



# Supercharged Biotech Rice

## Why in News?

Recently, the Scientists from the Chinese Academy of Agricultural Sciences have shown how a transcriptional regulator can **boost grain yields and shorten the growth duration of rice.**

- This **'supercharged biotech rice'** yields **40% more grain.**

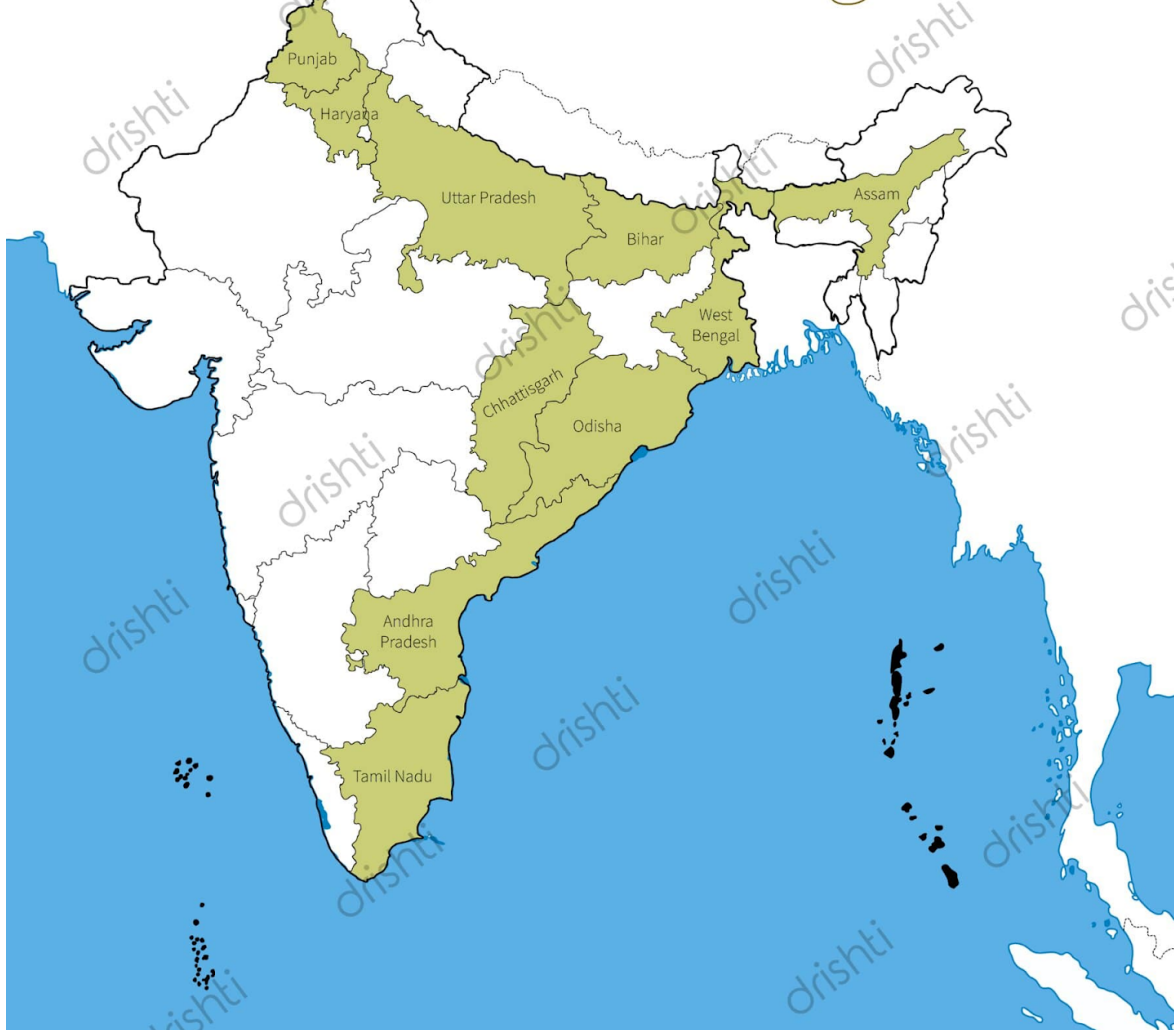
## Why are the Key Highlights of the Report?

- **Supercharged Rice:**
  - The report has pointed out that giving a Chinese rice variety **a second copy of one of its own genes** has boosted its yield by up to 40%.
  - When a second copy of a single gene (called **OsDREB1C**) is added to rice, it **improves photosynthesis and nitrogen use, speeds up flowering and absorbing nitrogen more efficiently** — offering larger and more abundant grains.
    - The change helps the plant absorb more fertilizer, boosts photosynthesis, and accelerates flowering, all of which could **contribute to larger harvests.**
  - The **researchers added the same 'native' gene again**, and not any foreign one (as in the case of [BT cotton](#) or [BT soybean](#)). This method is best described as **genetic modulation.**
    - Gene modulation refers to the process of temporarily altering gene expression levels without making heritable changes to the underlying cellular DNA.
    - It is not a [genetic modification \(GM\)](#) and neither is the result of a **transgenic plant**, carrying elements from another donor.
- **Significance in India's Context:**
  - This report is particularly relevant to India, which must aim to continue its world position in the production of rice and marketing.
  - **India is the world's largest exporter of rice.** It exported 18.75 million metric tons to over 150 countries during the year 2021-22, thereby earning \$6.11 billion.
    - **Vietnam** was **the second largest** producer of rice.
  - With growing demand in the coming years, **strategies should be found to increase the production and export of rice** and it has to be much more than the 18.75 million tons for India to continue and expand its role as the world's largest producer and exporter of rice.
  - India has some excellent rice researchers located in Andhra Pradesh, Karnataka, Punjab and Haryana, and genetic engineers in several laboratories across the country.
    - The **Ministry of Agriculture & Farmers' Welfare** can come together with the [Department of Biotechnology \(DBT\)](#) and nutritionists from the [Indian Council of Medical Research \(ICMR\)](#) can support these researchers to **augment India's role as the major rice exporter in the world.**

## What are the Important Points about Cultivation of Rice?

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# Major Rice Producing States



- It is a **kharif crop** which requires high temperature, (above 25°C) and high humidity with annual rainfall above 100 cm.
- Rice is **grown in the plains of north and north-eastern India, coastal areas** and the **deltaic regions**.
- **Deep clayey and loamy soil** is the ideal type of soil for growing rice.
- **Leading** producer states of rice are **West Bengal, Uttar Pradesh, and Punjab**.
  - **High yielding** states are Punjab, Tamil Nadu, Haryana, Andhra Pradesh, Telangana, West Bengal and Kerala.
    - In southern states and West Bengal, the climatic conditions allow the cultivation of two or three crops of rice in an agricultural year.
    - In states like Assam, West Bengal and Odisha, three crops of paddy are grown in a year; these are **Aus, Aman and Boro**.
- It is the **staple food crop of the majority** of Indian people.
- India is the **second largest producer of rice** in the world. About one-fourth of the total cropped area in India is under rice cultivation.
- **National Food Security Mission, Hybrid Rice Seed Production** and **Rashtriya Krishi Vikas Yojana** are a few government initiatives to support rice cultivation.

## UPSC Civil Services Examination, Previous Year Questions (PYQs)

**Q. Consider the following crops: (2013)**

1. Cotton
2. Groundnut
3. Rice
4. Wheat

**Which of these are Kharif crops?**

- (a) 1 and 4 only  
(b) 2 and 3 only  
(c) 1, 2 and 3  
(d) 2, 3 and 4

**Ans: (c)**

**Source: TH**

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