Nutritional Status and Food Consumption Pattern of Women Working in Tea Plantations of Nilgiri Hill's

By

A. THAHIRA BANU

A THESIS SUBMITTED TO
THE AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND HIGHER EDUCATION FOR WOMEN (DEEMED UNIVERSITY) COIMBATORE-641 043
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN FOOD SERVICE MANAGEMENT AND DIETETICS.

APRIL, 1994.

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CERTIFIED AS BONAFIDE RESEARCH WORK.

Signature of the
Head of the Department

Signature of the
Dean of the Faculty

Signature of
the Guide

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Introduction

I. INTRODUCTION

India is the largest producer, consumer and exporter of black tea. Ninety eight percent of Indian tea comes from Assam, West Bengal and Tamil Nadu. Ninety percent of tea in Tamil Nadu comes from Nilgiris,, covering an area of 36,524, (Manorama year book, 1993).

In the organised sector, plantation occupies a unique positioin due to its agro industrial features and large number of employment. Plantation sector employs about 1.6 million workers of either sex (Punia, 1992).

In tea plantation both men and women are employed in various stratum of work.Men and normally appointed as supervisors and mainly in manufacturing process within the factory, whereas women are mostly employed in the field work, who are daily wage workers and they are to perform all types of work.

Normally women workers out number men in tea plantation. Women are more preferred by the plantation sector, since this special kind of agricultural work is more familiar to Indian rural women. Women can also be employed at low wages.Apart from this, since male workers settle in the vicinity of the plantations along with their families, women

in those families participate in the plantation work to increase their family income. According to (Viswanath Gupta, 1990) one cannot think of tea plantations without women labourers. Their tender and skillful fingers are assets in plucking tea leaves.

The activities carried out by women in the tea plantations are numerous. They perform works like hoeing, pruning, shade lopping, plucking, mannuring, uprooting, planting and spraying. These field operations are seasonal in nature. Generally women are engaged in plucking all through the year.

Plantation activities are strenuous and require adequate energy and nutrient intake for efficient work output. Work efficiency of individuals depend on their food intake. Those who have an adequate diet will improve their general resistance to diseases and thus food intake directly affects the performances of work (Zeba, 1992).

Individuals who perform manual work, light or heavy call for an additional supply of energy and other nutrient. A low food intake reduces the physical capacity to work and increase the extent of fatigue, accident rate, and sickness In order to improve the work efficiency and output of these

workers, adequate diet with sufficient calories, proteins, minerals and vitamins must be available (Herchberg et al, 1988).

Women are the vulnerable sector of the population who need extra nutrients in terms of energy, protein, various vitamins and minerals, particularly during their period of pregnancy and lactation.

The employed pregnant women and nursing mothers in many areas are malnourished. Intestinal parasites and other endemic diseases combined with their physical work, leave women anaemic and under nourished affecting their normal work out put (Ramkumar, 1991).

Nutritional status of women in developing countries are generally poor, due to the fact that the majority of the women subsist on inadequate diet, both with respect to quantity and quality of food necessary for the physiologic needs and welfare (Devadas, 1989).

Women's nutrition in any community, largely depend on the dietary pattern, which is said to be influenced by social beliefs, customs, superstition, religion and cultural behaviour. The women of child bearing age of the low socio-economic status have poor nutritional status with

a high prevalence of malnutrition. Maternal malnutrition is responsible for high maternal mortality but also an important factor in influencing the nutritioinal status of the off spring (Siman, 1986, and Ramkumar, 1991).

Women being the nerve centre of the family, the welfare of the family is in her hands. She plays a crucial role in the well being of the family members. In our society, the rural women are under privileged, discriminated and often their health and nutritional status are neg lected leading them to lag behind in performance. There is an urgent need to develop the status of women with special reference to their health and nutrition. Recognizing this basic necessity, the government should formulate immediate action to re-orient and implement the existing policies and upliftment programmes conducive to the situation of rural women.

The present study is an attempt directed towards the assessment of nutritional status, food consumption pattern and work efficiency of women working in tea plantations of Nilgiri hills.

The main objective of the study is to assess the nutritional status of women working in tea plantations through the following steps.

A. Select suitable sample of women working in tea plantations in Nilgiri hills.

B. Study their socio-economic status.

C. Find out the dietary pattern and food habits of the selected women.

D. Study the Body Mass Index of the subjects.

E. Assess their clinical picture.

F. Estimate the haemoglobin levels.

It is believed that the results of the present study would disclose the real health status of atleast a small portion of the women workers in tea plantations and thus will serve as the basis for further development activities.

Review of Literature

II. REVIEW OF LITERATURE

The review of Literature pertaining to the study on "Nutritional status and food consumption pattern of women working in tea plantations of Nilgiri Hills" is presented under the following headings:

A. Status of women in the society.

B. Health status of women working in plantations.

C. Upliftment programmes for women.

D. Nutritional status of women.

A. Status of women in the society.

Women particularly those living in rural areas of developing countries are the most under privileged segment of the society, chronically neglected, in many cases, lack even such basic necessities of life as food and health care. It is a pity that inspite of progress achieved in enhancing food production and improving public health, women are still disproportionately hungrier, poorer and sicker than their male counterparts, (Benazir Butto, 1990).

The cultural customs and traditions force women to be inferior and submissive to man in diverse ways. (Jain, 1986 and sood,R. 1991) state that women are excepted to run the household and perform the rituals of child bearing and other

functions distinct to her by nature.Although education and other outward changes have been developed, yet women are kept in sub-ordinate position, to play the role of reproduction and care of the family (Kamaladevi, 1983).

UNO Report (1980) concludes that in global level though women constitute 50% of the total population and 1/3rd of its labour force, they earn ony 1/10th of the world's income and less than 1% of the worlds property FAO (1985) points out that, rural women's working day is longer and harder, but her importance in contribution to food crops and income to the family, by her work is often neglected. (Cadwell, et al. 1991) state that the increasing duration of the famale work day, and the widening gap between male and female income and the rising responsibilities of women with in the house hold are all evidence of the view that rural women have often been victims of developmental process and outcomes. Women are deprived of education and training, which does not allow them to take better paid jobs. (Benett, 1989) opines that women of the poor household, put more of her time in hard work , both in household and outside, but yet she is paid less when compared to her male counterparts.

A study carried out by (Joshi, 1989) found that 75% of the work in tea plantations are done by women. Yet they were

paid less and enjoyed the least benefits. These women due to their lack of educations, skill and good health were employed in low paid jobs, she stresses that women can play a positive and active role if they are imparted education, training skills and good nutrition.

B. Health status of women working in plantations.

Demaeyer, 1989 states that enjoyment of the highest standards of health is one of the fundamental rights of every being without distinction of caste, religion, political belief, economic and social condition. Health is a critical factor for all and is related to ethical, artistic, materialistic and spiritual aims of life (Singh, 1992).

Madhok, 1993 reports that women represent 50% of the worlds population and it is one of these women, that the whole population clings onto. Unfortunately in our country women neglect their own health and nutrition. In plantations women are unhealthy and poorly served lowerson (1989) states that women inthe plantation sector will be suffering from greater levels of ill health and falling into margins of ill health, due to their under developed economy (Gayanayake et al. 1991) found that in the tea plantations of Srilanka, Women's health were generally ppor, due to their long hours of tediouswork and poor diet and also study conducted on the rice farming and plantation women by revealed that

women's health is profusely affected and they are more prone to diseases like arthritis, intestinal and parasitic infestations. Study conducted by (Sivaram, 1990) concluded that the health status of women in plantations of Nilgiris is relatively poor since they suffer from deficiency diseases, such as malnutrition, anaemia, glossitis and neuritis and major diseases like asthma, arthritis and gastritis due to their unhealthy diet and low socio economic status.

According to FAO (1985) malnutritioin is a major health problem affecting women in 3rd world and it is estimated that one quarter of the population in developing countries is under nourished, following major deficiencies as protein energy malnutrition. Iron deficiency Anaemia, iodine deficiency and Malnutrition among women are also identified to be due to economic factors which indirectly affect women health status (Leslie 1991).

Anaemia is found to be the second common disease among the women workers, 30 to 50% prevalence of anaemia is reported on the plantations of Niligris. A study conducted by Planter's Chronicle (1988) states that the causes of anaemia are due to deficient diets, worm infestation, repeated pregnancies and unhealthy environmental conditions.

Plantation workers are more prone to diseaes such as bronchial problem, lung infections, malnutrition, helminthis infestation, dysentries, contact dermatitis, because they are subjected to inhalation of dust direct exhaustion due to heavy work, high temperature and humidity and working bare foot (Ram Kumar, 1990). There are serious health problems for women who are exposed to agro chemicals which bring about serious health hazards, such as gynaecological infections. Fiona Plus (1992) points out, that women labourers who are exposed to dust, grains, rice husk, tea andtobacco acquire the diseases such as byescnosis, bagassosis, farmers lung and occupationalasthma. (Neera Desai, 1985) concludes that the changing pattern of economic development have put a heavy burden on women, which is reflected in their health status and hence there are health problems related to work place hazards of pollutants on women.

According to WHO (1991) out of 50,000 women in the world, who die anually from causes related to pregnancy is estimated to be 35,000 in south Asia alone. Their alarming number of maternal deaths is due to both the high maternal mortality ratio and large number of pregnancies which increase the life time risks of women.

