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Status and productivity of tea estates of the Chattogram tea-valley, Bangladesh

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Abstract

The agro-based tea-export-oriented industry has a tremendous contribution to the local and national economy of Bangladesh. This study was conducted through field observation and a semi-structured questionnaire survey to investigate the present status and role of tea estates on the local and national economy, situated in the Chattogram tea-valley of Bangladesh. The study revealed that the overall production and management of the surveyed tea estates were satisfactory. In the case of the surveyed tea estates, the study also revealed an average of 19% and 13% increases in tea production and yield respectively compared to the previous year. The tea estates were found committed to maintaining the standard of the processed tea which ensured a higher auction price of the processed tea. Besides, percentage increases of the area of the tea estates were satisfactory enough to comply with the rules of the Bangladesh Tea Board. Contrarily, the study also identified some common problems in the surveyed tea estates, specifically a shortage of workers, lack of raw materials, capital, and modern machinery, land-use conflicts, etc. which hinder the production of the tea estates of the Chattogram tea-valley. The study also recommended several effective actions to eradicate all constraints which originated from the tea estates of the Chattogram tea-valley, Bangladesh.

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Introduction

An evergreen shrub species belongs to the family Theaceae and native to Asia, popularly known as Tea (*Camellia sinensis* L. Kuntze), an aromatic beverage, is a widely consumed drink in the world (Macfarlane and Macfarlane, 2004). This is considered as a popular health-drink after water, commonly prepared by pouring hot or boiling water over cured the species leaves, and provides cooling, slightly bitter, and astringent flavor (Penelope, 2000). Tea is used as a medicinal drink in South-western China, the place of its origin (Heiss and Heiss, 2011). During the seventeenth century, drinking tea became fashionable among Britons, who started large-scale cultivation, production, and commercialization of the tea-plant in the Indian sub-continent to bypass a Chinese monopoly at that period (Weinberg and Bealer, 2001).

There are more than 58 tea-producing countries around the world, while Bangladesh is now ranked 10th position amongst the tea-growing countries (Hossain *et al.*, 2015). In Bangladesh, tea is one of the major cash crops, and the tea-industry is recognized here as an agro-based export-oriented industry for over a century (Saha *et al.*, 2015). The Bangladesh tea industry is one of the major sources of income for the national exchequer (Islam *et al.*, 2005). Khisa and Iqbal (2001) reported that Bangladesh tea estates produce about 2% of global tea production and earn around 2 billion BDT (Bangladeshi Taka) every year. But, tea exports from Bangladesh fall by more than a quarter last few years as the country's crop lost out to tea from Africa and other South Asian nations (BBC News, 2002). Present tea yield per hectare in Bangladesh is quite low in comparison with other tea-growing countries of the world due to lower productivity, low soil pH in the tea cultivation sites, and anthropogenic disturbances (BTB, 2015; Saha *et al.*, 2015).

The tea production area of Bangladesh is broadly divided into two main zones – Surma valley, located in the Srimangal district of Greater Sylhet, contains 133 tea estates; and another one is Halda valley, distributed in Chattogram and Chattogram Hill Tracts (CHTs) regions containing 23 tea estates. Surma valley (Sylhet zone) is larger than Halda valley and consists of six tea-valleys, whereas Halda valley consists of only one tea-valley. Most of the tea gardens of the Sylhet zone were established in the British period. On the contrary, the tea gardens of the Chattogram zone were newly established. Halda valley tea zones of Chattogram and CHTs regions, also deliberatively known as *Parbottyo Tea gardens*, are the country's famous tea-growing areas (Khisa and Iqbal, 2001).

Presently, the tea-industry of Chattogram tea-valley, Bangladesh is confronting a multitude of problems. Deficiency of capital and modern machinery, the lower market value of tea in comparison to increasing production cost, poor yield per hectare in comparison to increasing domestic demand, absence of modern techniques for measuring the quality of tea, etc. create some of the nagging problems (BTB, 2015). Moreover, during the dry season or prolonged drought, there is also a scarcity of perennial water sources for irrigation, which creates severe problems for tea production (Islam *et al.*, 2005). Besides tea workers sometimes face payment problems that hamper tea production and tea development activities, and adversely affect the earning of foreign exchange (BBS, 2010; BTB, 2015). Hence, it urgently needs to focus attention on improvements in the tea-manufacturing sector covering the quality of tea, its productivity, cost of production as well as the marketing system (BTB, 2015; Islam *et al.*, 2005). The present study was carried out to investigate the present status, production, and problems regarding the tea estates of Chattogram tea-valley.

