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Cultivation of deepwater rice in India

Vikas Tandon* and Saurbh Soni
Department of Entomology,
C.S.K. H.P. Agricultural University, Palampur
*Corresponding author: tandonvikas8763@gmail.com

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Introduction

Rice (*Oryza sativa*) belongs to the grass family *Poaceae*, and is one of the world's leading sources of food crops among cereals and important staple food of almost half of the world population. In India, it is a staple food crop for over 65 per cent of the population. Rice is known as a semi-aquatic, annual grass plant and grows in a wide range of soil and water regimes: irrigated lowland, irrigated upland, rain fed lowland, rain fed upland and deep water/ flood prone.

Cultivation of deepwater rice is one of the world's most interesting and challenging crops. The Ganges-Brahmaputra-Meghna Basin, Nepal and several minor areas in Assam, account for 58 per cent of Asia's deepwater rice and 55 per cent of the world's total deepwater rice. Deepwater rice represents 23 per cent of Bangladesh's total rice area but only 6 per cent of India's. In India, cultivation of deepwater rice is practiced in various the states in which Assam accounts for over 20 per cent deepwater rice of the total rice area, in Bihar area under cultivation is 16 per cent, while in Uttar Pradesh, West Bengal and Nepal it shares 8 to 11 per cent. In Peninsular India (Orissa, Andhra Pradesh and Tamil Nadu), deepwater rice cultivation is far less important, shared only 2 to 4 per cent of the total rice cultivated area. Floating rice has also been known as long-stemmed rice. Deepwater areas are those with a depth of flooding off over one meter in the peak monsoon season and intermediate deepwater areas as the land with a flooding depth from 30 to 100 cm. Cultivation of deepwater rice depends on local hydrology and flooding patterns vary. Deepwater rice emits the least methane, a greenhouse gas, of the wetland rice ecologies, whereas producing approximately three times lower yield than rice cultivated under normal conditions.

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Production Constraints

1. Flood prone rice is direct seeded by February - April and remains in a 3-4-leaf stage till onset of rain. During the vegetative stage, the crop faces moisture stress and consequently the rice hills population is reduced apart from the reduction in yield of mixed crop sown with rice.
2. Sudden flash flood in deepwater rice areas may cause moderate to complete damage of rice hills population at onset of rain.
3. The local hydrology is irregular and uncertain. The crop at tillering may face drought and/or submergence, which complicates in choice of rice variety and cropping system.
4. Flood prone faces severe weed growth in rice crop. In the early stage of the crop, annual and perennial and at later stage, perennial and floating type wild rice weeds reduce yield, especially in fields having low rice plant population.
5. In deepwater rice, only tall or elongating type varieties are cultivated, those with a low yield potential. Unfortunately, because of harsh ecology having low returns, high yielding varieties (HYVs) has not been developed for flood prone rice ecosystem. So there is need of the hour to improve varieties of deepwater rice.
6. Because of low yield potential there is little economic feasibility of scientific weeding, plant protection, fertilizer use and harvesting, under highly submerged conditions (>100 cm) and there are also problems to adopt agricultural operations.
7. Nowadays, farmers have fragmental holding and uncontrolled physiography in areas which may leads to the problem of on farm development and pisciculture in organized manner.
8. Rice growers are under poor economic conditions in flood-prone areas. The farmers have joint families, low land holding and illiteracy. Most of them are working as migratory agricultural labourers.

Conclusions:

The selection of suitable flood resistant varieties plays a vital role in flood-prone areas to have higher productivity. The breeding and agronomic management strategy should consider intensification and diversification of the farming system in flood-prone areas, along with increasing the productivity of the rice crop.