International Journal of Farm Sciences **6(4):** 120-130, 2016

Assessment of drudgery of farm women in groundnut production system

GEETA CHITAGUBBI, RENUKA SALUNKE, SHREEDEVI MUGALKHOD and ASHWINI MORAB

All India Coordinated Research Project- Home Science (Family Resource Management)
Main Agricultural Research station, University of Agricultural Sciences
Dharwad 580005 Karnataka, India
Email for correspondence: gnbenagi@gmail.com

ABSTRACT

Rural women farmers are actively involved in farming activities of groundnut production and in processing of value-added products of groundnut in addition to their domestic responsibilities. A study was conducted on assessment of drudgery of farm women in groundnut production system through drudgery reducing technology in Dharwad district of Karnataka comprising 150 samples. The results depicted that pod plucking was completely women exclusive activity. More than 9 kg weight was carried by women while removing stalks and stubbles/doing cleaning activity (9.25 kgs). The distance of carrying load was observed to be maximum in pod plucking (7.20 m). Highest pain rating of 3.73 (towards very painful) to lower back was reported by 62 followed by pain in knees (3.39) by 84 per cent women. Highest postural discomfort rating in knees (3.57) and lower back (3.47) was reported while performing weeding. Maximum rating of physiological workload was given to bundling and bunching (3.19) followed by weeding (3.13) which was performed by almost all women. Maximum drudgery index was found in case of bundling and bunching (34.50%) followed by pod plucking (32.92%) and removing of stalks and stubbles (28.81%). Among all the activities weeding was done for maximum number of days (18.20 man days).

Keywords: Postural discomfort; pace of work; drudgery index; bundling; bunching

INTRODUCTION

Woman is the backbone of agricultural task force and they do most tedious and back breaking tasks in agriculture. The need of the hour is to strengthen their participation by empowering them with gender-friendly technologies that help in increasing the production and also reduce drudgery. They play a vital role and are the major labour force in groundnut production. They are actively involved in farming activities of groundnut production operations like seed treatment, weeding, fertilizer application, harvesting, postharvest operations, storage and other value-added products making. Same is their role in groundnut cultivation.

Technological empowerment of women is the need of the day for betterment of agriculture and agricultural production. This should also reduce drudgery and enhance the efficiency of women in agriculture and ultimately increase the productivity. The available agricultural tools and technologies are not women-friendly and not designed as per the ergonomic consideration of women in agriculture.

The contribution of women is very high in the farm sector as they are involved in majority of farm operations and are therefore subjected to extra harsh conditions of work that leads to drudgery. Introducing women friendly improved farm tools and equipment can reduce drudgery in farm operations (Singh et al 2009).

The decortication capacity of sitting type groundnut decorticator was 30 kg per hour whereas by hand or teeth farm women were able to break only 1 kg groundnuts per hour. Besides its shelling efficiency (95%) was also found more than their local practice (92%) and reduced finger pain (73%), hand pain (60%), backache (40%), tooth pain (66%) and cuts in mouth (70%) (Pandey et al 2013).

Chakraborty et al (2014) reported that use of groundnut decorticator lead to a significant decrease in cardiac cost of work while the throughput registered a significant increase. The drudgery reduction was 57.87 per cent.

METHODOLOGY

The present study was conducted at villages Shivalli, Yadwad, Uppinabetageri and Shibargatti of Dharwad Taluka and Belavadi of Bailhongal Taluka on a sample of 150 farm women for groundnut production system for the characterization of drudgery of women in groundnut production environment. The sub-sample of 30 households was selected for intervention of improved technologies in groundnut production. A questionnaire was used for detailed data collection. Each improved technology introduced was further tested in detail for performance in the field on parameters like pace of work, human power used, work done or work output, drudgery score in its use and body disorder score. The drudgery score was allotted by analyzing the drudgery of women on six parameters namely gender participation, posture and postural discomfort, physical loads, body pain and musculoskeletal disorders, time load and physiological loads.

Gender participation was analyzed by using the scale of participation of women in each activity viz WE= Women exclusive only (1), WD= Women dominated and supported by men (2), ME= Men exclusive only (3), MD= Men dominated and supported by women (4) and EP= Equal participation by men and women (5).

