



ISSN 2278 – 0211 (Online)

Assessment of Drudgery of Farm Women in the Cotton Production System

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Abstract:

A sample of 50 farm women involved in cotton production system was selected from five villages of Parbhani district. Pretested interview schedule was used to collect the data. The activities performed by the farm women in selected production system were listed out. Six variables. Physical load, Postural load, Time load, Musculo skeletal Discomfort (MSD) load, Repetitive strain load and Physiological load were selected for characterizing drudgery of women in selected production system. Drudgery index was calculated based on total drudgery load.

Results indicated that drudgery index of women was categorized as medium to high in Cotton production activities. Significant variation was observed due to factors contributing to drudgery of women labourer in cotton production system. Therefore in order of priority, physiological load, physical load, Repetitive strain load factors contributed to overall drudgery of women agricultural labourers. The study revealed that drudgery of women labourers in Cotton cultivation is characterized by physiological, physical and repetitive strain load experienced due to lack of protective aids and appropriate technologies. Result emphasized the need of improving work life of women in agriculture by designing cost-effective tools/ implements, techniques based on ergonomic consideration to avoid physical load carrying, repetitive strain, long hours of work and health hazards.

Keywords: Drudgery index, Load factors, MSD, Physiological load, postural load

1. Introduction

Agriculture is an important unorganized sector when majority of the women labour force is engaged. The farm women's participation was maximum in cutting, picking, cleaning grains, drying of grains, storage, processing operations and major part of cleaning of field, raising nursery for seedlings, weeding, shifting production to threshing floor, winnowing and grading operations are also done by farm women. In case of leveling of field, fertilizer application, they do least amount of work, where as there is no participation of farm women in ploughing of field, plant protection measures and marketing activities. (Chayal and Dhaka 2010). Over the years women cultivators are typically and wrongly characterized as economically inactive and women cultivators play only a supportive role in agriculture as farmer's wives (Samanta, 1994). Dash (2000) stated that the Indian women, especially in the poverty group spend above five hours per day more than the Indian man in work, including visible burden of family. As per the recent findings women in India are major producers of food in terms of value, volume and number of hours worked.

Marathwada region has the largest area under cotton cultivation. Most of the drudgery prone tasks are performed by women in cotton cultivation. The present study was taken up with the objective to assess drudgery in women dominated activities.

2. Materials and Methods

The present study was conducted in selected villages of Parbhani district. A total of 50 women farmers engaged in cotton production system from last 5 years were selected purposively. Interview schedule was used for collecting general background information and to elicit information on drudgery involved in women dominated activities in cotton production system. Drudgery in cotton production system was calculated as per the six parameters i.e. physical load, posture, repetitive strain, physiological load, musculoskeletal disorder, time load and load factor. Each factor was measured using quantitative and qualitative methods (Mrunalini et al 2015)

Drudgery load and drudgery index were calculated for each selected activity in selected crop system by using following formulae

$$\text{Drudgery Load} = [\text{dr(PL)} + \text{dr(P)} + \text{dr(RS)} + \text{dr(T)} + \text{dr(MSDs)} + \text{dr(PysL)}]$$

$$\text{Drudgery Index \% (DI)} = [100 \times \text{dr (total)}] / 150$$

where,

dr (total) = Total drudgery, PL – physical load (25 points) , P – postural load (25 points) , RS – repetitive strain load (25 points) , T – time load (25 points), MSDs – musculoskeletal disorders (25 points), PhsL – physiological load (25 points) (Mrunalini et al 2015 and Garasia et al 2015)

Drudgery Level Categorization

< 15 = V. Low , 15- 30 = Low, 30 - 45 = Moderate to Heavy, 45 - 60 = Heavy, 60- 80 = V. heavy and >80 = Unacceptable

3. Results

3.1. Crop Calendar

Month wise performed farm activities in cotton production system in Marathwada region are indicated in crop calendar. According to this crop calendar, sowing of cotton seeds along with fertilizer application is initiated in the month of June. The major activities performed from the month of July to September (total 3 months duration) were intercultural operations, weeding (monthly), fertilizer application (monthly) and spraying (5 times/ crop duration). The harvesting of cotton crop was commenced in the month of October and was extended up to the month of December (total 3 months duration). In case of irrigated farms, irrigation was performed for every 15 days.

