## **RESEARCH PAPER** International Journal of Agricultural Engineering / Volume 5 | Issue 2 | October, 2012 | 153 – 157

## Ergonomical evaluation of paddy transplanting operations in Odisha

## S.K. MOHANTY, J.N. MISHRA AND M.K. GHOSAL

Received : 19.04.2012; Revised : 10.07.2012; Accepted : 25.08.2012

See end of the Paper for authors' affiliations

## Correspondence to:

M.K. GHOSAL Department of Farm Machinery and Power, College of Agricultural Engineering and Technology, Orissa University of Agriculture and Technology, BHUBANESWAR (ODISHA) INDIA Email : mkghosal@rediffmail. com ■ ABSTRACT : Transplanting of paddy is a very tedious job mostly done by female agricultural workers during the peak season. Most of the agricultural implements are generally designed for the male workers keeping in view of their physiological and physical capabilities. Manual transplanting of nursery in puddled field is time consuming and involves lot of fatigue and drudgery. Now power operated transplanters are also available but the socio-economic condition does not allow them to adopt the modern technology. To ease the transplanting operation, four-row paddy transplanter has been developed by different research centers which were evaluated with 12 female agricultural workers in the age group of 18-45 years. A two-row paddy transplanter was developed at College of Agricultural Engineering and Technology, OUAT, Bhubaneswar as per the anthropometric and strength data to suit the female workers of Odisha. The mean value of age, weight, height, VO, max and body surface area was 31.1 years, 51.7 kg 152.3cm, 1.71 l/ min and 1.52m<sup>2</sup>. Physiological parameters like heart rate, Oxygen consumption rate(OCR) and relative cost of work load (RCWL) etc were measured in different transplanting operations. It was recorded that the mean value of working heart rate and increased heart rate ( $\Delta$  HR) was 137.5 and 67.5 beats / min in case of four row paddy transplanter against 127.7 and 47.1 beats/ min in two-row paddy transplanter. The oxygen consumption rate (OCR) and RCWL of these workers were also recorded to be 1.06 l min<sup>-1</sup> and 62.4 per cent in four row transplanter and 0.91 1 min<sup>-1</sup> and 53.5 per cent in two-row paddy transplanter. The force required to operate the transplanter and field capacity was recorded to be 121.6 Nm, 111.3 Nm and 0.11 ha / hr, 0.05 ha / hr for four -row and two-row paddy transplanter, respectively. The two row paddy transplanter was observed to be suitable for female workers against four row paddy transplanter considering the physiological parameters into consideration.

- KEY WORDS : Ergonomics, Manual transplanters, Heart rate, Oxygen consumption rate, relative cost of Work load, Field capacity
- HOW TO CITE THIS PAPER : Mohanty, S.K., Mishra, J.N. and Ghosal, M.K. (2012). Ergonomical evaluation of paddy transplanting operations in Odisha. *Internat. J. Agric. Engg.*, **5**(2) : 153-157.

number of manually operated farm tools been designed and developed by different organizations in the country. These are mainly designed for the male workers keeping their physical and physiological parameter into consideration. Women play a major role in the rice farming throughout the world right from sowing, transplantation and to post harvest processing and that rice farming is a back breaking exercise. Transplanting and associated activities shared 22.3 per cent of total time spent by farmers family women and 45.6 per cent of women wage earners. The overall participation of farm women in transplanting and related activities was 36.5 per cent, Arya (2004). Rice is shown either by direct seeding, known as broadcasting or by transplanting, while studying it is observed that 10 to 12 per cent higher yield was observed from transplanted rice than direct seeded

rice. The transplanting operation is generally done by farm women. The 4-row manual paddy transplanting required skill so that the plant to plant and row to row spacing can be obtained. To case the transplanting in bending posture for through out a day, a 4-row transplanter available in the market has been ergonomically evaluated. However, the study was mostly done for female workers in the age group of 18-45 years to evaluate the equipment for its suitability for farm women and to modify it to their requirement if necessary. Physiological cost of work is influenced by the health of the operator, nutrition, basal metabolic rate (BMR) and energy expended while working. These measurements are also important from the safety point of view because whenever physical capacity of a person in exceeded, it is bound to cause considerable fatigue and decrease in the degree of alertness