

Maize Seed Industry in Thailand

DEVELOPMENT, CURRENT SITUATION, AND PROSPECTS

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INTRODUCTION

The rise of maize in Thailand from a marginally-consumed snack product in the 1950s to a major commodity today was aided by an effective long-term integration of public and private resources into research, development, and marketing of its seeds. Maize is the most highly-traded seed commodity in Thailand's import/export markets and is one of the main contributors to the country's role today as the third largest seed exporter in Asia after Japan and China. With suitable geography and weather, a highly-trained scientific workforce, and a wide diversity of germplasm, Thailand is well positioned to become a major seed hub in Southeast Asia and tropical Asia more broadly. Despite these favorable conditions, there are concerns that domestic regulations could hinder those aspirations. This policy brief will provide an analysis of the maize seed industry's current state and future prospects, prefacing that with a review of the historical context under which it emerged. Lessons learned from this sector could have implications for the development of the seed industry in other developing countries.

DEVELOPMENT OF THE MAIZE SEED INDUSTRY

The government played a major role in the early stages of development of the maize seed industry. Prior to the 1950s, maize enjoyed limited demand and a marginal market presence, a far cry from today where maize sits behind only rice as the country's most important field crop. This evolution has origins in the 1950s, when the government launched a campaign to promote alternatives to rice in order to diversify agricultural production. To encourage maize production, the government opened land specifically for the crop, distributed seed, and procured output at predetermined prices. At this stage, public sector organizations, with the help of international donors, were largely responsible for research, development, and marketing.

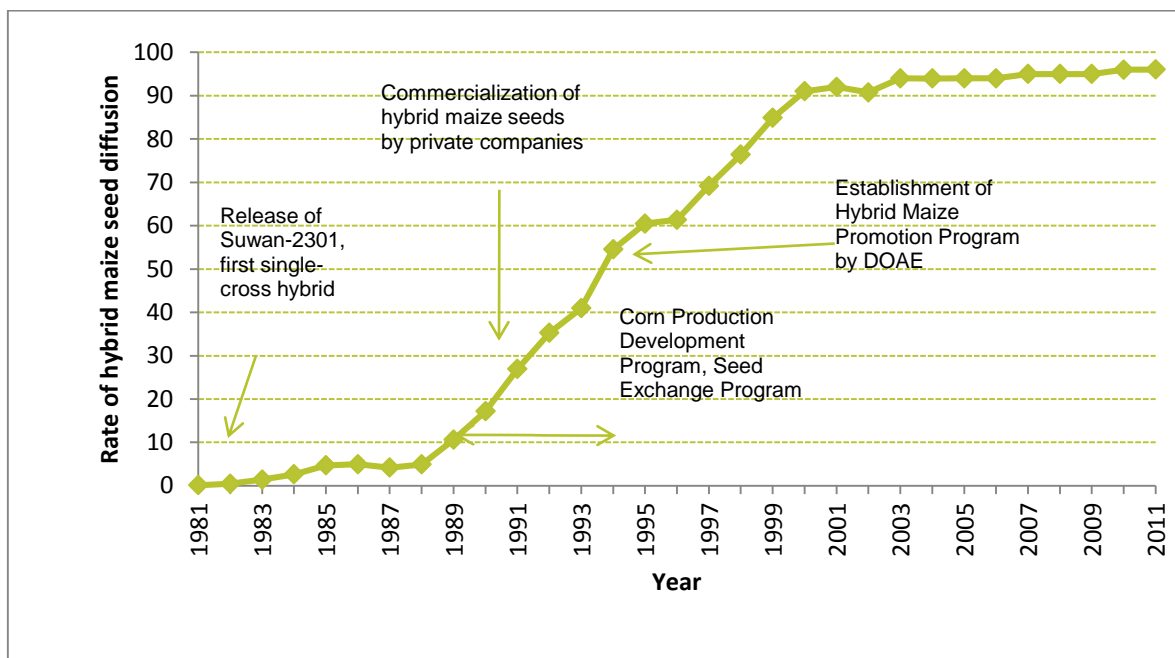
In 1975, the public National Corn and Sorghum Research Center (NCSRC, also known as "Suwan Farm") released Suwan-1, the country's first significant improved open pollinated variety (OPV) of maize. It was highly resistant to downy mildew disease and proved popular with farmers. The public organizations that produced and distributed the seeds became unable to meet demand, allowing private companies such as Bangkok Seed Industry (currently Charoen Pokphand) to fill the void drawing upon genetic material from NCSRC. The Thai Board of Investment (BOI) helped accelerate development in the private sector by offering incentives to potential investors, such as tax holidays and guaranteed repatriation of profits for foreign companies. Subsequently, private companies became influential actors in seed production especially with the proliferation of hybrid maize.

