

MSC and The Pearl Joint Policy Note

Insurance will not close the climate adaptation gap: Here is where it can help



Financing climate adaptation for underserved households, micro, small, and medium enterprises (MSMEs), smallholder farmers, and agricultural value-chain actors

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Key messages

- **Adaptation finance faces two distinct constraints:** An unresolved funding gap and an incomplete financeability architecture. Insurance cannot address the funding shortfall, but it can help overcome some of the risk-related barriers that limit access to finance.
- **Commitments have grown, but delivery has not.** International public adaptation finance fell by approximately 7% in 2023, to USD 26 billion, against needs that the United Nations Environment Programme (UNEP) estimates at USD 310-365 billion a year for developing countries by 2035 (UNEP, 2025).
- **A six-question investability test** can separate adaptation investments that are ready for credit plus insurance from those that still belong to grants, guarantees, or adaptive social protection.
- **The biggest opportunity is likely in the private sector tier.** Inclusive financial service providers already lend an estimated USD 1.5 trillion annually to MSMEs, smallholder farmers, and actors in the agricultural value chain (MSC, 2025). Determining which instruments are appropriate for different borrowers requires disaggregation by livelihood and wealth group, rather than geography and sector alone. The Pearl applies this approach in fragile and climate-exposed settings across Africa and the Middle East.
- Insurance should be judged by its contribution to additional adaptation investment, lower losses, continued responsible access to finance, and timely and fair payouts when shocks occur.

¹ Download the pdf at: [Zenodo. https://doi.org/10.5281/zenodo.22086334](https://doi.org/10.5281/zenodo.22086334)

Consider a smallholder farmer in Bihar, India, who takes a loan to install a solar-powered drip irrigation system. The loan is repayable because reduced water and input costs, combined with more reliable production, create a credible cash-flow benefit. Science-based evidence, together with local expertise, establishes the farmer's exposure to drought risk and the benefits of adopting the irrigation system.

Additional risk-sharing mechanisms strengthen the financing case. Weather insurance covers part of the severe residual drought risk, a portfolio guarantee protects the lender against exceptional correlated losses, and public support absorbs the catastrophic layer. Insurance does not make the irrigation profitable. Instead, it protects against a defined shock that could undermine an otherwise viable repayment case.

The core issue

Adaptation finance faces two distinct challenges. First, public and concessional funding remains far below the needs identified by developing countries. (UNEP, 2025). Second, some investments that could raise income, reduce costs, or protect productive assets still cannot attract repayable finance because data, underwriting, risk-sharing, and delivery systems are weak. Insurance cannot close that funding gap, and it cannot rescue an investment that is not financially viable. However, for a narrower class of effective and financeable investments, it can transfer residual risk and help protect borrowers and lenders when climate shocks occur.

These challenges can be distinguished by asking three questions. First, who ultimately pays for the investment. This is the *funding* question. Although a loan provides money upfront, the borrower still funds the investment through repayments. Second, who supplies capital, on what terms, and when? This is the *financing* question. Third, who absorbs losses when a defined climate event occurs? This is the *risk-transfer* question.

Private finance and insurance can expand and support the financing channel and share risk. They rarely address the funding challenge because the ultimate cost still falls on households, firms, customers, or domestic taxpayers.

A decade of promises, a decade of shortfalls

Adaptation commitments have grown steadily more ambitious. Adaptation finance has barely moved.

- In 2009, COP15 established the goal of mobilizing USD 100 billion a year in climate finance (UNFCCC, 2009; OECD, n.d.). The goal covered both mitigation and adaptation but included no binding adaptation sub-target.
- At COP26 in 2021, developed countries pledged to double adaptation finance to around USD 40 billion annually by 2025 (UNFCCC, 2021), a target that is now slipping out of reach.
- At COP29 in 2024, governments agreed a new overall climate-finance goal of USD 300 billion a year by 2035, again without a binding allocation for adaptation (UNFCCC, 2024).

Although the overall USD 100 billion climate-finance goal was reportedly exceeded starting in 2022, the adaptation-specific shortfall persists. Commitments have increased, but adaptation finance has not kept pace. International public finance for adaptation has remained largely

stagnant, between USD 20 billion and USD 28 billion per year, for most of the past decade. In 2023, only USD 26 billion was available. This represented a decline of about 7% from 2022 and remained far below estimated adaptation needs of USD 310-365 billion a year for developing countries by 2035 (UNEP, 2025). The lower estimate is based on modeled costs, while the upper estimate is derived from national adaptation plans. These figures represent identified or modelled adaptation needs rather than a single public-sector expenditure requirement. In practice, private actors and households may deliver or co-finance some priorities.

The factors driving the shortfall are becoming more severe. International public adaptation finance came under strain in 2023 as governments confronted the fiscal aftershocks of COVID-19, geopolitical conflict, rising energy-security costs, inflation, and deepening debt distress. The challenge extends beyond mobilizing additional capital. Public, philanthropic, and private finance must also support adaptation effectively and reach those who need it across the Global South.

