

Seeds

SOWING THE FUTURE OF AGRICULTURE

Seeds – the biological point of origin of a crop, decides the future of a nation. A strong agriculturally sound nation must essentially have a robust seed sector to support it. The seed sector has the immense responsibility of not only producing certified seeds, but also supplying them at affordable rates and making them available at appropriate times. The seeds of requisite quality is a constant need and the onus rests with the plant breeding community. The traits are most often decided by the demand, geographical and ecological needs, stresses and most importantly their economic advantage.



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India today is one of the most agriculturally developed nations. The country owes this status to a sound and well established seed sector. A slew of policy measures enacted by the government facilitated the development of the seed industry. The New Seed Development Policy introduced during 1988 – 1989 gave access to Indian farmers to the best of seed and planting materials available anywhere on the world and the policy stimulated appreciable investments by private individuals, Indian Corporate and MNCs in the Indian seed sector. The vibrant seed segment with equal participation from public and private seed sector had thus so far ensured that needs of Indian farmers are well met in terms of quantity and quality. However, for a country as diverse and vast as India, maintaining quality becomes critical.

Indian Seed Industry So Far....

Over the last decade, global seed industry has tripled in size reaching USD 45 billion and is estimated to grow at same rate crossing USD 92 billion by 2020. USA, France, China, Brazil and India are top markets contributing to 66 per cent of total

global market together. The global organic seed market is expected to reach USD 4.59 billion by 2022, according to a new report by Grand View Research, Inc. Growing health consciousness and environmental awareness have resulted in shift in consumer preferences towards organic food. Such trends are projected to complement the organic seed market in the near future.

Indian seed industry is ranked fifth in the world. Indian seed market has shown robust CAGR of 19 percent over last four years growing from USD 1 billion in 2010 to USD 2.2 billion in 2014. In value terms, the major growth has come from the increased adoption of Bt Cotton hybrids, single cross Corn hybrids and hybrid vegetables. The volume growth has mainly come through increased Seed Replacement Rate observed in crops like Paddy and Wheat. Indian seed industry is estimated to grow at 12-13 per cent crossing USD 3 billion mark by 2020.

The overall Indian seed market is expected to grow at 11 percent annually, while Indian vegetable seed market is expected grow at 14.6 percent. In 2020, Indian field crop market would cross USD





Domestic vegetable seeds industry is expected to double from the current size to around Rs. 8,000 crore in the next five years. Over the last two & half decades, vegetable crops produced in India has nearly trebled, increasing to estimated 181 million tonnes in FY2018 from 59 million tonnes in FY1992.

3 billion mark, while vegetable seeds market would reach USD 700 million. The contribution of varietal seeds to the overall commercial seeds in India has witnessed a steep decline from 72 percent in FY'2007 to 36.8 percent in FY'2013. The Indian seed market is majorly contributed by non-vegetable seeds such as Corn, Cotton, Paddy, Wheat, Sorghum, Sunflower and Millets. In FY'2013, non-vegetable seeds accounted for 82.2 percent with Cotton alone accounting for 36 percent.

Domestic vegetable seeds industry is expected to double from the current size to around Rs. 8,000 crore in the next five years. This growth will be necessitated by the estimated growth in vegetable production required to meet future demand, and driven by greater use of hybrid seeds, which as of now have low penetration. Over the last two & half decades, vegetable crops produced in India has nearly trebled, increasing to estimated 181 million tonnes in FY2018 from 59 million tonnes in FY1992.

At present with the private sector dominating the market (with around 76 percent market share), there has been intense competition and a proliferation of companies. Today the private sector plays a dominant role both in R&D and marketing with the underlying infrastructure, technical skills, and production capacity. The New Policy on Seed Development of 1988 played a big role in opening up Indian agriculture to world seed market. The Policy greatly liberalized import of vegetable and flower seeds in general, and seeds of other commodities

to some extent and also encouraged the multinational seed companies to enter the Indian Seed Market. However, export of seed from India reached new heights with the implementation of Export Import Policy, 2002-2007.

