

The Seed Industry in Vietnam

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INTRODUCTION

For the last three decades, Vietnam’s agricultural sector has undergone continuous and impressive change. Having recently transitioned from a planned economy, the private seed industry has only recently begun to emerge and the legislation which governs it is new. Policy reform, which began in 1981, culminated in 1988 with the liberalization of input and output marketing. These changes engendered institutional transformation and resulted in significant development of the agricultural sector, especially rice production. Paddy output increased from 12 million tons in 1980 to 44 million tons in 2012. Since 1989, Vietnam has been a rice exporter and in 1997 the country became the second largest rice exporter in the world. Current exports average 6-7 million tons per year.

In Vietnam, seed is important given that the country is an agriculture-based economy where more than 75 percent of the population lives in rural areas and 60 percent of its labor force works in agricultural sector that encompasses close to 30 percent of the GDP. Rice area accounts for approximately 80 percent of total cropped area and is cultivated by 90 percent of farm households in Vietnam. Despite the importance of agriculture, the seed industry in Vietnam is underdeveloped and can only meet a small share of seed demand. In the cases of hybrid rice, maize, and vegetables, imported seed makes up 70-80 percent of the total. The added challenges of population growth and decreasing agricultural land availability due to industrial and urban expansion, makes it imperative that the seed sector develop and productivity continues to increase.

Demand for rice consumption has been changing from low to high quality rice due to increasing incomes, both in Vietnam and in rice importing countries. The seed industry does not only face the pressure of creating high yielding rice varieties, but also high quality rice to meet domestic and international demand. Improved seed varieties therefore have an important role for transforming agriculture in Vietnam in the future.

The development of the Vietnamese seed industry can be divided into four separate periods.

Table 1—The evolution of the seed industry in Vietnam

1960 – 1970	Seed related institutions are founded, consisting of one national seed company, research institutes, and an agricultural university that focuses primarily on rice.
1971 – 1985	The National Maize Research Institute and other specialized institutes are established. Maize and vegetables seeds are bred, tested, and produced.
1986 – 1995	Hybrid seeds including rice, maize, vegetables, and cotton seeds are introduced. Private sector and foreign companies are allowed to participate in seed industry.
1996 – present	The seed industry has developed rapidly with multiple public and private participants. In this period, hybrid seed breeding has been a key feature.

Throughout the evolution of seed policy, Vietnam has had many successes including the development of a collection of short-duration crop seeds that are good quality, high yielding, adaptable, and have relatively good resistance to pests and diseases. In the northern regions the number of crops per year has increased from two crops (winter-spring rice and autumn rice) to three crops (winter-spring rice, autumn rice, and winter crop) while in the south a single rice crop per year has been replaced by three rice crops per year, or two rice crops plus a winter crop. In both instances, increased cropping has rapidly expanded production. Additional advances in variety improvement have introduced high quality, fragrant rice breeds that are competitive with Thailand, sustaining the high-value export market.

However, high quality certified seeds only account for approximately one quarter of all seeds used. While there have been many advances, the implications of poor adoption suggests that Vietnam still has not reached its seed production potential.

Table 2—Seed demand and seed market volume in Vietnam

Crop	Planted areas in 2007 (1000 ha)	Seed rate (kg/ha)	Seed demand (ton)	Seed market	
				Volume (ton)	Value (1000\$)
1. Rice	7210.0	120	865,200	216,300	131,180
- Hybrid	650.0	27	17,550	17,550	20,568
2. Maize	1067.9	20	21,358	19,200	38,400
3. Peanut	254.6	200	50,920	20,370	22,237
4. Soybean	190.1	100	19,010	11,470	13,912
5. Cotton	20.5	8	164	160	1,164
6. Vegetables	644.0	-	432	267	70,000

Source: estimate by VSTA, 2008

New seed varieties in Vietnam are a mixture of seeds created in the country and imported varieties. According to MARD (2007), between 1977 and 2005, there were 575 new crop varieties that were approved and recognized, including 177 rice varieties, 75 maize varieties, 15 potatoes varieties, and 7 cassava varieties. However, according to the National Center for Crop Test and Inspection (2005), there were in total 688 rice varieties including 159 local varieties and 529 improved varieties grown in the country, much more than the number of registered varieties (177).

