



## Experiential Briefing Note

### Rainfall Index-Based Insurance for Maize Farmers in Thailand: Review of Pilot Program 2006-2008

January 2009

Prepared by Ornsaran Pomme Manuamorn, Operations Analyst  
Agriculture and Rural Development Department, the World Bank

#### Context

Agriculture remains a major economic activity in Thailand despite the growth of industrial and service sectors in the past decades. Agriculture accounts for 10 percent of Thailand's GDP<sup>1</sup> but supports directly and indirectly the majority (68 percent) of the Thai population who live in rural areas. Exposure to natural disasters causes significant financial losses to Thailand's agricultural sector each year, with droughts and floods being the most recurrent shocks. At the micro-level, these extreme weather events negatively impact farmers' livelihoods, resulting in significant income losses, an inability to repay loans, and, ultimately, poverty. At the national level, the government absorbs the costs of these natural disasters through various spending channels including public relief operations funded by the Ministry of Finance (MOF), and a natural disaster compensation scheme funded by the Ministry of Agriculture and Agricultural Cooperatives (MOAC).<sup>2</sup>

Among developing countries, Thailand has a relatively more sophisticated, commercially oriented agricultural sector and a strong agricultural bank with extensive outreach. While the insurance industry is rather developed in both life and non-life business lines, it has limited rural penetration, and agricultural insurance remains absent. The most recent efforts in developing agricultural insurance were initiated by the Government with collaboration from private insurance companies during the late 1970s and the early 1980s. However, these efforts only led to a few experimental schemes that were short-lived and discontinued due to financial losses.

Though the country had a very brief past experience with another form of index insurance (area-yield), the current lack of an agricultural insurance system gave rise to interest in Thailand to test index-based weather risk management instruments. This interest was catalyzed among key Thai institutions when the Department of Insurance (DOI), now the Office of Insurance Commissioners (OIC), and the Bank for Agriculture and Agricultural Cooperatives (BAAC) were approached by some

<sup>1</sup> World Development Indicator Database, April 2007.

<sup>2</sup> For more information, see Vichit Lorchirachoonkul and Weena Chaisilaparungruang, "Crop Insurance Covering Production Cost" (in Thai), National Institute of Development Administration (NIDA), 2002, p. 9- 10 . The MOAC website also provides information.

foreign market players about the possibility of developing index-based weather risk management products for the Thai market. The opportunity to implement a weather index insurance project in Thailand materialized in 2005 when the World Bank -- which had been working on a pilot scheme in India and exploring the applicability of the index approach to Southeast Asia -- came in contact with key Thai stakeholders including the DOI, The General Insurance Association (GIA), and BAAC. These key stakeholders requested technical assistance from the World Bank and the project ultimately resulted in a pilot.

In this context, the Commodity Risk Management Group (CRMG) of the World Bank's Agricultural and Rural Development (ARD) department began to provide technical assistance to Thai institutions to develop an index-based weather insurance pilot. The primary focus of the CRMG's technical assistance was on contract design for risks related to rainfall, while the local partners led and financed other aspects of the pilot program development. The World Bank also provided advice on administrative procedures, pilot program monitoring, and international experiences.

#### **Implementation Approach**

There were four facets of work that led to pilot implementation – operational, technical, financial and legal. Roles and responsibilities of institutions involved in the pilot are defined in relation to the four aspects as follows:

- Operational - **BAAC** suggested the pilot locations, led the field work and data collection, and, as an agent/intermediary of the insurance companies, conducted farmer education sessions, marketing and sales of the index insurance contracts. BAAC was also responsible for other operational work including collecting and transferring premiums to insurers, distributing insurance certificates, creating databases of participating farmers, and distributing daily rainfall information to insured farmers during the period of insurance coverage.
- Technical - **CRMG** funded and provided guidance for designing a weather index for maize in the pilot areas that led to a prototype insurance contract. The local insurance team later refined the index contract based on feedback received from farmers, BAAC, and a local maize expert. The local insurance team also conducted premium pricing based on standard international methodology.
- Financial - The **GIA** represents ten insurance companies that participated in the project. The ten companies jointly underwrote all the drought contracts.
- Legal - **The DOI** (now OIC) advised on legal and regulatory issues and approved the index contract as an insurance product eligible for sales.

Apart from the above, other organizations are also part of the steering committee that supported the project:

- MOAC provided data and policy advice.
- The Thai Meteorological Department (TMD) provided data and technical and operational advice, and supported the installation of an additional weather station during the first year of the pilot.

### **Pilot Program**

The index-based insurance pilot project began in the Pak Chong District of the Nakorn Ratchasrima Province of Thailand. Maize is the primary crop in Pak Chong, thus was chosen as the focus crop of the pilot, and drought is the principal risk. Nakorn Ratchasrima is a major maize production site in Thailand, and a large part of maize growing areas in this province lack irrigation, thereby leaving the crop exposed to drought. Maize is a major economic crop in Thailand and is grown by more than 320,000 farm households in Thailand (2004 numbers)<sup>3</sup>. Maize ranks sixth highest in loan volume for BAAC's lending portfolio. BAAC has a large group of maize growing customers in Nakorn Ratchasrima and suggested its Pak Chong Branch as the initial pilot site. In this district, there is high-quality historical weather data and reliable real-time communication -- a prerequisite for developing index-based weather insurance contracts -- from the Pak Chong Agro-meteorological Station. The station, which belongs to the TMD, had approximately 40 years of rainfall data for use in contract design and premium pricing.