The national hybrid maize development program, launched in the late 1970s, used Suwan-1 as a base for developing other varieties. First generation hybrid maize varieties had unstable characteristics and questionable productive value, however. They would experience improvements in ensuing years not only because of the efforts of public sector organizations like NCSRC, but also those of private companies and foreign multinationals, who introduced commercial trials of hybrid maize varieties. The Department of Agricultural Extension (DOAE) meanwhile helped spread technical knowledge to contract growers and to the production staff of private seed companies.

The adoption of maize hybrids increased rapidly during the early 1990s. In 1989, the government provided support to maize farmers through the Seed Exchange Program instead of direct subsidies. The government also encouraged demand for maize seeds by promoting maize as a replacement for major commodities that were overproduced and experienced depressed prices. The adoption of maize hybrids increased rapidly after the release of the single-cross CP-DK888 variety by Charoen Pokphand (CP) Seeds in 1991 (Suwan-taradon, 2001). Other hybrid seed companies started breeding their own single-cross hybrids and the increase in competition among seed firms provided farmers with more alternatives. Poolsawas and Napasintuwong (2013) credit the mass commercialization of maize

hybrids for its rapid diffusion during the 1990s. Private companies played an important role in this effort, developing promotion programs and providing information to farmers about the advantages of their products. The extraordinary growth of Thailand's feed and livestock industries can be attributed to the parallel success of the hybrid seed industry.

Figure: 1—Rate of hybrid maize diffusion



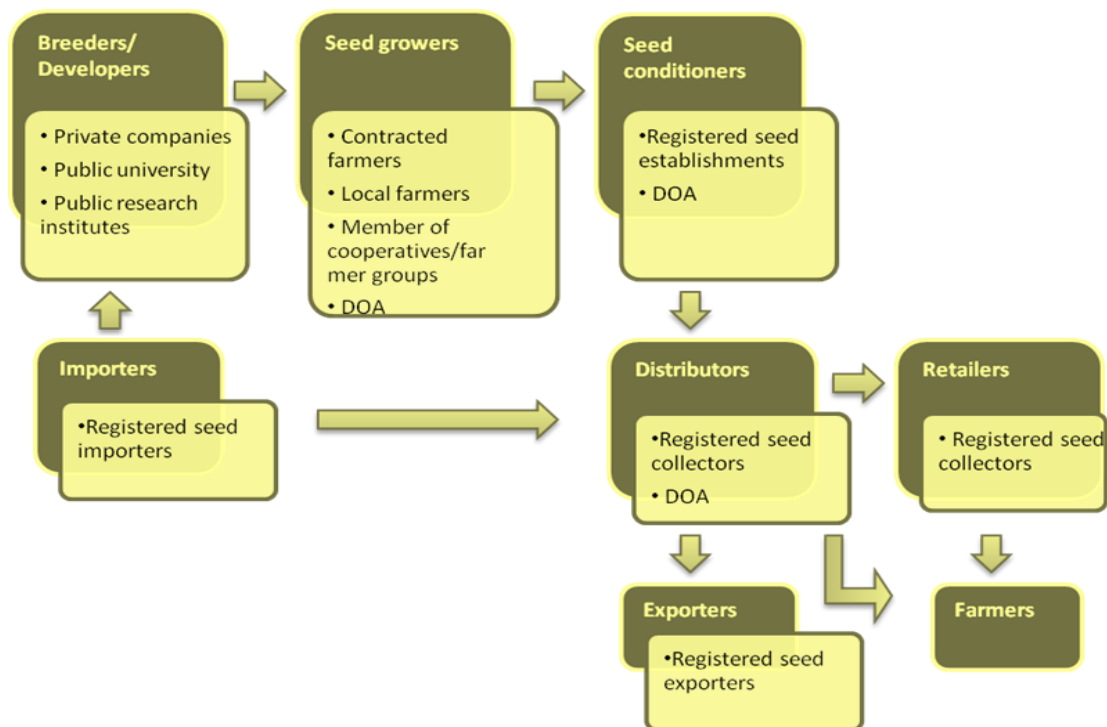
Source: Adapted from Suwantaradon et al., 2012