Materials and methods

About the study site

A survey on the present status of tea estates was conducted from December 2015 to March 2016 in the Halda-valley or Chattogram tea-valley of Bangladesh. There are 23 tea estates in the Chattogram tea-valley area. The tea estates have been categorized into 3 broad categories (A, B, and C) based on their

production, annual estate area extension, and management performance (Alam and Akhter, 2015; BTB, 2002) (Table 1). From the 23 tea estates, a total of eight tea estates have been selected randomly for survey purposes. Out of the selected eight estates, 3 estates from Category A, 2 estates from Category B, and 3 estates from Category C. The distribution of the 23 tea estates in the Halda-valley or Chattogram tea-valley (Chattogram and CHTs region) was shown in Fig. 1.

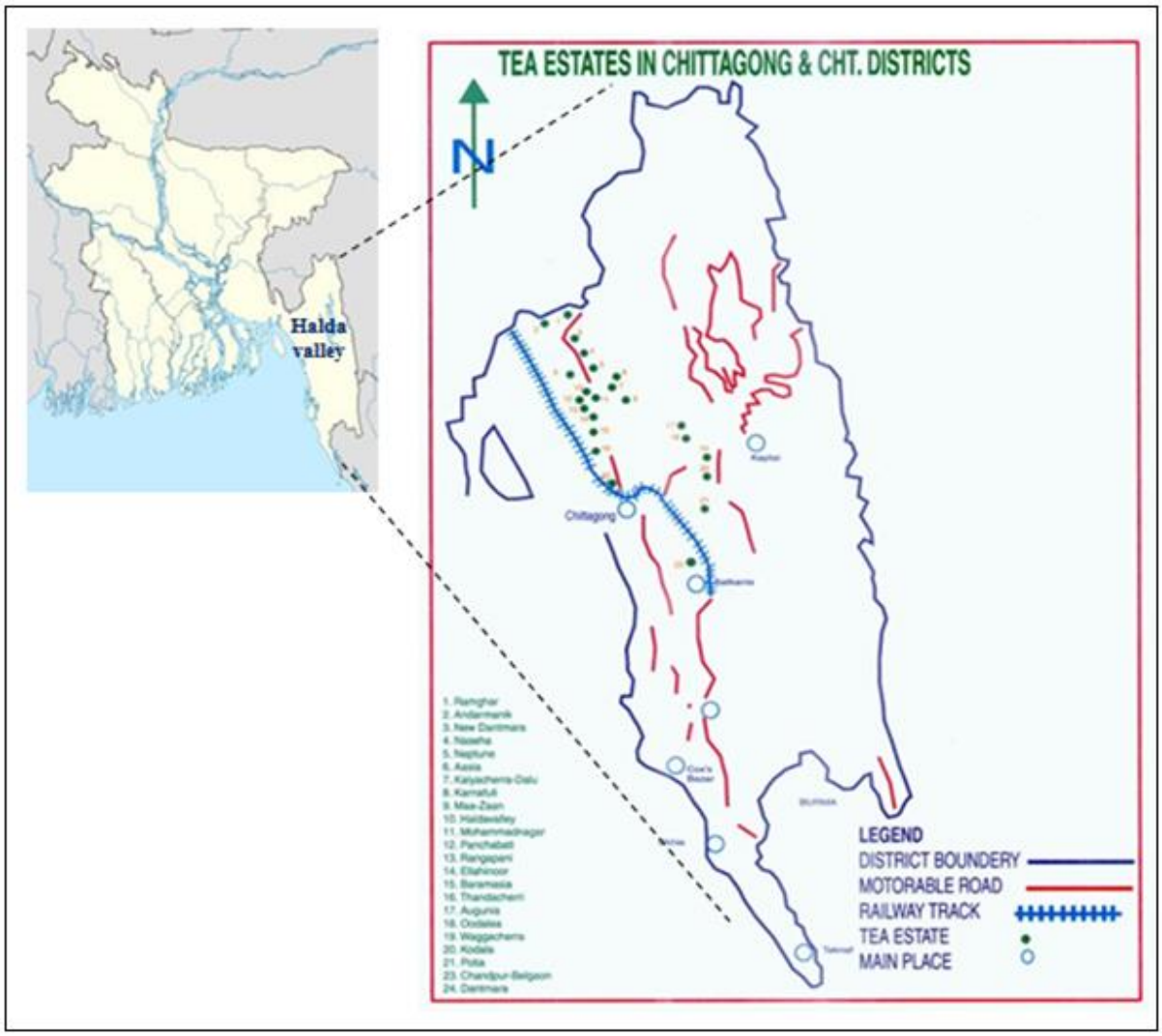

Fig. 1. Distribution of several tea estates in the Halda-valley/Chattogram tea-valley, Bangladesh.

