

A worker harvests tea leaves in a tea plantation
in Kenya. Photo: Jane Rix / Shutterstock.



Strengthening Climate Resilience

Through Financial Inclusion

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Authors

Paul Adams, Isabella Genta, Gonzalo Pons, Arianna Zapanta

Contributors

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Executive Summary

Climate shocks are eroding livelihoods and savings for the more than three billion people living in highly climate-vulnerable regions, and limited access to appropriate financial tools compounds this exposure, particularly for women and marginalized groups (IPCC 2022; [Women's World Banking 2025](#)). This note reviews the evidence on inclusive finance as a lever for climate adaptation and resilience, drawing primarily on randomized evaluations (RCTs) and quasi-experimental designs, and sets out a research agenda to guide further work.

The strongest evidence is on helping people respond to shocks through digital payments and index insurance. There is less evidence on whether savings and credit help people cope with shocks, and even less on what works for people in urban areas, those working in the informal economy, and people who do not rely on agriculture. Most existing studies focus on agricultural communities, and few examine how impacts differ for women and men.



Boats on a canal in Thailand.
Photo: Galyna Andrushko / Shutterstock.

Digital payments can strengthen climate resilience by making it easier for people to send and receive money through informal support networks, such as friends and family, and by helping governments deliver emergency cash transfers more quickly and at lower cost. Evidence from Kenya, Mozambique, and Uganda consistently shows that access to mobile money helps households maintain consumption and reduces hunger during droughts and floods. Evidence from Niger further shows that the payment method itself matters: delivering the same transfer digitally rather than in person increases food consumption ([Jack and Suri 2014](#); [Batista and Vicente 2025](#); [Wieser et al. 2019](#); [Aker et al. 2016](#)). However, there is limited evidence on whether digital payments improve longer-term resilience beyond helping households cope with immediate shocks. One important challenge is that mobile money agents can run out of cash during widespread crises, when many people try to withdraw money at the same time. As more people begin using digital payments directly instead of cashing out, this challenge is expected to become less severe.

Savings products can strengthen households' ability to cope with shocks, though the climate-specific evidence is limited and falls short of demonstrating significant resilience gains. Climate-adjacent RCTs on savings groups in Ghana, Malawi, Uganda, and Mali find improved food security but no significant income effects ([Karlan et al. 2017](#); [Beaman et al. 2014](#)). Beyond climate-related studies, evidence shows that formal and digital savings accounts help people maintain their consumption when their income falls, although the size of these benefits varies across settings. Simple design features, such as commitment savings and labeling accounts for a specific purpose, can increase the benefits of savings accounts, especially for women, at little additional cost. However, it is still unclear whether these approaches work as well during climate shocks, which often affect entire communities at once, last longer, and can strain both household savings and the family and community networks people typically rely on for support.

Index insurance, which provides payouts when a predefined weather or climate indicator reaches a specified threshold, can help farmers cope with climate shocks, but only if they enroll. Among those who take it up, evidence suggests that it reduces the need to skip meals or sell productive assets after droughts. For example, insured pastoralists in Kenya were much less likely to reduce meals or sell livestock following a drought ([Janzen and Carter, 2019](#)). However, enrollment remains low, limiting its overall impact. One of the main barriers is basis risk—when insurance payouts do not match a household's actual losses. Evidence from northern Kenya suggests that households who better understood how index insurance works were more, not less, concerned about this risk, indicating that information and education alone are unlikely to substantially increase enrollment ([Jensen et al. 2018](#)).

Credit supports climate resilience through two distinct pathways with uneven evidence quality. Quasi-experimental studies in Nigeria, Kenya, and Southern Africa associate credit access with adoption of climate-smart practices before shocks, though stronger evidence is needed to confirm these findings, while RCT evidence shows that credit linked directly to climate shocks, such as guaranteed emergency loans in Bangladesh, protects consumption and agricultural investment after a shock occurs ([Lane 2024](#)). Conventional microcredit, by contrast, shows no significant average welfare effects, suggesting that resilience benefits depend on climate-specific design rather than access alone ([Banerjee et al. 2015](#); [Bryan et al. 2024](#)).

Across all four products, the evidence is strongest for short-term shock absorption and weakest for sustained resilience. The large welfare gains come from bundled approaches, particularly insurance paired with credit and inputs, and from delivery infrastructure that reduces the cost and friction of getting transfers to households quickly. In addition, product design determines resilience outcomes more than access alone: gender-responsive design is not yet standard practice, women face barriers to high-performing products and reframing insurance around women's roles has raised uptake in at least one study ([The World Bank 2024](#); [Women's World Banking 2025](#); [Delavallade et al. 2015](#); [Arteaga et al. 2024](#)). Lastly, the evidence base is concentrated in rural agriculture, leaving substantial gaps for urban, informal and service-sector populations that future research can prioritize.



A woman carries a child along a street in India.
Photo: Sudarshan Jha / Shutterstock

Introduction

Climate shocks can disrupt livelihoods, erode savings, and damage financial infrastructure. Low-income households face compounding effects: floods and droughts often destroy physical assets, erode the income and savings that sustain formal financial participation, and strain the infrastructure that delivers financial services, from mobile money agent networks to insurance payout systems. These disruptions threaten recent gains in financial inclusion and increase the urgency of targeted, solutions with strong evidence of what works.

According to the Intergovernmental Panel on Climate Change (IPCC), approximately 3.3 to 3.6 billion people live in regions highly vulnerable to climate change ([IPCC 2022](#)). The impacts are expected to fall disproportionately on vulnerable communities, with up to 132 million people at risk of being pushed into extreme poverty by 2030 ([OECD 2025](#)). Against this backdrop, 1.3 billion adults are unbanked and over 80 percent live in regions highly vulnerable to climate change ([The World Bank 2025](#), [UNSGSA 2023](#)). When a drought or flood hits, households need to do several things at once: keep food on the table without selling off productive assets, find resources to rebuild and reinvest once their own savings are exhausted, and take on the risk of higher-return activities in the first place. Financial services support these functions in overlapping ways. Savings and a timely transfer from an unaffected relative can smooth consumption and protect assets; credit can finance recovery and reinvestment; insurance can make higher-return investment possible by absorbing downside risk; and access to digital payments connects households to remittances and transfers from unaffected networks, while also underpinning the delivery of all the other services. Where households lack access to any of them, they fall back on costly coping: selling assets, cutting meals, or going without.

The dynamic falls hardest on women. Over 800 million women in climate-vulnerable countries lack access to the financial tools needed to receive relief payments, with more than four out of five unbanked women globally residing in high climate exposure settings ([Women's World Banking 2025](#)). Climate shocks have well-documented social consequences for women, including increased child marriage and gender-based violence, as seen during Ethiopia's drought crisis, and growing health risks, such as adverse maternal outcomes under extreme heat ([UNICEF 2022](#); [Delavallade et al. 2025](#); [Persson et al. 2025](#)). Women are also more likely to work in informal sectors, hold fewer assets, and assume disproportionate responsibility for household recovery ([Deere et al. 2014](#); [Delavallade et al. 2025](#)). Evidence from small firms reinforces this pattern: a study of disruptions across small firms in Uganda found that women-owned firms experienced a significantly larger performance gap than men-owned firms following operational and health shocks, driven partly by women's lower access to risk management tools and informal credit networks ([Kundu et al. 2024](#)). Yet most financial products still do not incorporate gender-responsive features or deliberately expand access and usability for women ([The World Bank 2024](#); [Women's World Banking 2025](#)).

This note focuses on how financial services help households cope with climate shocks and adjust to a changing climate. It does not examine financial services aimed primarily at reducing greenhouse gas emissions (mitigation). It builds on Innovations for Poverty Action's (IPA) previous work on climate change and financial inclusion, including briefs published in [2017](#) and [2019](#).

