CEC Working Paper

Plucking the Pain

Occupational Health Study on Small Tea Plantation Workers

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2008

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March 2008

Published by
Centre for Education and Communication
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INTRODUCTION

The agricultural sector employs half of the world's labour force and is one of the three most hazardous sectors of activity (along with mining and construction), in both industrialised and developing countries. According to the Convention on Agriculture, recently introduced by the International Labour Organization (ILO), 'agriculture' covers all activities (whether indoor or outdoor) directly associated with cultivating, growing, harvesting and primary processing of agricultural products; animals and livestock breeding, including aquaculture; and agro-forestry or any work performed in a forest and related to cultivation or conservation. This definition applies irrespective of the size of the undertaking[1].

According to the International Labour Organization (ILO), huge numbers of agricultural workers and farmers are killed worldwide every year. In 2002, the International Labour Organization estimated that 355,000 fatal accidents take place every year, and more than half of them occur among agriculture workers. Millions of people working in agriculture are seriously injured in workplace accidents with agricultural machinery or are poisoned by pesticides and other agrochemicals. This sector is also characterised by poor coverage of inspection, welfare, information, and medical and emergency services. The burden of improving health and safety in this sector is enormous.

One of the neglected sectors among agricultural workers in India is tea plantation. The tea industry has an important and special place in the Indian economy. Tea is the country's primary beverage, with almost 85 per cent of total households in the country consuming tea. India is the world's largest producer and consumer of tea, accounting for 27 per cent of the world tea production. India's tea industry exports were estimated at Rs 17.31 billion during financial year 2006, accounting for 0.4 per cent of India's exports. In value terms, tea ranks as the fourth largest agricultural product export item from India, with exports of around US$410 million in 2004. In terms of employment, the tea industry employs around 1.27 million people at tea plantations and two million people indirectly, of which 50 per cent are women. The last fact is particularly important when we consider that tea industry, to a large extent, drives the economies of the regions where the tea gardens are concentrated – Assam, for example.

Indian Tea Industry

In India, tea is primarily grown in Assam, West Bengal, Tamil Nadu and Kerala. Tripura, Karnataka, Himachal Pradesh, Uttaranchal, Sikkim, Bihar, Manipur, Orissa, Nagaland and Arunachal Pradesh also grow tea in small quantities. India is also an important tea exporter, accounting for around 12-13 per cent of world tea exports. Further, certain varieties of tea (for example, Darjeeling tea) are grown only in India, and are in great demand across the

[1]Muchiri, F.K. *Towards better occupational health and safety services in the agriculture sector*. African newsletter on occupational health and safety, 2001; 11, p. 31

world. The Darjeeling tea possesses a distinct flavour and fine colouring that set it apart from all other teas.

The northeastern states have at present around 280,000 hectares of land under tea cultivation, accounting for around 55 per cent of India's total area under tea cultivation, which is 521,000 hectares. Assam Valley alone accounts for an estimated 272,000 hectares, followed by 8,300 hectares in Tripura. These northeastern states produced around 474 million kilograms (mkgs) of tea during crop year 2005, accounting for 51 per cent of India's tea production. About 0.62 million plantation workers are employed in the tea gardens of the region. Other northern states such as West Bengal produced 217 mkgs in 2005, accounting for 24 per cent of India's tea production. Tea production in West Bengal is concentrated in Dooars, Terai, and Darjeeling regions. Tea production in Darjeeling was estimated at around 11.4 mkgs in crop year 2005.

South India, with a total area of about 115,000 hectares under tea cultivation, produced around 227 mkgs of tea in 2005, accounting for around 24 per cent of India's tea production. In South India, the Nilgiris region alone has around 61,000 hectares of land under tea cultivation, and produced around 155 mkgs in 2005. Of the total tea production in South India, around 75 mkgs is accounted for by the small-scale sector, comprising over 65,000 small tea growers and 167 bought-leaf factories (BLFs), including cooperatives. BLFs buy raw tea, process it into finished products, and then sell the products. Over the past two decades, there has been a rapid expansion of the small sector in the tea industry, with a large number of farmers in the Nilgiris, which accounts for 95 per cent of the small tea growers, converting from vegetable cultivation to this plantation crop.

The total number of tea estates in the country is estimated at around 129,027. Almost 99 per cent of total tea growers have less than 10.12 hectares of land, with most of such growers located in South India. In fact, 99.5 per cent of the gardens in South India belong to this category. The intensity of competition in the Indian tea industry is high because of the large number of players. However, while around 5,000 big growers have an annual output of 800-825 mkgs, the estimated 0.12 million small growers have an annual output of only around 100-125 mkgs. In India, small tea growers coexist with large corporate and medium proprietary gardens in the North and the South[2].

Small tea growers typically sell their output to middlemen, plantations, or bought-leaf factories. Prices for small tea growers tend to be lower than prices of estate tea plantations. Compared to large plantations that are often run by multinationals with access to the latest technical information, small tea growers even lack the knowledge of how to pick and store the leaves properly, and how best to treat the bushes and the land. Lack of capital resources exacerbates this situation, as they are not able to afford the necessary technical inputs like fertilisers and irrigation.

[2]The Indian Tea Industry, August 2006. www.icra.in

India's tea production is seasonal in nature. In northeastern India, the tealeaves are plucked at weekly intervals from April to December, with a peak of crop during June to August, and there is a dormant season during winter. In southern India, the crop is harvested during the cold and dry months (December to March), with two distinct peak crop periods, pre-monsoon and post-monsoon.

The tea industry in India is regulated under Tea Act, 1953, whereby the Tea Board has been constituted by the government of India (GoI) to regulate the production and extent of cultivation of tea; improve the quality of tea; promote cooperative efforts among growers and manufacturers of tea; and secure better working conditions and the provisions and improvement of amenities and incentives for workers. The Tea Board regulates and controls the total area of land under tea cultivation. Permission has to be obtained from the board for planting of tea on any land not previously planted with tea.

There are around 230,000 small growers engaged in tea production. In India, the small growers are mainly located in the Nilgiris, Tamil Nadu. However, the number of small growers is growing significantly in West Bengal and Assam as well[3]. In the last ten years, there has been a phenomenal growth in the small growers sector as compared to the traditional organised sector in terms of area and production. *Indian Tea Scenario 2002*, a status paper prepared by the Indian Tea Association (ITA), points out that from 1991 to 2001, the production of tea by the organised segment decreased by 0.2 per cent, while that of the small growers segment increased by 12.6 per cent. The increase in the area under small growers has been 14.9 per cent. Overall, the contribution of the small growers sector in the total production of tea in India has gone up from 6.92 per cent in 1991 to 19.91 per cent in 2001[4].

In the last five years, the number of small growers has gone up. Within Tamil Nadu's Nilgiris area itself, there are around 125,000 small tea growers, and in Assam, the number of small growers is around 30,000[5].

Plant Characteristics

Tea is made from the young leaves and leaf buds of the tea bush *Camellia sinensis*. There are three main tea plant varieties – Chinese, Assamese and Cambodian – according to geographical distinction. These three varieties have a number of hybrids. Tea is basically a rain-fed crop,

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[3]Chattopadhayay, S., 'Note on workers in major black tea producing countries'. In *Globalization and its effect on tea plantation workers*. March 2005. pp. 8-15

[4]John, J. 'Globalisation and the Indian tea industry'. In *Globalization and its effect on tea plantation workers*. March 2005. pp. 17-30

[5]Chanda, P. 'Changing character of the tea industry in Assam'. In *Globalization and its effect on tea plantation workers*. March 2005. pp. 56-58

and usually grown in areas where annual rainfall varies from 1,150 millimetres to 6,000 millimetres. Humidity conditions also have an impact on tea production and yield, with relative humidity (RH) of 80-90 per cent being considered favourable during the growth period of tea plants. However, production is adversely impacted with RH of below 50 per cent. Thus, the sub-tropical climate of northeastern India and of parts of southern India is favourable for the cultivation of many crops including tea and coffee.

Unlike traditional annual crops, tea is relatively free of pests and diseases, easier to maintain, excellent for soil conservation, and a regular source of income.

Tea bush has a productive life of nearly 100 years, but repeated pruning tends to bring it down to 60-70 years. The plant takes about 15 years to develop fully, and the most productive period is between the 15th and the 35th years. The major part of capital expenditure is incurred in the first five years, which then yields return over the next 100 years. The yield from bush drops after the plant attains 50 years of age. The process of pruning is important for maintaining the tea bush in the right form and height for growing and plucking. Pruning is also necessary for the removal of branches that are decayed or dead as a result of drought, pests, or diseases.

The tea plant is initially trained into a small bush by centring low within a few months of planting, through removing the central leader stem in order to encourage development of lateral branches. The lateral branches are cut to a convenient height of 40 to 50 centimetres, and the growth above this is periodically cut. Thus, a small and compact bush is formed. New shoots are allowed to grow unhampered and these shoots are tipped, leaving a growth of 20-30 centimetres above the pruning cut, depending on the kind of plant. The crop is then harvested at regular intervals.

In southern India, the pruning cycle extends over a period of 4-6 years depending on the elevation and growth. Pruning and skiffing are done periodically to keep the height of the bush at a convenient level for the pluckers to operate, as also to encourage vegetative growth. Annual pruning is a practice in northeastern India, but even there the present trend is towards an extended pruning cycle. After a series of pruning cycles, the bushes are rejuvenated by hard pruning, removing all cankered and diseased portions of the stem. In northeastern India, the economic life of the tea bush is generally 40-50 years, and around 2-3 per cent of the area is uprooted and replanted every year.

In India, around half of the bushes have completed over 50 years, while only around a quarter are in the most productive age category. On a regional basis, Kerala has the highest population of old bushes with over 70 per cent of the bushes being more than 50 years of age. The Assam variety, a single-stem tree ranging from 20 feet to 60 feet in height and including several sub-varieties, has an economic life of 40 years with regular pruning and plucking. In other countries, such as Kenya, where a larger degree of plantation was done in the 1960s, the

average bush age is in the most productive period. Consequently, the yield from such places is higher than the yield levels attained in India. The yield level is the outcome of many factors apart from the age of tea bushes, including weather conditions, genetic material, irrigation, fertilisers and cultivation techniques. Tea productivity varies from year to year.

OCCUPATIONAL HAZARDS OF WORKING IN TEA PLANTATIONS

Agriculture is a hazardous occupation carried out in difficult and sometimes dangerous working conditions. The specific hazards facing plantation workers vary from one plantation to another. Tea is among the most labour-intensive of all the plantation crops. On an average, around 60 per cent of the cost of production is incurred on labour. Work at the plantations is basically manual in nature. The factory, which processes the green tealeaves, is mechanised, but it employs less than 10 per cent of the total labour force. Field workers are engaged in plucking and activities related to the maintenance of the plantation and its tea bushes. These include hoeing, weeding, pruning of the bushes, and drainage. Women are mainly engaged in plucking of tealeaves and in light maintenance work. The men too pluck tealeaves, but in addition they are engaged in strenuous agricultural activities. Adolescents more or less do the same work as the adults, and are also engaged in spraying of pesticides, which can be harmful to their health[6].

Plantation land is cleared and prepared for new planting, or areas of old or poor-quality tea are uprooted and replanted with high-yielding, vegetatively propagated cuttings. New fields take a couple of years to come into full bearing. Regular programmes of manuring, weeding and pesticide application are carried on throughout the year.

There is a great variation worldwide in the diseases arising from agriculture work. The factors that can create conditions for these diseases include climate, fauna, population density, living conditions, eating habits, standards of hygiene, education levels, occupational training, working conditions, technological developments, and quality of, and access to, services.