In developing countries 60% of the maternal mortality rates are due to socio cultural traditions, together with poverty, lack of educational opportunities, early marriages excessive fertility and low socio economic satus (Ramalingaswami, 1991). According to (Chatterjee, 1990) females face increased health risks associated with repeated pregnancies, long periods of lactation and dangerous conditions of child delivery.

C. Upliftment programmes for women

To awaken the people, it is the women who have to be awakened. Once they are on the move the household moves, villages move and country moves (Jawaharlal Nehur).

Development is not merely an increased gross national product or per capita income but an all around development of the people. This process has to be begin with attention to the upliftment of women because they are the builders of culture and values.

(Shohani, 1987) combined with comprehensive labour welfare scheme has enlighted expression of its commitments to improve the level of well being ofthe plantation workers through an integrated health, family welfare progrmmes and educational training. The Indian ministry of Human Resources Development (1988) gave the national perspective plan for

women 1988 -2000 AD, with aims at reviewing the policies and existing programmes for betterment of women giving more emphasis on education, health and family welfare, employment and farming, so that these women can catch up with the developmental main stream by 2000 AD.

DWCRA was designed with the objectives of improving women's health, educational, social and economic status and which created in them a new awareness, leading them to perform their activity in a better manner (Padmanabhan, 1993). DWCRA is not only helpful in improving and assisting women educational and nutritional standards, but also improving the same in their children (Balachandran G. 1984) CSWB was established in 1953, which initiated the welfare programmes for women, with special reference to maternity and child care, health, education and training (Jain, 1985). Awareness building programme, which is recently initiated has helped women discover more about themselves and their role in development and tomake them, aware of different service available for them, (Ullocishewa, 1991). (IRDP) combined with Bangladesh Rural Advancement Committee (BRDP) is an essential programme. Which has created awareness among women on literacy, health and nutrition, vocational skills, self employment loans and other beneficiaries services, World Bank (1990). (CAPART). The council for Advancement of

people actions and rural technology provides funds to voluntary agencies working for our rural womens, welfare. CAPART also promote rural tehnology that makes work quicker for women in their household and outdoor activities (Gramin Vikas, 1994).

Indira Awas Yojana is another programme for women, which gives free housing and other services to women of poor households, widows and unmarried women. (Chatterjee, 1992). The family planning programmes which really brought light into women's health status. This was implemented to improve the socio economic conditioin of the family and specifically health of the women and in the poor households due to more mouths to feed and low inocme, had been deprived of purchasing power in terms of food, clothing, health and schooling, hence family planning programme has become an upliftment programme for women, and also self employment programmes for women, made rural women to participate at all village level saving and credit schemes for their own economic upliftment (Reid, 1991). According to (Banerjee, 1990) the working group on employment of women appointed by the planning commission (1977-78) was to improve womens social status by improving her health, educational status, fertility reduction and creating special agencies in all states to improve her production through trainings about the new technologies.

The national perspective plan for women 1988 -2000 AD had recommended a holistic approach to women's development, specially for those women who are engaged in agriculture and farm based activities, since mechanisation in agriculture has often tended to eliminate women. Thus we have to see that new technologies does not displace women or aggravate economic hardships. So learning and education was over emphasised by these plans to rural agricultural women (El-arnor, 1991).

D. Assessment of Nutritional Status:

Nutritional status of an individual is a reflection of the interacton between host factors and the nutrients consumed (Planters Chronicle 1988).

Nutritional status survey identifies the nutritional health of a selected polpulation at a given time. It includes anthropometeric measurements, physical and clinical findings, biochemical data and dietary studies. So assessing nutritional status help us to identify persons who are at risk or malnourished (Robinson and lawler, 1986) the three classiccal methods of assessing nutritional status is by dietary, biochemical and clinical assessment. As these three methods assess the different status of nutrition, and it is generally considered that the food intake data reflect

nutritional status, clinical examination on long term nutrition history. Thus any one combination is used for assessing nutritional status. (Ruth et al. 1978). Hanes I & II survey included a physical examination with special emphasis on observable signs of malnutrition, body measurements such as height and weight, biochemical examination and dietary intake. A study conducted on the nutritional status of women, using tools such as anthropometric biochemical, clinical and dietary assessment which enabled to assess the nutritional status, revealing that most of the women had deficiency signs and lower level of haemoglobin and had less weight for their height as per the standard (Chitra, 1993).

(Reddy et al, 1993) defines BMI as weight in kg/ht2 cm) is used to assess the nutritional status of adult persons with BMI value less than 18.5 are considered to suffer from chronic energy deficiency (CED). The CED group is further classified into different degrees. Ist (17-18.8), 2nd (16 to 17) and 3rd below 16. Study conducted on female workers and their relation to body weight and work out put states the BMI directly affects one's work out put, samples having body weight of 50-60 kg. with the mean % of 101% has significantly higher work out put when compare to body group below 30 to 70 kg. NIN Proceedings (1977). According to Sanjeev (1991), the assessment of nutrition, status using

skin fold thickness, body circumstances and their relationship to age, sex and socio economic status, from North West India revealed that women having low BMI were found to be at low socio economic status, and BMI above 20 were under high socio economic conditions. (Malathi Ragunath, 1993) states that, the criteria for classifyng CED in adults has been proposed by James Feuolozzi and Water Low (1988) which is more precise approach in identifying the affected individuals by measuring their body weight and height, energy intake or energy expenditure as well as Basal Metabolic rate (BMR).

(Higgins et al, 1992) point out that nutritional status is assessed as a result of persons energy expenditure as well as caloric intake. Since energy intake can vary according to their activity and he also conducted a study on women agricultural workers of Ghana revealed that energy expenditure was an impotant deteriment of womens nutritional status since they were to perform strenous Agricultural tasks.

HUI (1985), concludes that the cultural method to estimate food intake in a diet survey for assessing the nutritional status is to ask persons to weigh foods before and after the food is served and then substracted the weight of the left over. Dietary intake information involves the

collection of information on foods eaten by individuals and computation of these values using food composition tables.Thus dietary surveys are one way of assessing nutritional status (Eleanorampao, 1991).

(Forbes, 1984) outline newer methods of Biochiemical eamination for assessing anaemia the haemoglobin concentration, both the haemoglobin and haematocrit (HCT) are equally useful tests. A fall in HCT represents anaemia iron in the cytochormes and myoglobin also falls with associated clinical signs such as koilonchyia, glossitis, angular stomatitis and oesophageal webs. Hb or HCT are suitable measurements to determine prevalence or Iron deficiency Anaemia (IDA) in areas and specific population groups, where frequency of iron deficiency anaemia is known to be high (Cook, 1986).

Methodology

III. METHODOLOGY

The methodology of the study on "Nutritional status and food consumption pattern of women working in tea plantations of Nilgiri hills" is presented under the following heaings.

A. Selection of the Area.

B. Selection of the sample.

C. Formulation of the Schedule

D. Assessment of the nutritional status through

1. Diet survey
2. Body Mass Index (BMI)
3. Clinical Assessment.
4. Haemoglobin levels.

E. Work efficiency of the selected sample.

A. Selection of the area.

"The Nilgiris", one of the beautiful districts of Tamil Nadu was selected for the study. It covers an area of 2500 sq km at an average elevation of 7000 ft. It consists of 90 % of tea plantations of Tamil Nadu.

The study was conducted in two estates namely Dunsaldale and Rock Hill estates in Sholur Village. These estates had

adequate number of women workers, who are more backward, illiterate and yet to devlop. More over the investigator is a native of this village, interested in the development of the nutritional status of women working in tea plantations.

B. Selection of the sample

A total number of 200 adult women in the age range of 15 to 45 years were selected byconvenience sampling for the study.

Convenience sampling is also called chunk. A chunk refers to that fraction of the population being investigated which is selected neither by Probability nor by judgement but by convenience (Gupta, 1991).

These samples were found to be regular workers and willing to co-operate in the study. The socio-economic status, and dietary habits of all the 200 subjects were assessed.

The samples were then divided into four groups according to their capacity ot pluck tea leaves. Ten subjects from each level of activity were randomly selected for further studies on bio-chemical examination and clinical asssessment. To find out the food and nutrient intake food weighment survey was also carried out on these 40 women.

C. Formulation of interview schedule.

According to Verma (1988) a schedule has to be used in direct interview or direct observation and filled by the enumerator.

An interview schedule was specially designed to elicit informatioin on socio-economic status and dietary pattern. The schedule also contained questions on the work out put data. The schedule formulated is given in Appendix I.

D. Assessment of nutritional status.

1. Socio economic survey.

As the investigator is a native of the study area and well known to the selected women folk there was no problem in establishing or creating a rapport withthe women.The investigator interviewed each subject personally and collected the details. The socio-economic status of the subjects were assessed by finding out the family income, expenditure pattern, savings, debts, number of family members in their family and their occupation.

2. Diet survey.

The dietary habits were elicited by including questions on meal pattern, foods consumed and cooked, diet followed during special conditions, foods preserved, methods of cooking, foods beliefs and taboos.

Food weighed is a more precise dietary analysis and weighed food record is the most accurate method (Guthrie, 1986). Hence the food and nutrient intake of the subjects were assessed by conducting a weighment survey on subsamples of 40 subjects.

3. Anthropometric measurements.

The physical dimensions of the body are influenced by nutrition. Selected body measurements can therefore give valuable informatioin concerning certain type of malnutrition in which body size and body compositioin are affected (Jelliffe, 1966).

