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**Abstract:** Rice (*Oryza sativa* L.) which is primarily a high calorie food is considered staple food for more than 60 % of the world's population. At the current population growth rate (1.5 %), the rice requirement of India by the year 2025 would be around 125 million tonnes. To meet the food requirement of the growing population, the rice production has to be enhanced with good management practices with shrinking availability of land, labour and water resources. Rice is grown mostly through transplanting in India, in spite of the fact that transplanting is cumbersome practice and requires more labour. To overcome this problem, farmers are gradually switching over to direct seeding under puddled condition. Keeping these points in view an investigation on "Effect of crop establishment methods under puddled soil on productivity of rice" was conducted at agronomical farm of Birsa Agricultural University, Ranchi, Jharkhand, during the kharif season of 2015 with the objectives to find out effect of different establishment methods on productivity, nutrient utilization, energetics and economics of rice cultivation. The treatments comprised of five different rice establishment methods – conventional transplanting, mechanical transplanting, drum seeding of sprouted seeds, broadcasting of sprouted seeds and broadcasting of dry seeds. The experiment was laid out in Randomized Block Design with four replication and the rice variety used was Naveen. The soil was clay loam in texture and slightly acidic in reaction (pH 6.1), low in organic carbon (3.6 g/kg) as well as in available nitrogen (200.7 kg/ha), whereas high in available phosphorus (33.54 kg/ha) and medium in potassium content (187.04 kg/ha). Results revealed that among the various establishment methods, rice established through conventional transplanting produced higher dry matter (1473.80g/m<sup>2</sup>), LAI (3.60), CGR (10.38 g/m<sup>2</sup>/day), panicles/m<sup>2</sup> (282), total (124.10) and filled (106.27) grains/panicle resulting in higher grain yield (44.18 q ha<sup>-1</sup>) and straw yield (68.43 q ha<sup>-1</sup>) over rest of the establishment methods except drum seeding of sprouted seeds and mechanically transplanted rice. However, conventional transplanting had edge by 19 and 21 % over broadcasting of either sprouted or dry seeds, respectively whereas drum seeding of sprouted seeds (43.70 q ha<sup>-1</sup>) was significantly higher by 17.7 and 19.7 % over broadcasting of either sprouted or dry seeds, respectively in grain production. Further, nitrogen removal by conventionally transplanted and drum seeded rice was similar. While, phosphorus and potassium removal by rice biomass with conventionally transplanted, mechanically transplanted and drum seeded rice were similar. Weed density and weed dry matter of conventionally transplanted and drum seeded rice being on par were significantly lower than rest of establishment methods. Gross energy output by biomass (150.48 x 10<sup>3</sup> MJ/ha), net energy output by biomass (139.0 x10<sup>3</sup> MJ/ha) and biomass energy-use efficiency (13.06), specific energy (2628.16 MJ t<sup>-1</sup>) and gross return ( ` 71114 ha<sup>-1</sup>) recorded in conventional transplanting was on par with drum seeding of sprouted seeds and mechanically transplanted rice. The specific energy requirement under drum seeded rice (2590.59 MJ t<sup>-1</sup>) was significantly lower by 19.0 and 16.8 % than broadcasting of either dry seeds or sprouted seeds, respectively. Drum seeding of sprouted seeds ( ` 49293.61ha<sup>-1</sup>) being on par with conventional transplanting ( ` 45704.42 ha<sup>-1</sup>) in net return had significant edge by 23.9, 26.9 and 27.1% over broadcasting of sprouted seeds, mechanical transplanting and broadcasting of dry seeds, respectively. The benefit : cost ratio (2.34) under drum seeded rice showed significant edge by 20.6, 23.8, 30 and 55% over broadcasting of sprouted seeds, broadcasting of dry seeds, conventional transplanting, and mechanical transplanting, respectively. Based on the findings of one year experimentation, it can be concluded that rice crop established through drum seeding and conventional transplanting gives similar grain yield, net return and energetics with higher benefit: cost ratio. Hence, for higher productivity, establishment of rice through drum seeding can be a feasible alternative of conventional transplanting.

**Description:** EFFECT OF CROP ESTABLISHMENT METHODS UNDER PUDDLED SOIL ON PRODUCTIVITY OF RICE

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