Data collection

The study was based on primary data collected through field observation and interviews with the managers of the eight tea estates and respective manufacturing industries by a semi-structured questionnaire which was worked out in advance checked and pre-tested for intelligibility (developed by Dutta and Hossain, 2016). Inter-personal (i.e., face-to-face communication) method was adopted during the interviews. The questionnaire addressed the general information of the tea estates and processing industries. Information was also collected from different secondary sources to supplement the collected data. Relevant information for the study has been collected from different sources and justified precisely during the study. Some secondary information was also collected from the Bangladesh Tea Board, Chattogram regional office, Bangladesh.

Statistical Analysis

During the study, all related information (qualitative and quantitative) was collected intensively and sorted

carefully using a spreadsheet package-Microsoft Excel, version: MS Office Suite 2016. Analysis of the recorded data was conducted to achieve the major findings i.e., mean, median, frequency, percentage distribution, etc. Finally, the key findings of this study were summarized, reviewed, and presented scientifically in the form of tables and figures.

SWOT analysis

A SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was conducted to evaluate the opportunities, available strengths, and potential threats of the surveyed tea estates. Analysis of SWOT considers as logical thinking, which is applied to optimize strengths and opportunities, minimize external threats, transform weaknesses into strengths, and summarizes key management issues (Dutta and Hossain, 2020; Hong and Chan, 2010). According to FAO (1989), SWOT is an efficient and recognized technique to be used in compiling, synthesizing, and analysis of information for sustainable forestry, nature management, production, and development of resources. During the study, several tea-production related external and internal factors, top strengths, weaknesses, potential opportunities, and threats of the tea estates were identified systematically through SWOT analysis and enlisted in an organized list to formulate an efficient strategy for the amelioration and development of the tea estates, proposed by Dutta and Hossain (2020), Murtini *et al.*, (2018). At the final stage, major findings were expressed in a simple two-by-two grid.

Results and discussions

Management and demographic features of the surveyed tea estates

The management information, year of establishment, total production area, as well as the overall condition of the studied tea estates of the Chattogram tea-valley, was highlighted in Table 2. The table also represented the information regarding workers of the eight tea estates. The largest tea estate of Chattogram tea-valley is the Karnaphuli tea estate which contains 6571.70 acres of land.

Table 1. Name, Location, and category of tea estates in Chattogram tea-valley.

Name of the tea estate	Location	Category
Aasia	Bhujpur, Fatikchhari	A*
Agunia	Dhamirhat, Rangunia	C
Andharmanik	Chinacherra, Fatikchhari	C
Baramasia	Nazirhat, Fatikchhari	A*
Chandpore Belgoan	Pukuria, Fatikchhari	A
Dantmara	Dantmara, Fatikchhari	C*
Elahinoor	Nazirhat, Fatikchhari	C*
Halda valley	Narayanshat, Fatikchhari	A
Kaiyacherra-Dulu	Bhujpur, Fatikchhari	A
Kodola	Kodala, Fatikchhari	C
Karnaphuli	Fatikchhari, Fatikchhari	B*
Maa-Jan	Dantmara, Fatikchhari	B
Mohammadnagar	Mirzahat, Fatikchhari	C
Naseha	Dantmara, Fatikchhari	C
Neptune	Narayanshat, Fatikchhari	A
New Dantmara	Dantmara, Fatikchhari	A*
Oodaleah	Nazirhat, Fatikchhari	B*
Panchabati	Nazirhat, Fatikchhari	B
Patiya	Karunacherra, Patiya	C
Ramgarh	Nalua(via-Ramgarh), Fatikchhari	A
Rangapani	Rangapani, Fatikchhari	C*
Thandacheri	Thandacheri, Rangunia	C
Waggachera	Baraicheri, Rangunia	C

*Surveyed tea estates (Source: Alam and Akhter, 2015; BTB, 2002).