### *The 2006 Dry-Run*

Preparatory technical work for the pilot primarily involved: 1) collecting of rainfall, yield and other key agro-meteorological data; 2) interviewing farmers about the importance of rainfall and losses they have suffered due to rainfall deficit risk; 3) running crop model to derive quantitative relationships between maize yield and rainfall; and 4) designing a prototype rainfall index insurance contract. Upon completion of this technical work, a dry-run of the pilot was carried out from June to August 2006. The clientele consisted of BAAC clients (borrowers) who grew maize, lived within the 20 km radius of the Pak Chong Agro-meteorological Station, and were interested in the insurance product.

The dry-run provided an opportunity for the GIA, BAAC, and TMD to practice product marketing and customer enrollment, and to set up a rainfall monitoring system for insurance payout purposes so that the system will be fully functional when the pilot was operational. The dry-run also provided the pilot team with input from farmers to improve the prototype rainfall index developed for Pak Chong. Both BAAC and farmers in the pilot area had a good understanding of their risk environment. As a result, during the dry-run, they were able to apply careful scrutiny to the usefulness of the insurance product, and the role which index-based insurance can play to complement existing risk management measures. Feedback

---

<sup>3</sup> MOAC, Thailand

from farmers and BAAC managers showed that the simple cumulative rainfall index did not reflect the disproportional impact on yield of a prolonged water stress during the vegetative phase and that the contract would need to be altered for the full pilot. This resulted in changes that would provide coverage during the identified “dry spell” period of the 2008 contract.

### *The 2007-2008 Pilot Implementation*

With the refined product, the partners implemented the first year of the full-scale pilot during the 2007 maize growing season. A relatively small total amount of US\$42,400 was insured in two locations in the Pak Chong district. To facilitate the expansion of the pilot to cover two additional sites, the GIA agreed to sponsor the installation of a new automatic weather station. Following the 2007 season, the pilot partners decided to expand the project to other maize producing locations with significant deficit rainfall risk. In the 2008 season, the project grew to cover eleven weather stations in five provinces including Nakorn Ratchasima, Petchaboon, Lopburi, Nakorn Sawan and Saraburi. The insurance companies also offered farmers with more contract variations, including choices in contract start date, sum insured, and premium. US\$300,000 was insured in the second year. In 2008, a group of farmers around one weather station received a large payout due to rainfall deficit measured during the first phase of the contract.

### **Lessons Learned**

While it is too early to fully evaluate the pilot experience in Thailand, an early review of the pilot offers the following observations.

**Additional work on contract design needs to be carried out to design contracts appropriate for Asia.** Most previous work on contract design had been carried out in Africa. While the methodology used in Africa works well for climates with pronounced seasonal variations, it needs to be better adapted to suit tropical climates such as Southeast Asia, and perhaps wetter areas in Africa. New work on contract design could be used in other areas with similar climatic patterns.

**Feedback from the Thai farmers suggested institutional trust plays a key role in product take-up.** During qualitative interviews after the pilot seasons, farmers stated motivations for purchasing insurance included risk management, experimentation, and word-of-mouth from peers, but most importantly, trust in BAAC – an institution with long-term relationships with the farmers – which played a key role in introducing the insurance product. This lesson is consistent with the experience of BASIX, a microfinance institution that first introduced rainfall index-based insurance for farmers in India, and suggests that identifying partners from organizations that farmers trust could be similarly critical to successfully reaching target clientele.

The growth of weather index-based insurance in Thailand has been gradual and the number of farmers insured modest, but even with the limited experience of just two

seasons, the project also has had a significant demonstration effect by generating wider interest from other institutions in the Southeast Asian region, as well as international reinsurers. More importantly, **this project has laid an early institutional foundation for future market development through the investment that the local partners have made in building operational infrastructure, raising public awareness, educating farmers, and engaging in dialogue with the government on broader policy support.**

Despite the operational infrastructure and local capacity in actuarial premium pricing, it is observed that **the primary constraint in the current size of the pilot program, as well as independent market development in Thailand, is the need for an agro-meteorological expertise to work with insurers in designing index-based insurance contracts for new crops and new areas of the country.** This suggests that more engagement in the contract design process from national institutions with relevant agro-meteorological expertise is needed, along with continued investment in weather stations and ongoing cooperation among the insurance sector, BAAC, and the government.

#### **Next steps**

Local program partners are planning to expand the insurance coverage to all maize growing districts in the existing 5 provinces in 2009 (weather stations permitting). They are also discussing the possibility of new weather station installation. The World Bank will continue to provide limited technical advice and support to the Thai partners to ensure the smooth transfer of knowledge for locally designed contracts.