

## The Geneva Association: The case for a Southeast Asian agriculture risk pool



Natural or man-made disruptions to agricultural activity have led to severe food shortages, sharp increases in food prices and starvation among the poor. In this extract from the Geneva Association's Risk Management Newsletter, **Dr Suzanne Corona** from **Asia Capital Reinsurance Malaysia** says adequate protection of agricultural interests is therefore fundamental in managing food security – an area of vital focus for governments and one in which the (re) insurance industry has an important role to play.

**A** growing population is only one driver behind the increase in demand for food. The effect of population growth could be easily amplified by changes in food consumption patterns as income rises. How about the supply side? Although the global agricultural land area has increased significantly since 1961, data from the last decade indicates that the trend has started to reverse.

Landowners seek to optimise income from their land. Political pressure is towards maximising tax revenue, an incentive to transform agricultural land into commercial land.

Land area is only one factor; there is also yield-per-area. Over the past 20 years, yield has been increasing. However, the rate of increase is levelling off. This could be attributed to multiple reasons such as the degradation of soils and water quality, toxin build-up and the fact that modern agronomy is reaching its limits.

Water supply is a significant risk factor in agricultural activity. Fresh water only makes up 3% of the global water supply. Most agriculture production uses fresh water, with the exception of salt water fish farms. According to Food and Agriculture Organization of the United Nations (FAO), 70% of the world's fresh water consumed is used by the agricultural sector. Given the projected increase in demand for agricultural products, fresh water scarcity is projected to increase.

Consequently, the cost of agricultural production may increase.

### Pan-ASEAN agricultural pool

Asia is a particularly vulnerable region when it comes to the agricultural sector's exposure to calamities. This suggests a major need to protect Asian agricultural interests against disaster risk. As local governments are major stakeholders in agriculture, sovereigns are ideal candidates to participate in a robust insurance-based financial solution.

The establishment of a pan-ASEAN agriculture pool as a collective scheme can mitigate the risks associated with agricultural production and food security in the region. In this scheme, the Member States of ASEAN contribute underwriting capacity based on the relative importance of agriculture trade to their economies.

Using weather-based indices and backed by an insurance policy, farmers will obtain financial coverage for major agricultural disasters that affect their production. Member States which are net consumers of agricultural products will subsidise the insurance premiums of those countries

which are net producers, thus promoting food security and political stability across the entire region.

### Leveraging on the ASEAN Plus Three Emergency Risk Reserve's experiences

Starting an international venture such as this on the ASEAN level makes sense, as there is already an existing framework of government exchange upon which to build the infrastructure of the proposed public-private partnership (PPP) risk transfer scheme.

Given the experience with the ASEAN Plus Three Emergency Rice Reserve (APTERR) – this includes the 10 ASEAN states plus Japan, China and the Republic of Korea – regarding food security, a pan-ASEAN agriculture pool among the ASEAN Plus Three (APT) states may also be feasible.

A pan-ASEAN agriculture pool would complement APTERR in that the insurance scheme's *raison d'être* is to encourage farmers to continue producing food, rather than moving to cities in search of a better life, by insuring the costs of production, in contrast to APTERR, which aims to stabilise the market price of the product for consumers.

### Geographical diversification

Substantiating the case of a pan-ASEAN agriculture pool is the benefit of geographical diversification in dealing with the perils that affect agriculture risks most.

Similar working and existing reinsurance solutions are based on the same principles. We have calculated the straightforward Pearson correlation coefficients between different countries and regions using again the EM-DAT database.

The pan-ASEAN agriculture pool would bring together capacity from the Member States, who will each take their share of risk in terms of both premiums and losses. This is a manifestation of the principle of solidarity. The innovative feature of this pool is that net importing (consuming) and net exporting (producing) countries are brought together in one scheme as illustrated in Figure 1.

