Role of Women in Tea Gardens - A Case Study in Dooars

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Abstract

The Tea Industry is one of the largest employers of women amongst organized industries in India. The anti-oxidants present in tea prevent cancer and consuming tea in a limited amount improves our metabolic rate and cardio-vascular activity etc. In the tea gardens, women play a very important role. Most of the operations involved in tea cultivation are practically done by women who have acquired the skill at coordinating their nimble fingers through many years of experience. As women's role in tea gardens directly affect the productivity and they also benefited from the economy so women workers really help to eliminate hunger and malnutrition starting from their household level.

1. Introduction

Tea is one of the most important beverages in India and is the major foreign exchange earner. India is the second largest producer of tea in the world, which produced 1095.46 million kgs during 2011-2012 (Tea Board, 2013). The Indian states of Assam, West Bengal, Meghalaya, Tripura and Sikkim in the northeast and Tamil Nadu, Karnataka and Kerala in the south contribute significantly to the overall tea production in the country. India is also the world's largest consumer of tea and almost eighty percent of tea produced in India is consumed domestically. Tea is known as the queen of all beverages and tea from Bengal is considered as the best. The tea industry is one of the largest employers of women amongst organised industries in India. Women constitute nearly 51% of the total workforce.

Tea is not only a refreshing beverage today but also its nutritive value (Table 1) is a scientific truth. Anti-oxidants present in tea prevents cancer. Consuming tea in a limited amount improve our metabolic rate, cardio-vascular activity etc.

2. Tea Areas of Dooars

The area under tea in Dooars in West Bengal is about 68,000 ha and is located between 89° to 89°9' N latitude and 26°3' to 26°8' E longitude. There are 163 tea gardens in Dooars producing over 115 million kg of made tea per year. It accounts for 20% of the tea area and 21% of tea produced in North India. The productivity of tea in the region (1795 kg tea ha^{-1}) is higher than Assam average but almost at par with the national productivity.

A large part of the Dooars tea districts is on old alluvial red soils known as the Red Bank soils. These are loamy soils of great depth, contain high organic matter and are acidic. They are the grey, sandy loam soils of Eastern Dooars, which have undergone very little weathering and are rich in bases and phosphate but low in organic matter and nitrogen. Soils of very different types and ages are found within these classes. One is Mal sand in Western Dooars, which consists of fine quartz accompanied by a large percentage of talc and potash mica. Dolomite rocks are found to the north of Central and Eastern Dooars and some limestone deposits also lie scattered in the foothills of this region. The 'Plateau' soils of Western Dooars are fairly old deposits. In general, Dooars soils contain high organic matter compared to tea soils of Assam.

The regions receive an average annual rainfall of more than 3000 mm but the distribution is highly uneven with 93% of total rainfall in May-October. The remaining 7% is distributed

Table 1: The calorie and the nutritive value of a cup of tea (Amount provided by 650 ml of tea with semi-skimmed milk)

Energy	200 KJ (48 k cal)
Protein	3.41 g
Carbohydrate	4.77 g
Fat	1.36 g
Minerals	
Calcium	109 mg
Potassium	300 mg
Zinc	0.68 mg
Vitamins	
Thiamin(B1	270 mg
Riboflavin(B2)	270 mg
Vitamin (B6)	70 mg
Folate	20 g

between November and April. The average maximum temperature ranges from 23.4 to 31°C and minimum 10.4 to 23.8°C. Excess rainfall causes severe water logging problems in plains while moisture stress in the lean dry months leads to severe droughts. Seepage in tea gardens with rolling topography is another problem limiting productivity in the region.

In the face of recurring severe annual droughts, shade probably is the most important factor for mitigating the ill effects of moisture stress as well as augmenting productivity. In the early part of the season, during drought, severe attacks of greenfly and thrips are often noticed. Red spider mite, caterpillar pests and Helopeltis are important pests in the region. Blister blight is becoming a seasonal disease in most of the estates while sporadic infection of black rot and red rust is found in pockets.

