

Structure of Seed Sector

Structure of the Indian Seed Industry

Although the Indian seed market is one of the largest, it is almost exclusively supplied by locally produced seeds. Farmers retain seed of major food crops (wheat, rice, sorghum, millet, corn, and pulses) and commercial crops for many years, and the largest volume of seed trade involves local exchanges of established self-pollinating varieties. The seed replacement rate in most crops is very low, with the exception of cotton and some vegetables. The use of hybrid seeds is mostly confined to cotton, and to some extent to corn, millet, sunflower, and few vegetables. However, awareness about the high yield and quality of produce from hybrid seeds, attracting farmers to switch over to hybrids, is growing. The Indian seed industry used to be dominated by public sector seed companies. However, following the easing of government regulations and the implementation of a new seed policy in 1988, the private sector seed companies have started playing a major role in seed development and marketing. More recently, the government's decision to embrace biotechnology as a means of achieving food security has attracted several leading biotechnology-focused multinational seed companies to India. The composition of the seed industry, by volume of turnover, has reportedly reached a ratio of 60:40 between the private and public sectors.

Public Sector Seeds Companies

Public sector involvement in the seed industry on a national scale began at the beginning of the "green revolution" with the establishment of the National Seed Corporation (NSC) in 1963, which was charged with the responsibility of promoting seed industry development from production through processing, storage and marketing, and establishing a system of quality control. Before that, the Indian seed industry was little developed apart from a small number of private companies dealing with high value vegetable and flower seeds. In the initial years of operation, the NSC concerned itself mainly with foundation seed production and with seed certification after the enactment of Seed Act in 1966. The State Seed Corporations (SSC) were established later with support from the World Bank, initially in nine states, and later expanded to cover 13 states, for production and handling of seed in their respective states.

The role of public sector seed companies is now mostly confined to certified seeds of high volume, low value segment of high yielding varieties of cereals, pulses, and cotton with a limited presence in the high value hybrid sectors of cotton, cereals, and vegetables. Wheat and paddy seed constitutes a major share of the seeds handled by them. The NSC and SSCs work closely together to coordinate procurement and sales prices as well as variety demand and supply. Their presence is considered necessary by the government to ensure the availability of reasonably priced seeds of major crops throughout the country and to make sure that private sector seed companies do not enjoy and exploit unreasonable market power.

The public sector seed companies, however, lag behind in research; they are mostly dependent on public research institutions, under the aegis of Indian Council of Agricultural Research (ICAR) and State Agricultural Universities (SAUs) for their breeder seed requirements. Based on feed back from dealers and end-users, the public sector seed companies/state governments forecast seed demand for various crops three years in advance and a requirement for breeder seeds is placed with the GOI's Ministry of Agriculture.

Using the breeder seeds supplied by government research institutes, the public sector seed companies produce foundation seeds on government farms or reliable, well-trained contract farms. These are further multiplied in contract farmers' fields next year as certified seeds for commercial distribution. If for some reasons (drought or other weather calamities) the supply of certified seeds falls short of requirements, the public sector seed companies source commercial grain from the market, upgrade the quality, and after proper testing distribute it as quality seeds.

All seed grown by contract growers for seed corporations meeting the specified standards attract a premium price over and above the commercial grain price for that crop. The premium can vary between 25 percent for cereals to over 100 percent for hybrids. In the public sector, NSC is usually the retail price setter with the SSCs following NSC prices in determining their own for similar or substitute varieties. For self-pollinated field crops, an accepted basis is to add a margin of 15 to 25 percent on production costs. For hybrid seeds of cereals and vegetables, prices to some degree reflect market trends. However, there is government intervention in the pricing of seeds produced by public sector corporations with the degree of intervention varying from state to state. Some states are now thinking of giving greater autonomy to their seed corporations to make them financially viable by allowing them to market private branded seeds, domestically produced or imported. An advantage to the government seed companies is that they have a vast distribution network and trusted brand image. The reason why they are losing market share is because seeds by private companies often outperform the publicly available varieties. Some SSCs have started their own research to evolve superior propriety hybrids.

Private Sector Seed Companies

Easing of government regulations in the late 1980s spurred enormous development within the seed industry by attracting several foreign seed companies to India. While some of them (like Cargill) entered through joint venture partnerships with Indian seed companies, some others already had a presence in India through affiliate companies (like Hindustan Lever).

They identified potential crops for hybridization and started research and development activities. Typically they concentrated on hybrids, mainly corn, cotton, sunflower, vegetables, and flowers (more recently on rice), and they now account for a major share of commercial production of these seeds in India. The basic reason for the private sector's focus on these crops is that it involves low production volume and higher margins. Concomitantly, they had little interest in developing self-pollinated crops, which involve high volume and low margin and are more prone to piracy in the absence of an effective Plant Variety Protection regime in India. Furthermore, there is no significant government intervention in the pricing of these hybrids, and the Indian seed regulations permit marketing of truthfully labeled seeds.

