



Direct Seeding can be Better Instead of Transplanted Rice

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Direct seeding is a crop establishment system wherein rice seeds are sown directly into the field, as opposed to the traditional method of growing seedlings in a nursery, then transplanting into flooded fields. Direct seeded rice is seen to be one of the most efficient, sustainable, and economically-viable rice production systems used today. Compared to the conventional puddled transplanted rice method operable in Asia, Direct seeded rice delivers faster planting and maturing, conserves scarce resources like water and labor, is more helpful to mechanization, and reduces emissions of greenhouse gases that contribute to climate change. Although direct seeding is widely practiced in the USA and S.America, productivity challenges have limited its wide-scale adoption in Asia, where 90% of the global rice is produced and consumed.

Direct seeding: In direct seeding, the rice seeds are sown directly in the soil, either as dry grains (dry DS) or pre-germinated grains (wet DS). The seed can be broadcasted or drilled in lines.

Advantages of direct seeding: For direct seeding, no nursery seedbed is needed and direct seeding requires much less labor for crop establishment than transplanting.

Disadvantages of direct seeding: More seed is needed for DS than for transplanting; animals, drought or water logging can reduce seed germination; and weeds can be a serious problem.

Dry direct seeding: In rainfed systems, dry seed may be manually broadcast onto the soil surface and then incorporated by shallow plowing or by harrowing while the soil is still dry. Care must be taken not to incorporate the seed too deep (only 1-3 cm deep), especially on clay soils or where surface "sealing" is a problem. Alternatively, dry seed can be sown in a row with a seed drill. Seeding rates vary between 80 and 200 kg per ha. Some gap filling (transplanting) is normally undertaken within the field after establishment.

Wet direct seeding: In irrigated areas, pre germinated seed is broadcasted or sown in lines with a drum seeder. Seeding rates are 60 -120 kg per hectare. Pre-germinate the seed by soaking in water for 24 hours and incubating for another 24 hours (the little roots should not be too long because they break easily). Seedlings should be broadcasted on recently drained, puddled and leveled fields. If the field is too wet, allow it to dry for 12 to 24 hours before seeding. Avoid flooding the emerging seedlings and keep the field drained for the first few days. If possible, a shallow water layer is re-introduced 7 to 10 days after seeding.

Good soil preparation and leveling are essential for direct seeding, otherwise the establishment will be irregular and weeds will cause big yield losses.

Weed management: Extra care of weed management is needed for direct seeding. Do not use direct seeding in fields with severe weed problems in the previous season. Otherwise, herbicides can be necessary to reduce weeds. In rainfed rice, post-emergence herbicides are often preferred by farmers. With good soil preparation and leveling, one herbicide application and one manual weeding during the season should be sufficient.

Fertilizer application: Basal fertilizer application is usually avoided in direct seeding. The mixed NPK fertilizer can be top dressed at 11-20 days after seeding and after weeding. Only in the case of dry direct seeding, basal fertilizer application with a seed drill is a good option.

In rainfed lowlands: Avoid direct seeding in very wet/lower fields where the danger of seeds being washed away or submergence after heavy rainfall is high. Avoid direct seeding on very dry/upper fields where lots of weeds grow.

Selected herbicides for wet seeded DS rice and their use.

Active ingredient (in %) *	Weed type	Amount (g ai / ha)	Time of application	Remarks and spray volume
Pretilachlor (with safener for DS) (30)	sedges, grasses, broadleaves	300	0-3 days after seeding	Drain and apply to saturated soil. Spray volume is 150-200 liter per hectare.
Butachlor (80)	sedges, grasses, broadleaves	750	6-8 days after seeding	Apply on saturated soil. Spray volume is 150-200 L/ha
2,4 D (40)	sedges, broadleaves	320	15-21 days after seeding	Weeds need to be above water. Re-flood within 2-3 days after application.
metsulfuron methyl (20)	sedges, broadleaves	4	20-25 days after seeding	Apply on saturated soil. Spray volume is 150-200 liter per hectare.

* The active ingredient (ai) is the chemical killing the weeds
The list above covers some common herbicides useful in direct seeded rice.



Direct seeding field

Advantages of direct seeding

- No significant reduction of yield under optimal conditions
- Savings on irrigation water by 12-35% under efficient water management practices
- Reduces labor and drudgery by eliminating seedling uprooting and transplanting

- Reduces cultivation time, energy, and cost
- No plant stress from transplanting
- Faster maturation of crops
- Lower greenhouse gases emissions
- Mechanized DSR provides employment opportunities for youth through service provision business model
- Increases total income by reducing cost of cultivation

Current constraints

- Higher seed rates
- Seeds exposed to birds and pests
- Weed management
- Higher risk of lodging
- Risk of poor or non-uniform crop establishment

References

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