



#04 ■ December 2008

Climate Change: What Role for Insurance?

Experts expect climate change to affect not just average temperature, but also weather variability and extreme weather events.

The effects, including economic and human losses, impose a disproportionate burden on vulnerable developing countries.

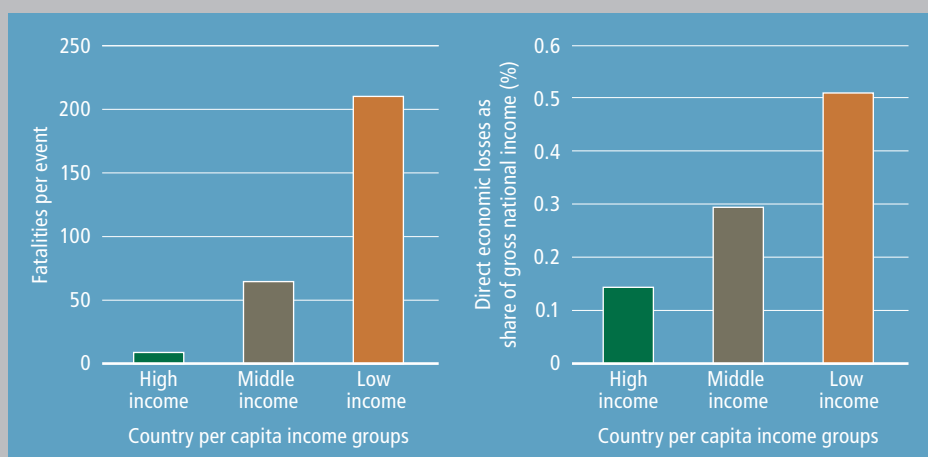
How can insurance, including public–private arrangements with international support, play a role in helping vulnerable countries adapt? This Policy Brief offers practical guidance to policymakers shaping the post-Kyoto adaptation strategy.

Key Points

- Natural disasters cause more deaths in low-income countries than in middle-income and high-income countries combined. Disasters also impose a greater economic burden, relatively speaking, on vulnerable developing countries. Lack of resources means such countries struggle to recover from disasters, exacerbating poverty.
- Climate change is expected to increase weather variability and extreme weather events particularly affecting developing countries. The UN Framework Convention on Climate Change recognizes the unfair burden and obliges developed countries to assist vulnerable countries.
- Although not a panacea for adapting to climate change, insurance instruments offer substantial benefits for low-income countries, both to reduce their vulnerability to weather variability and adapt to climate change. The Bali Action Plan calls upon policymakers to consider insurance as part of an adaptation strategy.
- Insurance enables vulnerable countries to exercise their “rights” to reliable, dignified post-disaster relief without sacrificing self-respect; it can contribute to reducing poverty by providing the pre-disaster security necessary for taking risky, high-return, investments.
- Novel risk-sharing arrangements, such as index-based insurance, can also strongly encourage countries to invest in preventive measures, since claims depend on a physical trigger and not on actual losses.
- Due to the large capital-reserve requirements, the costs of insuring against natural disasters are high. Donor support makes insurance affordable and is also a winning strategy for development organizations: it provides them a secure planning horizon, leverages tight humanitarian budgets, and creates incentives for reducing losses and ultimately the need for post-disaster aid.
- Although supporting insurance with price-distorting subsidies is problematic, it is possible to design “smart subsidies” that respond to failures in the market and which are far preferable to the alternative—providing *ad hoc* post-disaster assistance.
- A global mechanism for supporting pro-poor insurance as part of a post-Kyoto adaptation strategy could provide affordable security at a lower cost by pooling national insurance programs.

Figure 1

A disproportionate share of the human and economic burdens from natural disasters (1980–2004) falls on low-income and lower middle-income countries. (Source: IIASA calculations based on Munich Re, 2005)



How are developing countries affected by weather variability and extremes?

Over 95 per cent of deaths from natural disasters in the last 25 years occurred in developing countries. Direct economic losses (averaging US\$ 50 billion per annum in the last decade) were more than twice as high in low-national-income countries as opposed to high-income ones (Figure 1). According to the United Nations International Strategy for Disaster Reduction (ISDR), more than three-quarters of recent economic losses can be attributed to windstorms, floods, droughts, and other climate-related hazards, and the Intergovernmental Panel on Climate Change (IPCC) has predicted that climate change will magnify these losses because of increasing weather variability.