Maize and sweet corn production occurs mostly in the northern and northeastern regions of Thailand. In the northeast, maize is often grown on rubber plantations and competes for space with rubber production. As rubber trees grow larger, area cultivated for maize decreases. Sweet corn production occurs at a smaller scale and is geared toward domestic consumption. Though there is no rigorous data on the demand for maize seed, it can be estimated using area under cultivation as a proxy. Interviews with private companies reveal that farmers generally used about 18.75 kg of maize seed per hectare, 9.4 kg/ha for sweet corn, and 31.25-37.5 kg/ha for baby corn. In 2012, it was estimated that domestic demand for field maize seed was about 22,000 tons. Numbers for sweet corn and baby corn seed were estimated at 340 and 1,000 tons, respectively.

MAIZE SEED INDUSTRY STRUCTURE

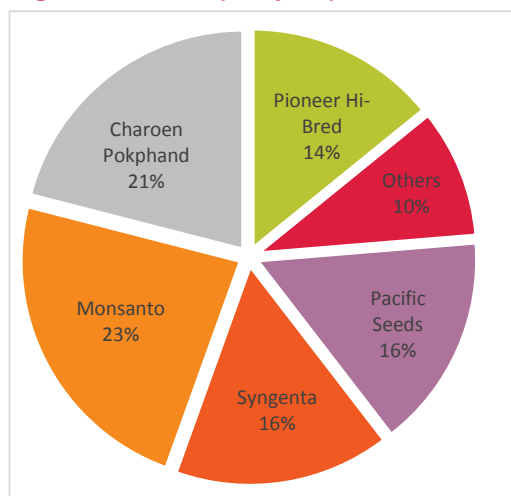
The value chain of the maize seed industry in Thailand is illustrated in Figure 2. Large multinational companies generally integrate into all levels of the value chain, from developing or importing germplasm to marketing and distributing seed. These companies are responsible for most long-term investment in research and development and have exclusive rights to their own registered varieties and brand names. At present, there are five leading multinational companies in the maize seed industry: Monsanto, Charoen Pokphand, Syngenta, Pacific Seeds, and Pioneer Hi-Bred. Of the five, Charoen Pokphand is the only Thai multinational. These five companies account for a combined 90 percent (Figure 3) of maize seed production and have integrated business models that incorporate research and development.

Figure 2—Maize seed industry in Thailand



Local small and medium-sized companies focus primarily on seed multiplication through contracted farmers using germplasm from other public or private sources which they then condition, store and sell. They cannot claim exclusive rights to the seeds that they produce but they are able to register their respective brand names as DOA certified assuming the source is certified. Many of these small producers produce public variety hybrid seeds, but some also engage in unauthorized reproduction of trademarked brands. A diminutive share of maize seeds is sold by the public sector, namely DOA and NCSRC, as well.

Figure 3—Sales (ton/year) and market shares of the top five field maize seed companies in Thailand, 2011



Source: Aungsuratana et al., 2012

Research capacity not only requires large investment in facilities, but also in human resources. At present, the number of skilled scientists, including plant breeders, pathologists, and soil scientists are very low. Industry experts agree that the future of Thailand’s seed industry rests upon its ability to apply increasingly sophisticated research tools for trait identification, breeding, and multiplication. Seed companies engaging in research and development of new varieties require a large initial investment, thus freezing out many smaller competitors. Interviews with large multinational companies revealed that their annual research budgets are approximately 10-15 percent of their global sales. Moreover, research investment for Thai companies ranges from 20-50 million baht (600,000-1,500,000 USD).

Large multinational companies have a long history of breeding research in several countries, which allows them access to a broader spectrum of germplasm to develop new varieties. Conventional breeding techniques, such as screening germplasm, making selections, combining materials, and evaluating progeny, are labor intensive and do not benefit much from economies of scale. On the other hand, multinational companies have a decided advantage over their competitors because of their

developed links with international research centers. A wider selection of germplasm and the ability to conduct research at numerous sites domestically and internationally has benefited these companies the most.

Because of these high barriers to entry, smaller seed companies are limited in their ability to innovate to the same extent. Still, companies like Seed Asia and Bio Seeds conduct their own research and development largely based on public germplasm sold by NCSRC. Public genetic materials that have been developed over time are still valuable to these small companies, who pay a small royalty fee in return.

