

PART II

CHAPTER-2

ERGONOMICS STUDY ON WORKERS ENGAGED IN TEA-LEAF PLUCKING  
OPERATION IN INDIA.

## 1. INTRODUCTION

Unlike paddy cultivation tea plantation is in the organised sector of Indian agriculture. The tea-leaf pluckers work on daily wage basis. The present study was undertaken to find out the pluckers' livelihood and the ergonomics aspects as compared to those of the unorganised sector, e.g., the workers engaged in paddy cultivation in rural India.

This study was carried out at the Borbhatta Experimental Station with workers engaged in non-commercial production of tea and at the Hatijhuri Division of the Hunwal Tea Estate, where the workers were engaged in commercial production of tea. This study was undertaken in 1979.

## 2. LITERATURE REVIEW:

The first ergonomics study on tea-leaf pluckers in India, a similar study, was undertaken at Fulbari, one of the tea estate in the Himalayas a few thousand feet below Darjeeling (Sen et al., 1976 (40)), but it was restricted to the male tea-leaf pluckers only. As far our knowledge goes, studies in relation to ergonomics aspects, socio-economic and occupational health and safety problems in the case of female tea-leaf pluckers are not available.

## 3. AIMS AND OBJECTIVES

This study was aimed at gathering information about the ergonomic aspects, socio-economic and occupational health problems of the female tea-leaf pluckers, as females are mostly engaged in this task. This is also to compare the population engaged in this organised sector with those of the unorganised sector engaged e.g., in paddy cultivation, to identify the scope of mechanisation and to improve occupational health safety and productivity.

#### 4. MATERIALS AND METHODS

Total thirteen female tea-leaf pluckers were questioned for information on their social and working life. Some parameters were also directly observed, e.g.,

- i) Socio-economic status (76), their physical characteristics (55,94,199-204) and ethnic origin, household data and income, including physical fitness index,
- ii) Their nutritional status based on a questionnaire and direct measurements of their average food intake both on a day-to-day and through-out-the year-basis was noted. Daily intake was measured by the food weighing method (92) and analysing the food-stuff with the help of 'Nutritive Values of Indian Foods' by Gopalan et al. (93),
- iii) Activity schedule and pattern of activities during 24 hours observed to gain insight into the work-rest cycle,
- iv) Employment pattern in the tea garden was noted from the data furnished by the management of the tea-gardens and through the questionnaire to the workers,
- v) Occupational hazards during work in tea garden were noted as well as obtained from the workers by the help of the medical officer of the gardens.

## 5. RESULTS AND DISCUSSIONS

### 5.1 Physical Fitness:

The physical fitness index (PFI) (87, 94) of the female tea-leaf pluckers, were found to be  $103 \pm 0.75$ ,  $98 \pm 0.92$  and  $96 \pm 7.64$  for the 'Fast', 'Average' and 'Slow' category workers respectively as presented in Table-11. These values are below the Indian standards (94, 200-204) as determined by the pattern of recovery after standard physical exercise of stepping up and down a stool of 16 inches high. Scores for Sen's modification of Harvard step test are as follows (200, 206):-

Very good: 175 to 200  
 Good : 150 to 174  
 Average : 100 to 149  
 Poor : <100

The physical fitness appears to be directly related to the plucking efficiency. The more physically fit a person is the greater <sup>the</sup> work done (205A) i.e., the plucking efficiency, in a given time. +

'Fast' category of pluckers had relatively high <sup>ed</sup> PFI <sub>h</sub> than that of 'Average' and 'Slow' pluckers. +

### 5.2 Social Life:

Beyond their tea-plucking work in the garden the workers remain engaged in household work and led a social life prevalent in the locality.

### 5.3 Nutritional Status:

Female tea-leaf pluckers used to take food at home and sometimes during the tiffin period of the work schedule in the garden. Sometimes they took prepared garden tea without milk at the temperature above that of

TABLE - 11

Physical Fitness Index Of Different Categories of  
Female Tea-leaf Pluckers.

Categories	Index	
	Mean	$\pm$ S.D.
Fast ( N = 3 )	103.4	0.75
Trainee ( N = 2 )	98.2	9.48
Average ( N = 2 )	98.1	0.92
Slow ( N = 4 )	95.8	7.64

the ambient. Calorie and other nutrients intakes were observed to be similar to the food intake pattern of the female workers engaged in paddy cultivation, but less in their food. This is around 2187 Kcal per day and was at the level of poverty for the Indian (22). The present investigation shows that one female tea-leaf plucker consumes 476 g. carbohydrate, 45 g. protein, and 6 g. fat per day. Nutritional assessment of the female tea-leaf pluckers is presented in Table-9. Nutritious food intake is required to produce more energy for the work and to gain positive health.