Some of the specific features of plantation work which can be related to multiple exposures for the workers engaged in a variety of plantation activities are:

- Most of the tasks are carried out in the open air, exposing workers to climatic conditions
- The seasonal nature of the work and the urgency of certain tasks in specific periods
- The variety of tasks to be performed by the same person
- The type of working postures and the length of the tasks performed
- Contact with animals and plants exposing workers to bites, poisoning, infections, parasitic diseases, allergies, toxicity, and other health problems

[6]Forastieri, V. *Challenges in providing occupational safety and health services to workers in agriculture*. The ILO programme on safety and health in agriculture. African Newsletter on Occupational Health and Safety, 2001; 11: pp. 33-38

- The use of chemicals and biological products
- The considerable distances between the living quarters and the workplaces

Harvesting, commonly referred to as 'plucking' in tea parlance, is overwhelmingly labour-intensive, despite the tendency to use shear harvesters during the heavy cropping period when labour is scarce in some areas. In some countries, notably Japan and the former USSR, mechanical plucking has been carried out with some success, but this requires a reasonably flat terrain and bushes to be grown in set rows.

The possible occupational hazards in tea gardens are discussed below.

Agrochemical Exposure

Agrochemicals such as pesticides and fertilisers are essential inputs to improve the productivity of the farmer in terms of farm produce, but their use is also associated with chemically induced injuries to health. The magnitude of health damage caused by agrochemical exposure varies according to the type of crop cultivated, the type of agrochemical used, the mode of application/exposure, the individual susceptibility, and the climatic conditions. Spraying of chemicals without appropriate protective gear, and non-observance of re-entry intervals while spraying cause much harm to the sprayers as well as to the other non-spraying workers. Since the vast majority of workers in the tea plantation are women, concerns have centred on the potential reproductive hazards of chemical exposure and their impact on pregnant women, nursing mothers and their children. These agrochemicals affect the body by coming in contact with skin, as well as through inhalation or through accidental ingestion. The major target organs can be respiratory system, skin, eyes, ears and throat. Systemic toxicity can occur by persistent exposure to these chemicals. This may manifest in the form of neurological, gastrointestinal, renal, or hepatic toxicity.

Musculoskeletal Disorders

The adoption of awkward and uncomfortable postures, and carrying of excessive loads cause numerous, but largely unreported, musculoskeletal disorders in agriculture. Traditional tools and methods require high human energy input. Back injuries and lower-back pain are mainly associated with heavy physical work and repeated lifting and twisting. Knee lesions often appear when work involves kneeling and walking on uneven surfaces.

First, the adoption of awkward and uncomfortable postures and carrying of excessive loads cause numerous musculoskeletal disorders. Carrying of heavy loads can cause serious musculoskeletal disorders such as back pain, chest pain and miscarriages. Women are also involved in collecting water, firewood, laundry, livestock and other weight on their backs or heads over considerable distances. Back injuries and lower-back pain are mainly associated with heavy physical work and repeated lifting and twisting.

Second, the use of ergonomically inappropriate hand tools also causes severe musculoskeletal problems. These hand tools are locally manufactured by informal small-scale industries and are not correctly proportioned to the body dimensions of the worker, and also do not match the working capacity and strength of the worker. These traditional tools also require high-energy input, which is likely to cause premature fatigue and undermine the productivity of the farmer[7]. Long standing hours also cause excessive strain and fatigue, increasing the possibility of an accident.

Neurological problems arise from repeated pressure on tools with the hand. The sciatic nerve is placed under strain as a result of prolonged bending and carrying heavy loads. Furthermore, changes in production processes and the increase in the pace of work have brought to the fore new occupational pathologies, such as tenosynovitis among cane-cutters and workers pruning tea bushes. Chronic musculoskeletal disorders are the type of injuries that are very likely to develop cumulatively over time, and most of these can lead to permanent disability.

These occupational and work-related diseases lead to significant expenditure of energy, to premature ageing, to absenteeism, to declining productivity, and to high social and health cost.

Occupational Accidents and Injuries

Falls and injuries caused by agricultural equipment of the cutting and digging type are the most common types of accidents. This is not unexpected, considering the steep slopes on which tea is generally grown and the type of work involved in the processes of clearing, uprooting and pruning. Apart from exposure to natural hazards like lightning, workers are always in danger of being bitten by snakes or stung by hornets, spiders, wasps or bees. However, highly venomous snakes are seldom found at the high altitudes at which the best tea grows. Several injuries such as wound and fracture are also occasionally caused by animals' bites and kicks, and by slippage in the field. The main areas of concern include injuries from machinery and equipment, unsafe handling of and exposure to chemicals for crop protection, and injuries from the crops themselves, especially during harvesting. An allergic condition caused by contact with a certain species of caterpillar has been recorded in Assam.

A recent study of occupational hazards on tea estates found that almost two-thirds of employees had suffered from work-related illness or injury. A considerable portion (30.3 per cent) reported facing occupational safety hazards at least once every month. Occupational illnesses were reported to be quite severe (56 per cent) and long-lasting (45 per cent).

Climatic Conditions

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[7]Bruce, T.F. *Occupational health and safety in agriculture in Ghana*. African Newsletter on Occupational Health and Safety, 2001; 11: pp. 48-49

Work in the open exposes workers to wind, rain, cold, heat, and ultraviolet radiation. These agents can lead to a series of health problems, which, even if they cannot strictly be classified as 'occupational health problems', cause absenteeism, low productivity, and a lowering of resistance to well-known disorders. Rain and cold can lead to respiratory infections and chilblains, which leave skin lesions liable to become infected. Exposure to the sun may cause burning, chronic photodermatosis (diffuse redness on the exposed parts of the skin, associated with cutaneous atrophy, which may lead to localised thickenings after several years) and varying degrees of sunstroke. Heat causes a dilation of superficial blood vessels and, thus, leads to dehydration through over-perspiration (sometimes rendered more severe by excessively protective and waterproof clothing) as well as leg oedemas, cramps and fainting; it also facilitates poisoning through cutaneous absorption and spread of pesticides inside the human body. The wind carries bacteria, parasites, mineral and vegetable dust, and fungal spores.

In developing countries, the negative effects of long hours of work may be exacerbated by the effect of extreme climatic conditions. Malnutrition, hot and humid weather, and endemic diseases may also undermine the capabilities and performance of agricultural workers. Studies on the effect of heat exposure on workers' health have shown that temperatures that differ even minimally from the comfort zone tend to increase the risk of accidents.

In large agro-industries, work schedules are arranged to take advantage of maximum shifts allowed in a temperate climate. No account is taken of heat stress when planning working time. In small farms, which practice self-sustainable agriculture, workers tend to carry out heavy work in the early hours and before noon, and sedentary work in the afternoon. This is in keeping with the traditions of rural life, which are adjusted to the hot climate.

Infectious and Parasitic Diseases

The major diseases occurring in agricultural work are infectious disorders such as those transmitted by contact with domestic or wild animals (zoonosis), respiratory infections, dermatosis, and allergies.

Skin Disorders

Skin disorders can result from the entry of pathogenic agents into the body, either through a lesion or through healthy skin. Contact dermatitis is the most common occupational dermatological infection in agriculture, and is caused by the action of solvents and other products present in pesticides. Allergic dermatitis can be caused by chrome contained in rubber boots or gloves, and by pesticides (fungicides of the dithiocarbamates group) as well as by disinfectants and soap. Occupational acne occurs due to the handling of motor oil and grease.

Respiratory Disorders

Respiratory disorders in agriculture cover a wide range of clinical manifestations, from benign disorders to serous respiratory insufficiency including occupational asthma. The various organic allergens can, furthermore, be carriers of bacteria, moulds, toxins, and pesticides, to transport them into the respiratory tract, thus creating even more serious lung difficulties. Gases used as pesticides or produced by a reaction when pesticides are applied, directly affect, through irritation, the walls of respiratory tract, provoking asthmatic reactions among people suffering from bronchial hyper-activity.

Occupational Cancer

Occupational cancer in agriculture can be present as a delayed complication of certain diseases whose origin is occupational, or it can arise through direct exposure to a variety of risk factors. Pesticides and fertilisers have been associated with the appearance of gastric and bronchial cancers (e.g., arsenical fungicides), as well as with non-Hodgkin's lymphomas (e.g., phenoxy-acetic herbicides).

Major Safety and Health Hazards

- Cuts to hands, legs and feet from the sharp edges of tea leaves
- Falls, sprains, fractures, bruises, cuts and burns, especially during clearing, uprooting and pruning
- Musculoskeletal injuries from repetitive and forceful movements, bending and lifting, and carrying heavy or awkward loads
- Injuries from cutting tools
- Exposure to harsh climatic conditions
- Snake and insect bites
- Poisoning and long-term health problems from pesticide use or exposure
- Long hours of work
- Stress and harassment by supervisors

Generic Health Hazards of Community Conditions

Housing is generally substandard. The most common diseases are those of the respiratory system, closely followed by enteric diseases, anaemia and substandard nutrition. The former are mainly the outcome of working and living conditions at high altitudes and exposure to low temperatures and inclement weather. The intestinal diseases are due to poor sanitation and low standards of hygiene among the labour force. These are mainly preventable conditions, which underline the need for better sanitary facilities and improved health education. Anaemia, particularly among working mothers of childbearing age, is all too common; it is partly the result of ankylostomiasis, but is mainly due to protein-deficient diets.

It has been observed that two categories of illnesses – respiratory and water-borne – account for 60-70 per cent of the diseases prevalent among tea workers in the subcontinent. These diseases are also the major contributors to absenteeism, sickness benefit costs, and expenditure on drugs. By and large, these illnesses are controllable through ensuring a protected water supply, proper disposal of human and animal waste, better personal hygiene, and improved living conditions. By placing the emphasis on a preventive rather than a curative approach, not only will there be a reduction in costs to management, but, more importantly, there will also be a lower incidence of illness, with its attendant positive impact on worker productivity. Anaemia is also a problem, affecting between 30 and 50 per cent of plantation workers, taking 11 grams percentage of haemoglobin for women and 12 grams percentage for men as the standard haemoglobin count. The adverse effect that anaemia has on output has been documented, for instance, in a study of Indonesian rubber tappers, which showed that the productivity of non-anaemic workers was 20 per cent higher than their anaemic counterparts. By identifying and treating anaemia, productivity can be increased. This has been demonstrated by a group of tea estates in the subcontinent, where increased productivity was achieved by giving a course of 100 iron tablets to a cross-section of 250 pluckers.

LITERATURE REVIEW

OHS Studies among Tea Plantation Workers

As with most of the economic sectors of India, occupational health and safety (OHS) stays a neglected domain for the stakeholders. It has either been ignored or has been observed as a way of life for the workers, by the workers themselves as well as by the employers. Agriculture being an unorganised sector witnesses the maximum negligence with regard to the health and safety of its workers. There are very few studies done for evaluating the overall picture of health and safety among these workers, and whatever data is available generally provides input to one-to-one exposure and outcome variable. The findings of some of the studies conducted to evaluate the health and safety of tea plantation workers have been summarised below:

1. Out of 2,391 accidents in 1996, 478 accidents (20 per cent) were reported in the factory premises and 1,913 (80 per cent) in the field. Sprains/fractures and dislocations, bruises and cuts, and poisoning due to snakebites were the top three injuries reported. The reasons behind these injuries were accidental falls due to uneven and rough terrain, improper use of sharp cutting devices, and non-use of protective footwear. Occupational dermatitis, amputations, burns and injuries to internal organs were also reported[8].
2. Body mass index (BMI) of the younger age group was slightly higher (19.40 kg/m^2) than that of the older age group (18.22 kg/m^2). The mean BMI was 18.81 kg/m^2.[9]
3. Among tea pluckers, it is not BMI that determines labour productivity; instead, height is the significant predictor for amount of leaves plucked, followed by the mid-upper-arm circumference. Taller individuals with large arm circumference plucked more green leaves per day, while the shortest women plucked the least amount[10].
4. Degenerative changes in the cervical spine have been reported due to carrying tea baskets over the head. Continuous plucking also causes painful abrasions to the hands. Wearing hand glove may not be practically possible during hot and humid weather, and it also involves high cost[11].