Table 3—Number of new crop varieties by periods/ years

New varieties	Number of new crop varieties approved					Areas under improved seed (%)
	1977-2006	2007-2009	2010	2011	2012	
1. Rice	177	59	9	3	8	30
2. Maize	75	35	4	5	3	83
3. Potatoes	15	4				-
4. Soybean	31	6		2		68
5. Peanut	21	4				54.6
6. Tomatoes	22			4		-
7. Coffee (new lines)	17					-
8. Sugarcane	14					-
9. Rubber	17					98.3
10. Tea	10	2				20
11. Cashew nut	10					28.6
12. Fruits	27					-
13. Other	139	12				-
Total	575	216	-	-	-	-

Source: National Center for Crop Test and Inspection, 2000; Vietnam Seed Trade Association, 2010; Crop Department - MARD, 2011, 2012, 2013

Imported seed constitutes a large part of the total seed sold and planted in Vietnam. According to recent statistics by the Vietnam Seed Trade Association, the annual import value of seed is about US\$150 million. Annually, Vietnam imports nearly 15,000 tons of hybrid rice seed from China, accounting for 70-75 percent of rice seed demand, with a value of \$21 million. Similarly, 10,000 tons of hybrid maize is imported mostly from Thailand and India annually comprising more than half of the total seed sold. Hybrid maize varieties account for 84.3 percent of total planted maize area with much of it (51.8 percent) coming from imported varieties. Vietnam has to import 80 percent of vegetable seed from Thailand, China, Japan, Korea and France with the import value estimated at \$70 million.

POLICY LANDSCAPE

The process of registering seed is quite lengthy and often takes 2.5-3 years. The system requires an organization or an individual to submit their variety to a facility for *distinctness, uniformity and stability* (DUS) testing and cultivation-value and use-value (VCU) testing to assess the productivity, quality, resistance against pests and unfavorable conditions, and capacity to produce seeds. The trials ensure that the variety outperforms comparison varieties in at least one of the criteria as follows:

- (a) Productivity is at least 10 percent higher;
- (b) Quality is better in aspects of nutrition, appearance, export potential, or processing;

- (c) Economic benefit is higher;
- (d) Agronomic properties are better (duration, resistance to pests, or unfavorable conditions).

If the testing results meet the requirements, then the varieties are validated by the Grassroots Science Council and passed onto the Professional Science Council which will determine if the variety is suitable for trial production. The duration from trial production to formal recognition of new plant variety must be at least 2 crop seasons but not over 3 years for annual crops, and at least 2 years of harvest but not over 7 years for perennial crops.

After trial production, a dossier of the technical process of cultivation, a report on DUS testing results for at least the first crop, the minutes of the Grassroots Science Council’s meeting, and a written request for recognition of the new plant variety by the provincial Department of Agriculture and Rural Development where the trial is conducted will be submitted to the Crop Department of MARD. Based on the Professional Science Council’s recommendation, the Crop Department proposes to the Minister of MARD to officially recognize the new agricultural plant variety.

Although the testing and recognition of new agricultural plant varieties has made sound achievements, seed registration in Vietnam still faces several challenges. First, the number of crop varieties that need to be tested for registration has increased significantly in recent years due to the liberalization of the sector, which has increased variety development and accelerated seed importation, especially the latter. During the five year period from 2008 to 2012, a total of 1575 DUS tests and 4329 VCU tests were requested. Second, the duration for seed registration, usually 2.5-3 years, is lengthy and the staff for seed testing is limited in both number and qualification. Moreover, facilities for testing are not modern enough to handle the volume of tests and can be improved.