The smallest tea estate of Chattogram tea-valley is the Dantmara tea estate containing only a 452.54-acre land area. About 68.81% (highest) of the total area of the New-Dantmara tea estate was under tea production whereas about 34.59% (lowest) of the total area of the Rangapani tea estate was used as a tea production area. The highest number of workers was found in the Karnaphuli tea estate compared to the other tea estates (Table 2).

Table 2. General information of the surveyed tea estates.

General Information		Surveyed tea estates							
		Aasia	Dantmara	New-Dantmara	Baramasia	Rangapani	Elahinoor	Oodaleah	Karnaphuli
Category		A	C	A	A	C	C	B	B
Management information	Manager	1	1	1	1	1	1	1	3
	Asst. manager	0	0	2	2	2	0	3	10
	Staffs	9	4	3	18	12	9	17	76
Registered worker	Men	260	42	99	285	183	75	452	1067
	Women	230	42	144	322	231	87	374	958
Casual worker		70	50	0	1156	494	200	42	292
Year of establishment		1971	1978	1964	1911	1902	1966	1904	2003
Total area (acre)		1316.8	452.54	505	2985	3200	1500	3945.44	6571.7
Area under tea	acre	634.43	200	347.5	1535	1107	745	1901.46	2616.5
	%	48.18	44.19	68.81	51.42	34.59	49.67	48.19	39.81

Productivity (per day) of the tea estates

In the study, surveyed tea estates were categorized into three major categories: Large (produce more than 2000 kg of tea per day), Medium (produce 1000-2000 kg of tea per day), and Small (produce less than 1000 kg of tea per day). The study revealed that 50% of the tea estates were resided in the 'Small' category, whereas 38% and 12% of the tea estates were found within the 'Medium' and 'Large' category respectively (Fig. 2).

Annual production and yield ha^{-1} of the surveyed tea estates

Among the surveyed tea estates, maximum (1,385,829 kg) and minimum (52,670 kg) amount of ready-made tea were produced by the Karnaphuli and the Dantmara tea estates respectively in 2016 (Fig. 3). Though production of ready-made tea was increased in all the tea estates as compared to the previous year, the highest (44%) and the lowest (8%) percentage increases in production were found in the Dantmara and the Elahinoor tea estates respectively. The average percentage increase in production of the surveyed tea estates was about 19% compared to the previous year (Fig. 3). In the present study, yield represents the production of tea crop (kg) per hectare area. Except for Dantmara and New-Dantmara tea estates, yield ha^{-1} of all tea estates of Chattogram tea-valley increased as compared to the previous year.

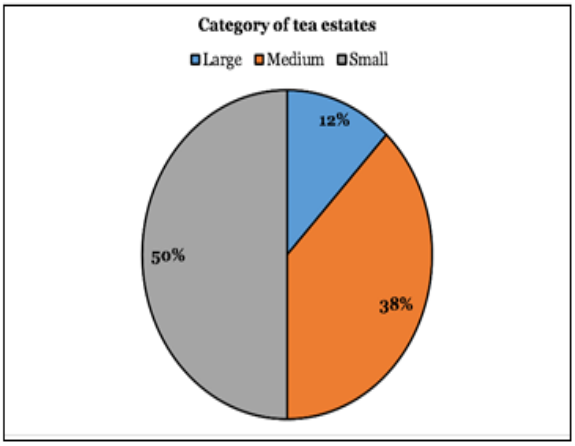

Fig. 2. Percentage of different category tea estates in the Chattogram tea-valley.

The highest (1,796.58 kg ha^{-1}) and the lowest (934 kg ha^{-1}) yield belonged to the Karnaphuli and the Oodaleah tea estate respectively in 2016 (Fig. 4). According to the Bangladesh Tea Board (BTB), the average yield of Bangladesh was 1,239 kg ha^{-1} in 2016. The present study revealed the average yield of the surveyed tea estates of the Chattogram tea-valley was 1,147.64 kg ha^{-1} in 2016, which was below the national yield (Fig. 4).