The posture used while performing the selected activities in each production system was recorded (sitting, standing, bending, squatting and kneeling). The postural discomfort in each body part was rated by using the five point scale by the women as under viz Very severe= 5, Severe= 4, Moderate= 3, Mild= 2 and Very mild= 1.

Parameters like pace of work, human power used, work done or work output, drudgery score in its use and body disorder scores were measured. The drudgery scores were given by analyzing the drudgery. The Corlet and Bishop's body map was used to locate pain by the respondents for musculoskeletal disorder and pain rating viz Very painful= 5, Painful= 4, Moderate pain= 3, Mild pain= 2 and No pain= 1

The pain and disorder were recorded as per the body part and symptom or disorder experienced and the rating of pain was recorded on five point scale. The five point scale was adopted to measure the rating on work demand, feeling of exhaustion, posture assumed in work, perception on manual loads operate, difficulty perception, work load perceptions, musculoskeletal disorder and pain rating. Three point scale was adopted to measure the body tolerance to symptoms and impact on work viz Never= 1, Very often= 2, Not very often= 3, Quiet often= 4 and Always= 5.

In addition Information on the type of technology used and whether the respondents were satisfied by the technology was also collected.

RESULTS and DISCUSSION

Data given in Table 1 indicate that maximum percentage of the households belonged to the forward caste (68.70%); had nuclear families (70.70%); belonged to middle income group (41.33%); maximum households had more than 10-20 years of farming experience (37.33%) and maximum women belonged to middle age group (48.67%).

Table 2 presents the details of gender participation and technology usage in groundnut production system. Pod plucking was completely women exclusive activity; decortication of groundnut and weeding activities were performed by 86.67 and 70.67 per cent women respectively. Removing of stalks and stubbles/cleaning of land was observed to be an activity with equal participation of both men and women in majority (88.62%). Bundling and bunching activity was found to be women dominated activity among 92.00 per cent. Sowing and uprooting were observed by men exclusively as expressed by the sample.

Information on physical load carried and load rating perceived by the respondents is presented in Table 3. More than 9 kg weight was carried by

Table 1. Socio-economic characteristics of the sample repondents in groundnut production system (n= 150)

Variable	Category	Respondents	
		Frequency	Percentage
Caste	Backward	34	22.70
	SC	5	3.30
	ST	8	5.30
	Forward caste	103	68.70
Family type	Nuclear	106	70.70
	Joint	36	24.00
	Extended	8	5.30
Age (years)	Young (18-35)	44	29.33
	Middle age (36-50)	73	48.67
	Old age (>51)	33	22.00
Land holding	Marginal	36	24.00
	Small	46	30.67
	Medium	33	22.00
	Large	35	23.33
# animals	Buffaloes	4	2.67
	Cows	7	4.67
	Bullocks	62	41.33
# years of farming	Less than 10	36	24.00
	10-20	56	37.33
	20-30	47	31.33
	More than 30 years	11	7.33
Total family income (Rs)	Low (<46000)	59	39.33
	Medium (46000-100000)	62	41.33
	High (>100000)	29	19.33

women while removing stalks and stubbles/ doing cleaning activity (9.25 kg) followed by weeding (8.72 kg), pod plucking (8.45 kg) and bundling and bunching (7.64 kg). The results of the study are supported by the study of Revanwar et al (2015).

The distance of carrying load was observed to be maximum in pod plucking (7.20 m) followed by weeding (6.94 m). The height of carrying load ranged between 4.28 to 4.63 feet. All women gave maximum load rating to pod plucking (3.26) followed

Table 2. Gender participation and technology usage in groundnut production system (n= 150)

Activity	Gender participation					Technology/ method used
	WE	WD	ME	MD	EP	
Removing of stalks	-	17 (11.33)	-	-	133 (88.62)	Manual
Sowing	-	20 (13.33)	130 (86.66)	-	-	Manual
Weeding	106 (70.67)	38 (25.33)	-	-	6 (4.00)	Kurupi
Uprooting	-	-	15 (10.00)	135 (90.00)	-	Manual
Bundling & bunching	8 (5.33)	138 (92.00)	-	2 (1.33)	2 (1.33)	Manual
Pod plucking/stripping	150 (100.00)	-	-	-	-	Manual
Decortication	130 (86.67)	-	-	20 (13.33)	-	Manual