3.2. Gender Participation in Cotton Production System

In Marathwada region, major role of farm women in the cotton production system was found to be in weeding, cotton picking, gathering and heaping (100%) and dibbling activities (80%). It was followed by removing stalk and stubbles (80%) and spreading of manure (50%).

3.3. Technologies Used in Cotton Production System

Majority of the activities in cotton production system were performed manually. Traditional khurpi was used for performing weeding activity. Very few farmers used plough for seed dropping purpose. All the respondents expressed dissatisfaction regarding type of technologies they used in performing cotton production activities.

3.4. Factor Wise Drudgery Load of Farm Women in Cotton Production System

Factor wise drudgery load of farm women is discussed under each selected load factor

3.4.1. Physical Load

Maximum average load of 27 kg was carried by farm women while performing baggage and transport activity followed by 19 kg weight in cotton picking and heaping activities respectively. On an average 5-6 kg load was carried while performing land preparation, cotton picking and transporting of manure respectively. On an average maximum 5 km distance was travelled by the farm women while performing spreading of manure in cotton field followed by 4 km distance in cotton picking and 3 km distance in gathering and heaping of cotton and transportation of manure respectively (Table 1).

3.4.2. Postural Load

Majority of the activities such as transportation and spreading of manure, seed dropping, cotton picking, heaping and baggage at field in cotton production system were performed by alternating standing and bending postures. Only removing stalks and stubbles was found to be performed by alternating sitting and bending postures and weeding was performed in squatting posture (Table 2).

Total discomfort ratings indicated that majority of the farm women were suffering severe discomfort while performing cotton production activities at shoulder, upper and lower arm, waist and upper legs while performing activities. The activity wise discomfort ratings were highest for cotton picking followed by spreading manure, seed dropping and weeding.

3.4.3. Repetitive Strain Load

The repetitive strain load of farm women in cotton production system was highest while performing weeding plant to plant followed by cotton picking and removing stalks and stubbles. The repetitive strain load of baggage and transport activity reported by farm women was least (Table 3).

3.4.4. Physiological Load

The Physiological load of farm women while performing transportation of manure was reported highest due to heavy load carried by farm women for long distance. It was followed by spreading of manure and weeding plant to plant. The Physiological load in baggage and transport activity was due to heavy load of baggage. Majority of the farm women were of opinion that their physiological load was due to continuous working in severe sunlight (Table 4).

3.4.5. Time Load

Time spent by farm women while performing transportation of manure, spreading of manure, dibbling and cotton picking was maximum i.e. 7 h/day followed by 6 h/day for removing stalks and stubbles and weeding plant to plant respectively. Number of man

days required per season were highest for completing weeding plant to plant (50 days), followed by 29 and 22 man days per season for cotton picking and removing stalks and stubbles respectively which were exclusively performed by farm women (Table 5).

3.4.6. MSD Load

Maximum body disorder symptoms reported by farm women were for waist region of the body while performing all farm activities in cotton production system. It was followed by for upper and lower legs, arms, shoulder, upper and lower back. Body disorder symptoms were least experienced by farm women at abdomen, neck and shoulder. Sum of discomfort ratings were noted to be highest for the cotton picking activity due to working continuously by alternating standing and bending posture for longer duration (Table 6).

3.5. Activity Wise Drudgery Load of farm Women in Cotton Production System

Activity wise drudgery load of farm women in cotton production system is discussed under each selected load factor

3.5.1. Removing of Stalks & Stubbles

Removing of stalks & stubbles in farm was performed exclusively by farm women in cotton production system. This activity was recorded for maximum repetitive strain load and time load of farm women. MSD load of farm women in performing land preparation activity was noted least.

3.5.2. Transportation of Manure

Drudgery involved in transportation of manure performed by farm women in cotton production system was found to be higher due to physical and physiological load. Postural and time load of farm women in transportation of manure was recorded to be least.