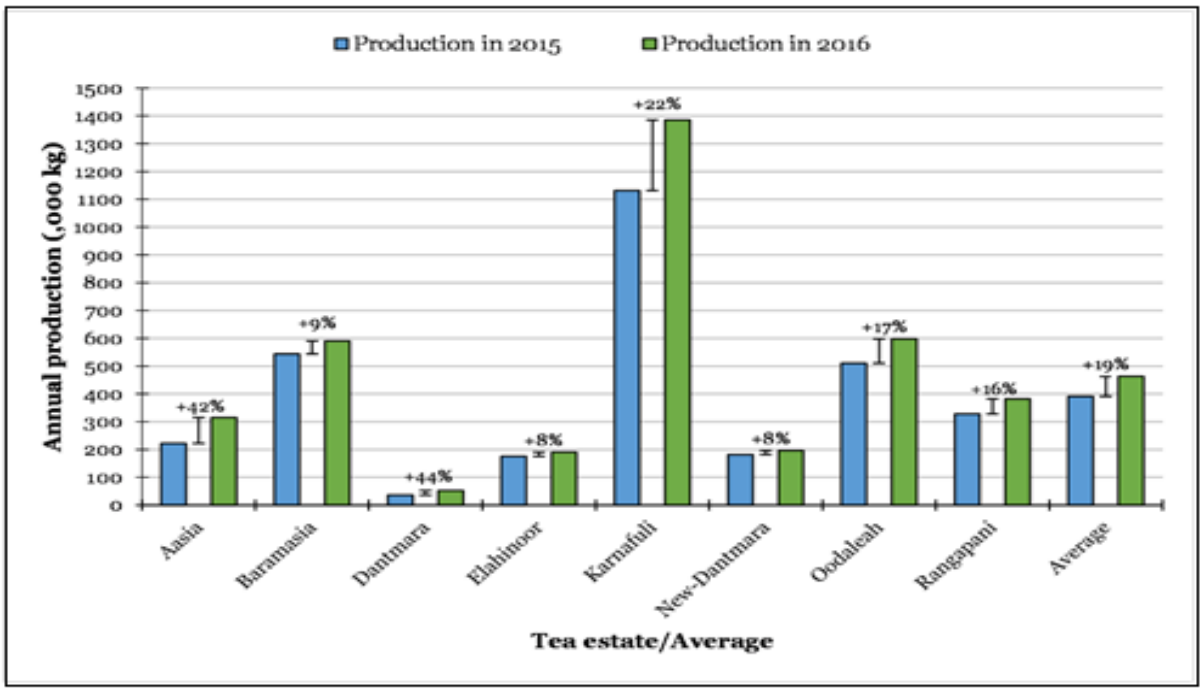

Fig. 3. Annual production (,000 kg) of the surveyed tea estates in 2015 and 2016.

Price of manufactured tea of surveyed tea estates

Tea estates sell their processed tea in an auction market and the auction prices vary from estate to estate and also from market to market. Among the surveyed tea estates, the highest average auction price (199.77 BDT/kg) was recorded for the Rangapani tea estate in 2016 which indicated that the processed tea quality of the estate was quite better than that of other tea estates. The lesser quality processed tea belonged to the Dantmara tea estate with an average auction price of 175 BDT/kg (Fig. 5). The average auction price per kg of processed tea of the surveyed tea estates was about 185.83 BDT/kg as most of the estates maintained the standard of the processed tea (Fig. 5).