This requires identifying and removing barriers that prevent finance from reaching adaptation opportunities, including risk perceptions, high transaction costs, weak pipelines, institutional constraints, and unsuitable financing instruments. The central question is no longer only how much finance is needed, but also how available and additional capital can be directed to adaptation at scale, and how quickly this can be achieved. Without addressing these barriers, calls for more finance risk leaving many of the same communities, enterprises, and institutions behind.

The instruments we keep conflating

Much of the confusion in this debate stems from treating six distinct instruments as interchangeable. They are not. Each serves a different purpose and addresses a different challenge:

- **Adaptation investment.** Investment in assets or practices that reduce exposure or sensitivity to climate hazards, such as resilient housing, irrigation, drought-tolerant seeds, and drainage systems. These investments build resilience. The instruments below either finance or protect them.
- **Credit.** Provides upfront financing for adaptation investments and is repaid through the income, savings, or avoided losses those investments generate.
- **Insurance.** Transfers a defined residual risk from the policyholder to a risk carrier in exchange for a premium. It reduces downside volatility after risk reduction has done its work. It does not, by itself, create the cash flow required to repay a loan.
- **Guarantees.** A third party, usually public or philanthropic, absorbs part of a lender's loss if borrowers default. This changes the lender's risk calculus rather than the borrower's.
- **Anticipatory finance.** Funding released before a shock occurs, when pre-agreed forecast thresholds are reached, such as the IFRC's forecast-based financing model (IFRC Anticipation Hub, n.d.). It can use insurance-like triggers, but much of it is provided through funds or contingency funding.
- **Adaptive social protection.** A fiscal transfer rather than a market instrument. For the poorest households, and for risks that cannot be insured, it is often the most appropriate tool. No market mechanism can substitute it.

Maintaining these distinctions is important because most proposals that seek to address adaptation finance through insurance implicitly assign insurance functions that are more appropriately performed by credit, guarantees, or the public sector.

Why the private sector hesitates to invest

Global climate-finance flows illustrate the imbalance. CPI's Global Landscape of Climate Finance (CPI, 2025) tracked roughly USD 1,780 billion for mitigation in 2023, compared with roughly USD 65 billion of tracked adaptation finance, of which only about USD 6 billion, or 0.3%, came from the private sector. Private climate finance exceeded USD 1 trillion for the first time in 2023, yet almost none of it flowed to adaptation in the Global South.

More recent estimates place private adaptation finance at just USD 3.8 billion in 2024, down from USD 8.6 billion in 2023 (CPI, 2026). CPI cautions that these figures remain significantly affected by data gaps and year-to-year fluctuations in large investments (CPI, 2026).

These figures do not suggest that adaptation is inherently not investable. Estimates cited by the Zurich Climate Resilience Alliance suggest the private sector could potentially address around 15-20% of identified public-sector adaptation needs under enabling policy conditions (Waddell *et al.*, 2025). Some practitioners consider this estimate conservative. However, it should not be interpreted as meaning that 15-20% of adaptation projects are currently investable. The challenge stems from a set of distinct and potentially addressable barriers:

- Adaptation benefits are often public or shared rather than privately monetizable;
- Avoided losses can be difficult to measure and attribute;
- Investment tickets are small and transaction costs remain high;
- Borrowers face currency and interest-rate risk;
- Lenders often lack forward-looking climate-risk models;
- Adaptation assets can have uncertain collateral value;

Those who pay for investments do not always capture all the benefits;

- Some investments generate no identifiable cash flow from which debt can be repaid.

The proportion of adaptation investment opportunities that could support private finance may be considerably higher than 15-20%, particularly where investments are linked to income-generating enterprises. The critical distinction is whether an adaptation measure generates new income streams or primarily protects existing assets and income. For example, the decision to lend to support investment in a drip irrigation system that increases yields is likely to be much more straightforward than the decision to invest in resilient housing that will protect a family's shelter and health.

Capital remains scarce and expensive in many of the markets where adaptation investment is most needed. CPI identifies access to affordable, long-term, local-currency capital as a continuing constraint in emerging markets and developing economies, alongside the need for catalytic capital and better risk-return structures (CPI, 2025). Therefore, in many cases, financing depends on risk-sharing arrangements that enable capital to support adaptation on terms that both lenders and borrowers can sustain.

What insurance can and cannot do

Within that risk-sharing architecture, insurance performs a narrower and more valuable role than the claims payout it is known for:

- **Support risk transfer after adaptation investment:** Evidence and technical appraisal establish whether an adaptation investment reduces climate risk. Insurance can then transfer part of the measurable residual risk that remains after the investment. Insurance does not cover the risk that an irrigation system, resilient seed, or housing upgrade fails to deliver its expected benefit. Instead, it covers a contractually defined loss associated with a specified hazard.²
- **Improve risk visibility:** Underwriting, hazard, exposure, vulnerability assessment, and claims data, where available, can help make climate risk more visible. Regional climate-risk assessments that combine physical hazard data with livelihood and exposure information, such as The Pearl's transboundary Tigris-Euphrates Basin assessment for the UNEP, illustrate the type of forward-looking evidence base on which underwriting depends (Cornforth et al., 2026). This work also formed the basis of a case study in UNEP's Adaptation Gap Report 2023 (UNEP, 2023). Preconditions include sufficiently broad coverage, responsible data sharing, and climate-scenario models that incorporate a range of plausible futures under varying climate conditions rather than relying solely on historical losses.
- **Protecting borrowers and lenders from climate shocks:** Insurance coverage protects the balance sheets of borrowers and lenders alike. A farmer with crop insurance who experiences flooding is more likely to repay a loan, and the lender's portfolio is more likely to remain resilient. Where payouts are parametric, they can arrive fast enough to support recovery before disruption becomes a lasting loss.

