

Performance of Twin Wheel Hoe in Narmada District

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Abstract

Women constitute a major and vital work force in agriculture. Nearly 84% of all economically active women in India are engaged in agriculture and allied activities. But the irony is that, most of the agricultural equipment and tools are designed keeping in mind men's physiological parameters which are substantially different from women's physiological parameters. Even the tools and equipment should not only be tailor made for women while they should be designed according to local conditions and demand. It is necessary to evaluate agricultural tools, equipment and technologies in gender perspective for increasing productivity and reducing the drudgery and also to promote women specific production and processing technologies in rural areas. Hence, the study is focused on ascertaining the acceptability of twin wheel hoe tools for weeding by the farm women and finding out the problems/constraints perceived by them during use of tools. The research study was conducted in purposively selected Gopaliya village of Dediapada taluka of Narmada district in Gujarat. Hence, the study was done to know the performance of weeder that is twin wheel hoe in reducing drudgery among women engaged in weeding activity. The results showed that the weeding were done with man power then cost of work was Rs/ha/Day 2592 during the weeding activity performed by improved tool , the twin wheel hoe cost was 1650 one time purchase cost followed by time saving also affected. Data were collected through structured interview schedule and through field operation observations of individual women farmer. Results of the study showed significant change in drudgery of women farmers after using twin wheel hoe during weeding work with less difficulty more postural comfort .

Key words: Ergonomics, traditional ,improved, weeding, farm women ,MSD

INTRODUCTION:

Weeds, instead of harboring insects, compete with the crop for water, light and plant nutrients and adversely affect the microclimate around the plant. In the absence of an effective control

measure, weeds remove 30-40 % of applied nutrients resulting in significant yield reduction. Mechanical weeding is preferred considering the fact that manual weeding is time consuming, tedious and costly. In most of the developing countries women constitute as one of the important sources of farm power. About 6.5 per cent of the power used in crop production and related activities in the country like India is contributed by about 241million workers, of which about 42 per cent (i.e.101 million) are female workers. Among all agricultural activities, weeding is predominantly the responsibility of farm women. Weeding is an agricultural activity of removal of unwanted plants manually or with traditional tool like khurpi and kudali (Singhet al., 2007). Therefore, in agriculture, the application of ergonomics can help in increasing the efficiency and productivity of the women without affecting their health and safety. Traditional method of weeding takes longer time for weeding. Women generally adopt squatting and bending posture while doing the activity and maintain it for long hours, which cause musculo-skeletal problems (Sharma,1999). Now a day's different types of weeders are developed in India. These weeders are helpful for weeding in agriculture. Weeding by manually operated weeder increase the efficiency of workers and productivity of work. Manual weeding requires huge labour force and accounts for about 25 percent of the total labour requirement which is usually 10 to15 man-hours/hectare. Moreover, the labour requirement for weeding depends on weed flora, weed intensity, time of weeding, and soil moisture at the time of weeding and efficiency of worker. Weeding activity was performed for maximum number of days in a year from morning till evening in squatting position majority of women perceived it as moderately heavy activity. In the present study twin wheel hoe .designed by Suruchi bardoli was tested on ergonomics parameters in comparison to the traditional method of weeding.

MATERIAL AND METHODS

KVK Narmada has conducted a Front line distribution on use of twin wheel hoe for weeding operation, a technology for relief of pain which was caused during squatting posture and for reducing drudgery of women workers during weeding. A total of 30 farm women were purposively selected from Gopaliya village of Dediapada taluka of Narmada district who were performing manual weeding of vegetable from many years for present study. Data were collected through observation during field work performed by women farmers and with personal interview

of every selected farm women. Twin wheel hoe weeder was compared in terms of traditional practice of weeding in squatting and improved practice of Weeding through hand weeder in standing position Assessment of drudgery in traditional and improved method and improvement in their work efficiency was recorded on certain parameters during manual weeding / drudgery experience of farmwomen activities was calculated on 6 psycho-physical parameters on a continuum of 5 point scale with total score of 30 (Corlette & Bishop, 1976). The parameters rating were on work demand, feeling of exhaustion, posture assumed, perception on manual loads operative, difficulty perception and work load perception.

RESULTS AND DISCUSSION

Thirty farm women from KVK adopted village Gopaliya , with normal health without any major illness or cardiovascular problems in the age range of 25 to 40 years having normal blood pressure and body temperature were selected. Body height, weight and BMI of each subject were measured. The grading of health status of women on the basis of BMI was done. The BMI scores were interpreted as per the classification given by Garrow (1987).

Table 1, showed the mean age of the selected farm women was 36 years with the average height of 152 cm and gross body weight being in the range of 42 to 52 kg. The mean body mass index was calculated to be 21.00, which meant they were in the normal category.