Since the subjects included in the present study were adult women, Body Mass Index (BMI) was found out. To calculate BMI weight was recorded with thehelp of a human weighing balance.The height was taken byusing a non - stretch fibre glass tape, fixed to a vertical wall.The heights and weighs were recorded to the nearest 0.5cm and 0.5 kg respectively which is shown in Plate I & II.

BMI was calculated using the formula weight in kg/height in sq. m. recommended by Garrow, (1987). Degree of malnutrition is calculated comparing with the standard values given in appendix II.

4. Clinical assessment.

Clinical examination is the most important in nutritional assessment as we get direct information of signs and symptoms of dietary deficencies prevalent among people (Devadas, 1990). Hence the selected sub samples were examined carefully by the investigator for any sings of nutrient deficiency and recorded the findings.

5.Haemoglobin Levels.

The haemoglobin level, was tested for the selected sub smaple of 40 subjects. The blood samples from the subjects were obtained through finger prick method and analysed using the cyanmethaemoglobin method (ICMR, 1992). The procedure utilised for the analysis is presented in Apppendix III.

E. Work efficiency of the selected sample.

The work efficiency of the selected sample was determined by finding out the total amount of tea leaves plucked in Kg/day, for each subject. The subjects were also interviewed to know their capacity to withstand the strenuous work, and their absenteesm. The results of the study were analysed and presented with discussions in Chapter IV.

PLATE-1

Height measurement.

PLATE -2.

Weight measurement.

PLATE - 3

Plucking activity done by the sub.sample.

Results and Discussion

IV. RESULTS AND DISCUSSION.

The results of the study on "Nutritional Status and food consumption pattern of women working in tea plantations of Nilgiris"' are presented and discussed under the following

A. Socio-economic data.

B. Dietary habits.

C. Work output data

D. Nutritional Status of the Sub Samples.

A. Socio - economic Status of the selected 200 adult women working in tea plantations of Nilgiris were asssessed.

1. The results revealed that all the women selected for the study were Hindus. Analysis of their community revealed that 24% of the women belonged to kota community and 31% of the women belonged to baduga community. These two communities are the tribal populations of Nilgiris, forty five percentage of the women belonged to gowder community, who are scheduled castes. These women speak Kota, baduga and kannada language respectively.

2. Type of family.

Majority of the women belonged to nuclear families and only 13% were in joint families.

3. Family size

Table I gives the family size of the selected sample.

TABLE.I.

FAMILY SIZE OF THE SELECTED SAMPLE

Number of Family members	Number of families n	%
1 to 2	34	17.0
3 to 4	93	46.5
5 to 6	67	33.5
7 to 8	6	3.0
Total	200	100

Table I shows that majority (46.5%) of the families had 3 to 4 members, 33.5% had 5 to 6 members. Only 3% of the families had 7 - 8 members, these families were joint families. Family sizes is one of the factors which affects nutritional status of an individual.

Food consumption of each individual is indirectly proportional to the number of members in the family, especically in low income groups.

In the present study, number of members in the families were more in about 34.5% of the families and hence the available food has to be divided among the members of the family.

Income

Table II gives the monthly income of families of the selected samples.

TABLE II

MONTHLY INCOME OF THE FAMILIES OF SELECTED SAMPLES

Income Range in Rs.	No.of Samples	% of Samples
300 - 500	72	36
500 - 1000	128	64
Total	200	100

Income classification is according to HUDCO (1994)

From Table II, it is seen that 36% of the families were found to be in the income range of Rs. 300 - 500 per-month and 64% of the families were found to be in the income range of Rs. 500 - 1000 per month.

Nineteen percent of the families payed 0 - 10% of their income as remmitance, and 44% of the families saved a small proprotion of their monthly income.

According to Sarvekshana (1991), a major portion of the income of an average Indian is spent on food as compared to his urban counterpart (57 paise). The rest of the money spent on non-food item like fuel, light, clothing housing and saving or debts.

6. Educational status

Table IV indicates the educational status of the selected women.

TABLE IV

EDUCATIONAL STATUS OF SELECTED WOMEN

Educational Status	No. of samples n	%
Primary School	40	20
Middle School	50	25
High School	38	19
Higher Secondary	20	10
Illiterate	52	26
Total	200	100

In can be noted from Table III that 72.5% of the families spent 30 - 40 per cent on food, and 26.5% of the families spent 50- 70% of their total income on food. Most of the vegtables and greens are obtained from their fields and milk and milk products from their own cattle. Hence they did not spent money for purchasing vegetables , greens and milk and milk products. Even then a large percentage of their income was spent of food. This is because of the low income of the families. As income decreases percentage of money spent on food increases. Martin Brown (1985) pointed out that, many people in developing countries spend 70 to 80 % of their income on food. Sixty eight (68.5%) of the families spend 10 - 15% on clothing, 25.5% of the families spent 15 - 30% of their total income on clothes.

Forty four percentage of the families spent 0 - 10% of their income on education. Free education was provided by the plantation sector for the children of the workers. Hence,in general not much money was spent for education. seventy three and half percent of the families spent 0 - 10% of their total income on medicine, only 19% of the families utilized the free medical service rendered by the plantatin sector. Sixty seven percent of the families spent 10 - 20% of their total amount on betal leaf and alcohol, rest of the families spent only a meagre amount.

According to HUDCO(1994), the income range from Rs. 1250 - 2650 per month is categorised as low income group. The families of the samples selected are getting less income than the low income category. The sample selected can thus be considered as living below poverty line, the daily wages for women workers in the tea plantations is Rs 30 paise/kg of tea leaves. Hence the family income is very low.

Expenditure pattern

Table III represents the monthly expenditure pattern of the selected families surveyed.

TABLE III

MONTHLY EXPENDITURE PATTERN OF THE SELECTED FAMILIES SURVEYED

Items	% of Income spent	No of families	% of families
Food	30 - 40	145	72.5
	50 - 70	55	27.5
Clothing	0 - 15	137	68.5
	15 - 30	51	25.5
	None	12	6.0
Education	0 - 10	88	74
	10 - 20	1	0.5
	NOne	76	38
	free education	35	17.5
Medicine	0 - 10	147	73.5
	10 - 20	15	7.5
	free medicine	38	19
Fuel & light	0 - 10	136	68
	10 - 20	6	3
	free education	58	29
Betal leaf	0 - 10	134	67
& alcohol	10 - 20	36	23
	20 - 30	4	2
	None	16	8
Transport	0 - 10	150	85
	10 - 20	23	11.5
	None	7	3.5
Remmitance	0 - 10	38	19
	10 - 20	--	--
	None	162	81
Savings	0 - 10	88	44
	10 - 20	4	2
	None	108	57
Recreation	0 - 10	179	74.5
	10 - 20	72	21
	20 - 30	2	1
	None	7	3.5

It could be noted from Table IV that, majority (74%) of the samples were educated. They had atleast primary school education and hence they were able to write their names and read some words. About 25% had middle school education and 29% had school and higher secondary education. Illiterates were only 26% who consisted mainly of older women. Realising the importance of education, the plantation sector has made provisions for free education within the plantation itself for the children and working women. This free education offered, has increased the percentage of literates significantly.

7. Age

Table V indicates the distribution of the selected women according to age.

TABLE V

DISTRIBUTION OF THE SELECTED WOMEN ACCORDING TO AGE

Age in years	No. of samples n	%
15 - 25	46	23
25 - 35	83	41.5
35 - 45	71	35.5
Total	200	100

It can be seen from Table V that majority (77%) of the women selected were between 25 to 45 years of age, which is the most productive age.Only 23% of the subjects were adolescent girls in the age range of 15 to 25 years. In general women below 15 years and above 60 years were not found in plantation activities. As work involved was very strenuous, older adults were not engaged for work..Plucking being an exhausting operation, where the eyes,brain and fingers have to work in unison complementary to each other, perhaps after certain ag e, the dextrity of the fingers and alertness of the mind decreases due to normal aging process affecting their perfection in plucking. Thus older adults are not found in plantations, (Sivaram 1990).

8.Marital Status

Table VI shows the Marital status of the selected women.

TABLE VI

MARITAL STATUS OF THE SELECTED WOMEN

Marital Status	No.of Samples n	%
Married	174	87
Unmarried	26	13
Total	200	100

Table VI indicates the percentage of married and unmarried women in the selected samples. Eighty seven percent of the women selected were married whereas only 13% were unmarried. The unmarried girls were bellow 20 years of age.Among 87% of married women 26% of them were married at their age of 10 tol5 years. Forty seven percent of them were married at the age of 15 to 20 years. In general all the girls get married before 20 years of age. This early marriage at the age of adolescence affects the overall nutritional status of women, affecting their productivity.This also leads to many pregnancies, where most of their children are stillborn or dead after birth.

The study also showed that 33% of the women, had their Ist pregnancy at the age of 12 to 16 years and thirty seven percent of women at the age of 16 to 20 years.It was also found that there was a high infant mortality due to low birth weight and infections.

B. Dietary habits.

A dietary survey was conducted with the help of an interview schedule, to elicit the dietary habits of the selected women. The details collected on meal intake pattern, methods of cooking foods preserved, foods given

during pregnancy and lacatation, food beliefs and diet during illness are presented and discussed in the following.

Forty five percent of the selected women were non vegetarians, whereas 55% of the women were vegetarians.

