



Direct Seeding of Rice

For Prelims: [Direct Seeded Rice \(DSR\)](#), Water stress, Groundwater

For Mains: Benefits and issues of Direct Seeded Rice method of rice implantation

Source: [IE](#)

Why in News?

The Government of Punjab is actively promoting the [Direct Seeding of Rice \(DSR\)](#) also called the 'tar-wattar' technique of **rice** cultivation, which promises a multitude of advantages over traditional transplanting.

- However, the adoption of DSR in Punjab has been slow, with only 1.73 lakh acres (out of 79 lakh acres under paddy cultivation) using this technique in 2023.

What is Direct Seeding of Rice (DSR)?

▪ Transplantation Technique of Rice:

- In this technique, farmers prepare **nurseries** where seeds are first sown.
- After 25-35 days, the young seedlings are **uprooted and replanted**, in the main field.
- This method is labour and water-intensive, it is known to maximise yields and maintain better crop health. It requires around 25-27 irrigations in total.

▪ Direct Seeding of Rice (DRS):

- There is no nursery preparation or transplantation involved in this method.
- In DSR, the **pre-germinated seeds are directly drilled into the field** roughly 20-30 days prior to when they would have been transplanted by a tractor-powered machine.
- The field is irrigated and levelled prior to the seeding process which is carried out using a **seed drill** or lucky seeder.
- Before sowing seeds are treated by soaking in a fungicide solution.
- The first irrigation is carried out 21 days after sowing.

▪ Soil Characteristics for Successful DSR:

- **Soil Texture:** It is more suitable for **heavy or medium-to-heavy-textured soils** as they have **high water retention capacity** due to the presence of **high clay and less sand** content.
 - Only 20% of Punjab's soil is light-textured.
- **Iron Content in the Soil:** Soils should be **rich in plant-available iron** and have **minimal weed pressure** for optimal DSR.
 - Iron deficiency may require crop transplantation after a month, which negates the labour-saving benefits of DSR.
 - **Use ferrous iron (green-coloured, non-oxidized)** as a supplement if needed,

instead of oxidized iron (brown-coloured).

What are the Benefits of the DSR Technique?

▪ **Reduced Water Usage:**

- The DSR technique can reduce water usage by 15-20% compared to the traditional puddling method, which requires 3,600 to 4,125 litres of water per kg of rice.
- With DSR, 15-18 irrigation rounds are required against 25 to 27 irrigation rounds in traditional methods.

▪ **Lower Labour Requirements:**

- It **requires less labour** compared to the traditional transplantation method, where paddy seedlings have to be uprooted and replanted in the main field.

▪ **Earlier Maturity:**

- Crops grown using the DSR technique **mature 7-10 days faster** than those grown using the traditional method. This gives **farmers more time to manage the paddy straw**.

▪ **Improved Soil Health:**

- The DSR technique involves **less disturbance to the soil**, which can help **maintain soil health and fertility**, unlike the traditional method that involves extensive ploughing and puddling.