A less appreciated function of insurance is its ability to support continued lending in climate-exposed areas. Roundtable participants cited Uganda, where repeated climate shocks have driven lenders and microfinance institutions (MFIs) to withdraw from high-risk areas. Recent evidence from Pakistan found that nearly half of the surveyed financial institutions (Notta and Zetterli, 2025) reduced lending in climate-vulnerable areas, and one in five had stopped lending in some of these areas altogether (CGAP and PMN, 2025). The increasing credit risk for MFIs due to climate vulnerability has been documented by MSC (2024) and Ahmed *et al.* (2025). Conventional credit appraisal can reinforce this challenge. Because it relies heavily on historical data, such as assets, income, and repayment records, it may underestimate future climate risk. At the same time, it can overlook the risk-reduction benefits of adaptation investments, leaving borrowers assessed on their current vulnerability rather than the resilience those investments are expected to create.

Continued access to finance is not always consistent with effective adaptation. In places that are becoming physically unsafe or economically unviable, subsidized insurance may perpetuate exposure, encourage moral hazard or maladaptation, or delay necessary relocation. The objective is to direct finance toward credible resilience pathways and avoid reinforcing unsustainable patterns of risk exposure.

² Adaptation standards, technical appraisal, warranties, monitoring, and verification are needed to determine whether the investment itself works.

The following table (Table 1) summarizes the role of each instrument, including who ultimately pays, who receives the payout, and who retains the residual risk. Also refer to Figure 3, which demonstrates how these instruments interact within a layered resilience stack.

Table 1: Layers of climate insurance coverage, showing who pays the premium, who receives the payout, and who retains residual risk.

Layer of cover	Who pays the premium	Who receives the payout	Who retains residual risk
Micro or retail (for example farmer or MSME policy)	Borrower (often subsidized; premium may be financed within or alongside a loan)	Borrower	Borrower (basis risk, exclusions, uncovered perils)
Meso or portfolio (lender or aggregator cover)	Lender or aggregator (cost passed into lending rates)	Lender/aggregator, with defined pass-through to borrowers	Lender (attachment points, model error)
Sovereign or macro (parametric pools)	Government, often with donor support	Government, for rapid response and adaptive social protection	The state and, ultimately, uninsured households
Uninsurable or catastrophic layer	Not insurable at viable premiums	—	Public backstops, grants, and loss-and-damage finance must carry it

The protection gap is real and is widening

The scale of the shortfall is stark. Swiss Re (Swiss Re Institute, 2026) estimates that 80-90% of catastrophe losses in emerging economies are uninsured. The protection gap is widest where climate risk is rising fastest. In 2025, natural catastrophes caused approximately USD 220 billion in global economic losses. Around USD 107 billion, or 49%, was insured. That 49% insured share is the highest on record, according to Swiss Re, but it still left roughly USD 113 billion uninsured. While 2025 set a record for the insured share of losses, uninsured losses remained substantial.

Coverage of climate risk among low-income households remains limited. The Microinsurance Network's *Landscape Study* (Microinsurance Network, 2025), covering 294 insurers across 37 countries, identified 112 climate-related products reaching 42 million people. That is a meaningful start, but it remains small relative to an overall microinsurance reach of 344 million people and an estimated 3-billion-person potential market for all forms of microinsurance across the countries studied. This leaves an 88% protection gap. Meanwhile, insurers are pulling back from high-risk markets, even in advanced economies. This trend reflects climate-related losses, rise in rebuilding costs, and regulatory constraints on pricing. For example, major insurers continue to restrict coverage in climate-exposed markets. State Farm, California's largest home insurer, has not accepted new homeowners' applications in the state since May 2023 and has initiated the non-renewal of 30,000 homeowners policies concentrated in areas of greatest catastrophe risk (State Farm, 2025). Following the January 2025 Los Angeles wildfires, the company paused pending non-renewals in the affected county (California Department of Insurance, 2025). The pause also reflects California's statutory one-year non-renewal moratorium

in declared disaster zones. More broadly, the US Treasury’s Federal Insurance Office (US Department of the Treasury, 2025) found that homeowners in the highest climate-risk ZIP codes faced non-renewal rates about 80% higher than those in the lowest-risk ZIP codes. This finding demonstrates how rising physical climate risk is already affecting insurance availability. If the world’s deepest insurance market is retreating from its own high-risk geographies, the trajectory for countries such as Bangladesh and Kenya is likely to be even steeper.

