The Smart Seed Coating Technology

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Why in News?

Recently, ICAR–IIOR, Hyderabad announced the successful demonstration of its biopolymer-based Smart Seed Coating Technology.

- **Smart Seed Coating Technology –** A ***biopolymer-enabled multifunctional protective layer around seeds.***
- This technology uses a special coating to give crops ***useful microbes, nutrients, growth boosters, and small doses of protectants.***
- **Relevance –** It is particularly for ***rainfed farming (Kharif),*** enhancing crop resilience and reduce production risks.
- **Developed by –** Indian Council of Agricultural Research (ICAR) and Indian Institute of Oilseeds Research (IIOR), Hyderabad.
- **Aim –** To strengthen seed quality, crop establishment, and resilience against climatic and biological stresses.
- **Demonstration –** Farmers FIRST Programme of ICAR, Rampur Thanda village, Telangana.
- **Patent –** Indian Patent secured for biopolymer-based seed coating.

Mechanism

- **Primer Layer Application –** A specially designed biopolymer solution is applied to the seed surface. This layer ensures strong adhesion of the coating to the seed coat.
- **Functional Layers –** Once the primer is set, additional layers carrying microbes, nutrients, micronutrients, and crop protectants are added sequentially.
- **Controlled Release –** The multilayer structure ensures that inputs are released gradually at the seed–soil interface, matching the crop's early growth needs.
- **Distribution –** Treated seeds are then distributed to farmers through

seed corporations, FPOs, cooperatives, and private seed companies for field use.

Key features

- **Comprehensive System –** It functions as a comprehensive seed enhancement system capable of integrating multiple beneficial inputs into a single application.
- **Versatility –** Customizable for cereals, millets, pulses, oilseeds, fibre crops, fodder crops, vegetables, spices, and horticultural crops.
- **Partnerships –** ICAR-IIOR promotes collaboration with National Seed Corporations (NSC), State Seed Corporations, Farmer Producer Organizations (FPOs), cooperatives, seed hubs, custom treatment centres, seed entrepreneurs, and private seed companies.
- **Field Demonstrations –** Telangana trials in groundnut and soybean showed 30% yield improvement over conventional practices.
- **Multi-location Trials –** (All India Coordinated Research Project) AICRP-Seed trials across soybean, maize, chickpea, cotton, mustard, pigeon pea recorded 12–37% productivity gains.

References

1. PIB | Smart seed
2. ICAR | Smart Seed