Today India ranks 26th on the global list with annual seed export of USD 138 million and 1.38 per cent share in overall global seed export. If the exports are segregated into field and vegetable crops seed, India exports field crop seeds to the tune of USD 71.4 million and vegetable crop seeds to USD 67 million. However, India's position is comparatively better in vegetable seed export having ranked in top 15 countries with share of 1.94 percent. Field crop seeds export includes, Corn seed which has largest share, with the annual export value of USD 29 Million, followed by Sorghum (USD 17.1 Million), Rice (USD 8.2 Million), Soybean (USD 8.2 Million), Sunflower (USD 4.3 Million) and Cotton (USD 0.27 Million).

The Policy Bolsters

Indian policies have played a key role in developing India's seed potential. The foundation of today's seed sector was laid in 1966. The parliament passed the Seeds Act 1966 to provide legal framework around seed certification and make good quality seeds available to the cultivators. Under this act, Seed rules were framed and notified in 1968 and systematic Seed Certification started in India in 1969. This act provided for establishment of a Central Seed Committee to advise the states in seed related matters. It also provided for establishment of Seed Certification Agencies in the states; Seed



certification Boards and State Seed Testing Laboratories.

Later constituting of Seed Review Team-SRT in 1968 and National Commission on Agriculture's Seed Group in 1972 further paved the way for development of Indian seed sector. With the launching of the World Bank aided National Seeds Programme (1975-85), a transformation change was brought about. The three phased programme led to the creation of State Seeds Corporations, State Seed Certification Agencies, State Seed Testing Laboratories, Breeder Seed Programmes etc. Later on, many programmes and schemes such as Seed Control Order (1983), Creation of the Technology Mission on Oilseeds & Pulses (TMOP) in 1986 (now called the Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM)), Production and Distribution Subsidy, Distribution of Seed Mini-kits and Seed Transport Subsidy Scheme (1987) further

expanded the scope of the seed segment. The New Policy on Seed Development (1988) was a game changer. The policy encouraged the private sector and import of vegetable and flower seeds. Foreign Direct Investment was also permitted in seed sector.

National Seeds Policy (2002) introduced another facet into the seed sector. With the New Policy in Development of Seed, the seed scene in India observed a spurt in improved varieties. This failed to protect the rights of the farmers over their seeds. To address this issue, the National Seed Policy was introduced. The policy was launched to – provide intellectual property protection to new varieties; usher this sector into planned development; protect the interest of farmers and encourage conservation of agro-biodiversity. It focused on Varietal Development and Plant Varieties Protection, Seed Production, Quality Assurance, Seed Distribution and Marketing,

Infrastructure facilities, Transgenic Plant Varieties, Import of seeds and planting material, Export of seeds, Promotion of Domestic Seed and Strengthening of monitoring system. The policy advocated the establishment of a National Gene Fund and a Plant Varieties & Farmers' Rights Protection (PVP) Authority.

The Seeds Bill (2004), still pending, seeks to regulate the production, distribution and sale of seeds. The Standing Committee has recommended that farmers selling or exchanging seeds from other farmers be exempt from this requirement. The Bill has been pending since December 2004. The government has proposed new amendments to the Bill in April 2010 and November 2010, accepting most of the recommendations given by the Standing Committee. The Seeds Bill, 2004 aims to regulate the quality of seeds sold, and replaces the Seeds Act, 1966. All varieties of seeds for sale have to





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be registered. The seeds are required to meet certain prescribed minimum standards. Transgenic varieties of seeds can be registered only after the applicant has obtained clearance under the Environment (Protection) Act, 1986. In addition, the label of a seed container has to indicate specified information. The Bill exempts farmers from the requirement of compulsory registration. Farmers are allowed to sow, exchange or sell their farm seeds and planting material without having to conform to the prescribed minimum limits of germination, physical purity and genetic purity (as required by registered seeds). However, farmers cannot sell any seed under a brand

name. If a registered variety of seed fails to perform to expected standards, the farmer can claim compensation from the producer or dealer. The Bill provides for setting up a compensation committee that shall hear and decide these cases. It also provides for an appellate mechanism to be set up by notification.