Adaptation is the process of adjustment to actual or expected climate and its effects, in order to moderate harm or take advantage of beneficial opportunities ([IPCC 2022](#)). Resilience is the capacity of interconnected social, economic, and ecological systems to cope with a hazardous event, trend, or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure ([IPCC 2022](#)). The distinction this note relies on follows from these: resilience concerns the capacity to absorb and recover from acute shocks, while adaptation concerns the longer-term process of adjusting behaviors, investments, and systems to ongoing and expected climatic change. Mitigation denotes actions or financial products that reduce greenhouse gas emissions. While financial inclusion can also support mitigation, the poorest households contribute minimally to global emissions yet face the greatest exposure to climate hazards and the weakest safety nets ([IPCC 2022](#)). This note therefore focuses on adaptation and resilience, where financial services for low-income households have the most direct bearing, rather than on mitigation.

The review draws primarily on causal evidence from randomized evaluations (RCTs) and quasi-experimental designs. The studies referenced in the evidence section involve shocks that are either directly climate-related, such as droughts, floods, and rainfall failures, or closely analogous in their effects on households, such as large income shocks, health shocks, and seasonal food shortfalls. These non-climate studies are included because they test similar financial coping channels that climate shocks activate, namely consumption smoothing, asset protection, and informal risk-sharing. Where a study involves non-climate shocks, this is stated explicitly in the review. Studies measuring general welfare outcomes without a shock context are included as contextual evidence where they inform the interpretation of climate-specific findings, and are clearly identified as such. The majority of rigorous evidence reviewed here is drawn from agricultural settings, a limitation that is itself a finding and one that shapes the research agenda set out at the end of this note.

The following section reviews the emerging evidence on how four types of financial services, savings, credit, payments, and insurance, can support household resilience to climate shocks, and where current products and evidence fall short. The discussion then draws out the cross-cutting findings that emerge across the four product areas, and the note closes by setting out a research and learning agenda to address the gaps the evidence leaves open.



Landslide rescue operations in Guwahati, India. Photo: Talukdar David / Shutterstock.

Emerging Evidence

The following evidence reviewed examines how four types of financial services can support climate resilience: digital payments as a means for moving money quickly to where it is needed, savings as a precautionary buffer, credit as a tool for recovery and investment, and insurance as a mechanism for transferring climate risk.

Digital Payments

A woman with dark skin and braided hair, wearing a bright green jacket over a yellow and blue striped shirt, is smiling while looking at a smartphone in her right hand. In her left hand, she holds several banknotes. The background is a blurred green field.

A farmer uses a mobile phone while holding cash.
Photo: Wirestock Creators / Shutterstock.

KEY FINDINGS

Mobile money helps households cope with climate shocks. Strong evidence shows that access to mobile money protects household welfare during floods, droughts, and other climate shocks by helping households maintain consumption, reduce hunger, and avoid negative coping strategies.

A core benefit comes from stronger informal risk-sharing. Most studies find that mobile money improves resilience because they make it easier for households to receive remittances and financial support from family and social networks, especially across long distances.

Digital delivery makes government transfers more effective. Although the evidence base is smaller, studies suggest that delivering government transfers digitally—and particularly before an anticipated shock—improves food security and helps households protect assets compared with manual delivery or delayed assistance.

Important evidence and implementation gaps remain. Most studies measure short-term recovery rather than long-term resilience. In addition, liquidity constraints among mobile money agents can reduce the effectiveness of digital payment systems during widespread shocks, though this constraint is expected to ease as digital payments become more widely accepted and cash withdrawal becomes less necessary.

Climate Shock-Response Evidence

By allowing community members to send funds almost instantly over large distances, digital payments allow individuals who have suffered a shock to access financial support from a wider set of friends and family. The following studies measure outcomes during or immediately following climate shocks.

- In rural Mozambique, an RCT introducing mobile money for the first time in villages previously without formal financial services found that, following major flood events, households in participating areas were better able to meet their basic needs and reported less hunger than households in the control group, driven by increased migrant remittances facilitated by the new mobile infrastructure. The same protective effect was observed for idiosyncratic income shocks, but flood shocks produced larger and more consistent welfare gains ([Batista and Vicente 2025](#)).
- In remote northern Uganda, an RCT rolling out mobile money agents found that in areas far from a bank branch, the rollout lowered the probability of reducing meals in the seven days before the survey by 12 percentage points, specifically among households exposed to drought or flood shocks. In areas closest to existing bank branches, effects were smaller, suggesting mobile money fills a gap left by conventional financial infrastructure in the most climate-exposed and financially excluded communities ([Wieser et al. 2019](#)).
- In Kenya, a quasi-experimental panel study using the staggered rollout of mobile money agents found that while large negative shocks (including weather-related income shocks) reduced consumption by about 7 percent for non-users of mobile money, the consumption of mobile money users was unaffected, driven by greater remittance inflows and a more diversified network of senders ([Jack and Suri 2014](#)).
- In Tanzania, a quasi-experimental difference-in-difference study using national panel data found that village-level rainfall shocks, including floods and droughts, caused a 6 percent drop in per capita consumption for households without mobile money, while mobile money users fully smoothed the impact of the shock. The mechanism was increased remittance flows from networks outside the village. Non-users living in the same village as mobile money users saw no spillover benefit, suggesting access to the technology itself, not proximity to it, drives resilience ([Riley 2018](#)).
- Also in Tanzania, quasi-experimental evidence shows that mobile money adoption reduced the probability of falling into transient poverty after rainfall shocks by approximately 6 to 8 percentage points ([Abiona and Koppensteiner 2022](#)).
- In Bangladesh, an RCT providing mobile banking training to rural households and urban migrants increased urban-to-rural remittances by 26 percent, raising rural consumption by 7.5 percent and reducing extreme poverty. Rural households also borrowed less, saved more, and consumed more during the lean season. Urban migrants experienced less poverty and saved more, but reported worse health ([Lee et al. 2021](#)).

Anticipatory and Government-to-Person Transfers

The studies below examine three related but distinct questions: the effect of digital versus manual delivery channels, the added value of anticipatory timing over post-shock delivery, and the impact of anticipatory digital transfers relative to no transfer. Together they suggest that both anticipatory timing and digital delivery improve welfare outcomes, though the mechanisms differ and the studies are not directly comparable. These effects are often most pronounced in the immediate post-shock period and may attenuate as affected households gradually recover. When transfers are delivered in anticipation of a forecast climate event rather than after it, they can enable preemptive protective action.

- In Niger, a randomized comparison of mobile-money versus manual cash delivery of drought-response transfers found that beneficiaries receiving mobile transfers experienced food consumption approximately 9 percent higher than those paid manually, greater dietary diversity, and slower depletion of non-durable assets ([Aker et al. 2016](#)).
- In Bangladesh, households randomly offered anticipatory cash transfers through mobile money transfer were 2.4 percentage points more likely to reach acceptable food-security thresholds and have better mental well-being than post-flood recipients who were still waiting for cash during the critical period. Two months later, outcomes converged with those offered the equivalent transfer through mobile money and differences disappeared ([Christian et al. 2025](#)).
- In Bangladesh, a quasi-experimental evaluation of an anticipatory cash transfer delivered via digital wallets before peak flooding found that recipients were 36 percent less likely to go a day without eating during the flood, with higher food consumption and wellbeing three months later, lower asset loss, and less costly borrowing after the flood, compared to comparable eligible households that did not receive any the transfer at all ([Pople et al. 2026](#)). After five months, positive effects on adult food consumption persisted, but gains in child food consumption and wellbeing had narrowed as control households caught up ([Pople et al. 2026](#)).

