



DIRECT SEEDED RICE

A more sustainable approach to rice production

Rice is one of the most important food crops in the world. However, with traditional methods 40% of the world's irrigation water is applied for rice production. Increasing water scarcity due to climate change and competition from urbanization is making this traditional method of rice production unsustainable in the long term. Combined with other factors like shortage of labor and decreasing arable land, new ideas and innovations in rice cultivation are critically needed to meet rising demand and ensure food security.

One of the potential solutions to address these challenges is direct seeding. 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.

Besides saving significant irrigation water, labor, and time, direct seeding substantially decreases emissions of greenhouse gases. Some of the trade-offs associated with the shift from transplanted rice to direct seeding may include higher seed rates, lodging, and risk of weed infestation.

Although direct seeding is widely practiced in the United States and South America, productivity challenges have limited its wide-scale adoption in Asia, where 90% of the global rice is produced and consumed. This underscores the need for an integrated and scientific approach to make direct seeded rice socioeconomically and environmentally sustainable.

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 GHG 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



Use of hand-drawn drum seeder for wet direct seeding



Drip irrigation system for dry direct seeded rice



Mechanized dry direct seeding

Partnerships for Direct-Seeded Rice

The Direct Seeded Rice Consortium (DSRC), a multi-stakeholder organization convened by IRRI with partner members across Asia, are collaborating to improve the socioeconomic and environmental sustainability of rice production systems by developing and optimizing innovations, practices, and methodologies for both dry and wet direct seeded rice. These include:

- Mechanization of farming operations, including crop establishment and harvest
- Use of most suitable inbred and hybrid rice cultivars
- Seed treatment solutions
- Refining seed rates for both inbred and hybrid rice cultivars
- More efficient water management, including drip irrigation systems
- Optimizing nutrient management
- Integrated pest management, including weeds
- Application of GIS and drone technology for precision management
- Minimizing post-harvest losses

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For more information on DSR, visit facebook.com/dsrc.irri

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IRRI aims to improve livelihoods and nutrition, abolishing poverty, hunger, and malnutrition among those who depend on rice-based agri-food systems. In doing so, IRRI's work protects the health of rice farmers and consumers, and the environmental sustainability of rice farming in a world challenged by climate change. IRRI's work promotes the empowerment of women and supports opportunities for youth in an equitable agri-food system.