From Breeder to Farmer

Seeds are a critical input in the agriculture system. Pure seeds are the foundation of today's agriculture. Hence any dilution in its quality can be a sufficient reason to erode the credibility of improved seeds. The production of improved seeds therefore is highly regulated and monitored in India.

The Indian seed programme largely adheres to the limited generations' system for seed multiplication in a phased manner. The system recognizes three generations namely breeder, foundation and certified seeds and provides adequate safeguards for quality assurance in the seed multiplication chain to maintain the purity of the variety as it flows from the breeder to the farmer.

Breeder seed forms the foundation of the seed production programme and is the progeny of nucleus seed of a variety produced by the originating breeder or by a sponsored breeder. Breeder seed production is the mandate of ICAR and is being undertaken with the help



of ICAR Research Institutions, National Research Centres and All India Coordinated Research Project of different crops; State Agricultural Universities (SAUs) with 14 centres established in different States; Sponsored breeders recognized by selected State Seed Corporations, and Non-Governmental Organizations. ICAR also promotes sponsored breeder seed production programme through the National Seeds Corporation (NSC) / State Farms Corporation of India (SFCI), State Seeds Corporation (SSCs), Krishi Vigyan Kendras (KVKs) etc.

Foundation seed is the progeny of breeder seed and is required to be produced from breeder seed or from foundation seed which can be clearly traced to breeder seed. The responsibility for production of foundation seed has been entrusted to the NSC, SFCI, State Seeds Corporation, State Departments of Agriculture and private seed producers, who have the necessary infrastructure facilities. Foundation seed is required to meet the standards of seed certification prescribed in the Indian Minimum Seeds Certification Standards, both at the field and laboratory testing.

Certified seed, which is the next link in the seed production chain is the progeny of foundation seed and must meet the standards of seed certification prescribed in the

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“Indian Agriculture is poised for continuous growth in the years ahead. In the upcoming decade 2018-2028, the overall growth in agriculture is expected to increase in comparison with the last few years GVA growth rate of 2-5%. Seed Industry is expected to be an important contributor to this growth. To achieve this potential, all the stake holders, and particularly the Industry participants and the Government, will be required to work hand in hand. The Industry may enhance its investment in new product development. It may create high yielding seeds or seeds which are more tolerant to biotic or abiotic stresses. In the face of flattish or declining land under cultivation, increase in yield becomes critical. Equally ecological changes brought about by climate change creates a need for stress resistant / tolerant seeds. Industry may take forward such products to the farmers through wide extension services. To motivate the Industry to spend on R&D and extension services, the government may adopt very constructive policies. Creating a predictable policy which is stable across different states will allow Industry to both plan ahead and invest in new product development & extension services with an expectation of catering to the growing and large all India Market. Schemes such as the PDPS which have been successfully introduced in some parts of the country will help farmers deal with market volatility better. Additionally creating a constructive climate for biotechnology will motivate both scientists and Industry. It is hoped that some of these initiatives will come to pass so that the potential opportunity is well captured”.

Indian Minimum Seeds Certification Standards, 1988. In case of self pollinated crops, certified seeds can also be produced from certified seeds provided it does not go beyond three generations from foundation seed

stage-I.

The production and distribution of quality/certified seeds is primarily the responsibility of the State Governments. Certified seed production is organized through State Seed Corporation, Departmental Agricultural Farms, Cooperatives etc. The distribution of seeds is undertaken through a number of channels i.e. departmental outlets at block and village level, cooperatives, outlets of seed corporations, private dealers etc. The efforts of the State Governments are being supplemented by NSC and SFCI which produce varieties of national importance. NSC markets its seeds through its own marketing network and also through its dealer network. SFCI markets its seeds mainly through the State Departments of Agriculture and the State Seed Corporations. The production of certified seed by NSC and State Seed Corporations