An investability test

If insurance is to help convert adaptation from a funding claim into a financeable proposition, practitioners need a disciplined way of assessing when that is realistic. We propose the screening framework presented in Table 2: an adaptation investment qualifies as a realistic candidate for credit-plus-insurance approach only if all six questions can be answered positively. Where one or more answers are “no”, the case is better suited to grants, guarantees, public investment, or adaptive social protection.

Table 2: The investability test: Six questions for screening adaptation investments for credit-plus-insurance

Test	Question
Cash-flow test	What predictable income or operating-cost savings will service financing in normal years, and how will repayment be protected during shock years?
Adaptation-effectiveness test	Is there credible, peril-specific evidence that investment reduces expected climate-related losses, without creating maladaptation elsewhere?
Insurability test	Is the remaining risk sufficiently uncertain, measurable, bounded, and transferable at an acceptable cost?
Affordability test	Can the borrower, lender, insurer, or public sponsor sustainably meet the combined cost of the investment, financing, and insurance premium?
Delivery and protection test	Are distribution, disclosure, consent, claims servicing, grievance resolution, regulation, data, and reinsurance arrangements adequate?
Additionality test	Will the insurance or guarantee generate additional adaptation investment or lending, or risk reduction measures such as broader climate adaptation and disaster risk management efforts, early warning systems, and the transfer of risk to capital markets, rather than simply protecting an existing lender portfolio?

The additionality test matters particularly for meso-level insurance. A product may protect a financial service provider’s balance sheet without reducing borrower exposure, lowering their price, expanding access, or generating any new adaptation investment.

The adaptation-effectiveness test benefits from livelihood-disaggregated evidence. Integrated climate-livelihood storyline methodologies trace plausible climate futures to the household and wealth-group level. The Pearl applies this through its integrated Climate-Livelihoods Impact Assessment Model (Inclusive Consultative Integrated Climate-Livelihood-Environment or ICICLE storylines) within the Implementation Centric Evolving Climate Change Adaptation Process (ICECCAP) framework (Wells *et al.*, 2023). These approaches are built specifically to generate the peril-specific evidence this test requires, rather than relying on aggregate or national-level risk indicators that can mask which households face the greatest exposure.

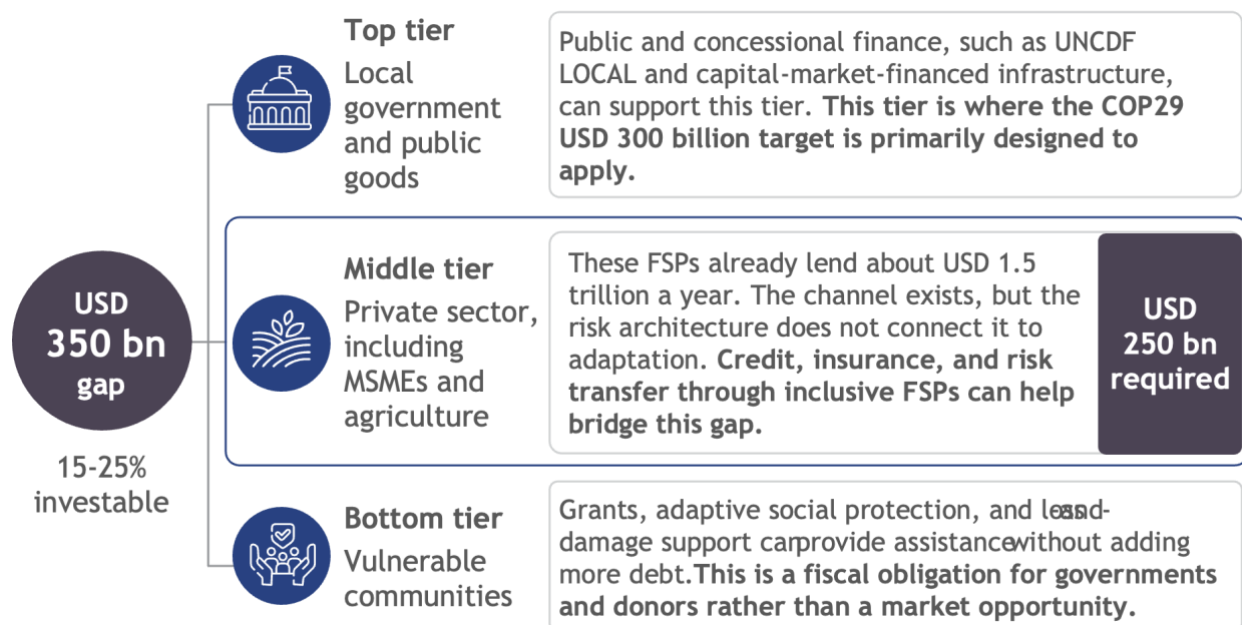
Whom this helps most: three tiers of adaptation finance

Adaptation-finance stakeholders broadly fall into three tiers, and each requires a fundamentally different solution, as shown in Figure 1.

