India's Basmati Rice Cultivation Dispute and the Direct Seeded Rice

For Prelims: Indian Agricultural Research Institute, Rice, Green Revolution, Indian Council of Agricultural Research, Direct Seeded Rice, World Trade Organisation, Intellectual Property Rights (IPR)

For Mains: Regulations governing intellectual property protection, Direct Seeded Rice method of rice implantation

Source: IE

Why in News?

Recently, India's prized basmati rice **varieties, like Pusa-1121 and 1509 Basmati**, have been found in Pakistan under new names, raising concerns among Indian scientists at the Indian **Agricultural Research Institute (IARI)**, urging legal action to safeguard Indian farmers and exporters.

- This highlights the urgency for unified action to protect Indian farmers and maintain equitable trade practices.
- In another development, the **Federation of Seed Industries of India (FSII)** and Sathguru Consultants have emphasised the necessity for collaborative endeavours in rice cultivation, with a particular focus on **direct seeded rice (DSR) techniques.**

How are Indian Basmati Varieties Illegally Cultivated in Pakistan?

- **Illegal Cultivation:**
  - The cultivation of Indian basmati varieties in Pakistan began with Pusa **Basmati-1121 (PB-1121),** officially registered as '**PK 1121 Aromatic**' in Pakistan.
    - Other popular IARI-bred varieties like **Pusa Basmati-6 (PB-6) and PB-1509** have also been grown and renamed in Pakistan, posing a significant challenge to Indian agricultural authorities.
  - More recent varieties such as Pusa Basmati-1847 (PB-1847), PB-1885, and PB-1886, designed to **resist bacterial blight and rice blast fungal disease,** have also been identified in Pakistani fields.
- **Implications:**
  - The unauthorised cultivation of Indian basmati varieties in Pakistan undermines the **rights of Indian farmers and breeders** protected under the **Seeds Act, 1966**, and the **Protection of Plant Varieties and Farmers' Rights Act, 2001 (PPV & FR Act).**
    - The Protection of Plant Varieties and Farmers' Rights Act in India, enacted in 2001, protects the rights of Indian farmers to **sow, save, re-sow, exchange, or share the seed/grain produced from registered varieties.**
      - The Act prohibits selling the seeds of protected varieties in branded form without the breeder's rights.
      - **IARI-bred improved basmati varieties are registered under this Act.**

        - The Seeds Act of 1996, allows cultivation of IARI varieties only in the officially demarcated **Geographical Indication (GI) area** of basmati rice within India.
            - All basmati varieties bred by IARI are officially notified under the **Seeds Act, 1966 for cultivation.**
            - These varieties are designated for cultivation within the **officially demarcated Geographical Indication area of basmati rice in India, spanning 7 northern states** (Punjab, Haryana, Himachal Pradesh, Delhi, Uttarakhand, Uttar Pradesh (west) and two districts of Jammu & Kashmir (Jammu and Kathua)).
            - Even Indian farmers are prohibited from violating the breeder's rights by selling the seeds in branded, packaged, or labelled form.
            - These regulations aim to safeguard the intellectual property rights of breeders and ensure the exclusive rights of Indian farmers to cultivate and trade in protected basmati varieties.
    - Cultivation of the protected basmati varieties in **Pakistan would potentially violate** intellectual property rights (IPR) and could be raised by India in relevant bilateral forums and at the **World Trade Organisation**.

Protection of Plant Varieties and Farmers' Rights Act, 2001

- **Rights under the Act:**
    - **Breeders' Rights:**
        - Breeders are granted exclusive rights to produce, sell, market, distribute, import, or export protected varieties.
        - Breeder's rights include the ability to appoint agents or licensees and seek civil remedies for infringement.
    - **Researchers' Rights:**
        - Researchers can utilise registered varieties for experimentation or research purposes.
        - **Initial use of a variety for developing another variety is permitted,** but repeated use requires prior permission from the registered breeder.
    - **Farmers' Rights:**
        - Farmers who have evolved or developed new varieties are entitled to registration and protection similar to breeders.
        - Farmers **can save, use, exchange, share, or sell farm produce, including protected varieties,** subject to certain conditions.
        - Recognition and rewards are provided for farmers' conservation efforts related to plant genetic resources.
        - Compensation provisions exist for farmers in cases of non-performance of protected varieties.
        - Farmers are **exempt from paying fees in proceedings** under the Act before relevant authorities or courts.

How does this Affect the Global Basmati Market?

- In 2022-23, India exported **45.61 lakh tonnes of basmati rice** valued at USD 4.79 billion. India's basmati rice exports are on the brink of reaching record levels, with projections **indicating exports of 50 lakh tonnes worth $5.5 billion in the current fiscal year.**
    - Notably, 89% of the estimated 21.35 lakh hectares of basmati area sown during Kharif 2023 was under IARI-bred varieties, with significant portions under specific varieties such as PB-1121, PB-1718, PB-1885, PB-1509, PB-1692, PB-1847, PB-1, PB-6, and PB-1886, raising concerns about the impact of illicit cultivation on export volumes and revenues.
- Pakistan's basmati exports, although lower than India's, have gained traction due to the depreciation **of the Pakistani rupee**, enabling competitive pricing in international markets.
- The piracy of Indian basmati varieties by Pakistan poses a **threat to India's dominance in key export markets,** especially in the **European Union** and the United Kingdom.

