



Correlative Study On Postural Discomfort And Field Performance Evaluation Of Weeder

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Abstract:

Women are plays an important role in agriculture. Most of the weeding operation was done by women. Weeding by developed manually operated weeder decrease the postural discomfort and field performance than traditional method of weeding. Hence present investigation was undertaken with an objective to study the postural discomfort and performance evaluation of manually operated weeder. Present investigation was undertaken in Nagpur, Maharashtra state during the year 2010-2011. For this investigation farmers and farm workers are selected randomly from Nagpur district. The field performance of the developed weeder was evaluated in the field of cotton, soyabean and groundnut crops. Prestructured questionnaire and overall discomfort rating (ODR) scale was used for data collection.

Present investigation shows that postural discomfort at neck shows significant results in big farmers (0.32**), medium farmer (0.28**) and small farmers (0.22*) whereas marginal farmers shows no significant results. This shows that when postural discomfort at neck is increased when land holding is increased. young age group and middle age group farm workers shows significant results of weeding index (0.639** and 0.32**), effective field capacity (0.39** and 0.22*), theoretical field capacity (0.28** and 0.27**), field efficiency (0.29** and 0.22*) respectively while plant damage shows no significant values.

KEYWORDS: Correlation, postural discomfort and field performance

INTRODUCTION

Women in rural India play a major role in shaping the country's economy through their active participation in agriculture. At present, women work force in agriculture and allied sector is estimated at about 61 million which amounts to about 30% of the total rural workers in the country.

Ever since man started growing crops he had come up with the problems of weeds, which are undesirable for the growth of a farm. Farmers and researchers are putting up a combined front to tackle the menace of weeds. Weed control in Indian farm is a serious concern. Weeds pose major problem during warm and humid climate especially affecting kharif crops. The problem of weed control is more acute in black soil during kharif season. Weed control is one of the most expensive operations in crop growth. The

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high cost of weeding can be understood from a comparative study of the losses in the farm due to various causes.

Weeding and hoeing is generally done 15 to 20 days after sowing. The weed should be controlled and eliminated at their early stage. Depending upon the weed density, 20 to 30 per cent loss in grain yield is quite usual which might increase up to 80 per cent if adequate crop management practice is not observed. Competition in the early stage of growth and failure to control weeds in the first three weeks after seeding, reduce the yield by 50 per cent (Gunasena and Arceo, 1981). At least 40 million tones of major food grains are lost every year due to weeds alone (Singh and Sahay, 2001).

Presently there are many types of weeders available from simple to complex and motorized weeders. Several innovative and cost effective designs were developed and experimented according to the requirements of the farmers and soil conditions. Efforts are still on to reduce the drudgery in weeding operation. Mechanical weed control not only uproots the weeds between the crop rows but also keeps the soil surface loose, ensuring better soil aeration and water intake capacity. Manual weeding can give a clean weeding but it is a slow process (Biswas, 1990).

While operating the weeder, there would be some weeds left near the plant. These weeds were manually removed, which is a supplemental effort to the mechanical weeding. The field was irrigated one day before weeding and at least half inch water was retained for easy operation. Weeder was moved front and back between every two rows both vertically and horizontally. Hence present investigation was undertaken with an objective to study the postural discomfort and performance evaluation of manually operated weeder

MATERIAL AND METHODS

Present investigation was undertaken in Nagpur, Maharashtra state during the year 2010-2011. For this investigation farmers and farm workers are selected randomly from Nagpur district. The field performance of the developed weeder was evaluated in the field of cotton, soyabean and groundnut crops. Prestructured questionnaire was used for data collection. Overall discomfort rating (ODR) was measured on a 10-point visual analogue scale (0- no discomfort, 10-extreme discomfort) that is an adoption of a technique developed by Corlett and Bishop (1976). A scale of 70 cm length was fabricated having 0 to 10 digit marked on it equidistantly. A movable pointer was provided to indicate the rating. At the end of each trial, the subjects were asked to indicate their overall discomfort rating on the scale.