- **The top tier:** Local governments and public goods. This includes infrastructure financed through public and concessional finance, such as United Nations Capital Development Fund's (UNCDF's) LOCAL program (UNCDF, n.d), as well as capital-market-financed infrastructure. This is the tier COP29's USD 300 billion target is primarily intended to support.
- **The middle tier:** MSMEs, smallholder farmers, and agricultural value-chain actors, where much of the unmet opportunity lies. Inclusive financial service providers already lend an estimated USD 1.5 trillion a year to this segment (MSC, 2025). The channel exists; what does not exist is the risk architecture to wire that channel into adaptation, credit plus insurance, and other risk transfer mechanisms, delivered through institutions these borrowers already trust. Identifying which borrowers within this tier can absorb which instruments depends on disaggregating by livelihood and wealth group rather than treating "MSMEs and smallholder farmers" as a single homogeneous segment. A subsistence farmer and a commercially oriented agricultural value-chain actor face different combinations of credit, insurance, and grant support, even within the same district (Mardi *et al.*, 2026).
- **The bottom tier:** The most vulnerable households, who need grants, adaptive social protection, and loss-and-damage financing rather than additional debt. This is a fiscal obligation for governments and donors rather than a market opportunity.

UNEP's *Adaptation Gap Report 2025* puts the overall adaptation finance gap at USD 284-339 billion a year, the difference between needs of USD 310-365 billion by 2035 and current international public flows of USD 26 billion (UNEP, 2025). UNEP estimates that the private sector could realistically deliver around USD 50 billion a year, roughly 15-20% of total needs, if backed by targeted policy action and blended finance. That leaves the majority of the gap, specifically the MSME and smallholder tier this policy note is concerned with, still dependent on public and concessional finance, or on private capital that has not yet found a workable risk architecture. Under current market structures, only a fraction of this potential is readily investable. Private capital can play a larger role, but doing so depends on enabling policy conditions.

Figure 1: Three tiers of adaptation-finance stakeholders and the instrument each tier requires.

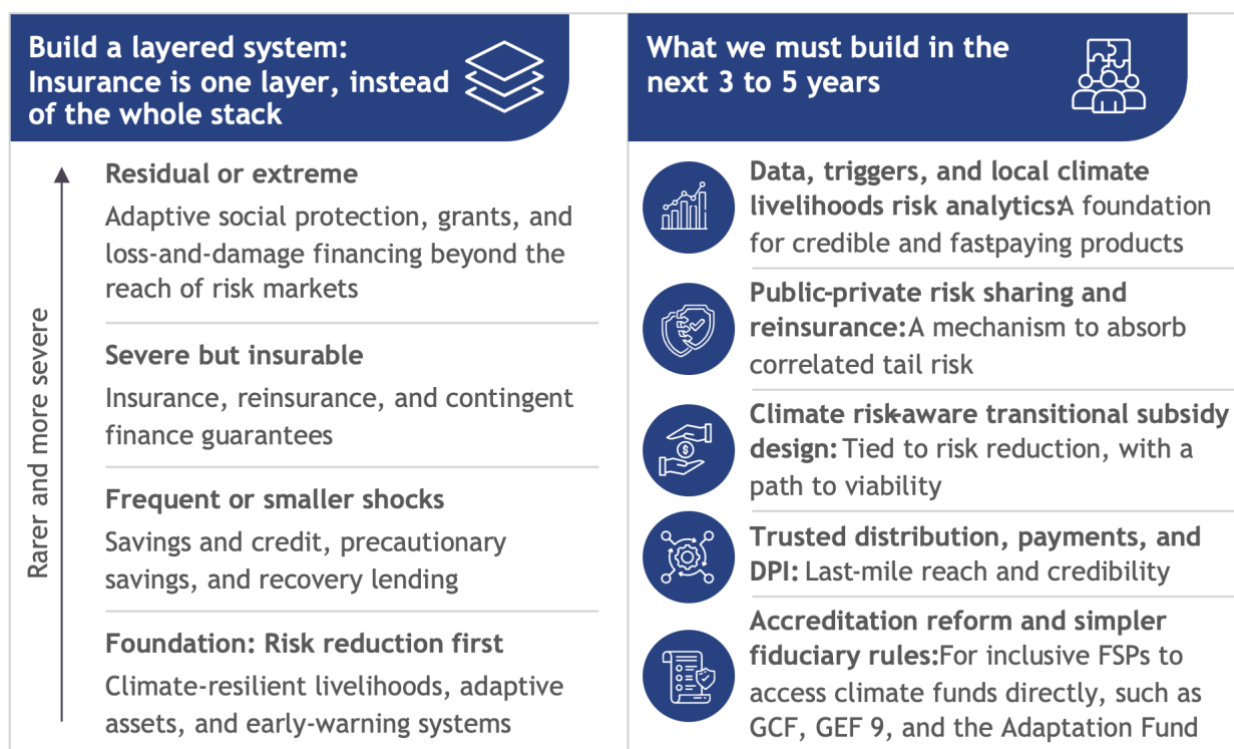


Source: Adapted from MSC (2023); estimates of USD 350 billion and USD 250 billion are based on UNEP (2025, p. 53, fig. 4.7), Adaptation Gap Report 2025: Running on Empty.