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[8]*Occupational safety and health in the tea plantation sector in Sri Lanka*, 1996-97. ILO/EFC plantation safety and health monitoring project, 1997

[9]Kishtwaria, J. et al. *An ergonomic assessment of women workers involved in tea plantation in Himachal Pradesh*. J. Hum. Ecol., 16(3): pp. 223-226 (2004)

[10]Gilgen, D. et al. *Intestinal helminth infections, anemia and labour productivity of female tea pluckers in Bangladesh*. Trop. Med. Intl Health, 6(6): pp. 449-457 (June 2001)

[11]Sivaram, B. *Productivity improvement and labour relations in the tea industry in South Asia*. ILO

5. Physical deformities like shrinking limbs, big bellies and very big joints were reported in the Darjeeling tea estates by Nar Shankar Rai, consultant to World Wide Fund for Nature, India. There are many cases of gastrointestinal and pulmonary disorders also[12].

6. Study among tea pickers in Kenya tea plantations revealed that 35 per cent pickers have developed back pain solely due to occupational exposure. The relative risk of developing back pain increases proportionally with the increase in age[13].

7. In a study done in Bangladesh, the managers of tea gardens informed about the large scale of absenteeism among workers due to illness, which may be due to occupational hazards like working under the glare of scorching sun or in the rain, insect/snake bites, exposure to fertilisers, insecticides and fungicides, and non-use of self-protective measures like mask or gloves. The problem further aggravates due to certain non-occupational hazards like unsafe drinking water, unhygienic sanitation, and poor food intake and the consequential malnutrition[14].

The dearth of significant data for overall evaluation of occupational health and safety status reiterates that need-based preventable strategies are required to be framed, adopted and evaluated in the course of time. This study was undertaken with the sole intention to collect basic field information taking into consideration the different exposure parameters, personal statistics, and health indicators to comprehensively compile the different health and safety instruments.

Objective of the Study

The objective of the study is to collect, analyse and correlate data on the health and safety of tea plantation workers. The end goal is to work out the feasibility of interventional studies to ascertain the cause-and-effect relationship of potent health-hazard exposures, and encourage training workshops/programmes, capacity building, and advocacy and campaign for the implementation of OHS measures based on the collected data.

[12]Tea pesticide flavored. http://www.downtoearth.org.in/full6.asp

[13]Muruka, A.O. *Age, height and duration of service in relation to back pain among tea pickers in Kenya*.

[14]Mondal, A.H. *Decent work in agriculture in Bangladesh*.

METHODOLOGY

A sample of 118 labourers was chosen from two tea producing states of India for interview and examination. The study covered Dibrugarh district in the state of Assam and Nilgiris district in Tamil Nadu. Out of 118 labourers, 39 belong to Dibrugarh, and the rest 79 belong to Nilgiris. All the 118 labourers are directly involved in the tea gardens. All of them are working in small tea gardens, and many of them have the dual role of being a grower/owner of the garden as well as a worker. The work profile of these workers varies/overlaps, being involved in plucking, fertiliser spreading, pruning, pesticide spraying, supervising plantation activities, and carrying leaves/loads. There are also instances of part-time involvement in other professions like teaching and accounting. Owners of tea gardens not involved in any activity in the tea garden have not been considered for the study.

A detailed questionnaire was prepared to obtain information on demography, personal habits, exposure history, health hazards of spraying pesticides, and ergonomic hazards and injuries that have occurred while working in tea gardens. On the subject of health, specific questions were asked on respiratory, gastrointestinal (GI), neurological, dermal and musculoskeletal problems. Questions on personal and family histories of medical illness were also included in the questionnaire.

Further, each participant was subjected to a general physical examination related to height, weight, pulse and blood pressure (BP). BMI was calculated with the help of height and weight measurements. Specific symptoms or illnesses like prominent varicose veins or skin allergies were also examined and recorded. All the collected data was analysed with the help of Epi Info 2005 software.

Limitations of the Study

- In Assam, the total targeted population could not be interviewed due to some unavoidable circumstances, including anti-social activities by some militant groups, and bandh/curfew.
- In Tamil Nadu, workers were not available in off/dry season, and getting them to participate was also problematic due to the greater time consumption in filling the responses because of the language barrier.

OBSERVATIONS

Demographic Profile of Workers

The study was undertaken in two states: Assam (Dibrugarh) in northeast of India and Tamil Nadu (Nilgiris) in South India, characterised by different climatic conditions, agricultural practices, customs and socio-economic variations. Out of 118 workers, 39 were from Assam and 79 from Tamil Nadu. A total of 46 males and 72 females were interviewed. The minimum age among the female workers was 17 years, and that among the male workers was 20 years; the maximum age among working females was 64 years and that among males was 74 years.

Chart 1: State-wise gender distribution of workers included in study

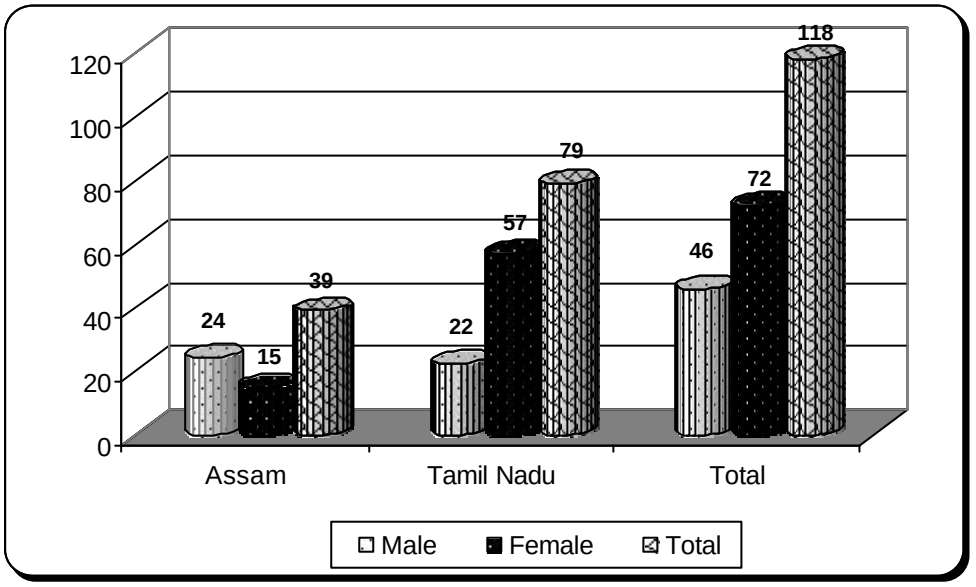


Chart 1 shows that 57 out of 72 female workers were from Nilgiris, and 15 were from Dibrugarh. This variation could be related to the time of the year the study sample was interviewed. Assam region undergoes pruning during the month of January, which is mainly done by male workers. In Nilgiris, plucking continues during the month of January, with the work activity dominated by female workers.

Table 1: Number of workers according to age group and gender

	Age group (in years)							
	< 20	21-30	31-40	41-50	51-60	61-70	71-80	Total
Male	2 (4.3)	9 (19.6)	12 (26.1)	17 (37.0)	3 (6.5)	2 (4.3)	1 (2.2)	46 (39)
Female	3 (4.2)	13 (18.1)	24 (33.3)	21 (29.2)	9 (12.5)	2 (2.8)	0 (0.0)	72 (61)
Number of workers	5 (4.2)	22 (18.6)	36 (30.5)	38 (32.2)	12 (10.2)	4 (3.4)	1 (0.8)	118 (100)

(Figures in parentheses are percentage of row total)

A total of 74 (62.7 per cent) workers belong to the age group of 31-50 years, with almost equal distribution among males and females. This equi-distribution among male and female workers is maintained in the age groups of below 30 years. However, in the 51-60 years age group, females are (12.5 per cent) twice the percentage of males (6.5 per cent). No female in the study was found to be in the age group of more than 70 years.

A total of 17 (43.6 per cent) workers in Dibrugarh are below the age of 30 years, while only 10 (12.6 per cent) workers in Nilgiris belong to this age group. Out of 118 workers, 96 are married and nine have lost their spouses. Thirteen workers are in the 'unmarried' category, which includes four workers in the age group of below 20 years. The only married member in this age group is from Assam. Four workers have been married for one year, while one has been married for 60 years.

Out of 105 married/widow/widower workers, eight have no child, 17 (17.5 per cent) have one child, 39 (40.2 per cent) have two children, 22 (22.7 per cent) have three children, and 12 (12.4 per cent) have four children. Two (2.1 per cent) workers have seven children. The total number of male children is 137 and that of female children is 113. This gives a male to female ratio of 1.20:1.00, with a mean of '2.38' children per family.

Eighteen workers reported some kind of illness of his/her spouse. It is beyond the scope of this report to mention the nature of illnesses they suffer from. None of the worker reported ill health of any of the children.

It was analysed from the collected data that the total members in a worker's family vary from 1 to 11. A maximum of 32 workers reported having four family members; 15 workers have five members, and 21 workers have three to six members. The fact that nine workers have eight family members, three have nine members, and one has 10 and 11 family members each, indicates the prevalence of large families among the workers. It is worth mentioning here that with such kind of family set-ups, these workers have the major responsibility of supporting

their families. Data shows that 16 workers have one member dependent on each of them, 27 have two dependents each, and 21 have three dependents each. One worker has eight dependents, two workers have seven dependents each, and seven workers have five to six dependents each.

Out of 112 workers who responded to the question about their monthly wages, 63 (56.3 per cent) reported earning less than Rs 1,500 per month, as compared to 27 (24.1 per cent) who earn between Rs 1,500 and Rs 2,500 per month. Only 22 (19.6 per cent) workers are earning more than Rs 2,500 per month. It was found that the person who supports eight dependents earns less than Rs 1,500 per month.

Table 2: Education of workers according to age group and gender

Education	Age group (in years)							Gender	
	<20	21-30	31-40	41-50	51-60	61-70	71-80	Male	Female
Illiterate 51 (43.2)	2 (3.9)	5 (9.8)	14 (27.5)	17 (33.3)	10 (19.6)	2 (3.9)	1 (2.0)	11 (21.6)	40 (78.4)
Middle 25 (21.2)	1 (4.0)	5 (20.0)	7 (28.0)	10 (40.0)	1 (4.0)	1 (4.0)	0 (0)	12 (48.0)	13 (52.0)
Matric 28 (23.7)	2 (7.1)	7 (25.0)	11 (30.6)	6 (15.8)	1 (8.3)	1 (25)	0 (0)	15 (53.6)	13 (46.4)
XII 11 (9.3)	0 (0)	5 (45.5)	3 (27.3)	3 (27.3)	0 (0)	0 (0)	0 (0)	5 (45.5)	6 (54.5)
Graduate 3 (2.5)	0 (0)	0 (0)	1 (33.3)	2 (66.7)	0 (0)	0 (0)	0 (0)	3 (100)	0 (0)
Total 118	5	22	36	38	12	4	1	46	72

(Figures in parentheses are percentage of row total)

Table 2 is indicative of education of the workers with respect to age and gender. All three graduates are males, two being from Assam and one from Tamil Nadu, and all are in the age group of 31-50 years. Out of 27 workers below the age of 30 years, seven are illiterate, which is 13.7 per cent of the total number of 51 illiterates. Overall, 40 females and 11 males are totally illiterate, 35 of them from Tamil Nadu and 16 from Assam.

