2 Genome-Edited Rice Varieties Developed in India

Prelims - *Current events of national and international importance.*

Why in News?

Recently, Union Agriculture Minister released 2 genome-edited varieties of rice.

- India Becomes the *1st Country in the World* to develop genome-edited rice varieties.

***The genome** is the entire set of DNA instructions found in a cell. In humans, the genome consists of 23 pairs of chromosomes located in the cell's nucleus.*

- **2 genome edited rice verities**
  - DRR Rice 100 (Kamla)
  - Pusa DST Rice
- **Developed by** - Indian Council of Agricultural Research (ICAR).

> *In 2018, ICAR initiated genome-editing research to improve two major rice varieties – **Samba Mahsuri and MTU 1010**, under the National Agricultural Science Fund.*

- **Development technology** – It is by using genome-editing technology ***based on CRISPR-Cas***, which makes precise changes in the organism's genetic material without adding foreign DNA.
- Genome editing of *SDN 1 and SDN 2 types of genes* has been approved under India's biosafety regulations for general crops.

DRR Rice 100 (Kamala) variety
• Developed by - ICAR- IIRR (Indian Institute of Rice Research), Hyderabad. • Based on - Samba Mahsuri (BPT 5204). • Objective - To increase the number of grains per panicle and it matures 20 days earlier (~130 days). • Benefits – Due to its shorter duration, it helps save water and fertilizers and reduces methane gas emissions. • Its stalk is strong and does not fall. • The rice quality is similar to the original variety, Samba Mahsuri.
Pusa DST Rice 1
• Developed by - ICAR-IARI (Indian Agricultural Research Institute), New Delhi • Based on - MTU 1010. • Benefits – It can increase yields by 9.66% to 30.4% in saline and alkaline soils, with the potential for up to 20% increase in production.

- **Significance** – It hold the potential for revolutionary changes in higher production, climate adaptability, and water conservation.
    - A 19% increase in yield.
    - A 20% reduction in greenhouse gas emissions.
    - A saving of 7,500 million cubic meters of irrigation water.
    - Improved tolerance to drought, salinity, and climate stresses.

In the 2023-24 budget, the Government of India allocated ₹500 crores for genome editing in agricultural crops. ICAR has already initiated genome-editing research for several crops, including oilseeds and pulses.

Quick Facts

- **ICAR** – It is an *autonomous organisation* under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare.
- It has its *headquarters at New Delhi*.
- It is the apex body for co-ordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country.

Reference

PIB| Launch of 2 Genome Edited Rice Varieties in India