



EFFECT OF GARLIC PLANTER ON EFFICIENCY AND ERGONOMIC PARAMETERS FOR FARM WOMEN INVOLVED IN GARLIC SOWING

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Abstract

The present study “Effect of garlic planter an efficiency enhancement of farm women involved in garlic sowing” was undertaken in adopted village, Semari Harchand block Sohagpur of KrishiVigyan Kendra, Hoshangabad for performing sowing efficiency of farm women by use of garlic planter. Hence, the present study was undertaken to introduce garlic planter and assessing its acceptability among the farm women. Reduction of women’s drudgery with the use of garlic planter was asses in the term of energy expenditure. Ergonomic cost was calculated by measuring heart rate, energy expenditure, and total cardiac cost of work. The results indicate that the 20 labours/ha required by hand sowing whereas 2 labour / ha required through bullock drawn garlic planter with total saving of 18 labour/ ha and efficiency 500 sqm / day and 10000sqm/day respectively.

Key Words: drudgery, ergonomic, efficiency, garlic planter

Introduction

Garlic (*Allium cepa L.*) is used as a spice as well as medicinal crop of India and China. India is second producer of Garlic after China. In India Gujarat, Rajasthan, Madhya Pradesh, Uttar Pradesh and Maharastra are mainly cultivated state of India. The area under garlic has been gradually increased in last decades due to its profitability in the form as cash crop. The area under garlic crop is increasing however; the increase in production is proportionally very less, because of heavy labour requirement during sowing of garlic. Mainly sowing of garlic is doing by farm women. During sowing of garlic farm women adopt unnatural body posture due to which their physical workload increases and also they faces many types of musculoskeletal problems as a results the efficiency of women to work decreases to a greater extent with a lot of drudgery.

The survey showed that sowing of garlic by hand is very exhausting and time consuming task and the farm women faces cervical, hand and knee pain during sowing of garlic. Farm women performed this activity is of bending and squatting posture for longer time. This posture increases the fatigue and drudgery of farm women, while sowing of garlic which leads to ache and pains in the

back and cervical region. Drudgery is generally conceived as physical and mental strain, fatigue, monotony and hardships experienced while doing a job. It is certain, that if appropriate drudgery reducing farmstead implements are made available to the rural women, these would contribute to reduction in drudgery, increase capability, productivity and consequently the greater workload thereby improved efficiency. Many agricultural operations and household activities performed by women involve a lot of physical strain, which create serious health problems in the long run. Since they are overburdened with so much work both on farm and home, there is chance of neglecting their health. Thus, the burden shared by women for the socio-economic development is twofold, one on the domestic front and the other on the economic front (Akthar *et al.*, 1996). To increase the productivity of the women’s work, there is a need for the ergonomic analysis of the activities performed by women and to study the circulatory stress and the physiological cost of each agricultural activity. Then suggest possible solution or techniques to increase the productivity and bring the women in the main stream of work force.

Hence in view of the above an attempt has been made to study the increase efficiency and reduce the drudgery of farm women in sowing of garlic. A bullock

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drawn garlic planter (three row) was introduced and tested on farm women through the heart rate method. Heart rate is one of the most accurate means of the energy expenditure while performing any activity. Generally heart rate is used as an ergonomic measure to evaluate the physiological or functional demand of work on the individual (Hasalkar *et al.*, 2004). From the physiological point of view, the job demand or work load refers to the demands placed on the cardio-respiratory system and is determined by the energy cost and cardiac cost of work (Chauhan, 1999). With a view to generate information, a field experiment was conducted at farmer's field in Hoshangabad district to increase the efficiency and reduced the drudgery of farm women in sowing of garlic through garlic planter.

Materials and Methods

The present study was carried out on 20 farm women of age group 25-45 years without having any physical deformity. The experiment was conducted in the year 2013-2014 and 2014-2015 in the month of October. Sowing of garlic with bullock drawn three row garlic planter provided by Department of Agriculture Engineering MP Government Hoshangabad was compared with traditional practice by sowing by hand with the use of khurpi for digging or making the hole. During the experiment various parameters *viz.* time profile, sowing efficiency was studied. Stop watch was used to record the time. Following parameters were recorded during experiment

Heart Rate

Heart rate was recorded using a Digital Heart Rate Monitor. In the morning resting heart rate (RHR) of the respondent was recorded and after completion of the activity working heart rate (WHR) was recorded.

1. Energy Expenditure Rate and Cardiac Cost

From the average values of heart rate and energy expenditure was calculated with the help of formulae given by Varghese *et al.* (1994) which is as follows

$$EER (kj/min) = 0.159 \times HR (beats/min) - 8.72$$

Where,

$$EER = \text{Energy Expenditure Rate (kj/min)}$$

$$HR = \text{Heart rate (beats/min)}$$

From the values of change in heart rate (beats/min) and output (sowing m²/hr) the cardiac cost is calculated.

After performing the activity:

Respondent were asked to rate the perceived

exertion on a five point scale every time.

Results and Discussion

From the table 1 to evaluate the sowing of garlic by garlic planter through ergonomic point of view 20 respondents in the age group of 25 to 45 years were selected at random and average was counted 37.5 years, the basic body dimensions were measured and average was worked out as height 153.5cm. and weight 48.5 kg respectively.

The results represented in table 2 depict ergonomic assessment of sowing of garlic through hand and garlic planter. As per comparison with traditional practice of sowing by hand and garlic planter the total saving of labour was 18 labour/ha and the efficiency of farm women was increased 90% in terms of labour saving. The average working heart rate observed in traditional practice sowing by hand and garlic planter was 91.6 beats/min and 84.50 beats/min respectively. With the use of garlic planter the sowing of garlic was 10,000m²/day as compare to traditional practice of sowing *i.e.* 500m²/day similar results reported www.icar.org.in/files/reports/icar-dare-annual/mechanization. Cardiac cost saving was 28% with decreased of drudgery in farm women. With the use of garlic planter for sowing of garlic the farm women found light rate of perceived exertion as compared to traditional

Table 1: Selected anthropometric dimensions of farm women involved in sowing of garlic.

Sl.No.	Parameter	Sowing of garlic
1	Age groups (Yrs)	37.5
2	Body Weight,(Kg)	48.5
3	Body Height(cm.)	153.7

Table 2: Ergonomic parameters and perceived rate while performing sowing of garlic.

S. No.	Physical Parameters	Sowing by hand	Sowing by garlic planter
1	Area covered (m ² /day)	500	10,000
2	Labour required(man/ha)	20	2
3	Efficiency(%) of farm Women	-	90%
4	Average working heart rate (beats/min)	91.6	84.50
5	Average heart rate during rest (beast/min)	84.5	81.2
6	Δ Heart Rate (beast/min)	7.1	3.3
7	Average Energy Expenditure (Kj/min)	6.54	4.71
8	Drudgery reduction (%)	-	28%
9	Rate of Perceived Exertion	Heavy	Light

practice sowing by hand.

Conclusions

Sowing of garlic by traditional practice by hand is a time consuming and tedious operation. The decrease in drudgery showed that the activity is light. Farm women feel sowing of garlic by hand it as a maximum drudgery prone activity, because of its monotony in performance, continuous sitting in bending and squinting posture and performing is for a longer period of time. The work efficiency with the use of bullock drawn garlic planter for sowing of garlic is very high and efforts are less.

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