Moreover, *indirect* losses that arise from the long-term consequences of disasters on economic development can greatly amplify the *direct* economic and human losses. Many highly exposed developing countries cannot fully recover by simply relying on limited external donor aid. In turn, external investors are wary of the risk of catastrophic infrastructure losses, while small firms and farmers cannot access the credit necessary for investing in higher-yield/higher-risk activities. This leads to slowed economic recovery, exacerbating poverty.

When is it advisable for low-income households, businesses, and governments to insure against climate-related risks?

Insurance cannot be a panacea for governments, households, and businesses in those highly exposed and vulnerable countries trying to adapt to climate change. It is generally inappropriate for very slow-onset climate impacts, such as sea-level rise and desertification, where other instruments are needed.

Most importantly, insurance must be considered within an overall risk-management and adaptation strategy. The two top priorities are avoiding dangerous climate change and preventing human and economic losses.

Whether insurance is advisable depends on its benefits and costs. By spreading losses temporally and geographically, and assuring timely liquidity for the recovery and reconstruction process,

insurance is beneficial to those in the risk pool. And by enabling productive adaptation, insurance brings the added benefit of helping communities escape from disaster-induced poverty traps.

Yet the costs are high. Because the events can affect whole regions at the same time (covariant risks), insurers charge extra for holding large capital reserves. This adds significantly to the insurance premium. Without government or donor support, private insurance is thus not easily affordable to low-income clients. The market, alone, cannot cover the insurance needs of the poor.

What is the experience with insurance instruments and programs in developing countries?

Catastrophe insurance is playing an increasingly visible role in developing countries with novel, donor-supported programs demonstrating their potential to pool economic losses and smooth incomes of the poor facing weather variability and climate extremes, as well as transfer risks to the global capital markets. For example:

- In *Malawi*, smallholder farmers can buy affordable, index-based drought insurance. Unlike traditional claims-based insurance, indemnity is based on an index of local rainfall. By making farmers more creditworthy, this pilot loan/insurance scheme enables farmers to purchase hybrid seeds, and thus greatly increase their productivity.
- The World Food Programme (WFP) piloted an index-based drought insurance scheme for government relief expenditure in *Ethiopia*. Future transactions may include a catastrophe bond, which pays an above-market interest rate if rainfall exceeds a specified level, but part of the principal would go to the Ethiopian government if rainfall is below this level.
- The *Caribbean island states* have recently formed the world's first multi-country and index-based catastrophe insurance pool to provide governments with immediate liquidity in the aftermath of hurricanes or earthquakes.

Participants at a recent expert workshop on *Insurance Instruments for Adaptation to Climate Risks*, hosted by IIASA, noted that experience was too short to judge if internationally backed public-private systems were viable in the long haul.

"Communities value disaster insurance not because it rewards them or makes them richer after a disaster. They value insurance because they see it as an instrument of dignity. Financial support to recover from a disaster becomes their right without sacrificing their self respect. It is far more dignified to claim your right for recovery than to find yourself dependent on the *ad hoc* generosity of donors."

— Hari Krishna (2007), Expert Workshop on Insurance Instruments for Adaptation to Climate Risks, Laxenburg, Austria

However, they might radically change the way development organizations provide disaster aid and support adaptation to climate change. Importantly, without exception the schemes have received technical and/or financial support from international development and donor organizations.

Can climate insurance be designed in a way that contributes to adaptation instead of maladaptation?

Adaptation can be thought of as reducing risks to property, assets, livelihoods, and lives. This includes physical interventions (flood defences or early warning systems); lifestyle changes (relocating or changing livelihoods); training for early warning systems; and strategies for recovery (formal and informal insurance). Insurance is commonly viewed as an alternative to adaptation, not an integral part, as suggested here.

However, *well-designed* insurance reduces disaster losses in two ways: (1) by providing early liquidity, it prevents long-term loss of livelihood and lives; and (2) by pricing risk, it sets strong incentives for pre-disaster preventive behavior. In Istanbul, for example, apartment owners who choose to disaster-proof their properties pay a lower insurance premium, making investments in safety more attractive. Poorly-designed insurance contracts, on the other hand, can discourage investments in loss prevention or even encourage negligent behavior.

What principles should guide outside support for insurance programs?

Opponents rightly argue that subsidies can distort the price signal and encourage maladaptation; support in the form of reinsurance can crowd out the role of the private market. Proponents counter with the observation that the market often fails to provide "correct" price signals, and that enabling insurance for the poor can create a role for the private sector by encouraging public-private partnerships.

