

**Resilience-linked insurance
premium subsidies:
the “feed-in tariff” of
the adaptation economy?**

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Insurance is a proven adaptation tool, but it remains severely underused in low and middle-income countries, where affordability constraints and rising climate and nature risks are widening the protection gap. This brief argues that premium subsidies can help scale insurance uptake if they are designed to reward risk reduction. A resilience-linked approach would tie subsidy levels to measurable adaptation and resilience outcomes, helping governments, insurers, donors and supply-chain actors share the cost of protection while strengthening sovereign resilience.

About the authors

Samuel Brown

Senior Program Manager, Innovative Finance, NatureFinance

Gustavo Martins

Senior Associate, NatureFinance

Arend Kulenkampff

Lead, Innovative Finance, NatureFinance

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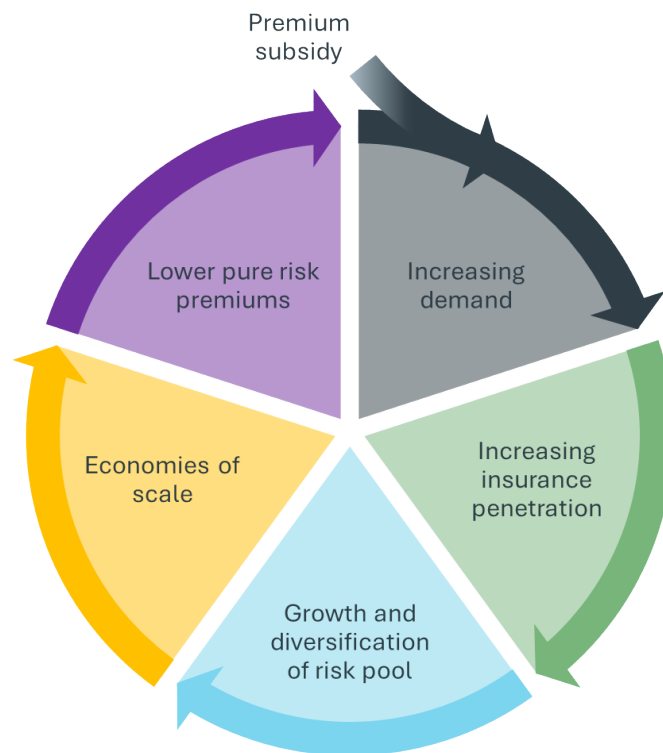
ADB	Asian Development Bank
ARC	African Risk Capacity
BMZ	German Federal Ministry for Economic Cooperation and Development
CCRIF	Caribbean Catastrophe Risk Insurance Facility
FCDO	UK Foreign, Commonwealth & Development Office
GDP	Gross Domestic Product
IMF	International Monetary Fund
KPI	Key performance indicator
KfW	German Development Bank (Kreditanstalt für Wiederaufbau)
PCRIC	Pacific catastrophe risk insurance company
SDC	Swiss Agency for Development and Cooperation
SEADRIF	Southeast Asia Disaster Risk and Insurance Facility

Premium subsidies can help turn insurance into a resilience tool

Germany's feed-in tariff for solar power providers had a profound impact on the global energy sector, creating a powerful, predictable, multi-year demand signal for solar panels. The resounding success of the policy in terms of sustaining demand and stimulating supply has spurred a search for policy solutions with similar cascade effects in other sectors such as agriculture and the adaptation economy (NatureFinance, 2024). Here we put forward one such solution: insurance premium subsidies.

The analogy works on multiple levels. In both cases, subsidies enable the state to absorb risks that the private market prices too punitively for either solar panels or insurance to scale organically. The price guarantee helps lower barriers to access faced by consumers such as utility customers and policyholders, while also mitigating underwriting risks faced by project financiers and insurers. Both solar and insurance uptake benefit from flywheel effects, whereby demand stimulus from the subsidy generates economies of scale, for example, due to deeper and more diversified risk pools that lower prices and lift uptake (Figure 1). Ideally, market penetration reaches a point where growth becomes self-sustaining and the subsidy can be withdrawn without undermining demand.

FIGURE 1

How premium subsidies can create an insurance flywheel

Source: Authors

Like solar panels for climate mitigation, insurance is a proven adaptation and resilience solution with a long record of managing physical risks and smoothing economic volatility. Agricultural insurance, spanning both agricultural property protection (for example, crops, livestock, equipment, etc.) and revenue or yield-based covers, is especially important in the context of worsening climate and nature-related shocks. These have the potential to trigger destabilising output losses, balance-of-payments pressures, and political and food security risks. Insurance incentivises ex-ante risk reduction by policyholders and speeds up post-disaster recovery, lessening the fiscal burden on governments during times of crisis.

