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### Partial factor productivity of major nutrients on grain and straw of rice hybrids in SRI strategy

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#### ABSTRACT

Rice is an important cereal crop of India. Field experiments were conducted at the wetlands of Agricultural College and Research Institute, Coimbatore to bring out the impact of modified planting / direct seeding, limited irrigation, conoweeding and green manuring verses conventional planting, conventional irrigation, hand weeding and no green manuring on the partial factor productivity (PFP) of rice hybrids CORH 2 and ADTRH 1. Partial factor productivity of grain and straw yields were higher under modified planting / direct seeding, conoweeding and no green manuring practices.

Key words: Conoweeding, Green manuring, Limited irrigation, Partial factor productivity

#### **INTRODUCTION**

In India, rice is cultivated over an area of 41.9 m.ha with a total production of 83.1 m.tonnes and productivity of 1984 kg/ha (Anon, 2006). Rice ecology is endowed with several yield depressing factors *viz.*, weed menace, nutritional disorders, labour scarcity, pest-disease complex and water scarcity. These limitations are not without opportunities.

Exploitation of the inherent potential of rice soils with suitable crop management options may insulate the existing constraints and step up rice production and productivity. Hence, the present study was undertaken with modified crop management options such as differential crop establishment, water efficient rice cultivation, weed control effected by *in situ* weed incorporation using conoweeder and soil fertility enhancement through green manuring, the principles of System of Rice Intensification (SRI). Partial factor productivity reflects the ability of the major nutrients to produce incremental grain and straw yields. The present paper highlights the partial factor productivity of major nutrients on grain and straw yields of CORH 2 and ADTRH 1 rice hybrids as influenced by SRI strategy.

### MATERIALS AND METHODS

Field experiments were conducted during 2001-02 in the wetlands of Agricultural College and Research Institute, Coimbatore to bring out the influence of the principles of SRI on grain and straw yields of CORH 2 (125 days duration) and ADTRH 1 (115 days duration) rice hybrids.

The soil of the experimental site was deep, clay loam (Vertic Ustochrept) belonging to Noyyal series. The pH was 8.3, electrical conductivity, 0.54 dSm<sup>-1</sup>, cation

exchange capacity, 18.0 cmol (p+) kg<sup>-1</sup>, organic carbon, 5.1 g kg<sup>-1</sup>, available NPK were 232, 32 and 740 kg ha<sup>-1</sup>, respectively. The available silica content was 380 ppm. The treatments adopted were:

# Main plot treatments (Irrigation and establishment techniques):

- P<sub>1</sub>: Transplanting conventional nursery seedlings at 20 x 20 cm spacing
- $P_2$ : Transplanting 10 12 days old dapog nursery seedlings at 20 x 20 cm spacing verses
- $I_1$ : Irrigating the field to 5 cm one day after the disappearance of ponded water
- $I_2$ : Irrigating the field to 2 cm after the development of hairline cracks

# Subplot treatments (Weeding and nutrient management):

- W<sub>1</sub>: Manual hand weeding twice as per the farmers' practice (weeds removed)
- W<sub>2</sub>: Weeding by conoweeder at 10 days interval upto maximum vegetative period verses
- N<sub>1</sub>: Recommended level of N, P, K and Zn without the addition of green manures
- $N_2$ : Recommended level of N, P, K and Zn with the addition of green manures @ 6.25 t ha<sup>-1</sup>.

The experiment was laid out in strip plot design with each treatment replicated four times. The fertilizer (NPK) was applied at the rate of 150: 60 kg ha<sup>-1</sup> for P<sub>1</sub> and 175: 60 : 60 kg ha<sup>-1</sup> for P<sub>2</sub> during wet season for CORH 2 and 150 : 60 : 90 kg ha<sup>-1</sup> during dry season for ADTRH 1.

Grain yield was obtained at 14 % moisture content. Straw was sundried to a constant weight and ovendried