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 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:

1. **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.

2. **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-till seed-cum-fertilizer drill with inverted T-type furrow openers. Seed drills with inclined plate seed metering system should be preferred. Power tiller-operated seeder (PTOS) or seedcum fertilizer drill for 2-wheel tractors can also be used for sowing, if available.

**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

<table>
<thead>
<tr>
<th>Cultivar type</th>
<th>Sowing window</th>
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</thead>
<tbody>
<tr>
<td>Long duration (145-155d)</td>
<td>20 May to 20 June</td>
</tr>
<tr>
<td>Medium duration (130-135d)</td>
<td>May last week to 30 June</td>
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<tr>
<td>Shorter duration (115-120d)</td>
<td>May last week to 30 June</td>
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</table>

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 methods:

1. **Sowing methods:**

   - **Field preparation and sowing**

     - **In dry soil condition:**
       - Rice is seeded in a well bed in the evening hours to avoid moisture loss.
       - These operations should preferably be done in the evening 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.

     - **For medium duration cultivars:**

       - Swarna sub-1, MTU-7029, BPT-5204 (SambhaMahsuri), Rajendra Mahsoori-1, Moti, and Rajshree.

     - **For longer duration cultivars:**


     - **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).

   - **Pre-emergence herbicides:** Pendiemetalin 30 EC (1.3 L/acre) or pretil-achlor with safen 30.7 EC (SOFIT) @ 650 ml/acre or oxadiargyl I80WP (45 gm/acre). Use any one application timing. Under vatter 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 safener + etoxysulfuron (500 ml + 48 gm/acre) for broad spectrum control of grasses, broadleaf and sedges. If weed flora is dominated by Cyperus rotundus, then apply tank mix of bispyribac + pyrazosulfuron and if flora is dominated by Leptochloa chinensis and Dactylonomyema eglyptum, use fenoxaprop + etoxysulfuron.

   - **Time of application and method:** 15-25 DAS when weeds are 3-4 leaf stage using 120-150 l 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:** Drill 50 kg DAP at the time of sowing; apply 25 kg MOP + 10 kg Zinc sulphate during land preparation

       - **Urea topdressing:** Apply in 3 splits

         - 15 kg urea - early at 15 DAS
         - 30 kg urea at active tillering
         - 45 kg urea panicle initiation stage

     - **For micronutrient deficiency (Iron and Zinc):** foliar spray of 1% urea + 0.5% ZnSO4 + 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

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**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 irrigation 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.