



EFFECT OF HANGING TYPE GRAIN CLEANER ON EFFICIENCY AND ERGONOMIC PARAMETERS FOR FARM WOMEN INVOLVED IN CLEANING OF PIGEON PEA

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Abstract

The present study was undertaken in adopted village of Krishi Vigyan Kendra, Hoshangabad (Madhya Pradesh), India; to performing cleaning of pigeon pea. Hence, the present study was undertaken to introduce the hanging type grain cleaner and assessing its acceptability among the farm women. Reduction of women's drudgery with the use of hanging type grain cleaner 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 hanging type grain cleaner clean 214 kg/hr pigeon pea as compare to local sieve 48 kg/hr with increase efficiency 77.5%.

Key words : Hanging type grain cleaner, drudgery, ergonomic, health hazards.

Introduction

Rural women play a significant role in shaping the Indian economy. They play a key role in the entire food system starting from the selection of seed sowing, drying, staking, cleaning, grading, storing and feeding the family from the harvested produce. Therefore, the women work force engaged in agriculture and allied activities is estimated around 92 million which constitute about 40 percent of the total rural workers in the country (Singh *et al.*, 2007). As per the previous study by Bhople and Pathai (1998) the daily work schedule of rural women is very demanding and arduous. It is estimated that during peak period women work every day for about 8-9 hours in agriculture and 4 hours in household activities. So a farm women suffers a lot of drudgery while performing farming operations and household activities.

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 greater 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. Pigeon pea (*Cajanas cajan*) is a important pulse crop of India. It is used as a human food. Cleaning of pigeon pea through traditional sieve is very tedious and time consuming job. Hence, an effort in this research is made to ergonomically analyze the work load of the maximum drudgery involved farm activity *i.e.* cleaning of pigeon pea by traditional sieve and hanging type grain cleaner.

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

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Table 1 : Selected anthropometric dimensions of farm women involved to cleaning of pigeon pea.

S. no.	Parameter	Cleaning of pigeon pea
1.	Age groups (Yrs)	35.5
2.	Body Weight,(Kg)	52
3.	Body Height(cm.)	155.6
4.	Hand length	16

Results and Discussion

From the table 1 to evaluate the cleaning of pigeon pea though ergonomic point of view 20 respondents in the age group of 20 to 45 years were selected at random and average was counted 35.5 years, the basic body dimensions were measured and average was worked out as height 152.5cm. and weight 50.6 kg, respectively.

Table 2 : Ergonomic parameters and perceived rate while performing cleaning of pigeon pea.

S. no.	Physical parameters	Cleaning with traditional sieve	Cleaning with hanging sieve
1.	Output (Kg/h)	48	214
2.	Efficiency(%) of farm Women	-	77.5%
3.	Average working heart rate (beats/min)	98	102
4.	Average heart rate during rest (beast/min)	84	81
5.	? Heart Rate (beast/min)	14	21
6.	Average Energy Expenditure (Kj/min)	6.86	7.50
7.	Average physiological cost of work (beats/kg)	17.5	7.2
8.	Drudgery reduction (%)	-	59%
9.	Rate of Perceived Exertion	Moderately heavy	Light

2013-2014 in the month of January. Cleaning of pigeon pea with hanging type grain cleaner made by CIAE, Bhopal was compared with local sieve (chhana). During the experiment various parameters *viz.* time profile, cleaning efficiency was studied. Stop watch was used to record the time. Following parameters were recorded during experiment for hanging type grain cleaner and local sieve.

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.

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

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

Where,

EER = Energy Expenditure Rate (kj/min)

HR = Heart rate (beats/min)

From the values of change in heart rate (beats/min) and output (kg/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.

The results represented in table 2 depict ergonomic assessment of hanging type grain cleaner. The average working heart rate observed in traditional sieve and hanging grain cleaner was 98 beats/min and 102 beats/min, respectively. With the use of hanging type grain cleaner the cleaning of pigeon pea was 214 kg/hr as compare to traditional sieve *i.e.* 48kg/hr with increase efficiency 77.5%. The increase in efficiency of farm women was three fold. Singh *et al.* (2007) also find similar results during cleaning of soybean. Cardiac cost saving was 59% with decreased of drudgery in farm women. With the use of hanging type grain cleaner farm women found light rate of perceived exertion as compared to traditional sieve.

Conclusion

Cleaning of pigeon pea by traditional sieve is a time consuming and tedious operation. The decrease in drudgery showed that the activity is light. Farm women feel use of traditional sieve it as a maximum drudgery prone activity, because of its monotony in performance, continuous sitting and performing is for a longer period of time. The work efficiency with the use of hanging sieve to clean the pigeon pea is very high and efforts are very low.

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