For those in low and middle-income countries that lack adequate buffers to cope with sizable “contingent liabilities” or fiscal space to invest in adaptation and resilience measures, premium subsidies act as a quasi-macro insurance policy. Claims paid out by insurers are savings on disaster relief and recovery, while rapid financial relief softens the hit to economic growth and fiscal revenues. Insurance has significant positive spillovers for economic development more broadly, from increasing risk appetite and entrepreneurial activity to lubricating trade, commerce and lending.

Confronting the crisis of insurability

Despite these benefits, insurance penetration is exceedingly low across governments, firms and households in low and middle-income countries, while the use of disaster risk finance by their governments is exceptionally rare. The reason is both structural and behavioural. There is a well-established empirical relationship between GDP per capita and insurance penetration, with premiums as percentage to GDP growing slowly at low levels of income, accelerating at around the US\$10,000 marker, and then stabilising as economies mature (Enz, 2000). The lack of disposable income is compounded by cognitive biases that discourage insurance purchases, for example recency bias (over-weighting the importance of recent experiences), present bias (prioritising immediate rewards over future ones) or optimism bias (believing that one is less likely to experience a negative event compared to others). The same biases also influence policymakers' decisions over whether to undertake disaster risk finance or insurance, as does the political calculus that premium payments represent an immediate and certain budgetary cost, while payouts are stochastic in nature and may ultimately benefit successor administrations.

Climate change and nature loss are likely to widen the already massive protection gap in low and middle-income countries.

Climate change and nature loss are likely to widen the already massive protection gap in low and middle-income countries. Increasing losses will force insurers to raise premiums and cut exposure to high-risk areas, placing insurance even further out of reach of vulnerable populations who need it most urgently. As the insurance market retreats or fails to gain traction, governments are forced to step in as insurers of last resort. Expenditures on disaster recovery that might otherwise have been indemnified by the private sector are on top of adaptation and resilience investments for critical upgrades to infrastructure. As fiscal burdens and sovereign contingent liabilities mount, capital markets will increasingly price climate and nature risks into sovereign financing, driving up borrowing costs and further compressing fiscal space. This vicious cycle may culminate in widespread sovereign debt distress or even default in countries with precarious public finances.

Premium subsidies directly address the affordability barrier

Among the policy interventions to foster insurance and break the fiscal doom loop, premium subsidies directly tackle the affordability barrier by immediately reducing the out-of-pocket cost for the insured. The majority of agricultural insurance programs are subsidised (Hazell et al 2017). The cost to governments is estimated conservatively at around US\$20 billion per year globally (Hazell et al 2020), with an average subsidisation rate of around 50% (Meyett et al 2017). This is a small fraction of the more than US\$600 billion spent annually on agricultural subsidies (Damania et al 2023). Their potential to stimulate demand has been demonstrated by Brazil's Rural Premium Subsidy Program, which has been instrumental in driving uptake of crop insurance as well as pioneering KPI-linked incentives (Box 1)(Lavorato et al 2019).

BOX 1

Brazil shows that subsidy budgets can make or break insurance uptake

Brazil's Programa de Subvenção ao Prêmio do Seguro Rural, established in 2003, has been a pillar of national agricultural policy and a major driver of rural insurance demand. The federal government pays a percentage of the premium directly to the authorised private insurers on behalf of the farmer, while the insurers bear the underwriting risk and responsibility for distribution and claims management.

For much of the program's history, the subsidy was heavily concentrated in multiple peril crop insurance for large-scale soy and corn producers in the Midwest of the country. This had the effects of incentivising conventional farming practices and curtailing access by smallholder producers, especially in the North and Northeast, for whom indemnity-based products are generally unavailable (Souza et al, 2022).

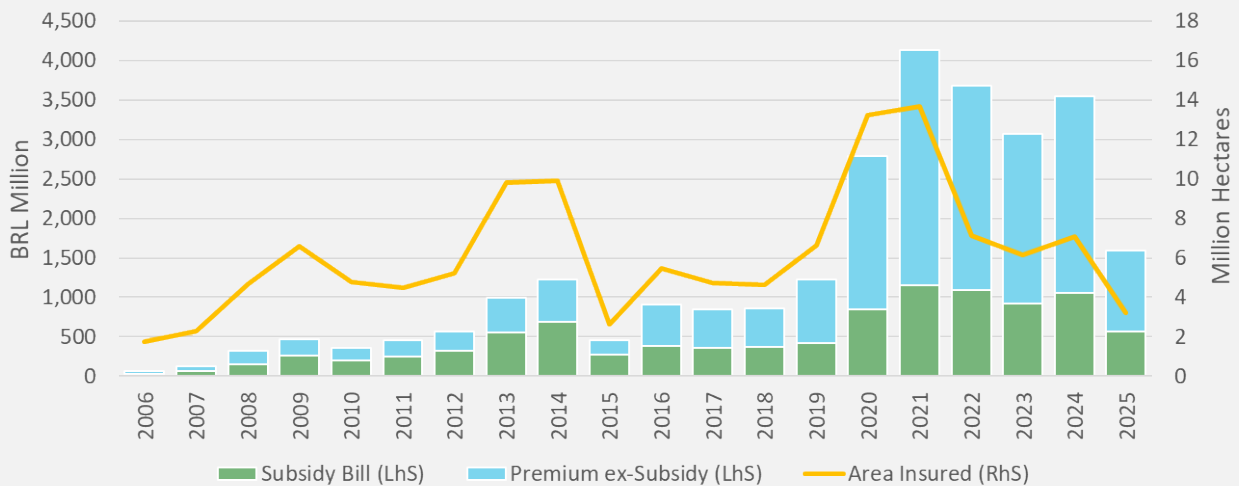
To address these gaps and distortions, the government has started piloting a performance-linked subsidy that is tiered by crop and linked to sustainable land use key performance indicators (KPIs).