YEAR	Production/Availability of Seed (Metric Tonnes)		
	Breeder Seed (Production)	Foundation Seed	Certified / Quality seed
2005-06	6823	74800	1405000
2006-07	7382	79654	1481800
2007-08	9196	85254	1943100
2008-09	9441	96274	2503500
2009-10	10683	114638	2797200
2010-11	11921	180640	3213592
2011-12	12338	222681	3536200
2012-13	11020	161700	3285800
2013-14	8229	174307	3473130*
2014-15	8621	157616	3517664
2015-16	9036	149542	3435248
2016-17	11221.8 (Target)	220907	3802904

The contribution of private sector seed companies in total seed production of the country is depicted in the following table:

Year of Production	Total Seed Production (Lakh qtls.)	Share of private sector
2003-04	132.27	47.48%
2004-05	140.51	45.02%
2005-06	148.18	46.80%
2006-07	194.31	41.00%

is mainly organized through contract growing arrangements with progressive farmers. SFCI undertakes seed production on its own farms.

The requirement of certified/quality seeds is assessed by State Governments on the basis of the area sown under different crop varieties, area covered by hybrid and self-pollinated varieties as well as the seed replacement rate achieved. The availability of seed is ascertained by the State Departments of Agriculture on the basis of the production of seed in government farms and production of seeds by State Seeds Corporations and other agencies. The Government of India periodically assesses the requirement and availability of seeds through detailed interaction with State Governments and seed producing agencies in the bi-annual Zonal Seed Review Meetings and the National Kharif and Rabi Conferences. The Department of Agriculture and Cooperation facilitates tie-up arrangements with seed producing agencies to ensure that the requirement of seeds is met to the maximum extent possible.

Seed production in India has also seen active participation from the private segment. However, they seemed to be more concentrated on high value low volume seeds. At present, around 400-500 companies are engaged in Indian seed segment. Private sector companies have earned a significant place in the case of maize, sunflower and cotton. The advent of Bt cotton was primarily a fete achieved by private sector participation. In 2002, a joint venture between Monsanto and Mahyco introduced Bt cotton to India. Private sector has an irreplaceable position in the case of vegetable seeds and planting materials of horticultural crops.

Protecting Rights

With the obligation of catering to the agricultural community there came the immense responsibility of protecting the rights of the stakeholders involved. The entry of private segments and with the entry and exit



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of the planting materials to and from India, it has become all the more pertinent to protect the biodiversity and breeders' rights.

India, signatory to World Trade Organization (WTO) was required to introduce an "effective system" for the protection of plant varieties. In compliance to the TRIPS Agreement, India established Protection of Plant Varieties and Farmers Rights (PPV&FR) Authority, under the Protection of Plant Varieties and Farmers Rights Act, 2001. PPV & FR Authority became operational from 11th November, 2005. The Authority favours establishment of an effective system for protection of plant varieties, the rights of farmers and plant breeders and to encourage development of new varieties of plants. The authority strives to accord recognition and protection of the rights of farmers in respect to their contribution in conserving, improving and making the available plant genetic resources for the development of new plant varieties. It also has the potential to accelerated agricultural development in the country by stimulation of investment for research and development both in public and private sector, and facilitate growth of seed industry to ensure the availability of quality

seeds and planting material to the farmers.

Under this act, farmers who have developed or bred a new variety shall be entitled for registration as a breeder of a variety. They are also permitted to save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected under this Act in the same manner as he was entitled before coming into force of this Act.

Farmer who is engaged in the conservation of genetic resources of land races and wild relatives of economic importance working on their improvement and preservation shall be entitled to recognition and reward from the Gene Fund provided the material so selected and preserved has been used as a donor of genes in varieties register able under the PPV & FR Act. Any person or group of persons (whether actively engaged in farming or not) or any other Governmental or Non-governmental organization may stake a claim on behalf of the village or local community.

Quality Matters

Good quality seeds are the cornerstone of any farming system's success. The seeds sold should hence be of optimum genetic and physical purity, high germination percentage and optimum moisture content. It should also be free from noxious weed seeds, other crop seeds and should be free from seed borne diseases. Seed certification programmes are ways to ascertain and verify the authenticity of these claims. Seeds, being the primary input, such safeguards are necessary.

