

## **A Qualitative Study on Sustainability of Tea industry: Exploring the Challenges and Opportunities using PESTEL Review**

### **ABSTRACT**

*The fundamental value of this study is to examine the sustainability issues of the tea industry in Bangladesh using PESTLE (Political, Economic, Technological, Social, Environmental, and Legal factors) analysis. PESTEL analysis is perceived that the macro-environmental factors in the sustainable tea industry of Bangladesh are rather unpromising in a consequence, making it a profitable industry through evaluating its challenges and opportunities. Qualitative research method has applied to measure the importance of the macro-environmental factors and their level of influence on the tea industry. For the data collection purpose, this study was used an interviewing method and the thematic analysis was applied for data analysis purposes. 30 industry experts and stakeholders were interviewed and some major insights are discovered. Lack of governance of public authority, limited awareness of sustainability issues, below-standard labor wages, achieving economies of scale, outdated machineries and technology and liberal import law are some significant challenges are facing sustainable tea industry of Bangladesh. The findings may provide useful suggestions for the policy-makers, researchers, developers and tea garden owners for decision making purposes.*

**Keywords:** *Sustainable tea industry, PESTLE analysis, Qualitative study, Macro-environmental factors.*

## 1. INTRODUCTION

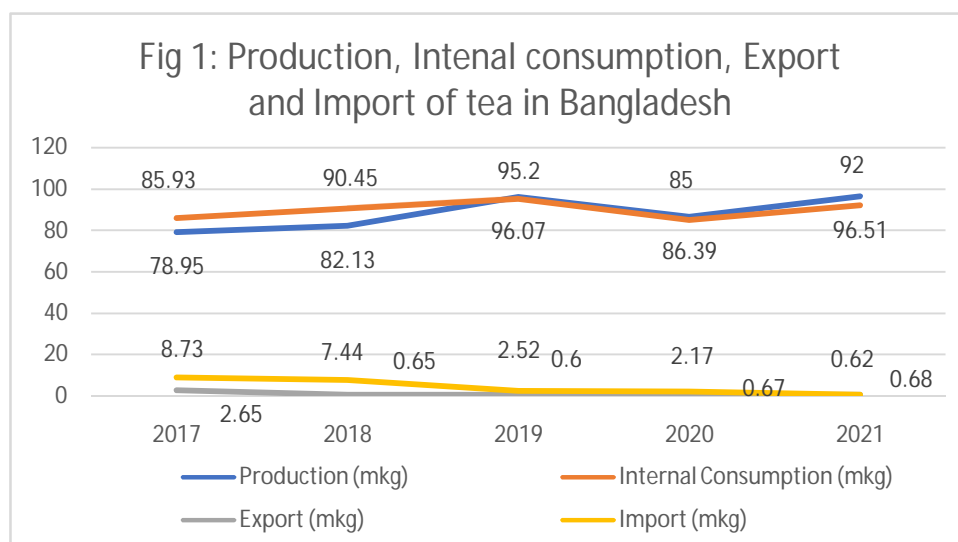
Tea is a distinctive agricultural crop that contains a unique cultivation and harvesting pattern different from other typical cropping systems. The tea industry constitutes different processing and marketing techniques worldwide. At present, tea is being cultivated in nearly forty countries where China, India, Kenya, and Sri Lanka are contributing more than 78 percent of tea production and 73 percent of exports in 2016 (ITC, 2018). As a small player in the international tea market, Bangladesh stood in 12<sup>th</sup> position contributing 1.3% of the total world tea production amount in 2019 (FAO, 2020). Though Bangladesh has no significant contribution to international export, tea production and trade have a powerful role in economic growth, employment in rural areas, poverty alleviation and food security in the economy of Bangladesh. In 2020, Bangladesh produced 86.39 million kilograms of tea worth Tk 163.10 billion and contributed 0.81% of the national GDP as an import substitute.

As a labor-intensive industry, about 1.5 lakh ethnic minority people working in the tea industry live in remote areas (Shah & Pate, 2016) generating rural employment opportunities. Seasonal variations of climatic elements and soils of three ecological zones, particularly Surma valley, Halda valley, and Karatoa valley respectively in the greater Sylhet, Chittagong, and Panchagarh districts in Bangladesh, are suitable for tea cultivation (Mamun, 2011). The tea industry of Bangladesh started its journey as an export-oriented industry. Recently, due to the abrupt growth of internal demand and exposure of new tea-producing counties, exportable surpluses have decreased against a slow growth rate of production causing a loss of export position in the world market. In parallel, Bangladesh's tea industry is facing crucial challenges such as soil degradation due to the overuse of chemical fertilizers and pesticides, low-quality tea, inefficient

economic management and environmental threats (Islam *et al.* 2021). To meet the local demand, companies are showing their interest in importing premium quality tea from other countries. Consumers are becoming conscious of food substances and the production practices of agricultural items. In this scenario, this is the peak time of conversion to sustainable tea cultivation and production to reduce dependency on imports, achieve food security, offering healthy consumption and environmental protection.