PERFORMANCE AND EFFECTIVENESS OF REGULATORY POLICIES

Although the number of varieties requested for testing and registration are quite high, the number is still quite low compared to the total number of varieties traded in the market as discussed above. To ensure seed quality, MARD and provincial authorities organize seed inspections in the market. As reported by MARD in 2008, 41/64 (64 percent) of the provinces organized periodic inspections at an average of 1.25 visits/year although most visits were announced in advance. Because of limited staff, only a small share of the seed sales can be examined (for example only 8.7 percent in Lam Dong province) so in many cases inspectors focus on the primary crops for that agro-ecological zone. On average, there is only one seed inspector per province and only 70 staff in the whole country. Meanwhile the number of seed varieties in the market is large and often changes from one crop season to the next, especially vegetable seeds.

The main contents of inspection include labeling requirements, quality, and compliance of trading requirements. Inspections have shown that the share of units that violated legal requirements were quite high (Table 4) and the units in violation of the law were quite diversified from big to small companies. Additionally, there are mechanisms for consumers to seek recourse for poor quality seed with successful cases brought against Syngeta (maize) and even local extension agents who provided poor watermelon seeds. Warnings, penalties, and public disclosures are main measures to deal with violating units.

Table 4—Seed test results by centers

Varieties	Northern		Middle and highland		Southern	
	No. of sam- ples	Percentage pass test (%)	No. of sam- ples	Percentage pass test (%)	No. of sam- ples	Percentage pass test (%)
1. Inbred rice	782	5.6	299	29.4	129	14
2. Hybrid rice	666	20.4	21	4.8	-	-
3. Inbred maize	-	-	4	0	-	-
4. Hybrid maize	186	46.2	27	11.1	338	84.6
5. Vegetable	-	-	-	-	128	18
6. Peanut	-	-	2	-	-	-
7. Potatoes	178	6.7	-	-	-	-
Total	1852	14.7	353	26.1	595	55.0

Source: MARD 2008

KEY PLAYERS

According to the Seed Ordinance, MARD is responsible for the implementation of state management for national agricultural and forestry seed varieties. Under them the Crop Department a) Performs state management of seeds b) Formulates strategies, planning of

crop development c) Organizes surveys, statistics on seeds utilization d) Develops procedures, specifications, and technology of agricultural seeds and plant varieties; d) Manages a database of plant varieties and tests the quality of new varieties e) Issues and withdraws licenses and certificates and f) Manages exports and imports of seeds and plant varieties. There also two units under the Crop Department that directly manage the seed sector, including the Plant Variety Protection Office (PVPO) and the National Center for Plant Variety Test and Certification (NCPVTC). The NCPVTC has a main office in Hanoi, and 7 centers in the main geographical regions of the country and cooperates with 54 inspection/certification stations. Management of seed at the provincial level belongs to the Provincial People Committee (PPC) with the help of the Crop Department while at the district level the DARD or the General Economic Department together with the Extension Station and Protection Plant Station participate in seed sector management.

Studies of MARD (2007) and VSTA (2007) highlighted that capacity at the provincial and district levels is weak and equipment for testing is inadequate. In addition, a lack of information systems and information sharing between state management agencies remains a problem hindering coordination and cooperation between agencies.

According to the Vietnam Seed Trade Association, as of 2011, there were 415 businesses operating in the formal seed supply system, not including cooperatives and seed producing groups in rural areas. Of these, there are eight international/multinational companies that operate seed business, most of which concentrate on producing and trading of hybrid maize, vegetable, and rice seeds. There are two types of business models in Vietnam. Some are locally based and operate in many areas of seed production, trade, and retail. Others, such as Monsanto and Syngenta, operate a small representative office in order to submit varieties for DUS and VCU testing and registration. Once approved these companies partner with a Vietnamese counterpart that distributes their seeds.