Seed certification is a process designed to maintain and make available to the general public continuous supply of high quality seeds and propagating materials of notified kinds and varieties of crops, so grown and distributed to ensure the physical identity and genetic purity. Seed certification is a legally sanctioned system for quality control of seed multiplication and production.

In India, the seed certification programme was initiated with the establishment of field evaluation



of the National Seeds Corporation in 1963. A legal status was given to seed certification with the enactment of first Indian Seed Act in the year 1966 and formulation of Seed Rules in 1968. The Seed Act of 1966 provided the required impetus for the establishment of official Seed Certification Agencies by the States. Maharashtra was the first State to establish an official Seed Certifications Agency during 1970 as a part of the Department of Agriculture, whereas Karnataka was the first State to establish the Seed Certification Agency as an autonomous body during 1974. At present 22 States in the country have their own Seed Certification Agencies established under the Seed Act, 1966. In great majority of the countries in the World, including India, seed certification is voluntary and labelling is compulsory.

Seed certification assumes more

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significance when it comes to export of seeds. To further consolidate India's presence in world seed trade, the Organization for Economic Cooperation and Development (OECD) granted eligibility to India to participate in the OECD Seed Schemes program in 2008. The program provides an international framework for the certification of agricultural seed movement in international trade. The Schemes were established in 1958 with a view to support fast-growing seed trade, regulatory harmonization in Europe, the development of off-season production, the seed breeding and production potential of large exporting countries in America (North and South) and Europe, and to support standardization in international seed trade. Most countries and seed importing companies now require OECD approved seed testing and quality certificates. The objective of the OECD Seed Schemes is to encourage use of seeds of consistently high quality in participating countries. The Scheme authorizes use of labels and certificates for seed produced and processed for international trade according to agreed principles. Presently, India participates in five schemes namely, cereal, maize



and sorghum, vegetable, grass and legume and crucifer and other oil or fiber species. In India, 10 State Seed Certification Agencies covering all the regions of the country were nominated as Designated Authorities to carry out the varietal certification of the OECD Seed Schemes.

India – A Potential Seed Player

India's agricultural exports are in demand in many countries. Beyond being an exporter of agricultural commodities and processed food products, India holds immense potential as a seed exporter. Currently commanding a small share in world trade, India however, has immense potential to capitalize on this trade.

India's varied agro climatic

conditions has rich and fertile soils with versatile agro climatic conditions suitable to a variety of crops. The presence of national and international research institutes is also a favourable factor for India in seed production segment. Presence of international research institutes in India can help India to collaborate to develop products targeted for geographies outside of India. Also the increasing research capability of private sector in India can catalyze the export oriented seed development programs of India. Availability of highly qualified techno commercial talent pool for both public and private organizations proves to be one of the greatest strengths of Indian seed industry. India's well established seed production systems and regulations, large number of trained seed growers, large number of seed producing companies are the enabling factors to make India a hub for seed export. For, post harvest handling, the Indian seed processing/conditioning industry has perfected the techniques of quality up-gradation and maintenance to ensure high standards of physical condition and quality. By virtue of the diverse agro-climatic conditions several geographical zones in the country

have emerged as ideal seed storage locations under ambient conditions. In terms of seed marketing and distribution, more than 20000 seed dealers and distributors are in the business.

However, the country is yet to bridge some of its gaps in the seed segment. The increasing production cost due to increasing labour charges and processing fees are disturbing many seed producers in the private sector. Another problem vexing the seed sector is the slow pace with which new seeds enter the commercial market. With the fate of GM technology hanging in the balance, research on many new varieties with improved traits are stalled. The recent stalemate on Bt pricing has also rattled the seed industry. India has cut royalties that local seed companies pay to Monsanto for the second time in two years triggering unrest in the seed segment. Non-uniform Price



regulation in Bt cotton is leading to market uncertainty. Delayed rollout of OECD testing and international quality standard testing schemes leading to competitiveness of Indian Seed exports delays and lack of synergy between seed testing, SPS and regulatory processes for exports are some of the other challenges

facing this sector.