RESULT AND DISCUSSION:

TABLE NO.1. CORRELATION OF INDEPENDENT VARIABLES WITH POSTURAL DISCOMFORT OF FORM WORKERS BY TRADITIONAL METHOD OF WEEDING

Sr. No.	Independent variables Postural discomfort	Age group			Land holding				Typed land		Type of work	
		Young	Middle age	Old age	Marginal farmer	Small farmer	Medium farmer	Big farmer	Wetland worker	Dryland worker	Farm supervisor	Form work
1.	Postural discomfort neck	0.14 ^{NS}	0.21*	0.32**	0.18 ^{NS}	0.22*	0.28**	0.32**	0.28**	0.25**	0.17 ^{NS}	0.19*
2.	Postural discomfort at clavicles	0.19*	0.21*	0.24*	0.28**	0.25**	0.19*	0.22*	0.29**	0.19*	0.15 ^{NS}	0.21*
3.	Postural discomfort at shoulder	0.17 ^{NS}	0.17 ^{NS}	0.21*	0.21*	0.35**	0.18 ^{NS}	0.19*	0.18*	0.19*	0.17 ^{NS}	0.19*
4.	Postural discomfort at arm	0.14 ^{NS}	0.14 ^{NS}	0.24*	0.27**	0.21*	0.10 ^{NS}	0.21*	0.38**	0.27	0.18 ^{NS}	0.19*
5.	Postural discomfort at elbow	0.15 ^{NS}	0.14 ^{NS}	0.32**	0.25**	0.28**	0.28**	0.24*	0.21*	0.28**	0.13 ^{NS}	0.21*
6.	Postural discomfort at forearm	0.10 ^{NS}	0.15 ^{NS}	0.28**	0.21*	0.23*	0.27**	0.18 ^{NS}	0.19*	0.19*	0.09 ^{NS}	0.24**
7.	Postural discomfort at	0.09 ^{NS}	0.21*	0.29**	0.19*	0.19*	0.24*	0.19*	0.19*	0.29**	0.08 ^{NS}	0.19*



8.	Postural discomfort at palm	0.18 ^{NS}	0.19 ^{**}	0.21*	0.28 ^{**}	0.20*	0.21*	0.21*	0.28 ^{**}	0.22*	0.15 ^{NS}	0.20*
9.	Postural discomfort at backside	0.17 ^{NS}	0.28 ^{**}	0.33 ^{**}	0.18 ^{NS}	0.32 ^{**}	0.28 ^{**}	0.34 ^{**}	0.26 ^{**}	0.19*	0.14 ^{NS}	0.19*
10.	Postural discomfort at buttock	0.14 ^{NS}	0.19*	0.19*	0.32 ^{**}	0.27 ^{**}	0.27 ^{**}	0.27 ^{**}	0.31 ^{**}	0.21*	0.13 ^{NS}	0.17 ^{NS}
11.	Postural discomfort at thighs	0.19*	0.21*	0.38 ^{**}	0.38 ^{**}	0.21*	0.29 ^{**}	0.28 ^{**}	0.19*	0.19*	0.11 ^{NS}	0.21*
12.	Postural discomfort at knees	0.28 ^{**}	0.22*	0.19*	0.32 ^{**}	0.19*	0.19*	0.27 ^{**}	0.24*	0.21*	0.10 ^{NS}	0.19*
13.	Postural discomfort at legs	0.17 ^{NS}	0.12 ^{NS}	0.19*	0.21 ^{**}	0.17 ^{NS}	0.11 ^{NS}	0.19*	0.23*	0.16 ^{NS}	0.15 ^{NS}	0.17 ^{NS}
14.	Postural discomfort at foot	0.14 ^{NS}	0.15 ^{NS}	0.18 ^{NS}	0.17 ^{NS}	0.21*	0.19*	0.14 ^{NS}	0.14 ^{NS}	0.21*	0.17 ^{NS}	0.18 ^{NS}

