Seed Sector – Trends for Next Decade and Beyond

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A new decade – A new dawn

- ❑ A new world order with very different contours
- ❑ India's population will cross 150 cr
- ❑ It will usher in a new era in food and agri field
- ❑ Lifestyle changes will make it a different world
- ❑ Technology will drive the world
- ❑ Creativity, Innovation and Research will play a key role
- ❑ Organizations & Employees have to reinvent themselves to succeed

Mega trends we can expect in Indian agriculture in this decade

1. Agriculture moving from a production oriented system to a demand driven system – consumers demands have to be met through suitably tailored crops and varieties.
2. Consumers moving to more nutritious and immunity boosting foods due to the increased health concerns Post - COVID…. Varieties that produce more nutritious crops needed.
3. Natural resource conservation – water conservation and soil fertility restoration – will be under focus - Appropriate agronomic practices need to be promoted – Emphasis on micro irrigation will assume a lot of importance and flood irrigation has to be replaced – need suitable varieties.
4. Climate change will show its impact more forcefully – Using modern technologies, seeds and agronomic practices to fight temperatures, floods, droughts, etc will be the key.
5. Traceability of food will assume significance - Consumers will prefer less use of chemicals in growing their foods – reducing the use of pesticides and fertilizers to optimum levels and producing foods with zero chemical residues. Increasing demand for organic food – input use efficiency will be important – varieties that need less chemicals will be preferred.
6. Farmers have to be connected to markets – increased role of private markets and contract farming - will improve farmers price discovery and produce value added products in closed loop system – Contract farming will bring more technological support to farmers and will use seeds with specific traits and features.

Mega trends we can expect in Indian agriculture in this decade

7. Value added agricultural exports thrust by the government – current 40B$ export with <15% % value added products to be improved to 100B$ export with at least 30% value added products in this decade – Farmers competitiveness has to be improved through technology introduction, higher yields and lower cost of production.

8. Value chain development will be in focus with involvement of states –
Examples: Fruits, Chilli, Rice, Wheat, Edible Oils and Organic foods.

9. Shortage & Cost of farm labour will increase further – Currently about 50% of cost of cultivation. Seed varieties with less involvement of labour costs will be preferred.

10. Consolidation of farmers bargaining power through FPOs will gain velocity:10,000 high quality FPOs, who will grow crops and varieties to meet demands of consumers.

11. Increased role of technology:

a) scale up of mechanization and digitization of agricultural operations –
Need for seed varieties that suit mechanized operations

b) Biotechnology and its applications, both GM and Non-GM, will assume more importance in order to meet the challenges being faced by the farmers and consumers.

Research Priorities for the next decade

❑ Field Crops Breeding for

- biofortification
- climate resilience, environmental friendliness
- improvement in grain quality, better heterosis and milling quality of hybrid rice
- oilseeds yield improvement (crops like sunflower, mustard and sesame)
- hybrid development in pigeon pea
- abiotic and biotic stress resistance in rice, synchronized tillering, FUE, WUE , submergence tolerance and DSR suitability
- sucking pest and CLCV tolerance, earliness, dwarf and suitable for mechanical picking
- plant architecture in different crops to increase number of plants per acre, for mechanical operations and for drip irrigation systems
- breaking yield barriers by exploiting the potential available in wild species and land races.
- improved and high quality seed production
- to mitigate labour costs
- downstream end user industry requirements
- for export of seeds and crop output

Research Priorities for the next decade & beyond

❑ Vegetable Crops Breeding for

- yield, adoptability and disease resistance
- improvement of shelf life and tolerance to high temperatures i
  (Coriander, Palak and Methi)
- shape, size and resistance to Alternaria in Onions
  (could help in growing the crop throughout the year and bring greater price stability).
- resistance to CMV, CLCV, Anthracnose in Chilli and
  Gummy Stem blight, DM and PM in Cucurbits
- tolerance to climate changes, salinity and high heat in cucurbits.
- WUE, NUE and Herbicide Tolerance as some of the targets
- value addition breeding: examples
  Tomato (Lycopene, TSS, Flavours, Shelf life),
  Water Melon (Seedless, Lycopene and Dry Matter),
  Okra & Sweet Corn (high flavonoids),
  Brinjal (Flavonoids, Ascorbic Acid, TSS, Shelf Life)
- for export of seeds and crop output
- protected cultivation