Discussion

Digital payment infrastructure strengthens household climate resilience primarily by expanding the reach and speed of informal risk-sharing networks. Causal evidence spans Kenya, Tanzania, Mozambique, and Uganda, with consumption protection estimates ranging from 7 percent ([Jack and Suri 2014](#)) to 12 percentage points reduction in meal skipping ([Wieser et al. 2019](#)). The RCT in Mozambique is particularly notable as one of the few studies documenting protective effects specifically during flood events, not only general income shocks ([Batista and Vicente 2025](#)). Broader non-shock evidence adds further support: in Bangladesh, an RCT providing mobile banking training to paired rural households and urban migrants raised rural consumption by 7.5 percent, with the strongest gains during the lean agricultural season, suggesting digital payments also build general financial buffers that support resilience over time ([Lee et al. 2021](#)).

Digital payments also enable formal government social protection payments (G2P) before, during or after climate shocks. In Niger, recipients of mobile money transfers during a drought-response program reported food consumption approximately 9 percent higher than those paid through manual cash delivery, along with greater dietary diversity and slower asset depletion ([Aker et al. 2016](#)). By allowing funds to reach recipients faster and at lower cost than manual distribution, digital payment infrastructure makes it operationally feasible to disburse transfers quickly after a shock. There is also early evidence that anticipatory timing improves outcomes relative to post-shock delivery. In Bangladesh, households randomly offered anticipatory transfers through mobile money were 2.4 percentage points more likely to reach acceptable food-security thresholds and reported better mental well-being than post-flood recipients still waiting for cash during the critical period, though outcomes converged two months later ([Christian et al. 2025](#)).

A structural constraint, however, limits the positive effects of both informal and G2P transfers: mobile money agents frequently exhaust cash reserves during large regional shocks, when demand for transfers spikes precisely when they are most needed ([Annan et al. 2024](#)). This vulnerability is a feature of the current stage of digital financial infrastructure, where digital payment acceptance from merchants is low, meaning that cash-out remains necessary for most transactions. As digital payments become more widely accepted and the need for cash-out declines, it is expected to ease over time.

In addition, evidence on whether short-run recovery gains compound into better outcomes across repeated shocks remains thin. Follow-up data in Bangladesh offers a mixed picture: positive effects on adult food consumption persisted five months after the transfer, but gains in child food consumption and wellbeing had narrowed as control households caught up ([Pople et al. 2026](#)).

Key gaps for future research include how digital financial infrastructure can be strengthened to maintain functionality during large covariate shocks, how digital payment access supports sustained adaptation over longer time horizons and how anticipatory cash digital transfers compare to post-shock payments across different hazards.

Savings



A man counts Ghanaian cedi notes. Photo: RODWORKS / Shutterstock.

KEY FINDINGS

Savings products can help households cope with shocks, but direct evidence for climate resilience is limited. Strong evidence shows that savings improve households' ability to smooth consumption, maintain food security, and avoid harmful coping strategies after income and health shocks. However, there is little rigorous evidence demonstrating similar effects during actual climate shocks.

Savings groups and formal savings products show promising, but modest, benefits in climate-vulnerable settings. In drought-prone and seasonally vulnerable contexts, savings groups increase savings and improve food security and consumption smoothing. However, studies generally do not find statistically significant improvements in income or broader resilience outcomes during climate shocks.

Product design influences both uptake and impact. Behavioral features such as commitment devices, labeled savings accounts, and flexible savings products can increase savings and reduce harmful coping behaviors. Evidence also suggests that households, particularly women, may prefer savings over insurance, even when insurance provides greater protection against climate risk.

Major evidence gaps remain. Most rigorous studies examine idiosyncratic income or health shocks rather than floods, droughts, or other climate events. Future research can assess how savings products perform under covariate shocks, which product features work best for different climate risks, and how product design can better align household preferences with the most effective financial tools.

Climate-Adjacent Evidence

Direct evidence on savings and climate shocks is limited. The following studies are the closest the current literature offers, and the results are modest.

- In Senegal and Burkina Faso, a Sahel region where drought risk is widespread and almost a quarter of participants had experienced food shortages from dry weather, a randomized evaluation comparing weather index insurance against three savings products found that female farm managers were significantly more likely to invest in savings than insurance, investing roughly 30 percent less in the insurance than men did, despite the main treatment showing that insurance outperforms savings treatments on input spending and yields. Farmers also preferred savings products with lighter commitment features, saving more in flexible instruments than in restrictive ones ([Delavallade et al. 2015](#)).
- In Ghana, Malawi, and Uganda, a cluster-randomized trial of Village Savings and Loan Associations (VSLAs) found that participation increased savings by about 35 percent and improved loan access by more than 40 percent. In drought-affected villages, VSLAs generated a positive, but statistically insignificant income effect ([Karlan et al. 2017](#)).
- In Mali, a randomized evaluation of savings groups found improvements in food security, consumption smoothing across seasons including lean seasons associated with rainfall shortfalls, and buffer stock savings, with total savings increasing by approximately 30 percent. The study did not find significant effects on overall income or expenditure ([Beaman et al. 2014](#)).

These studies suggest that savings groups and savings products can provide some support in drought-prone and seasonally vulnerable contexts, but none demonstrates a statistically significant resilience gain measured during an actual climate shock, even where general food-security gains are found.

Non-Climate Shock-Response Evidence

The bulk of the savings evidence base examines idiosyncratic income and health shocks. These studies are included because they test similar coping channels that climate shocks activate, particularly consumption smoothing, asset protection, and harmful coping behavior. Whether these effects hold under covariate shocks, which differ from idiosyncratic shocks in scale, duration and their capacity to simultaneously deplete household liquidity, local asset markets, and informal support networks, remains untested.

Formal and Digital Savings Accounts

- In Chile, low-income microfinance members randomly offered free savings accounts were better able to smooth consumption following income shocks (with consumption cutbacks mitigated by about 43 percent) and reported significantly lower anxiety about their financial future ([Kast and Pomeranz 2024](#)).
- In Kenya, randomly providing female market vendors with access to basic savings accounts increased business investment by 45 percent and daily expenditures by 27 to 40 percent within six months, with treated women also better able to maintain business operations during health shocks ([Dupas and Robinson 2013a](#)).
- In Peru, randomized access to savings groups resulted in expensive investments from group members, such as housing improvements and reduced households' vulnerability to idiosyncratic shocks by about 5 percentage points, with the largest reductions (about 9.4 percentage points) among poorer villages ([Frisancho and Valdivia 2020](#)).

Behavioral and Group-Based Savings Products

- In rural Kenya, Rotating Savings and Credit Association (ROSCA) members randomly offered a group-based savings pot saw substantial increases in preventive health spending (up to 128 percent for the group commitment arm), while those offered an individual health savings account earmarked for emergencies were 12 percentage points more likely to be able to afford medical treatment when health shocks occurred ([Dupas and Robinson 2013b](#)).
- In Kenya, vulnerable women randomly assigned to receive a labeled mobile savings account earmarked for emergencies, on M-PESA, a mobile money service, increased savings by approximately 400 KSh (or roughly 3 USD) over 12 weeks, and were 4.9 percentage points less likely to use transactional sex as a coping mechanism to health shocks ([Jones and Gong 2021](#)).

