

MORE RICE BY USING LESS WATER AND LOW PUDDLING IN CLAY LOAM SOILS

VEENA SHARMA

Water Management Research Centre, Sher-e-Kashmir University of Agricultural Sciences and Technology, JAMMU (J&K) INDIA

Puddling of soil is an essential part of field preparation for transplanting of rice seedlings. It destroys soil structure, alters particle orientation and reduces soil permeability. The conventional wetland rice cultivation involves transplanting two/three seedlings per hill (25-30 days old) with a spacing of 20cm x 15cm in puddled soil. Most of the present water consumption for rice production is actually counterproductive, over-irrigated rice fields becoming water-logged and less productive with time. Fortunately, more rice can be produced by using less water provided that concurrent changes are made in the way that plants, soil and nutrients are managed.

The system of rice intensification (SRI) developed by Fr. Henri de Laulanie in the 1980's, over two decades of observations, experimentation and innovation (in association with an NGO - Association TefySaina and many small farmers in Madagascar, shows that keeping paddy soils "moist", but not continuously saturated gives better results, both agronomically and economically than flooding rice throughout its crop cycle. SRI is a "system" of rice production with four main components of soil fertility management through adequate organic sources, planting time and method, weed control and irrigation water management. There are six practices recommended as starting points for SRI: Transplant young seedlings (2-leaf stage), usually 8-12 days old, Wider spacing usually 25cm x 25cm, intermittent irrigation, multiple weeding with a rotary weeder/ho, fertilizers are replaced by compost or just any decomposed/decomposable biomass and transplanting is done quickly, within 30 minutes of dislodging from nursery, not inverting the root's tip when pushing the seedling into the soil. Low inputs based pro poor nature of system of rice intensification attracts attention of research scientists, practitioners, NGOs and policy makers. Experience with the System of Rice Production (SRI) tells us that farmers who grow irrigated rice with continuous flooding of their paddies have been wasting large volumes of water for centuries, even millennia. More rice can be produced by using less water, provided that concurrent changes are made in the way that plants, soil and nutrients are managed. Water application through irrigation has been decreased for system of rice intensification as compared

to conventional.

An experiment was conducted for three *Kharif* and two intervening *Rabi* seasons, beginning with *Kharif* 2006, at WMRC research farm of Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu, Chatha, Jammu, to investigate the influence of puddling intensities and organic amendments (nutrient sources) on soil water availability and performance of rice under SRI (System of Rice Intensification) and conventional transplanting methods in clay loam soil. The investigation aimed at quantifying the overall soil moisture dynamics in rice root zone under the SRI method of aerobic cultivation of irrigated rice and exploring the scope for enhancing yields as well as water productivity in rice, has generated the vital information. Soil moisture status in rice rhizosphere (as a consequence of incident rainfall and applied differential irrigation amounts in conventionally transplanted and SRI plots) monitored at 3-week intervals throughout rice growth seasons of *Kharif* 2006 and 2007, irrespective of the differential inputs of water, remained more than 50% of plant available range, throughout the crop growth period. 34% increase in number of fertile tillers under wide spacing in SRI method in comparison to conventional transplanting is also revealed in the study.

There is no need of soil puddling as a pre-requisite for establishment of rice on the clay loam soils of sub-tropical plains of Jammu. The additional cost and energy requirement can effectively be saved. Dry ploughing and wet ploughings to soften the seed bed for the ease of transplanting should suffice.

Aerobic cultivation of transplanted rice under SRI system has certainly an edge over the conventional method of transplanting, two or more older seedlings per hill in puddled soils, more in terms of enhanced water productivity than yield increases *per se*, creating an optimal and sustainable crop growth environment for both rice and following upland crops. Over time, through build-up of organic matter and consequent maintenance of soil physical environment for ensuring enhanced availability of both water and nutrients to both rice and the crop that follows. Recycling the residues (roots and stubble) of rice and the following crops is the key factor of

Contd.... p. 79