Personal Habits

There are 23 smokers, of whom six have been smoking for less than five years, while six others have been smoking for more than 15 years. The maximum number of years of smoking was found to be 24, and 11 workers have been smoking for 5 to 15 years. Twenty-one workers have a smoker at home, and six workers stay in the company of smokers most of the time.

Twenty-eight workers consume alcohol, of whom 12 are regular drinkers (>3 times a week) and 16 are occasional drinkers. Nine workers have been drinking for less than five years, while four have been drinking for more than 15 years. The maximum number of years of drinking was 25.

Fifty-one workers are consuming smokeless tobacco products. Thirty-eight workers from Assam are consuming betel nut (known as 'tamul' in local language). Twenty-five workers consume *tamul* alone, while 12 consume it along with *khaini*. One worker consumes *khaini* alone. In Tamil Nadu, 13 workers consume tobacco products – one consumes *gutka*, two chomp *paan* with betel nuts, and 10 chew tobacco.

Job Profile

The data shows that there are 109 (92.4) unskilled and semiskilled workers who usually learn the basic practical skills of plucking/pruning or pesticide spraying at work, and nine (7.6) are skilled workers who have undergone training to perform their job. The skilled workers have imbibed their skills either at United Planters' Association of South India (UPASI), or through formal agricultural courses offered by universities or trainings from other agencies.

Enquiry about the tenure of work in tea gardens revealed that out of 116 workers, 76 have been working for more than 10 years in tea gardens, 22 for 6-10 years, and 17 for 1-5 years. Only one worker has been employed for less than a year. About 71 per cent of the females (51 out of 72) have been working for more than 10 years, while only 57 per cent males have been working for the same duration. In the final count, 59 (76 per cent) out of 78 workers in Tamil Nadu have been working for more than 10 years, whereas only 17 (45 per cent) out of 38 fall in this category in Assam.

The overall working life (N = 106) of one worker sums up to 60 years, and for another it is more than 45 years. Three workers have been working for 36 to 45 years. Six workers have been working for 31-35 years. Rest 92 workers have worked less than 30 years. In this group, 12 workers have been working for less than five years, 20 workers for 6-10 years, 15 for 11-15 years, 18 for 16-20 years, 11 for 21-25 years, and the rest 16 for 26-30 years. Out of 14 workers who have been working for more than 31 years, 10 belong to Tamil Nadu and four to Assam. Out of these 14, five are females and nine are males.

A total of 98 (83 per cent) respondents reported working for approximately eight hours a day, and the rest 20 (17 per cent) of them work for more than eight hours in a day. This ratio holds well for male and female workers equally, i.e., 83 per cent of male and 83 per cent of female workers work for eight hours a day. However, the percentage of workers working for more than eight hours is more in Tamil Nadu (19 per cent) as compared to Assam (13 per cent).

Out of 116 workers, 115 reported taking breaks during work. The duration of rest ranges from 10 minutes (one worker) and 30 minutes (20 workers), to 60 minutes (92 workers) and 90 minutes (2 workers). The distribution pattern of rest is almost same in both the states and

among male and female workers. The majority of workers (44 out of 115) take this break after working for three hours, 35 after four hours, and 15 after five hours. This variation is according to local practices and weather conditions.

Forty per cent (29 out of 72) female workers and nearly 35 per cent (15 out of 43) male workers go for break after three hours of work. About 32 per cent (23 out of 72) female workers and 30 per cent (12 out of 43) male workers take rest after four hours of work. In Assam, 68 per cent (25 out of 37) workers take a break after four hours of work and 22 per cent (8 out of 37) after three hours of work. In Tamil Nadu, 46 per cent (36/78), 13 per cent (10/78), and 17 per cent (13/78) go for rest breaks after three, four and five hours, respectively. The hilly terrain in Tamil Nadu may be the reason for early rest breaks in the tea gardens there.

Most of the workers live close to their workplace. A total of 47 (39.8 per cent) workers travel less than a kilometre to their workplace, and for 62 (52.5 per cent) workers this distance varies from one kilometre to five kilometres. Three workers (2.5 per cent) travel a distance of 6-10 kilometres, 11-20 kilometres, and more than 20 kilometres, respectively. Sixty-one per cent of male workers and 26 per cent female workers stay within a kilometre of their workplace. Sixty-eight per cent female workers and 28 per cent male workers have their workplace within a radius of 1-5 kilometres.

In Assam, 80 per cent workers reside within a kilometre of the workplace, and 15 per cent between one kilometre and five kilometres from the workplace. In Tamil Nadu, 20 per cent reside within a kilometre of the workplace, and 71 per cent between one kilometre and five kilometres from the workplace. All the workers staying within five kilometres of the workplace walk down to their respective places of work. Two workers (both male workers in Assam) use bicycle, five (all in Tamil Nadu, two male workers and three female) use bus, and one female worker in Tamil Nadu prefers mixed transport to go to the workplace.

Exposure Awareness

Awareness levels among small tea garden workers about the health effects of working in tea gardens are very low. About 72 per cent (85 out of 118) workers are not aware of any adverse health effects of their work. This is because they cannot relate their health problems to their work, and usually consider these problems to be a part and parcel of their life. Only 33 (28 per cent) workers are aware that their health is negatively impacted due to the work they are doing. Out of these 33 workers, 21 (63.6 per cent) are males and 12 (36.4 per cent) are females. Otherwise, 54.3 per cent (25 out of 46) male workers and 83.3 per cent (60 out of 72) female workers are not aware of any of the health impact of their work. This is statistically significant, with a corrected two-tailed p value of 0.0013. The state-wise analysis of awareness is also statistically significant with a corrected two-tailed p value of 0.000005. Out of 33

workers who recognise the health impacts, 22 (66.7 per cent) belong to Assam and 11 (33.3 per cent) to Tamil Nadu.

Their awareness level was again verified by asking them to describe the elements that have a harmful effect on their health. Only 28 out of the 33 workers were able to list these elements; 17 could decipher only one harmful element, and only one worker could enlist nine harmful elements present at his workplace. Further, out of these 28 workers, only 22 could tell the possible mechanism by which these elements have adverse effects on their bodies. More of the male workers (15 out of these 22) from Assam (total of 17 workers out of 22) have an idea as to how these hazards affect their health. Most of the workers have developed this awareness through self-assessment. Only one person admitted to having received this information from an external agency.

It was found that only 14 workers were using protective aprons while working. None of them were using eye protection, skin protection, or respiratory protective devices. As to the reason for not using personal protective devices, out of 59 respondents, 26 alleged that these were not available, 18 said that they were not aware of such devices, and the others either did not think that these were necessary, or were not using these because they were not habituated to the same. One worker brought up the issue of cost in procuring such devices.

The exposure to harmful chemicals is further aggravated by eating at the workplace. About 89 (78 per cent) out of 114 respondents carry their food with them to the workplace. The rest 25 (22 per cent) workers either live very close to, or inside, the garden.

None of the workers has received any training on how to work safely or how to provide first aid in emergency situations.

Table 3: Percentage of manpower using pesticide and fertiliser according to state and gender

	State		Gender	
	Assam	**Tamil Nadu**	**Male**	**Female**
Pesticide sprayers 42 (35.6)	23 (58.9)	19 (24.0)	39 (84.8)	3 (4.2)
Fertiliser spreaders 56 (47.4)	21 (53.8)	35 (44.3)	26 (56.5)	30 (41.6)

(Figures in parentheses indicate percentage)

The above table shows that out of 118 surveyed workers, 42 (35.6 per cent) spray pesticides and 56 (47.4 per cent) are engaged in spreading of fertiliser in the fields. State-wise distribution indicates that out of 39 workers in Assam, 23 (58.9 per cent) spray pesticide, while 21 (53.8 per cent) are engaged in spreading of fertilisers in the fields. In Tamil Nadu, out of 79 workers, 19 (24.0 per cent) workers are engaged in spraying pesticide, while 35 (44.3 per cent)

are engaged in spreading of fertilisers. Thus, the percentage of workers engaged in both these activities is less in Tamil Nadu as compared to Assam, which in a way indicates lesser use of pesticides and fertilisers in the southern state.

Male workers outdo female workers in pesticide spraying. The table shows that out of 46 male workers, 39 (84.8 per cent) spray pesticides and 26 (56.5 per cent) help with spreading fertilisers in the gardens. Of the total of 72 female workers, only three (4.2 per cent) spray pesticides, while 30 (41.6 per cent) help in fertiliser-related work. Thus, very few female workers undertake the more hazardous job of pesticide spraying as compared to male workers.

Table 4: Main symptoms reported on exposure to pesticide spray

N = 86

Organ system	Symptom	Reported by
Eye	Irritation	25 (29.0)
	Pain	25 (29.0)
	Burning	37 (43.0)
	Watering	32 (37.2)
Head	Ache	46 (53.5)
	Dizziness	30 (34.9)
	Sweating	26 (30.2)
	Excessive fatigue	40 (46.5)
Gastrointestinal	Salivation	6 (7.0)
	Cramps	12 (13.9)
	Nausea	15 (17.4)
	Vomiting	8 (9.3)
	Diarrhoea	2 (2.3)
Sleep	Decreased	8 (9.3)
	Increased	11 (12.8)
	Disturbed	13 (15.1)
Neurological	Tremors	10 (11.6)
Respiratory	Irritation	22 (25.6)
	Cough	28 (32.5)
	Cough with sputum	7 (8.1)
	Blood in sputum	2 (2.3)
	Wheezing	5 (5.8)
	Breathlessness	14 (16.3)
Skin	Irritation	29 (33.7)
	Redness	22 (25.5)
	Burning	37 (43.0)
	Rash	5 (5.8)

(Figures in parentheses indicate percentage)

Workers were asked to recall the symptoms observed/felt by them either while spraying pesticides/fertilisers or while being present in the vicinity of spray; and 86 out of the total workers reported having a few or many symptoms when exposed to pesticides. Out of these 86 workers, only 42 were actively involved in pesticide spray and 56 were spreading the fertilisers. This indicates that around 30 workers who are not actively associated with spraying activity also experienced these symptoms. This was due to the simultaneous activities of plucking/pruning and pesticide usage in the same garden or in the nearby garden. Small garden size, wind direction, humidity and rainfall influence the occurrence of these symptoms. The percentage of workers showing symptoms on various organs is shown in Table 4. Some symptoms that have a relatively higher percentage of occurrence on the day when pesticide is used are: burning of eyes (43 per cent), headache (53.5 per cent), excessive fatigue (46.5 per cent) and burning of skin (43 per cent). However, it cannot be ascertained whether this is due to direct contact or indirect contact with the pesticides, as the symptoms were reported both by sprayers and other workers. Also, the severity of these symptoms could not be ascertained due to variable perceptions of the individuals concerned. No scientific scale/parameter was

used to measure the severity of the symptoms. The intention was to bring forth the experiences rather than the statistical significant evaluation of the exposure-and-outcome relationship. Moreover, to reach a statistical significant correlation, the exact exposure parameters (dose, duration, type and frequency of exposure to pesticides) are required, which were difficult to comprehend due to wide variation in all the parameters among the users and the estates.

The tables in annexure show the occurrence of symptoms in workers by age group, gender and state. Here, all the reported symptoms are noted along with the frequency distribution in relation to the above parameters.