The current role of the private sector is limited and, while scattered examples of micro-insurance schemes that offer catastrophe cover without outside support do exist, these schemes are viable,

mainly due to very low cover. For example, Proshika, a large microfinance institution (MFI) in Bangladesh, offers compulsory group-based disaster insurance to its clients. But it is unlikely to cover more than a small percentage of disaster damage.

The inability of the poor to afford sufficient insurance cover and the reluctance of the private market to commit capital and expertise to the low-income market can be overcome by forming partnerships with insurers, governments, and NGOs, with support from bilateral and multilateral development/donor organizations. A catastrophe bond to transfer risk from Ethiopia to the international capital markets would only be possible with outside technical support from international financial institutions (IFIs) and other types of start-up assistance.

Subsidized premiums in the US farm insurance program have weakened incentives to plant more robust crop varieties, or to move away from farming in high drought or flood risk areas. However, even subsidized insurance has a greater incentive effect than the current practice of extending free, post-disaster aid to disaster victims. Moreover, the weakened incentives created by reduced-premium insurance might be compensated by linking support with vulnerability-reducing measures and subsidizing insurance only to eliminate the extra load placed on premiums by risk-averse insurers. Another principle that might guide outside support is to target it to the very high risks, where arguably the market fails to provide sufficient cover.

What role might insurance instruments play in a climate-adaptation regime?

To help define this role, IIASA has worked with the Munich Climate Insurance Initiative (MCII) to put forward a proposal for a risk management module consisting of two pillars, [prevention](#) and [insurance](#), which would act together to reduce the human and economic burdens on developing countries ([Figure 2](#)). Both pillars would be fully financed by a post-Copenhagen, multilateral adaptation fund.

The prevention pillar

Preventing human and economic losses from climate-related disasters must be the first priority of a risk-management strategy. The first pillar thus calls for comprehensive risk management across vulnerable

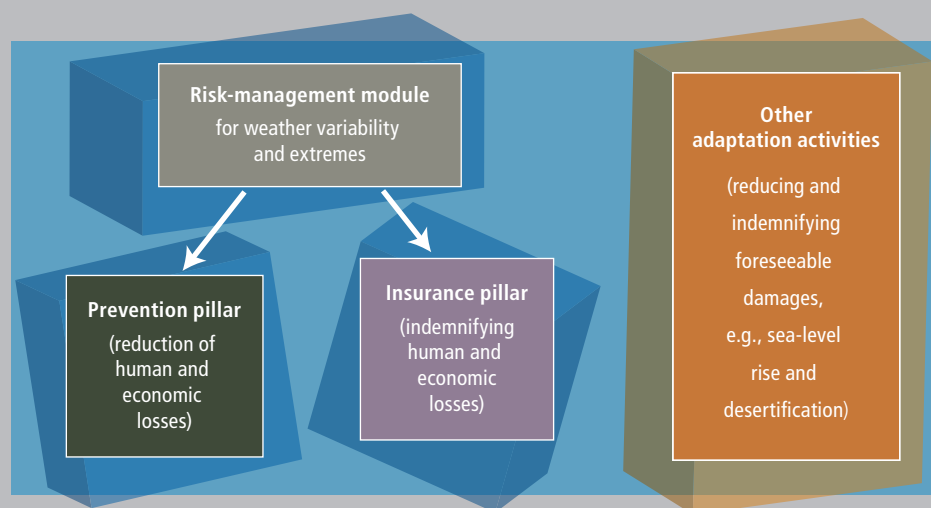


Figure 2
The MCII proposed risk-management module, together with other adaptation activities, would help vulnerable countries adapt to climate change.