As of 2024, the Rural Premium Subsidy Program applies a 40% subsidy to all crops except soy, which is subsidised at 20%. These rates rise to 45% and 25% respectively if the producers follow low-carbon agricultural practices. Furthermore, the Ministry of Agriculture and Embrapa launched a pilot, the Agricultural Climate Risk Zoning by Management Levels, which classifies plots into four management levels using six technical KPIs, including soil calcium content, period without tillage, presence of straw coverage and crop diversity (Redação Digital, 2026). The pilot remains small in scale (around R\$1 million for soy and R\$1 million for second-crop maize in 2026), with subsidies of up to 50% reserved for producers in the highest management levels of second-crop maize under the expanded second phase (CGSR, 2026).

Rural insurance coverage has moved in sync with the program’s budget allocations, although the cost of the unsubsidised portion still has a significant bearing on demand. For example, the subsidy bill more than tripled between 2018 and 2021 on the back of a deliberate policy push to promote the program (Figure 2). The number of policies written and areas insured jumped by equal measures, peaking in 2021 before subsequently falling amid higher premium charges for severe losses during 2021/2022 La Niña drought, softening commodity prices and more recently budget cuts in 2025.

FIGURE 2

Brazil’s rural insurance uptake has closely tracked subsidy funding



Source: Ministério da Agricultura e Pecuária

Even at the peak, the Rural Premium Subsidy Program coverage was a small fraction of the overall area under cultivation – approximately 5% in 2024, according to MapBiomass. For soybeans it is slightly higher at 12%, yet well below rates of around 60% in the US (USDA RMA, 2024). This shallow penetration largely reflects the limited budget allocated to the program, which at ~R\$1 billion in 2024 represented a mere 0.25% of the annual subsidised agricultural credit envelope under the Plano Safra.

The reason why the Rural Premium Subsidy Program is underfunded is partly explained by public accounting rules: it is a rare discretionary line item in Brazil's federal budget in which over 90% of expenditure is mandatory, making it a soft target during periods of fiscal consolidation. Accordingly, the large fluctuations in the premium subsidies and by extension rural insurance coverage coincide with periods of budget tightening. Ironically, the Rural Premium Subsidy Program's small size means that the contribution to headline fiscal savings is immaterial, yet the impacts on the agricultural insurance market are significant.

BOX 2

How Uganda is using premium subsidies to expand agricultural insurance access

Uganda's Agriculture Insurance Scheme was launched in 2016 with the aim of improving affordability for smallholders, encouraging commercial bank lending to the sector and, more broadly, boosting agricultural productivity and output. The program's architecture mirrors the public-private partnership structure of Brazil's Rural Premium Subsidy Program. In this case the government covers 30% for larger farmers, 50% of premiums for smallholders and 80% for producers in high-risk regions. These are paid directly to the 13 licensed insurers forming the Agro Insurance Consortium. Parametric coverage is more prevalent than in Brazil, reflecting the predominance of smallholders and multi-harvest crops such as coffee, bananas and cassava (Insurance Regulatory Authority of Uganda, 2022).

Uganda's program has expanded significantly since its inception: coverage grew from 45,700 farmers in 2017 to 772,000 by 2024, and the government has committed to reaching 3 million farmers by 2027 (UNDP, 2025). Whether it achieves that target will again depend on the availability of funding, which as in Brazil is a hard budget constraint. The annual subsidy bill is approximately UGX5 billion (US\$1.3 million), less than 1% of the UGX1.8 trillion agro-industrialisation program (Ministry of Finance, Planning and Economic Development, 2025). Plans to triple the subsidy allocation have been proposed but remain uncertain, and would likely not be sufficient to increase low renewal rates (Insurance Regulatory Authority of Uganda, 2024).