Public research institutes nowadays play a small role in the development of new varieties. They include public universities, public research institutions such as the National Center for Genetic Engineering and Biotechnology (BIOTEC) under the National Science and Technology Development Agency (NSTDA), and various field crop research centers run by DOA. DOA is the only public institute that engages in a very small amount of seeds for sales.

THAILAND'S MAIZE SEED MARKET

The majority of field maize and sweet corn seeds in Thailand's market are hybrid varieties, while OPVs are sold in smaller quantities. There are a significant number of sellers of hybrid and OPV seeds, but most are collectors and distributors. Farmers have a wide selection of different brand names and trademarks to choose from but the actual differentiation between products tends to be less because similar items are sold under various brand names by small merchants. Moreover, the Plant Variety Protection Law only applies to varieties that were developed after 1999 (when the law was passed) and is poorly enforced. As a result, pirated hybrid seeds are common in the market; it is estimated that approximately 10 percent of hybrid maize seeds in the market are unlicensed or do not reflect proprietary rights.

Companies promote their products by showcasing their varieties at demonstration plots in local communities. Some large companies also run technical training programs to spread their technology to local farmers. The most common marketing strategy among large companies, however, is to offer large-volume discounts or sales incentives to wholesalers and distributors who meet target sales. Establishing brand name recognition and loyalty has become an important aspect of the market, and large companies are especially observed pursuing this goal.

There is evidence, however, that the maize seed industry bears marks of an oligopolistic environment. Insufficient government regulation has allowed some level of collusion between the large companies, evident through cooperative pricing techniques observed in the past decade. That a laissez-faire attitude exists with regards to the maize industry is underpinned by two factors. First, the industry is still small enough that most industry participants, especially at the higher levels, know each other personally. The close network discourages opportunistic or overtly unethical behaviors, which would be punished at a high personal cost. Secondly, it is understood that the large multinational companies have invested in their reputations for quality and service, making them less likely to risk that track record. Both reasons appear to encourage a hands-off approach from a regulatory standpoint but may facilitate collusion.

"SEED HUB" AND FUTURE PROSPECTS

Thailand's aspirations to become the "seed hub of Asia" color its policy intentions for the immediate future. Several related public agencies are involved in promoting the Seed Hub Policy including BIOTEC, which has designed a series of strategic plans with the last phase to be completed in 2016. The goals of the program are to provide farmers with good quality seeds, increase the number and income of seed-producing farmers, and to promote the Thai-owned brand name seeds (National Science and Technology Development Agency 2006). The ultimate target is to increase the value of seed exports to 5 billion baht (160 million USD) by 2016.

The Ministry of Agriculture has set up flagship projects to improve the standards of agricultural products in 2013–2014. As part of the "seed hub" initiative in the run up to the ASEAN Economic Community (AEC) trade agreement, Thailand is increasing research and production of tropical plant seeds, including field crops and vegetables for domestic use and for exports (Office of Agricultural Economics 2013). Accompanying these efforts are incentives provided by the BOI for businesses engaging in biotechnology and plant propagation and development. These policies have included the exemption of import duties on equipment used for biotechnology, the development of science and technology parks, and corporate income tax exemptions and reductions.

CONCLUSION

Thailand's seed industry has benefited from an effective research and investment environment. The country has a successful track record of establishing research facilities that have achieved demonstrable results. Successful privatization introducing more competition in the market has helped develop Thailand's maize seed industry. Privately-developed hybrid varieties have nearly replaced publicly-developed versions in the market, a result of a conducive policy environment, and long-term research efforts. While the oligopolistic structure of the current market in theory implies higher margins and less competitive products, product differentiation and market segmentation has curbed those tendencies. Leading multinational seed companies still must contend with numerous small local competitors supported by public institutions. Maintaining the maize seed industry's competitiveness will require a continuous analysis of regulations and policy.

Toward Thailand's goals of becoming the seed hub for the region, policies favoring investment in research and development are essential for further growth in the industry. Promotion from the BOI could aid new entrants and smaller companies to engage in further innovation, even though they will most likely trail far behind industry leaders in research. In addition, the government must emphasize developing Thailand's research base, especially in the education and training of scientists and other trained professionals. Further collaboration with local and international research institutes could also provide further opportunities.

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