Discussion

The evidence reviewed establishes that savings products can strengthen households' ability to cope with shocks, though effects are modest and the evidence base has limitations for drawing conclusions about climate resilience specifically. The three pieces of direct climate-adjacent RCT evidence fall short in demonstrating savings' significant resilience gains: research in drought-affected villages in Ghana, Malawi, and Uganda found that VSLA participation generated positive but statistically insignificant income effects ([Karlan et al. 2017](#)); savings groups in Mali improved food security and consumption smoothing across lean seasons associated with rainfall shortfalls, but found no significant effects on income or overall expenditures ([Beaman et al. 2014](#)); and in a drought-prone Sahel setting, female farm managers were significantly more likely to invest in savings than insurance with farmers broadly preferring savings products with lighter commitment features ([Delavallade et al. 2015](#)). The bulk of the remaining shock-response evidence, which is rigorous but drawn from idiosyncratic income and health shock contexts, tests similar coping channels but under conditions that differ from covariate climate shocks in scale, duration and their capacity to simultaneously deplete household liquidity, local asset markets and informal support networks. Formal and digital savings accounts support consumption smoothing and reduce food insecurity in shock contexts, with effect sizes that vary considerably across settings, from modest reductions in vulnerability ([Frisancho and Valdivia 2020](#)) to substantial gains in business investment and consumption ([Dupas and Robinson 2013b](#), [Kast and Pomeranz 2024](#)). Behavioral features such as commitment devices and account labeling amplify effects at low cost, particularly in reducing harmful coping behaviors among women.

[Delavallade et al. 2015](#) findings also surfaces an important product choice dynamic: women preferred savings over insurance despite insurance producing larger resilience gains, suggesting that savings preferences may reflect real liquidity and trust constraints rather than a preference for lower-impact tools. This underscores that product uptake and impact may be context- and shock-dependent, and that product design and access may be key levers for closing the gap between what works and what gets used. One promising avenue is integrating climate adaptation content directly into savings groups: embedding climate-smart agricultural training into existing groups increased meeting attendance and average loan sizes across eight countries in sub-Saharan Africa, suggesting members accessed larger sums to invest in adaptive practices, though the study did not collect data on actual loan use ([Nabami et al. 2024](#)).

Three questions shape the savings research agenda: whether savings effects hold under covariate climate shocks; how different product features perform across climate shock profiles and household vulnerability levels; and how product design can ensure women access the most effective tool for each type of risk rather than defaulting to lower-impact options.

Credit



A customer pays with a credit card. Photo: Drazen Zigic / Shutterstock.

KEY FINDINGS

Credit can strengthen resilience when designed specifically for climate risk. Promising evidence comes from credit products tailored to climate shocks, such as emergency credit lines and loans bundled with index insurance. Guaranteed emergency credit encourages households to invest more and maintain consumption during shocks, though it may also reduce incentives to shift toward less climate-exposed livelihoods. Bundling credit with insurance expands credit supply by aligning with lender incentives, though whether this design is commercially viable and scalable for financial service providers remains underexamined.

Credit supports climate adaptation by enabling investment. Quasi-experimental evidence shows that access to credit increases adoption of climate-smart agricultural practices and productive assets. In one study, the largest benefits occurred when credit was combined with complementary services such as agricultural extension.

Product design matters more than credit access alone. The evidence suggests that features such as guaranteed post-shock liquidity, insurance-linked loans, and repayment structures determine whether credit builds resilience. Meanwhile, conventional microcredit products show little evidence of building resilience.

Credit can influence both short-term recovery and long-term adaptation. Unlike other financial products that primarily help households cope after a shock, credit also shapes decisions before shocks occur by enabling investment in productive activities and climate adaptation. However, supporting continued investment in climate-exposed livelihoods may, in some settings, reduce incentives to shift toward less climate-vulnerable activities.

Important evidence gaps remain. Most rigorous evidence focuses on agriculture, leaving limited evidence on credit for resilience investments in housing, small businesses, or other sectors. More research is also needed on how credit product features affect outcomes under different climate risks and whether promising products are commercially viable at scale.

Climate Shock-Response Evidence

A small number of studies explicitly examine credit products designed to respond to climate shocks. These provide the most direct evidence on how credit can support resilience.

- In Bangladesh, a randomized evaluation offering farmers access to guaranteed emergency loans following flood shocks found that credit access increased land dedicated to agricultural production by 18 percent and crop production by 19 percent. When floods occurred, households with access to the emergency loan option showed a 10 percent consumption increase relative to flooded control households ([Lane 2024](#)).
- In northern Ghana, a randomized evaluation bundling agricultural loans with drought index insurance found that insured loans increased the likelihood that smallholder farmers receive credit by roughly 15 to 21 percentage points. While the study found no effect on farmers' likelihood of applying for credit, it found an increase in the likelihood of loan approvals of between 17 and 25 percentage points ([Mishra et al. 2021](#)).
- Lab-in-the-field experiments in rural Tanzania showed that adding index insurance to loan contracts increases borrowing by 11 percent and raises farmers' willingness to undertake high-risk, high-return investments by 33 percent, indicating that insured credit can shift risk-taking towards more profitable production choices under rainfall and yield risk ([Gallenstein et al. 2021](#)).
- In East India, households part of Self-Help Groups, a versatile model of local savings and credit associations, experienced 50 percent lower loss of adequate food consumption and strong credit flows after a drought. They also increased seasonal migration by about 35 percent to minimize future income shocks ([Demont 2022](#)).

Non-climate shock-response evidence

One study examines credit access during shocks that are predominantly income- or health-related rather than climate-specific, but tests the same consumption-smoothing channel.

- In Kenya, a regression discontinuity study of the M-Shwari digital loan product, exploiting a credit score threshold that determined loan eligibility, found that households eligible for small digital loans (roughly USD 40) were 6.3 percentage points less likely to forego expenditures when facing negative shocks, in a sample where most shocks were income or health-related ([Suri et al. 2021](#)).

Credit and Climate Adaptation

A separate body of evidence examines how credit access shapes farmers' decisions to adopt climate-smart practices before shocks occur. These studies test an ex ante pathway distinct from the consumption-smoothing mechanism examined above

- In Nigeria, a quasi-experimental study revealed that credit status positively and significantly impacts the intensity of climate adaptation strategy (CAS) utilization, which refers to the number of climate-smart farming practices a farmer actually uses to cope with climate change. An average crop farmer will utilize 1.99 times CAS more when he is not being credit constrained, while the average crop farmer in the treated group will utilize 1.76 times CAS more than it would if credit constrained ([Olutumise 2023](#)).

- In Southern Africa, a quasi-experimental study found that access to either extension services or credit significantly increased climate-smart agriculture (CSA) technology adoption. Extension services alone proved more effective than credit alone, but simultaneous access to both had the strongest combined impact. However, the joint effects of credit and extension were less pronounced among younger and women farmers compared to older and male farmers ([Makate et al. 2019](#)).
- In Kenya, a quasi-experimental evaluation of climate-smart villages found that the program increased adoption of improved livestock breeds and boosted membership in savings and credit groups, which in turn further encouraged livestock upgrades. Access to credit also helped spread the benefits more evenly: ownership of improved livestock was distributed more equitably in program villages than in comparison areas, as measured by a 0.04 reduction in the Gini coefficient ([van Asseldonk et al. 2024](#)).

Discussion

The evidence that credit access increases adoption of climate-smart practices is consistent and positive across all three available studies. In Nigeria, farmers without credit constraints utilized climate-smart farming practices at nearly twice the rate of credit-constrained farmers ([Olutumise, 2023](#)). In Kenya, access to savings and credit groups increased adoption of improved livestock breeds and distributed ownership more equitably ([van Asseldonk et al. 2024](#)). In southern Africa, credit access significantly increased climate-smart agriculture technology adoption, with the strongest effects when paired with extension services ([Makate et al. 2019](#)). All three studies use quasi-experimental methods, which limits causal inference, but the consistency of positive and statistically significant effects across distinct country contexts strengthens confidence in the direction of the finding.

