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India's Seed Sector: What is New, What is Working, and What Still Needs Fixing

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The seed has been the most essential element at the core of India's ambitions of agricultural sovereignty and food security. In recent years, India's seed industry has been evolving far quicker than most people realise, owing to a combination of private investment, new government initiatives, policy discussions, and a determination to provide farmers with higher-quality, climate-resilient seed. This article provides a concise, easily readable overview of the current events and government programs influencing the seed industry in India.

Indian Seed Industry: Size, Growth, and Why It Matters?

With an approximate size of about 3.82 billion USD, globally the Indian seed market is currently at the fifth position and is expected to expand at a compound annual growth rate (CAGR) of 5.56 % over the following five years (Mordor Intelligence, 2025). This growth is backed by the rising usage of certified or quality seeds by farmers who now acknowledge the substantial return on investment that high-quality seeds offer. The proportion of certified seeds sown area to the area under farm-saved seeds, known as the Seed Replacement Rate (SRR), has been steadily rising over the years for different crops (Chauhan et al., 2016). Better quality seeds are one of the most economical ways to increase yields and improve farm earnings. It usually delivers a greater productivity enhancement from marginal input changes. Thus, policies with a seed sector focus are crucial for agricultural development.

Recent Government Push: Schemes, Funds, and Institutional Action

In recent years, the central government has significantly increased its efforts in the areas of seed production, accessibility, and quality control. Some of the important public actions consist of the following.

1. National Mission on High-Yielding Seeds (NMHYS): This project was announced on February 1, 2025, during the Union Budget 2025–26 presentations with Rs. 100 crores in funding. It intends to increase farm productivity by creating and promoting high-yielding, biotic and abiotic stress-resistant cultivars. Under this program, more than 100 new seed types have been made available since July 2024. There is a provision of some local Centres of Excellence which would aid in farmer adoption and research (Shukla, 2025).

2. Seed Authentication, Traceability and Holistic Inventory (SATHI): It is an online system launched by the Central Government on 19 April 2023 to improve the accountability and credibility of the seed supply system. Farmers may quickly obtain information on the seed's origin, registration status, quality test results, and legitimacy of the variety by scanning a distinctive QR code attached to each seed packet via the SATHI mobile app. It has integrated 75,330 seed cultivators and more than 5,678 seed-producing entities over 16 states (Mittal et al., 2024). By providing access to real-time data, it enables farmers to make sound decisions, protects them from fraudulent or inferior seeds, and helps seed manufacturers manage their inventory more effectively. More than 32,500 samples failed in

seed quality testing alone in 2025, underscoring the significance of a strong monitoring system in protecting farmers' income and advancing sustainable agriculture (Ministry of Agriculture & Farmers Welfare, 2024; Khan, 2025).

3. Clean Plant Program: This initiative, announced during the 2023-25 budget speech, finally got approval on August 9, 2024, with a budget of Rs. 1,765.67 crores. The National Horticulture Board is implementing this program along with ICAR's support. Its goal is to ensure Indian farmers have access to high-quality, virus-free seeds and planting materials to improve yields and exports. The central government will establish nine Clean Plant Centres nationwide under this program for crops such as grapes, citrus, mango, guava, pomegranate, and temperate fruits, equipped with state-of-the-art tissue culture and testing facilities (Ministry of Agriculture & Farmers Welfare, 2024).

4. National Seed Congress (2024): The 13th National Seed Congress (NSC), 2024, at Varanasi, saw the participation of 700 delegates, comprising business professionals, scientists, and policymakers, to fortify India's seed industry. Showcased projects like the creation of 200 seed parks in Uttar Pradesh and the introduction of the Rice Fallow Webpage & Atlas to support crop planning in Eastern India (Ministry of Agriculture & Farmers Welfare, 2024; IRRI, 2024).

5. Sub-Mission on Seeds and Planting Materials (SMSP): This scheme was initially started in 2014–15 to promote certified seed production, creation of infrastructure, and seed distribution systems in order to increase the production and dissemination of high-quality seeds throughout India. During 2023-24, this was incorporated into the National Food Security and Nutrition Mission (NFSNM) as its seed component. Under the combined SMSP-NFSNM scheme, a budget of ₹270.90 crore was allocated for 2024–2025. Of this amount, Rs. 141.46 crore went towards the Seed Village Programme, which promoted decentralised seed production and local availability of high-quality seeds (Ministry of Agriculture & Farmers Welfare, 2025).

6. Recent Progress by the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Authority: The PPV&FR Authority has recently identified some bottlenecks in the varietal registration process, which led to the certificate clearance of many backlog applications during the year 2022-23 and 2023-24 (PPV&FRA Annual Report, 2023-24). To strengthen the seed certification and variety protection system, the PARV portal (Portal to Apply for Registration of Plant Varieties) was launched on September 12, 2023, which allowed for online application, real-time monitoring, and electronic certifications for plant varieties (Saxena, 2023).

Seed replacement rate, certified seed share, and adoption patterns

The Seed Replacement Rate (SRR) varies significantly among crops in India's seed system. NITI Aayog projects that the SRR for paddy will go from 44% in 2019–20 to 43% in 2025–26 and then to around 56% in 2047–48 (NITI Aayog, 2024). During the same time period, wheat is estimated to increase from roughly 33% to 50–64%, and pulses from 42% to 54%. Although there has been progress, the spread of certified/quality seed is uneven. Although crops like vegetables and cotton have good levels of adoption, the share sold in food crops, such as cereals, is frequently only 30–40%, with a large portion of the market depending on truthfully labelled (TL) seed instead of full certified varieties (CRISP, 2021). These trends point to a twofold policy hurdle: increasing the supply of certified seeds for pulses and oilseeds to increase food security and increasing the SRR in cereals to increase productivity.

Where the gaps still are: Practical challenges

Despite the positive trend, there are still several enduring obstacles.

1. SRR variations: Productivity increases will be inconsistent unless SRR in pulses and staples improves across crops and states. (CRISP and CGIAR, 2023).

2. Duplicate seed and transparency: As more and more reports of fake or inferior inputs come to light, the government is considering more substantial penalties and improved digital labelling. (Mohan, 2025).

3. Lack of foundation or breeder seeds for scaling of industry: Institutional allocations through the seed hub system aim to provide private seed firms with a dependable supply of breeder and foundation seed from government sources, but execution is crucial.

4. Uncertainty in regulations: Investors and researchers face uncertainty and policy complications when a new Seeds Bill is delayed or contested. (Devananda, 2024).

Some practical suggestions

Research and policy articles agree on several doable actions:

1. Expand seed hubs and connect them to storage and credit so that long-term seed replication capability can be achieved.
2. To restore market confidence, seed bags should include digital traceability and QR labelling.
3. Focused SRR initiatives for key crops (such as paddy, wheat, maize, soybeans, and pulse crops) are needed.
4. To prevent confusing rules, upgrade the regulatory framework while upholding center-state coordination.

Conclusion: careful optimism: momentum is important, but so is execution

Larger business growth, proactive public backing for seed hubs and infrastructure, a new focus on breeder-to-farmer networks, and increased requests for legal reformation are all indicators of the recent acceleration in the seed industry. The success of this seed revolution, however, depends primarily on how it is carried out. This includes assuring that breeder and foundation seeds are available, stepping up compliance against counterfeit goods, expanding farmer awareness, and coordinating subsidies and programs to increase SRR in key crops. India's seed industry can provide a significant productivity boost in the upcoming ten years, provided that lawmakers, public research organisations, and private breeders adhere to coordinated programs and storage, revolving finances, and traceability issues are addressed.

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