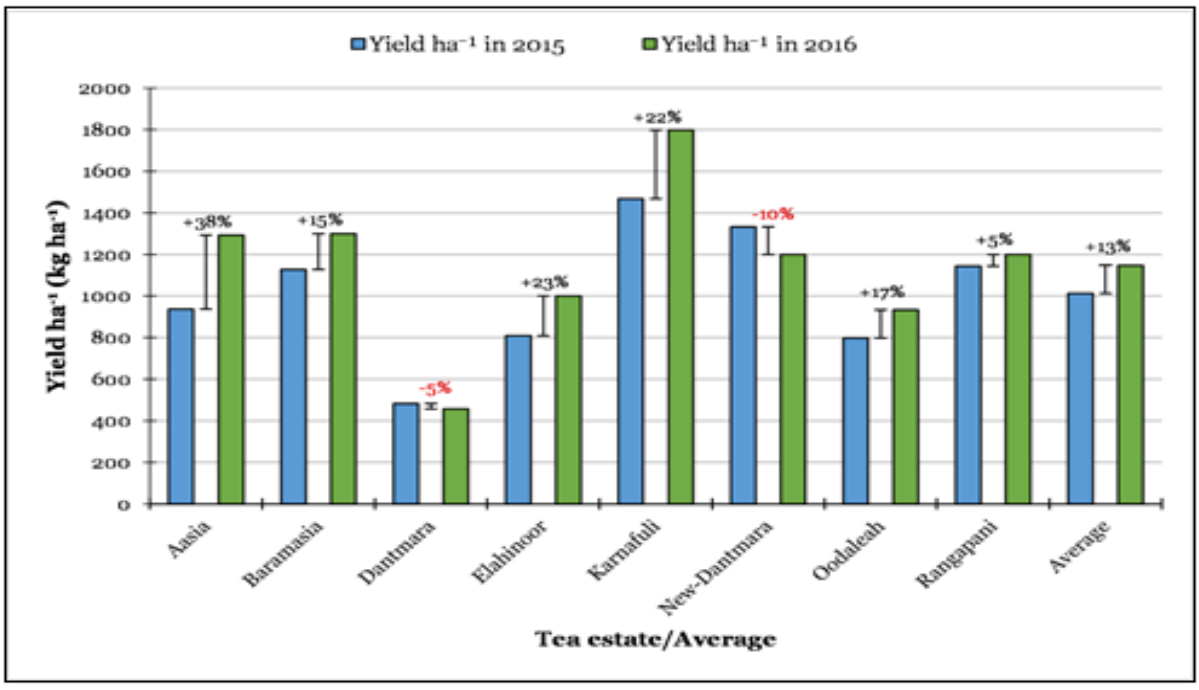

Fig. 4. Yield ha^{-1} (kg ha^{-1}) of the surveyed tea estates in 2015 and 2016.

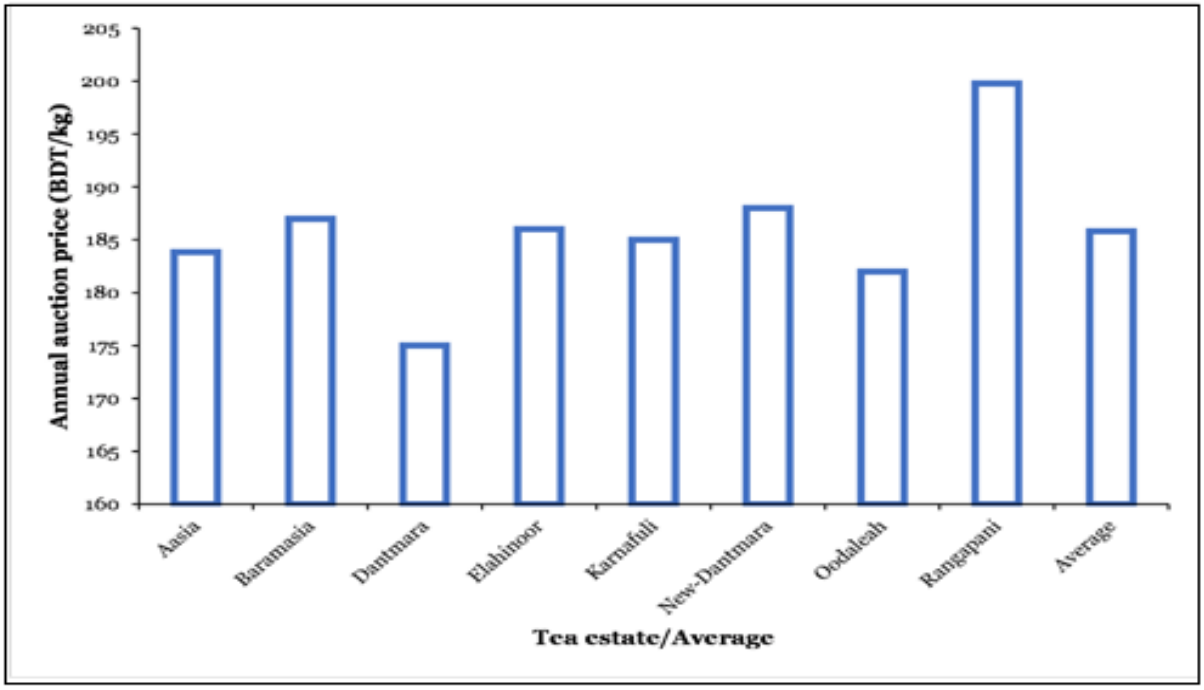

Fig. 5. Average annual auction price (BDT/kg) of the surveyed tea estates in 2016.

Extension of the tea estate area

According to the rules of the Bangladesh Tea Board (BTB), every tea estate needs to extend a minimum of 1% estate area every year. Each tea estate (except the Aasia estate) has extended more than 1% area of its total land in 2016 which indicates that the tea estates complied with the rules and regulations of the BTB. Among the surveyed tea estates, about 3.38% (highest) and 0.94% (lowest) of the total area of the Elahinoor and the Aasia tea estates had been extended respectively (Fig. 6). The average extended area of the surveyed tea estates was 35.51 acres (about 1.63% of the total area). The extended area (acres and %) of each surveyed tea estate was illustrated in Fig. 6.