Year	Production (mkg)	Internal Consumption (mkg)	Export (mkg)	Import (mkg)
2017	78.95	85.93	2.65	8.73
2018	82.13	90.45	0.65	7.44
2019	96.07	95.2	0.6	2.52
2020	86.39	85	0.67	2.17
2021	96.51	92	0.68	0.62

Table 1: Production, domestic consumption, export and import of tea in Bangladesh



Sustainable tea farming tends to natural and social concerns and offers innovative and economically feasible opportunities for cultivators, workers, policymakers and other stakeholders who are involved in the industry. Sustainable concerns adopting technologies and

practices which have no adverse effects on the environment are easily accessible and suitable for farmers, improve food production and produce environmentally friendly products and services through restoring biodiversity and agroecology system (Pretty *et al.* 2008; Chappell & LaValle 2011; FAO 2020). Most tea-producing countries that follow ‘conventional’ farming practices result in soil erosion, lower tea productivity and quality leading to negative impacts on the environment and human health issues (Hong & Yabe 2015; Van Ho *et al.* 2019; Le *et al.* 2021). Nowadays many countries are moving toward sustainable farming practices and achieving competitive advantages. Globally, the total registered area of organic tea was nearly 542,000 hectares, which comprises 13.2% of the total global area of tea production (Willer & Lernoud 2019). Recently, Bangladesh Government has formulated a new extension policy for agriculture to protect the environment as ‘Environment-friendly Sustainable Agriculture’ by encouraging the usage of organic fertilizer and facilitating **integrated pest management (IPM) programs** (MOA, 2007). In 2000, Kazi & Kazi Tea initiated the use of the flat zone areas in Panchagarh with the extensive use of organic pesticides and fertilizers on a limited scale (Sultana *et al.* 2014). This project has changed the socio-economic state of the rural people of Panchagarh and drives the prelude development of the tea sector (Islam, 2012). Like other agricultural commodities, the productivity and quality of tea are highly affected by macro-environmental factors such as political, environmental, economic, socio-cultural, technological, and legal factors (PESTEL analysis). A macro-environmental analysis can provide an opportunity for effective compliance of investment and strategic movement that may direct the positive sustainable economic growth of this industry. But very limited studies have been conducted to explore the viability of a sustainable tea production system, particularly concentrating on PESTEL review. Therefore, this study attempts to explore the challenges and opportunities the tea-producing nations will face by

adopting sustainable tea farming processes from the PESTEL framework, especially Bangladesh's tea industry context.

## **2. LITERATURE REVIEW**

The global tea industry is continuously increasing in production and export to respond to the growing demand. According to the International Tea Committee, global tea production has increased by 70% and consumption increased by 60% during 1993-2010 indicating a significant growth both in tea production and consumption (Chang, 2015). Bangladesh is a small contributing country in global production, fulfilling its internal demand by playing an import substitute role. Therefore, an assessment of the PESTEL analysis of the Bangladesh tea market may explore the global as well as the internal opportunity for marketers and investors. PESTEL analysis defines a conceptual framework of a holistic approach with proper diagnosis (Dinçer, 2004) that can perform as a competitive advantage for the tea industry. As the international tea market becomes intensely competitive (Eren, 2002), the Bangladesh tea industry is facing different challenges that arise from the changing business environment (Raza, 2019).

A PESTLE analysis is a process used by marketers to examine and observe the external marketing environmental factors have an effect on an organization. PESTLE is an extensive version of the ETPS model which was originated by Harvard professor Francis Aguilar in 1967 and published in Francis' book 'Scanning the Business Environment'. PESTLE is explained as a theory to analyzes political, environmental, social, technological, economic, and legal factors in an organization or industry ("Professional Academy", 2018; "Oxford College", 2016). Kotler (1998) argued that PESTLE analysis gives a strategic direction to understanding the growth or decline of the market, business potential, position, and direction for future operations.

