

## Characterization of Drudgery in Vegetable Production System



### Management

**KEYWORDS :** Drudgery, farm women, vegetable production, characterization

**A. Mrunalini**

Professor and University Head, Department of Resource Management and Consumer Sciences, Faculty of Home Science, Hyderabad, Professor Jayashankar Telangana State Agricultural University, Andhra Pradesh, India.

**D. Esther**

Senior Research Fellow, Department of Resource Management and Consumer Sciences, Faculty of Home Science, Hyderabad, Professor Jayashankar Telangana State Agricultural University, Andhra Pradesh, India.

**J. Deepika**

Ph.d. Student, Department of Resource Management and Consumer Sciences, College of Home Science, Hyderabad, Professor Jayashankar Telangana State Agricultural University, Andhra Pradesh, India.

### ABSTRACT

*A survey was conducted in five operational villages of Chevella mandal of RR district, Telangana state, to characterize drudgery of women working in vegetable production system. Thirty women were taken as sample comprising 10 per cent of vegetable growing families. Interview schedule was developed to collect the data from farm women by recall method on six factors viz; physical load, posture load, repetitive strain load, physiological load, time load and musculoskeletal disorder load. Results confirmed that factors contributed to the variance in drudgery load of activities.*

### INTRODUCTION

Today, India is the largest producer of fruits in the world, having a share of over 10 per cent and the second largest producer of vegetables with a global share of over 13 per cent. In India, the typical work of the female agricultural laborer or cultivator is limited to less skilled jobs, such as sowing, transplanting, weeding and harvesting, that often fit well within the framework of domestic life and child-rearing. Many women also participate in agricultural work as unpaid subsistence labor. According to United Nations Human Development Report only 32.8% of Indian women formally participate in the labor force, a rate that has remained steady since 2009 statistics. By comparison men constitute 81.1%.

It is not an exaggeration, that women in India are the backbone of food security. Women are playing a significant and crucial role in agricultural development and allied fields including crop production, livestock production, horticulture, post harvest operation, agro/social forestry, fisheries etc. There is a greater involvement of women under various agricultural operations along with house arrangement out of the total 329 million hectares geographical area of the country, net shown area is 142 million hectare. It is estimated that women are responsible for 70 percent of actual farm work and constitute up to 60 percent of the farming population. But it is most unfortunate that the role of women in agriculture has not highlighted. By and large they have remained invisible workers. Over the years women cultivators are typically and wrongly characterized as economically inactive and women cultivator play only a supportive role in agriculture as farmers' wives (Samanta, 1994).

In spite of various initiatives aimed at improving the agricultural sector which includes the horticultural sub-sector, the sector still remains relatively under-developed. The horticultural sub-sector also reflects the problems in the agricultural sub-sector. These problems include inadequate knowledge and technology of production, insufficient planting materials, land tenure, poor extension services and insufficient post harvest facilities.

### REVIEW OF LITERATURE

A study was undertaken by Suma et al. (2004) to know the workload of women in weeding activity. The results revealed that the total cardiac cost of work while weeding was 6165.87 beats and the physiological cost of work was 14.67 beats/min. The aver-

age working heart rate during weeding was observed to be 94.36 beats/min and the average energy expenditure was 6.28 kJ/min. Though weeding was performed for maximum number of days in a year, continuously from morning till evening in squatting position. Majority of the women perceived it as light to moderately heavy activity. The heart rate responses showed similar result as far as the classification of workload is considered.

Mahendra and Awadhesh (2012) emphasized on finding stresses by using ergonomic change in the design of handle to make it more comfortable. Body part discomfort score and overall discomfort ratings experienced by the subjects had also estimated. During the muscular activity workers physiological responses i.e., energy expenditure, oxygen consumption rate and heart rate increases. This increase in physiological responses was related to the type, intensity and duration of work and thus sets limited to the performance of heavy work. Oxygen consumption rate and heart rate was used for physiological cost estimation. These parameters were measured by Computerized Ambulatory Metabolic Measurement System K4b.