Match the instrument to the risk layer within a layered resilience stack

Insurance must also be understood within the broader resilience system. Adaptation finance ultimately seeks to build resilience to climate risk. The objective is a layered resilience system that matches each risk category to the instrument best equipped to manage it. Insurance is one layer within that system. Applying insurance to risks beyond its capacity can lead to product failure and undermine trust (Figure 2).

Figure 2: The layered resilience stack, matching each class of climate risk to the instrument suited to carry it.



Trust and affordability shape the market. Demand for climate insurance is created or destroyed by design, rather than simply by how badly people need cover. Several factors undermine trust: basis risk, where a real loss occurs but the index does not trigger; opaque triggers and slow or contested claims; premiums that are unaffordable without subsidy, compounded by poorly designed subsidies that collapse the moment they are withdrawn; and products pushed through top-down approaches rather than co-designed with users. What builds a market depends on clear triggers, fair prices, fast and visible payouts, trusted local distribution with grievance redress mechanisms, and products bundled with credit and savings so that their value is tangible.

The empirical record supports a qualified conclusion. A review of 20 randomized evaluations found that voluntary take-up of weather-index insurance at market prices was generally low, in the range of 6-18% (J-PAL, 2024). The same evidence found that bundling insurance with credit could reduce loan take-up when the premium raised the effective cost of borrowing. In one Malawi experiment, take-up of a standalone credit product was 33%, falling to 17.6% once insurance was added (Giné and Yang, 2009). Take-up improved in some contexts after providers addressed constraints related to pricing, trust, liquidity, access to credit, and product quality. For vulnerable households, the priority is access to financial services that effectively manage risk and meet their needs, with fair and timely payouts.

Design shifts, ordered by readiness

Our roundtable of climate insurance and adaptation finance practitioners converged on seven design shifts. None is unconditional, and each comes with feasibility requirements that determine whether it works in practice. We group them here by implementation readiness, rather than by how attractive they sound.

Near term

- **Protect lenders through portfolio-level risk transfer.** Climate risk is becoming lending risk. Roundtable participants cited Pakistan, Uganda, and other markets in which repeated shocks have driven lenders out of high-risk areas (CGAP and PMN, 2025). Insuring at the wholesale portfolio level, rather than on a loan-by-loan basis, keeps institutions willing to lend while also helping individual borrowers repay. However, portfolio-level coverage requires several conditions: a defined portfolio of verified adaptation lending; reliable portfolio or geographic risk data; a clear payout and loss-retention structure; a clear pass-through of benefit to borrowers; safeguards against weaker underwriting or excessive exposure concentration; adequate reinsurance or a public backstop; and evidence that insurance cover generates additional lending rather than merely subsidizing the existing balance sheet.
- **Aggregate borrowers and risks to make the economics work.** Smallholders and MSMEs are too costly to insure individually and are subject to covariant risk. Aggregation, or pooling risk across thousands or millions of clients, can cut distribution costs, improve data quality, and strengthen negotiating power with reinsurers. One Acre Fund's work is an exemplar in this context (Deutschmann *et al.*, 2025). But aggregation lowers acquisition and administration costs; it does not, by itself, reduce the underlying risk premium. It diversifies risk only if the pool differs across geography, crop, planting season, hazard, production system, and weather correlation. A large pool of identically exposed farmers represents concentration and not diversification. Reinsurance, public risk layers, and adequate insurer capital remain necessary, even for well-diversified pools.
- **Embed insurance in credit and other financial services, with strong safeguards.** Vulnerable households and small firms rarely pay upfront. Folding cover into financial services they already use spreads the cost and reduces transaction costs. This is done by embedding the premium in loan repayments or, as institutions such as UNCDF are piloting, by lending to finance the upfront premium itself (UNCDF, n.d.). The parallel is credit-life insurance, which achieved scale in many financial systems through this embedding logic. This experience demonstrates that embedding can support distribution at scale. It does not, however, demonstrate that the product is affordable, understood, valued, or fairly priced. Financing the premium spreads the payments over time and may increase the total cost of the loan. Furthermore, embedding insurance effectively and ethically requires some minimum safeguards, including transparent total cost; informed consent; a clear account of who receives the payout; cancellation and premium-refund rules; basis-risk disclosure; accessible claims information; grievance redress; and evidence that lender benefits are passed through to borrowers as better availability, pricing, tenor, or repayment flexibility. Products should also distinguish borrower insurance from lender portfolio protection and voluntary cover from mandatory cover. Agriculture and Climate Risk Enterprise (ACRE) Africa's embedding approach demonstrates this at scale, as documented by United Nations Development Programme (UNDP). Partnerships with banks and input suppliers have supported more than 540,000 agricultural loans and protected more than USD 400 million in lending across six African countries by integrating insurance directly into credit and input financing (UNDP IRFF, 2026a).

