work, or product subsidies that can largely be phased out over time and target only the most vulnerable groups.

- Document lessons learned on how to optimally design these subsidies for different markets and different types of households engaged in the agricultural sector, by learning from successful and less successful models across Africa.
- Partner with research organisations and donors with an interest in building resilience to accelerate the generation of evidence on the cost-effectiveness and cost–benefit ratios of a government's investments in public insurance schemes and insurance markets.
- Provide deeper insights into the costs of scaling successful crop insurance schemes by partnering with insurers, reinsurers and other actors involved in designing and delivering insurance solutions in subsidised schemes.

These recommendations align with the shared G20 vision and the mandate of South Africa's presidency through their strong focus on solidarity and equality by designing subsidies so they benefit the most vulnerable. The recommendations are primarily focused on improved risk transfer solutions, thereby linking explicitly to the agenda of the ECSWG, but also have clear linkages to other working groups and task forces, including the Agriculture Working Group and the Task Force on Food Security.

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Acknowledgement

SAIIA gratefully acknowledges the support of the Swedish Government and the Konrad Adenauer Foundation for this publication. This publication was also supported by a grant from the African Climate Foundation (ACF) and [in part] by a grant from the Open Society Foundations from a grant from the International Development Research Centre, Ottawa, Canada.

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