A study was conducted by Jatinder and Aruna (2012) on ergonomic interventions in weeding operation for drudgery reduction of hill farm women in India. Experimental data were conducted on representative sub sample of 60 hill farm women of both states to assess physiological workload and musculoskeletal problems both while working with traditional tools along with improved tools by employing selected parameters viz., physical fitness level, physiological parameters etc. The results showed that heart rate values were more than acceptable limits for task performed with the traditional tools as compared with improved tools. Significant reduction in the heart rate was observed while working with improved tools. Analysis of MSDs showed that the postural stress and severity of pain in various body parts was reduced by adopting new technology. Hence, the use of improved weeding tools was recommended over the existing ones for drudgery reduction.

Choudhary and Singh (2003) also reported that the role of women in ploughing of field, application of manure and fertilizer was found to be very less. The work was also not done in marketing and plant protection measure by farm women.

**METHODOLOGY**

Characterization means portraying the qualities of an activity in the selected production system that is either facilitating work performance or causing risk to health and safety of worker. Bench mark survey method was followed based on criteria of accessibility, willing cooperation of respondents, five villages were selected and made operational for the present study. A sample of 30 women farmers covering five villages viz., Kethiradipalli, Tolkata, Bakaram, Ethabarpalli and Nagireddyguda were drawn. Two mandals namely Moinabad and Chevella of RR district from Telangana state as vegetable growers were found to an extent of 300 from marginal landholdings. A questionnaire was formulated as research tool after all the production related activities were identified and were made into sub tasks. Among them, only the women exclusive and women dominant or women equal participation tasks were selected for characterizing activities as per factors during survey. Thirty women farmers representing 10 per cent of vegetable growers from the operational villages were selected for the survey. Interview schedule was developed and standardized to collect the data from farm women by recall method. The interview schedule contained general information, where in details on subject's age, years of farming, family size and income, land holding status, crop calendar, gender participation and technology used were elicited apart from six variables viz; physical load, posture load, repetitive strain load, physiological load, time load and musculoskeletal disorder load. Each factor was measured using quantitative and qualitative methods as furnished in Table -1.

S. no.	Variables	Attributes
1	Physical load	a. Weight of the load (kgs) b. Distance carried (kms) c. Height lifted (mts) d. Physical load rating(5 point scale) e. Physical load factor
2	Posture	a. Nature of posture b. Body part involved c. Discomfort rating (5 point scale) d. Posture load factor
3	Repetitive strain	a. Nature of work b. Repetitive strain rating (5 point scale) c. Repetitive strain load factor
4	Physiological load	a. Physiological load rating (5 point scale) b. Physiological load factor
5	Duration / time	a. Hours / day b. No. of days c. No of labour employed d. work load as per time e. Time load factor
6	Body pain and disorder	a. Body part involved b. Body disorder symptoms c. Body pain rating (5 point scale) d. Frequency e. Posture load factor

Activities were considered as independent and the six factors as dependent variables and a null hypothesis was formulated for the purpose of understanding the source of variation from among the activities and factors for the purpose of the study.

N0: There is no significant variation in drudgery load between activities.

There is no significant variation in drudgery load due to factors.

Analysis of variance and chi square tests were conducted to confirm and characterize drudgery. Total drudgery was calculated using linear combination method as per the formula given below.

$$\text{Total drudgery} = (\text{dr(PL)} + \text{dr(P)} + \text{dr(RS)} + \text{dr(T)} + \text{dr(MSDs)} + \text{dr(PhsL)})$$

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)

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

**Drudgery level categorization was done as follows**

Assuming that manual physical works done beyond one third (30%) human capacity may be treated as heavy, the drudgery index was categorized for interpretation as below. It also equated to the physiological load calculated by heart rate method.

Drudgery Index	Expected Equivalent Heart rate
< 10% = Very low	
10 – 20 % = Low	Up to 90 b.min <sup>-1</sup>
20 – 30 % = Moderate	91 - 105 b.min <sup>-1</sup>
30 – 40 % = High	106 - 120 b.min <sup>-1</sup>
40 – 50 % = Very High	121 - 135 b.min <sup>-1</sup>
> 50 % = Extremely High	136 - 150 b.min <sup>-1</sup>

**RESULTS AND DISCUSSION**

**Crop calendar**

In Telangana region during kharif and Rabi season, Vegetable crop production is done for eight months in a year. The summer season vegetables grown are coriander, cluster beans, Tomatoes, Spinach, and Bottle guard.