Premium subsidy schemes can also be inefficient or even maladaptive from an adaptation and resilience standpoint if they are poorly designed. This is true for most agricultural subsidies analysed in a global study by the World Bank, which showed that pricing interventions often distort production and harm the environment (Damanian et al., 2023). To avoid reinforcing those patterns and ensure that premium subsidies are efficient, scalable, productivity and resilience enhancing, the following five issues should be addressed:

- 1. Moral hazard:** Having less “skin in the game” may encourage the insured to act in ways that increase physical hazards, such as doubling down on unsustainable land use practices, or the subsidies may themselves incentivise maladaptive behaviour, as when they encourage short-term crop yield maximization.
- 2. Macro-criticality:** If the subsidies and underlying insurance do not target high-risk sectors or cover sufficient territory, then they may not meaningfully reduce government’s ex-post disaster spend, undermining the justification for the ex-ante subsidy spend.
- 3. Affordability gaps:** If the unsubsidised portion of the premium is still prohibitively expensive for certain beneficiaries, such as low-income segments, for example, smallholder farmers, then uptake may not increase in response.
- 4. Supply-side constraints:** If the policy-induced demand is not met by sufficient supply from private or public insurers, i.e., supply is inelastic, then the subsidies can prove distortionary.
- 5. Budget constraints:** If the government lacks the resources to fund the subsidy program, or if the adaptation and resilience gains are not recognised by creditors and ratings agencies, then the program can undermine public finances.

Five design principles for resilience-linked premium subsidies

Each of these design challenges can be largely overcome with certain tweaks to the subsidy program design in addition to complementary enabling policies and modifications to how sovereign risk assessments treat premium subsidies. The following list lays out five core principles to meet the design challenges of effective subsidy schemes.

Design principle 1.

Link subsidies to measurable risk reduction

To mitigate moral hazards, the subsidies can be linked to actions by the insured that produce demonstrable risk-reductive outcomes and avoid maladaptive use of proceeds. Subsidisation rates would vary based on performance across a set of predefined targets tracked by KPIs. For this to work, the claims of reduction in hazards must be backed up by sound science and amenable to robust measurement, reporting and verification, while the outcomes should be both feasible and ambitious for the insured to achieve.

Regenerative farming is one example of risk-reductive interventions in the agricultural sector, which include practices such as no-till farming, intercropping and agroforestry. Research shows that, over time, regenerative practices can deliver comparable or superior outcomes to conventional farming in terms of overall farm economics, taking into account by-crop revenues and lower input costs, as well as stronger resilience to adverse weather events.(McKinsey, 2024).

However, transitioning to regenerative practices, for example, buying shade tree saplings and waiting for them to grow can be relatively costly, lengthy and uncertain. Premium subsidies alongside other incentives can help to compensate farmers for the transition costs and dissuade them from reverting to conventional practices in reaction to catastrophic events. The subsidies can be reduced once the transition is complete and the resilience gains have crystallised, or withdrawn entirely if the premiums have fallen enough to become affordable.

Design principle 2.