In addition, the shock-specific evidence points to two conditions under which credit can support climate resilience. First, providing guarantees before a shock, that credit will be available after a shock occurs, changes investment behavior ex ante: farmers offered emergency credit lines in Bangladesh, planted more and produced more, and maintained higher consumption when floods hit, compared to those without that guarantee ([Lane 2024](#)). However, the same mechanism raises a tension: enabling continued agricultural investment in flood-prone areas may reduce incentives to shift land use or livelihood strategy in response to changing climate risk. Second, bundling credit with index insurance removes the correlated default risk that deters lenders in climate-exposed contexts, expanding credit supply ([Mishra et al. 2021](#)). This product design shows promise because it works through the lender side, aligning FSP incentives with credit expansion rather than against it. Whether such designs are commercially viable and scalable from a FSP perspective remains underexamined in the evidence base.

The broader credit literature reinforces that product design matters more than access. Conventional microcredit does not reliably improve welfare ([Banerjee et al. 2015](#)), larger loans produce higher variance in outcomes ([Bryan et al. 2024](#)), and immediate repayment schedules constrain productive investment ([Field et al. 2013](#)). Credit without deliberate design for climate contexts is unlikely to build climate resilience.

The credit research agenda centers on four gaps: how credit performs across climate shock profiles over longer time horizons; how credit product design, including repayment flexibility, loan size, and credit scoring, affects borrower welfare under climate shocks; what evidence exists for credit linked to climate-relevant investments outside agriculture, including housing, flood protection, and business continuity; and whether the product designs that show promise in single-shock contexts are commercially viable and scalable from an FSP perspective. IPA's forthcoming randomized evaluation of housing microfinance in the Philippines ([Dahis et al, forthcoming](#)) will contribute evidence on the third gap, specifically on credit for climate-resilient construction.

Insurance



A hand holds a euro banknote over a wheat field. Photo: Fotokostic / Shutterstock.

KEY FINDINGS

Index insurance can strengthen climate resilience before and after shocks. The evidence shows that index insurance encourages households to invest more in productive activities before climate shocks occur and helps protect assets, consumption, and livelihoods when shocks materialize. However, farmers who were insured but did not experience a payout-triggering shock tended to drop coverage in subsequent seasons, suggesting uptake is not stable without a realized benefit.

Bundling insurance with credit and other inputs can meaningfully increase adoption and resilience, but the specific combination and shock severity matter. In Ethiopia, only a full bundle of insurance, credit, and input vouchers significantly increased technology adoption and productivity. In addition, improved seeds alone protected against moderate shocks, but only seeds bundled with insurance helped farmers recover from severe ones.

Demand for insurance remains persistently low in many settings. Evidence suggests that reducing liquidity barriers, improving product design, and addressing basis risk are more important for adoption than information alone. Evidence from Kenya shows that better product knowledge does not reliably increase take-up, and in some cases, reduces willingness to pay rather than increasing it.

Important evidence gaps remain. Most rigorous evidence focuses on agricultural livelihoods and index insurance, and evidence on the design features that drive demand is concentrated in Kenya, limiting how confidently these findings generalize to other contexts. More research is needed on whether these adoption strategies hold outside Kenya, and in non-agricultural applications.

Climate Shock-Response Evidence

Index insurance strengthens climate resilience through two mechanisms that often operate together: enabling bolder investment by removing the risk of catastrophic loss, and protecting welfare when shocks materialize. The following studies measure outcomes during or in direct response to climate shocks.

- In northern Kenya, an encouragement design study based on randomized discount coupons to induce purchase of Index-Based Livestock Insurance (IBLI) found that households who purchased the insurance and received a payout were on average 61 percentage points less likely to anticipate selling livestock than comparable households that did not purchase insurance during a severe covariate drought shock, with larger effects for wealthier households on asset protection (96 percentage points) and for poorer households on meal skipping (49 percentage points), demonstrating that insurance functions as a flexible safety net that responds differently depending on how households cope with shocks. On average, insurance also reduced meal skipping, though this average effect was not statistically significant ([Janzen and Carter 2019](#)). A follow-up study tracking the same households a decade later found that even temporary insurance coverage produced lasting shifts in production strategy and raised children's educational attainment by 40-55 percent relative to the control group. This suggests that the behavioral change insurance induces before shocks materialize matters as much as the payouts that follow them ([Barrett et al. 2025](#)).
- In northern Kenya, a study exploiting exogenous variation in program participation and the randomized rollout of IBLI extension and premium discounts, among the same population as a contemporaneous cash transfer program, found that insured households made productivity-increasing investments, reduced distress sales of livestock during droughts, and saw a marked increase in income per adult equivalent. Measured per unit of marginal cost, IBLI's welfare impact was considerably larger than that of the cash transfer program ([Jensen et al. 2017](#)).
- In Mexico, a regression discontinuity design exploiting rainfall thresholds in a nationwide weather-index insurance program found that municipalities receiving insurance payments after a weather shock cultivated 39 percent more land and households had higher per capita income and expenditure by approximately 38 percent and 27 percent, respectively, in the following season ([De Janvry et al. 2014](#)).
- In Uzbekistan, using a lab-in-the-field approach, crop index insurance simulated induced ex-ante (insured but no damage) and ex-post (payout) welfare gains for all outcomes evaluated (risky but profitable fertilizer input, consumption, and farm income) and strengthened climate resilience after a drought ([Moritz et al. 2025](#)).
- In Mongolia, a quasi-experimental study using a household survey panel found that pastoralist households that purchased IBLI before a shock recovered faster from asset losses than comparable uninsured households. Indemnity payments had a significant, positive, and economically large effect on herd size one to three years after the shock, though the effect disappeared by year four. The evidence suggests IBLI relieved credit constraints and helped herders avoid selling or slaughtering animals, smoothing their productive asset base over time ([Bertram-Huemmer and Kraehnert 2018](#)).

- A randomized evaluation in Bangladesh found that demand for index insurance among farmers was fairly price elastic, with discounts more effective at stimulating uptake than rebates. Purchasing insurance had both risk management and income effects on agricultural production. The risk management effects led to expanded cultivation and higher input expenditures during the monsoon season, while the income effects supported more intensive rice production in the subsequent dry season, with greater use of irrigation and fertilizers, higher yields, and increased total output ([Hill et al. 2019](#)).
- In the Philippines, a quasi-experimental study found that farmers insured under cost-of-production (COP) crop insurance spent more on chemical fertilizers and pesticides, the inputs that determine their indemnity payments. However, these farmers were also likely to reduce effort on inputs not covered by the indemnity formula. Since yields depend on both types of inputs, the overall effect of COP insurance on productivity is unclear ([He et al. 2019](#)).
- In southern Ethiopia, a quasi-experimental study of pastoralist households based on randomly distributed coupons found that before a drought, holding insurance without a payout reduced food expenditure for both male- and female-headed households, reflecting the cost of premiums. During and after a severe drought, however, index insurance had no significant impact on food consumption, with negligible differences between male- and female-headed households. Taken together, these results show a real cost from premiums with no corresponding consumption benefit when the shock arrived. The researchers conclude that index insurance alone is not sufficient to protect consumption against climate-related shocks, and that it works best as a complement to other safety nets, suggesting that consumption benefits of index insurance are realized only ex post and primarily for women ([Timu et al. 2023](#)).

Bundling Insurance With Credit and Inputs

Bundling insurance with complementary services can increase adoption of modern agricultural technologies (i.e. seeds, fertilizers) and improve recovery from severe shocks, though the evidence on durability is limited and mixed.

