Pangenome for Asian Rice

***Prelims**: Current events of national and international importance| Sustainable Development*

Why in news?

Recently scientists from China have assembled the first pangenome for Asian rice.

- **Pangenome** – It is a ***comprehensive genetic blueprint of a species*** that includes,
  - **Core genes,** which is common to all individuals in a species.
  - **Accessory or unique genes** present in some, but not all, varieties.
- It shows the ***complete genetic diversity*** within a species.
- **First pangenome of Asian rice –** It is created by analysing genomes from 144 varieties of wild and cultivated rice from Asia.
- **Evolutionary Findings** – The study reinforced the hypothesis that all Asian cultivated rice originated from a ***wild variety called Or-IIIa (ancestor of japonica).***
- Asian cultivated rice (Oryza sativa L.) was domesticated from its *wild progenitor O. rufipogon.*
- About ***20% of genes are unique to wild rice***, which has traits that can improve *resilience and yield*.

Significance

- **Crop Improvement** - It enables development of new rice cultivars with Higher yield, Drought and heat resistance, Disease and pest tolerance.
- **Climate Adaptation** - It helps address climate-related risks such as reduced productivity due to rising temperatures and arsenic uptake in rice grains.
- It is essential in countries like India, which is already witnessing a 0.7°C rise in average temperature since 1901.
- **Sustainable Agriculture** – The wild rice genes can improve environmental adaptability, regeneration potential, and Genetic diversity in modern rice breeding programs.
- ICAR recently announced development of two genome-edited rice varieties (Samba Mahsuri and MTU 1010) with higher yields and better drought resistance.
- The pangenomic data will ***accelerate India's efforts*** in crop biotechnology.

Reference

The Hindu| First Pangenome for Asian Rice

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