We have to use different and modern tools of science and technology in this decade

- Emphasis on pre breeding efforts – to build research capacity beyond this decade.
- GM, Gene Editing, Marker Assisted Selection and other technology platforms must be exploited – especially in crops of national priority like Oilseeds, Pulses & Vegetables.
- Biotechnological tools to be used in research as well as in Seed Production and Quality control.
- Metabolomics and Proteomics to be used along with Mutation breeding and DH for quick turnaround
- Pathogen profiling in each location is to be undertaken and documented
- Molecular Markers for Qualitative traits to be given prominence as we need to develop quality traits that are demanded by end users.
- Gene Editing can help us in developing climate resilience, low input use, disease tolerance (viral disease of tomato, nematode infections of soybean), WUE & FUE and improved consumer traits (low gluten wheat, high fibre wheat, tomatoes with enhanced flavour, better quality soybean oil and non-browning of potato/apple/mushrooms)

- Mutually beneficial collaborative research projects between Private parties and between Private and Public Institutions should be scaled up especially in OP crops of national importance – avoid duplication of work & infrastructure investments
- High throughput service centres for molecular breeding required for use by smaller and medium sized seed companies
- Partner with end user / food industry and take up customized breeding programmes

Key focus areas for next decade and beyond

Increasing hybridization, Seed / Variety Replacement and adoption of modern technology are expected to drive Seed Industry to Rs. 50,000 cr by 2030

- ❑ Increase research investments to 10% of revenue by 2030
- ❑ Build Seed export business of Rs. 10,000 cr by 2030
- ❑ Diversification of seed production areas and use modern production technologies to build enough capacity to meet domestic and export demand - Make our seed quality on par with global standards.
- ❑ Modern seed treatment systems, seed enhancement technologies have to be brought in to upgrade our industry to global standards.
- ❑ Protect own IP and respect others IP – a cultural shift has to take place.
- ❑ Large Scale Digitization of operations of seed companies & Seed traceability systems should be put in place to help in increasing exports of agricultural produce, processed foods and seeds.
- ❑ Human Resource development is another key area of focus to develop our organizations to be modern, ethical, legally compliant and farmer centric.

Digital Revolution will sweep the world in this decade – seed industry will get digitized

- Transformation of operations using latest Digital Solutions

  - Selling through digital e-commerce platforms
  - All field operations on digital Apps
  - Digital and AI systems in plants and QC
  - 'Touchless' engagement with farmers for product promotion
  - Use satellite and data based systems

- Partnerships and collaborative solutions for farmers using Agri Tech, Food Tech and Fin Tech enterprises

Our human resources have to be reoriented to the new decade

- Digital Proficiency & Modern outlook
- Systems thinking – end to end technical knowledge based solutions for farmer's welfare
- Ability to work in collaborations and partnerships (with Digital enterprises, with new private aggregators & other enterprises who will connect veg farmers and consumers, B2B business with food processors, exporters and others)
- Always look for saving natural resources in all operations
- While thinking commercially, keep society & environment in mind

Seed Industry needs Government support ….

- Rigorous enforcement of seed and biotech IP laws in the country – will help in scaling up research investments
- Facilitative Biodiversity laws that will enhance research investments by both Indian and Multi National companies and promote collaborative research between Indian companies and outside organizations.
- The regulatory regime has to support new biotechnology introduction with predictable and science-based decision making.
- East of doing business across all states by making Seed Act implementation uniform across the country.
- Recognition for companies investing in research through incentives, rewards and awards.
- Alignment of purpose and strategy between Centre and States

….. To serve the farmers' interests better

Thank You