- In the Rift Valley zone of Ethiopia, an area adversely affected by rainfall shocks and drought, a multi-arm RCT randomly assigning smallholder farmers to stand-alone insurance, insurance with credit, or a full bundle of insurance, credit, and input vouchers found that only the full bundle led to significant increases in adoption of modern agricultural technologies, with technology adoption roughly 18 to 22 percentage points higher than in the insurance-only arm, and to significant gains in agricultural productivity ([Belissa et al. 2025](#)).
- In Mozambique and Tanzania, an RCT found that both moderate droughts and severe yield shocks undermined the resilience of uninsured control farmers, with long-lasting effects: farmers invested and produced less in seasons following shocks, and severe yield shocks increased hunger and food insecurity. Drought-tolerant maize seeds alone provided significant protection against moderate drought but did not offer sufficient protection during severe shocks. Farmers with seeds bundled with index insurance recovered from severe shocks, raising yields in the following season by 60 percent compared to control farmers with no intervention. For people with this bundle, improved seeds still supported farmers during moderate shocks, suggesting that insurance is less needed in those events, but insurance provided added protection under more severe shocks that seeds alone could not mitigate.

- Farmers who witnessed both the drought-tolerant seeds and the index insurance work first-hand subsequently increased their agricultural investment beyond pre-shock levels, which is what the authors call a “resilience dividend.” However, farmers across treatment arms who did not experience a shock during the study period were more likely to scale back investment and back away from using the technologies the next season, reflecting the challenge of sustaining risk management tools whose benefits only materialize infrequently ([Boucher et al. 2024](#)).
- In Kenya, researchers used pictorial games to explain how a risk-contingent credit product (bundling rainfall index insurance directly with a credit contract) can offer protections during bad seasons. Farmers that used the bundled product were roughly 14 percentage points more likely to use chemical fertilizers and spent significantly more on these fertilizers (approximately KSh 1,900 more per acre) than those in the comparison group (no credit). The uptake of the bundled product was also higher than traditional credit (34 percent versus 31 percent) ([Shee et al. 2023](#)).
- In India, a study combining insurance with climate-smart agriculture (CSA) technologies found that conditional indemnity insurance can encourage CSA adoption, but with limitations. A “no-burning” condition significantly reduced crop residue burning: villages with the condition saw a 12 percentage point reduction in burning rates compared to those with unconditional coverage. Even so, more than 90 percent of farmers continued burning their residues, citing concerns about yield loss, traditional practices, or lack of access to alternatives ([Kramer and Ceballos 2018](#)).

Investment Effects Under Climate Risk

A smaller set of studies examines how insurance changes investment behavior in climate-exposed settings, even when a shock has not yet materialized.

- In Ghana, a multi-year randomized trial found that rainfall index insurance increased total farm cultivation expenditure by USD 266 relative to a control group mean of USD 2,058, expanded cultivated acreage by approximately one acre, and raised spending on farm chemicals by USD 38. A cash grant of USD 420 per farmer produced no significant increase in overall farm investment, while insurance alone did, suggesting uninsured rainfall risk rather than capital constraints as the primary barrier to productive investment ([Karlan et al. 2014](#)).
- In India, randomly offering rainfall index insurance to farmers led them to shift into riskier, but higher-return production strategies: insured farmers were approximately 13 percentage points more likely to plant the high-yield weather-sensitive rice variety. Overall take-up was approximately 40 percent in the treatment group. This highlights a potential tension: by removing catastrophic loss, insurance may reduce incentives to adopt climate-adapted varieties ([Mobarak and Rosenzweig 2013](#), [Boucher et al. 2024](#)) attempts to resolve this tension by pairing insurance directly with drought-tolerant seeds.
- In Burkina Faso, a randomized evaluation of index insurance for cotton farmers found no impact on cotton investment itself but significant spillover effects on investment in farmers’ other agricultural activities, consistent with a risk-reduction dividend, while payouts to farmers hit by a shock confirmed the value of insurance as a risk-management tool. Implementation problems involving trust, understanding, and the timing of coverage limited the program’s overall impact ([Stoeffler et al. 2022](#)).

Design Features, Take-up, and Renewal

Despite these effects, demand remains low in many settings, and realized benefits depend heavily on product design, trust, and delivery. It is worth noting that available evidence on design features and demand is concentrated in Kenya, which limits the generalization of these findings to other contexts.

- In Kenya, an RCT offering farmers a crop insurance product with premiums deducted at harvest rather than paid upfront found take-up rose dramatically from five percent to 72 percent, with the largest gains among poorer farmers ([Casaburi and Willis 2018](#)).
- Two Kenya-based RCTs find that greater knowledge and understanding of index insurance may not automatically translate into higher demand. [Janzen et al. \(2021\)](#) evaluated a lower basis-risk contract and an experiential game, finding that both independently increased preferred coverage, but combining them produced no additional effect. [Osiemo et al. \(2025\)](#) similarly found that game-based learning outperformed conventional oral or lecture-based financial education in knowledge accumulation. This was driven primarily by increased product knowledge, with suggestive evidence that directly experiencing basic risk scenarios during gameplay made the product's limitations more concrete than theory-based learning alone.
- A randomized evaluation introducing commercial rainfall deficit insurance into drought-prone cooperatives in Amhara State, Ethiopia found market take-up of only 0.5 to 3 percent across seasons, and when free contracts were distributed to 39 percent of farmers, this failed to stimulate input use, yields, or income, with no persistent demand in subsequent seasons ([Ahmed et al. 2020](#)).
- In Kenya, an RCT among women in pastoralist communities testing index-based livestock insurance reframed as 'family insurance' found that insurance purchase rates increased by 10 percentage points overall compared to conventional farming. Among women who had previously experimented with subsidized index insurance, family framing was associated with a 50 percent increase in uptake over the traditional framing, suggesting that product framing tailored to women's roles can substantially raise uptake and that subsidized initial exposure is key to sustained purchase once discounts end. ([Arteaga et al. 2024](#)).
- In northern Kenya, a demand study using randomized interventions among pastoralist households found that demand for index-based livestock insurance was negatively associated with basis risk, which is the gap between what the satellite index predicts and what individual households actually experience. Households with better product knowledge were more sensitive to basis risk in their purchase decisions. The study does not estimate welfare or investment outcomes and so speaks to barriers to adoption rather than the impacts of insurance ([Jensen et al. 2018](#)).

Discussion

The evidence supports two broad conclusions about index and weather-related insurance. First, by reducing downside risk, insurance enables farmers and pastoralists to adopt more profitable crops, inputs, and herd strategies, though the risk-taking this induces can have positive or negative welfare effects depending on context. Effect sizes can be meaningful: a rainfall index insurance trial in Ghana found that insurance alone increased farm cultivation expenditure by roughly 13 percent relative to control, while an equivalent cash grant produced no significant effect ([Karlan et al. 2014](#)). Yet, these effects are not automatic. A randomized evaluation among cotton farmers in Burkina Faso found no effect on the insured crop but significant investment spillovers to other activities, and implementation problems involving trust, understanding, and timing limited the program's overall impact, indicating that delivery quality shapes whether insurance realizes its investment dividend ([Stoeffler et al. 2022](#)). Second, beyond enabling investment, insurance reduces the need for costly distress coping when shocks materialize, with evidence from Kenya and Ethiopia showing particularly meaningful reduction. In northern Kenya, where index-based livestock insurance and a cash transfer program operated among the same population, insurance reduced distress livestock sales during drought and, measured per unit of marginal cost, delivered larger welfare gains than the cash transfer ([Jensen et al. 2017](#)).