To work in these plantations, young men and women were recruited from Chotanagpur tribal villages. Thus, the tea worker population today is chiefly comprised by tribals like the Oraon, Munda and Santal. Nepali workers are also a big part of the labor force in these estates. According to a 1983 survey, the number of permanent tea workers in Dooars was 1,50,707, of which over 50% were women. About the same number of women are employed on temporary assignments during the period April - October. The task of tea leaf plucking is the prerogative of these women workers.

It is said that most tea parties are attended by women and it is always a woman at the Table who is honoured with the duty of pouring the tea. It is a common notion that the custom of Tea is a woman thing! However, women are involved in a much more important role in the "Tea cultivation" and "Tea manufacturing process' and furnished hereunder.

3. Womens' Role in Tea Cultivation

3.1. Land preparation for replanting on uprooted land

In case of replanting, major work like land preparation, uprooting, ploughing, labeling, planting of rehabilitation of crop (*Mimosa invisa*, Guatemala grass) etc., are done by male workers. Women workers are generally involved in tea planting, initial manuring and mixing of insecticides in pits.

3.2. Propagation

3.2.1. Seed propagation

Women play an important role for seed propagation. Sandy loam soil is the best for raising nursery. Wherever possible, the nursery site should be on virgin soil. In the absence of virgin soil, uprooted tea area or area with poor soil is used after the site has been put under green crops like *Crotolaria anagyroides, Mimosa invisa* or grasses like *Tripsecum laxum* (Guatemala), *Cymbopogon* sp., (Citronella), etc., for a period of about two years. The plants need lopping for 2-3 times a year and the loppings are left in situ for decomposition. Alternatively, the area is heavily dressed with cattle manure @ 25 tons ha^{-1}. Tea seeds are planted on nursery beds in row at a depth of 1.5 cm with the "eye" facing downwards or parallel to the ground surface.

3.2.2. Polythene sleeve nursery

When land is insufficient, seedlings are raised in polythene sleeves (17 cm lay flat wide, 20-30 cm long and 150 gauge thick). The soil is mixed with superphosphate @500 g m^{-3} and the sleeves are filled with the soil 3-4 weeks before sowing. Seeds are sown at of 0.5-1cm depths with the "eye" facing downwards and covering the seeds with a thin layer of soil. Clones can also be planted directly into sleeves. Before filling sleeves, the soil is sieved through a No.4 wire mesh to eliminate pebbles. The sleeves are filled with the sieved soil without much ramming and the filled sleeves should be kept covered preferably under shade for 6-8 weeks prior to planting cuttings. Only hand weedings are done carefully and proper care against pests and diseases are ensured to protect the plants. All the above mentioned jobs are done by the women in tea gardens of Dooars.

3.2.3. Vegetative propagation

The nursery is raised on a high land with adequate drainage and sunlight which is convenient for irrigation and frequent inspection. It is necessary to prepare the beds at least 6-8 weeks before planting cuttings. The surface of the beds should be slightly cambered for quick run-off of rain or irrigation water

3.2.3.1. Planting of cuttings

With a dibber (small bamboo sticks slightly thinner than the stem) 2cm deep holes are made at 5 cm apart on the bed. Cuttings are then planted firmly by holding the cutting at the node with the leaf pointing away from the hand in a semi erect position and inserting the stem on the holes upright. In north south oriented beds, the tip of the leaf should point towards north and in east west aligned beds, the tip should point towards west. The mother leaf should be more or less in an upright position after insertion into the holes. There should be no air pockets in the interspaces of cutting and soil. Dipping the cuttings in 0.1 per cent zinc sulphate solution before planting helps root initiation. The soil moisture should be maintained at field capacity. The cuttings are transferred to sleeves just after initiation of roots. Shade should be such that cuts about 50% of the mid-day sun light falling on the nursery bed. In the low lath frame shade, the bamboo frames should be raised on the east after the cuttings have produced 4-5 new leaves. Where thatch is used in overhead shade automatic thinning occurs in time. When bamboo lath is used, gradual removal of the roof (alternate one) ensures adequate hardening of plants. Young plants need protection from pests and diseases by high volume spray of suitable pesticide. Weeds are to be removed by hand. The plants are kept outside without shade for a couple of weeks before taking them to the field. In rainy season, the all the women were engaged in plucking and male workers were deputed in nursery for preparation of beds ,shades etc. However, during winter and summer women were engaged in nursery for jobs.

