

Physiological Assessment of Nilgiri Women Involved in Economic Activities

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ABSTRACT Prosperity of nation depends on status of its women, as they not only constitute nearly half of its population, but also positively influence growth of remaining half of population. Hence, a study was conducted to study personal profile of women farmers, performance of women in tea cultivation, potato cultivation and livestock activities. Physiological assessment was done in terms of RPE and REBA. By simple random sampling, 30 women were selected in Nilgiri district. Seventy percent were 30 years of age and educated up to high school. About 67 percent were dependent on tea cultivation for livelihood. Sixty three percent women had income in the range of Rs 5,000 to 10,000/-. All women performed bed preparation activity, whereas sowing was done by 20 percent women. Weeding activity was actually done by 63.33 percent respondents. Regarding harvesting of potato crops, 76.67 percent women performed it. Mean rating of perceived exertion was in the range of 1 to 1.27. REBA results showed that 40 percent women respondents were in AL3 category which means that they were in high risk level.

INTRODUCTION

Women are an indispensable constituent of any economy. Throughout the world, rural women historically have played, and continue to play an important role in farming system. Overall, women's involvement in farming varies from region to region, and even within regions, visible variation can be seen. In almost all tea growing areas of Asia, men traditionally undertake activities such as land preparation, ploughing, irrigation and field-levelling. Women, on the other hand, are responsible for sowing, transplanting, weeding and crop processing (FAO 1997), livestock enterprise, which provides employment and economic support to rural families who are landless and marginal farmers. Many of the important activities in animal husbandry were also performed by women besides fulfilling their re-

sponsibilities as home makers (Randhawa and Chandra 1993).

Besides livestock rearing, women are active in farming also. In the district of Nilgiri, tea cultivation is the main livelihood source. Women farmers have different responsibilities in it including agricultural production systems. In many areas, activities related to planting, weeding and harvesting of the crop are the domain activities of women farmers.

Men are primarily responsible for the tasks of land preparation, bund fixing, weeding and fertilising; women performed most of the work associated with harvest and post-harvest activities.

Several researchers have studied and confirmed that women work for 14-18 hours daily (Ancheta 1982 ; Kaur and Punia 1986) on live stock raising, fetching fodder, farming operations, collecting fuel and water from far off places and expend more total energy a day as compared to men. Kishtwaria et al. (2009) studied the extent of participation and time spent by women in different activities in three different zones of Himachal Pradesh.

Women are critical to the well-being of farm households. Aside from raising children, women are expected to prepare all meals, maintain the homestead, and assist in crop and animal pro-

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duction, all the while tending to the general health of their families. In truth, women are involved in all aspects of agriculture, from crop selection to land preparation, to seed selection, planting, weeding, pest control, harvesting, crop storage, handling, marketing, and processing. So keeping all these points in mind, this study was conducted in the rural area of Nilgiri district with the closed view to achieve the objectives like to collect the background information of women farmers working in the Nilgiri district, domain wise performance of women in farm activities (tea and potato cultivation), domain wise performance of women in livestock rearing activities, domain wise performance of women in household activities and also to assess the physiological parameters of women respondents in terms of rated perceived exertion, and with the application of REBA (Rapid Entire Body Assessment) technique.

METHODOLOGY

For the present investigation, descriptive cum experimental research design was selected. A sample size of 30 women respondents was selected by applying simple random sampling technique. The study was conducted among farm women practicing farming and non-farming activities in Bearhatty village of Coonoor block in Nilgiri district (Tamil Nadu state). Data regarding farm and non-farm activity were collected with the help of structured interview schedule. Biomechanical stresses during performance of activities were measured by recording the incidence of body pain experienced by women in different body parts by administering body map (Corlette and Bishop 1976) along with questionnaire. Performance of women in tea cultivation were divided as bed preparation (ploughing), sowing, weeding, fertilizer application and plucking. Potato cultivation practices were categorised as bed preparation (ploughing), sowing, weeding, fertilizer application, irrigation and harvesting. On the other hand, role of women in livestock activities was categorized under five domains viz., purchasing of feed, feeding of animals, health care, management and miscellaneous (marketing and cleaning of animals). With regard to role of women in household activities, they were mainly involved in decision making, cooking food, fetching of water, collecting fuel and marketing.

For physiological cost of work, rated perceived exertion was calculated with the step stool method. Further to assess the musculoskeletal risk associated while performing activities were collected with REBA worksheet, that is, postural analysis tool was used in the field by direct observations (Hignett and Mc. Atamney 2000).

RESULTS

The data in the tables reveal the state of women in agriculture in the particular village of Nilgiri district.

