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**Abstract:** Rice (*Oryza sativa* L.) is one of the world's most important crops and is used as a staple food for more than half of the world's population. At the current population growth rate (1.5 percent), the requirement of rice by the year 2025 would be around 125 million tons. There is a need of productivity gain with good management practices. In India rice is primarily grown by transplanting of seedling in puddled field which is very cumbersome and labour intensive. Both raising nursery and transplanting in Jharkhand are monsoon dependent, which is extremely erratic in onset, distribution, intensity and cessation. Many times seedlings overgrow in nursery waiting for adequate rains to perform puddling operations. Delayed transplanting with over aged seedlings, starts flowering soon after planting that results in drastic reduction in grain yield. Sometimes it becomes even difficult to raise nursery due to very delayed and erratic monsoon. Often, farmers fail to transplant the seedlings in time either due to prolonged dry spell or intense rainfall resulting lower yields. So, there is need to search for suitable crop establishment methods to overcome these problems. An investigation on "Productivity of unpuddled rice under different establishment methods" was conducted at rice agronomical farm of Birsa Agricultural University, Ranchi, Jharkhand during Kharif season of 2016 with objectives to find out the effect of establishment methods on productivity, nutrient utilization, energetics and economics under unpuddled condition. The treatments comprised of six different rice establishment methods- dry direct seeded rice (20cm x 15cm), dry direct seeded rice (broadcasting), aerobic rice, semi dry rice, Rice (line sowing) + *Sesbania aculeata* (broadcasting) and transplanted rice. The experiment was laid out in randomized block design with four replications and the rice variety used was Naveen. The soil was clay loam in texture and slightly acidic (5.9) in reaction, low in organic carbon (3.9) and in available nitrogen (206 kg/ha), whereas medium in available phosphorous (31.35 kg/ha) and potassium (186.06 kg/ha). Results revealed that among the various establishment methods, Rice + *Sesbania aculeata* produced maximum dry matter accumulation at maturity (1406.38 g/m<sup>2</sup>), LAI at 90 DAS (3.41), CGR at 90 DAS - maturity (11.70 g/m<sup>2</sup>/day), number of panicles/m<sup>2</sup> (268), filled grains/ panicle (177) resulting in highest grain yield (50.30 q/ha) being on par with transplanting method (49.20 q/ha) and 39.41%, 25.12%, 20.33% and 19.19% higher than dry direct seeded rice broadcasting, line sowing (20cm x 15cm), aerobic rice, and semi dry rice respectively. The N, P and K uptake by Rice + *Sesbania aculeata* was 104.87, 19.45, 107.04 kg/ha respectively which was comparable to transplanted rice N (103.30 kg/ha), P (18.95 kg/ha), K (106.22 kg/ha). The gross biomass energy output was maximum with Rice + *Sesbania aculeata* (167.47 x 10<sup>3</sup> MJ/ha) followed by transplanting method (165.35 x 10<sup>3</sup> MJ/ha) and specific energy of Rice + *Sesbania aculeata* was lowest i.e. 1894.86 MJ/t followed by transplanting method (1962.02 MJ/t). The net return (57991 `/ha) and B: C ratio (2.08) of Rice + *Sesbania aculeata* comparable with transplanting but 45.9 %, 33.47 %, 32.6 %, and 24.86 % higher net return than that of dry direct seeded rice broadcasting, aerobic rice, line sowing (20cm x 15cm), and semi dry rice respectively. On the basis of one year experimentation it may be concluded that Rice (line sowing) + *Sesbania aculeata* (broadcasting) may be practiced for better crop growth, higher productivity and profitability.

**Description:** PRODUCTIVITY OF UNPUDDLED RICE UNDER DIFFERENT ESTABLISHMENT METHODS

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