Table 1: Physical characteristics of the respondents (n=30)

Physical characteristics	Mean \pm Sd.
Age (years)	36 \pm 7.044
Height (cm)	152 \pm 3.640
Gross weight (kg)	48.56 \pm 6.393
Body Mass Index	21.00 \pm 2.676

Health status of farm women:

The rating of health status of women on the basis of BMI was done as per the classification given by Garrow(1987). The distribution of respondents as per BMI scores is reported in Table 2.

Table 2: Percentage distribution of respondents as per BMI scores

BMI Scores	Interpretation	Percentage of respondents
< 16.0	*CED grade III (severe)	-
16.0-17.0	*CED grade II(moderate)	10
17.0-18.5	*CED grade I (mild)	-
18.5-20	Low weight normal	55
20.0-25.0	Normal	35
25.5-30.0	Obese grade I	-
>30.5	Obese grade II	-

*CED = chronic energy deficiency

Table 2 reported that majority of the farm women (55%) fall in low weight normal category. Only 35 per cent of women were having BMI scores in normal range. It was observed that 10 per cent women belonged to poor health status in chronic energy deficiency of moderate grade Category of obesity grade II. It can be concluded that 10 per cent of respondent did not enjoy good health status as per BMI scores.

Musculo skeletal problems:

Weeding is an agro activity where musculo-skeletal problems are very pronounced. The reason being the activity is time bound and performed continuously for prolonged hours. The traditional method employs bending and squatting posture while pulling out weeds either with bare hands or using short handled sickle. Musculo-skeletal problems and posture were evaluated by asking the respondents as to where they felt pain in their body after weeding with traditional and improved technology. Weeding with traditional tools in strenuous posture caused severe pain in shoulders, upper and mid back and upper arms. The women perceived the task as very heavy. On the contrary using improved weeding tool induced moderate to light discomfort/pain in shoulders, arms, wrist and neck. They were relieved from back pain as improved tool employed standing posture and eliminated back breaking bending and squatting posture. The rating of perceived exertion was also reported as moderately heavy with use of improved tool.

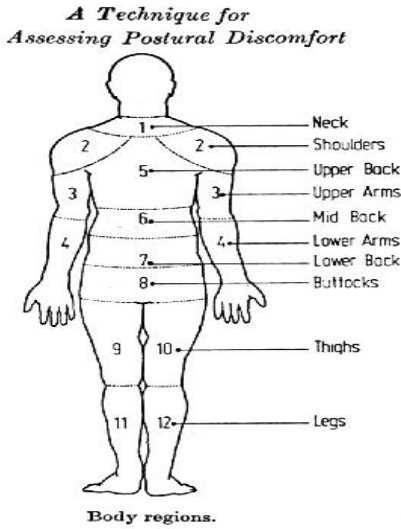


Table-3 Assessment of drudgery in traditional and improved method of weeding.
 N = 30

S B N o d y p a r t s	Head	Neck	Shoul der	Uppe r arms	Low er arms	Chest	Waist	Wrist	Hips	Uppe r legs	Low er leg	Uppe r back	Low er back	Total no. of body parts	Body parts involved	Sum of discomfort rating	Average discomfort rating
	F a r m a c	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R	* B D S P F R

Table 4. Assessment of work efficiency during weeding of vegetables

Sr.No.	Parameter	Man-days	Time (hr)	Labour employed	Work Area
1.	Traditional Practice Manual weeding in squatting posture (sickle)	4.5	28	10	1ha
2.	Improved Practice with twin wheel hoe	2.0	20	4	1 ha

CONCLUSION:

Table 3 showed that perception of respondents on musculo-skeletal problems were severe pain in shoulders, upper and lower back and upper arms, wrist etc through traditional methods of using khurpi/sickle followed by twin wheel hoe was found useful in terms of saving time, human effort, increasing work capacity and productivity. It was found to be compatible, easy to handle and applicable in field situation as well as most efficient for weeding vegetable fields. It was observed that use of Twin wheel hoe weeder improved posture and efficiency of worker. The body discomfort reduced with use of weeder because it employed standing posture eliminating muscular fatigue and excessive loading of inter-vertebral discs of backbone. This proved that weeder are ergonomically sound, women friendly, drudgery reducing and improves efficiency of women. Singh and Arora (2010) emphasized in their study that there is a need to increase awareness of musculoskeletal disorders and associated risk factors and to train farm women periodically for the proper and safe ways of handling tools and equipment in order to avoid musculoskeletal disorders. Verma & Gupta (2013) In the assessment of work efficiency of worker during weeding of vegetables difference of eight hour in harvesting one hectare area by a women worker reduce their man-day.

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