    - **Pakistan holds an 85% share of the EU-UK market** due to its cheaper currency, allowing it to dominate these markets.
- However, **India maintains dominance in markets such as Iran, Saudi Arabia, and other West Asian countries,** where consumers prefer **parboiled rice** with harder grains that are less susceptible to breakage during cooking.

Indian Agricultural Research Institute

- The **Indian Agricultural Research Institute (IARI)** is India's largest and foremost institute in research, higher education, and training in agricultural sciences.
- It played a pivotal role in the **Green Revolution,** contributing significantly to scientific advancements and the development of appropriate agricultural technologies.
- Established in 1905 in the village of Pusa in north Bihar, it was relocated to New Delhi in 1936 after a devastating earthquake.
- The administrative control of the IARI is vested with the **Indian Council of Agricultural Research (ICAR)**, an autonomous organization established under the **Societies Registration Act, of 1860.**

What is the Direct Seeded Rice (DSR) Technique?

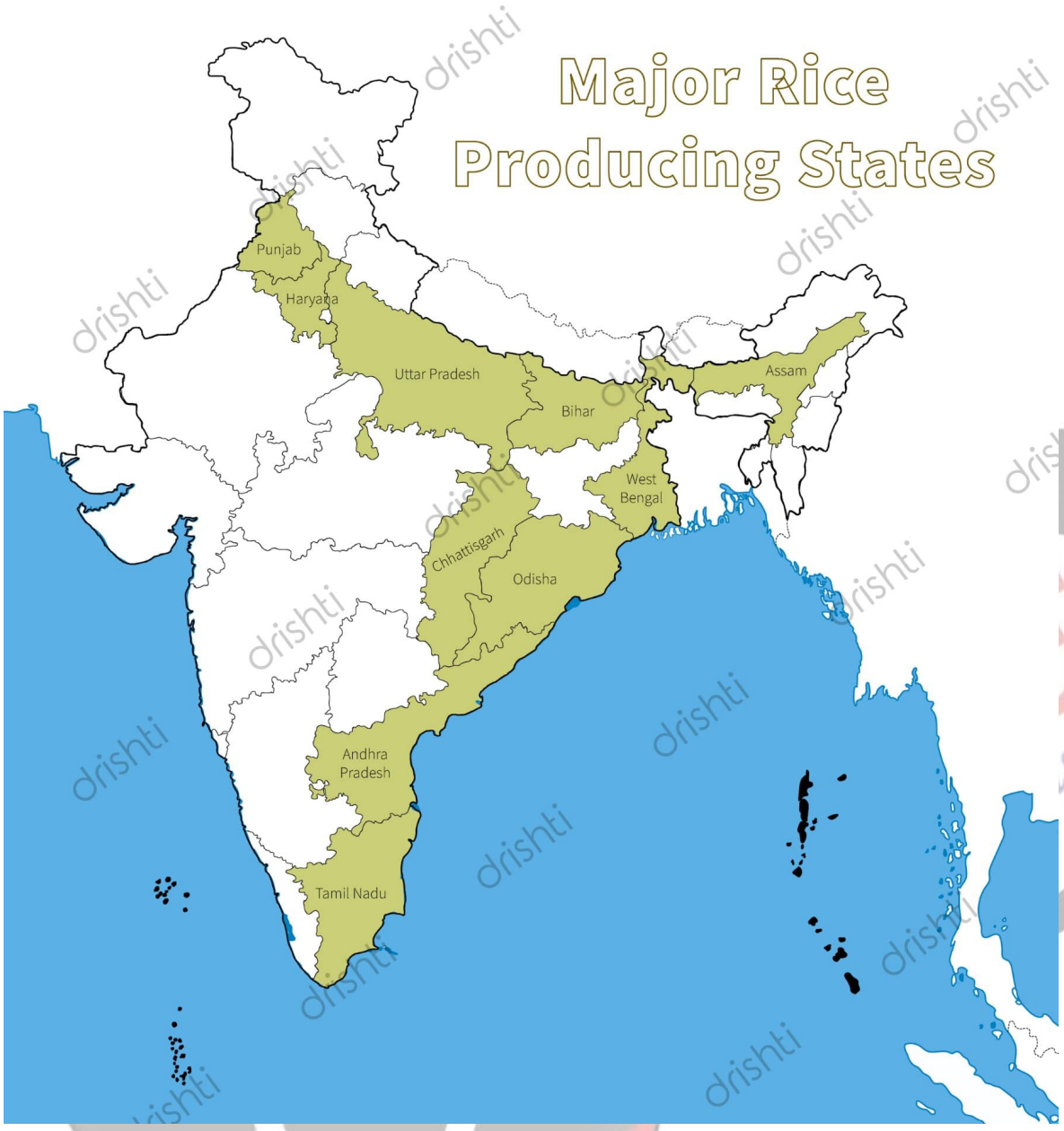
- **About:**
    - Direct seeded rice (DSR) is a method of rice cultivation where **seeds are sown directly in the main field,** bypassing the traditional nursery raising and transplanting process.
- **Advantages of DSR:**
    - **Labour and Cost Savings:**
        - Eliminates the **need for labour-intensive nursery** raising and transplanting, reducing overall production costs.
        - Reduces manual labour requirements and associated costs, potentially leading to higher yields and better returns for farmers.
    - **Water Conservation:**
        - **Reduces water consumption by approximately 40%** compared to traditional methods, minimising soil erosion and methane emissions.
        - Requires less water than traditional transplanting, making it suitable for areas facing water scarcity.
    - **Early Crop Maturity**: Crops mature **7–10 days' sooner than usual (115–120 days),** allowing for the timely planting of successive harvests.
- **Methods of DSR:**
    - **Dry Seeding:** Seeds are sown in dry soil, suitable for areas with assured rainfall or irrigation facilities.
    - **Wet Seeding:** Seeds are sown in puddled soil, similar to conditions for transplanting, suitable for areas with assured water availability.
- **Challenges:**
    - **Weeds:**
        - Weeds pose a significant challenge to DSR due to their competitiveness and initial infestation in the absence of water layers, leading to potential yield losses ranging from 20% to 85%.
        - Shifts in weed composition and diversity from **puddled transplanted rice (PTR)** to DSR further complicate weed management strategies.
        - Weedy rice, genetically similar to cultivated rice, has become a major concern in areas where DSR is extensively practised, causing significant yield losses and quality degradation.
    - **Development of Herbicide Resistance:**
        - Increased herbicide use in DSR has led to the emergence of herbicide-resistant weed biotypes, compromising weed control efforts.
        - **Root-knot nematodes** pose a severe constraint in DSR, affecting crop yield, particularly in areas transitioning from PTR to DSR.