There is not enough evidence to support the confidence that insurance can scale as a broad-based resilience tool in its current form. Basis risk is a structural demand constraint that requires improvements to index accuracy ([Jensen et al. 2018](#); [Elabed and Carter 2015](#)). Demand-side constraints are not primarily informational: evidence shows that deeper understanding of basis risk could reduce rather than increase willingness to pay ([Osiemo et al. 2025](#)). The concentration of design and demand evidence in Kenya is a further limitation; whether these findings on basis risk, premium timing and framing hold across other geographies and livelihood types is an open question. Evidence on gender-differentiated impacts remains thin: one study of pastoralist households in southern Ethiopia found that post-drought insurance payouts raised food expenditure for female-headed households, but concluded that insurance protects consumption only once payouts arrive and works best as a complement to cash transfers and informal risk-sharing rather than as a stand-alone tool ([Timu et al. 2023](#)). The insurance research agenda priorities are: whether effects extend to non-agricultural livelihoods; which demand-side interventions most effectively drive adoption, with basis risk reduction prioritized; and what is the relative cost-effectiveness of different insurance design features in driving adoption and resilience outcomes.

IPA is currently developing and testing climate and health microinsurance products for small firms in the Philippines, with a randomized evaluation planned. IPA is also conducting a pilot of a government program using Early Warning Systems (EWS) and index-based insurance to support smallholder farmers in Bolivia's climate-vulnerable Valles Macro Region, where farmers face the dual constraints of imperfect weather information and incomplete insurance markets that prevent optimal agricultural investment decisions ([Innovations for Poverty Action, 2025](#)).



What the Evidence Shows Across Financial Products

The evidence across savings, credit, digital payments, and index insurance points to three patterns that should shape future product design and research priorities.

The first is a stark asymmetry in the quality and climate-specificity of evidence across instruments. Payments and insurance carry the most direct climate shock evidence. Evidence on saving products is mostly drawn from idiosyncratic income and health shock contexts; the three pieces of climate-adjacent RCT evidence produce positive but largely statistically insignificant effects ([Karlan et al. 2017](#); [Beaman et al. 2014](#); [Delavallade et al. 2015](#)). Credit shock-response evidence is limited to a handful of agricultural studies, with the broader microcredit literature finding no significant average welfare effects from conventional products ([Banerjee et al. 2015](#)). This asymmetry does not necessarily reflect differences in instrument effectiveness; it reflects where rigorous evaluations have been concentrated. The role of savings and credit in climate-specific contexts remains underexamined.

The second pattern is that the largest welfare gains consistently come from bundled products and from payment infrastructure that enables faster, lower-cost delivery. Insurance paired with credit and inputs produces the strongest effects on productive investment and food security: in Ethiopia, only the bundle of insurance, credit, and input vouchers significantly increased technology adoption and agricultural productivity ([Belissa et al. 2025](#)), and in Mozambique and Tanzania, bundling drought-tolerant seeds with index insurance raised yields in the season following a severe shock by 60 percent compared to uninsured control farmers, an effect not achieved by seeds alone ([Boucher et al. 2024](#)). On the delivery channel, the clearest direct test in Niger showed that mobile money delivery of the same drought-response G2P transfer raised food consumption by approximately 9 percent relative to manual delivery ([Aker et al. 2016](#)), a channel effect that may hold under both anticipatory and post-shock models.

Third, the limited gender-differentiated evidence available suggests women do not adopt the highest-performing products: in a drought-prone setting women invested substantially less in index insurance than men and preferred savings ([Delavallade et al. 2015](#)), while reframing insurance around women's roles raised their uptake ([Arteaga et al. 2024](#)). At the same time, when women do hold insurance and a payout is triggered, the welfare gains can be larger: in Ethiopia, an insurance payout after a severe drought significantly raised food expenditure among female-headed households but not male-headed households, suggesting that consumption benefits of insurance are realized primarily for women *ex post* ([Timu et al. 2023](#)). Sector analyses report that gender-responsive design is still not the norm ([The World Bank 2024](#); [Women's World Banking 2025](#)).

Several questions anchor the research agenda. Sustaining adoption between shock events is unresolved: farmers who were insured but did not experience a shock disadopted in subsequent seasons ([Boucher et al. 2024](#)). Whether products that reduce the short-term cost of shocks dampen incentives for deeper adaptation is also open; guaranteed credit in Bangladesh increased cultivation of flood-prone land rather than prompting shifts in livelihood strategy ([Lane 2024](#)), and in India, insurance adoption increased usage of weather-sensitive, high-yield seed varieties rather than climate-adapted ones ([Mobarak and Rosenzweig 2013](#)). Most of the evidence base rests on single-shock designs, and only a small number of studies examine long-term impacts, with little evidence on how effectiveness changes under the compounding shocks that characterize climate change. Evidence on product bundling shows complementarity matters ([Belissa et al. 2025](#); [Boucher et al. 2024](#)), but no study has compared cost-effectiveness across product combinations. Consumer protection and regulatory frameworks remain almost entirely unevaluated, with particular concerns around compounding obligations in bundled products and pricing transparency for low-literacy users.

Most current evidence and product offerings remain concentrated in rural agriculture, leaving substantial gaps for urban, informal, and service-sector populations. Realizing the full potential of inclusive finance for climate adaptation and resilience requires better-targeted product design, lower-friction delivery, and more deliberate research to fill the gaps this review has identified.



Research and Learning Agenda

The evidence reviewed in this note is most robust for digital payments and insurance in climate shock contexts, and thinnest for savings and credit where almost no studies are designed to test climate shock responses directly.

Across all four products, the evidence is weakest for longer-term resilience, urban contexts, informal workers, and gender-differentiated impacts. These are populations and contexts that matter greatly for climate adaptation at scale alongside the agricultural households where most of the current evidence is centered.

A second foundational gap is adaptation itself: this review documents resilience effects, the capacity of households to cope with and recover from acute shocks but whether short-run recovery gains compound into better outcomes across multiple shocks over time is only beginning to be answered.

There is also an underexplored tension worth investigating: if financial services primarily strengthen resilience and recovery, they may reduce the urgency households feel to make deeper adaptive changes, though whether this holds in practice is an open empirical question.

IPA seeks to catalyze new evidence and action on these gaps, with a focus on clarifying when, for whom, and under what conditions financial services reduce climate vulnerability and support longer-term adaptation.

The agenda below organizes these questions by financial product, with each priority recurring under the products where it is most acute.

A Note on Adaptation and Resilience

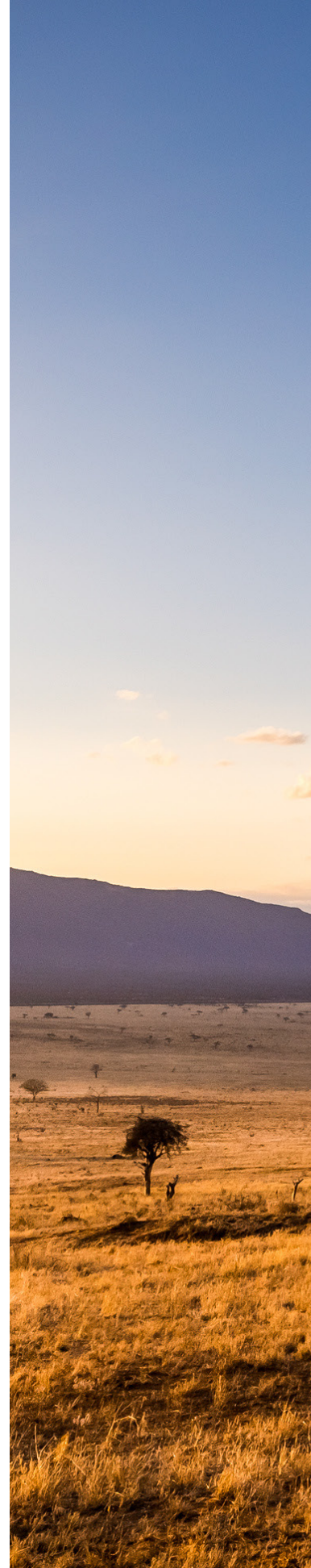
Resilience lends itself to rigorous impact evaluation because shocks are observable, recovery timelines are measurable, and counterfactuals can be constructed through randomized or quasi-experimental designs.