PESTLE entails a deep consideration of the external environment in which a business operates. Uncontrollable factors are considered as external factors and the aspects like PESTLE require to be analyzed to determine the organizational strategy (Hitt *et al.* 2012). The PESTLE analysis is a useful tool that helps to understand market growth, future potential, and direction for a particular industry. In a study, Oraman (2014) mentioned that business changes have created a ‘big picture’ of opportunities and significant threats for the organic food industry in Turkey investigated by PESTLE analysis. After filtering all the PESTLE factors, the positive and negative influences can be evaluated. Ng’ang’a (2015) observed the Kenya tea market and identified a key facilitative role of PESTEL factors in enhancing return on investment, and sustainability of the tea industry. Sustainable agricultural practice helps to achieve a competitive advantage in the long run. Maximum use of resources in an ecologically viable way may promote future food security. In a study, Pretty *et al.* (2008) observed that, unlike the environmental and social concerns, sustainable agriculture also addresses innovative and economically feasible opportunities for growers, laborers, consumers, policymakers, and other stakeholders in the entire food system. The changing nature of macro-environmental factors may generate both opportunities and threats for businesses. Therefore, the findings of this study attempt to contribute to the strategic movement for future growth.

### **Review studies on challenges and opportunities of Tea industry**

Tea has an ancient heritage and culture has turned into an inevitable part of our daily life. In many developing countries, tea plays an important role in economic development and employment. Due to the exposure of new tea-producing countries, the world tea market becomes competitive and prices are falling sharply, creating pressure on profitability. The productivity of tea is mostly influenced by the conditions of tea estates, the topography of land

and soil and other climatic and environmental issues. Worldwide policymakers and planners are emphasizing sustainability issues in the agriculture sector. But some major complex challenges have put this concept far behind in developing countries. Insufficient research in the agriculture sector, environmental and climate disasters and management weaknesses at the macro and micro levels are the important challenges facing sustainable agriculture, the tea industry is not exceptional. In a study, Prathibhani, *et al.* (2018) identified that the global tea industry is confronting some unique challenges such as climate change, quick-changing tea markets and traditional production systems. Fierce international competition is changing the nature and habitual behavior of consumers through the introduction of different value-addition products. According to Kamalakkannan *et al.* (2020) Sri Lankan tea industry faces severe threats to sustainability issues due to contamination problems, low productivity, yield drop, climate changes, labor shortage, internal migration of workforce etc. Kagira *et al.* (2012) have categorized several challenges that affect the sustainability methods of the tea sector in Kenya are production-related challenges, management agency challenges, local market-related challenges, regulatory challenges and international market-related challenges. In another study in Bangladesh, Raza (2019) identified some major challenges as withdrawal of investment by the big industries, low customer interest in high-quality tea, adulteration during manufacturing, changing weather conditions and labor crisis. The lack of an instrument for measuring the MRL value is causing extensive use of pesticides **in the tea industry of Bangladesh (Islam *et al.* 2005).** In 2020, the global tea market accounted for nearly \$ 200 billion and is expected to increase to over \$318 billion by 2025. Awareness among people about healthy consumption behavior, urbanization, rising income level and living standards, rising per capita consumption and growing population size are the main reasons behind growing demand worldwide. To maintain

the sustainable development in the tea industry researchers have underlined attention on research and technological innovation, value addition and product diversification, tea tourism, social network service promotion and organic tea production (Prathibhani *et al.* 2018). FAO's intergovernmental group on tea has published a report that urban young consumers from large producing countries are likely to emerge as the fastest growing section, not only interested to pay a premium for the specialty teas but suggested some sustainable solutions as the introduction of high-yielding and improved quality vegetative clones, proper and concentrative use of organic manures and fertilizers, systematic intercultural methods, cohesive pest control management and scientific knowledge about tea plantation also interested to learn more about the product they consume- its origin, quality and contribution to sustainable development. In a study, Raza (2019) identified some major opportunities for the Bangladesh tea industry such as increasing local and international demand both for green tea and black tea, expansion of auction centers and new cultivable land. In another study, Saha *et al.* (2021) among planters and efficient management. Therefore, conversion to a sustainable production may create some opportunities and simultaneously challenges for the tea-producing nations.

### **3. METHODOLOGY**

A qualitative research methodology has been conducted using an in-depth interviewing method to collect primary data from the respondents. In this exploratory research, respondents selected through a purposive sampling technique who have direct and indirect involvement with the tea industry of Bangladesh. The purposive sampling technique permits the researcher to apply cases or selects interviewees that have the essential information related to his or her research objectives (Mugenda, 2003). A semi-structured questionnaire was prepared to have flexibility at the time of the interviewing process (Dawson, 2002). Open-ended questions were chosen related to the

information needed on political, economic, environmental, social, technological, and legal factors. The researcher has conducted a discussion with the selected respondents with a personal interview and an interview session has been recorded and transcribed. All the responses have been collected in the native language (Bangla) and translated into English keeping the closer meaning conveyed by the interviewers.