WE= Women exclusive, WD= Women dominating, ME= Men exclusive, MD= Men dominating, EP= Equal participation, Figures in parentheses indicate per cent values

Table 3. Physical load carried and load rating perceived by women in groundnut production system (n= 150)

Activity	Women (%)	Weight of the load (kg)	Distance (m)	Height (ft)	Load rating
Removing of stalks	100	9.25	6.46	4.40	2.95
Weeding	100	8.72	6.94	4.63	2.99
Bundling & bunching	100	7.64	6.78	4.28	3.00
Pod plucking/stripping	100	8.45	7.20	4.44	3.26
Decortication	86.67	-	-	-	-

by bundling and bunching (3.00). All women rated pod plucking, bundling and bunching activities as moderately heavy followed by weeding and removal of stalks and stubbles which were rated towards moderately heavy range.

Pain rating in different body parts while performing various activities is depicted in Table 4. The main body parts which had pain were knees, lower back, hands, wrists, fingers, upper legs and shoulders. Bundling and bunching was the activity in which all listed body parts had pain followed by weeding wherein pain in knees, lower back, hands and wrists was felt. Highest pain rating of 3.73 (towards very painful) was given to lower back by

62 per cent women followed by pain in knees (3.39) by 84 per cent women. And almost same pain rating of 3.70 (towards very painful) was experienced in lower back while performing bundling and bunching by 37.33 per cent women followed by pain in knees (3.56) experienced by 38.66 per cent women.

The graphical presentation in Fig 1 shows that maximum pain rating was given to lower back while performing almost all listed activities in groundnut production system as expressed by maximum percentage of women.

Table 5 presents the posture used and postural discomfort experienced in various body parts while performing the activities. Standing and bending were the main postures used in removal of stalks and stubbles and in bundling and bunching activities. On the other hand weeding was performed in bending and squatting postures and pod plucking in sitting and bending postures. Sitting was the main posture used by women while performing decortication activity. Eighty per cent of rural women expressed their willingness to adopt sitting type groundnut decorticator as per a study conducted by Ambrose and Annamalai (2013). Highest rating was given to postural discomfort in knees (3.57) and lower back (3.47) while performing weeding. While performing bundling and bunching activity the pain rating was given to lower back (3.36) and knees (3.33).

The knees and lower back were the sites in postural discomfort reported by maximum percentage of women in most of the activities.

As high as 98.67 per cent women expressed moderately sever discomfort in knees while performing weeding activity followed by 60.00 per cent expressing similar discomfort in lower back while performing pod plucking activity whereas 97.33 per cent women expressed moderate discomfort while removing stalks and stubbles/doing cleaning of land and decortication activities.

Thirty eight per cent women doing bundling and bunching activity also expressed almost moderately severe postural discomfort in lower back.

The overall physiological workload rating of the activities performed by women is presented in Table 6. Maximum rating of physiological workload was given to bundling and bunching (3.19) followed by weeding (3.13) and pod plucking (3.11) which were performed by almost all women.

Table 7 presents the drudgery parameters and drudgery index as perceived by women. Maximum drudgery index was given to bundling and bunching (34.50%) followed by pod plucking (32.92%) and removing of stalks and stubbles (28.81%). All these four activities

Table 4. Body pain rating while performing various activities in groundnut production system (n= 150)

Activity	Participation (%)	Body part							
		Shoulders	Wrists	Hands	Lower back	Buttocks	Upper legs	Knees	Fingers
Removal of stalk and stubble	100.00	2.54 (52.66.)	2.00 (4.00)	2.72 (31.33)	2.46 (97.33)	-	2.41 (52.00)	3.01 (53.33)	-
Weeding	100.00	2.91 (15.33)	2.88 (36.00)	2.87 (72.00)	3.51 (75.30)	2.64 (34.00)	2.93 (39.33)	3.50 (98.00)	2.86 (35.33)
Bundling and bunching	100.00	3.00 (30.66)	3.13 (10.00)	3.07 (42.66)	3.70 (37.33)	-	2.66 (4.00)	3.56 (38.66)	-
Pod plucking	100.00	2.84 (35.33)	2.96 (71.30)	2.92 (92.00)	3.73 (62.00)	-	2.97 (27.33)	3.39 (84.00)	2.92 (27.33)
Decortication	90.00	3.00 (2.66)	2.42 (45.33)	2.88 (6.00)	2.70 (78.00)	2.15 (61.33)	2.00 (0.66)	2.85 (82.66)	3.05 (66.00)