1. Food consumption pattern.

Majority of the families consumed rice, ragi and wheat as their staple food. During season they consumed the millets samai and thenai. They included pulses like Red gram dhal, Bengalgram and horse gram in their diet.

With regard to green leafy vegetables greens available in between the flushes of tea plants were included almost daily in their diet, greens consumed mainly were kuppaimeni, parupukeerai, sirukeerai and pulikeerai. The consumption of greens is more due to its easy availability in the tea plantations. Majority of the families consumed roots and tubers, which was also available in large quantities in the hills. The roots and tubers used were potatoes, onion, carrot ande raddish..Other vegetables like broad beans, ladies finger, pumpkin were also consumed by them, broad beans was found to be in every bodies diet as it was produced locally.

Fleshy foods were not consumed by most of them even though they were non-vegetarians. The reason indicated was

the high cost of non-vegetarian foods and low purchasing power. Fifty percent of the families owned dairy and they consumed the milk and milk products obtained from them. Thirty eight percent of the families who owned dairy did not consume adequate quantity of milk, since they sold the milk to the milk society with the hope of improving their economic status.

2. Daily meal pattern

Most of the families (64%) did not plan the meal in advance. They prepared rice and ragi preparations separately and combination like wheat and ragi kali. Other items like wheat dosa, ragiroti , wheat chappathi, wheat rice, wheat uppuma and ragi wheat porridge were also prepared. These cereal preparations were eaten with a vegetable preparation. Normally lunch packed and taken was eaten in the work spot. It consisted of only a cereal preparation like kali. They consumed tea and coffee thrice a day with minimum quantity of milk in in which was provided by the plantation sector itself..

3. Methods of cooking.

Table VII indicates the methods of cooking followed by selected samples.

TABLE VII

COOKING METHODS FOLLOWED IN THE SELECTED FAMILIES

Method of Cooking	Cereal n	Pulses n	veg n	green n	Fleshy foods n
Boiling	128	99	200	200	74
Shallow fat frying	92	114	..	..	36
Deepfat frying	..	..	..	..	20

From Table VII it is evident that boiling was the most commonly practiced method by all the families. Cereals, vegetable, greens and fleshy foods were cooked by boiling method. The use of fat was very low due to their low economic status. Fat was used only for seasoned pulses and vegetables.

4. Foods preserved

The type of foods preserved by the samples are mainly lime , garlic, dried greens, since these are easily available in between the flushes of the tea plants, salting was the usual method of preservation followed by majority of the families.

5. Foods given and avoided during pregnancyand lactation.

During pregnancy majority of the women did not consume any special food, but foods like papaya, thenai, bamboo rice

and samai were not consumed by 80% of the selected women. Bread, milk, garlic curry and ragi porridge were specially consumed by 35% during lactation, since these foods were considered as easy to digest, good for health and milk producing.

Condiments like nutmeg and garlic were believed to be galactogogues which were given to lactating women for sufficient milk production.

6. Food beliefs.

a. Hot and cold foods.

Fifteen percent of the women believed that fenu greek leaves, kupaimeni keerai, thadi keerai are cold foods and avoided them during fever cough and cold. Another 18% of the women considered tea, old rice and curd as cold foods and avoided them during fever, cough and cold. Twenty percent of the women considred chicken, beef,, papya, thenai and samai as hot foods and they avoided these foods in conditions like hot climatic conditions, Indigestion, menstruation, diahorrea, dysentry and chicken pox. Potato, cabbage, beet root and beans were considered as gas producing by 61% of the women.Yet these roots and tubers and vegetables were consumed due to their only availability and most of them cultivated these in their fields. Swaminathan

(1991) states that food beliefs and fads are contributory factors of malnutrition among the rural areas of developing countries. In the present study also it was observed that due to wrong food belief, several Nutritious foods were avoided.

7. Diet during illness

Table VIII depicts the diet given during illness,

TABLE VIII

DIET DURING ILLNESS

Conditions	Foods included	% number of sample.
Fever	Bread, milk Black coffee Ragi porridge.	70
Diahorea	Rice and Rava porridge	38
Dysentry	Ragi porridge, Khuskhus paste, goats milk	31
Constipation	Ragi, Wheat and all greens and raw vegetables.	20
Cold and cough	carriander water & shukiti keerai	25

Table VIII indicates the type of diet habituated by the samples during various disease conditions. Seventy five percent of the women consumed bread, milk, black coffee and kanji during fever. They believed these foods would decrease

the elevated temperature and it is easy for digestion. Thirty eight percent of the women, consumed rice and rava kanji when affected with diahorrea. Sago porridge, khus-khus paste, goats milk were consumed by 31% of the samples for quick relief from dysentry. Lots of greens, vegetables, whole wheat rice and ragi were consumed during constipation for easy motility by 20% of the samples. Thirty six percent of the samples consumed raddish leaves fresh raddish and ginger paste for immediate temporary relief from gastritis. Twenty five percent of the samples believed corriander water and greens namely chukiti keerai to be effective in reducing cold and heal if any inflammation is present in the throat. On the whole, majority of the samples avoided hot an spicy foods in all condition of illness.

C. Work output data.

The efficiency of work output was studied according to the amount of tea leaves plucked by each subject per day. The data thus collected is presented in Table IX. Fig. I also represents the plucking capacity (kg) for the subjects.

TABLE X

QUANTITY OF TEA LEAVES (KG) PLUCKED PER DAY BY THE SELECTED SUBJECTS

Plucking capacity in kg.	No. of samples n	%
0 - 5	11	5.5
5 - 10	38	19
10 - 15	70	35
Above 15	81	40.5

In can be noted from Table IX that 40.5% of the samples were able to pluck above 15 kg. which is the upper unit, while only 5.5 %. of ther samples plucked 0- 5 kg. The next majority of 35% of the samples plucked 10 to 15 kg. and 19% plucked 5 - 10kg.

Though majority of the samples selected for the study were found to be under norished, the samples had higher plucking capacity. The plucking efficiency was mainly because of the experience of the subjects. The plucking capacity of the subject is shown in plate III.

QUANTITY OF TEA LEAVES (KG) PLUCKED PER DAY BY THE SUB SAMPLES

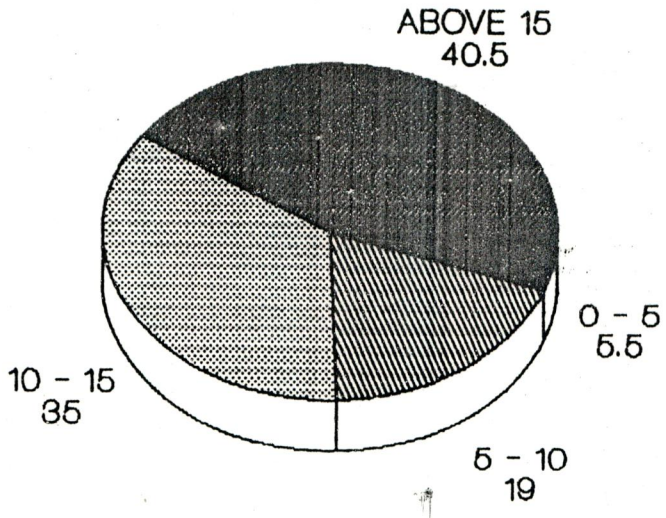


FIGURE - 1

D. Nutritional Status of the sub samples

1. BODY MASS INDEX OF THE SELECTED SUB SAMPLE.

The body mas index of all the subjects were determined from the heights and weights and the data is presented in Table X. B.M.I Data is shown in Figure.II.

TABLE X

BMI OF THE SELECTED SUB SAMPLES (n = 40)

BMI	Criteria	No.of the sub sample n	%
> 16	CED Grade III	12	30
16 - 17	CED Grade II	6	15
17 - 18.5	CDE Grade I	10	25
18.5 - 20	Low weight Normal	8	20
20- 25	Normal	4	10
25- 30	Obese Grade I	--	--
> 30	Obese Grade II	--	--

Table X shows that 90% of the women had BMI bellow 20, and only 10% were between 20 to 25. According to garrow 1987. For adult women normal BMI range should be between 20 to 25. Only 4 subject out of 40women had normal BMI. Eight subjects had 18.5 to 20. They were classed as low weight normal group. All the rest of the subject (28) were below normal and malnourished. From the results of the present study,it can be understood that majority of the women 90%

BMI OF THE SELECTED SUB SAMPLES

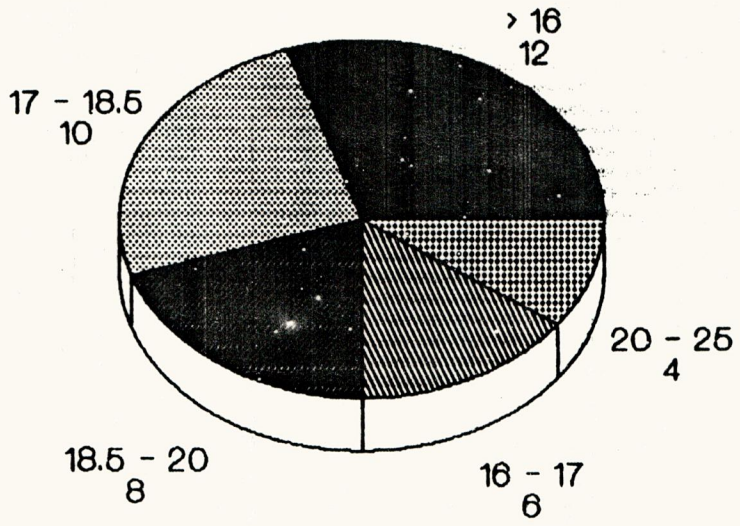


FIGURE - 2

were undernourished of which 30% belong to Grade III.15% under Grade II and 25% fall under the category of Grade I, and 20% of the sample were low weight normal adults and only 10% were in the normal range. None of the subjects were above normal.