3.5.3. Spreading of Manure

Spreading of manure performed by farm women in cotton production system was ranked second for its drudgery load amongst all the activities in cotton production system. Drudgery load of farm women in spreading of manure was increased due to highest physical and postural load followed by physiological, repetitive strain and time load. MSD load of farm women in spreading of manure in cotton production system was scored least amongst all the factors.

3.5.4. Seed Dropping (Dibbling)

Dibbling was performed solely by farm women in cotton production system. Drudgery load of farm women involved in this activity was highest because of postural load i.e. continuous alternating standing and bending posture for long duration followed by repetitive strain, time and MSD load. Physical load of seed dropping activity performed by women was scored least.

3.5.5. Weeding

Drudgery load of women exclusive activity weeding was found to be increased due to highest repetitive strain and postural load. Physical load of farm women was least scored for weeding activity.

3.5.6. Cotton Picking

Cotton picking activity was a women exclusive activity which was ranked first for its drudgery load. Drudgery load of cotton picking activity was highest mainly due to repetitive strain and time load factors. Drudgery load of cotton picking activity was also found to be increased due to physical load factor, as they carried 5 – 10 kg weight of cotton while performing cotton picking. Cotton picking activity was scored less for its MSD load.

3.5.7. Gathering & Heaping

Gathering & heaping of collected cotton in the field was also performed only by women. Drudgery load of farm women involved in this activity was scored less amongst all the selected activities in cotton production system. This activity was scored less because of low MSD score and postural load.

3.5.8. Baggage and Transport

Drudgery load of farm women involved in baggage and transport activity was scored minimum amongst all the selected activities in cotton production system. Drudgery load of farm women involved in this activity was least because postural, time and MSD load was scored minimum. Drudgery load experienced in baggage and transport activity was due to higher physical and physiological load.

4. Discussion

Cotton is a seven months crop grown during Kharif. Gender participation in tasks of this system revealed that among the major eight tasks, women exclusively participated in sowing, weeding and crop harvesting. While land tillage, row making, inter culture operations, pest management were considered as exclusively men's tasks. Traditional tools were used for cotton production System viz. khurpa, wooden plough and local cattle drawn hoe (*Kolapa*). Maximum average load of 27 kg was carried by farm women while performing baggage and transport activity followed by 19 kg weight in cotton picking and heaping activities respectively. On an average 5-6 kg load was carried while performing land preparation cotton picking and transporting of manure respectively. On an

average maximum 5 km distance was travelled by the farm women while performing spreading of manure in cotton field followed by 4 km distance in cotton and transportation of manure respectively. Physical load of the women in cotton production system was highest while performing transportation of manure and spreading of manure followed by bagging at field and transport. The next drudgery prone activities with respect to physical load were cotton picking and heaping followed by removing stalks and stubbles and spreading of manure. The physical load of farm women while performing weeding activity was scored least. Postural load of farm women while performing spreading of manure, seed dropping and weeding activities was scored highest followed by removing stalks and stubbles and cotton picking. The least postural load was observed in case of baggage and transport activity. Weeding plant to plant and removing stalks and stubbles in the field were scored highest for its time load factor. It was followed by time load of the seed dropping (dibbling) and cotton picking activities. Time load factor was least scored for the baggage and transport activity performed by women. MSD load for farm women for seed dropping (dibbling) activity was found to be highest. It was followed by MSD load in transportation of manure, weeding, cotton picking, gathering and heaping of plants and spreading of manure (Table 7).

Activity wise drudgery load in cotton production system revealed that among the factors causing impact on overall drudgery in cotton production activities were physical load, repetitive strain load followed by physiological load and postural load. ANNOVA showed significant variation in drudgery load attributed to the drudgery factors. There was significant variation among the activities with respect to all the selected factors.

5. Conclusion

It can be concluded from the data that Drudgery load of farm women in cotton production system was highest for cotton picking activity due to maximum repetitive strain followed by physical and physiological load. The activities such as spreading and transportation of manure, weeding and seed dropping were with similar drudgery load. Drudgery load was least in case of baggage and transport of cotton as posture, time, repetitive strain and MSD load was scored least.

