

Circulo - respiratory efficiency of agricultural workers in Odisha

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ABSTRACT : The cardio respiratory performance of male and female subjects was studied in relation to manual types of agricultural work in Odisha. Operations like land preparation with spade, manual transplanting and seeding methods, weeding, harvesting with local sickle and reaper were evaluated. The working heart rate and oxygen consumption rate recorded 136.3 beats/min, 0.98 l min⁻¹ for male and 138.4, 0.92 l min⁻¹ in spading operation. Manual random transplanting required working heart rate of 118.6 beats/min and 114.7 beats/min for male and female workers and higher heart rate of 128.7 beats/min, 133.7 beats/min was recorded in 2 row and 4 row paddy transplanter operated by male workers, and it was 130.4 beats/min and 134.8 beats/min in 2 row and 4 row paddy transplanter for female workers. The 2 row and 4 row transplanter required 9.3 and 20.3 man day / ha for male and female workers, respectively. Weeding in squatting posture required less working heart rate and oxygen consumption rate of 98.3 beats/min, 0.45 l min⁻¹ for male and 100.2 beats/min, 0.4 l min⁻¹ for female workers. Four row pre germinated paddy seeder required the working heart rate, oxygen consumption rate and relative cost of work load of 126.4 beats/min, 0.80 l min⁻¹ and 41 per cent against 140.2 beats/min, 1.08 l min⁻¹ and 55.4 per cent in case of 8 row paddy seeder operated by male workers. The female workers could not operate the 6 and 8 row pre germinated paddy seeders due to higher pulling force in puddled field. Operation of locally available sickle in squatting posture required, 23.2 and 33.3 per cent lower energy expenditure rate against paddy reaper for both male and female workers. Pedal thresher was about 70 per cent more efficient than manual threshing. The working heart rate, oxygen consumption rate required in pedal thresher was 126.5 beats/min, 0.79 l min⁻¹ for male and 124.3 beats/min, 0.68 l min⁻¹ for female workers. The relative cost of workload of pedal thresher was 23.9 and 18.5 per cent lower than that of manual threshing by male and female workers. Proper training and modification of existing tools and equipments will reduce drudgery and fatigue of workers.

KEY WORDS : Working heart rate, Oxygen consumption rate, Relative cost of work load

Article Chronicle : Received : 20.04.2012; Revised : 18.09.2012; Accepted : 08.10.2012

How to cite this Article : Mohanty, S.K., Ghosal, M.K. and Mishra, J.N. (2012). Circulo-respiratory efficiency of agricultural workers in Odisha. *Engg. & Tech. in India*, 3(2) : 111-115.

INTRODUCTION

In rice cultivation system, different cultural operations are mostly done by male and female workers. Human labourers contribute about 60 per cent of total cost of cultivation in paddy crop. Therefore, it is of prime need to evaluate the ergonomic aspects of quantum of drudgery involved in agricultural

activities in paddy cultivation. Ergonomical cost of work consists of the anthropometry, body size, health of the worker, basal metabolic rate, energy expenditure rate, oxygen consumption rate and type of working posture. Many ergonomical studies have been conducted on some selected implements but study on the complete set of operations in rice cultivation system with male and female agricultural workers need to be studied. The strength and efficiency of the female agricultural workers is 70 per cent of male workers (Astrand and Rodahl, 1986). Some implements and operations are best suited to female workers. Thus, studies on human energy measurements in agricultural operations of both male and female workers can provide a rational basis for recommending methods and implements for performing the agricultural operations most efficiently and safely (Gite and Singh, 1997). Therefore, ergonomical study was conducted for different

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