



# Best Bet Agronomy of Dry Seeded Rice (DSR) Eastern UP and Bihar

## What is DSR?

DSR is one of the rice establishment methods in which seeds are directly sown in the main non-puddled field rather than transplanting rice seedlings from the nursery.

## Field preparation and sowing method

### Field Leveling:

Good land leveling ensures better crop emergence, water saving and better yield. This can be best achieved with laser land leveler. If laser leveler is not available, then it can be achieved by careful leveling using traditional method (scraper, proper ploughing followed by planking).

### Sowing Methods:

It can be done by two methods:

- In moist soil (vattar condition):** Apply heavy pre-sowing irrigation in a well prepared field (2-3 dry ploughings) and as soon as field is in vattar condition, plough the field again followed by planking. Sowing should be done immediately after field preparation using seed drill. Attach a light wooden plank behind seed drill to achieve good seed to soil contact. These operations should preferably be done in the evening hours to avoid moisture loss. This method helps to conserve soil moisture.
- In dry soil condition:** In this method, rice is seeded in a well prepared (2-3 ploughing + planking) dry field using seed drill and then a light irrigation is applied (or wait for rain) for crop emergence.

The decision on which method to use depends on the weather conditions and available resources. If farmers have irrigation facility and want to establish early before rain starts, then first method

(vattar sowing) is best, which reduces early irrigation requirement for 2-3 weeks and minimizes weed problem.

### Seeding Equipment:

Use zero tillage cum fertilizer drill (Zero Tillage Machine) or seed drill machine. During sowing of rice inclined plate machine is better option while releasing seed. For sowing power tiller operated seeder or two wheel tractor seed drill can also be used.

### Sowing Time:

20 May to 30 June

**Optimum timing:** 10-15 days prior to onset of monsoon, i.e. last week of May to mid-June

Cultivar type	Sowing window
Long duration (145-155d)	20 May to 20 June
Medium duration (130-135d)	May last week to 30 June
Shorter duration (115- 120d)	May last week to 30 June

If showing is delayed beyond 30 June, prefer short duration hybrids.

### Seed Rate:

12 kg/acre for inbred varieties; 8 kg/acre for hybrids.



### Sowing Depth:

It should be 2-3 cm (don't put seed deeper than 3 cm); Row spacing: 20 cm; if using weeder then row spacing should be 25 cm.

**Seed Quality:** Use certified seeds.

### Seed Treatment:

For vattar sowings, weighed quantity of seeds are soaked in water + fungicide (Bavistin or Emisan @ 1g/kg rice seed + streptomycin 0.1 g/kg rice seed) solution for 12-24 hours. Amount of water used for soaking is equivalent to quantity of seed used for seed treatment. After 24 hours, seeds are removed from fungicide solution and dried in shade for 1-2 hours before sowing. Soaked seeds should only be used for vattar sowing conditions and if seed drill is with inclined seed metering system (sowing method 1). Don't use soaked treated seed for sowing in dry conditions (sowing method 2) and with seed drill with fluted roller type seed metering system. In such situation, use dry seed treatment (see below).

For dry soil conditions, dry seed treatment should be done. For this, treat seeds with imidacloprid (Guicho-350® @ 3ml/kg seed alone or in combination with tebuconazole (Raxil-Easy @ 1 ml/kg seed. Mix the chemicals in 15 mL water/kg seed.

### Cultivar Selection:

Shorter duration varieties or hybrids are preferred to reduce the irrigation requirement and to enable timely planting of wheat after the rice harvest. However, longer duration varieties have advantage where inadequate drainage is the primary factor preventing early harvest of rice. The inbreds and hybrids suitable for DSR in the Eastern IGP are given below:

- **Long duration cultivars:** Swarna sub-1, MTU-7029, BPT-5204 (Sambha Mahsuri), Rajendra Mahsoori-1, Moti, and Rajshree.
- **For medium duration cultivars:** Hybrids (PBH-71, Arize-6444, Arize Prima, Arize Dhani, 27 P. 31, DRH-748, Frontline Gold, RH-1531, US-312); Inbreds (Rajendra Sweta, Rajendra Suvashini, MTU-1001, NDR-359).
- **For shorter duration cultivars:** Hybrids (Arize 6129, PRH-10, Arize Tej, RH-257, DRH-2366, DRH-834, PAC-807); Inbreds (Sarju-52, Rajendra Bhagwati, Shaibhagi Dhan, Abhishek).