        - Root-knot nematodes are **plant-parasitic nematodes from the genus Meloidogyne**. They are commonly found in soil in regions with hot climates or short winters, and they can cause significant damage to various plants.
    - **Stagnant Yield:**
        - Reports indicate yield decline in DSR, attributed to soil sickness, plant autotoxicity, and continuous cultivation without proper rotation.
    - **Lodging:**
        - DSR is more prone to lodging compared to the puddled transplanting system (PTR), **affecting crop quality and harvest efficiency,** necessitating the preference for lodging-resistant cultivars.
    - **Diseases and Insect Pests:**
        - DSR is susceptible to various diseases such as **rice blast and sheath blight,** as well as insect pests, compromising crop health and yield potential.
    - **Other Challenges:**
        - Challenges such as exposure of rice seeds to birds and rats, adverse effects of sudden rain after seeding, and uneven crop stand further add to the complexities of DSR cultivation.
- **Possible solutions:**
    - Integrated and systematic weed monitoring programme. **Biocide** use for nematode control.
    - Hill seeding, lodging resistant cultivars can help to overcome lodging.
    - Integrated management as well as bio-technological and genetic approaches may help resolve insect, pest and disease issues.
- **Industry Perspective:**
    - Recognized as a technological advancement in rice cultivation, creating opportunities for businesses involved in seeds, fertilizers, pesticides, and farm machinery.
    - Aligns with global sustainability goals, appealing to environmentally conscious stakeholders.
    - Economic viability for farmers and the agricultural value chain is evaluated.
- **Government Support and Policies:**
    - Support from government policies and procurement systems is crucial.
    - Synergies between Central and state government policies are needed for effective transition to DSR.

Note

- FSII is an industry body of the R&D-based plant science industry, engaged in the production of high-performance quality seeds for food, feed and fibre in India.

Rice



- **Temperature:** Between 22-32°C with high humidity.
- **Rainfall:** Around 150-300 cm.
- **Soil Type:** Deep clayey and loamy soil.
- **Top Rice Producing States:** West Bengal, Punjab, Uttar Pradesh, Andhra Pradesh, and Bihar.
- It is the **staple food crop of the majority** of Indian people.
- India is the **second largest producer of rice in the world after China.**
- In states like **Assam, West Bengal and Odisha,** three crops of paddy are grown in a year. These are **Aus, Aman and Boro.**
- National Food Security Mission**,** Hybrid Rice Seed Production **and** Rashtriya Krishi Vikas Yojana are few government initiatives to support rice cultivation.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. What is/are the advantages/advantages of zero tillage in agriculture? (2020)

1. Sowing of wheat is possible without burning the residue of the previous crops.
2. Without the need for a nursery of rice saplings, direct planting of paddy seeds in the wet soil is possible.
3. Carbon sequestration in the soil is possible.

Select the correct answer using the code given below:

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

Ans: (d)

Mains:

Q.1 How is science interwoven deeply with our lives? What are the striking changes in agriculture triggered off by science-based technologies? **(2020)**

Q.2 Sikkim is the first 'Organic State' in India. What are the ecological and economical benefits of Organic State? **(2018)**

Q. How far is Integrated Farming System (IFS) helpful in sustaining agricultural production? **(2019)**