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CHAPTER - 2

TEA PLANTATION

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5. A NEW ERGONOMIC METHOD FOR SELECTION
OF WORKERS.

A New Ergonomic Method For Selection of Workers

1. Introduction

An organised sector of Indian agriculture e.g., tea plantation divides its workers into different categories. Female tea leaf pluckers are categorised as, 'Fast', 'Average' and 'Slow' on the basis of average daily shoots plucked, according to garden management. But this categorisation is not scientific and there ^{are} several discrepancies (87) as stated also in Part II, Chapter-2, Section 5.5. *

2. Aims and Objectives :

This is aimed at ^{ing} to develop a new method for the categorisation of female tea leaf pluckers on the basis of quality and quantity of production, skill, efficiency and physiological responses adopted during operation. *

3. Materials and Methods :

The present study is based on the findings stated in Part III, Chapter-2. Ten female tea leaf pluckers were taken for this investigation.

Four parameters of work study were selected. These were --

1. Average number of shoots plucked per minute
2. Hand movement and number of shoots plucked ratio
3. Average weight of ~~per~~ shoot plucked *
4. Energy (J) expended to pluck one shoot.

These are linked with quantity of production, working efficiency, quality of shoots plucked i.e., production. To note work stress physiological responses

i.e., energy expenditure during tea leaf plucking task was observed. Categorisation based on the new adjusted average system was compared with the existing categorisation furnished by tea garden management.

4. Results and Discussions :

Table-42, represents subject ~~wise~~ energy expenditure, time study and productivity. Very sensitive parameter heart rate responses was not chosen as small sample size may not give proper values as well as it may be affected by ⁵psychological state of work and thermal environment of the work place. X

Table-44, represents the criteria for categorisation based on three point scale. According to these parameters and rate on this scale each subject was classified counting total point. X

The final categorisation appears here,

Categorisation symbol	Total Points	New Categorisation
A:	11 Points and above	Fast
B:	10 Points	Trainee
C:	9 Points	Average
D:	8 Points and below	Slow

Table-45 represents the new categorisation.

Discrepancies in existing categorisation is proved in this table. By this a new category "B" comes from the previously said "Slow" group by the management, which can be classified as "Trainee" group, would benefit immensely from training.

TABLE - 43

Energy Expenditure, Time Study and Productivity of
Female Tea-leaf Pluckers.

Subject number	Average number of shoots plucked min^{-1}	Total number of hand movements min^{-1}	Average weight per shoot (g)	Number of shoots plucked/number of hand movements	Energy expenditure (KJ min^{-1})	Energy expenditure to pluck one shoot (J/shoot)
4	114.7	142.0	1.19	0.81	18.29	159.5
7	128.4	118.8	0.75	1.08	13.98	108.9
8	104.9	99.1	0.94	1.06	12.10	115.3
9	100.2	101.1	1.06	0.99	13.81	137.8
10	77.6	86.7	1.06	0.90	7.70	99.2
11	123.5	133.1	1.79	0.93	13.86	112.2
12	131.8	84.1	1.06	1.57	11.85	89.9
13	92.5	104.1	0.69	0.89	8.20	88.7
15	189.3	172.1	0.98	1.10	25.87	136.7
16	66.1	108.8	1.24	0.61	9.96	150.7

TABLE - 44Criteria for Categorisation of Female Tea-leaf pluckers

Average Weight per shoot, g ^f	Average number of shoots plucked min ⁻¹	Ratio of shoots plucked to number of hand movements	Energy expended to pluck one shoot (J/shoot)	Points scored
< 1.0	> 140	> 1.0	< 150	3
1.0 - 1.15	75 - 140	0.7 - 1.0	150 - 200	2
> 1.15	< 75	< 0.7	> 200	1

TABLE - 45

Categorisation of Female Tea-leaf Pluckers

Subject Number	Points scored from				Suggested Total points	Suggested categorisation	Existing categorisation
	Average weight per shoot	Average number of shoots min ⁻¹	Ratio of shoots plucked to hand movements	Energy expended per shoot			
7	3	2	3	3	11	A	Fast
8	3	2	3	3	11	A	Fast
15	3	3	3	3	12	A	Fast
12	2	2	3	3	10	B	Slow
13	3	2	2	3	10	B	Slow
9	2	2	2	3	9	C	Average
10	2	2	2	3	9	C	Slow
4	1	2	2	2	7	D	Average
11	1	2	2	3	8	D	Slow
16	1	1	1	2	5	D	Average

5. Conclusion :

This new ergonomic system of categorisation would be a valid method for proper formation of groups, and may help to select the right man to the right job. This can select the workers for training, i.e., helpful for formation of a new group 'Trainee' on which consideration for investment for training which would be profitable and they would show maximal improvements thereafter. The parameters described above also could help tea garden authorities to decide which 'temporary' workers could be given 'Permanent' status, i.e., be confirmed in the jobs, with eligibility to allowances and other benefits.