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Annexure

Farm Activity	Weight of The Load (KGS)	Distance Carried (KMS)	Height Lifted (MTS)	Physical Load Rating	Physical Load Factor	Physical Load
Land preparation – Removing stalks and stubbles	6	1.5	0.9	4	2	9
Transportation of manure	5	3	0.9	5	5	21
Spreading of manure	5	5	0.9	5	5	21
Seed dropping/dibbling	193g	2.5	-	5	1	6
Weeding plant - plant	5	0.5	0.9	4	1	4
Picking _ Harvesting	6	4	0.9	4	2	10
Picking - gathering and heaping	19	3	1.2	4	2	10
Baggage and transport - bagging at field	27	0.25	1.5	3	5	15

Table 1: Activity analysis of physical load of farm women in Cotton Production System

Farm Activity	Sum of Discomfort Rating	Average Discomfort Rating	Posture Load Factor	Posture Load
Land preparation - Removing stalks and stubbles	28	4	2	9
Transportation of manure	29	4	1	4
Spreading of manure	30	4	3	14
Seed dropping/dibbling	30	4	4	14
Weeding plant - plant	30	4	3	14
Picking _ Harvesting	34	4	2	9
Picking - gathering and heaping	23	4	2	8
Baggage and transport - bagging at field	20	3	1	3

Table 2: Activity analysis of postural load of farm women in cotton production system

Farm Activity	Repetitive Strain Rating	Repetitive Strain Load Factor	Repetitive Strain Load
Land preparation - Removing stalks and stubbles	4	4	14
Transportation of manure	4	1	5
Spreading of manure	5	1	5
Seed dropping/dibbling	5	3	12
Weeding plant - plant	4	5	19
Picking _ Harvesting	4	4	16
Picking - gathering and heaping	4	4	13
Baggage and transport - bagging at field	3	1	3

Table 3: Activity analysis of repetitive strain load of farm women in cotton production system

Farm Activity	Physiological Load Rating	Physiological Load Factor	Physiological Load
Land preparation - Removing stalks and stubbles	4	2	8
Transportation of manure	4	5	17
Spreading of manure	5	2	11
Seed dropping/dibbling	4	2	8
Weeding plant - plant	4	2	11
Picking _ Harvesting	4	2	9
Picking - gathering and heaping	4	2	8
Baggage and transport - bagging at field	3	4	10

Table 4: Activity analysis of physiological load of farm women in cotton production system

Farm Activity	Hours / Day	No. of Days / Acre/ Season	No. of Labour Employed (Incl. Self)	No. of Man Days / Season	Work Load as Per Time	Time Load Factor	Time Load
Land preparation - Removing stalks and stubbles	6	6	5	22	4	3	11
Transportation of manure	7	3	3	8	4	1	5
Spreading of manure	7	3	3	8	4	1	5
Seed dropping/dibbling	7	3	4	8	4	3	10
Weeding plant - plant	6	7	7	50	5	1	5
Picking _ Harvesting	7	7	6	29	4	3	11
Picking - gathering and heaping	3	4	4	6	3	3	9
Baggage and transport	2	2	2	1	2	1	3

Table 5: Activity analysis of time load of farm women in cotton production system

Farm Activity	Avg. Pain Rating	MSD Load Factor	MSD Load
Land preparation - Removing stalks and stubbles	10	2	5
Transportation of manure	10	3	8
Spreading of manure	10	2	6
Seed dropping/dibbling	12	3	10
Weeding plant - plant	11	2	7
Picking _ Harvesting	12	2	6
Picking - gathering and heaping	12	2	6
Baggage and transport - bagging at field	6	3	5

Table 6: Activity analysis of MSD load of farm women in cotton production system
MSD- Musculo skeletal disorder

Farm Activities	Total Drudgery (150)	Drudgery Index (%)	Level	'F' Value
Removing stalks and stubbles	61	41	MH	35.85*
Transportation of manure	66	44	MH	77.75*
Application of Manure	67	45	H	39.59*
Seed dropping	66	44	MH	19.36*
Weeding (plant to plant)	65	43	MH	77.34*
Cotton Picking	67	45	H	19.92*
Gathering and heaping	60	40	MH	16.28*
Baggage and transport	43	29	Low	169.9*

Table 7: Drudgery load of farm women in cotton production system
H- Heavy, MH- Moderate to heavy, * Significant at 5% level