

# PROCEEDINGS

Biennial Conference

on

"Doubling Farmers' Income by 2022: The Role of Weed Science"

**(1-3 March, 2017)**

**MPUAT, Udaipur, Rajasthan**



Supported by NABARD

Organized by

**Indian Society of Weed Science  
ICAR - Directorate of Weed Research**

In collaboration with

**Indian Council of Agricultural Research  
Maharana Pratap University of Agriculture  
and Technology, Udaipur, Rajasthan**





## Weed management role in increasing crop yield and doubling rice farmers’ income in India - An analysis

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India produces 24.8% of world rice by standing first in area (43.9 million ha) and second in production (106.5 million tons) globally. Rice plays vital role in Indian food security as it is staple food for two thirds of Indians supplying 33% of food energy. Rice productivity and production are to be increased to meet the demands of increasing population. Indian rice farmers are constrained by escalating farming cost and depleting income. The rice productivity in India is low (2.4 t/ha) due to wide range of environmental conditions and ways it is grown and the biological and physical constraints that prevail. Among biological constraints weeds are major causing yield losses of 10 to 100% depending on method of rice establishment, associated weeds, cultural practices adopted, environmental and other associated factors (Rao and Nagamani 2010, Rao *et al.* 2015). Thus any effort involving improvement in food grain production to meet current and future food demands and double the farmers’ income must involve rice and weed management. The objective of the present analysis is to assess weed management role in attaining higher crop production and to double the income of rice farmers in India.

### METHODOLOGY

Three approaches were used for the current analysis. First is to review the published literature on economics of rice and weed management to assess the extent weed management may improve rice yield and farmers income. Second is to analyze farmer participatory demonstrations conducted in rice farmers’ fields to enhance the farmers’ income and improve livelihood as a part of Bhoosamrudhi program. Third is to study rice farmers’ innovative experiences as case studies and disseminate them for wider usage by rice farmers for doubling their income. The experiences gained during implementation of farmers’ participatory demonstrations in Bhoosamrudhi program at Raichur, Chikmagalur and Udupi districts of Karnataka are the basis for the second and third approaches analysis

### RESULTS

The review of literature revealed the attainment of benefit cost ratio up to 3.4 with adoption of improved weed

management technology in India, depending on the location and the method of rice establishment. The farmer participatory demonstration in Raichur district, where the farmers’ rice productivity is high, the increase in crops production and doubling of income is possible by integration of integrated weed management (IWM) with improved rice varieties (IRV) (RNR 15048) use following best management practices (BMP) and crop intensification (CI). In Chikmagalur district of Karnataka, where the rice productivity is low, increase crop production and doubling of income was observed with integration of IWM with IRV (IET 21478 and IET21479) following BMP. The observations in Udupi district revealed that crop diversification and inclusion of vegetable (brinjal, bhendi) and flower crop (Chrysanthemum) cultivation in rice paddies results in doubling of farmers’ income while enabling farmer to earn at regular intervals during the period of rice crop cultivation.

### CONCLUSION

It is concluded that it is possible to increase the crop production and double the income of the rice farmers. Single approach is not applicable to all the farmers. It is essential to adopt farmer specific approach that suits to farmers’ available resources, economic conditions and associated environment. Integration of weed management with crops best management practices and diversification in crop rotations is essential. Integrated rice farming systems (IRFS) approach, in which Integrated weed management (IWM) is a component, is suggested for doubling the income of the rice farmers in India.

**Acknowledgement:** The authors thank Government of Karnataka for financial support.

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