

Water stress is the most severe limitation to the productivity of rice in rainfed ecosystem. Almost 13 million ha rainfed rice area in India is drought-prone. Rice farmers in these areas often face crop failure due to drought at one or the other stage of the crop. The delay in onset of monsoon results into delayed transplanting or drought stress at seedling stage, long spell between two rains causes drought at vegetative stage and early departure of monsoon affects crop by exposing it to drought at flowering and grain filling stage. To help farmers cope with water scarcity, the International Rice Research Institute (IRRI) has bred several new lines that are as high-yielding as any normal varieties with sufficient water. One of these drought-tolerant breeding lines (IR 74371-70-1-1) was released in 2009 by CRURRS, Hazaribagh in the name of Sahbhagi Dhan.

Release of early, drought tolerant rice variety Sahbhagi Dhan for bunded uplands and rainfed drought prone shallow lowlands of eastern India has made it possible to reduce losses from intermittent drought while ensuring stable rice yields in a drought year. Sahbhagi Dhan matures in 105-110 days in the plains of Odisha and 110-115 days in the plateaus. Depending on moisture availability and soil type, it can be direct sown or transplanted. Direct seeding in dry soil saves about 30% of water. It can be done with a zero till machine or a seed drill if they are available, or seeds can be sown behind the plough or broadcast after furrows are opened. Direct seeding can also be done in wet soil with pre-germinated seeds using a drum seeder or broadcast. Seed cum fertilizer drills or zero till machines allow placement of fertilizers near the root zone giving a head start to the rice seedlings compared to weeds in terms of access to nutrients. It is a good practice to use a worn out plough to make shallow furrows to adjust seeding depth when seed drills are not available. Package of practices for successful cultivation of Sahbhagi Dhan are listed below:

Off-season ploughing

One deep ploughing at the beginning of summer months helps to bury weed seeds at a depth that prevents their germination. It also helps to kill insects or pathogens in the soil.

Land preparation

For dry seeding, plough the field after receipt of monsoon rain 2-3 times to get a fine tilth as the land should be properly levelled for uniform germination and crop stand.

In case of transplanting, prepare seed bed during middle of June to early July.

Seed priming

Seed priming can also be done by soaking seeds in water or solution containing seed invigorators or fungicides. Please see the decision tree to select suitable crop establishment method.

Crop establishment

In case of dry seeding, sow the seeds in 20 cm apart in rows either by seed drill or behind the plough with a seed rate of 80kg/ha. In transplanted crop, plant 25 day old seedlings in 20cm x 15cm spacing with 2-3 seedlings per hill. In wet seeding, dibble sprouted seeds (soaked in water for 24 hours and incubated for 48 hours) using drum seeder or manually by July 15 with a seed rate of 60kg/ha.

Fertilizer management

Follow soil test based fertilizer management recommendation for best results. In its absence, apply 30kg P₂O₅ and 20 kg K₂O at final land preparation. Compact the soil by laddering or wooden planks to conserve moisture before sowing. Apply 60kg N in 3 splits at basal, 3 and 7 weeks after sowing.

In case of transplanted crop, apply nitrogen at 60kg/ha in 3 splits; 1/2 as basal and the rest in two splits at 3 weeks and PI stage. If Sesbania green manuring is done, first dose of N could be reduced by 10 kg/ha.



Weed management

Cultural methods to manage weeds can begin early if pre-monsoon showers allow 1-2 ploughings. Allow first flush of weeds to germinate which can be ploughed down at final land preparation. For herbicidal weed control, apply Butachlor at 1. Kg/ha or Pretilachlor at 800 g/ha or Pyrazosulfuron ethyl at 20 g/ha in a thin film of water in transplanted rice field at 3-6 days after transplanting (DAT). It can be done either by spraying or broadcasting granules or even by mixing EC formulations with sand 50 kg/ha and then broadcasting the same. Pre-emergence application of Butachlor (3-5 days after sowing) at 1.25 kg/ha or Pretilachlor at 800 g/ha in moist surface soil effectively controls the first thrust of grassy weeds and sedges in direct seeded rice. A post-emergence herbicide (Bispyribac-sodium) can be used at 20-25 days after sowing under DSR to effectively reduce weeds.

Chemical weed control should be followed by mechanical weeding or light manual weeding before topdressing nitrogen. One hand weeding 20-25 days after transplanting may be done if herbicide application is not possible due to rain.

Plant protection

Need-based application of insecticides/fungicides may be taken up under epiphytotic conditions.

Harvesting

Harvest the crop when 75-80% of the grains are mature.

Grain yield of Sahbhagi Dhan range from 4-5 t/ha in direct seeded/transplanted conditions when the crop establishment is timely and the crop is moderately fertilized. Nitrogen may be top dressed when soil moisture is adequate and weeding is done. Sahbhagi Dhan tolerates intermittent dry spells better but it may not tolerate cold as well as others, hence very late transplanting is not advised. It is also not suitable for boro cultivation.

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