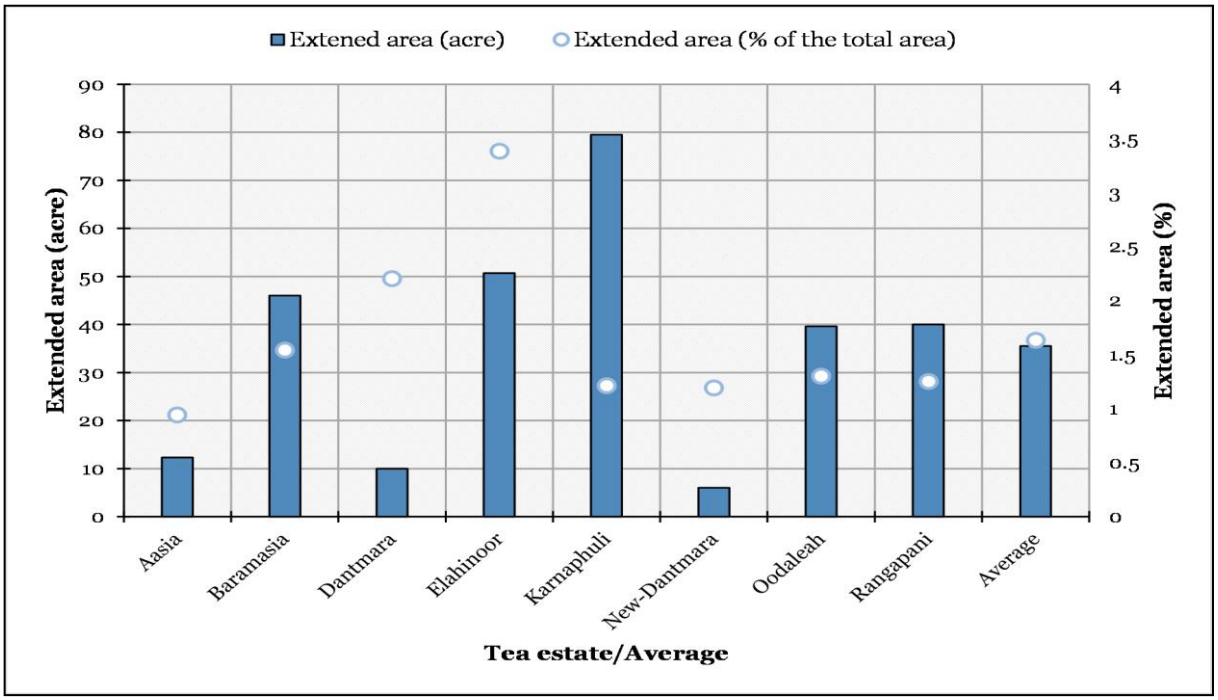

Fig. 6. Extended area (acres and % of the total area) of the surveyed tea estates in 2016.

Findings from SWOT analysis

Several feasible strengths of the study area were identified based on field observation. The main strength of the study area is that the production of the tea estates is increasing with time. The land is quite productive for tea cultivation, and climatic factors of the study area have severe positive effects on tea production. Those tea estates provide enormous employment amenities, and also contribute tremendously to the local and national economy of Bangladesh (Table 3).

The major weakness identified in this study is that the unsustainable way of labor-management. Facilities provided by the authorities are not adequate for the survival and upliftment of the laborers' socio-economic condition. Lack of adequate infrastructures, high malnutrition and illiteracy rate, illicit felling and encroachment in the tea estate area, land-use conflicts, etc. are some other minor weaknesses that should be eradicated for the advancement of the tea estates (Table 3).

The present study revealed the persistence of several potential scenic spots in the study area. Such spots might be helpful to maintain a healthy and sound environment, and simultaneously increase aesthetic beauty. Such kind of opportunities also facilitates tourism activities for the nature-lover and creates employment opportunity for an unemployed person in the study area with extra benefits. Supports from the authority for observing the site-view are another opportunity to increase income and also preserve the existing floral resource (Table 3).

The major findings clearly showed that labor shortage is the main threat prevailing in most tea estates. Furthermore, some other threats in the study area are security problems of the officials/executives, deterioration of the law-and-order situation of the tea estates, political or outsider influence on their internal arrangements, lack of perennial water source for irrigation during the dry season, and also in prolonged drought, etc.