#### 5.4 Working Seasons and Working Hours:

Tea bushes are plucked between the months of April and November each year, June to August being the peak period. During the plucking season each day work starts at 8:00 hours and ends at 16:00 hours, i.e., 8 hours work per day. The working time has two breaks with a 0.5 hours lunch break at noon time and three 0.5 hours stoppages at 9:00 hours, 11:30 hours and 14:00 hours for weighing and depositing the shoots plucked and drinking tea etc. X

#### 5.5 Employment:

Both male and female workers are employed in tea gardens, i.e., in tea plucking job. The most labour consuming tea-leaf-plucking operation is carried out mainly by the females though males are also engaged in the same.

The workers of the tea-gardens were employed according to three categories, e.g., 'slow', 'average' and 'fast' pluckers. This categorisation was done on the basis of the average daily output and maximum daily output from the data obtained by the tea gardens. The critical examination of the data furnished showed that all the groups overlap.

### Suggested categorisation:

The discrepancies in the categorisation by the tea gardens were likely to have an adverse effect. While collecting the data manually it was seen that some of the workers exhibited outstanding performance and it was obvious that they did not belong to the group assigned to them by the garden management. Basically, they were categorised as 'slow' on the basis of output but exhibited many characteristics that equalled or even ~~excluded~~ <sup>exceeded</sup> the 'fast' group.

#### 5.6 Education:

Workers were <sup>not</sup> found to have formal education. Most of the female workers were illiterate. Only some of them studied at primary level.

#### 5.7 Family Size:

Family size was observed to be large due possibly to not undertaking any family planning as the publicity of the methods to be used for family planning was very poor. The other reason for big size family may be the workers' belief that more family members meant more earning.

#### 5.8 Occupational Hazards:

##### 5.8.1 Fitness:

E.K.G. studies (205) during selection of subjects, some workers were disqualified. During this study neuromuscular illness were also noticed, but it was not clear whether these were due to occupational health hazards.

##### 5.8.2 Agricultural Chemicals:

Skin reactions were noticed by the application of fertilizers like Ammonium Sulphate, Super phosphate etc. Reaction to varieties of pesticides were not clearly

evident. It was felt that workers should be made aware of the possible routes of contamination (18).

#### 5.8.3 Tannin deposition on skin:

Due to the shoots being plucked for a long period, deposition of tannin on the fingers' surface were observed which might alter the normal metabolism. So the use of gloves may save from this type of hazards.

#### 5.8.4 Parasitic infections:

Due to the work in muddy fields during rainy seasons or inside the tea gardens, there are plenty of parasites and vectors causing several infections. The main infections are from intestinal parasites. It was noticed that more than 60% of the workers had some form of parasitic infections known to decrease the working capacity to as low as 35% (207).

#### 5.8.5 Injuries:

Medical report (207) indicates that 33% of accidents are due to injuries from pruning knife.

#### 5.8.6 Other hazards:

Medical report indicates (207) that the presence of low haemoglobin level, marked lowering of the blood sugar level at the end of days work, most of the subjects show deficiency of vitamin 'A' and elevated eosinophil counts indicating presence of allergens in their environment.

The Blood Sugar Level (BSL) of the workers as presented in Fig. 7, rises from the initial value, reaches a peak at around 11:30 hours, at the end of the first work period, and then falls to levels often below the initial BSL, at the end of the days work. Whole day's BSL level (207, 208) is presented in Fig. 7. Serum