Photo 1: Pesticide sprayer can be seen without any protective appliances

Table 5: Musculoskeletal symptoms reported according to organ involved

N = 116[Y]

Musculoskeletal symptoms/organ involved	Discomfort	Pain	Stiffness	Swelling	Movement limitation	Tingling	Numbness
Neck	18 (15.5)	83 (71.5)	39 (33.6)	1 (0.9)	17 (14.6)	*	*
Shoulder	12 (10.3)	79 (68.1)	16 (13.8)	0 (0.0)	3 (2.6)	*	*
Arm	11 (9.5)	64 (55.2)	2 (1.7)	3 (2.6)	2 (1.7)	4 (3.4)	2 (1.7)
Elbow	0 (0.0)	41 (35.3)	0 (0.0)	0 (0.0)	0 (0.0)	*	*
Wrist	3 (2.6)	52 (44.8)	3 (2.6)	0 (0.0)	1 (0.9)	*	*
Fingers	19 (16.4)	61 (52.6)	9 (7.8)	6 (5.2)	9 (7.8)	7 (6.0)	14 (12.1)
Chest	7 (6.0)	45 (38.9)	1 (0.9)	0 (0.0)	0 (0.0)	*	*
Back	18 (15.5)	97 (83.6)	62 (53.4)	0 (0.0)	12 (10.3)	*	*
Legs	13 (11.2)	67 (57.7)	6 (5.2)	1 (0.9)	2 (1.7)	12 (10.3)	3 (2.6)
Ankle	1 (0.9)	40 (34.5)	1 (0.9)	1 (0.9)	1 (0.9)	*	*

(Figures in parentheses indicate percentage)

[Y] *Two respondents were owners of small tea gardens and not actively involved in field activities except for supervisory responsibilities, so they did not participate in these specific questions related to exposure and outcome.*

**The symptoms were not asked for these organs.*

Other symptoms reported during plucking of leaves for long hours were dizziness (26.7 per cent), eye tiredness (13.8 per cent), eye pain (12.1 per cent), and blurred vision (10.3 per cent).

All the workers were expected to endure some repetitive traumas due to the mechanical nature of work. The organs affected might vary according to the nature of work, the duration of work, and the physical conditions of work. Again, the emphasis was to ascertain the percentage of workers experiencing these various symptoms, rather than judge them on the scale of severity. All the major musculoskeletal symptoms were interrogated and their occurrence was recorded as acute or chronic. However, for the convenience of presentation, both the data were clubbed together and Table 5 shows the aggregate percentage.

As the table indicates, back muscles and bones have to endure most of the insult of a continuously stooping posture. With 83.6 per cent workers calling it a day with back pain most of the times, about 53.4 per cent wake up with stiffness of the lower back the next morning.

The duration of suffering from pain and stiffness varies and is mainly intermittent. In terms of occurrence, back pain is followed by neck pain (71.5 per cent), shoulder pain (68.1 per cent), leg pain (67.7 per cent), arm pain (55.2 per cent) and finger pain (52.6 per cent). Many a times, these pains are accompanied by stiffness and movement limitation of the organ involved.

The neck has high percentage of both stiffness (33.6 per cent) and movement limitation (14.6 per cent). Arms, fingers and legs were also interrogated for neurological symptoms of feeling tingling and numbness. Tingling is more in legs (10.2 per cent), while fingers have more numbness (12.1 per cent).

Photo 2: Permanent movement limitation of left-hand fingers of a plucker

Photo 3: Permanent movement limitation of fingers of both hands of a plucker

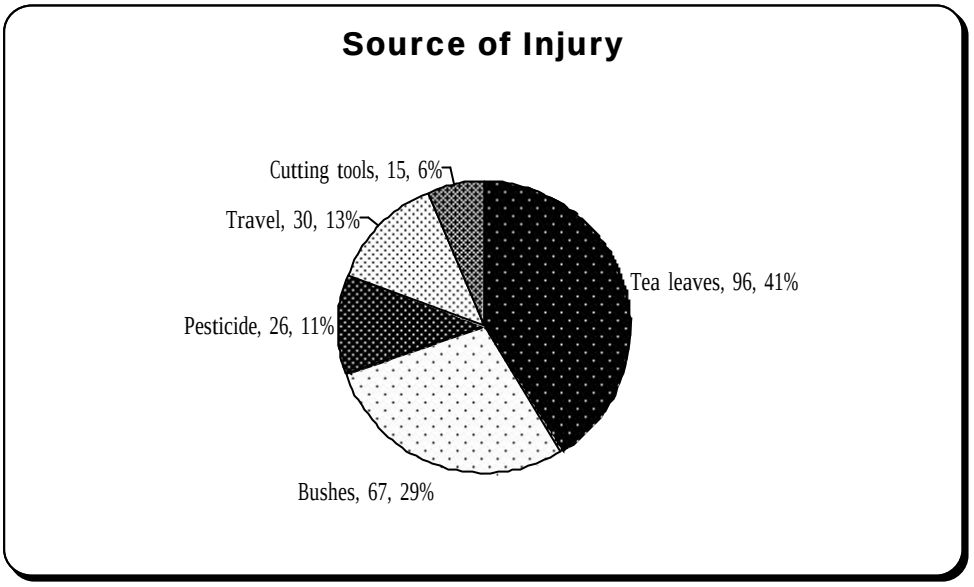
Photo 4: Straining the neck, back, arms and shoulders, and legs while carrying a load of 20-25 kilograms for a distance of four kilometres in hills

Photo 5: Straining the neck, back, arms and shoulders, and legs during pruning

Photo 6: Straining the neck, back, arms and shoulders, and legs during plucking

Injuries Data:

Chart 2: Sources of body injury during work in tea gardens



Out of 117 workers who responded to the query about injuries at workplace, 111 (95 per cent) replied in the positive. The main source of injury was tea leaves (96 workers, 41 per cent). The other sources of bodily injury recognised were bushes (29 per cent), travelling/walking on uneven gardens (13 per cent), pesticides (11 per cent), and cutting tools (6 per cent).

Chart 3 is representative of the organs that bear the brunt of the injuries. Fingers (39 per cent) receive maximum injuries, followed by legs (26 per cent) and feet (13 per cent). Back (7 per cent), eyes (5 per cent), face (5 per cent), arms (4 per cent), and trunk (abdomen and chest; 1 per cent) are other organs that are affected in the course of activities in the field. Although the percentage of eye injury is less, the repercussion may be serious as even a minor or superficial injury here can lead to permanent disability with loss of partial or complete vision. Sharp and penetrating injuries through bushes and cutting tools are potentially dangerous for eyes.

Chart 3: Organs involved in injury

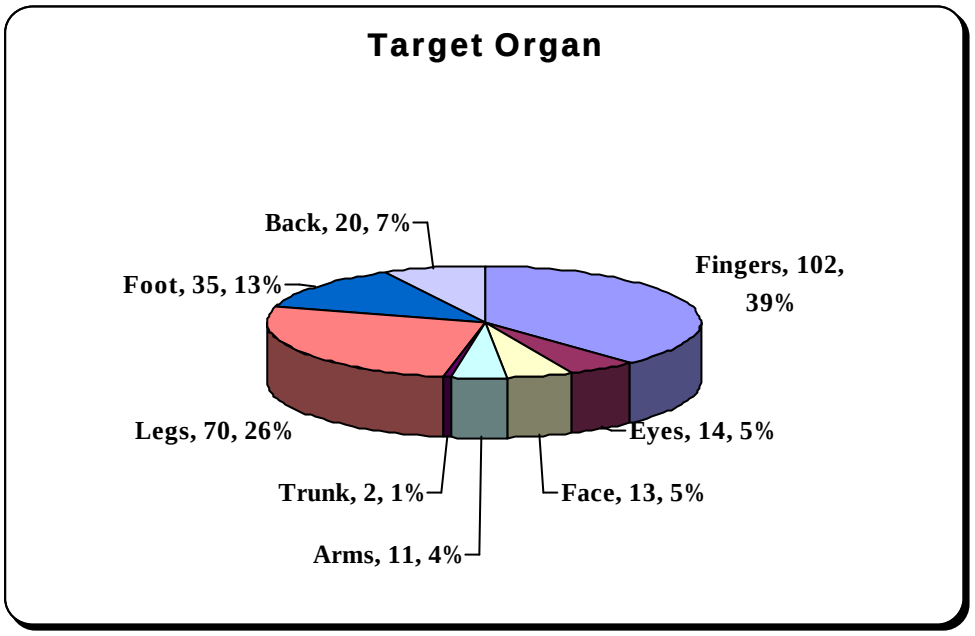


Photo 7: Tender Injuries

Chart 4: Various field activities causing injuries

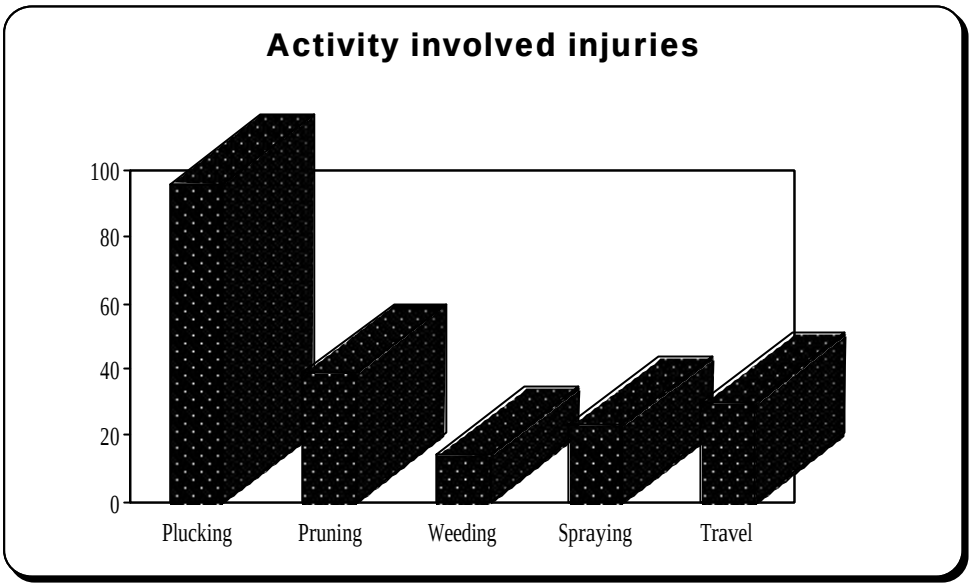


Chart 4 represents the percentage of various activities in tea gardens which are potential sources of injuries. Plucking (48 per cent) is reported as the main activity, followed by pruning (20 per cent), walking on uneven surfaces causing slips, sprains and falls (15 per cent), pesticide spraying (12 per cent), and cleaning of fields or weeding (7 per cent).