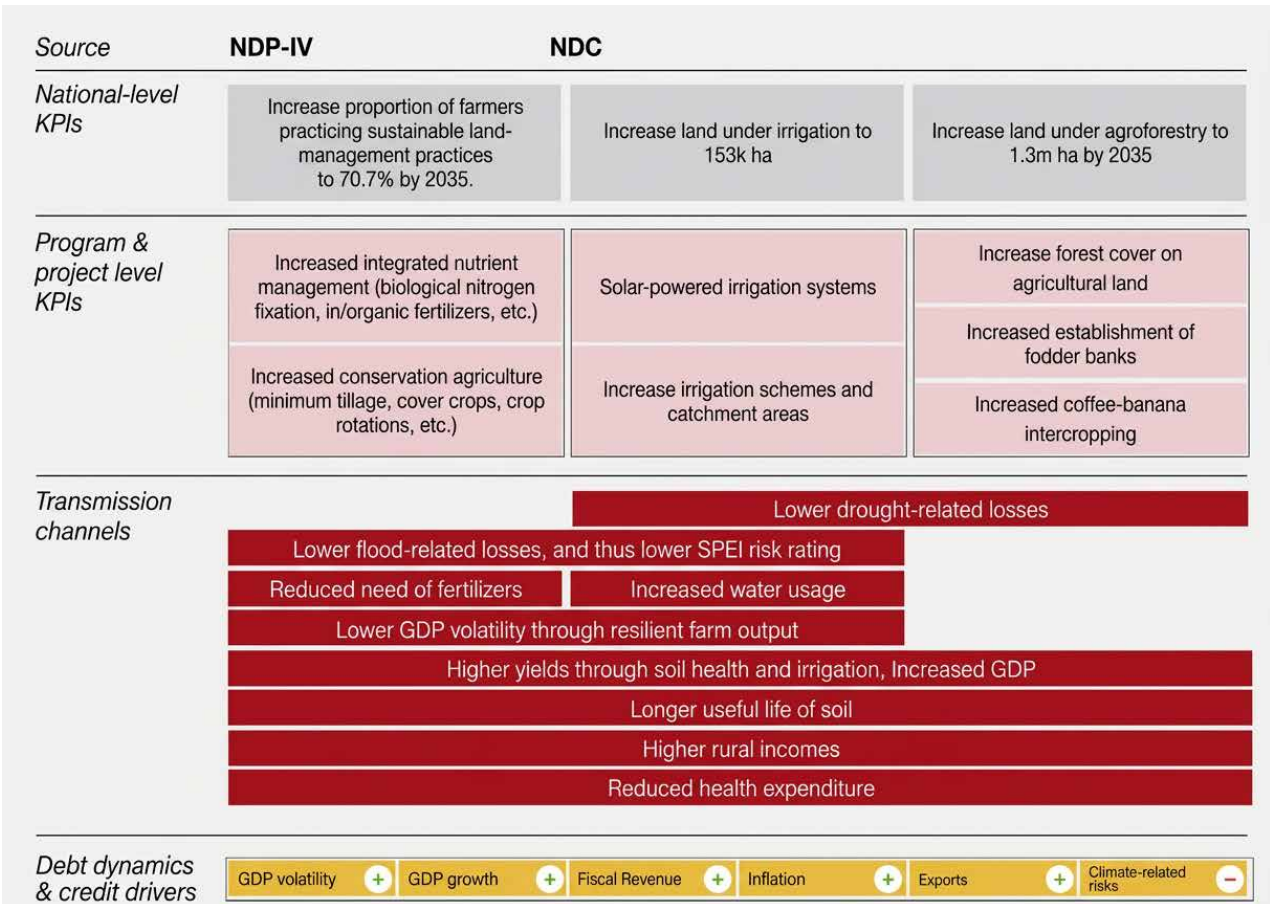
Choose KPIs that are financially material

To ensure that the subsidies deliver meaningful adaptation and resilience gains, the program should focus on macro-critical sectors that are highly exposed to physical climate risks and the KPIs should target effective de-risking interventions. This will help to ensure that the fiscal savings from avoided disaster spend exceed the premium subsidy bill. If the interventions reduce contingent liabilities for the sovereign and improve other macro-fiscal variables (for example, by reducing GDP volatility, boosting exports, etc.), then the program will also be credit positive for the sovereign's risk profile.

Agriculture is macro-critical in many low and middle-income countries and regenerative farming practices are a proven adaptation and resilience intervention. For example, Uganda has been working with the Coalition of Finance Ministers for Climate Action and a consortium of technical partners including NatureFinance on modelling the macro-fiscal impacts of their climate smart agro-industrialisation strategy in terms of the sovereign credit and debt sustainability profile. Preliminary findings have indicated that interventions such as agroforestry can generate meaningful improvements in the country's public debt dynamics and rating sensitivities. The exercise looked at several on-farm adaptation and resilience interventions aligned with the countries' national development plan and nationally determined contributions, including agroforestry coffee for export. Figure 3 lays out the linkages between policies at the national level, KPIs tracking project and program execution, and the transmission channels that connect them to credit drivers and debt dynamics.

FIGURE 3

How adaptation KPIs can link project outcomes to sovereign credit drivers



Source: NatureFinance, Systemiq, London School of Economics, Teal Insights

Design principle 3.

Share costs across public, private, and philanthropic actors

The subsidy bill may need to be split between the government and third parties such as development institutions or philanthropy if the remaining portion is still too expensive for the beneficiaries or because the governments lacks budget or institutional capacity to carry it alone. Whatever the reason, such a public-private co-financing arrangement has the benefit of sharing the risk and financial burden of the program while also opening another route to deliver adaptation and resilience funding into exposed sectors and countries.

For any party subsidising a policyholder's premium, the policyholder's business continuity carries direct financial relevance and materiality — and that supporting it ultimately generates a tangible benefit for the subsidising party itself. For example, for governments or businesses that source inputs from insured producers covered by the program, participating as “outcome payers” can be an effective strategy to bolster the resilience of their supply chains. They can encourage their suppliers to implement regenerative practices and support recoveries that minimise interruptions to their operations.

Design principle 4.

Build the market infrastructure insurers need to respond

The success of a subsidy scheme depends on whether the policy-induced demand stimulus can be accommodated by supply from private or public carriers. This requires more than just a willing buyer; it necessitates supply-side policies and regulations that allow carriers to increase capacity and admit new entrants, as well as enabling market infrastructure. The former includes a combination of reforms and interventions such as reducing and optimising premium taxes; premium subsidy passthrough rules; easing licensing and market entry requirements; shifting from rigid prescriptive solvency capital requirements to risk-based supervision; loosening product bundling, authorisation and pricing regulation; and facilitating cross-border reinsurance. Admittedly, enacting these will take time and confront resistance from vested interests. Yet the recognition of insurance as a matter of sovereign finance (see design principle #5) should elevate these supply-side measures in the government's list of policy priorities.