Medium term

- **Pair insurance with pre-arranged anticipatory and contingent finance.** Anticipatory finance moves resources when pre-agreed forecast thresholds are reached, which

enables households to protect assets and prepare before a drought, flood, or cyclone occurs. Standard parametric insurance does not inherently pay before an event. It can pay rapidly after an observed trigger, while forecast-based arrangements release funds before impact. Much anticipatory finance is grant- or contingency-funded, following the forecast-based financing tradition, even where insurance-like triggers are used (IFRC Anticipation Hub, n.d.). The legal basis, trigger, funding source, and financed actions differ between the two approaches (IFRC Anticipation Hub, n.d.). The evidence base is promising (WFP, n.d.). Anticipatory support can reduce subsequent losses and response costs, although the evidence remains stronger for public and meso-level mechanisms than for retail insurance products. Effective anticipatory support depends on several conditions, including reliable forecasts with low false-trigger rates; pre-agreed processes and action plans; legal clarity; and pre-positioned finance.

- **Develop public backstops and reinsurance for correlated risk.** Large, correlated portfolios still require substantial reinsurance or public risk absorption, regardless of the distribution model. These mechanisms underpin the portfolio-level and aggregation shifts discussed earlier. Uganda’s national agricultural insurance scheme illustrates the model at work: a public-private consortium of 14 insurers, differentiated premium subsidies of 30-80% according to farm scale and risk, and Swiss Re as lead reinsurer holding a 45.6% share. Together, these arrangements have expanded coverage to more than 100,000 farmers as of 2025 (UNDP IRFF, 2026b).

Experimental or long term

- **Reward adaptation through insurance pricing.** Insurance pricing today rarely reflects investments in resilience. A farmer using drought-tolerant seed or drip irrigation typically pays the same premium as one who does not. Linking demonstrated risk reduction to insurance pricing could turn insurance from a passive payout mechanism into an active incentive for adaptation. Early models already exist in the United States. California requires insurers to recognize verified wildfire-mitigation measures through premium discounts, while Alabama provides substantial insurance discounts for properties certified to resilience standards (California Department of Insurance, n.d.; Ludington *et al.*, 2025). These approaches demonstrate how measurable investments in resilience can be translated into direct financial benefits for households and businesses. This is one of the most promising ideas in the field, although evidence remains limited. Feasibility rests on four unresolved questions: measurement (can the resilience measure be verified consistently and at low cost?); causality (does it credibly reduce insured loss under the relevant hazard?); materiality (is the loss reduction large enough to support a meaningful discount?), and persistence (will the measure be maintained through the policy period?). Discounts will need to be hazard-specific and model-supported. Drought-tolerant seed does not protect against flooding, and drip irrigation provides limited protection where water supplies fail.
- **Mobilize insurers’ investment portfolios for adaptation.** Insurers are among the world’s largest institutional investors, but their capacity to finance adaptation directly is constrained by asset-liability matching, liquidity requirements, credit ratings, regulatory capital charges, currency risk, small project sizes, thin investable pipelines, long development periods, and uncertain adaptation revenues. This is a separate asset-management question from the insurance-design shifts discussed earlier. Implementation depends on enabling instruments, including aggregation vehicles,

credit enhancement and guarantees, local-currency structures, labelled resilience bonds, standardized project pipelines, and supportive regulatory frameworks.

Feasibility (see Table 3) should be assessed along three dimensions: the strength of the underlying evidence, operational readiness for delivery at scale, and the principal failure mode if the intervention is scaled too far or too quickly.

Table 3: Feasibility of the six design shifts, by strength of evidence, operational readiness, and principal failure mode

Design shift	Strength of evidence	Operational readiness	Principal failure mode
Portfolio-level risk transfer	Moderate; documented in several markets	Medium; requires portfolio data and reinsurance capacity	Weak underwriting incentives; benefit not passed through to borrowers
Aggregation of borrowers and risk	Moderate; strong on distribution cost	Medium to high for distribution; lower for true diversification	Concentration mistaken for diversification
Embedded insurance in credit	Mixed; some evidence that it reduces credit take-up	Medium; distribution channel exists, safeguards often absent	Premium raises the effective cost of credit; weak consent and disclosure
Anticipatory and contingent finance	Promising, mainly at public/meso level	Medium for public/meso; low for retail insurance	False or missed triggers; unclear legal basis for payout
Premium discounts for adaptation	Weak; largely anecdotal	Low; measurement and verification unresolved	Discount not materially effective, or not maintained through the policy period
Mobilizing insurers' investment portfolios	Weak for small-ticket adaptation	Low without credit enhancement	Regulatory capital and liquidity constraints block deployment

What must be built around the market?

Implementing the recommendations above requires some important steps to develop the market for the provision of adaptation-focused insurance:

- **Data integration, not just data generation.** Expert opinion diverged on whether data is the binding constraint. Some argued substantial climate, agricultural, and socioeconomic data already exists; others stressed persistent gaps in local-level risk assessment. There was broad agreement, however, that the larger bottleneck is integrating, sharing, and operationalizing data across sources rather than simply generating more data. This is consistent with The Pearl's experience in the Euphrates-Tigris Basin, where the underlying hazard and livelihood data were fragmented across agencies. The value came from integrating available data into a single regional and local risk profile rather than generating new primary data in a volatile and resource-constrained environment (UNEP, 2023).

