

# Insurance solutions for managing the food crisis

Private-public partnerships for agriculture investments and risk management



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Swiss Re is a leading and highly diversified global reinsurer. Swiss Re engages in innovative private-public partnerships to foster the rural sectors' access to the benefits of modern risk management.

The Commonwealth Business Council (CBC) provides leadership in increasing international trade and investment flows, creating new business opportunities, promoting good governance and corporate social responsibility, reducing the digital divide and integrating developing countries into the global market.

The Commonwealth Business Council (CBC) is partnering with Swiss Re to help develop private-public partnerships with interested countries for agriculture investment and risk management.

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## Executive Summary

Food prices for wheat, maize, corn or soybeans have risen in the last 18 months markedly, mainly as a result of a growing imbalance between supply and demand for agricultural products. Since 2000, prices for food have nearly doubled around the world. The supply side is not keeping up with the increase in demand. Direct investments into agriculture production are still remarkably low. This issue is being addressed at both the national and international level. For example, within the Commonwealth, Ministers of Finance, at their Annual Meeting in October 2008, called on the international community to intensify its support for affected countries and to accelerate both short and longer term investments in increasing agricultural production and productivity.

In order to contribute to these global efforts, Swiss Re is partnering with the Commonwealth Business Council (CBC) to help develop Private Public Partnerships (PPP) with interested countries for agriculture investment and risk management.

Government subsidized crop insurance programs almost always take the form of a Private Public Partnership (PPP) where governments collaborate with the insurance sector. Successful PPP even go further and include risk transfer to the domestic as well as international reinsurance market for peak exposure. In national agriculture pools, risk is aggregated and shared among insurance companies while peak risks are secured by state-owned reinsurers in some markets. In some occasions, governments leverage the use of capital market instruments to smooth and protect budgets at reduced opportunity costs. For this, partners outside the insurance sector are involved in the PPP concept so that governments can benefit from the same solutions as already used in the corporate business segment.

Examples include: **bancassurance programmes**, where crop insurance is tied to the farm credit and subsidized insurance policies are distributed and administered by bank agents; **index insurance covers** where indemnity is defined by parametric triggers based on official yield statistics or weather data; **Government Fund Protection** using the same financial instruments to provide stability to farming communities, governments can reduce volatility in spending in cases of agriculture disasters; **natural catastrophe models** that can ultimately be utilized for agriculture exposure to model flood and typhoon losses and to define an index based on modeled losses following a severe event.

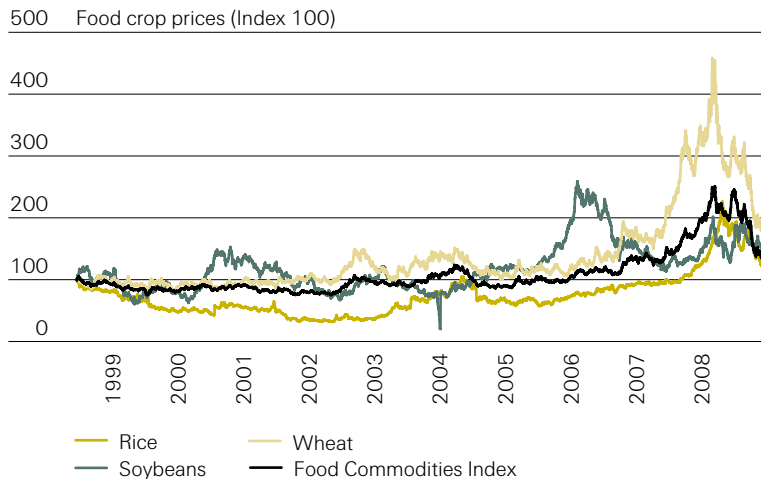
### Recommendations

1. Private Public Partnerships have worked well in established markets and governments are urged to consider the development of Private Public Partnerships to help expand agricultural production.
2. Provide government and donor support for subsidizing agriculture insurance and developing parametric and index solutions, particularly to assist small scale farmers, as an efficient way to pro-actively manage disaster response that is particularly relevant in the current food crisis.

### Managing food price volatility

Food prices for wheat, maize, corn or soybeans have risen in the last 18 months markedly, mainly as a result of a growing imbalance between supply and demand for agricultural products. Between 2000 and mid 2008, prices for food have nearly doubled around the world (Figure 1). The supply side is not keeping up with the increase in demand. Direct investments into agriculture production are still remarkably low.