3.3. Young tea management

Various field management practices are followed in post-planting care to encourage early establishment and vigorous growth of tea plants as well as to increase their radial spread and longevity. In Dooars these are shade, weed control, pest and disease control, drainage, irrigation, manuring and bush frame formation. Except drainage and irrigation, women worker does other post-planting care. After planting, the area is mulched adequately with green vegetative matter. Sowing of green crops, e.g., *Crotalaria anagyroides*, *Tephrosia candida*, *Priotropis cytisoides* etc., in the young tea fields between alternate tea rows provides shade and generates mulching materials. The green crop has to be periodically lopped and the lopping left in situ to decompose. The young plants should also be protected from pests and diseases using suitable control measures. Plants like *Indigofera teysmanii, Melia azadirach, Gliricidia sepium* etc., should be planted for providing temporary shade. They will be ready to provide shade within a year of planting and should be kept lopped periodically. *Indigofera teysmanii* is the most common species used for temporary shade and is propagated by means of seed, air-layering or stem cutting.

3.4. Plantation

This is a very delicate operation and needs adequate planning and proper supervision. Correctly planted tea plants establish in the field quickly, grow vigorously and come into full bearing earlier. On the other hand, a slight error during planting can cause high percentage of mortality or permanent setback to the plants. However women worker play a great role in plantation.

3.4.1. Type of plants used for planting

Only healthy plants 40-60 cm high with at least 12 good mature leaves and of pencil (0.5 cm) thickness (at collar) are taken for planting in field. In general, 9 to 12 month old plants attain this stage. Sub-standard plants are discarded. Before plants are removed from nursery, they are hardened by gradual exposure to full sun.

3.4.2. Type of planting

There are two types of planting, i.e., pit planting and trench planting.

3.4.2.1. Pit planting

This method is followed when spacing between plants is wide enough to allow digging of individual pits of proper size and without much difficulty. Pits should be about 45 cm wide and 45 cm deep, circular and straight walled. Smaller pits restrict root growth and retard shoot growth and development. The excavated soil is conditioned by mixing with 4-5 kg well-decomposed cattle manure or 150-200g well-decomposed oil cakes and returning the soil into the pits. No other manure is used except 30 g rock phosphate and 30g SSP at the time of planting.

3.4.2.2. Trench planting

This method is adopted for closer spacing and in heavy soils. Trenches 30 cm wide and 45 cm deep are dug along the rows. The excavated soil is conditioned and returned back as in case of pits and tea is planted directly on the trenches.

3.4.3. Method of planting

There are two methods of planting, for plants raised in nursery beds. They are bheti planting and stump planting.

3.4.3.1. Bheti planting

Here, the plants are lifted along with the bheti and the roots intact from the nursery bed. This is convenient with plants grown in ploythene sleeves, which reduces difficulty in transportation, reduce root damage and gives a very high percentage of survival. The polythene is removed carefully by slitting the tube and the bheti is held in the pit half-filled with the conditioned soil in such a manner so that the top of the bheti is flushed with the ground surface. 30g rock phosphate is added at the bottom of the bheti and the pit is filled with soil

with adequate ramming. At about 5 cm depth 30g SSP is added around the bheti and the pit is filled up to the collar of the plant with soil. Adequate ramming is necessary to prevent sinking of the pit level later, which will cause localized water logging. The same method can be used for plants grown in sleeves.