India seed sector carries the responsibility of feeding the nation. With more emerging threats, the industry must be geared up to facilitate research and development of new varieties. This requires well aligned policies, personnel and extension services. ■



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SEED SYSTEMS TO DOUBLE FARMERS' INCOME

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Availability, accessibility and affordability of improved seed varieties at right time in sufficient quantities is crucial to increase farmers' incomes. Many research studies clearly revealed that the use of recommended seed variety and quality seeds will increase profits. However, availability of quality seed (certified or truthfully labeled seed) of recommended variety in sufficient quantity during sowing time is always a problem to the farmers. Still farm saved seeds of nondescript varieties contribute to about 50% of cropped area in most of the crops like pulses, millets and oilseeds. Replacing the farm saved seeds with either certified or truthfully labeled seeds will have the potential to increase farmers' yields and profits by 30 to 40% with very little investment.

The existing formal seed production agencies including public sector agencies like National seeds Corporation (NSC), State Seed Corporations (SSCs), private companies are meeting just about 30 to 40% of the seed needs of the farmers. That too they mostly concentrate on major commercial crops like cotton and vegetables, where they get huge profits. The seed availability for rainfed crops like pulses, oilseeds and millets are not sufficient, especially in remote villages and backward states. Most of the farmers are still using farm saved seeds of the old varieties released 20 years back, even though new varieties with 20 to 30% higher yield potential are available. As a result, the farmers' yields from these crops would be lower by 50 to 60% compared to their potential yields observed in the research stations.

As a part of national objective

of doubling farmers' incomes, governments should focus on picking this low-hanging fruit first for immediate impact on farmers' incomes in low productive, backward and remote villages.

Creation of platform for open sourcing seed material

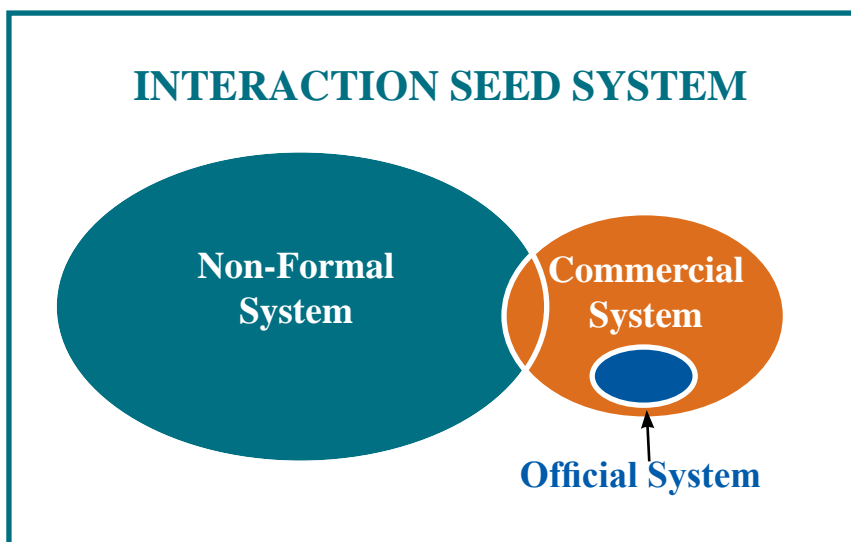
Large scale seed production requires availability of seed materials (breeder and parental seed lines) from which the seed companies (either public or private) can produce certified or truthfully labeled seed to sale to farmers for wider adoption by the farmers. Most of these parental lines and breeder seeds are in the control of a few public research institutions and private companies. These government agencies and private companies are independently working in silos without free movement of breeder seed and parental lines. If a small private company or Farmers' Producer Organizations (FPOs) wants to use parental line of a particular variety for multiplication and seed production

to distribute to a large number of farmers, there are many procedural hurdles. Experience shows that, it is almost impossible to get parental seed lines by a third party even from public funded institutions.

But the free movement of parental seed material is essential for innovations in seed systems to increase development and availability of locally suitable varieties and seeds for different agro-climatic conditions. Hence, there is a need to develop an open source platform for sourcing parental seed materials, in which all stakeholders, both public and private seed companies, and FPOs should be members with nominal membership fee. Under this, an online list of all the parental seed materials available with all organisations should be provided and can be shared with whomever putting an indent for a particular seed material in a time bound manner with nominal fee.