Facilitating cross-border reinsurance will be key to unlocking local underwriting capacity since most low and middle-income country insurance markets are too small and concentrated to form an adequate risk pool for global reinsurers. Ceding some of the risks to the international market would allow local carriers to write more coverage in response to subsidy-induced demand. But regulation often hampers cross-border reinsurance purchases for several prudential reasons; in low and middle-income countries with thin foreign exchange reserves, restrictions are also a way to limit capital outflows.

Enabling market infrastructure includes access to data (for example, loss experience databases, catastrophic exposure registries), actuarial models that enable accurate pricing, and distribution channels that deliver insurance to the target beneficiaries. The latter typically rely on digital financial inclusion solutions designed for underbanked segments of the population, many of whom operate in the informal sector and have limited financial literacy. “Inclusive insurtech” and meso insurance leverage technologies such as mobile money, digital ID, and streamlined underwriting using data science and artificial intelligence. In the agriculture finance space, this suite of solutions is known as the “agri stack.”

The broader policy initiatives and upgrades to market infrastructure should align with the aims and approaches of the premium subsidy scheme. Otherwise, they run the risk of working at cross purposes. For instance, the US Farm Credit system relies heavily on federally subsidised crop insurance to collateralise working capital loans for farmers, yet the coverage terms and pricing have been designed to incentivise short-term yield maximization and the cultivation of commodity row crops (The Rockefeller Foundation, 2024).

Design principle 5.

Reflect resilience gains in sovereign credit assessments

Premium subsidies that fulfil the above criteria can have a net positive impact on the fiscal accounts if the ex-post savings exceed the pre-ante rate subsidy and reduce sovereign contingent liabilities. The fiscal space that these savings create can be used to cover public assets or disaster relief and recovery in hard-to-protect areas or to fund adaptation investments. These adaptation and resilience gains should also be reflected in sovereign credit assessments performed by international financial institutions, foreign investors and credit rating agencies, provided they can be demonstrated with robust measurement, reporting and verification and credible modelling. In other words, resilience-linked premium subsidies should be recognised as credit positive by market actors and rewarded accordingly in sovereign risk pricing.

Resilience-linked premium subsidies should be recognised as credit positive by market actors and rewarded accordingly in sovereign risk assessments and pricing.

For low and middle-income countries whose agriculture sectors make up a large share of GDP and that rely heavily on soft commodity exports, the “credit uplift” from transferring a share of the catastrophic risk to re/insurers can be material. A study by NatureFinance on the forestry sector in Ghana illustrates this point. It showed how investments in regenerative agriculture in the forestry sector can lift the sovereign’s credit rating and improve the debt trajectory, reversing the prior trend where degradation of soil quality under conventional full-sun cultivation contributed to the country’s sovereign debt crisis (NatureFinance, 2025).

Integrating insurance into sovereign risk assessments

There is an asymmetry at the heart of sovereign credit assessment: whereas climate and nature risks are increasingly being priced into sovereign bond yields, credit ratings and public debt sustainability analysis, the macro-critical gains from adaptation and resilience investments are largely omitted, understated or treated in an ad hoc fashion. This can have the effect of exaggerating the exposure faced by the sovereign and discouraging investments in adaptation and resilience since they typically appear only as current expenditures in the government budget and a potential driver of debt accumulation.