In this regard, a sustainable management approach, political advocacy, support from the higher authorities, and local people's awareness, etc. would be the efficient conciliation for improving the current status and productivity of the study area (Table 3).

Table 3. SWOT analysis of tea-production estates of Chattogram tea-valley, Bangladesh.

Strengths	**Weaknesses**
1. Enhancement of tea production with time	1. Unsustainable way of labor-management
2. Provide enormous employment amenities	2. Lack of adequate infrastructures
3. Adequate physical conditions for tea-production	3. High malnutrition and illiteracy rate
4. Tremendous contribution to the economy	4. Land-use conflicts
Opportunities	**Threats**
1. Existence of several potential scenic spots	1. Shortage of workers
2. Scope for eco-tourism facilities	2. Encroachments and security problems
3. Support from the associated authority	3. Political influence on the internal arrangements
4. Advanced healthy and sound environment	4. Lack of perennial water source for irrigation

Impacts of surveyed tea estates on the local economy and livelihoods

The tea estates of Chattogram tea-valley play a vital role in the local and national economy of Bangladesh. The government of Bangladesh earns foreign currency by exporting tea to foreign countries. Tea estate creates employment opportunities for the local communities. About ten thousand workers are engaged in the 23 tea estates of Chattogram tea-valley, Bangladesh. These tea estates play an important role to maintain a healthy and sound environment as tea plants stabilize soil and decrease soil erosion. Besides a tea estate increases natural beauty and facilitates tourism activities.

Tea estate authorities provide some facilities to the workers of the estates. Though the workers are not satisfied with these facilities, it meets their partial

needs. They are provided house after being registered or permanent worker. Workers can also enjoy government leaves according to the leave rules. But if any worker wants to work in the plucking season during the leave period, he/she is provided extra wages. Female workers get 3-month maternal leave as per leave rules. Besides they are provided ration facilities after being registered or permanent worker. The tea estate authority provides medical facilities and bears all treatment costs of the workers. The authority also bears the educational costs of the children of tea workers. Despite the basic facilities provided by the authority, the workers have limited scope to integrate with the people of the major communities and they face great difficulties in exploring livelihood options outside the tea estates.

Major problems in the tea estates

During the study, several problems were identified in the tea estates of the Chattogram tea-valley. The main problem prevailing in most of the tea estates was the shortage of workers. The study also identified some other problems, e.g., lack of adequate infrastructure, lack of capital and modern machinery in various tea estates, the lower market value of processed tea in comparison to increasing production cost, lower yield per hectare in comparison to increasing domestic need, high malnutrition and illiteracy rate, illicit felling and encroachment in the tea estate area, pest and diseases in the cultivation site, land-use and political conflicts, etc.

The present study also recorded some crucial problems in the Chattogram tea-valley which need to be solved urgently. Some mention-worthy problems were security problems of the executives, unexpected natural calamity, deterioration of the law-and-order situation of the tea estates, log stealing, political or outsider influence on their internal arrangements, illegal occupation of land by the outsiders, lack of perennial water source for irrigation during the dry season and also in prolonged drought, etc. These findings support the result of another research. Islam et al. (2005) recorded similar problems from different tea gardens of Bangladesh, which ultimately reduced tea production and increased production cost. In the present study, it was noticed that climate change, seasonal effect, high production cost, injudicious nutrient management, pest and disease, consistent quality aspects of tea, etc. were the major challenges for tea production in the study area, which were quite similar to the findings of another research carried out by Shah and Pate (2016) in India.

Concluding remarks

This study attempted at focusing on the overall condition and the role of the tea estates in the Chattogram tea-valley of Bangladesh. In Bangladesh, tea is a popular beverage and major cash-crop for GDP growth. But the production and export of tea are confronting several challenges due to high production costs and less application of modern technologies. Though the tea estates of Chattogram tea-valley are found to maintain production and yield growth as well as the standard of processed tea, those estates are undergoing several problems. These problems of the tea estates need to be addressed and solved accordingly by the respective authorities to maintain the optimum quantity and quality of tea to compete with the other tea estates. The tea estates of Chattogram tea-valley have a great contribution to the upliftment of local and national economies. So, the present study highly recommends adopting the sustainable tea management technique to improve tea quality and also to reduce the production cost. Further investigation is also needed to improve the overall situation and increase the optimal production of tea products in the Chattogram tea-valley of Bangladesh.

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