Currently, some 500 hybrids of field crops and vegetables are being marketed, as truthfully labeled seeds, mostly by private seed companies. The private seed sector now comprises some twenty or so large players (with sales turnover exceeding rs. 200 million), several medium companies (sales turn over between rs. 200 million and 20 million), and a large number of small, unorganized players (sales turnover less than rs. 20 million) with local presence.

The private seed industry is now undergoing a transition following the Indian government's focus on biotechnology research, as a means of increasing agricultural production and also driven by trends in the domestic and world seed market. Intensifying international competition, increasing R&D costs, and the complexity of biotechnology have led to increased consolidation of the Indian seed industry with several of the large and medium companies merging or being taken over by multinational seed companies. Most large multinational seed companies now have their presence in India (either as a joint venture or with 100 percent equity) with their main focus on biotechnology. These include Monsanto, Bayer CropScience, Syngenta, Advanta, Hicks-Muse-Tate, Emergent Genetics, Dow Agro, Bioseed Genetics International Inc., Tokita Seed Co, and Nunhems Zaden BV.

Another factor attracting international seed companies to India is the country's varied agroclimatic conditions and abundant skilled and unskilled labor, as seed production, particularly hybrid seed production, is highly labor intensive. Private seed production is largely centered around Bangalore for vegetable crops and Hyderabad for field crops, particularly cottonseeds.

The emergence of these two seed production centers is due to ideal climatic conditions, better infrastructure, the technology and research leadership, and the expertise of the two regions' seed farmers in manipulating crops for perfectly synchronized flowering. The initial focus of many of these companies has been cottonseed, for which genetically modified (Bt) hybrids have already been approved by the Indian government for commercial cultivation, with other bio-engineered crops in the pipeline. Most of these companies have licensing agreement with Monsanto for the Bt gene; some are trying to develop their own Bt technology, legally or illegally.

The seed industry is represented at the national level by two associations " The Seed Association of India" based in New Delhi and the "Association of Seed Industries" based in Mumbai. Recently, a third association called All India Crop Biotechnology Association (AICBA), was formed with members from mostly hybrid seed producers and multinationals like Monsanto and Dow Chemicals.

Variety Development

Variety development (especially for self-pollinated crops) is predominantly carried out in the public sector, although in recent years there is growing private sector involvement, which focuses mainly on hybrid cereals, cotton, sunflower, vegetables, and flowers. The private sector is also actively involved in developing bio-engineered crops of cotton, oilseeds, and other crops. The ICAR, operating through 30 All India Coordinated Crop Improvement Projects (AICCIPs), five Crop Directorates, and seven National Research Centers coordinates public sector plant breeding. Basic genetic material from which new varieties are developed is available from the institutions' own resources and from the National Bureau of Plant Genetic Resources (NBPGR), through which India has established a working relationship with international agricultural research centers. ICAR's own institutes and several SAUs at research centers located in different parts of the country and focusing on various agroclimatic zones carry out the AICCIPs.

The present arrangement in India for variety development, testing, evaluation, and release are as follows:

- New varieties are developed by SAUs, ICAR institutes, and private seed companies.
- Varieties that show some promise are entered into the All India Coordinated Trials (AICT) operated by SAUs, ICAR institutes, and State Agricultural Departments under the auspices of ICAR.
- Results of the AICT are presented at the respective Annual Workshops of participating

scientists working on the particular crop, where recommendations are formulated for submission to the Variety Release Sub-Committee of the Central Seed Committee who makes final recommendations to the Agriculture Ministry on which varieties should be released and notified.

Public-Private Sector Cooperation

Cooperation between private sector seed companies and public research institutes under ICAR, SAUs, and the International Crop Research Institute for Semi-Arid Tropics (ICRISAT), supported by the Consultative Group on International Agricultural Research (CGIAR), is growing. Public sector breeder seeds are available free of charge to private seed companies with no strings attached. The AICT annual workshops provide venues to private sector seed companies to assess what is available with public research institutes. Under the “consortium” model with ICRISAT, private companies can jointly fund research that results in publicly available parental lines, which they often cross with in-house genetics to produce proprietary hybrids. ICRISAT recently introduced a live-in campus for private sector researchers to use the institutions’ facilities and expertise. ICRISAT is focusing more on private sector partnerships for funding reasons and also because of private companies’ effectiveness in getting the research result out to farmers. ICRISAT is currently reviewing its policy of keeping all research in the public domain and is considering licensing/royalties/exclusive rights. Private companies can also fully fund research at SAUs for exclusive rights on the results and/or hire professors as consultants, although the degree of cooperation varies from state to state.