Adaptation resists the same approach for a different reason than the compounding-gains question raised above. Some adaptation behaviors, such as climate-proofing housing or diversifying livelihoods, can themselves be observed relatively quickly, but whether they actually reduce vulnerability to climate change is not. Slow-onset shifts mean effects may be small in any given year, accumulate over decades, and only become measurable after a shock occurs or the shift reaches maturity, long after most studies have ended. As such, looking at the outcomes of adaptation requires study designs and funding horizons that most existing evaluations are not built for. Funders, policymakers, and researchers should treat the thin adaptation evidence as a call for longer study horizons and more patient funding.

A Note on Measurement

A prerequisite for much of the research agenda below is better measurement of climate shocks themselves. The studies reviewed in this note use a wide range of proxies, including rainfall deviation from historical mean, satellite-measured vegetation indices, self-reported flood or drought exposure, and administrative damage records, with little standardization across contexts or products. Whether a standardized survey instrument or index for climate shock exposure should be developed, and what it should include, is itself a research and measurement question that the field has not resolved.

A related measurement challenge is study design. Because climate shocks cannot be randomized and cannot be geographically contained, climate resilience research is inherently more event-driven than standard impact evaluation. The strongest designs randomize access to a financial product before a shock occurs and then measure differential outcomes when the shock hits. However, such designs require substantial advance planning, and depend on a shock materializing during the study period. How effects vary across households with different levels of exposure or vulnerability require subgroup analysis, which in turn requires larger sample sizes.



Digital Payments

- **How can digital financial infrastructure be strengthened to maintain functionality during large covariate shocks?** Agent liquidity constraints may reduce system absorptive capacity precisely when demand for transfers is highest, a structural vulnerability that household-level evaluations do not capture.
- **Does access to digital payments support sustained adaptation over longer time horizons?** How do the effects of digital financial access on household welfare persist or erode beyond the immediate post-shock period?
- **How does digital delivery improve the effectiveness of government-to-person payments in climate shock contexts, including anticipatory transfers?** How digital infrastructure specifically enables or amplifies anticipatory transfers, for instance by enabling faster disbursement, reducing transaction costs, or expanding reach ahead of a shock, remains underexplored across different hazard types and transfer sizes.
- **How does digital public infrastructure (DPI) unlock the climate-resilience potential of remittances, particularly through instant payment systems?** Non-experimental evidence suggests DPI-enabled remittance channels support climate resilience, but this has not been tested experimentally; open questions include how instant payment rails affect remittance speed, cost, and reliability during covariate shocks, and whether these effects differ from mobile-money-mediated remittances already reviewed above.

Savings

- **Do savings effects hold under covariate climate shocks?** Consumption-smoothing effects may weaken substantially when community-level savings and informal networks are simultaneously depleted.
- **How do different savings product features perform under climate and vulnerability profiles?** Commitment devices and account labeling show promising results for reducing harmful coping behaviors under idiosyncratic shocks, but none of these studies involve climate shocks.
- **How can savings products better serve women in climate-vulnerable contexts, and how can product design ensure women access the most effective tool for each type of risk?** Women's preferences for savings over other financial products may reflect real liquidity and trust constraints rather than a preference for lower-impact tools. However, savings is not inherently a lower-impact fallback; it can be the right tool for a given risk and context. How can product design help women access whichever financial tool, or combination of tools, best fits their specific needs?

Credit

- **How does credit perform across different climate shock profiles and over longer time horizons?** Whether guaranteed credit access continues to protect consumption and investment under repeated shocks, or whether repeated drawdowns erode repayment capacity, is unknown.
- **What are the impacts of credit linked to climate adaptation investments outside agriculture?** Urban informal workers and service-sector enterprises face distinct climate risks, including housing retrofits, flood protection, cooling equipment, and business continuity, but little rigorous evidence exists on whether credit financing these investments reduces climate vulnerability in non-agricultural contexts.
- **How does credit product design affect borrower welfare across full climatic cycles?** Design features such as timing and flexibility likely matter for how credit supports household welfare, but no existing study tracks full-cycle borrower welfare under repeated climate shocks or examines whether alternative repayment designs reduce vulnerability after a covariate event.

Insurance

- **Do insurance effects extend to non-agricultural climate-exposed livelihoods?** Rigorous causal evaluation of index or parametric insurance products outside agriculture is very limited. This is an important gap for extending insurance's resilience potential beyond rural contexts.
- **How can insurance products be designed to build household trust and drive adoption?** A core barrier is basis risk: when satellite and weather indices fail to capture whether a household was actually affected by a shock, trust erodes, and households disengage. Improvements to the precision of local climate shock measurement, including approaches that give households a role in verifying or reporting shocks, may be a prerequisite for other design improvements to take effect.
- **What is the relative cost-effectiveness of different insurance design features in driving adoption and resilience outcomes?** Multiple design features, including premium payment flexibility, bundling with credit and inputs, and product framing, independently shift demand and outcomes, but no study directly compares their relative returns. Whether the gains from any one feature are larger and more durable than another, and whether this varies by context or population, remains untested.
- **How can financial product design sustain adoption and engagement in years without shocks?** Evidence from Mozambique and Tanzania shows that farmers who were insured but did not experience a shock scaled back investment and disadopted insurance the following season, reflecting a broader challenge: the benefits of climate-responsive financial products only materialize infrequently, making sustained adoption difficult to maintain (Boucher et al. 2024). Unlike payments or savings, which impose no recurring cost and serve multiple purposes, insurance requires households to pay premiums during good years without knowing whether they will ever need to claim, making sustained adoption particularly difficult to maintain. How to keep households engaged with products between shock events remains an open question across product types and contexts.

Cross-Cutting Questions

- **Do financial products that reduce the short-term cost of climate shocks weaken incentives to adapt?** By lowering downside risk, financial products may enable continued investment in climate-exposed assets rather than prompting shifts in land use, crop choice, or livelihood strategy. The tension between resilience and adaptation is largely unexamined in the financial products literature.
- **How do repeated and closely spaced climate shocks change demand for financial services?** Coping strategies that work for a single event may fail when savings buffers have been depleted, informal networks drawn down, or borrowers are carrying debt from a previous shock, yet the existing evidence base is built almost entirely on single-shock designs.
- **What combinations and sequences of financial products are most effective?** Bundling evidence suggests that complementarity between products matters, but no study has tested staged progression models or compared the relative cost-effectiveness of different combinations across contexts.
- **What consumer protection standards are needed for climate-responsive financial products?** Bundled products raise particular concerns: clients may not fully understand terms, may face compounding obligations if a shock triggers both repayment stress and insurance basis risk simultaneously, and may have limited recourse when payouts are denied. Complex digital products raise concerns about pricing transparency for low-literacy users under time pressure.
- **How can regulation create enabling conditions for climate-responsive products to reach underserved populations?** Supply-side constraints include lender risk aversion in high-exposure contexts, agent liquidity constraints during covariate shocks, and the absence of regulatory incentives for anticipatory product design. Rigorous evaluation of specific regulatory and public finance interventions in this domain is scarce.

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