But it can be under stood that though majority of the subjects were undernourished, their workoutput or plucking capacity was not very much low. If all the subjects are better nourished and brought upto normal health their work output may still improve.

2. Clinical assessment

The clinical examination of the subject showed that majority of the subjects had poor and unhealthy appearance. For about 37.5% the subjects conjuctiva was pale and eyes were not bright 75% had angular stomatitis and 12.5% had bleeding, weak gums.

Thus, overall clinical examination showed symptoms of anaemia, B-Complex vitamin deficiency and Vitamin 'C' deficiency.

3. Haemoglobin levels

Table XI depicts haemoglobin level of all the selected sub samples.

TABLE XII

HAEMOGLOBIN LEVEL OF SELECTED SUB SAMPLES

Haemoglogbin g/dl	Number of samples n = 40
10 to 11	20
11 to 12	10
12 to 13	10
13 to 14	..

Table XI shows that a large number of the subjects had haemoglobin level between 10 g and 11 g/dl. Only about 10 subject had haemoglobin between 11 to 12 g. According to (Demayer, 1989) 13 g/100 ml is considered as normal haemoglobin level. In the present study only 10 subjects had normal haemoglobin content in the blood.

A large number of studies have indicated that anaemia reduces work output. (Agarwal, (1991), D.Souza & chan (1989), Kaur, (1993) Haemoglobin level was tested for women having different plucking capacity and the mean haemoglobin value for each group is presented in Table XII and the data is depicted in Fig.III.

TABLE XII

MEAN HAEMOGLOBIN VALUE FOR SUBJECTS IN VARIOUS PLUCKING CAPACITY

Plucking capacity in kgs	Hb level gm/dl.
0 - 5	10.7
5 - 10	10.8
10 - 15	11.4
Above 15	12.8

The mean haemoglobin values of the subjects with different plucking capacity reveals that, those who were able to pluck less amount of tea leaves had a very low mean haemoglobin value. (10.4 and 10.8 respectively for 0 - 5 and 5 - 10 kg.) But at the same time it is evident that those who had a higher haemoglobin content were able to pluck more tea leaves per day. The subjects who plucked more than 15 kg of tea leaves daily did not have anaemia. They were normal. So from the results of the present study it is evident that anaemia reduced work out put.

4. Mean food intake and plucking capacity.

Table XIII presents the mean food intake of the Sub samples according to their plucking capacity derived from the weighment survey. The data is depicted in Fig. IV and the values are presented in Appendix IV.

MEAN HAEMOGLOBIN VALUE OF THE SELECTED SUB SAMPLES - VARIOUS PLUCKING CAPACITY

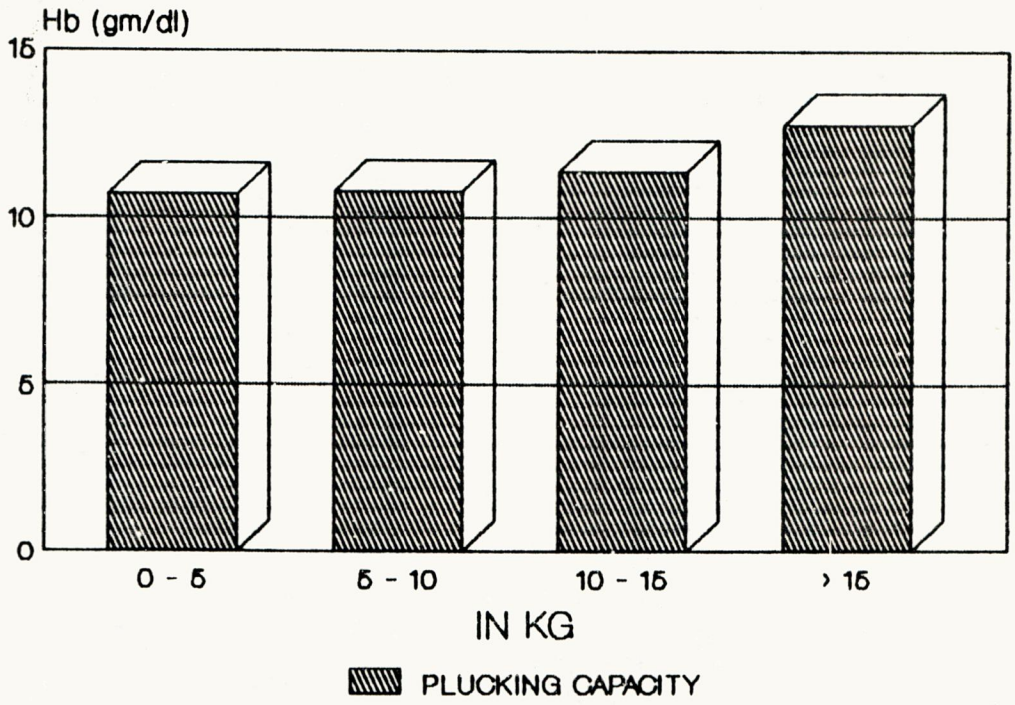


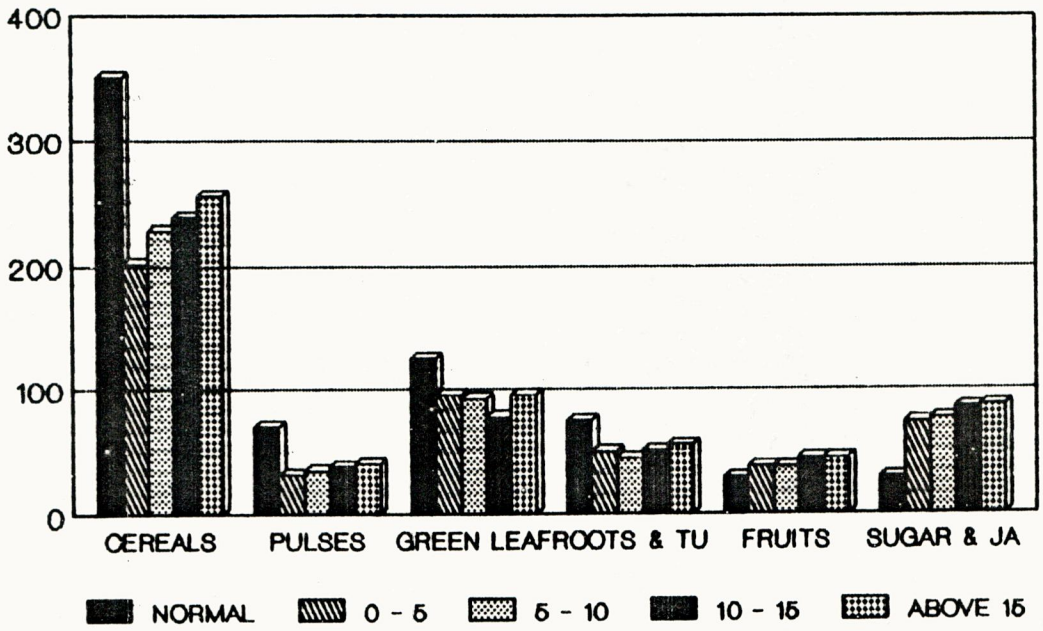
FIGURE - 3

TABLE XIII

MEAN FOOD INTAKE OF SUBJECTS WITH DIFFERENT PLUCKING CAPACITY

Food intake	RDA ICMR (1987)	Plucking capacity of sub samples N =40							
		0-5	Diff	5-10	Diff	10-15	Diff	Abl5	Diff
Cereals	350	202	147.5	228	-122	239	-121	256	-94
Pulses	70	32.1	-37	35	- 34	39	- 30	41	-28
Green leafy vegetables	125	95	-29	92	- 32	77.6	- 47	95	-29
Other vegetables	75	95	-16	41	- 33	66	- 8	60.7	-14
Roots and tubers	75	50	-37	45	- 29	51	- 27	55.9	-19
Fruits	30	39	+ 9	38	+ 8	45	+15	45	+18
Milk	200	79	-120	120	- 80	132	-67	141	-58
Fats & oil	35	10	- 25	14	- 20	15	-20	10	-19
Sagar & Jaggery	30	73	+43	76	+ 46	85	+55	87	+57

FIGURE - 4
MEAN FOOD INTAKE & PLUCKING CAPACITY OF THE SUB SAMPLES



The mean food intake of the subject were calculated through the food weighment survey. The mean food intake of the subjects were calculated through food weighment survey. The results compared with the recommended dietary allowance given by ICMR (1987) show that the mean intake of all the foods except fruits, sugar and jaggery are less than the RDA.

Fruits are easily available in the hills and at low cost. Hence intake of fruits may be high. The reason for high consumption of sugar and jaggery is because of the tea and coffee provided by the plantation authorities. All the workers consumed more amount of tea and coffee.

The cereal intake by the subjects in all levels of activity were very much les than the RDA.

Intake of pulses, vegetables, milk and fats and oil consumption were less thanthe RDA, Inspite most of the subjects having cattles, the consumption of milk and milk products were very much less.