3.4.3.2. Stump planting

Plants are lifted from the nursery bed without having any soil around the roots. The shoot portion is cut off 15-20 cm from the collar and the excess roots trimmed off before putting them into the pits. This method is generally followed with overgrown nursery plants and has the advantage of easy transport and reduced chances of withering after planting. However, the percentage of survival is much less than bheti planting. During plantation most of the heavy work i.e. preparation of pit , drench , uprooting , etc. were performed by male workers . Mixing of chemical fertilizers and FYM , insecticide sowing of *Crotalaria anagyroides*, *Tephrosia candida*, *Priotropis cytisoides* etc are the jobs performed by the women workers in Dooars.

3.5. Tea and shade infilling

In the garden of Dooars, tea and shade trees are in filled as and when required basis very skillfully by the women workers.

3.6. Manuring

Fertilizers are applied only when the tea bushes are ready to utilize them. As a general rule, the best time for fertilizer application is after the first rain in spring has moistened the soil and there is some new growth in case of unpruned tea. In case of pruned and skiffed teas, the fertilizers should be applied after the bushes have produced two new leaves. A weed free clean ground is desirable at the time of manuring. Sometimes green manuring is also done.

3.6.1. Method of manuring

In the mature tea, after complete coverage of ground, fertilizers are applied uniformly on the ground as broadcast. In Dooars, fertilizers are applied in a f circular band keeping a distance from the collar. N and K fertilizers are applied in two splits if the dose exceeds 100 kg/ha. This ensures adequate supply of nutrients throughout the growing period and higher utilization efficiency. Only selected female workers were engaged in application of manure in field .An additional benefit in terms of ½ day holiday may be given by the management in some gardens to the female workers considering the load of job.

3.7. Plucking or harvesting

Plucking in tea is synonymous with harvesting in other crops. The tender apical portions of shoots consisting of 2-3 leaves and the terminal buds are nipped off in plucking. The plucked shoots are manufactured to produce tea. Removal of the apical portion of a tea shoot stimulates growth of the dormant leaf and buds below the apex. The stimulated buds become active and start laying down initials of cataphylls, known as janams in Dooars. While laying new initials, the bud swells up and after reaching a critical stage, starts unfolding janams, fish leaf and normal leaves in succession. All these appendages carry axil buds, which are capable of producing normal shoots of equal vigor. Advantage has been taken of this unique property in designing plucking system. Plucking is done by women very efficiently.

3.7.1. Plucking systems

The plucking systems followed in Doors are:

a Fine plucking: Generally two leaf and a bud is plucked with an interval of 4 to 6 days.
b Coarse plucking: Generally three leaf and a bud is plucked with an interval of 10 to 15 days.
c Very coarse plucking: To regulate over vegetation and to increase the quantity (not the quality) of tea sometimes more than three leaf and a bud is plucked.
d Plucking with janam: To prevent further infections of pests and diseases in tea bushes sometimes 'plucking with janam' is done during pick of the season.

3.8. Pruning/ skiffing

Pruning is one of the most important operations, next to plucking, which directly determines the productivity of tea bushes. It is unavoidable in the sense that it has to be carried out periodically in spite of huge crop loss it results. If pruning is delayed, in other words as the age of wood from pruning increases, the size and weight of growing shoots on plucking surface decreases (Chakroborty, 1994). There is preponderance of banji shoots on plucking Table as more and more buds fail to grow with loss of vigor of growing apices. Therefore, to maintain the vegetative growth, pruning is necessary. Most of the pruning operations were done by the women workers in dooars tea gardens . However deep, medium and level of skiff were done by male workers .

3.8.1. Types of pruning

3.8.1.1. Light prune

Tea bushes are usually pruned every 3 or 4 years at 4 -5 cm above the last pruning cut. This type of pruning is called light prune (LP). The time period from one light prune year to another is called one pruning cycle and LP is a thus, natural sequence given at the end of a pruning cycle. It helps to renew the wood, regulate crop distribution, reduce pests and diseases and maintain ideal frame height of the bushes.

3.8.1.2. Height reduction prune and medium prune

However, when the tea bushes grows tall and plucking becomes

difficult, they are brought down to an optimum height by height reduction prune (HRP) at 60-70 cm, or medium prune (MP) at 45-60 cm above ground. Both HRP and MP help in rejuvenating the tea bushes that have become old and their yields have started declining. MP removes the knots and unproductive excess woods and facilitate consolidation by infilling of vacancies.

