

What is a weed?

A plant growing where it is not wanted and competing with the crop being cultivated for resources (nutrients, water and light) affecting crop production. Weeds generally have a prolific growth and can colonize the areas they infest quickly.

Effect of weeds on paddy

Weeds reduce the yield and quality of rice by competing for nutrients, water and sunlight (<http://agropedia.iitk.ac.in>)



Weed in paddy field

Upland direct seeded rice 35 - 45% reduction in yield	♦ They intensify the pest and disease problem by serving as alternate hosts
Direct seeded on puddled land 20 - 25% reduction in yield	♦ They reduce the efficiency of harvesting
Transplanted rice 10 - 15% reduction in yield	♦ Some weeds (e.g., Blackjack, green amaranth) have high heavy metal accumulation capacity, and may contaminate the surface as well as ground water if not managed properly

Measures to prevent weed infestation

- ♦ Initial land preparation and proper tillage: Plough the land during summer to economize the water requirement for initial preparation. Flood the field 1 or 2 days before ploughing and allow water to soak in. Keep the surface of the field covered with water with a depth of 2.5 cm at the time of puddling to decompose the weeds
- ♦ For fluffy paddy soils: compact the soil by passing 400 kg stone roller or oil-drum with stones inside, eight times at proper moisture level (moisture level at friable condition of soil which is approximately 13 to 18%) once in three years, to prevent the sinking of draught animals and workers during puddling
- ♦ Final land preparation: Repair the field bunds, and plaster with mud to remove weeds. Apply P and K at final land preparation to incorporate them in the soil. This will prevent algal accumulation after transplanting. Plough and level the field with a wooden plank so as to allow standing water up to 5 cm across the field. Transplant seedlings at recommended spacing
- ♦ For direct seeding, land preparation should begin with pre-monsoon showers. Use MB plough initially to turn top soil with weeds deep into the soil. Plough the field at least twice in an interval of 10-15 days to kill germinating weeds. Band place fertilizers using fertilizer cum seed drills so that nutrients are available to the crop and not to the weeds that may come in between rows
- ♦ Maintain recommended plant spacing and density: In paddy, the plant density at spacing of 20 x 15 cm² for transplanting and 20x10 cm for direct seeding is recommended helps in quick ground cover and reduce weed population
- ♦ Apply balanced fertilizer (right time and dose): One can use Rice Crop Manager (RCM) to generate site specific nutrient recommendations (<http://webapps.irri.org/in/od/rcm>)
- ♦ Improved water management practices: Continuous flooding of water generally provides the best growth environment for rice. After transplanting, water levels should be maintained around 3 cm initially, and gradually increased to 5–10 cm (with increasing plant height) and remain there until the field is drained 7–10 days before harvest. In areas where fields can be drained and irrigated at will, alternate wetting and drying can be practised 15–20 days after normal transplanting
- ♦ Always use weed free seeds, weed free seed bed, clean tools and machinery and clean irrigation canals



A farmer doing mechanical weeding in his field

Weed Management

Weed management is an approach to managing weeds after infestation using multiple control tactics to effectively control troublesome weeds.

What is the critical stage to keep rice field free of weeds?

Transplanted rice : 30 - 45 days after transplanting,

Direct seeded rice : 15 - 45 days after seeding

A Herbicide is a chemical used to kill or otherwise manage certain species of plants considered to be weeds.



Hand weeding by a farmer in his field

Chemical weed control

Pre-planting: Use Glyphosate 41% SL @10ml/L (For example: Roundup/Glycel) with a surfactant to kill standing weeds in the field and the bunds a week before initial ploughing.

Nursery: Spray Pretilachlor with Safener 30.7% EC @ 500g ai/ha in the nursery area at 1-3 days after sowing. (Product example: Sofit or Eaze-N* @600ml/acre.

Pre-Emergence: Pre-emergence herbicides may be applied in moist soil under direct seeded or transplanted conditions, to kill weeds that germinate after sowing/transplanting. Spray Pretilachlor 30.7% EC (Product: Sofit or Eaze-N*) @600 ml/acre to control grasses, broad-leaf weeds and sedges.

Apply post emergence herbicide (select based on weed flora) 15-25 days after seeding (DAS) or transplanting (DAT).

Herbicide	Dose (per acre) & time of application	Target weeds
Bispyribac-sodium 10% SC (Product: Nominee Gold, Adora, Taarak*)	80 ml, 15-25 DAT	Grassy weeds mainly Echinochloa and a few broadleaf weeds
Pyrazosulfuron 10% WP (Product: Sathi*)	80 gm, 15-25 DAT/Need based	Sedges mainly Cyperus rotundus and broadleaf weeds
Fenoxaprop-p-ethyl 22.5% (Product: Ricestar*) + ethoxysulfuron 15% WG (Product: Sunrice*)	300 ml + 50 gm, 15-25 DAT	Grasses including Leptochloa, Eragrostis, Dactyloctenium broadleaf weeds and sedges
Chlorimuron-ethyl 10% WP + metsulfuron-methyl 10% WP (Product: Almix*)	8 gm, 20-25 DAT	Broadleaf weeds and sedges

DAT - Days After Transplanting

DAS - Days After Sowing

** Does not imply endorsement of the product*

Cultural methods of weed control

Clear the field after harvest, irrigate and plough it properly.

- ◆ Puddled plots result in less weed competition, control field to field irrigation to reduce movement of weeds from one field to another
- ◆ Use weed seed free organic fertilizers
- ◆ Mulching helps reduce weed infestation. Rice straw can be used as a mulch
- ◆ Use competitive cultivars with early seedling vigour that helps in developing early ground cover
- ◆ Grow pulses like green gram as grain or cover crops to reduce weed infestation
- ◆ Use higher plant density to reduce weed competition

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