Background Information of the Women Respondents

It is obvious from the Table 1 that majority of the women respondents (70 %) were in the age group of 30 years and above. It means only adult members of the family were doing the farm and non-farm activities. More than half of the respondents (53.33%) were educated up to high school level, which showed a good sign of educational status of the village. Majority of the respondents (90 %) belonged to nuclear families.

Table 1: Background information of the respondents (N=30)

S. No.	Variables	Classification	Percentage
1.	Age	Middle (30 and above)	21 (70)
		Young (25-30)	9 (30)
2.	Education	Primary	5 (16.67)
		Middle school	9 (30)
		High school	16 (53.33)
3.	Family Type	Nuclear	27 (90)
		Joint	3 (10)
4.	Family Size	Small (2-5)	24 (80)
		Large (>5)	6 (20)
5.	Occupational Status	Agriculture	20 (66.67)
		Agriculture and livestock	10 (33.33)
6.	Income (Rs./Month)	Low (<5,000)	3 (10)
		Medium (5,000-10,000)	19 (63.33)
		High (10,000 and above)	8 (26.67)

Two-thirds of the women respondents (66.67%) were dependent on agriculture particularly tea cultivation as a source of livelihood, followed by the rest (33.33 percent) who were dependent

on both agriculture and livestock. In this particular village, cattle rearing was not major activity because there was no grazing land in the village and land was available only for tea plantation and forest areas thus people had to buy the fodder from market. A total of 63.33 percent of the respondents were in medium income category, that is, Rs. 5,000 to 10,000 per month followed by 26.67 percent in high income category Rs 10,000 and above per month.

Domainwise Performance of Women in Farm Activities (Tea Cultivation)

The results in Table 2 depicted that all the women performed bed preparation or ploughing activity and sowing was done by only 20 percent respondents and rest of them did supervision, that is, monitoring of the field. With regard to the weeding activity in the farm, it was done by 63.33 percent of the respondents only. Plucking as main activity was performed by women farmers only with the help of sickle. Fertilizer application was not done by women farmer as it was dominated by men only.

Table 2: Domain wise performance of women in farm activities (tea cultivation) (N=30)

S. No.	Domain	Performed (%)	Supervised (%)
1.	Bed preparation (ploughing)	-	30 (100)
2.	Sowing	6 (20)	24 (80)
3.	Weeding	19 (63.33)	11 (36.67)
5.	Plucking	30 (100)	-

These results can strongly be supported by the study conducted by Shiva (1991) who stated that rural Indian women are extensively involved in agricultural activities. However the nature and extent of their involvement differs with the variations in agro-production systems. The mode of female participation in agricultural production varies with the landowning status of farm households. In overall farm production, women’s average contribution is estimated at 55% to 66% of the total labour with percentages, much higher in certain regions. In the Indian Himalayas, a pair of bullocks works 1064 hours, a man 1212 hours and a woman 3485 hours in a year on one hectare farm, a figure that illustrates women’s significant contribution to agricultural production.

Domain-wise Performance of Women in Farm Activities (Potato Cultivation)

Potato cultivation is another source of livelihood for the people of Niligiri district. Seventy percent women respondents were doing supervision work during bed preparation activity for potatoes. Sowing and weeding activities were actually done by all the women farmers and fertilizer application was supervised by all the selected women. The irrigation activity in potato farms was performed by 56.67 percent of women. Regarding harvesting of potato crop, maximum of 76.67 percent women performed this activity and rest of them only supervised the activity (Table 3).

Table 3: Domain wise performance of women in farm activities (potato cultivation) (N=30)

S. No.	Domain	Performed (%)	Supervised (%)
1.	Bed preparation (ploughing)	9 (30)	21 (70)
2.	Sowing	30 (100)	-
3.	Weeding	30 (100)	-
4.	Fertilizer application	-	30 (100)
5.	Irrigation	17 (56.67)	13 (43.33)
6.	Harvesting	23 (76.67)	7 (23.33)

Table 4: Domain wise performance of women in livestock activities (N=10)

S. No.	Domain	Performed (%)	Supervised (%)
1.	Purchasing of feed	-	10 (100)
2.	Feeding	10 (100)	-
3.	Health care	9 (90)	1 (10)
4.	Management	3 (30)	7 (70)
5.	Miscellaneous (Marketing and cleaning animal)	-	10 (100)

Domain-wise Performance of Women in Livestock Activities

It is clear from the Table 4 that livestock was not a common economic activity of the women farmers. They reared cattle only for the domestic purpose. As there was no grazing land available and also people were not growing fodder, they had to buy it from the market at Coonoor block. Regarding feeding of the animals, all the women (100 %) performed supervision function.