Chart 5: Extent of injuries

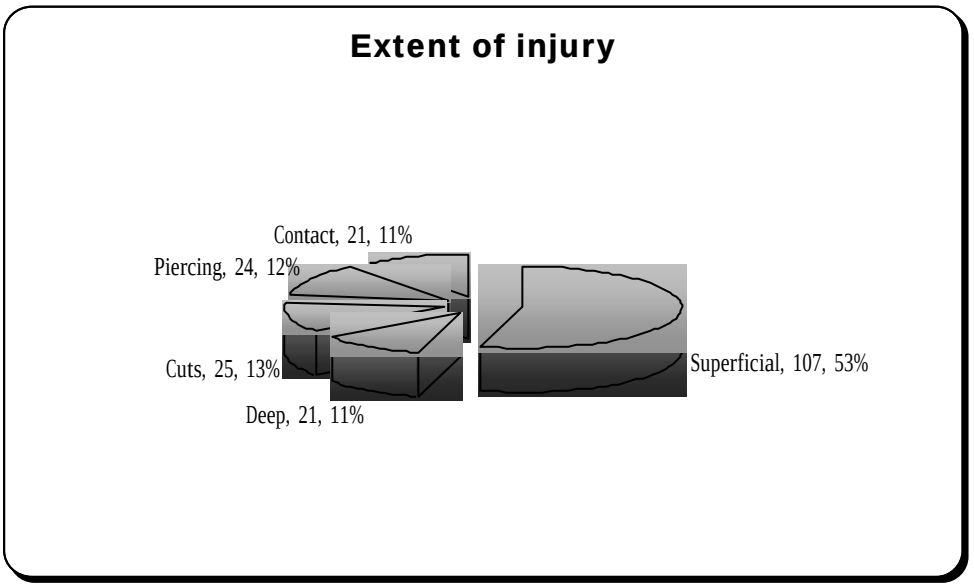
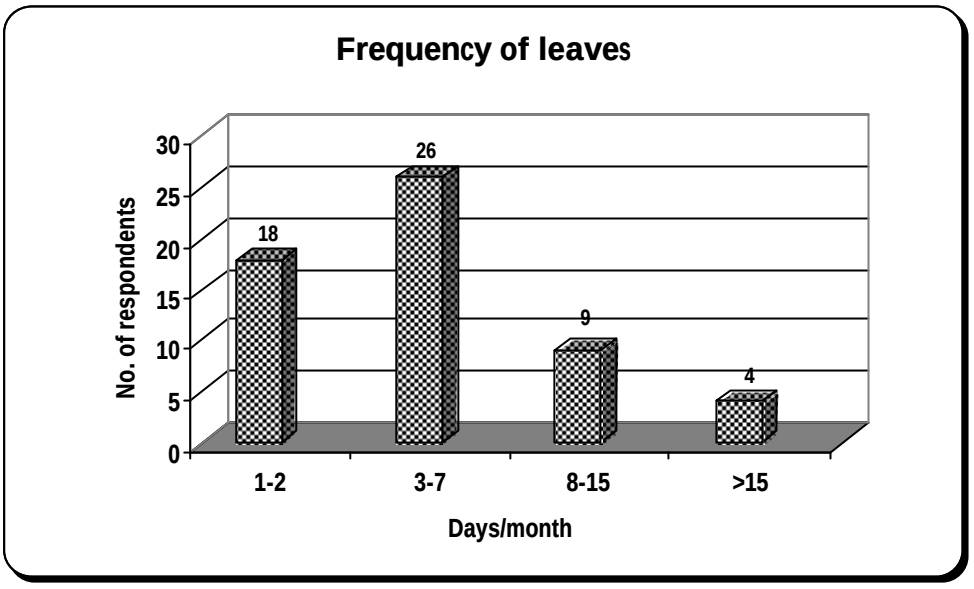


Chart 5 describes the extent of injuries on the body. Although the percentage of deep injuries (11 per cent), piercing injuries (12 per cent) and cuts (13 per cent) is very less compared to the rate of superficial injuries (53 per cent), they are nevertheless leading to the most severe form of permanent impairments. Fourteen workers reported a permanent disability due to these injuries.

Photo 8: Permanent impairment of left foot after a piercing injury by a bush

Photo 9: Permanent contracture of left-hand fingers after a deep-cut injury of wrist during pruning

Chart 6: Frequency distribution of leaves taken by workers due to ill health



The above chart represents the frequency distribution of leaves taken by workers due to ill health. Fifty-eight (50 per cent) workers take leaves from work due to ill health. Twenty-six (47 per cent) out of these 58 workers remain off work for 3-7 days in a month, while nine (15.5 per cent) take 8-15 days' leave. Four (7 per cent) workers remain absent for more than 15 days a month due to major slips or injuries. One female worker in Nilgiris was off work for more than one-and-a-half year due to back injury after falling in the garden. The high rate of sickness absenteeism along with the seasonal and contractual nature of work has severely jeopardised the earnings of workers. Whatever they earn is being spent on medications and treatment by doctors, as they are not provided with effective governmental healthcare services.

Table 6: Body mass index distribution by gender and state

N = 118

BMI classification	Gender		State		Total
	Male	Female	Assam	Tamil Nadu	
Underweight = < 18.5	4 (8.7)	10 (13.9)	7 (17.9)	7 (8.9)	14 (11.9)
Normal = 18.5 – 24.9	34 (73.9)	47 (65.3)	28 (71.8)	53 (67.1)	81 (68.9)
Overweight = 25 – 29.9	8 (17.4)	9 (12.5)	3 (7.7)	14 (17.7)	17 (14.4)
Obese = 30 or more	0 (0.0)	6 (8.3)	1 (2.6)	5 (6.3)	6 (5.1)
Total	42	72	39	79	118

(Figures in parentheses indicate percentage)

Ref.: BMI Classification: National Heart Lung and Blood Institute

Each worker underwent measurement for weight and height, and body mass index was calculated using the formula and classification of National Heart Lung and Blood Institute (NHLBI). Table 6 shows that there are 14 (11.9 per cent) underweight workers, 17 (14.4 per cent) overweight workers, and six (5.1 per cent) obese workers. All the obese workers are female, and 84 per cent are from Tamil Nadu. More female workers are underweight as compared to male workers; however, the underweight workers are in equal numbers (seven each) in the two states under study.

Table 7: Blood pressure recordings of workers at the site of work

N = 118

BP classification	Systolic BP	Diastolic BP	Frequency
Normal	< 120	And < 80	16 (13.5)
Pre-hypertension	120-139	Or 80-89	40 (33.8)
Stage I hypertension	140-159	Or 90-99	41 (34.7)
Stage II hypertension	> 160	Or > 100	21 (17.7)

(Figures in parentheses indicate percentage)

Ref.: National Heart Lung and Blood Institute, JNC – 7, the seventh report of the Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure

Although only 13 workers claimed to have been diagnosed with high blood pressure in the past, Table 7 indicates a very high percentage of workers with high blood pressure reading. These were the spot readings at the worksite, and need to be reconfirmed by repeated readings. But this is very clear from the table that only 16 (13.5 per cent) workers have normal spot blood pressure readings.

Five workers were known cases of diabetes, six of asthma, three of tuberculosis, one of ischemic heart disease, and eight of skin diseases. Family history reveals that there were five cases of cancer, 17 of diabetes, 22 of high blood pressure, 11 of ischemic heart diseases, and 10 of asthma in the parents and siblings of these workers.

NATIONAL LEGISLATIONS

The Constitutional Aspects of Employees' Right to Health

Article 21 of the Indian Constitution guarantees the protection of life and personal liberty of a person. Various Supreme Court judgements have, under the 'right to life', upheld the right to employees' health. For instance, in the case of Consumer Education Research Center Vs. Union Of India, the Supreme Court has held that, "occupational accidents and diseases remain the most appalling human tragedy of modern industry and one of its most serious forms of economic waste." Further, the judgement says, "Therefore, we hold that right to health, medical aid to protect the health and vigour to a worker while in service or post retirement is a fundamental right under Article 21, read with Articles 39(e), 41, 43, 48A and all related articles and fundamental human rights to make the life of the workman meaningful and purposeful with dignity of person[15]."

The Insecticide Act, 1968

The Insecticide Act, promulgated in 1968 and enforced on August 1, 1971, envisions the regulating of import, manufacture, sale, transport, distribution and use of insecticides, with a view to prevent risk to human beings and animals, and for the matters connected therewith. Prior to this, insecticides used in public health programmes were covered under the Drugs and Cosmetic Act, 1940[16]. The act has the following provisions related to health and safety[17]:

- No person can sell, stock or exhibit for sale, distribute any insecticide, which is not registered under this act or the use of which is prohibited under this act.
- Every person who is in-charge of any premises where any insecticide is being manufactured or is kept for sale or distribution shall be legally bound to disclose to the insecticide inspector the place where the insecticide is being manufactured or is kept.
- Pre- and post-employment medical examination of workers engaged in pesticide handling should be done by a qualified doctor, and a register shall be maintained.
- Protective clothing, namely, protective outer garment/overalls/hood/hat, protective gloves extending halfway up to the forearm, dust-proof goggles and boots in conjunction with respiratory device like different types of respirators to prevent inhalation of toxic dusts and vapours of gases should be provided to the pesticide handlers.

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[15]Sriraman, S. *Occupational health laws in India – How operational are they?* http://www.legalserviceindia.com/articles/occ.htm

[16]*Pesticide pollution: Trends and perspective*. ICMR Bulletin, vol. 31 (9): 2001

[17]The Insecticide Act, 1971, Govt of India. India

- First-aid treatment in case of poisoning, before physician is called.

Plantation Labour Act, 1951

Among the legislations affecting plantation labourers, the most important is the Plantation Labour Act, 1951. This act contains several provisions related to the health and hygiene of plantation workers. It makes mandatory for employers to provide the field workers with protective clothing, which includes umbrellas, canvas sheets that are wrapped around the waist to prevent damage of clothing, jute sacks or cane baskets to collect the leaves, and warm clothes during winter. The act has a great deal of potential for improving the working and living conditions of plantation labourers[18, 19].

The Factories Act, 1948

The Factories Act, 1948, is the principal occupational health and safety legislation in India. It makes provisions for safety, health and welfare of workers in factories. This act applies to any factory having ten or more than ten workers. The section on health deals with cleanliness of the workplace, waste management, adequate ventilation, temperatures, overcrowding, lighting, and sanitary conveniences. The safety section deals with securely guarding all parts of dangerous machinery; precautions for working on machinery; emergency devices for cutting off power; maintaining hoists and lifts; maintaining lifting machines, chains, ropes, and other lifting tackle in good condition; testing pressurised vessels regularly; sound construction of walking surfaces; providing of protective equipment; measures to remove gas and dust before entering confined places; and measures to prevent fires. The act also requires that the factory occupier must disclose to the workers, the chief factory inspector, and the local authority information about dangers, health hazards, measures to protect workers from substances or materials in manufacture, transportation and storage, safety and policy, quantity and characteristics and disposal of substances and waste, and transportation, storage and disposal of hazardous substances. The Factories Act also binds the employer to maintain up-to-date health records of workers, and to appoint a person experienced in handling hazardous substances to supervise handling, and provide protective measures and regular medical examinations[20].

National Policy on Safety, Health and Environment at Workplace

'The fundamental purpose of this National Policy on Safety, Health, and Environment at Workplace is not only to eliminate the incidence of work-related injuries, diseases, fatalities, disaster and loss of national assets and ensuring achievement of a high level of occupational

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[18]'Productivity and labour standards in tea plantation sector in India'. In labour and social issues in plantation in South Asia.

[19]Plantation Labour Act, 1951, Govt of India. India

[20]The Factories Act, 1948, Govt of India. India

safety, health and environment performance, but also to enhance the well-being of the employee and society, at large.'[21]

[21]National Policy on Safety, Health and Environment at Workplace, Govt of India. India

ANNEXURES

ANNEXURE I

Table: Pesticide exposure and symptoms reported according to age group, gender and state