But it is evident from table XIII that the intake of cereals and pulses is slightly more by the subjects who plucked more than 15kg. Increased food intake has influenced plucking capacity. Neera Sohani, (1988), has also found that increased food intake improves work efficiency.

TABLE XIV

MEAN NUTRIENT INTAKE OF SUBJECTS WITH DIFFERENT PLUCKING CAPACITY

Nutrients	RDA ICMR (1987)	Number of sub samples N =40							
		0-5	Diff	5-10	Diff	10-15	Diff	Abl5	Diff
Protein (g)	50	33	-17	36	-14	40	-10	41	-57
Fat	20	10	-10	11	-9	10	-9	11	-9
Energy	2225	1362	-803	1459	-766	1528	-697	1789	-456
Calcium	400	91.6	-308	204	-196	314	-86	233	-167
Iron	30	12	-18	16	-14	19	-10.8	26	-4
Carotene	2400	659	-1741	1254	-1146	1388	-1012	1437	-963
Thiamine	1.1	2.7	+19.6	2.7	+1.6	1.4	+0.3	2.08	+1.98
Riboflavin	1.3	2.08	+.78	1.08	+.220	2.1	+.81	2.44	+1.14
Niacin	14	6.836	-7.16	12.9	-1.1	9.7	-4.9	12	-2
Folicacid	100	69.2	-30.8	77.8	-22.2	89.7	-10.3	92	-8
Vitamin C	40	68.4	+28.27	42.5	+2.5	30.16	-9.84	51	+11

FIGURE

MEAN NUTRIENT INTAKE & PLUCKING CAPACITY OF THE SUB SAMPLES

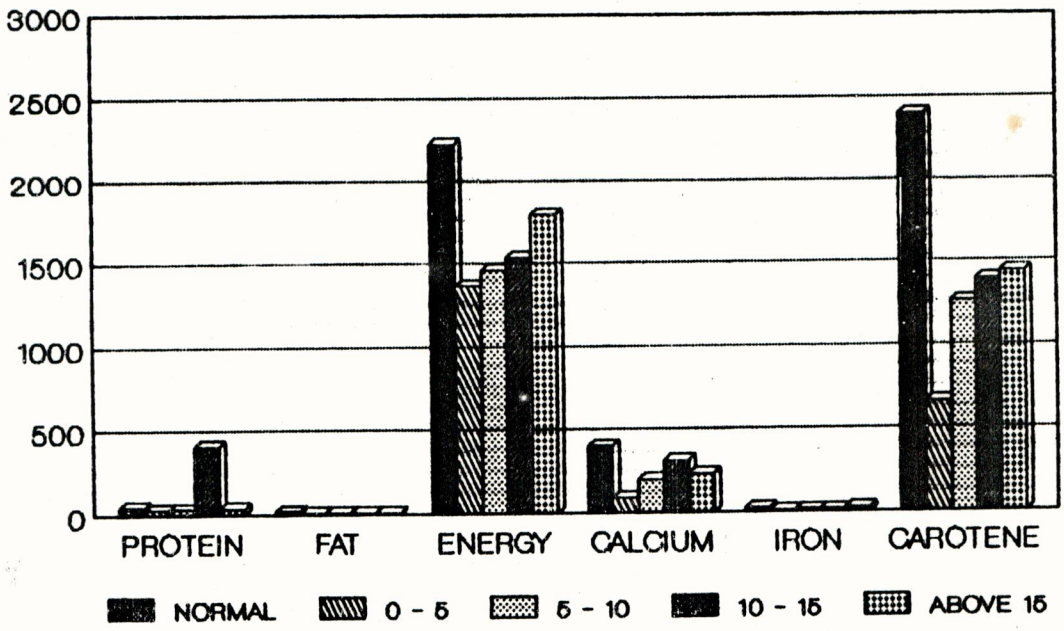


Table XIV shows that intake of the selected samples energy protein, fat, calcium iron, vitamin K. and folic and were less than the RDA given by ICMR (1990) These values are well correlated with the food intake of the subjects.

The deficit in energy intake is more for the group, who plucked only 0 - 5kg. Where as the deficit is less for those pluck above 15kg.The protein intake also increases in the groups who pluck more tea leaves.

As fruit consumption is more by the subjects the intake of vitamin C is also more, Intake of thiamine and riboflavin have met the RDA.

Thus, the results of the present study brings out the fact that the women, who toil in the plantations have poor nutritional status which requires immediate attention and action.

Adequate nutritious food should be supplied to these women at low cost so that they can improve their health and inturn increase work effeciency.

Summary and Conclusion

V. SUMMARY AND CONCLUSION

The present study on "Nutritional Status and food consumption pattern of women working in tea plantations of Nilgiris" was under taken to assess the nutritional status, food consumption pattern and work efficiency of women working in tea plantation of Nilgiri hills. Though the nutritional status of several groups of tribal population have already been assessed, this is the first attempt involving women workers in tea plantations.

Two hundred women working in tea plantations of Dundsaldale and Rock hill estates in the Nilgiri hills were selected for the study. The Socio economic status and food consumption pattern were assessed using an interview schedule, through personal interview with the subjects. The food and nutrient intake of a sub sample of 40 subjects were calculated by conducting a weighment survey. The body mass index (BMI) of all the subjects were estimated by recording the body weight and height of the subjects. Clinical assessment and blood haemoglobin estimation were done for a sub-sample of 40 subjects, with different plucking capacities. The data collected were analysed. The results of this investigation reveal the following.

1. All the 200 women were Hindus. Twenty four percent of the women belonged to kota community and 31 percent belong to baduga community, which are the tribal populations of Nilgiris.The rest of the subjects belonged to gowder community who are schedule castes.

2. Eighty seven percent ofthe women were in nuclear families and only 13 percent belong to joint families.

3. The number of members in the families of women ranged from 3-6.

4. All the families were getting a monthly income less than Rs. 1000 and thus they can be considered as living below poverty line.

5. About 70 percent of the income was spent in food. Money spent for education was negligible as free education was provided by the plantation sector for the children of the workers.Their savings were also negligible, but a considerable portion of the income was spent for recreation.

6. Analysis of the educational status of the selected women revealed that about 75 percent of the subjects were literates and only 25% were illterates.The illetrates were mainly the older women. Free education affored by the plantation has influenced the literacy rate.

7. About 77% of the selected women were between 35 to 45 years of age. It is the most productive age. Older women were not employed by the plantation sector. All women get married by the age of 20. Hence 87% of the women were married and only 13% were unmarried.

8. Forty five percent of the subjects were non vegetarians and fifty percent were vegetarians.

9. Ragi and wheat were staple foods in the diet. Millets like Samai and thenai were included only during season. Green leafy vegetable available in between the tea flushes were consumed almost daily. Though 45% of the subjects were non vegetarians fleshy foods were not included in the diet, because of high cost and low purchasing power. The quantity of food eaten was inadequate.

10. Boiling and shallow fat frying were the two main methods used for cooking.

11. No special foods were consumed during pregnancy but bread milk garlic curry and Ragi porridge were specially consumed during lactaion.

12. Green like Kuppaimeni, thadi Keerai was considered as cold foods and avoided during fever, cough and cold. Chicken, beef, papaya, thenai and samai were considered as

hot foods and avoided in hot climatic conditions. Potato, cabbage, beet root and beans were considered as gas producing.

13. When the plucking capacity ofthe subjects were studied, it was revealed that about 75% of the subject plucked more than 10 kg oftea leaves per day. Only 5% plucked less than 5 kg per day.

14. The Body Mass Index, of 90% of the subjects was below 20, which indicates poor nutritional status.

15. Clinical examination revealed that the subjects had unhealthy appearance, pale conjuctiva, bleeding gums and angular stomatitis.

16. The blood haemoglobin level of majority of the subjects was also below normal, but these who pluck more tea leaves per day had normal blood haemoglobin level.

17. The result of the weighment survey indicated that consumption of all foods except green leafy vegetables, fruits, sugar and jaggery were less than the recommended daily allowance. Better consumption pattern was noticed in those, whose work out put is more.

18. With regard to nutrient intake, deficient intake were noticed with regard to energy, protein, fat, calcium, iron

and carotene. Intake of Vitamin C, thiamine and riboflavin met the recommended allowances.

The results of the present study reveal that the women working in tea plantations are poorly nourished and their nutritional status is also very poor

The results indicate that this group of women need the attention of the planners and policy makers for formulating developmental programmes for this sector. The wages of the works should be raised and they need nutrition education for utilising the low cost locally available nutritious foods for improving their health and inturn their families. This will help in the improvement of the nation as a whole.

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Appendices

APPENDIX-I

QUESTIONNAIRE ON NUTRITIONAL STATUS AND FOOD CONSUMPTION PATTERN OF WOMEN WORKING IN TEA PLANTATIONS OF NILGIRIS.

I. General Information:

1. Name of the Investigator:

2. Name of Interviewee:

3. Name and address of the Head of the family:

   a) Door No.

   b) Address:

4. Type of family: Joint Nuclear

5. Religions & Caste:

6.

Sl. No.	Name of the family members	Relationship to head of the family	Marital Status	Age in years	Education	Occupation	Incc

7. Other sources of income: Amount (in Rs.)

a) Business earnings:

b) Received from properties:
Land

Building:

c) Income from investment:

d) Other earnings:

Total family Income:

8.

Sl.	Age of child labourers	Age of adolescent labourers	Educational Status	Number of sibilings	Daily Income/ wages.