**Gender participation**

Among the major eight tasks, women exclusively participated in removing stalks, weeding, transplanting and Harvesting.

**Technology use**

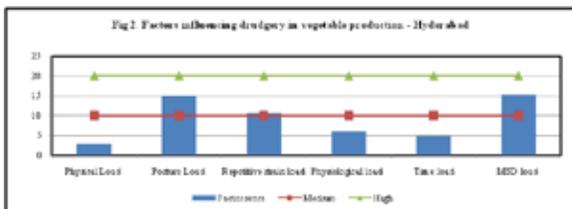
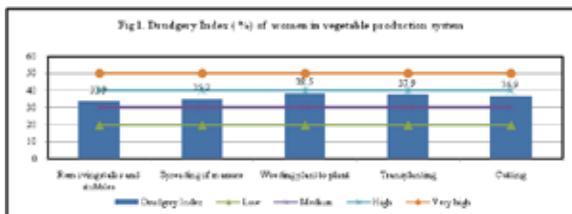
Traditional kurpi was the common tool used for hand weeding, transplanting and harvesting was done by hands. Spreading of manure was done with the local tools called favda, tagari and khodi.

**Drudgery load as per activity**

As per drudgery index, viz., Removing stalks and stubbles (34), spreading of manure (35), harvesting(37) and weeding and transplanting (38) were categorized as having high level drudgery. As

per ANOVA, there was no significant variation between activities when drudgery load was considered. This infers that all the activities were at the similar order of drudgery load. Chi-square test of association was conducted for the sample based on major population distribution behaviour.

Farm activity	Removing stalks and stubbles	Spreading of manure	Weeding plant to plant	Transplanting	Harvesting	Factor-wise Drudgery load
Physical Load	7	4	1	2	1	15
Posture Load	14	16	18	11	16	75
Repetitive strain load	6	11	12	12	12	53
Physiological load	6	3	8	8	6	31
Time load	6	3	3	9	4	25
MSD load	12	16	16	16	16	76
Total drudgery load	51	53	58	57	55	274
Drudgery Index	34	35	38	38	37	



Among the factors, it was indicated that MSD load, Posture, repetitive strain were influencing drudgery index in the order of priority. The variation was found in activities the weeding, harvesting and removing stalks. Manual physical loads were found insignificant as it was related to leafy vegetable production.

Source of Variation	SS	df	MS	F	P-value	F crit
Factors	697.9654	5	139.5931	21.2*	0.0002	2.71089
Activities	5.385276	4	1.346319	0.204648	0.932826	2.866081
Error	131.5741	20	6.578703			
Total	834.9248	29				

\*significant at 5 %

**CONCLUSIONS:**

From the above study, it was concluded that the drudgery load was varied based on activities and factors from low to very high level. As per ANOVA, there was no significant variation between activities when drudgery load was considered. This infers that all the activities were dependent on the drudgery factors. Drudgery load of activities removing of stalks and stubbles was found highly associated with posture, Repetitive strain and MSD, spreading of manure is associated with posture, physiological load and MSD, sowing activity is associated with Posture, Repetitive strain and Time load, weeding activity is associated with physiological load and MSD and drudgery load in harvesting activity was associated with physiological load, Repetitive strain, Time load and MSD at 5% level.

**REFERENCE**

• Suma, H., Renuka, B., Rajeshwari, S and Nutan, B. 2004. Assessment of workload of weeding activity in crop production through heart rate. Journal of Human ecology. 14(3): 165-167. | • Mahendra, S.K and Awadhesh, B. 2012. An ergonomic approach to design hand tool for agricultural production. Work. 41:1335-1341. | • Jatinder, K and Aruna, R. 2012. Ergonomic interventions in weeding operation for drudgery reduction of hill farm women in India. Work. 41: 4349-4355. | • Choudhary, H. and Singh, S. (2003). Farm women in agriculture operations. Agri.Ext.Rev. 15 (1):21-23. | • Samanta, R.K. (1994). The reap less than show. The Hindu. April Issue, Chennai, India. |