Promoting innovation systems

With the easy availability of all types



of parental seed material in open source, there is a lot of scope for development of new varieties suitable for local agro-climatic conditions, even by small seed companies and farmers' organizations. This will create local market for improved seed, in which everyone can participate and break the monopoly of a few private companies in the seed marketing channels. This will ultimately increase number of seed companies which supply seed in the remote villages and increase number of seed varieties available in the local seed market, which increase choice of seed varieties available to farmers to pick and choose according to their suitability at cheaper rate compared to existing monopoly prices.

Apex committee for rolling plan for seed availability

Timely availability of right variety of seed in local seed markets should be the objective of the seed planning. The existing seed planning is confined to only formal sector which consider demand and supply conditions of varieties released and supplied through public seed agencies like NSC with utter neglect of informal seed producers who meets about 50% of total seed demand. In the estimation of demand and supply of each seed variety for each agro-climatic condition in local seed markets, there is a need for inclusion of seed production plans of informal sector by estimating how much seed is required and how much is supplied through formal and informal sources. There is a need for adoption of three year rolling plan for this purpose, as to meet seed demand for this year, planning should start at least three years before. The rolling plan should take in to account year after year climatic variability and contingency plans to meet the changing varietal preferences and consequent seed requirements.

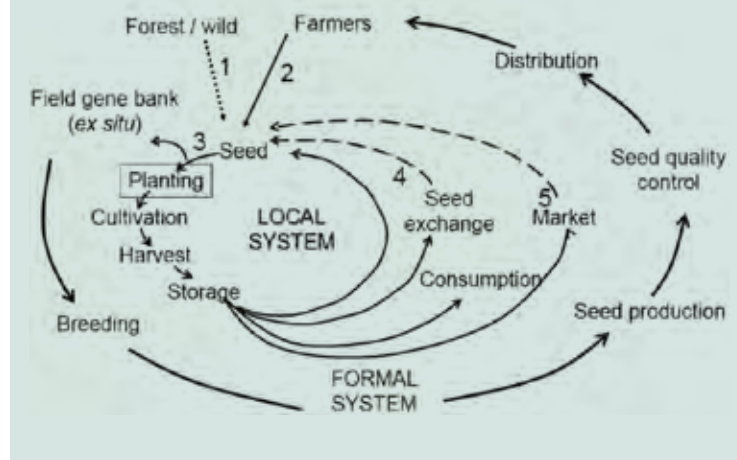
Timely availability of identified varieties

The identified varieties under rolling plans should be available in each village, either through public, private seed companies or by arranging local production by farmer producer companies (FPOs) or through institutions like Farmers Coordination Committees (FCCs) of Telangana. There should be a penalty clause if companies are not able to provide seed in time before sowing especially in remote villages.

Distribution subsidy in notified remote villages

To make available the identified varieties in remote, rainfed, backward districts for crops

Entry Point: Informal seed system



like pulses, millets, oilseeds where the quantity demanded is scattered, thin, low volume is important. Although production subsidy is already available, there is a need for distribution subsidy to distribute the seed to these remote and difficult to reach villages. To ensure equal opportunity to local FPCs and small seed companies to produce seed locally, they should also get distribution subsidy equal to the large private companies from other areas.

Regulation and monitoring for quality seed

Quality of the seed in terms of germination percentage and genetic purity is of paramount importance for profitability of the farmers. Although formal sector is controlled by state seed certification agencies, quality is still a big problem. Almost every day there is news about spurious seed. Wide spread use of Bt3 cotton seed varieties before official release is one of the best examples of the lapse of the regulatory framework which needs to be strengthened. Informal seed sector should encourage formation of clusters of 25 to 50 acre clusters and clusters should get Participatory Guarantee Certification. Provisions for the same can be provided in Seed Village Scheme of Government of India.

With above measures, there will be sufficient competition in the seed market to break monopoly and encourage companies to serve remote and backward villages to supply quality seed to increase farmers' profitability. ■