Table 6: Rated perceived exertion of women (N=30)

Activities	RPE Score													Mean
	0.0	0.5	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0		
Weeding (n=15)	-	-	-	-	2	1	1	-	-	-	-	-	1	
Plucking(n=15)	-	-	-	1	-	-	1	2	-	-	-	-	1.27	

A good proportion of the respondents (90%) were involved in performing health care activities and 70 percent women were involved in supervising the management activities.

Domain-wise Performance of Women in Household Activities

Despite the agricultural and livestock activities, women had to perform the household duties. Table 5 highlighted that majority of the women respondents (76.67%) were not participating in decision-making activities. But, all the respondents were actually participating in cooking food, fetching of water and collecting the fuel from the forest. Majority of the women farmers (60%) were involved in buying activities.

Table 5: Domain wise performance of women in household activities (N=30)

S. No.	Domain	Performed (%)	Supervised (%)
1.	Decision making	7 (23.33)	23 (76.67)
2.	Cooking food	30 (100)	-
3.	Fetching of water	30 (100)	-
4.	Collecting fuel	30 (100)	-
5.	Marketing	18 (60)	12 (40)

Rated Perceived Exertion of Women Respondents

To study the effect of various groups of activities on the perception of exertion during tea harvesting activity, they were asked to give ratings on a 10 point scale after completion of task. The mean exertion perceived by women was recorded. It was found that the mean rating of perceived exertion ranged from 1 to 1.27 on the basis of verbal expression of fatigue (Table 6).

It was further analyzed from the study that women involved in plucking activity felt weak due to strong exertion with mean rating of 1.27, followed by somewhat less exertion for which mean RPE was one both in weeding and plucking activities. It might be because plucking ac-

tivity was performed for several times which lead to exertion in the particular muscle used.

Rapid Entire Body Assessment (REBA) Analysis for Postural Discomfort of Respondents

Tea cultivation work puts more stress on the musculoskeletal system. Work related musculoskeletal disorders are caused due to frequent bending, pulling or pushing of muscle, overexertion, adoption of awkward postures used for task completion. Therefore, this study was an attempt to provide an objective measure of the postural discomfort of women workers with the application of REBA (Rapid Entire Body Assessment). The findings related with assessment of postural discomfort are given in Table 7. Various postures of neck, trunk and leg in group A (plus load/force), upper arms, lower arms and wrists in group B (plus coupling) along with activity score were observed and analyzed. It was found that a sum total of 40 percent women respondents were in third category of action level (AL_3) which interprets high risk level and immediate action is required. Again, 26.67 percent respondents were found in second action level (AL_2) indicating medium risk and change is required soon followed by 20 percent respondents in AL_1 (low risk and action may be needed in future). In zero action level (AL_0) that is 'negligible risk level', a proportion of 13.33 percent was found and here adopted posture is acceptable. So, no action is required.

Table 7: REBA analysis for postural assessment of women workers (N=30)

Activity profile	REBA action category			
	AL_0	AL_1	AL_2	AL_3
Respondents	4(13.33)	6(20)	8(26.67)	12(40)

AL_0 : Zero Action Level; AL_1 : First Action Level; AL_2 : Second Action Level; AL_3 : Third Action Level

DISCUSSION

Thus, it can be concluded that women form the backbone of Indian agriculture, comprising

of majority of agricultural labourers, women have been putting in labour not only in terms of physical output but also in terms of quality and efficiency. Widespread ignorance and belief that women in the rural areas do not participate in the economic development because they are confined to household and farm and their non-farm activities are unaccounted and non-recordable sometimes. Hitherto conditions of women in the plains and easily accessible areas have been explained by scholars concerned with the development of women, but the hilly and backward areas however, have been neglected for a long time. In the present investigation women were found to be significantly working in farm and non farm activities and due to overexertion of work schedule, they were developing bio-mechanical stress and health hazards.

CONCLUSION

Tea cultivation was the main source of livelihood in which plucking was mostly done by women. Potatoes were also cultivated in which women performed sowing and weeding activities. Agriculture and cattle farming were difficult in this particular village as land was divided into up land, mid land and low land. Few people reared cattle and purchased the fodder from the nearby market. Mean rated perceived exertion of women was high for plucking as compared to weeding activity. Forty percent women respondents were in third action level (AL_3) category which interprets that risk level is high and necessary action is required soon.

RECOMMENDATIONS

- ♦ Tea cultivation and plucking activities may be evaluated from ergonomics point of view so as to make it women friendly.

- ♦ Hand tools for plucking the tea leaves may be designed on the basis of anthropometric data of women.
- ♦ Agriculture needs to be promoted for growing crops and cattle rearing.

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