Figure 1: Development of food prices



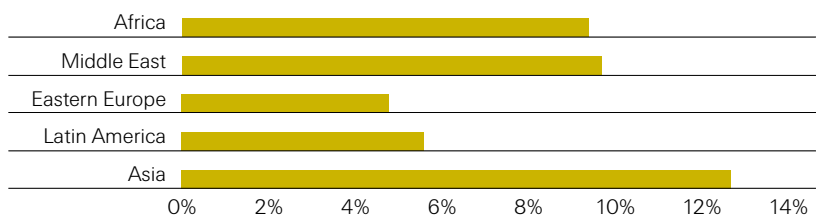
Source: Swiss Re and Bloomberg data 2009

This issue is being addressed at both the national and international level. Discussions initiated at the UN Food Summit in June 2008 have led to a formal consultation process for the establishment of a “Global Partnership for Agriculture, Food Security and Nutrition” (GPAFSN) intended to co-ordinate among the various UN agencies, donors, partner countries and other stakeholders. Within the Commonwealth, Ministers of Finance, at their Annual Meeting in St Lucia in October 2008, called on the international community to intensify its support for affected countries and to accelerate both short and longer term investments in increasing agricultural production and productivity.

In order to contribute to these global efforts, Swiss Re is partnering with the Commonwealth Business Council (CBC) to help develop Private Public Partnerships with interested countries for agriculture investment and risk management.

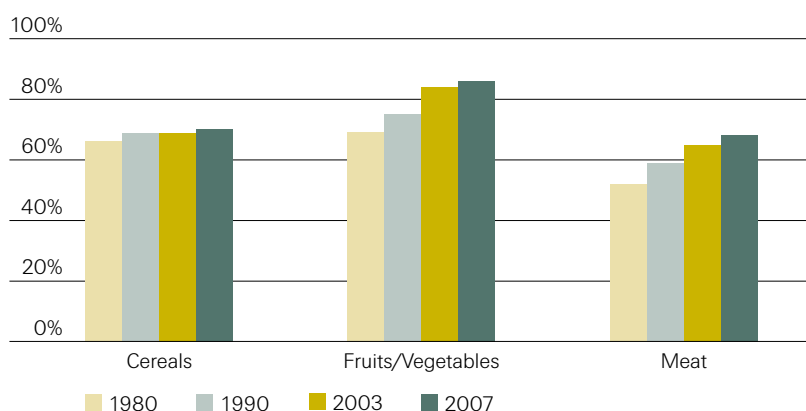
The agriculture sector in many emerging markets represents a large portion of the economy (Figure 2). Emerging markets also have a large world market share with regard to major agriculture products (Figure 3).

Figure 2: Agriculture’s share of GDP across emerging market regions, 2008



Source: Swiss Re Economic Research & Consulting, estimates on FAO data

Figure 3: Emerging markets' shares in world production



Source: FAOStat, update of Swiss Re sigma 1/2007, Swiss Re Economic Research & Consulting

#### *Agriculture Investment and Risk Management – A Private Public Partnership Model*

In order to increase agricultural production and investment, reducing the volatility of agricultural production would assure stable returns for investors, allow farmers to retain their capital to invest in future production, and reduce the burden on governments to support farmers in the event of a natural disaster.

Governments increasingly make use of newer risk management approaches to complement crop insurance schemes or to overcome difficulties of implementing insurance covers. In some occasions, governments leverage the use of capital market instruments to smooth and protect budgets at reduced opportunity costs. For this, partners outside the insurance sector are involved into the Private Public Partnership concept so that governments can benefit from the same solutions as already used in the corporate business segment. Governments often have to intervene after weather-related events or disasters that lower agriculture production levels. This puts a financial burden on governments, which often struggle to finance this unexpected burden.

The goals of a PPP programme are clear: reduce short term price and production volatility; and increase long term production. It is critical to begin work early.

In the current context, additional fiscal capacity and security is required to help governments and the private sector invest and re-invest in agriculture. There is now considerable interest from governments and international financial institutions to support and fund the development of new Private Public Partnerships to address these needs. There is valuable expertise and financial capacity available from the private sector, particularly in the area of capital markets and reinsurance.

Legal provisions under the World Trade Organisation (WTO) also enable collaboration. For example, subsidized crop insurance programs and index solutions are effective pro-active approaches to managing natural disasters in agriculture. At the same time insurance subsidies are very attractive to governments because the WTO exempted subsidies for agricultural insurances from their free trade treaty in 1994 – if the agricultural insurance relieves the impact of natural disasters.

### *Moving from ex post to ex-ante event financing*

Natural disasters and climate impacts can have a devastating impact on the agricultural sector. Once disasters strike many farmers turn to the government for help in the form of emergency funding, tax relief and other means. Often, development organisations and donors are becoming active, too. A pro-active approach would of course be more favourable to stabilize earnings volatility for farming communities. One way of achieving this are insurance solutions and capital market instruments.