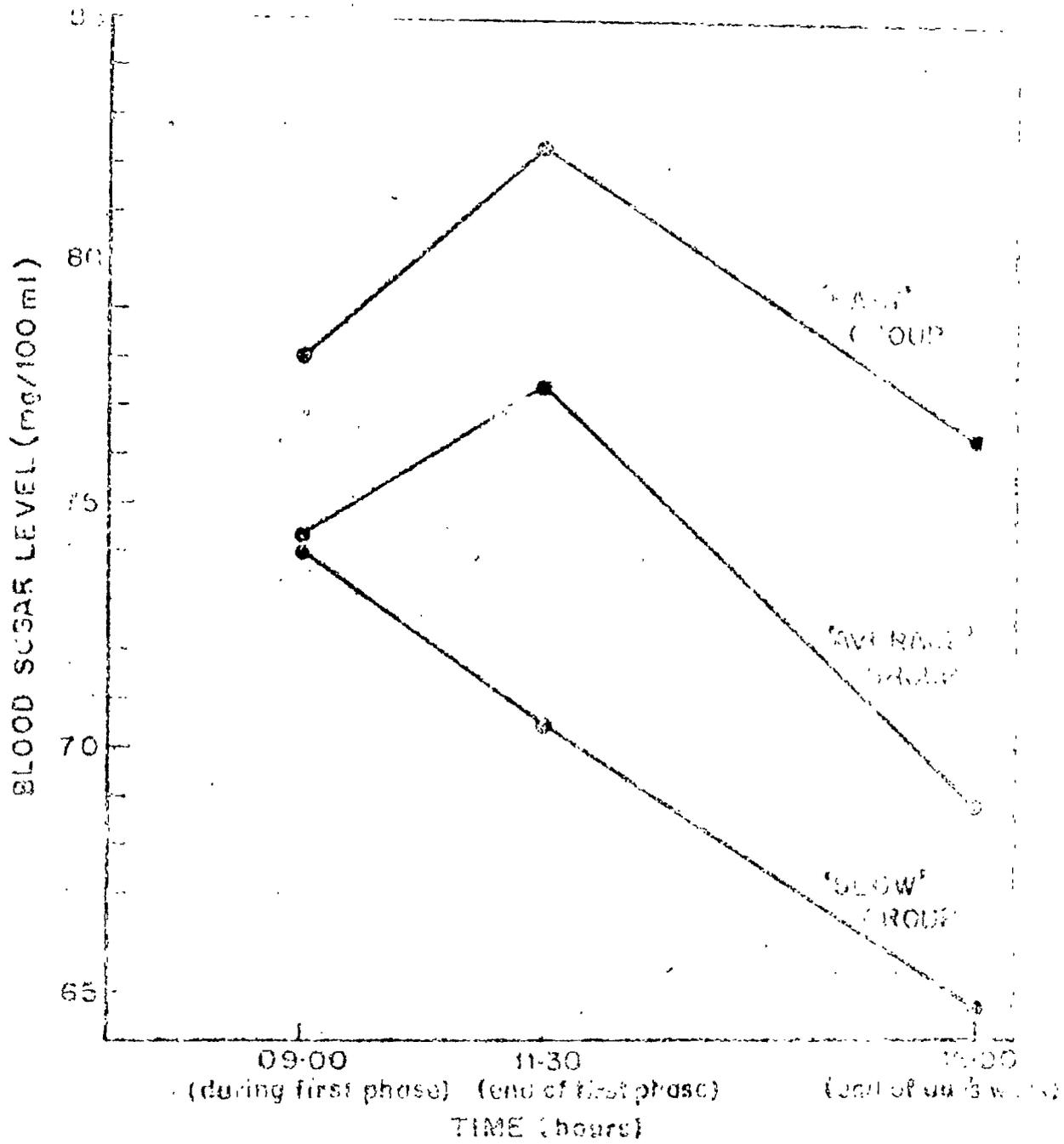


Fig. 7. Variation of Blood-sugar Levels over the working day in Different Categories of Pluckers.

cholesterol levels were 97.4, 95 and 76 mg % respectively in the 'fast', 'average' and 'slow' groups of the workers. Low Haemoglobin levels of the workers varied from group to group, being 87.8% and 75% in the 'fast', and 'slow' groups respectively (207).

## 6. CONCLUSIONS

Tea plantation is in the organised sector of agriculture. Most of the tea-leaf pluckers are females. They are near the poverty line and mostly from communities of the same ethnic group. They have unplanned family size. They have practically no formal education. The female pluckers of hilly region of North East show several similarities in behaviour to that of the female workers engaged in paddy cultivation at Eastern coastal region. Categorisation according to the working efficiency of the tea-leaf pluckers were examined and found to be overlapping. They had plenty of occupational health hazards. Though the medical help was available the workers had a tendency of not utilizing it possibly due to fear of injections etc. Mechanisation in the field of tea plantation would not affect the workers as they are the employees of an organised sector, as decision comes from top management.

## 7. SUMMARY

The present investigation was to gather some basic information about the people engaged in tea-leaf plucking operations in hilly regions of North East India in comparison to the people engaged in paddy cultivation in the coastal regions of Eastern India. Some selected parameters, e.g., physical fitness, socio-economic and nutritional status, working hours, employment categorisation, education, family size and occupational hazards, etc., were studied on female tea-leaf pluckers with the help of a questionnaire technique and by direct observations. The results revealed that their living conditions were inferior than those of the people engaged in paddy cultivation. Implementation of capital intensive machines in this organised sector did not affect the workers due to decision comes from top management, as was observed in the case of unorganised sector of paddy cultivation.