8.a) For the past how many years you are working?

b) What is your work timings?

9. Are you married Yes No

If yes,

Sl.	Name	Age of marriage	Numbers of pregnancy	Age at each pregnancy	No. of Children			
					Alive	Dead	Still born	Abo

10. Length of time of breast feeding and weaning of the children.

No.of Children	Age of weaning	Duration of breast feeding	Reasons	Foods introduced food quantity	Age at which it is given	Reasons
I. Child						
II. Child						
III. Child						

11. Monthly expenditure pattern:

Sl.No.	Items	Rupees spent	Percentage spent
1.	Food		
2.	Clothing		
3.	House rent		
4.	Education		
5.	Medicine		
6.	Fuel, light		
7.	Betal leaf, alcohol Tabaco		
8.	Durable goods		
9.	Transport		

10. Other services

11. Remmitances

12. Savings

13. Recreation

DIETARY SURVEY

1. Are you a vegetarian or Non-vegetarian

2.Food expenditure pattern

Details of expenditure and frequency of purchasse

Foods	Frequency of purchase			Quantity of purchasing
	Daily	Weekly	Monthly	Kg or gm.
CEREALS				
Raw rice				
Boiled rice				
Wheat				
Maida				
Ragi				
Sago				
Bajra				
Others (Specify)				

Foods	Frequency of purchase			Quantity of purchasing
	Daily	Weekly	Monthly	Kg or gm.
PULSES				
Red gram dhal				
Black gram dhal				
Bengal gram dhal				
Gr.Gr. dhal				
R.B. gr dhal				
Cow pea				
Horse gram dhal				
Other (specify)				
ROOTS & TUBERS				
Potato				
Carrot				
yam				
Colocasia				
Other (specify)				
GREEN LEAFY VEGETABLES				
Amaranthus				
Others (specify)				

Foods	Frequency of purchase			Quantity of purchasing Kg or gm.
	Daily	Weekly	Monthly	
OTHER VEGETABLES]				
Brinjal				
Beans				
Pumpkin				
Ladies finger				
Cauliflower				
Peas				
Tomato				
Raddish				
Turnip				
Khol-Khol				
Others (specify)				
FRUITS				
Plantain				
Guava				
Plums				
Orange				
Pear				
Papaya				
Others (specify)				

Foods	Frequency of purchase			Quantity of purchasing Kg or gm.
	Daily	Weekly	Monthly	
NUTS & OILS				
Gingely oil				
Refined oil				
Groundnut oil				
Cocount oil				
Vanaspathi				
Others				
FLESHY FOODS				
Mutton]				
Fish(fresh)				
Fish (dried)				
Chicken				
Egg				
Beef				
Others				
MILK & MILK PRODUCTS				
Milk				
Curds				
Buttermilk				
Ghee				

Foods	Frequency of purchase			Quantity of purchasing
	Daily	Weekly	Monthly	Kg or gm.
SUGAR & JAGGERY				
Sugar				
Jaggery				
Palmjaggery				
PREPARED FOODS;				
Biscuits				
Pickles				
Varkee				
Bun				
Bread				
Papad				
Sweet				
BEVERAGES				
Tea				
Coffee				
Others (specify)				

3. Any special foods you consume apart from common foods?

4. Do you consume anything during your work time?

Yes No

If yes, How many times do you take drinks or snacks in b/w work time?

Frequency	Hot drinks	Cold drinks	Snacks
i) Only once			
ii) Twice a day			
iii) Thrice a day]			
iv) Four time a day			

If taken specify the quantity of milk & sugar used

5. Daily meal planning

Is planning done in advance

Yes NO Reasons

If Yes, what is the basis for planning

a) Total family requirment

b) Money available & other items of expenditure

c) Likes & dislikes of family members

d) Any other

6. Daily mean pattern

Days	Breakfast	Lunch	Tea	Dinner
1st day				
2nd day				
3rd day				

7.Methods of cooking

Food items	Boiling	Steaming	Frying		Stewing	Roasting
			Shallow	Deep		

8. Foods preserved at home

Food	Method of preservation	Period over which preserved	Problems encountered

9. Foods produced at home

Are you possessing any of the following

Kitchen garden Polutry Dairy

Items	Pdn/year	Use of the produce	
		By family	By sale

10. Diet during illness

Sl.No.	Illness	Foods given	Reasons	Foods avoided	Reasons

11. Details regarding food fads & taboos

Sl.No.	Reasons	Food stuff	Conditions in which Included	Avoided
1.	Hot fods			
2.	Cold foods			
3.	Gas producing			
4.	Bile producing			
5.	Foods causing skin diseases			
6.	Abortive foods			
7.	Milk Secretion			

Anthropometric measurements:

Work output data

1. How much leaves you pluck/day (kg)?
2. Do you feel fatigue while at work?
3. How often you fall sick?
4. Do you have health check up in the work area?
5. What are the common aliments<
6. Do you take packed lunches to work area?

   If yes, specify

   Type of food

   Quantity.

APPENDIX-II

ESTIMATION OF HAEMOGLOBIN LEVELS

AIM : To estimate the haemoglobin levels of the selected sub samples with various plucking capacity

Procedure:

1. Exactly 5ml of Drabkin's diluent solution was measured into a dry test tube from a buret or pipette with a suction bulb.

2. Exactly 0.02 ml of blood from standardized heamoglobin pipette was transferred into the diluent solution, Usual care in filling and cleaning of loaded haemoglobin pipette was exercised.

3. The pipette was rinsed three times with diluent solution, without allowing the formation of air bubbles in the solution.

4. The blood was then mixed thoroughly with diluent by rotating the tube.

5. A period of 20 minutes was permitted for the cyanmetheamoglobin to form.

6. 5 ml. of diluent solutin was used to get the blank reading.

7. With green filter No1540 tube, the readings were taken on photo-electric colorimeter setting blank at 0.

Calibration procedure.

1. The total blood iron was determined by Wong's method. This determination would give absolute amount of haemoglobin.

2. Exactly 0.02ml. of the known blood sample was measured out as described above into 5.0, 7.5 10.0, 12.5 and 15.0 ml. respectively of diluent solution and mixed by rotating the tubes. These solutions were then equivalent to blood samples containing respectively 100,,67, 50, 40and 30% that of the original solution.

3. Percent transmission using green filter 540 against diluent as blank set at 0, was read.

4. A standard graph using these haemoglobin concentration and corresponding transmission was prepared.

Reagents: Drabkin's diluent solution

Sodium Bicarbonate	1 gm
Potasium cyanide	0.05 gm.
Potasium ferricynaide	0.20 gm
Distilled water to make	1000 ml.

APPENDIX-III

CLASSIFICATION OF BODY MASS INDEX (BMI)

ACCORDING TO GARROW'S (1987)

BMI	CRITERIA
> 16	CED GRADE III
16 - 17	CED GRADE II
17 - 18.5	CED GRADE I
18.5 - 20	LOW WEIGHT NORMAL
20 - 25	NORMAL
25 - 30	OBESE GRADE I
> 30	OBESE GRADE II

APPENDIX-IV

INDIVIDUAL FOOD INTAKE OF THE SELECTED SUB SAMPLES

WITH 0 - 5 KG PLUCKING CAPACITY OF TEA LEAVES/DAY

S.NO.	CEREALS	PULSES	GREEN LEAFY VEGE-TABLES	OTHER VEGE-TABLES	ROOTS AND TUBERS	FRUITS	MILK AND MILK PRODUCTS	FATS AND OILS	SUGAR & JAGGERY
	g	g	g	g	g	g	g	g	g
1	210	35	92	57	51	40	80	9	70
2	143	21	90	55	50	40	80.2	10	68
3	201	30	89	54	48	38	78	12.5	72
4	189	27	88.5	53.5	49	40	70	7.5	70
5	212	33	98.5	63.5	52	42	92	10.5	82
6	205	34	97.5	62.5	53.5	43.5	83.5	8.5	81.5
7	198	31	104	69	47.5	37.5	73.5	10.5	63.5
8	208	32	94	59	50	40	70	9.5	70
9	217	37	101	56	48.5	38.5	88.5	10.5	78.5
10	190	31	95.5	61.5	50.5	30.5	74.5	9.5	74.5
TOTAL	2023	321	950	591	500	390.1	790.2	100	730
MEAN	202	32	95	59	50	39	79	10	73

APPENDIX-IV

INDIVIDUAL FOOD INTAKE OF THE SELECTED SUB SAMPLES

WITH 5 - 10 KG OF TEA LEAVES PLUCKING CAPACITY OF TEA LEAVES/DAY

S.NO.	CEREALS	PULSES	GREEN LEAFY VEGE-TABLES	OTHER VEGE-TABLES	ROOTS AND TUBERS	FRUITS	MILK AND MILK PRODUCTS	FATS AND OILS	SUGAR & JAGGERY
	g	g	g	g	g	g	g	g	g
1	226	34	98	39	45.5	30	122	12.8	79
2	223	39	95	38	48	38.7	118	12.5	79
3	210	36	89.5	42	46	45.5	116	13	75
4	199	29	87.5	44.5	43	39.5	121	13.8	70
5	240	38	92	37	45	39	127	14.9	76
6	225	32	95	40	45.5	36.9	120	15	82
7	245	39	88.5	43.5	49.7	35	121	14	75
8	232	35	85	42	38	40	120	12	72
9	260	34	96	40	45.5	42	120	17	80
10	222	34	95.5	45	43.8	35.5	119	14	72
TOTAL	2282	350	9252	411	450	382.1	1204	140.85	760
MEAN	228	35	92	41	45	38	120	14	76