Figures in parentheses indicate percentage of women expressing pain
Pain rating: Very painful- 5, Painful- 4, Moderate pain- 3, Mild pain- 2, No pain- 1

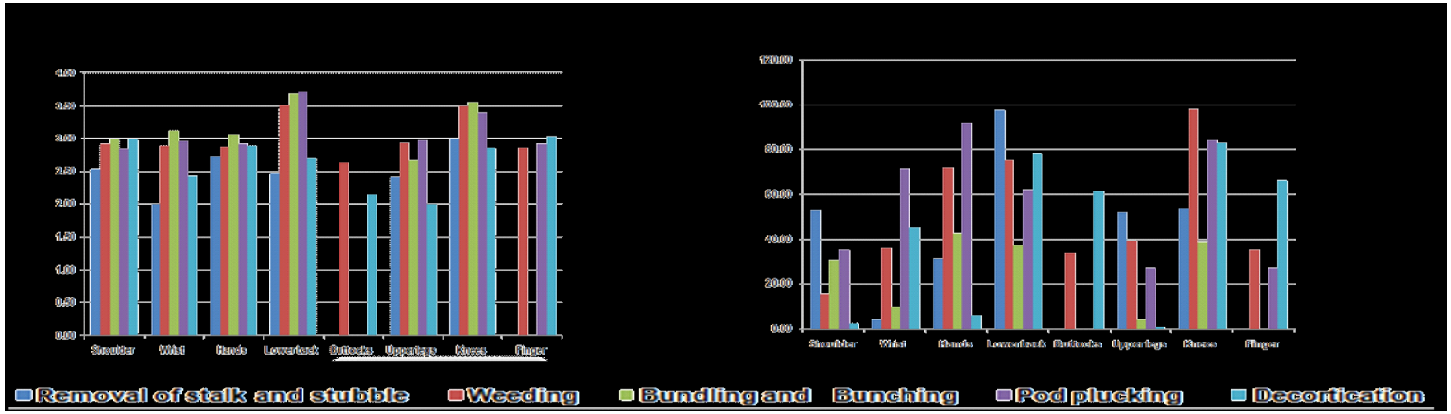

Fig 1. Graphical representation of body pain rating while performing various activities in groundnut production system

Table 5. Postural discomfort experienced in various body parts while performing activities in groundnut production system (n= 150)

Activity	Posture used	Body part						Physiological load rating
		Shoulders	Wrists	Hands	Lower back	Knees	Fingers	
Land preparation	Standing & bending	2.02 (57.33)	-	2.33 (3.67)	2.68 (97.33)	3 (44.00)	-	2.31
Weeding	Bending & squatting	2.80 (29.33)	2.73 (49.33)	2.81 (99.33)	3.47 (77.33)	3.57 (98.67)	2.82 (30.00)	3.13
Harvesting (bundling & bunching)	Standing & bending	2.85 (34.67)	3.04 (14.67)	3.00 (43.33)	3.36 (38.00)	3.33 (39.33)	-	3.19
Pod plucking	Bending & sitting	2.90 (89.33)	2.88 (72.00)	2.86 (96.00)	3.49 (60.00)	3.21 (91.33)	2.76 (24.67)	3.11
Decortication	Sitting	2.60 (6.67)	2.88 (62.00)	2.82 (7.33)	2.83 (72.67)	3.20 (71.33)	3.09 (58.00)	2.15

Figures in parentheses indicate percentage
Pain rating: Very heavy- 5, Heavy- 4, Moderately heavy- 3, Light- 2, Very light- 1

Table 6. Physiological workload experienced by the women while performing various activities in groundnut production system (n= 150)

Activity	Posture used	Physiological load rating
Removing of stalk and stubbles	Standing & bending	2.31
Weeding	Bending & squatting	3.13
Bundling and bunching	Standing & bending	3.19
Pod plucking/stripping	Bending & sitting	3.11
Decortication	Sitting	2.15

Physiological load rating: Very heavy- 5, Heavy- 4, Moderately heavy- 3, Light- 2, Very light- 1

were classified as moderately heavy activities.