N = 86

Organ system	Symptom	Frequency	Age group							Gender		State	
		(N = 86)	<20	21-30	31-40	41-50	51-60	61-70	71-80	Male	Female	Assam	Tamil Nadu
Eye	Irritation	**25 (29.0)**	1 (4)	3 (12)	9 (36)	7 (28)	3 (12)	1 (4)	1 (4)	15 (60)	10 (40)	8 (32)	17 (68)
	Pain	**25 (29.0)**	1 (4)	4 (16)	7 (28)	10 (40)	2 (8)	1 (4)	(0.0)	12 (48)	13 (52)	12 (48)	13 (52)
	Burning	**37 (43.0)**	2 (5.4)	7 (18.9)	13 (35.1)	10 (27.0)	4 (10.8)	1 (2.7)	0 (0.0)	23 (62.2)	14 (37.8)	21 (56.7)	16 (43.2)
	Watering	**32 (37.2)**	2 (6.2)	2 (6.2)	12 (37.5)	9 (28.1)	5 (15.6)	1 (3.1)	1 (3.1)	14 (43.7)	18 (56.2)	12 (37.5)	20 (62.5)
	Blurred vision	**19 (22.0)**	1 (5.3)	5 (26.3)	6 (31.6)	5 (26.3)	1 (5.3)	1 (5.3)	0 (0.0)	13 (68.4)	6 (31.6)	16 (84.2)	3 (15.8)
	Permanent disability	**2 (2.3)**	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	1 (50.0)	1 (50.0)
Head	Ache	**46 (53.5)**	2 (4.3)	10 (21.7)	12 (26)	13 (28.3)	6 (13)	2 (4.3)	1 (2.2)	24 (52.2)	22 (47.8)	21 (45.6)	25 (54.3)
	Dizziness	**30 (34.9)**	0 (0.0)	8 (26.7)	9 (30)	8 (26.7)	4 (13.1)	0 (0.0)	1 (3.3)	16 (53.3)	14 (46.7)	16 (53.3)	14 (46.7)
	Sweating	**26 (30.2)**	2 (7.7)	5 (19.2)	8 (30.8)	8 (30.8)	2 (7.7)	1 (3.8)	0 (0.0)	16 (61.5)	10 (38.5)	11 (42.3)	15 (57.7)
	Fatigue	**40 (46.5)**	2 (5.0)	6 (15.0)	12 (30.0)	12 (30.0)	5 (12.5)	3 (7.5)	0 (0.0)	22 (55)	18 (45)	13 (32.5)	27 (67.5)
Gi System	Salivation	**6 (7.0)**	0 (0.0)	3 (50.0)	1 (16.7)	1 (16.7)	1 (16.7)	0 (0.0)	0 (0.0)	3 (50.0)	3 (50.0)	5 (83.3)	1 (16.7)
	Cramps	**12 (13.9)**	1 (8.3)	2 (16.7)	4 (33.3)	5 (41.7)	0 (0.0)	0 (0.0)	0 (0.0)	5 (41.7)	7 (58.3)	7 (58.3)	5 (41.7)
	Nausea	**15 (17.4)**	0 (0.0)	3 (20.0)	4 (26.7)	6 (40.0)	0 (0.0)	2 (13.3)	0 (0.0)	7 (46.7)	8 (53.3)	7 (46.7)	8 (53.3)
	Vomiting	**8 (9.3)**	0 (0.0)	0 (0.0)	3 (37.5)	4 (50.0)	0 (0.0)	1 (12.5)	0 (0.0)	3 (37.5)	5 (62.5)	3 (37.5)	5 (62.5)
	Diarrhoea	**2 (2.3)**	0 (0.0)	2 (2.3)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	2 (2.3)	0 (0.0)
Sleep	Decreased	**8 (9.3)**	1 (12.5)	1 (12.5)	3 (37.5)	2 (25.0)	1 (12.5)	0 (0.0)	0 (0.0)	6 (75.0)	2 (25.0)	5 (62.5)	3 (37.5)

	Increased	**11 (12.8)**	2 (18.2)	4 (36.4)	1 (9.1)	2 (18.2)	1 (9.1)	1 (9.1)	0	5 (45.5)	6 (54.5)	9 (81.9)	2 (18.2)
	Disturbed	**13 (15.1)**	0 (0.0)	0 (0.0)	6 (46.1)	3 (23.1)	1 (7.7)	2 (15.4)	1 (7.7)	8 (61.5)	5 (38.5)	3 (23.1)	10 (76.9)
	Feel sleepy	**1 (1.2)**	0 (0.0)	1 (1.2)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.2)	0 (0.0)	1 (1.2)	0 (0.0)
	Daytime sleepiness	**2 (2.3)**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	2 (100.0)	0 (0.0)
Neurological	Tremors	**10 (11.6)**	0 (0.0)	1 (10.0)	7 (70)	1 (10.0)	0 (0.0)	0 (0.0)	1 (10.0)	7 (70.0)	3 (30.0)	1 (10.0)	9 (9.0)
	Twitching	**2 (2.3)**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	2 (100.0)	0 (0.0)
	Epilepsy	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Respiratory	Irritation	**22 (25.6)**	1 (4.5)	5 (22.7)	7 (31.8)	5 (22.7)	2 (9.1)	1 (4.5)	1 (4.5)	14 (63.6)	8 (36.4)	6 (27.3)	16 (72.7)
	Cough	**28 (32.5)**	1 (3.6)	5 (17.8)	9 (32.1)	9 (32.1)	3 (10.7)	1 (3.6)	0 (0.0)	17 (77.3)	11 (39.3)	11 (39.3)	17 (77.3)
	Cough with sputum	**7 (8.1)**	1 (14.3)	2 (28.6)	2 (28.6)	1 (14.3)	1 (14.3)	0 (0.0)	0 (0.0)	4 (57.1)	3 (42.9)	5 (71.4)	2 (28.6)
	Blood in sputum	**2 (2.3)**	1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	0 (0.0)
	Wheezing	**5 (5.8)**	3 (60)	1 (20)	0 (0.0)	1 (20)	0 (0.0)	0 (0.0)	0 (0.0)	4 (80)	1 (20)	3 (60)	2 (40)
	Breathlessness	**14 (16.3)**	1 (7.1)	2 (14.3)	5 (35.7)	4 (28.6)	1 (7.1)	1 (7.1)	0 (0.0)	8 (57.1)	6 (42.9)	5 (35.7)	9 (64.3)
Skin	Irritation	**29 (33.7)**	2 (6.9)	5 (17.2)	8 (27.6)	9 (31.0)	4 (13.8)	1 (3.4)	0 (0.0)	14 (48.3)	15 (51.7)	18 (62.1)	11 (37.9)
	Redness	**22 (25.5)**	2 (9.1)	7 (31.8)	7 (31.8)	4 (18.2)	1 (4.5)	1 (4.5)	0 (0.0)	10 (45.5)	12 (54.5)	19 (86.4)	3 (13.6)
	Burning	**37 (43.0)**	3 (8.1)	10 (27.0)	10 (27.0)	11 (29.7)	2 (5.4)	1 (2.7)	0 (0.0)	22 (59.5)	15 (40.5)	30 (81.1)	7 (18.9)
	Ulcer	**1 (1.2)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	1 (100.0)
	Rash	**5 (5.8)**	1 (20.0)	1 (20.0)	0 (0.0)	1 (20.0)	1 (20.0)	1 (20.0)	0 (0.0)	3 (60.0)	2 (40.0)	3 (60.0)	2 (40.0)

(Figures in parentheses indicate percentage)

ANNEXURE II

Table: Musculoskeletal symptoms reported according to age group, gender and state

N = 116

			Age group							Gender		State	
		Yes	<20	21-30	31-40	41-50	51-60	61-70	71-80	Male	Female	Assam	Tamil Nadu
	Dizziness	**38 (32.8)**	0 (0.0)	11 (28.9)	12 (31.6)	9 (23.7)	3 (7.9)	2 (5.3)	1 (2.6)	8 (21.1)	30 (78.9)	8 (21.1)	30 (78.9)
Eye	Tiredness	**19 (16.4)**	1 (5.3)	5 (26.3)	9 (47.4)	2 (10.5)	1 (5.3)	1 (5.3)	0 (0.0)	6 (31.6)	13 (68.4)	6 (31.6)	13 (68.4)
	Pain	**15 (12.9)**	0 (0.0)	3 (20.0)	6 (40.0)	5 (33.3)	0 (0.0)	1 (6.7)	0 (0.0)	4 (26.7)	11 (73.3)	2 (13.3)	13 (86.7)
	Blurred vision	**19 (16.4)**	1 (5.3)	5 (26.3)	10 (52.6)	2 (10.5)	0 (0.0)	1 (5.3)	0 (0.0)	4 (21.1)	15 (78.9)	8 (42.1)	11 (57.9)
Neck	Discomfort	**18 (15.5)**	0 (0.0)	10 (55.6)	4 (22.2)	3 (16.7)	1 (5.6)	0 (0.0)	0 (0.0)	10 (55.6)	8 (44.4)	17 (94.4)	1 (5.6)
	Pain	**83 (71.6)**	2 (2.4)	19 (22.9)	26 (31.3)	27 (32.5)	6 (7.2)	3 (3.6)	0 (0.0)	32 (38.6)	51 (61.4)	27 (32.5)	56 (67.5)
	Stiffness	**39 (33.6)**	2 (5.1)	7 (17.9)	13 (33.3)	13 (33.3)	2 (5.1)	2 (5.1)	0 (0.0)	19 (48.7)	20 (51.3)	14 (35.9)	25 (64.1)
	Swelling	**1 (0.9)**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	0 (0.0)
	Movement limitation	**17 (14.7)**	1 (5.9)	6 (35.3)	6 (35.3)	2 (11.8)	2 (11.8)	0 (0.0)	0 (0.0)	11 (64.7)	6 (35.3)	12 (70.6)	5 (29.4)
Shoulder	Discomfort	**12 (10.3)**	1 (8.3)	6 (50.0)	3 (25.0)	2 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	6 (50.0)	6 (50.0)	11 (91.7)	1 (8.3)
	Pain	**82 (70.7)**	2 (2.4)	14 (17.1)	29 (35.4)	28 (34.1)	6 (7.3)	3 (3.7)	0 (0.0)	28 (34.1)	54 (65.9)	24 (29.3)	58 (70.7)
	Stiffness	**16 (13.8)**	1 (6.3)	3 (18.8)	6 (37.5)	5 (31.3)	1 (6.3)	0 (0.0)	0 (0.0)	8 (50.0)	8 (50.0)	4 (25.0)	12 (75.0)
	Swelling	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Movement limitation	**3 (2.6)**	0 (0.0)	0 (0.0)	2 (66.7)	0 (0.0)	1 (33.3)	0 (0.0)	0 (0.0)	3 (100.0)	0 (0.0)	2 (66.7)	1 (33.3)
Arm	Discomfort	**11 (9.5)**	4 (36.4)	3 (27.3)	4 (36.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	7 (63.6)	4 (36.4)	10 (90.9)	1 (9.1)
	Pain	**64 (55.2)**	2 (3.1)	9 (14.1)	22 (34.4)	25 (39.1)	4 (6.3)	2 (3.1)	0 (0.0)	20 (31.3)	44 (68.8)	15 (23.4)	49 (76.6)
	Stiffness	**2 (1.6)**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	2 (100.0)	0 (0.0)
	Swelling	**3 (2.6)**	0 (0.0)	1 (33.3)	2 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.3)	2 (66.7)	2 (66.7)	1 (33.3)
	Tingling	**4 (3.4)**	0 (0.0)	1 (25.0)	2 (50.0)	0 (0.0)	1 (25.0)	0 (0.0)	0 (0.0)	2 (50.0)	2 (50.0)	2 (50.0)	2 (50.0)
	Numbness	**3 (2.6)**	0 (0.0)	3 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (66.7)	1 (33.3)	3 (100.0)	0 (0.0)
	Movement limitation	**2 (1.7)**	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	1 (50.0)	1 (50.0)