The question will be how to share the risk and, more precisely, the level of participation that should be undertaken by each Member State. We can measure the relative importance of agriculture products for each country by their net agricultural trade position normalised to gross domestic product (GDP). While this is a somewhat simplistic approach, it offers a basic idea for determining orders of magnitude. Going forward, we would need to refine par-

**Figure 1: Schematic Organisation of the pan-ASEAN Agriculture Pool**



used to define triggers. Satellite imagery techniques could also complete the tool box.

**Weather-based indices' issue**

One issue with the use of weather-based indices to trigger insurance claims is that they sometimes trigger a claim

when there is no loss or, on the contrary, do not pay claims when there is a loss. If the pan-ASEAN agriculture risk pool is calibrated for larger catastrophes, this bias will be reduced.

**Mechanics of the suggested pool**

The next step is to understand the risks which are ceded into the pool. This will give an estimate of the amount of reserves the pool will need to be able to handle a catastrophic event loss and also indicate a price for the risks which are ceded into the pool.

The data available today for modelling agriculture risk in Asia is quite dispersed and often biased by state politics or other issues. Our agriculture model covers crops, livestock and forestry. In its first version, it aims to cover the main Asian agricultural markets: China, India, Korea, and Japan.

Statistics on crops, forestry and livestock generally go back to the 1960s or 1970s and give an estimate of the economic damage ratio. Using weather measurements such as rainfall and temperature, we can associate return periods to the level of damage of each year. The data can be fitted onto a distribution to determine its mean and standard deviation.

The final step is to calibrate these results with the actual claims history. Here, the data is limited in that it covers only up to five years in China, but, in time, the model will be refined. The available data also needs cleansing and, where premium is the only exposure, transformation into sums insured. Using sums insured will reduce uncertainty in results that would arise from changes in premium rates.

**Microinsurance usually the distribution channel used**

These modelled approaches work for risks of significant size (middle-class residential risks or commercial risks), where it makes sense to use traditional insurance techniques (annual policy whereby premium payment is in exchange for coverage of a defined set of risks and perils).

The demographics of Asia, APT countries in particular, introduce a twist. Microinsurance will often be the proper vector of distribution in this PPP proposal due to the number of poor citizens. While the Chinese provincial schemes are using traditional insurance claims management techniques, the experience of India has shown that weather parameters could be more adapted to use as triggers for an event declaration. This approach erases the need to select the risks which are accepted into the pool, as pricing differentials no longer exist. It puts all the risks on an equal footing in terms of price.

Another advantage is that the return periods for different levels of weather parameters are relatively well known from several decades of measurements. Agriculture production can be correlated to these weather measurements and

used to define triggers. Satellite imagery techniques could also complete the tool box.

The premium corresponding to the risks ceded into the pool will be calculated and all members will share this risk proportionally to their interest in the pool, meaning that both the producing and consuming member states subsidise the premium for the producers (usually producers alone set up these subsidised insurance schemes).

Those premiums will be used to build up a fund which can pay for future claims from extreme weather events. The pricing should be calibrated so that there is some profit. However margin expectations are to be moderated, as evidenced by existing local and national schemes in Asia and around the globe. More importantly, this is not meant to be a risk funding exercise disguised as risk transfer.

**Pool should start with agricultural staples**

Going forward, all the ingredients are there to create a pan-ASEAN agriculture pool as a PPP initiative between ASEAN or APT states and the reinsurance industry to manage agriculture risks in the region.

Among member states, the pool can be formed via a treaty that defines how much capacity is to be contributed by each state. For each type of agriculture operation, the insurers will distribute insurance policies to the producing farmers in each state.

Do note that a given member state could be a net producer of one agricultural commodity and a net consumer of another. The pool should limit its cover to key agricultural staples as a first step. Insurance cover of the agriculture risks of APTERR using the pool can also be explored.

Further studies should be pursued by all relevant stakeholders to better understand the risks involved, while keeping in view the overall objective of promoting food security and reducing political risk through a healthy and sustainable insurance market environment with responsible players. ■

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