In many countries governments provide subsidies for agriculture insurance programs – in some countries up to 50% of the premiums to stabilize agriculture production and provide financial protection. Most subsidies are currently used in the crop sector under the form of multi peril crop insurance (MPCI). Farmers receive compensation by a pre-agreed price per tonnage if there is a drop in yields below a weighted historical average. A wide range of perils including drought, flood, frost, excessive moisture and sometimes diseases are covered. An extension of MPCI is Revenue Covers where fluctuations in commodity prices at planting compared to harvest are additionally covered. Income Covers is a further extension aiming to stabilize overall farm income.

MPCI schemes are large in Canada, USA, and India and are gaining increasing popularity in Brazil, parts of Europe and most recently in China. In some countries including South Africa and Australia, farmers do not receive subsidies and cope themselves. They are far less common in the specialized livestock sector, the forestry segment and the aquaculture industry. As crop insurance comes with high costs for administration and loss adjustment, subsidies are necessary to make insurance covers affordable for farmers. Besides high costs, moral hazard and antiselection are key challenges to overcome in setting up a new insurance program. In emerging markets, the lack of an insurance mentality, small scale farming, large distances and limited insurance distribution channels are difficulties to overcome. Moreover, the lack of insurance loss statistics or proxies such as governmental production statistics, weather data or outputs from yield forecast models makes actuarially sound pricing a challenge. At an initial stage, the same insurance conditions are often applied throughout an entire province and all crop types independent of exposure and risk management practise, leading to non-sustainable results in a commercial sense. Trained loss adjustors are a necessity to a successful crop insurance scheme and it often takes a considerable time until loss adjustment procedures and manuals are implemented.

### *Working with partners*

Government subsidized crop insurance programs almost always take the form of a PPP. The government usually sets up the legal framework and selects individual insurance companies to manage and deliver the insurance policies using their expertise in quantifying risk and transferring it. While some governments restrict their involvement in subsidizing, others assume a more active role and get involved in designing and adapting crop insurance policies, collecting production statistics, operating yield forecast models as well as providing guidance in setting terms and conditions of insurance (deductibles, rates). Under a PPP, governments act as a lender of last resort for large agriculture catastrophes when insurance protection is exhausted and payments from ad-hoc disaster relief funds are necessary.

Successful PPPs even go further and include risk transfer to the domestic as well as international reinsurance market. In national agriculture pools, risk is aggregated and shared among insurance companies while peak risks are secured by state-owned reinsurers in some markets. Peak exposure and catastrophe-type of losses are often transferred to international reinsurers that benefit from a globally diversified portfolio.

### *Bancassurance*

One example of such a partner outside the insurance sector could be the involvement of a bank. In a bancassurance program, crop insurance is tied to the farm credit and subsidized insurance policies are distributed and administered by bank agents. Where agriculture lending institutions are affiliated to the government, implementation can be better coordinated. And it makes credits for farmers more available. In many cases, farmers hardly get money from banks to improve their production due to the lack of collateral. In the case of bancassurance the recoveries will come from the insurance policy.

While the green revolution made its way to Brazil, it also brought some downside in the form of monoculture soybean plantation. These plantations are very vulnerable to drought. After two severe drought years in Southern Brazil, the government decided to subsidize MPCl covers in 2005 after high disaster relief payments. As it is usual practise to use future harvests as collateral for farm credit and input cost re-payment, farm loans and debts for input costs were not paid back and many farmers were out of business. Key to the development was the decision of the country's largest rural lender, Banco do Brasil, to embed crop insurance into their loans for soybean and corn farmers in the south and make insurance compulsory. A clear win-win situation emerged: farmers have access to more loans, banks have insurance as collateral of the loan in case of low harvest and while the government subsidizes this bancassurance scheme, it reduces potential disaster payments through risk transfer to the private sector. The insurance program is reinsured internationally through the state-owned reinsurer IRB and has rapidly expanded to include other Brazilian states and other crop types.



### *Index Insurance*

In order to complement crop insurance, governments increasingly embrace capital market solutions in the form of index covers. One of these solutions is index insurance where indemnity is defined by parametric triggers based on official yield statistics or weather data. Index solutions induce basis risk, ie the non-perfect correlation between losses in agriculture production and the payout of the index program. In other words, a farmer in a community only receives payment if an entire area is severely affected and vice versa. Indexes work best if risk is aggregated. Index insurance also has lower administrative costs which makes it cheaper than crop insurance with the additional benefit of faster payments.