3.8.1.3. Heavy prune

Heavy prune (HP) is given at 15-45 cm for complete renewal of frame. In collar prune, all above ground parts of the tea bushes are cut down and this operation is carried out only when the root system is considered strong enough to withstand the shock and initiate new growth. In practice however, very low pruning is generally avoided now a days as it results in heavy mortality. In between two successive prune (LP) years, tea bushes are given lighter forms of cuts which are termed as deep skiff (DS), medium skiff (MS), light skiff (LS), level of skiff (LOS) or untouched which is called unpruned (UP).

3.8.1.4. Deep skiff

Deep Skiffing (DS) of tea bushes is done normally between 12-15 cm above the last LP mark. The DS helps to regulate crop distribution and to reduce the ill effects of drought, excessive creep and the height of plucking Table.

3.8.1.5. Medium skiff

Medium skiff (MS) is normally given at 5 cm over last Deep skiff mark. The objective of MS is to regulate crop distribution, reduce the ill effects of drought, reduce the incidence of excessive banji formation and reduce the height of plucking Table.

3.8.1.6. Level of skiff and light skiff

Level of Skiff (LOS) is given 4-6 cm above the tipping mark mainly to level the plucking surface. Light Skiff (LS) is usually given up to 1 cm above the previous tipping height. Generally this practice is done by the male workers in Dooars region due to the crop canopy height, however this practice equally done by the female workers of upper Assam and Darjeeling tea gardens.

3.9. Pruning and bush sanitation

To prevent the chances of sun scorch, the bushes may be covered with the pruning litter immediately after the prune. At times, they may also require demossing and lime-caustic-wash. Bushes, which are dead, badly damaged and affected by primary root rots are uprooted and removed out of the section. In bushes attacked by termites, the earth runs are removed, and the bush and the surrounding area treated with recommended insecticide.

3.10. Pest and disease control

The tea growing environment in Dooars is conducive to a large number of pests and diseases. Adequate and timely measures are taken to reduce crop loss due to pests and diseases.

3.10.1. Pest control

The pests of tea can be controlled by adopting chemical as well as cultural control strategies simultaneously. Generally chemical control is not done by the women worker but the following cultural and physical measures are taken by them for pest control.

3.10.1.1. Cultural operations (Table 2)

a. Bush sanitation/Cold weather practices
b. Ground sanitation
c. Balanced nutrition
d. Soil rehabilitation prior to replanting.
e. Improved drainage
f. Proper shade management
g. Soil amelioration

3.10.1.2 . Mechanical and physical methods

a. Hand collection
a. Light trapping

3.10.2. Disease control

The diseases of tea can be controlled by adopting chemical as well as cultural control strategies simultaneously. Some of the predisposing factors are dull, humid, cloudy and cool weather prevailing for several days, heavy shade etc. Generally, chemical control is not done by the women worker but the following cultural measures are taken by them for disease control.

3.10.2.1. Cultural control

1. Pruning or skiffing of the severely affected sections.
2. Improvement of aeration by lopping side branches and 'matidals'.
3. Thinning out of the dense shade.
4. Improvement of drainage.
5. Alkaline wash after pruning.
6. Adoption of shorter pruning cycle in chronic and severely affected sections.

3.10.3. Weed control

Weed growth is most vigorous in young tea fields during April to October warranting adequate control measures. Soon after planting, the ground is cheeled and mulched heavily (done by women worker) or sprayed with a pre-emergent herbicide (done by male worker). Subsequently hand weeding in rings of 15 cm radius around the collar of the plant is done. Women worker play a great role in hand weeding.