There are also two seed companies that prior to 2002 were state-owned enterprises. In 2002 these enterprises became joint-stock companies that operate for profit. Vinaseed or National Seed Company (NSC) is the leading firm in producing, importing, and distributing rice seed while the Southern Seed Company is the leading firm in the maize seed market. The market share in rice seed and maize seed of NSC was 25 percent and 7 percent while these figures for SSC was 10 percent and 19 percent, respectively (Vinaseed, 2009). Likewise, at the provincial level there are currently 129 provincial seed centers operating that in the past were government agencies responsible for seed transfer to farmers but these centers have since transformed their operation model into a joint stock company. Lastly, there are five state-owned enterprises that belong to the national research institutes including: the Fruits and Vegetables Research Institute, the National Maize Research Institute, the Southern Horticultural Research Institute, the Agricultural Genetics Institute, and the Food Crops Research Institute. These companies provide consultancy services and participate in seed research and development.

Research activities for seed is mainly conducted by government agencies at the central level, sub-regional level, and universities. There are 18 research institutions or centers and 6 universities that are involved in breeding and adapting improved seed in various regions of Vietnam. Fifteen of 18 research institutions belong to MARD (Ministry of Agriculture and Rural Development).

Since 2005, all research institutions in Vietnam operate autonomously with regard to their research agenda, finances, and organizational structures. The purposes of the autonomy and self-management mechanism are to: 1) improve accountability for research results and to improve the dynamism and creativity of scientific organizations; 2) combine research and technological development with seed production and distribution to speed up the socialization of technological activities; 3) raise the operation efficiency of organizations. In recent years, several research institutions have established enterprises/companies to transfer their research outputs into production and markets.

While it is hoped that these changes would improve the public seed system, there still remains several weaknesses in the system. First, while there have been some good advances in the country due to variety development, the research and development (R&D) system is largely dependent on the imported genetic material (VSTA, 2007). In addition, while there has been a policy change, the R&D priorities are still driven by MARD funding rather than autonomously determined by the institutions themselves, who have a better understanding of their clients' needs. During the period from 2006 to 2010, MARD approved 19 seed projects with an investment of VND 268 billion (US\$ 12 million), but sales of seeds produced from these projects was only VND 16 billion (VietnamNews, 2013). Likewise, performance indicators do not monitor the usefulness and applicability of the research products.

POLICY RECOMMENDATIONS FOR SEED INDUSTRY

The seed industry has significantly contributed to agricultural transformation in Vietnam in recent decades and must continue to do so in the near future in order to deal with the ongoing threats of population growth, climate change, and shifting demands for food. While the formal seed system in Vietnam has made many significant achievements in the last 50 years, it is still underdeveloped given the enduring contribution of the informal sector and the poor adoption rates of certified seeds. This analysis has revealed a number of the weaknesses in research, production, and distribution. As a consequence, the seed industry in Vietnam is highly dependent on imported seeds.

The study proposes the following policy recommendations to develop a viable the seed industry in Vietnam:

- Renovate the administrative system which determines priorities to improve the quality and applicability of research results by: 1) involving stakeholders in seed research strategy development; 2) ensuring more even distribution of government research fund to all actors participating in seed research; 3) using third party quality assurance; and 4) prioritizing the commercialization of varieties.
- Facilitate greater private sector involvement in seed research and production by improving the registration and certification process. Support inter-country collaboration to harmonize and promote international standards.
- Strengthen public institutions to control seed quality at the provincial and district levels by training technical staff in seed testing and providing appropriate equipment. Promote international cooperation in seed testing and certification.
- Build a seed testing and certification information system that fosters information sharing between state management agencies.

The above actions and policy changes open the door for greater private sector involvement in the seed sector while improving the efficiency of the public research and quality assurance systems. This will go a long way toward improving the quantity and quality of seed and will ultimately improve the productivity of Vietnam's farmers.

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