

Research Paper :

## Economic evaluation of direct paddy seeder

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### ABSTRACT

Direct paddy seeder is becoming popular for wet seeding because of its less initial investment, easy operation, low repair and maintenance cost. Here, we analyze the human energy expenditure during operation of a direct seeder for assessing the suitability to rural women. A comparison was also made between mechanized and manual operations. Nine female subjects were selected for the investigation. The parameters used for the ergonomical evaluation of the direct paddy seeders include heart rate and oxygen consumption rate, energy cost of operation and acceptable workload. The selected nine subjects were calibrated in the laboratory by indirect assessment of oxygen uptake. The maximum aerobic capacity of the selected nine subjects varied from 1.21 to 1.51 l min<sup>-1</sup>. The average energy expenditure before 9 am was 15.87 kJ min<sup>-1</sup> while after 11 am it was increased to 17.05 kJ min<sup>-1</sup> during seeder operation. The subjects expended more energy during sowing in lines than paddy seeder operation to the tune of 36% before 9 am and 44% after 11 am. Based on the mean energy expenditure, the operation was graded as “moderately heavy” for direct seeder while it was “heavy” for manual sowing. The oxygen uptake in terms of VO<sub>2</sub> max was above the acceptable workload for both operations.

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Rice is the staple food for most people in Asia. It is not only a major cereal crop in Asia but also a way of life for thousands of millions of people all over the world. Human energy is predominantly used in most of the rice farming operations starting from land preparation to threshing. It is estimated that nearly 145 man-days are required per hectare of rice (Veerabadran and Pandian, 1999). Exclusive dependence on human labour will become counter-productive since it is scarce and costly in rice growing regions. Very often mechanization is equated with tractorization or automation of farm operations. Mechanization to fully substitute human labour may change social dissension. However, mechanization as a tool to reduce drudgery and to increase labour efficiency should be the criteria where large percentage of population depends on agriculture as a means of livelihood.

The application of ergonomics can help in increasing the efficiency and thereby productivity of the workers without jeopardizing their health and safety. The performance of any machine especially manually operated ones could be considerably improved if ergonomic aspects are given due consideration (Gite, 1993). The farmers

have been continuously using the tools and equipments which have been developed by trial and error methods and which are inefficient with respect to drudgery removal, safety aspects and ease of operation. Hence, there is an urgent need to study the ergonomic aspects in detail to quantify the drudgery involved in agricultural operations.

Most technologies developed for small-scale farmers are geared to men with no concern for their appropriateness for women, who possess different physiques and energy capabilities in comparison to men. There is an urgent need to design and develop farm tools specifically for female operators in order to improve overall ease of use, safety, and effective integration of women in farming system innovations (Kaul and Ali, 1992). Systematic efforts to evaluate the energy expenditure of female labourers are generally non-existent. Hence, the energy measurements for different operations performed in rice farming under different environmental conditions are essential. Here, we analyze the human energy expenditure during operation of a direct seeder for effective use of women labourers available for rice cultivation.