The factors causing drudgery were significantly different and it is inferred that among the six factors musculoskeletal disorders, postures and physiological load influenced variations in respective orders of priority for total drudgery.

Significant difference was found within the activities compared and it can be said that activities were dependent on drudgery load in groundnut production. The results of the study are supported by the study of Revanwar et al (2015).

Among all the activities weeding was done for maximum number of days

Table 7. Drudgery parameters and drudgery index in groundnut production system

Farm activity	Physical load (n= 25)	Posture load (n= 25)	Repetitive strain load (n= 25)	Physiological load (n= 25)	Time load (n= 25)	MSD load (n= 25)	Total drudgery (n= 150)	Drudgery index (%)	Level
Removing stalks & stubbles	1.68	10.39	11.92	5.69	7.65	7.56	43.22	28.81	Moderate
Weeding (plant to plant)	2.3	8.9	9.8	3.6	5.9	11.4	41.5	27.67	Moderate
Bundling & bunching	6.69	8.8	10.24	8.95	6.63	10.44	51.74	34.50	Moderate
Pod plucking	1.01	8.76	10.04	8.54	9.67	11.36	49.37	32.92	Moderate
Decortication	0	6.47	6.71	3.3	5.79	9.8	36.76	24.51	Low

ANOVA

Source of variation	SS	df	MS	F	P-value	F crit	
drudgery factors	210.2210	5	42.0446	14.53602	4.47794	2.71	Rejected
Activities	39.42231	4	9.85557	3.407388	0.027965	2.86	Accepted
Error	57.84828	20	2.89241				
Total	307.491	29					

Table 8. Time duration of the activities performed by women and the workload as per time in groundnut production system (n= 150)

Activity	Time duration			Work load as per time
	Hours	# days	# man days	
Removing of stalks	7.87	12.51	12.37	3.53
Weeding	7.89	18.45	18.20	3.62
Bundling & bunching	2.04	8.52	2.29	3.88
Pod plucking/stripping	9.21	11.87	13.52	3.78
Decortication	5.34	12.95	8.39	3.91

(18.20 man days) followed by pod plucking (13.52 man days). The work load against time duration was highest for decortication followed by bundling and bunching, pod plucking and weeding activities as shown in Table 8.

As per the data and the expressions of women the most drudgery prone activities were the women exclusive and women dominating activities namely weeding, pod plucking, decortication, bundling and bunching.

CONCLUSION

Rural women famers play a vital role in groundnut production and they are the major labour force in this system. Pod plucking was completely women exclusive activity. More than 9 kg weight was carried by women while removing stalks and stubbles/doing cleaning (9.25 kg). The distance of carrying load was maximum in pod plucking (7.20 m); highest pain rating of 3.73 (towards very painful) was given to lower back by 62 per cent women; highest postural discomfort rating in knees (3.57) and lower back (3.47) was given while performing weeding; maximum rating of physiological workload was given to bundling and bunching (3.19) and maximum drudgery index score was given to bundling and bunching (34.50%). Among all the activities weeding was done for maximum number of days (18.20 man days).

REFERENCES

Ambrose DCP and Annamalai SJK 2013. A study on the technology dissemination of gender friendly processing equipment among rural women in India. International Journal of Advanced Research **1(7):** 586-590.

Chakraborty S, Tomar RKS and Chakraborty SK 2014. Drudgery reduction of farm women in groundnut shelling. In: Technologies for sustainable rural development (Shukla JP ed), Allied Publishers Pvt Ltd, New Delhi, India, pp 13-18.

Pandey S, Sharma P and Sharma RK 2013. Sitting type groundnut decorticator for reducing the drudgery of farm women. Current Advances in Agricultural Sciences **5(1):** 80-86.

Revanwar MS, Zend JP and Admankar SN 2015. Assessment of drudgery of farm women in the cotton production system. International Journal of Innovative Research and Development **4(10):** http://www.ijird.com/index.php/ijird/article/view/78637.

Singh SP, Singh RS and Agarwal N 2009. Women friendly improved farm tools and implements for commercialization. Agricultural Engineering Today **33(2):** 20-25.

Received: 25.8.2016 ***Accepted: 13.10.2016***