3.11. Seed bari

Table 2: Pest and diseases of tea

Pests	Life stages	Mechanical / cultural control methods
Bunch caterpillar	Moths Caterpillar	Light trapping/Hand collection
	Pupa	Hand collection (from soil around tea bush/shade tree)
Looper caterpillar	Moths Caterpillar	Hand collection (from shade tree)
	Pupa	Hand collection (from tea/around collar)
Red slug caterpillar	Moth	Hand collection/Light trapping
	Caterpillar	Used engine oil barrier on ground
	Pupa	Hand collection (from stems/forks/dryfallen leaves)
Helopeltis	Adult	Hand collection in morning and evening.
	Nymphs	
	Egg	Hand plucking and removal of infested shoots.
Cockchafer	Adult	Hand collection
Thrips	Pupa &	Soil stirring /caustic washing
	Nymphs	Removing lichens & mosses
	Egg	Hard plucking
Aphids	Adult & Nymph	Removal of infested shoots
Tea seed bugs	Adult & Nymphs	Hand collection
Termites	Queens and workers/nest	Digging out/killing/ destruction by using insecticides

Seed baries planted specially for the purpose where the parents (selected generative clones) of approved stocks are established either planting directly or by grafting on any vigorous jat/ clonal root stocks. Planting, after planting care and manuring are similar as that of young teas. Pruning is not recommended except to remove unwanted shoots to clear congestion which will facilitate aeration and light penetration. For higher seed production, 30-40% sunlight should reach the ground in a diffused manner. Old seed baries can be rejuvenated by heavy pruning (MP) as in tea under plucking. Blossoming generally starts from early-October and ends by January with a peak period in November-December. Most of the seeds are produced from this peak flowering after 10 months. The seeds ripen by next October. The November-May period is very crucial for fruit development and moisture deficit in this period affects the seed yield adversely. The tea fruit is allowed to dehisce on the tree and the dropped seeds are collected from the ground. As these seeds lose viability rapidly, the normal practice is to collect them everyday. Tea seeds vary in size from 10 to 22 mm diameter. All the activities in seed baries were performed by the female workers in many dooars tea gardens .

3.11.1. Grading and sorting

After collection, seeds are passed through a rotary type shifter to eliminate very small seeds. The remaining seeds are allowed to soak 2-3 hours in a trough of water. The seeds which sink (sinkers) are then spread on a plastic sheet, tarpaulin or on the concrete floor and examined for pest, disease and mechanical damage. The suspended or floating seeds (floaters) are discarded.

3.11.2. Storage of seeds

Tea seed is stored for a minimum period in a cool place covered by a layer of semi-moist sand or sub-soil. Rapid drying during storage causes loss of viability.

3.12. Packing

After sorting, tea seeds are packed as soon as possible. For long distance transport, the seeds are packed in wooden boxes in units of 20 kg. Seeds are spread in layers along with packing material and covering each layer with a thin sheet of tough paper. When the box is full, a sheet of paper is laid on top and the lid is nailed down. The different packing materials used are moist sand, sub-soil, powdered charcoal, ash and their mixtures. Depending on the size of the grader used a kg of graded and sorted seed may contain 300-500 seeds.

3.13. Supervision

Before 1980's the supervision or monitoring work was done by male workers only but after 80's women workers are also involved in supervision. Supervision of all the steps involved in cultivation is done by women worker called 'Sardar'(OMRE-Grade II).

4. Womens' Role in Tea Manufacturing Process in Factory

4.1. Packaging

In bulk-tea manufacturing, all the activities are done by the male workers (starting from withering to dispatching). However, the gardens having packet tea unit engage female workers for sorting, grading (BP, BOP, BOP(SM), OF, ED, D etc.) weighing and packaging of various size of small packets up to 1 kg (Ammonium, 2010).

4.2. Acting as office bearer/ caretaker

In tea manufacturing the women workers are involved in water supply, cleaning of tea testing equipments, cleaning of office rooms, letter distribution etc.

5. Conclusion

In the tea gardens of Dooars, women play a very demanding role both in cultivation and manufacturing process. Tea cultivation and manufacturing both are very labor-intensive process. Harvesting of only tender leaves maintains the quality of tea. As women's role in tea garden directly affect the productivity. Norms related to their daily wages, incentive payments and other facilities should be rectified.

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