

Past to Future: A Pathway to Indian Seed Sector

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Introduction:

As the embodiment of development and nutrition, seeds are the fundamental unit of agriculture. In India, where millions of people depend on agriculture as their primary source of income, the seed industry is extremely important. With the help of changing market dynamics, legislative changes, and technological improvements, the Indian seed sector has experienced revolutionary changes over time. This article explores the current state, obstacles, and potential of India's seed industry, delving into its complexities.

Historical Evolution:

India's seed industry has a long history, dating back to a time when farmers relied on customary methods for conserving and choosing seeds. High-yielding varieties (HYVs) of seeds, on the other hand, heralded in a new age with the arrival of the Green Revolution in the 1960s. This transformed agricultural output and helped India become self-sufficient after it had been a food-deficient country.

With the establishment of both public and private seed corporations, the seed industry experienced tremendous expansion in the ensuing decades. Through organizations like the Indian Council of Agricultural Research (ICAR) and state agricultural universities, the government significantly contributed to the advancement of seed research and development. In addition, the 1990s' liberalization policies promoted private sector involvement, which raised funding for infrastructure and seed technologies.

Current Landscape:

India is currently among the world's top producers and consumers of seeds. A wide variety of crops, such as grains, pulses, oilseeds, vegetables, and fruits, are what define this industry. The seed market is divided into two sectors: the formal sector is made up of public institutions, organized seed firms, and research organizations; the informal sector is made up of traditional seed savers and local seed market places.

The prevalence of unregulated seed markets presents issues with seed quality, genetic purity, and varietal variation. In order to tackle these concerns, the government has implemented legislative frameworks including the Seeds Act of 1966 and the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act of 2001. These frameworks are designed to guarantee quality assurance, safeguard intellectual property, and provide farmers with equitable recompense.

Seed production system in India

The restricted generations method of gradual seed multiplication is mostly followed by the Indian seed program. In order to preserve the integrity of the variety as it moves from the breeder to the farmer, the system offers sufficient safeguards for quality assurance in the seed multiplication chain. It recognizes three generations: Nucleus, Breeder, Foundation and Certified seeds.

Nucleus Seed

A Nucleus seed is initial seed which serves as the foundation for maintaining the genetic purity of the variety. It emphasizes the critical role of the plant breeder in managing the nucleus stock to ensure the consistency of subsequent seeds. The nucleus stock is not accessible to farmers, as it is solely managed by the breeder. The next stage after the nucleus stock is the development of Breeder Seed.

Breeder Seed

Breeder seed is created by the original breeder or by a sponsored breeder and is the offspring of nucleus seed of a variety. The Indian Council of Agricultural Research (ICAR) oversees the creation of breeder seeds, which is carried out with assistance from ICAR Research Institutions, National Research Centers, State Agricultural Universities (SAUs), and the All India Coordinated Research Project of various crops. Over the years, the amount of breeder seed produced has steadily increased. Golden yellow color tag is issued for the Breeder seed.

Foundation Seed

Breeder seed's offspring, known as foundation seed, must be generated from either breeder seed or foundation seed that may be directly linked to breeder seed. The National seeds corporation (NSC), State Seeds Corporations, State departments of Agriculture, and Private

seed producers who possess the requisite infrastructure facilities have been entrusted with the production of foundation seed. White color tag is issued.

Certified Seed

The offspring of foundation seed, certified seed needs to adhere to the seed certification requirements outlined in the IMSCS, 2013. As long as the process doesn't go beyond three generations from foundation seed stage I, certified seeds can also be generated from certified seeds in the case of self-pollinated crops. State Seeds Corporation, NSC, SFCI, and other public, cooperative, and private organizations, among others, organize the production of certified seed on their own farms, government farms, and progressive farmer's fields. Azor blue color tag is issued.



Challenges and Opportunities:

Notwithstanding notable advancements, the Indian seed industry confronts various obstacles. The spread of fake seeds, which causes crop failures and financial losses for farmers, is one of the main issues. It is still crucial to make sure that certified seeds are reasonably priced and accessible, particularly for smallholder farmers. Furthermore, the regulatory framework is frequently criticized for being too complicated and for having bureaucratic roadblocks that prevent investment and innovation.



But there are also lots of chances amid these difficulties. The swift progress in the fields of biotechnology, genomics, and precision breeding presents a great opportunity to create crop varieties that are stress-tolerant and high-yielding, suitable for the varied agro-climatic conditions of India.

Future Directions:

Future prospects for India's seed industry depend on creativity, cooperation, and environmentally friendly methods. Through the adoption of digital technologies like blockchain and remote sensing, the seed value chain can become more efficient, transparent, and traceable. In order to maximize knowledge, assets, and market connections and hasten the creation and uptake of new varieties, public-private partnerships, or PPPs, are essential.

In order to lessen the effects of climate change and guarantee food security, there is also an increasing focus on climate-resilient seeds and conservation agriculture techniques. Improving farmer education, seed certification, and extension services are essential for advancing best practices and defending the interests of farmers and consumers.

Conclusion:

In summary, the Indian seed industry is at a turning point, ready for expansion and innovation despite a variety of obstacles. As the foundation of agriculture, seeds hold the key to millions of people's sustainable livelihoods and a plentiful harvest. India can achieve its goal of having a resilient, inclusive, and self-sufficient agriculture sector by creating an environment that supports research, entrepreneurship, and fair access to high-quality seeds.

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