Speed Breeding

Prelims: *Current events of national and international importance | Science & Technology*

Why in News?

Recently, scientists have been using speed breeding techniques to rapidly develop climate-resilient crop varieties amid climate change challenges.

- **Speed Breeding –** A set of techniques that manipulate environmental conditions to accelerate ***crop life cycle***.
- **Breeding Cycles –** Normally, a crop plant completes only one generation in one year.
- With speed breeding, plants grow faster, so the ***same plant type can complete 4 to 5 full life cycles in one year.***
    - E.g., rice flowering in around 60 days vs 130–140 days.
- **Need –** ***Conventional breeding takes 10 to 14 years***, so new varieties may become outdated by the time they are released.
- This becomes a major bottleneck in crop improvement.
- Climate change is causing erratic rainfall, heat stress and new pests.
- **Traditional Breeding Process –** Breeders select desired traits, cross plants and select promising leads, followed by multi-season field trials for validation.
- This process makes crop development slow and resource-intensive.
- **Mechanism –** *Manipulation of photoperiod, light intensity and spectrum, temperature, humidity, soil moisture and CO2 levels.*
- Use of plant growth regulators and high-density planting to hasten flowering and seed maturity.
- **Significance –** Helps develop climate-resilient, high-yield and nutritious crop varieties faster and ensures food security under changing climate conditions.

Reference

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