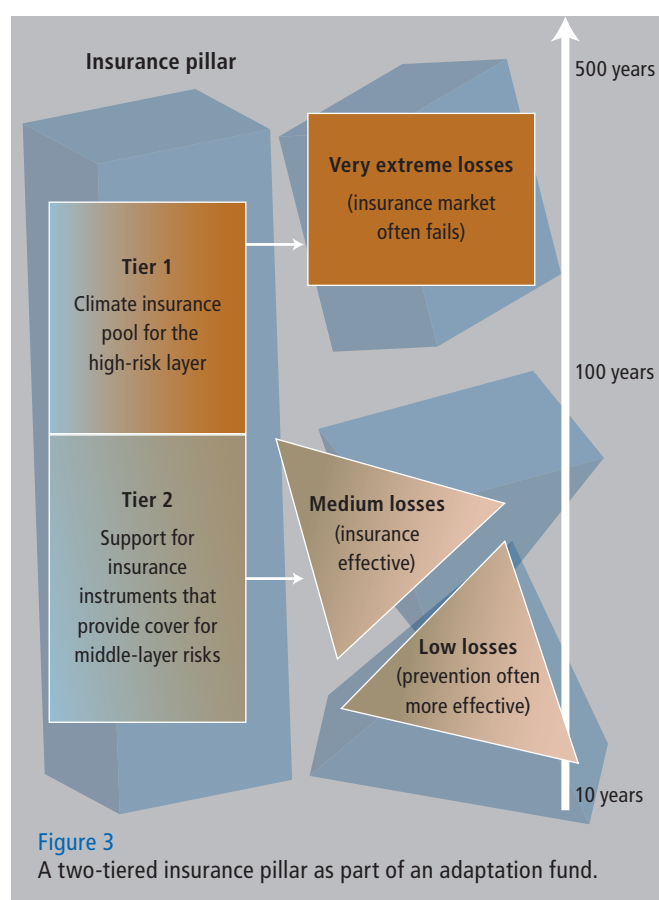


Figure 3
A two-tiered insurance pillar as part of an adaptation fund.

countries, building on detailed risk assessments. Risk assessments can uncover unforeseen possibilities for risk reduction, like early warning and land-use restrictions, and help lay the groundwork for risk-transfer systems. Qualification for participation in the insurance pillar might include progress on a credible risk-management strategy, with a specific focus on the most vulnerable communities and sectors.

The insurance pillar

This has two tiers, reflecting the different layers of risk that need to be addressed for effective climate adaptation: “high level,” exceeding the ability of any given country to pay in the case of an extreme event; and “middle level,” where any given country could cope given the

proper facilitating framework. “Low level” risk is absent; this can often be dealt with more cost-effectively by prevention measures.

As shown in Figure 3, the first tier would provide insurance cover to vulnerable country governments for a pre-defined high layer of risk (e.g., events expected to occur only every 100 to 500 years), and the premiums would be fully paid from a post-Kyoto adaptation fund. The second tier would enable mainly micro-scale risk-pooling and transfer mechanisms that provide cover for medium-loss events (e.g., events expected to occur every 10 to 100 years).

Insurance pillar, Tier 1 takes the form of a solidarity fund, or Climate Insurance Pool (CIP), to indemnify developing country property and infrastructure (and, potentially, lives and livelihoods) against low-frequency, high-consequence, climate-related events. The CIP would receive a fixed annual allocation from an adaptation fund equaling the expected average annual costs of the insurance scheme. The CIP operations would be managed by a dedicated professional insurance team responsible for risk pricing, loss evaluation (potentially based on an index), and indemnity payments, as well as placing reinsurance, as envisaged by Bals, Warner, & Butzengeiger (2006).

Insurance pillar, Tier 2 would take the form of a Climate Insurance Assistance Facility (CIAF) to provide support for the middle layer of risk and is based on a proposal by Linnerooth-Bayer and Mechler (2006), similar to a recent proposal for a joint International Fund for Agricultural Development—World Food Programme Weather Risk Management Facility, funded by the Bill and Melinda Gates Foundation. It would *not* directly provide insurance to households, farmers or governments, but would offer support to nascent micro-, meso-, and macro-scale disaster insurance systems, like those operating in Malawi and the Caribbean.

The MCII two-pillar proposal meets the challenge of providing support to promote sustainable, affordable, and incentive-compatible insurance programs with minimal crowding out of private sector involvement. While the first tier offers premium-free insurance for an upper layer of risk, it can be justified by market failure for this risk layer. By enabling insurance for the poor, this tier opens opportunities for capitalization through risk-transfer programs involving the private market. The second tier imposes affordable prices on heretofore unpriced risks—thus replacing the negative incentives and moral hazard created by post-disaster aid—and creates ample opportunities for the private sector in insuring and reinsuring these programs.



*Children fetch water during flooding in Sudan, August 2008.
UN Photo/Tim McKulka*



*Drought has severely impacted many farmers and crop yields
in the west of Nepal in 2008. © Naresh Newar/IRIN*

What is the message to policymakers for a post-Kyoto strategy?

One clear message for policymakers is that insurance mechanisms have a promising role in an adaptation regime. There are large, potential benefits for insurance in the developing world:

- providing security against the wholesale loss of assets, livelihoods, and even lives in the post-disaster period;
- changing the way development organizations provide disaster assistance and, at the same time, engaging the private sector in vast markets;
- ensuring reliable and dignified post-disaster relief;
- setting powerful incentives for prevention; and not least,
- spurring economic development.