*Significant at 1% level of significance ($r=0.25$)

**Significant at 5% level of significance ($r=19$)

NS – Non significant value

Table revealed that postural discomfort at neck by traditional method of weeding shows. Significant results in old age (0.32^{**}) at 1% level of significance whereas middle age workers (0.21*) at 5% level of significance. Young form workers are energetic that why they are shows no significant results after traditional method of weeding. In weeding operation comfortable posture is very important for increasing the efficiency of workers. When workers posture is good at working condition that time increase the productivity of work. In traditional method of weeding workers are not comfortable for his/her posture. That's why due to bad posture decrease the productivity of work and decrease the efficiency of workers.

Postural discomfort at neck shows significant results in big farmers (0.32^{**}), medium farmer (0.28^{**}) and small farmers (0.22*) whereas marginal farmers shows no significant results. This shows that when postural discomfort at neck is increased when land holding is increased. Upadhyay et al (2008) observed that due to heavy strain under gone during professional work were suffered maximum with both upper and lower back problems and it is also quite true that different body postures were used while performing the activities.

Postural discomfort shows significant results in wet land workers (0.28^{**}) and dry land workers (0.25^{**}). Farm workers shows significant results in postural discomfort at neck (0.19*), clavicles (0.21*), shoulder (0.19*), arm (0.19*), palm (0.20*), backside (0.19*), thighs (0.21*) and kless (0.19*) respectively while no significant results shows in postural discomfort at buttock legs and facts.

Postural discomfort at clavicles shows significant results in all the variables. Postural discomfort at shoulder shows significant results in old age (0.21*) while middle age and young age workers shows no significant results. Postural discomfort at shoulder in marginal farmers (0.21*), small farmers (0.35^{**}) and big farmers (0.19*) shows significant results while in medium farmer no significant result.

Most of the dry land farm workers and wet land form workers show significant results in all the part of postural discomfort.

Postural discomfort at elbow and firearm shows significant results in old age farm workers while others variable shows no significant results.

Most of the variables shows significant results for postural discomfort at wrist, palm, backside, buttock, thighs, knees, legs and feet respectively due to traditional method of weeding by form workers.

Tables conclude that in traditional method of weeding form workers are not adopted good posture for weeding. Due to that he/she occurs discomfort at neck, clavicles, shoulder, arm, elbow firearm, wrist,



palm, backside, buttock, thighs, knees, legs and foot respectively.

TABLE NO. 2. CORRELATION OF INDEPENDENT VARIABLES WITH POSTURAL DISCOMFORT OF FORM WORKERS BY DEVELOPED MANUALLY OPERATED WEEDER