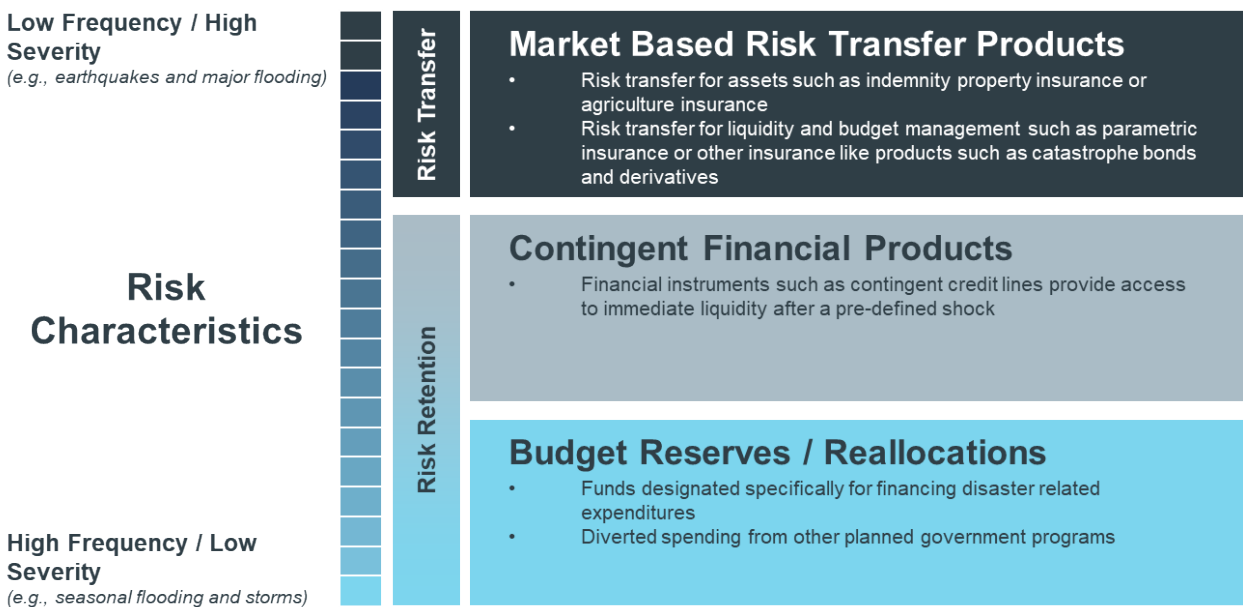
Premium subsidies are one instance of that asymmetry. In effect they function like an insurance policy for the sovereign since the contingent liabilities related to the covered perils are transferred to the private sector. However, neither the de-risking nor the macroeconomic knock-on effects such as smoother GDP and price volatility; spillovers on investment, etc. are adequately captured in the risk frameworks and rating models, whereas the costs of the subsidies are. Therefore, if a government chooses to ramp up spending on subsidies to hedge itself against climate and nature risks, that would likely be mechanistically penalised by the credit models.

There are practical fixes to correct this asymmetry, involving adjustments to quantitative and qualitative parameters in the prevailing sovereign risk models and frameworks. That means improvements to the GDP growth and inflation forecasts plus reductions in estimates of contingent liabilities, as well as changes to qualitative inputs such as institutional strength and political risk. This would capture the positive impact of regenerative agriculture and insurance on food security, which attenuates the threat of civil unrest and political instability. For completeness, the qualitative analysis should also account for the enabling policies, institutions, and infrastructure mentioned above, including with penalties for when a country scores poorly on these measures.

Disaster risk finance can also reward resilience

The logic of KPI-linked premium subsidies can also apply to disaster risk finance at the sovereign level; in this case, bilateral or multilateral donors and philanthropies help to defray the cost of macro insurance policies or catastrophe bonds (cat bonds). These are insurance policies taken out by central, state or local governments against large-scale perils such as earthquakes or pandemics. They are almost always parametric rather than indemnity based (i.e., payouts are triggered by an index rather than assessed losses). They form the top of the risk layering stack (Figure 3), covering high severity, low frequency events.

FIGURE 4
Where disaster risk finance fits in the sovereign risk toolkit



Source: World Bank

The toolkit of disaster risk finance solutions has grown over the years and been fine tuned to address the unique challenges faced by governments. Explicit and de facto subsidies are common. For example, donor agencies of the Swiss (SDC), German (BMZ and KfW) and UK (FCDO) have been offering premium subsidies for variety of disaster risk finance schemes including the sovereign catastrophe risk pools – African Risk Capacity (ARC), Caribbean Catastrophe Risk Insurance Facility (CCRIF), Pacific Catastrophe Risk Insurance Company (PCRIC), and Southeast Asia Disaster Risk and Insurance Facility (SEADRIF).

In May 2026, the Asian Development Bank (ADB) issued US\$80 million three-year disaster relief bonds for the Kyrgyz Republic and Tajikistan covering earthquake and extreme precipitation. The ADB and Asia Pacific Climate Financing Fund are paying part of the premium, while the Singapore Monetary Authority is covering much of the structuring costs (Asian Development Bank, 2026).

Despite signs of decent demand for the ADB offering, cat bond issuance is relatively rare. The global market for insurance-linked securities is around US\$50 billion, of which sovereign catastrophe bonds outstanding are below US\$2 billion (Reitmeier et al, 2025). The sovereign risk pools (CCRIF, ARC, PCRIC, SEADRIF) make up around US\$1-2 billion, and the contingent credit lines from development banks amount to less than US\$10 billion. These are paltry sums compared to the climate insurance protection gap estimated at over US\$123 billion in the US and EU alone (WWF Switzerland, 2026).