APPENDIX-IV

INDIVIDUAL FOOD INTAKE OF THE SELECTED SUB SAMPLES

WITH 10 - 15 KG PLUCKING CAPACITY OF TEA LEAVES/DAY

S.NO.	CEREALS	PULSES	GREEN LEAFY VEGE-TABLES	OTHER VEGE-TABLES	ROOTS AND TUBERS	FRUITS	MILK AND MILK PRODUCTS	FATS AND OILS	SUGAR & JAGGERY
	g	g	g	g	g	g	g	g	g
1	226	35	75	65	49	42	128	15	83
2	255.8	34.5	76	64	51	45.1	132	14.9	85.5
3	227.9	38	78	65	55	45	131	14	85.9
4	228	39	79	69	52	46.5	131.5	14.8	88.5
5	231	43	80	64	50	48.5	130	16.6	89.5
6	230	42	78.2	67	50	45	129.9	16.5	90.5
7	229.5	40.6	77.8	68	51	47	129.8	13.3	81.5
8	232	41.8	77.5	67	52	44.3	132.9	17.5	87.5
9	223	36.5	76.9	65	46	44	136	12.9	82.5
10	229	41.5	77	68	53	43	138	14.8	95.9
TOTAL	2392	392.7	7762	660	570	450	1320	150.5	850
MEAN	239	39	77.6	66	51	45	132	15	85

APPENDIX - IV

INDIVIDUAL FOOD INTAKE OF THE SELECTED SUB SAMPLES

WITH ABOVE 15 KG PLUCKING CAPACITY OF TEA LEAVES/DAY

S.NO.	CEREALS	PULSES	GREEN LEAFY VEGE-TABLES	OTHER VEGE-TABLES	ROOTS AND TUBERS	FRUITS	MILK AND MILK PRODUCTS	FATS AND OILS	SUGAR & JAGGERY
	g	g	g	g	g	g	g	g	g
1	251	44	98	52.1	44	46	138	14.5	51
2	259	43.1	99.7	59.2	56	39	135	14.6	53.5
3	253	38	90	60.7	47.1	48.5	146.5	14.8	59.5
4	261	45	94	58.8	57.8	46.8	149	16	60.1
5	255	44	92	52.5	48.2	45	148.5	17.5	55
6	253	34	95	64.5	45.1	49	137	15	56.5
7	258	44	97	58.5	47.8	46.5	138.9	14.9	56
8	255	42	95	60.9	46.9	45.5	141.5	14	64
9	255	36	101	59.1	58.5	48.5	140.6	13.8	65
10	254	44	90	65	49.5	39.5	135	15	53
TOTAL	2560	414.1	951	603	559	454	1410	160.15	873.6
MEAN	256	41	95	60	55.9	45.4	141	16	87.3

APPENDIX- V

INDIVIDUAL NUTRIENT INTAKE OF THE SELECTED SUB SAMPLES WITH

0-5 KG. OF PLUCKING CAPACITY OF TEA LEAVES/DAY

No.of sub samples	PROTEIN g	FAT g	ENERGY kcal	CALCIUM mg	IRON mg	CAROTENE /ug	THIAMINE mg	RIBOFLAVIN mg	NIACIN mg	FOLIC ACID /ug	VITAMIN C mg
1.	32	9.66	1342	55.5	7.73	652	6.4	6.88	3.2	65	68
2.	35	10	1341	77.1	7.13	590	2.17	4.95	7.47	111	63
3.	31.12	6.2	1334	180	8	640	2.9	4.27	10.66	55.2	80
4.	36.65	12.5	1366	54.1	9.35	683	2.4	0.61	9.21	43.9	64.5
5.	34	14	1431	85.5	43.5	572	1.5	1.45	8.34	73.3	75.7
6.	36	12.5	1351	78.9	9	651	2.5	0.72	8.23	65	76
7.	32	10	1392	80.9	7.56	719	2.7	0.41	4.55	51.6	62
8.	30	6.55	1370	90.5	8.81	725	2.9	0.46	5.14	74.9	40.8
9.	31	8.55	1346	107.9	8.01	714	1.3	0.036	5.71	21.06	73.8
10.	35	11.5	1349	104.9	7.3	1000	2.8	1.09	6.13	32.7	80.0
Total	322	101.8	13622	916	127.1	6956	27.95	20.89	68.3	592.40	684
MEAN	32.2	10.18	1362.2	91.6	12.71	695.6	2.79	2.08	6.83	5924	68.4

APPENDIX - V

INDIVIDUAL NUTRIENT INTAKE OF THE SELECETED SUBSAMPLES WITH 5-10 KG. PLUCKING CAPACITY OF TEA LEAVES

No.of	PROTEIN gms	FAT gms	ENERGY kcal	CALCIUM mg	IRON mg	CAROTENE µg	THIAMINE mg	RIBOFLAVIN mg	NIACIN mg	FOLIC ACID µg	VITAMIN mg
1.	30.26	10	1494	254	15.3	1222	1.33	0.616	5.94	96.3	25.3
2.	35	12	1475	132.5	18	1365	1.08	1.79	9.06	43.	62
3.	40	11	1479	139.1	13	1325	1.44	0.82	15.03	110	35.3
4.	32.5	11.2	1396	308	14	1229	4.6	12.5	22.5	76.5	58.2
5.	40	20	1464	140	19	1335	2.84	9.23	20.6	43.69	60
6.	45	16	1446	147.7	16	1335	1.49	1.56	11.7	57.1	50
7.	32	6.3	1493	387	18	1322	1.17	1.98	9.23	125	34
8.	31	8	1483	182.3	17	1268	3.44	0.66	10.72	78.9	34.8
9.	36	6	1389	198.3	15	1148	4.63	0.62	10.5	61.96	41.4
10.	40	16	1475	153.1	16	1027	4.66	1.25	13.77	85	56
Total	362	11.5	1459.4	204.06	161.63	12548	27.95	31.11	12.85	778	425
MEAN	362	11.5	1459.4	204.1	161.16	1254.8	12.7	3.1	12.9	77.8	42.

APPENDIX-V

INDIVIDUAL NUTRIENT INTAKE OF THE SELECTED SUB SAMPLES WITH 10-15 KG. OF PLUCKING CAPACITY OF TEA LEAVES/DAY

No.of sub samples	PROTEIN g	FAT g	ENERGY kcal	CALCIUM mg	IRON mg	CAROTENE /ug	NIACIN mg	THIAMINE mg	RIBOFLAVIN mg	FOLIC ACID /ug	VITAMIN C mg
1.	39	7.07	1537	557.5	12.9	1237	0.615	10.385	1.485	101	28
2.	38	9.5	1457	182.0	17	1779	1.35	10.185	1.21	43.8	30
3.	39	16.66	1588	103.3	22.4	1384	0.565	6.733	1.026	93.7	33
4.	40	6.7	1595	499	11.66	1406	0.705	10.46	1.33	108	30
5.	37	9	1586	443	13.46	1226	0.65	10.46	2.866	108	28
6.	41	9	1458	150.3	20.15	2051	1.76	11.45	1.12	120	34.5
7.	44.5	8.6	1488	195.4	28	1236	2	13.5	1.534	60.5	31
8.	40	12	1592	419	22.9	1310	0.585	8.54	1.354	97.5	29
9.	38	13	1475	1464	21.28	1150	1.37	9.695	0.785	122	31
10.	39	9.5	1789	450	22.8	1384	1.35	10.18	1.25	43.8	30
Total	805.5	101.06	152834	313.55	192.15	13833	13.88	10.95	97.04	897.5	301
MEAN	40	10.106	1528.34	31.35	19.21	13833	1.388	1.09	9.7	89.75	30.1

APPENDIX-V

INDIVIDUAL NUTRIENT INTAKE OF THE SELECTED SUB SAMPLES WITH ABOVE 15 kg PLUCKING CAPACITY OF TEA LEAVES/DAY

No.of sub samples	PROTEIN g	FAT g	ENERGY kcal	CALCIUM mg	IRON mg	CAROTENE µg	THIAMINE mg	RIBOFLAVIN mg	NIACIN mg	FOLIC ACID µg	VITAMIN C mg
1.	35	11	1786	239.9	20.65	671	1.64	0.62	10.88	56.4	65
2.	44	10.5	1696	417	46	730	5.25	3.5	8.21	121	58
3.	45	12.2	1730	200	23	1310	1.73	4.58	11.43	59	70
4.	48	13	1705	281	23.5	1559	1.58	0.84	12.26	91.13	57
5.	43	9.85	1763	228	41	1654	1.7	1.02	12.1	118	53.6
6.	39.5	8.38	1816	200	17	1330	1.77	0.809	13.73	123	18.98
7.	47.5	10	1797	183	40	1207	1.7	0.819	13.1	100	50
8.	46	7.75	1768	257	17	872	1.59	0.791	9.49	90	38
9.	49	18	1898	238	19.2	1264	1.7	0.621	12.5	97	40
10.	43	10	1879	289	19	1779	2.38	0.856	15.2	69	63
Total	440	110.68	17898	2332.5	266.4	14376	20.87	14.46	118.37	92	924
MEAN	44	11.06	1789	233.2	26.64	143.76	2.08	1.44	1.18	9.2	92.4