Large-scale production indexes – also called Group Risk Plan (GRP) – are based on large scale production and yield statistics measured by governmental entities, and indemnify a larger farming community for deviations in yields compared to pre-agreed (historical) levels – similar to MPCl but on a larger scale. GRP is very common in North America and parts of Latin America and is gaining interest from grain boards and food processors to secure a stable supply of agriculture raw material at an agreed price or including a protection for a certain price volatility.

In weather insurance, defining a function of temperature and/or rainfall parameters measured at officially recognized weather stations, shortfalls of agriculture production can be compensated in function of deviations of the pre-agreed normal. This concept is widely used in the energy sector.

India's farming communities have used weather insurance to secure crop production from impacts of excessive rainfall and droughts and the government recently decided to subsidize weather index products. To date, more than 500 000 Indian farmers have taken weather insurance policies through schemes provided by state-owned Agriculture Insurance Company of India and private sector insurance companies including ICICI Lombard and Iffco Tokio. This is a good way to complement the state-run agriculture MPCl insurance program. The international reinsurance market is supporting these developments in providing guidance on pricing and providing reinsurance cover to local insurers.

In Mexico the Secretariat of Agriculture (SAGAPRA) compensates cattle farmers for losses from reduced biomass and additional costs for feed in severe drought years through a subsidized index insurance cover. To define a drought index, satellite images are used to calculate a Normalized Difference Vegetative Index (NDVI) reflecting chlorophyll levels of vegetation. If the current index falls below the guaranteed index in a given municipality, an indemnity is payable to cattle farmers. The state reinsurer Agroassemex runs the program which is internationally reinsured. Currently, some 750 municipalities in 19 Mexican states benefit from this cover. Similarly, Agroassemex also runs a drought program for crops.

#### *Government Fund Protection*

Using the same financial instruments to provide stability to farming communities, governments can benefit to reduce volatility in spending in cases of agriculture disasters.

For example, wildfire activity increases particularly in drought years in Alberta, Canada, and suppression costs significantly exceed the budget. In order to manage and stabilize this budget the Forest Protection Division of Alberta's Ministry of Sustainable Resource Development bought a parametric cover through province-owned agriculture insurer AFSC, which is reinsured internationally. Given a good correlation between historical fire activity (hectares burnt) and past suppression costs including aircraft fuels, equipment expenses and re-allocation of manpower, a pre-agreed indemnity per surface burnt above a pre-defined level is payable. The structure is highly cost effective, with moral hazard limited due to strict operational procedures in fire detection and suppression. The Forest Protection Division provides weekly on-line updates on fire activity, hazard levels and uses remote sensing applications for monitoring.

In the context of losses for livestock from epidemic diseases, for example avian flu or foot and mouth disease, government affiliated insurers and livestock associations could choose to cover aspects of business interruption and government obligations for payments to farmers whose animals are culled under government slaughter order.

### *Catastrophe Models*

As already used for other lines of business (for example property and motor), sophisticated natural catastrophe models can ultimately be utilized for agriculture exposure to model flood and typhoon losses and to define an index based on modeled losses following a severe event. However there is quite a way to go. First insurance exposure information needs to be detailed (at least district level and per crop type) and more research is needed to define vulnerability functions (ie relationship between modeled peril intensity and possible losses) for different growth phases and crop types. At one point provincial governments could benefit from recent advances in research of reinsurers with in-house catastrophe model development capabilities.

### **Conclusion**

High commodity prices and increasing demand for food crops have a high impact on societies and economies. Although yields are still increasing at low rates, arable land decreases and is clearly outpaced by increase in demand and the growing population and new land to be brought into production. Food security issues and food prices will remain high on the topic list of governments as the demand gap will grow according to the predictions of the International Food Policy Research Institute.

The possible impact of climate change adds additional volatility to production and government ad-hoc disaster budgets. With that in mind it becomes even more important to stabilize the agriculture sector and rethink disaster funding. Pre-event funding has appealing advantages compared to ad-hoc payments after the disaster for governments and agriculture insurance is one way to support the producing sector.

A strong PPP aims to reduce potential gaps between economic losses and insured losses in case of severe catastrophes in agriculture – often observed in emerging markets – and foster a well established risk management system. Adequate risk management is essential in the current market conditions and outlook. International reinsurers with a track record in agriculture reinsurance in emerging markets can also provide know-how on technical aspects of agriculture schemes and can share valuable experience with newer risk management approaches that can complete crop insurance schemes.

### Recommendations

1. Private Public Partnerships have worked well in established markets and governments are urged to consider the development of Private-Public Partnerships to help expand agricultural production.
2. Provide government and donor support for subsidizing agriculture insurance and developing parametric and index solutions, particularly to assist small scale farmers, as an efficient way to pro-actively manage disaster response that is particularly relevant in the current food crisis.

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