The reasons for the muted uptake are many of the same barriers faced by insurance at household and firm levels. Add to that the complexity of disaster risk finance structures and the problem of basis risk, which is when parametric triggers fail to fire during an event because certain attachment thresholds have not been breached even though losses have occurred. This happened to Jamaica's cat bond in 2025 when Hurricane Beryl passed a mere 15 km outside of the trigger grid and central pressure readings were only 10 millibars below the thresholds. As a result, an estimated payout of US\$45 million did not occur to cover the US\$354 million of losses reported for the hurricane (n.b., the bond did eventually trigger under Hurricane Melissa a year later) (World Bank Group 2025). Such incidents undermine trust and political appetite for parametric solutions. Crucially, parametric triggers do not by themselves incentivise investments in adaptation and resilience since the payouts happen regardless of whether the government is taking action to narrow the protection gap.

As in the domestic insurance market, KPI-linked premium subsidies have the potential to boost demand for disaster risk finance and loosen some of the supply-side constraints. A government purchasing disaster risk finance is structurally a policyholder facing the same affordability, basis-risk and institutional barriers as a farmer. The five design principles apply directly at the sovereign scale, while producing a slightly different flavour in this context.

KPI linking: Modulating subsidies in line with performance on adaptation and resilience targets creates incentives for insured governments to invest in risk reduction. For indemnity-based instruments, the lower loss experience reduces the claims against the policy following an event; for parametric instruments, it mitigates the fallout of basis risks. KPI-linking also provides incentives to ensure that payouts are directed towards relief and reconstruction aligned with adaptation and resilience targets such as climate-proof infrastructure since these also generate higher premium subsidies at renewal.

Financial materiality: Picking adaptation and resilience KPIs that target macro-critical sectors reinforces the prior point, while also ensuring that the positive macro-fiscal impacts are visible in sovereign risk modelling. Indeed, the KPIs for a disaster risk finance solution could be aligned with those at the program level – farmers implementing regenerative practices receive subsidised insurance from the government for outcomes at the farm level. The government, in turn, receives cheap or free disaster risk finance based on the cumulative effects of farmers' actions. Conceivably, the disaster risk finance KPIs could even target the implementation of premium subsidies at the national level. For instance, disaster risk finance subsidies would rise in line with the national scheme's coverage. This could strengthen commitment to the scheme and help to further defray some of its costs.

Public-private partnerships: Just as corporates benefit from de-risking their supply chains at the farm level, so too could they benefit from de-risking at the sovereign level. The former mitigate idiosyncratic risks of individual producers or collectives, whereas the latter cover systemic risks at the sector level. In a similar vein, donor countries can deploy disaster risk finance subsidies to manage strategic supply chain risks for their respective economies, especially where they rely on soft commodities for industrial production (for example, cocoa in Switzerland) or food security (for example, soya in China).

Institutional readiness: Access to disaster risk finance and membership in sovereign risk pools requires effective fiscal risk and public financial management institutions to ensure that payouts are deployed efficiently, productively, and transparently. KPI-linked subsidies can aid in this regard by providing a robust performance-based framework for identifying and tracking disbursements, and an added financial incentive to ensure that they generate the desired outcome.

Fiscal space: Both the quality of disaster risk management institutions as well as the disaster risk finance arrangements themselves should be factored into sovereign debt sustainability and credit analysis as fiscal buffers against catastrophic shocks. However, the current credit rating agencies' methodologies and World Bank/IMF debt sustainability analysis framework do not reflect them in a consistent or systemic fashion. Disaster risk modelling scenarios and estimates of contingent liabilities must reflect the ex-post revenue injections from disaster risk finance payouts as much as the ex-post fiscal savings from premium subsidies. This should improve risk perceptions and ideally financing terms for sovereigns that have committed to credible adaptation and resilience objectives.

Subsidies are not a silver bullet, but they may be indispensable

Premium subsidies have significant but under-utilised potential to strengthen the adaptation and resilience profile of low and middle-income countries. Using them as part of a big push to deepen insurance penetration could have the same cascading effects as the feed-in tariff for solar energy, provided that the schemes are designed in such a way that incentivises physical risk reduction. The KPI-linking approach can help in that regard. Embedding financially material KPIs can help to mitigate moral hazard and improve fiscal outcomes, while attracting additional co-financing from downstream supply-chain actors. Integrating these benefits into sovereign risk analysis and credit assessments will help to galvanise governments to institute and scale such schemes alongside complementary supply-side reforms and infrastructure upgrades. The potential credit uplift for sovereigns will be even greater if a similar KPI-linked approach is taken with disaster risk finance.

Subsidy schemes are not a silver bullet. As the World Bank notes: "subsidised insurance is best seen as a way to handle some of the residual risk after other and more cost-effective measures have been taken to reduce farmers' exposure to production risks" (Hazzel et al, 2017). Those complementary supply-side measures are necessary, yet they are not sufficient to unlock demand in low and middle-income countries where disposable income is a binding constraint. Financial support is indispensable to ensure the flywheel takes effect.

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