Elbow	Discomfort	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Pain	**41 (35.3)**	0 (0.0)	4 (9.8)	15 (36.6)	17 (41.5)	5 (12.2)	0 (0.0)	0 (0.0)	13 (31.7)	28 (68.3)	7 (17.1)	34 (82.9)
	Stiffness	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Swelling	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Movement limitation	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Chest	Discomfort	**7 (6.0)**	0 (0.0)	5 (83.3)	1 (14.3)	1 (14.3)	0 (0.0)	0 (0.0)	0 (0.0)	6 (35.7)	1 (14.3)	7 (100.0)	0 (0.0)
	Pain	**45 (38.8)**	1 (2.2)	10 (22.2)	15 (33.3)	12 (26.7)	6 (13.3)	1 (2.2)	0 (0.0)	17 (37.8)	28 (62.2)	18 (40.0)	27 (60.0)
	Stiffness	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Swelling	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Movement limitation	**1 (0.9)**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	0 (0.0)
Back	Discomfort	**18 (15.5)**	0 (0.0)	9 (50.0)	4 (22.2)	5 (27.8)	0 (0.0)	0 (0.0)	0 (0.0)	12 (66.7)	6 (33.3)	17 (94.4)	1 (5.6)
	Pain	**97 (83.6)**	3 (3.1)	19 (19.6)	34 (35.1)	32 (33.0)	7 (7.2)	2 (2.1)	0 (0.0)	36 (37.1)	61 (62.9)	30 (30.9)	67 (69.1)
	Stiffness	**62 (53.4)**	1 (1.6)	7 (11.3)	26 (41.9)	20 (32.3)	6 (9.7)	2 (3.2)	0 (0.0)	24 (38.7)	38 (61.3)	13 (21.0)	49 (79.0)
	Swelling	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Movement limitation	**12 (10.3)**	0 (0.0)	4 (33.3)	5 (41.7)	2 (16.7)	1 (8.3)	0 (0.0)	0 (0.0)	9 (75.0)	3 (25.0)	11 (91.7)	1 (8.3)
Wrist	Discomfort	**3 (2.6)**	0 (0.0)	1 (33.3)	1 (33.3)	1 (33.3)	0 (0.0)	0 (0.0)	0 (0.0)	1 (33.1)	2 (66.7)	3 (100.0)	0 (0.0)
	Pain	**52 (44.8)**	1 (1.9)	6 (11.5)	17 (32.7)	22 (42.3)	4 (7.7)	2 (3.8)	0 (0.0)	17 (32.7)	35 (65.4)	10 (19.2)	42 (80.8)
	Stiffness	**3 (2.6)**	0 (0.0)	0 (0.0)	2 (66.7)	0 (0.0)	0 (0.0)	1 (33.1)	0 (0.0)	2 (66.7)	1 (33.1)	0 (0.0)	3 (100.0)
	Swelling	**0 (0.0)**	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Movement limitation	**1 (0.9)**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)	0 (0.0)
Fingers	Discomfort	**19 (16.4)**	1 (5.3)	8 (42.1)	6 (31.6)	3 (15.8)	1 (5.3)	0 (0.0)	0 (0.0)	11 (57.9)	8 (42.11)	18 (94.7)	1 (5.3)
	Pain	**61 (52.6)**	3 (4.9)	13 (21.3)	18 (29.5)	20 (32.8)	5 (8.2)	2 (3.3)	0 (0.0)	20 (32.8)	41 (67.2)	23 (37.7)	38 (62.3)
	Stiffness	**9 (7.8)**	0 (0.0)	0 (0.0)	5 (55.6)	2 (22.2)	1 (11.1)	1 (11.1)	0 (0.0)	4 (44.4)	5 (55.6)	4 (44.4)	5 (55.6)
	Swelling	**6 (5.2)**	1 (16.7)	0 (0.0)	1 (16.7)	2 (33.3)	2 (33.3)	0 (0.0)	0 (0.0)	2 (33.3)	4 (66.7)	3 (50.0)	3 (50.0)
	Tingling	**7 (6.0)**	1 (14.3)	3 (42.9)	2 (28.6)	0 (0.0)	1 (14.3)	0 (0.0)	0 (0.0)	5 (71.4)	2 (28.6)	7 (100.0)	0 (0.0)
	Numbness	**14 (12.1)**	1 (7.1)	5 (35.7)	3 (21.4)	4 (28.6)	1 (7.1)	0 (0.0)	0 (0.0)	8 (57.1)	6 (42.9)	8 (57.1)	6 (42.9)
	Movement limitation	**9 (7.8)**	0 (0.0)	3 (33.3)	2 (22.2)	3 (33.3)	1 (11.1)	0 (0.0)	0 (0.0)	3 (33.3)	6 (66.7)	6 (66.7)	3 (33.3)

Legs	Discomfort	**13 (11.2)**	0 (0.0)	5 (38.5)	4 (30.8)	3 (23.1)	0 (0.0)	1 (7.7)	0 (0.0)	6 (46.2)	7 (53.8)	11 (84.6)	2 (15.4)
	Pain	**67 (57.8)**	1 (1.5)	11 (16.4)	23 (34.3)	23 (34.3)	7 (10.4)	1 (1.5)	1 (1.5)	19 (28.4)	48 (71.6)	12 (17.9)	55 (82.1)
	Stiffness	**6 (5.2)**	0 (0.0)	2 (33.3)	0 (0.0)	3 (50.0)	1 (16.7)	0 (0.0)	0 (0.0)	0 (0.0)	6 (100.0)	2 (33.3)	4 (66.7)
	Swelling	**1 (0.9)**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)
	Tingling	**12 (10.3)**	0 (0.0)	4 (33.3)	4 (33.3)	3 (25.0)	1 (8.3)	0 (0.0)	0 (0.0)	2 (16.7)	10 (83.37)	8 (66.7)	4 (33.3)
	Numbness	**3 (2.6)**	0 (0.0)	1 (33.3)	0 (0.0)	2 (66.7)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	3 (100.0)	2 (66.7)	1 (33.3)
	Movement limitation	**2 (1.7)**	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	1 (50.0)	1 (50.0)
Ankle	Discomfort	**1 (0.9)**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)
	Pain	**40 (34.5)**	1 (2.5)	4 (10.0)	13 (32.5)	16 (40.0)	5 (12.5)	1 (2.5)	0 (0.0)	9 (22.5)	31 (77.5)	5 (12.5)	35 (87.5)
	Stiffness	**1 (0.9)**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
	Swelling	**1 (0.9)**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)
	Tingling	**2 (1.7)**	0 (0.0)	2 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	2 (100.0)	2 (100.0)	0 (0.0)
	Numbness	**1 (0.9)**	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	1 (100.0)	0 (0.0)
	Movement limitation	**1 (0.9)**	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (100.0)	0 (0.0)	1 (100.0)

(Figures in parentheses indicate percentage)

Annexure III

The Plantation Labour Act, 1951

1. SHORT TITLE, EXTENT, COMMENCEMENT AND APPLICATION.

(1) This Act may be called the Plantation Labour Act, 1951.

(2) It extends to the whole of India except the State of Jammu and Kashmir.

(3) It shall come into force on such date as the Central Government may, by notification in the official Gazette, appoint.

(4) It applies to the following plantations, that is to say, (a) to any land used or intended to be used for growing tea, coffee, rubber cinchona or cardamom which admeasures 5 hectares or more and in which fifteen or more persons are employed or were employed on any day of the proceeding twelve months;

(b) to any land used or intended to be used for growing any other plant, which admeasures 5 hectares or more and in which fifteen or more persons are employed or were employed on any day of the preceding twelve months, if, after obtaining the approval of the Central Government, the State Government, by notification in the official Gazette, so directs.

Explanation : Where any piece of land used for growing any plant, referred to in Cl. (a) or Cl. (b) of this sub-section admeasures less than 5 hectares and is contiguous to any other piece of land not being so used but capable of being so used, and both such piece of land are under the management of the same employer, then, for the purposes of this sub-section, the piece of land first mentioned shall be deemed to be a plantation, if the total area of the both such pieces of the land admeasures 5 hectares or more.

(5) The State Government may, by notification in the official Gazette, declare that all or any of the provision of this Act shall apply also to any land used or intended to be used for growing any plant referred to Cl. (a) or Cl. (b) of sub-section (4), notwithstanding that (a) it admeasures less than 5 hectares, or

(b) the number of persons employed therein is less than fifteen:

Provided that no such declaration shall be made in respect of such land which admeasured less than 5 hectares or in which less than fifteen persons were employed, immediately before the commencement of this Act.

7. CERTIFYING SURGEONS. (1) The State Government may appoint qualified medical practitioners to be certifying surgeons for the purposes of this Act within such local limits or for such plantation or class of plantations or it may assign to them respectively.

(2) The certifying surgeon shall carry out duties as may be prescribed in connection with (a) the examination and certification of workers;

(b) the exercise of such medical supervision as may be prescribed where adolescents and children are, or are to be, employed in any work in any plantation which is likely to cause injury to their health.

10. MEDICAL FACILITIES. (1) In every plantation there shall be provided and maintained so as to be readily available such medical facilities for the workers and their families as may be prescribed by the State Government.

(2) If in any plantation medical facilities are not provided and maintained as required by sub-section (1) the chief inspector may cause to be provided therein such medical facilities and recover the cost thereof from the defaulting employer.

(3) For the purposes of such recovery the chief inspector may certify the costs to be recovered to the Collector, who may recover the amount as an arrear of land-revenue.

19. WEEKLY HOURS. (1) Save as otherwise expressly provided in this Act, no adult worker shall be required or allowed to work on any plantation in excess of forty-eight hours a week and no adolescent or child for more than twenty-seven hours a week.

(2) Where an adult worker works in any plantation on any day in excess of the number of hours constituting a normal working day or for more than forty-eight hours in any week, he shall, in respect of such overtime work, be entitled to twice the rates of ordinary wages:

Provided that no such worker shall be allowed to work for more than nine hours on any day and more than fifty-four hours in any week.

(3) For any work done on any closed holiday in the plantation or on any day of rest, a worker shall be entitled to twice the rates of ordinary wages as in the case of overtime work.

20. WEEKLY HOLIDAYS. (1) The State Government may, by rules made in this behalf (a) provide for a day of rest in every period of seven days which shall be allowed to all workers;

(b) provide for the conditions subject to which, and the circumstances in which, an adult worker may be required or allowed to work overtime.

(2) Notwithstanding anything contained in Cl. (a) of sub-section (1) where a worker is willing to work on any day of rest which is not a closed holiday in the plantation, nothing contained in this section shall prevent him from doing so:

Provided that in so doing a worker does not work for more than ten days consecutively without a holiday for a whole day intervening.

Explanation I: Where on any day a worker has been prevented from working in any plantation by reason of tempest, fire, rain or other nature causes, that day, may, if, he so desires be treated as his day of rest for the relevant period of seven days within the meaning of sub-section (1).

Explanation II: Nothing contained in this section shall apply to any worker whose total period of employment including any day spent on leave is less than six days.

21. DAILY INTERVALS FOR REST. The period of work on each day shall be so fixed that no period shall exceed five hours and that no worker shall work for more than five hours before he has had an interval for rest for at least half an hour.

27. CERTIFICATE OF FITNESS. (1) A certifying surgeon shall, on the application of any young person or his parent or guardian accompanied by a document signed by the employer or any other person on his behalf that such person will be employed in the plantation if certified to be fit for work, or on the application of the employer or any other person on his behalf with reference to any young person intending to work, examine such person and ascertain his fitness for work either as a child or as an adolescent.

(2) A certificate of fitness granted under this section shall be valid for a period of twelve months from the date thereof, but may be renewed.

(3) Any fee payable for a certificate under this section shall be paid by the employer and shall not be recoverable from the young person, his parents or guardian.

28. POWER TO REQUIRE MEDICAL EXAMINATION. An inspector may, if he thinks necessary so to do, cause any young person employed in a plantation to be examined by a certifying surgeon.

32. SICKNESS AND MATERNITY BENEFITS. (1) Subject to any rules that may be made in this behalf, every worker shall be entitled to obtain from his employer, in the case of sickness certified by a qualified medical practitioner, sickness allowance, at such rate, for such period and at such intervals as may be prescribed.

(2) The State Government may make rules regulating the payment of sickness allowance and any such rules may specify the circumstances in which such allowance shall not be payable or shall cease to be payable, and in framing any rules under this section the State Government shall have due regard to the medical facilities that may be provided by the employer in any plantation.

34. USE OF FALSE CERTIFICATE OF FITNESS. Whoever knowingly uses or attempts to use as a certificate of fitness granted to himself under Sec. 27 a certificate granted to another person under that section, or having been granted a certificate of fitness to himself, knowingly allows it to be used, or allows an attempt to use it to be made by another person, shall be punishable with imprisonment which may extend to one month, or with fine which may extend to fifty rupees, or with both.