

## Speed Breeding

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### 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- **Need** - **Conventional breeding takes 10 to 14 years**, so new varieties may become outdated by the time they are released.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 CO<sub>2</sub> 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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