- **Investment in decentralized data collection.** Much of the climate and livelihoods data needed for underwriting and appraisal, including local hazard exposure, cropping patterns, wealth-group profiles, and informal lending, is not held centrally and often does not exist at all below national or regional resolution. Integration efforts depend on the availability of local-level data. Without investment in decentralized, community-level, and district-level data collection, integration efforts have little to work with. This is a distinct gap from the platforms-and-standards question. It is a data-generation gap, specifically at the local level, even where national and satellite-derived data may be comparatively strong.
- **Policy and regulation as market-makers.** Regulators can require insurers to incorporate resilience measures into underwriting and pricing, and governments can facilitate data sharing and enable innovative risk-transfer mechanisms. UNDP's 2026 review of 14 country case studies found that agricultural insurance scales most effectively when governments act as market shapers, coordinating policy, regulation, programs, and financing around a clear public-value objective, whether led by ministries of agriculture, ministries of finance, or centralized leadership (UNDP IRFF, 2026c). Coordination across agriculture, finance, disaster management, and insurance regulators was identified as a priority as these ecosystems are still largely governed in silos.
- **Improved clarity around subsidies.** Public support is often framed as a single question: How should subsidies be reduced or withdrawn over time? It is more useful to distinguish among four forms of support that are often grouped together as subsidies:
 - **Market-building support:** Data, models, product development, systems, regulation, and technical assistance;
 - **Distribution or uptake support:** Temporary support for customer acquisition or initial premiums;
 - **Affordability support:** Continuing premium subsidies for low-income groups where social benefits exceed private willingness or capacity to pay;
 - **Risk-layer support:** Reinsurance, guarantees, or public absorption of systemic and catastrophic losses that private markets cannot absorb.

Some administrative costs may decline as markets mature and scale. Catastrophic correlated risk and structural affordability constraints may persist. The key question is which costs or risks are being subsidized, who benefits, and whether a clear public purpose justifies continued support.

Success measures: How to judge whether this is working?

Insurance products are often assessed using scale-based metrics, such as capital mobilized, lending channels, and the number of people insured. Those measures can reward products that sell policies without improving resilience. The proposal architecture described here should instead be assessed against the following outcomes:

- Additional adaptation investment attributable to the intervention;
- Change in expected climate-related loss;

- Continuity of lending before and after shocks;
- Borrower income, cash flow, and repayment performance in shock years;
- Payout speed and adequacy;
- Frequency and severity of basis-risk failures;
- Total financing and premium cost;
- Borrower understanding and consent;
- Complaints and grievance-resolution performance;
- The extent to which portfolio payouts benefit borrowers;
- Subsidy required per unit of risk reduced;
- Distributional outcomes, including for women and poorer or more exposed clients.

Adaptation insurance should be judged by its contribution to additional adaptation investment, lower losses, continued responsible access to finance, and timely and fair payouts when shocks occur.

An actor-specific implementation agenda

The task ahead extends beyond building the architecture. It is to specify who should build what over the next three to five years.

- **Governments and regulators** should establish risk-data-sharing arrangements; permit responsible product experimentation; strengthen disclosure and grievance standards; define the treatment of portfolio cover; and determine which risks merit continued public support.
- **Donors and development finance institutions** should fund data and market infrastructure, including decentralized, local-level climate and livelihoods data collection rather than relying solely on national or platform-level systems; provide catalytic capital and public risk layers; support local-currency structures; and require credible evidence of additional adaptation lending and borrower benefit.
- **FSPs and insurers** should identify narrowly defined use cases; co-design products with clients; test borrower and portfolio structures separately; disclose full costs; and establish effective claims and redress systems before scaling.
- **Researchers and standard-setters** should develop low-cost, hazard-specific evidence on which investments actually reduce expected losses and should independently assess additional lending, customer outcomes, basis risk, and subsidy efficiency. Research groups such as The Pearl are already positioned to play this role by generating livelihood-disaggregated, hazard-specific evidence through pioneering My Climate Risk methodologies, applied across fragile and climate-exposed settings, including Akkar, northern Lebanon (Cornforth *et al.*, 2026).

From instrument to ecosystem

Can insurance close the climate adaptation gap in the developing world? Not on its own, not everywhere, and not in its current form. If redesigned along the lines mentioned in this brief, such as embedded in credit with strong safeguards, applied at portfolio level, paired with anticipatory finance, aggregated across diversified pools, and backstopped by clearly

specified public support, insurance can make a meaningful share of middle-tier adaptation investments financeable.

Insurance's role in closing the adaptation gap is narrower than is sometimes assumed: to transfer defined residual risks, protect viable investments and financial institutions against shocks, and help sustain responsible access to finance where adaptation investments have a credible economic case. The next task is not to sell more standalone policies. It is to connect effective adaptation, appropriate finance, risk transfer, consumer protection, and targeted public support, and to prove that the resulting system reduces losses and improves resilience for the people expected to pay for it. Building that system is a long-term undertaking that requires action now.

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