Sr. No.	Independent variables Postural discomfort	Age group			Land holding				Typed land		Type of work	
		Young	Middle age	Old age	Marginal farmer	Small farmer	Medium farmer	Big farmer	Form super.	farm work	wetland former	dryland farmer
1.	Postural discomfort neck	0.10 ^{Ns}	0.18 ^{Ns}	0.32**	0.18 ^{Ns}	0.15 ^{Ns}	0.12 ^{Ns}	0.25**	0.12 ^{Ns}	0.28**	0.22*	0.18 ^{Ns}
2.	Postural discomfort at clavicles	0.19*	0.21*	0.23*	0.15 ^{Ns}	0.18 ^{Ns}	0.18 ^{Ns}	0.21*	0.18 ^{Ns}	0.21*	0.27**	0.21*
3.	Postural discomfort at shoulder	0.22*	0.18 ^{Ns}	0.28**	0.11 ^{Ns}	0.15 ^{Ns}	0.10 ^{Ns}	0.24*	0.11 ^{Ns}	0.20*	0.24*	0.18 ^{Ns}
4.	Postural discomfort at arm	0.17 ^{Ns}	0.15 ^{Ns}	0.18 ^{Ns}	0.10 ^{Ns}	0.14 ^{Ns}	0.18 ^{Ns}	0.21*	0.18 ^{Ns}	0.22*	0.12 ^{Ns}	0.18 ^{Ns}
5.	Postural discomfort at elbow	0.18 ^{Ns}	0.17 ^{Ns}	0.21*	0.18 ^{Ns}	0.14 ^{Ns}	0.12 ^{Ns}	0.11 ^{Ns}	0.11 ^{Ns}	0.12 ^{Ns}	0.17 ^{Ns}	0.11 ^{Ns}
6.	Postural discomfort at forearm	0.17 ^{Ns}	0.19*	0.20*	0.14 ^{Ns}	0.17 ^{Ns}	0.12 ^{Ns}	0.21*	0.18 ^{Ns}	0.21*	0.18 ^{Ns}	0.12 ^{Ns}
7.	Postural discomfort at	0.24*	0.17 ^{Ns}	0.21*	0.11 ^{Ns}	0.12 ^{Ns}	0.17 ^{Ns}	0.28**	0.17 ^{Ns}	0.22*	0.21*	0.12 ^{Ns}
8.	Postural discomfort at palm	0.11 ^{Ns}	0.19*	0.17 ^{Ns}	0.11 ^{Ns}	0.18 ^{Ns}	0.05 ^{Ns}	0.08 ^{Ns}	0.18 ^{Ns}	0.18 ^{Ns}	0.11	0.20*
9.	Postural discomfort at backside	0.17 ^{Ns}	0.11 ^{Ns}	0.28**	0.18 ^{Ns}	0.12 ^{Ns}	0.09 ^{Ns}	0.12 ^{Ns}	0.10 ^{Ns}	0.21*	0.18 ^{Ns}	0.21*
10.	Postural discomfort at buttock	0.17 ^{Ns}	0.18 ^{Ns}	0.05 ^{Ns}	0.15 ^{Ns}	0.12 ^{Ns}	0.18 ^{Ns}	0.31**	0.12 ^{Ns}	0.24*	0.14 ^{Ns}	0.12 ^{Ns}
11.	Postural discomfort at thighs	0.14 ^{Ns}	0.19*	0.12 ^{Ns}	0.14 ^{Ns}	0.09 ^{Ns}	0.18 ^{Ns}	0.17 ^{Ns}	0.09 ^{Ns}	0.17 ^{Ns}	0.18 ^{Ns}	0.17 ^{Ns}
12.	Postural discomfort at knees	0.17 ^{Ns}	0.21*	0.27**	0.20*	0.18 ^{Ns}	0.32**	0.27**	0.05 ^{Ns}	0.23*	0.18 ^{Ns}	0.17 ^{Ns}
13.	Postural discomfort at legs	0.28**	0.19*	0.21*	0.18 ^{Ns}	0.12 ^{Ns}	0.28**	0.22*	0.12 ^{Ns}	0.18 ^{Ns}	0.21*	0.28**
14.	Postural discomfort at foot	0.09 ^{Ns}	0.12 ^{Ns}	0.21*	0.17 ^{Ns}	0.21*	0.18 ^{Ns}	0.28**	0.14 ^{Ns}	0.15 ^{Ns}	0.18 ^{Ns}	0.11 ^{Ns}

*Significant at 1% level of significance ($r=0.25$)

**Significant at 5% level of significance ($r=19$)

NS – Non significant value

Table shows that postural discomfort at neck in young and middle age farm workers shows no significant results. While old age (0.32**) farm workers shows significant results. Big form workers (0.25**) shows significant results while marginal, small and medium farmers shows no significant results of weeding activity done by developed manually operated weeder. Gangobadhyay et al (2010) found that there is significant ($P<0.05$) correlation between discomfort level and risk level of the individual working postures of the workers.