## Weed management

### Cultural:

Stale-bed technique is effective in reducing weed problem including problem of weedy and volunteer rice. In this practice, weed seeds are encouraged to germinate by applying irrigation 15-25 days before rice sowing and then are killed by either a nonselective herbicide (glyphosate, or paraquat) or by shallow tillage before sowing of rice.

### Chemical Control:

Pre-emergence followed by post-emergence herbicide application has been found effective for weed control in DSR.

- **Pre-emergence herbicides:** Pendimethalin 30 EC (1.3 L/acre) or pretilachlor with safner 30.7 EC (SOFIT) @ 650 ml/acre or oxadiargyl 80 WP (45 gm/acre). Use any one from the above listed herbicides.

Under vattar sowing, apply on the same day of sowing; Under dry sowing condition, apply 1-3 days after sowing/irrigation. Spray using water volume 150-200 lt/acre (10-13 tanks).

- **Post-emergence herbicides:** Use any one based on the weed flora: Bispyribac-sodium 10 SL (100 ml/acre) or tank mix of Bispyribac-sodium 10 SL + pyrazosulfuron (100 ml+ 80 gm) or tank mix of fenoxaprop-p-ethyl with safner + ethoxysulfuron (500 ml + 48 gm/acre) for broad spectrum control of grasses, broadleaf and sedges. If weed flora is dominated by *Cyperus rotundus* (Motha), then apply tank mix of bispyribac + pyrazosulfuron and if flora is dominated by *Leptochloa Chinensis* and *Dactyloctenium aegyptium*, use fenoxaprop + ethoxysulfuron.

**Time of application and method:** 15-25 DAS when weeds are 3-4 leaf stage using 120-150 lt water volume/acre (8-10 tanks). Use multiple nozzle boom fitted with flat fan nozzle for uniform application.

**Hand/mechanical weeding:** One follow up weeding is important to remove any escaped weeds as a strategy to delay/manage herbicide resistance.

### Nutrient Management:

"Rice-Wheat Crop Manager" a decision support tool can be used for calculating fertilizer requirement for site-specific nutrient management. The tool is available at <http://webapps.irri.org/in/brup/rwcm/>. Otherwise, apply following dose of fertilizer per acre as per state recommendations:

**Basal:** 50 kg/acre for DAP or if NPK in the form of 12:32:16 then 75 kg NPK and MOP 10 kg at the time of sowing.

**Urea topdressing:** Apply in 3 splits

- 20 kg/acre urea early at 15 DAS
- 35 kg urea per acre for short duration varieties and 45 kg urea per acre for long duration varieties at active tillering
- 35 kg urea per acre for short duration varieties and 45 kg urea per acre for long duration varieties at panicle initiation stage

Active tillering (AT) and panicle initiation (PI) stages vary depending on the varieties. For short term (115-120 days) variety, AT at 30-35 DAS and PI at 43-47 DAS; medium duration (130-135 days) variety, AT at 35-40 DAS and PI at 60-65 DAS; long duration (145-155 days) variety, AT at 45-50 DAS and PI at 75-80 DAS.

**For micronutrient deficiency (Iron and Zinc):** Foliar spray of 1% urea + 0.5% ZnSO<sub>4</sub> + 0.5% ferrous sulfate (volume basis) 2-3 time at weekly interval.

### Irrigation Management:

Under vattar DSR (method 1), first irrigation may be applied at 10-21 days after sowing (DAS) depending upon weather conditions. If rains are not received the follow up irrigation should be applied at weekly intervals. Under sowing in dry condition (method 2), subsequent irrigations should be applied at 4-5 DAS to ensure uniform germination and avoid seedling mortality. The follow up irrigation schedule will be similar as in vattar DSR. Care should be taken that there should be no water stress at two crucial stages i.e. panicle initiation and grain filling. For clayey soils, the appearance of hairline cracks on the soil surface is a general indication of the need to irrigate.

### Insect-Pest and Disease Management:

Similar to transplanted rice.

