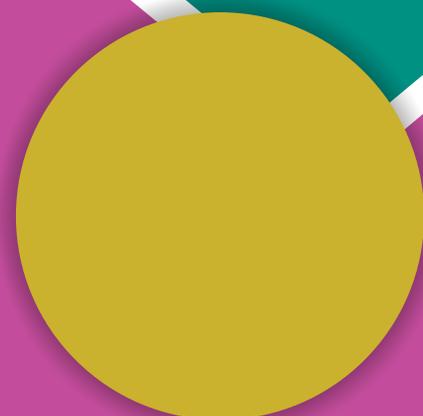


# Direct Seeded Rice (DSR) Technology



## Nadeem Akber and Zubair Aslam

Department of Agronomy,  
University of Agriculture, Faisalabad



Rice transplanting is the conventionally used method in rice growing countries of Asia especially Pakistan. But it is no more cost-effective because of water scarcity, unavailability of labor and high cost of production. Transplanting technique has to be replaced with a resource efficient, economical and productive method of sowing without compromising the yield and net production to ensure the food security in future. Direct Seeded Rice (DSR) in place of the traditional transplanted rice is a way to reduce labor charges for nursery raising, puddling and transplanting. DSR is sown directly into the moist soil like wheat, corn or cotton and does not need continuous submergence so it reduces overall water requirement.

### Advantages of DSR:

- Labor saving up to 75%
- Water saving up to 30%
- Early maturity of crop
- Timely sowing of wheat crop
- Saving of machinery operations (needed for puddling)
- Avoids compaction of soil due to puddling
- Good precursor of zero tillage technology

**Production Technology:**

The land should be prepared to produce a leveled seedbed with fine tilth free of weeds. Fine seed bed ensures better yield because of good germination and crop stand, root proliferation, fertilizer efficiency.

**Planting Techniques and Seed Rates:**

Sowing is done in moist soils or in dry soil (immediately irrigated) with a specifically designed DSR drill and calibrated to deliver desired seed quantity keeping 9" row spacing. Seed should be moistened in water for overnight to hasten germination. Soaked seed should, however, be dried in shade to avoid stickiness of wet seed for drilling. Soaking of seed with fungicide eliminates or reduces seed borne and soil-borne diseases. The seed rate for direct seeding of fine grain rice varieties should be 16-18 kg and for coarse varieties 14-16 kg per acre. Seed should be sown 2-3cm deep for good crop stand as placing seed deeper will result in poor emergence.

**Sowing Time:**

The best planting time for DSR is from end of June to early July. This, coupled with the fact that DSR matures 10-12 days earlier, enables early planting of the following wheat crop. Seeding too early causes crop sterility due to high temperature at anthesis.

**Fertilizer Application:**

Optimum quantity of fertilizer needed depends on the nutritional status of the fields; however, a generalized recommendation of fertilizer use consists of 2.5 bags urea, 2 bags DAP and 1 bag potassium sulphate. All P and K, 1/3<sup>rd</sup> of N should be drilled along with the seed; the remaining N can be applied in two splits; 1/3<sup>rd</sup> after 25 days of sowing and 1/3<sup>rd</sup> after 40-45 days. In areas where zinc deficiency occurs zinc must be applied as zinc sulphate (35% Zn) @ 5 kg/acre.

**Irrigation Management:**

Irrigation is critical in DSR especially at earlier stages. Soil must be kept moist for the first 12 days to ensure complete germination. First irrigation should be applied a days after sowing followed by pre-emergence weedicides one day after 1<sup>st</sup> irrigation. If, however, heavy soaking dose is applied first irrigation can be delayed until after emergence. In that case herbicide application should be done in the evening after sowing. DSR crop does not require continuous submergence and can be safely irrigated when hairline cracks appear on the soil. Moisture stress should be avoided at tillering, panicle initiation, and grain filling stages which are crucial for obtaining higher yields. At these stages it is advisable to keep fields flooded. The last irrigation should be applied 20 days before harvesting. DSR is an aerobic rice production and may show iron deficiency symptoms in some soils. Flooding or submerging the field corrects these symptoms.

**Major weeds of DSR:**

In Pakistan, the major DSR weeds are bermuda grass (*Cynodon dactylon* L.), climbing dayflower, jungle rice, purple nut sedge, egyptian grass, bulrushrice, small flower umbrella plant, flat sedge and most importantly horse-purslane (*Trianthema portulacastrum* L.). In many cases, horse-purslane even has led to complete failure of DSR crop.

## Weed control

There are many methods to control the weeds in crops, however, chemical control is the most commonly used and reliable method for controlling weeds in rice. Herbicide application offers an economical and practical approach towards weed management. An integrated approach of controlling weeds in DSR can be adopted as sometimes single use of herbicides has been found to be unable to control a broad spectrum of weeds. It might control only a specific species of weeds. Thus application of more than one herbicide seems to be a better option. But some difficulty is coupled with the use of pre-emergence herbicides such as their narrow application duration (0–5 DAS) and prerequisite of ample soil moisture at the time of their application. In such situations, post-emergence herbicides are superior. The need is to provide information and consultancy to farmer community regarding this technology because an economically good management of DSR fields requires a strong practical and theoretical understanding of agronomic practices.

**Table 1. Suggested Herbicide Applications**

Weedicide	Dose (a.i. ha <sup>-1</sup> )	Application time
Glyphosate	1 g	Pre-plant
Pendimethalin	1000 g	Pre-emergence
Pyrazosulfuron	30 g	Pre-emergence
Ethoxysulfuron	30 g	Post-emergence
Fenoxaprop-p-ethyl	937 g	Post-emergence