Wet land farm workers shows significant results of postural discomfort at neck (0.22*), clavicles (0.27**), shoulders (0.24*), wrist (0.21*), legs (0.21*) while postural discomfort at other parts of body shows no significant results after weeding by developed manually operated weeder. Dry land form workers shows significant result of postural discomfort at clavicles (0.21*), backside (0.21*) and legs (28**) respectively whereas postural discomfort at other parts of body shows no significant results after weeding by developed manually operated weeder.

Big form workers shows significant results of postural discomfort at neck, clavicles, shoulders, arm, elbow, forearm, wrist, palm, backside, thighs, buttock, knees, legs, and foot respectively while medium, small and marginal form workers shows no significant results of postural discomfort after weeding by developed manually operated weeder. This shows that big form works are done weeding activity for more time than others that's why they are occurs postural discomfort at different parts of body.

TABLE NO. 3. CORRELATION OF INDEPENDENT VARIABLES WITH FIELD PERFORMANCE EVALUATION OF DEVELOPED WEEDER

Parameters Independent variables	Weeding index	Plant damage	Effective field capacity	Theoretical field capacity	Field efficiency
Age					
a) Young group	0.39**	0.10 ^{NS}	0.39**	0.28**	0.29**
b) Middle age group	0.32**	0.18 ^{NS}	0.22*	0.27**	0.22*
c) Old age group	0.18 ^{NS}	0.21*	0.22*	0.19*	0.21*
Sex					
a) Male	0.22*	0.12 ^{NS}	0.28**	0.22*	0.28**
b) Female	0.28**	0.09 ^{NS}	0.42**	0.29*	0.20*
Area of land					
a) Marginal form workers	0.27**	0.15 ^{NS}	0.21*	0.22*	0.24*
b) Small form workers	0.33**	0.3 ^{NS}	0.33**	0.28**	0.22*
c) Medium form workers	0.38**	0.10 ^{NS}	0.27**	0.25*	0.27**
d) Big form workers	0.22*	0.17 ^{NS}	0.22*	0.24*	0.23*



* Significant at 5% level of significance (=0.19)

**Significant at 1% level of significance (=0.25)

Ns=No significant value

Table shows that young age group and middle age group form workers shows significant results of weeding index (0.639** and 0.32**), effective field capacity (0.39** and 0.22*), theoretical field capacity (0.28** and 0.27**), field efficiency (0.29** and 0.22*) respectively while plant damage shows no significant values.

Male and female form workers shows significant results of most of the parameters of field performance evaluation of developed manually operated weeder while plant damage shows no significant results. Marginal, small, medium and big form workers shows no significant results for plant damage while other parameters shows significant results weeding by developed manually operated weeder.

Table conclude that weeding by developed manually operated weeder increase the weeding index, effective field capacity, theoretical field capacity and field efficiency respectively while decrease the plant damage. This shows that form workers will do weeding activity by developed weeder with comfortable posture. That's why they don't suffer from uncomforness at the time of weeding. When workers posture is comfortable that time increase the efficiency of workers and increase the productivity of work. This shows that developed manually operated weeder reduce the drudgery of form workers. Olawale and Philip (2006) shows that average field efficiency was 90 percent and the functional efficiency of weeder was between 90 and 98.5 percent. Weeder (0.31** and 0.22**), and diameter of wheel (32** and 24**) respectively. While old age form workers shows no significant results for weight of weeder. Old age form workers are not physically fit that's why they feel weight of wooder is more.

Male and female farm workers show significant results of satisfaction regarding developed manually operated weeder. This shows that developed manually operated weeder increase the efficiency of male and female form workers and increase the productivity of work. With the help of developed manually operated weeder decrease the plant damage at the time of weeding and increase the field efficiency. By the developed weeder form workers will do more weeding in less time. Goel et al (2008). Shows that the highest performance index of 3689.74 was obtained with developed weeder at 11.63 per cent moisture content. Lowest plant damage (2.46 to 7.96%) and lower energy consumption rate (8.34 to 40.05 kJ/min) with highest performance index (678.66 to 3689.74) of developed weeder at different soil moisture content proved its superiority over other weeders.

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