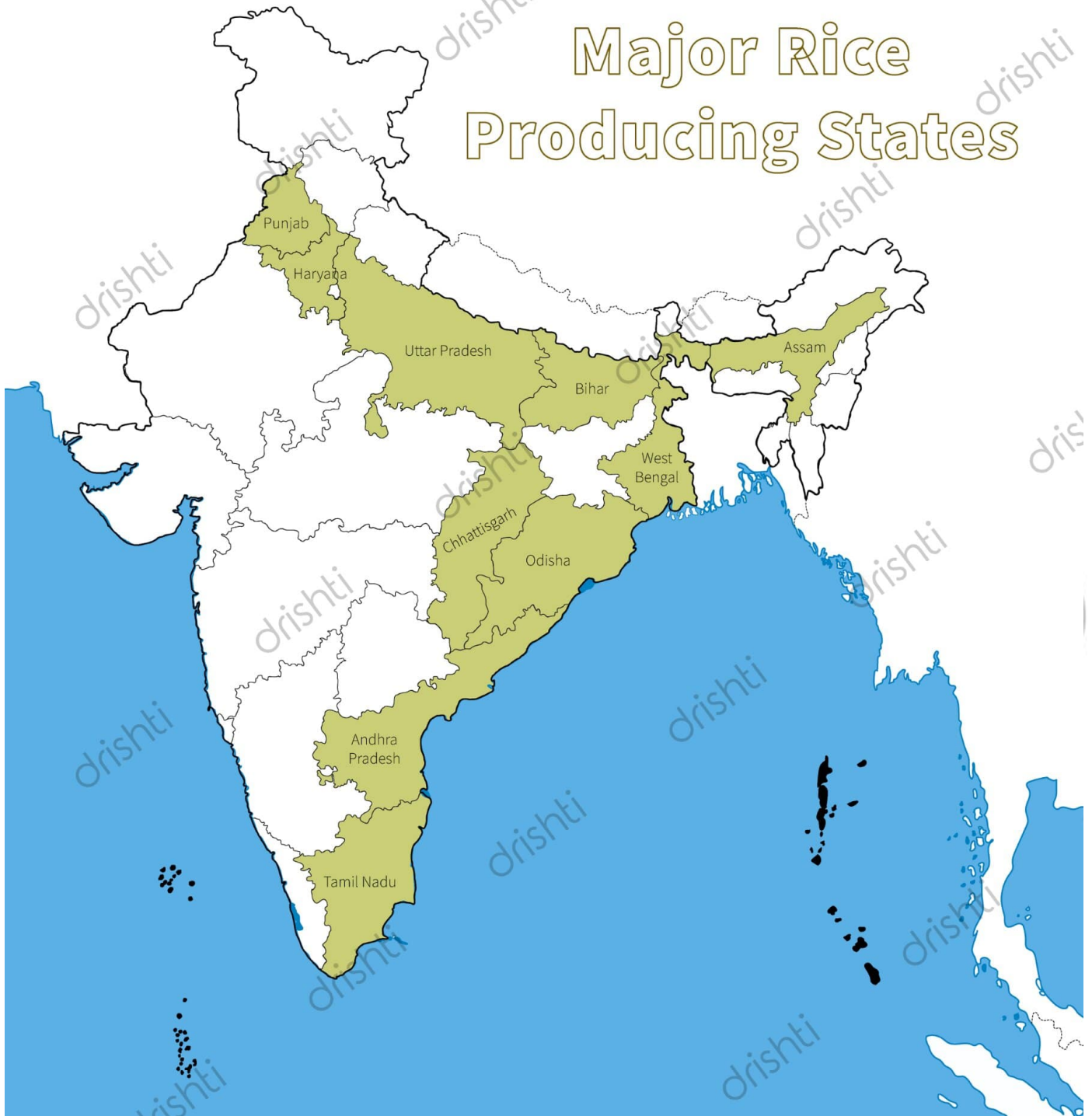
▪ **Reduced Greenhouse Gas Emissions:**

- **Puddling involves saturating the soil with water and then mechanically breaking it down** through techniques like ploughing or harrowing.
 - The traditional transplantation method **involves puddling of the soil**, which leads to the release of methane, a potent greenhouse gas.
- The DSR technique does not require puddling, thus reducing methane emissions.

Rice

- Rice is a **staple food for most of the population in India**.
- It is a kharif crop that requires high **temperature (above 25°C)** and **high humidity** with annual **rainfall above 100 cm**.
 - In areas of less rainfall, it is grown with the help of irrigation.
- In southern states and **West Bengal**, the climatic conditions allow the cultivation of two or three crops of rice in an agricultural year.
 - In West Bengal farmers grow three crops of rice called '**aus**', '**aman**' and '**boro**'.
- About **one-fourth** of the total cropped area in India is under rice cultivation.
 - Leading producer states: **West Bengal, Uttar Pradesh, and Punjab**.
 - High Yielding States: **Punjab, Tamil Nadu, Haryana, Andhra Pradesh, Telangana, West Bengal and Kerala**.
- India is the **second-largest** producer of rice after China.

Major Rice Producing States



What are the Challenges Associated with DSR Technique?

- **Subsidised Electricity:** A major reason Punjab farmers hesitate to adopt DSR is the **availability of subsidised or free electricity**, which **reduces the incentive to switch** to water-saving techniques like DSR.
- **Weed Growth:** In conventional methods, saplings are taller than weeds from the start, while in DSR, **both plants and weeds grow simultaneously**, which causes issues in harvesting and increase in the cost of weed removal using manpower

- **Lack of Awareness:** There is insufficient awareness and guidance on the benefits of DSR. Farmers are uncertain about yields from DSR, as results vary based on soil types, leading to confusion.
- **Cost:** The **high cost of DSR machines** is a significant barrier, especially for small and marginal farmers.
 - Additionally, the adoption of DSR could negatively impact skilled migrant labourers from Eastern UP and Bihar who rely on traditional paddy transplanting for employment.

Conclusion

The central government should assist state governments in promoting this approach by conducting training sessions and raising awareness. **Farmer Sakhi or Kisan Mitra can help in information dissemination regarding DSR.** State governments are offering subsidies on **DSR Seeder machines and financial incentives for each acre cultivated** using the DSR method. Ultimately, the government's policies on water, power, and labour will be the key drivers for promoting DSR.

Drishti Mains Question:

Discuss the challenges in the widespread adoption of the Direct Seeding of Rice (DSR) technique in India. Suggest measures that can be taken to increase its adoption among the farmers.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. What is/are the advantage/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