There are also many challenges: assuring sustainability and affordability in light of covariant risks; defining an appropriate role for donors, given the inefficiencies of subsidies; and assuring that systems avoid moral hazard and contribute to "good" investments.

A second message is that options already exist for including insurance mechanisms in the post-Kyoto adaptation strategy. As a practical way forward, this discussion has laid out a two-pillar international risk-management program as part of an adaptation regime—financed fully by a post-Kyoto adaptation fund—a *risk prevention* pillar that would directly support risk-reduction measures and a two-tiered *insurance* pillar that would address high- and medium-layers of risk.

Because of the substantial economies of pooling public- and private-sector risks, there are strong arguments for creating facilities, like a solidarity fund, at the global or regional scales.

By clarifying the opportunities and challenges of insurance as an instrument for adaptation, and outlining a practical way forward, it is hoped that this discussion contributes to the opportunities facing policymakers in adopting a comprehensive post-Kyoto adaptation strategy that enables risk-management and insurance through the funding of a global adaptation strategy.



A woman in Bangladesh searches her home destroyed by Cyclone Sidr in November 2007. © Tanvir Ahmed/IRIN

Further information

This IIASA Policy Brief is based on “Climate Insurance as part of a post-Kyoto Adaptation Strategy,” a paper by Joanne Linnerooth-Bayer, Christoph Bals, and Reinhard Mechler, due to appear as a chapter in the forthcoming book, *Adaptation and Mitigation Strategies for Surviving Climate Change*, published by Cambridge University Press. The findings were first presented at the Accra Climate Change Talks in August 2008 and the paper was delivered to the UN Climate Change Conference in Poznan (COP 14) in December 2008.

IIASA Policy Briefs present the latest research for policymakers from IIASA—an international, interdisciplinary research institute sponsored by scientific organizations in Africa, the Americas, Asia, and Europe. The research presented in this briefing is from IIASA’s Risk and Vulnerability Program and Germanwatch, a nongovernmental North–South initiative. The views expressed herein are those of the researchers and not necessarily of IIASA.

More IIASA publications are available at
www.iiasa.ac.at/Publications

For details of the topics covered in this briefing, see:

Bals C, Warner K, & Butzengeiger S (2006). Insuring the uninsurable: Design options for a climate change funding mechanism. *Climate Policy* 6(6):637–647, www.earthscanjournals.com/cp/006/06. Special issue on *Climate change and insurance: Disaster risk financing in developing countries*, E. Gurenko (ed.).

Krishna H (2007). Presentation discussion. Expert Workshop on Insurance Instruments for Adaptation to Climate Risks, organized jointly by IIASA, Munich Re, the German Agency for Technical Cooperation (GTZ), and the World Bank, and as part of the activities of the EU Integrated Project on Adaptation and Mitigation (ADAM), Laxenburg, Austria, 24–25 September 2007.

Linnerooth-Bayer J & Mechler R (2007). Disaster safety nets for developing countries: Beyond public–private partnerships. *Environmental Hazards* 7(1):54–61, doi:10.1016/j.envhaz.2007.04.004. Special issue on *Disaster Risk Management: Pro-active Financing to Reduce Vulnerability*, A. Amendola, J. Linnerooth-Bayer, N. Okada, & P. Shi (eds).

Linnerooth-Bayer J & Mechler R (2006). Insurance for assisting adaptation to climate change in developing countries: A proposed strategy. *Climate Policy* 6(6):621–636, www.earthscanjournals.com/cp/006/06. Special issue on *Climate change and insurance: Disaster risk financing in developing countries*, E. Gurenko (ed.).

Mechler R, Hochrainer S, & Linnerooth-Bayer J (2006). Public sector financial vulnerability to disasters: The IIASA CATSIM Model. In: *Measuring Vulnerability to Natural Hazards: Towards Disaster Resilient Societies*, J. Birkmann (ed.), UNU Press, Tokyo, Japan, pp. 380–398. (See www.unu.edu/unupress/2006/measuringVulnerability.html.)

Munich Climate Insurance Initiative (MCII) (2008). “Insurance Instruments for Adapting to Climate Risks: A proposal for the Bali Action Plan, Version 2.0.” MCII Submission to the 4th session of the *Ad Hoc Working Group on Long-Term Cooperative Action under the Convention* (AWG-LCA 3). Poznan 1–13 December, 2008. www.climate-insurance.org/upload/pdf/MCII_submission_Poznan.pdf.