6. Summary :

Female employees of tea gardens engaged in tea leaf plucking task are categorised as 'Fast', 'Average' and 'Slow' only on the basis of daily average shoots plucked. But it was observed that there are several discrepancies. This investigation describes a newer scientific method of categorisation on the basis of quantity and quality of production, skill, efficiency and energy expended. In this a newer group of "Trainee" appears which after a training would give better productivity. Such a method could facilitate predictive selection of pluckers, selection for training, and formation of groups in future studies.

COST - BENEFIT CONSIDERATIONS FOR IMPLEMENTATION
OF ERGONOMIC RECOMMENDATIONS.

Cost-benefit consideration for Implementation of
Ergonomic Recommendations

There is no point in suggesting scores of recommendations in a thesis if the feasibility of implementing them is very poor.

It is very important that one should consider the cost-benefit aspects of implementing all the recommendations presented in this thesis based on the whole study of paddy cultivation and tea plantation.

Most of the recommendations presented in this thesis are with regard to improvement of existing work methods modifications of implements on tool design and betterment of working conditions to enhance occupational safety, health, comfort and productivity as well as normal life situation. Hence implementation of a majority of them would involve low-cost.

Properly trained and educated workers represent an investment made by both unorganised and organised sectors, in terms of the training they received, and the experience gathered in their respective fields. They represent a large potential of production. If the workers can do and prefer jobs that are less fatiguing and tedious, the investment will earn a lot of production potential. The cost of implementing the recommendations against the increased production and job satisfaction will be relatively insignificant. X

The unsuitable traditional designs of implements, working methods, wasteful energy expenditure, fatigue, occupational illness, nutritional deficiencies, environmental stress and many other factors result in a substantial fraction of each worker's working capacity being

unutilised, or misdirected in relation to the fast changing world. Only if the optimal use is made of the working capacity of the workers, can production be maximised in terms of increased productivity and reduction of discomfort of work, and future generation of workers force be attracted.

The cost of removing these stress and filling these deficiencies must be balanced against the possible gains of the vast production potential being wasted.

Among the costs of increased production must be counted the costs of necessary precautions, control measures and research needed to ensure the health, safety and welfare of the workers in respective fields. These costs are as intrinsic to the process of stepping up production as the cost of more machinery to process the increased quantity of paddy yield and tea-leaf plucked, is also applicable to any area, where man is the most important factor. >

The present condition of India, as result obtained from the agriculturists' interview presented in this thesis and some early studies, reveals that, there is a negative tendency to accept capital intensive mechanisation, where a large portion of work force lives in poverty, illiteracy and lack of health awareness. In connection to the vast population engaged in agriculture, it is not preferable to impose technologies being used in developed countries. It is needed to coincide the attempts to achieve betterment with the traditional knowledge and practice of the common village farmers.

The simple improvements through modifications of existings or innovating newer ones parellel to the existing within the reach of common farmers e.g., 'Desi' plough and sickle design according to workers' anthra-

pometry, multi-purpose use of a single tool and increased safety, working comfort and productivity dealt ^{with} in this thesis or, use of semi float-seat which saves working time and wasteful movements and produces postural benefits, or use of protective work wear such as the consideration of simple leg-cover to protect the lower extremities from infections and inflammations due to work in contaminated water logging field, or environmental protection measures such as use of a fertiliser bag to protect body from rain and sun etc., which could be used with traditional knowledge and manufacturing process with commonly available materials with easy repairable system of low-cost or no-cost. We have to also consider to fit a right person to the right job and to use the proper human facilities and limitations. x

The need ^{of} intense research is being advocated herewith considering the Indian condition, and hence we shall be able to reach the ultimate goal of making work and life humane. x