30 respondents were selected from different stakeholder groups as 10 respondents were selected from tea companies, 5 are Government officials, 4 were selected from Bangladesh Tea Research Institute, 4 were tea garden managers, 3 respondents from dealer groups, 2 were retailers, and 2 were industry experts and researchers. To analyze the qualitative data, research has applied thematic analysis (Braun & Clarke, 2006, 2012). According to Braun and Clarke (2006), the thematic analysis process for this study five processes were identified, as familiarization with the data, generating initial codes, searching for themes, defining and labeling themes, and preparing the final report. This study intends to explore the opportunities and challenges the sustainable tea farming process will face from the PESTEL framework. Therefore, thematic analysis is a proper method to excerpt the actual meaning and conceptualize the opportunities and challenges in the tea farming context. Secondary data has been collected from reputed tea journals, publications, websites of the Bangladesh Tea Board, and reports. A review of the literature and discussion with some experts in the tea industry has provided good insight into the study.

#### **4. Findings:**

##### **4.1 Political Issues:**

As noted by the interviewees, political issues are the most challenging as it relates to government policies and legislations, tea garden owners and stakeholders. An interviewee quoted, *“Unlike other industries, Bangladesh’s tea industry is also influenced by political interest. Tea garden*

*managers who are the representative of tea garden owners act as the guardians of the tea estate who affect the livelihood of the tea laborers.*” The relationship between tea owners and laborers is considered the most critical political factor.

Tea laborers vigorously reside in the tea gardens away from the mainstream population and their rights depend on the interest of tea gardeners or owners. The interviewee states, *“Tea laborers do not have equal citizenship rights and have somewhat participation in elections. Political parties have shown negligible interest in the rights of tea garden workers and did not mention them in their manifestos.”* The interviewees also focus on some positive issues such as the effectiveness of trade unions, labor law application and equal wage rights establishment. The interviewee mentions, *“Bangladesh Cha Sramik Union (BCSU) are trying to establish their rights through bargaining with the owners and managers. Different NGOs’ and agencies are trying to work with the tea laborers to earn their rights.”*

#### **4.2 Environmental issues:**

Because the environment is dynamic, all interviewees emphasized that environmental issues are the most crucial issues that need to be addressed. The experts outlined, *“Increasing ecological concerns extremely affect the agricultural industry and tea industry is not exceptional. Extreme and overuse of chemical pesticides and fertilizers increases production costs and badly affects long-term farm productivity.”* Environmental issues highly influence the tea industry and vice-versa. As stated by the interviewee, *“Practicing the traditional cultivation method, climate change, short pruning period and lack of irrigation in dry seasons affect the quality and yield size of tea plantations. The topography, soil, and climate factors are composite and essential for extensive tea cultivation.”* The interviewee also added, *“Extreme climate change such as erratic rainfall, floods, drought, frost, or frequent hail, extreme temperatures and old bushes have*

*reported a negative effect on tea production in recent years.”* The respondents confirmed that climate change and irrigation are the two most important prerequisites of tea production.

The expert agreed that smallholding tea cultivation and organic farming methods can explore new dimensions for the sustainable tea industry in the future. They outlined, *“Small-scale and small-holding tea farming continues increasing every year in the valley changing fortunes of thousands of small, marginal and bigger farmers in Northern Bangladesh. Organic cultivation through substituting with natural manure and pesticides will be safe for human health and environment.”*

#### **4.3 Socio-cultural factors:**

The tea industry of Bangladesh largely contributes to the rural socio-cultural environment and development. An expert outlined, *“Rising demand in the market has gained the attention of foreign and national investors which brought a transformation in the socio-cultural life of Bangladeshis. The tea industry plays a great source of employment. More than 3 lac minority ethnic people who live in remote areas are directly and indirectly involved with the tea industry. Among the tea laborers, 75% are women which confirms women empowerment and poverty alleviation”*.

The respondent stated, *“Though the tea industry is labor-intensive, the tea laborers are the most deprived and poorest section of the society. The minimum wage level is relatively low for tea workers to bear their basic needs. Female workers face wage discrimination and live an inferior standard of living compared to other tea-producing countries”*. Therefore, tea workers lead a very miserable life by remaining excluded from society which is a major challenge for today. Despite the sociocultural challenges, the respondents also stated, *“Government and NGOs’ are providing special attention in this sector through introducing extensive socio-economic activities*

*in the tea garden. Tea garden managers have introduced different economic and non-economic social supports which are positively affecting the livelihood of tea laborers. Equal wages, training and education-learning process may help the tea worker to adopt different survival strategies.”*

#### **4.4 Technological issues:**

*An interviewee mentioned some challenges as, “Old fashioned machinery and technology, the traditional method of irrigation, orthodox machine use, poor internet facility, and dependency on labors for plucking tea leaf greatly affect the quality and output of tea production of Bangladesh. Like other developing countries like Kenya and Zimbabwe, Bangladesh has failed to adopt new technologies in all sectors to produce an optimum quantity of tea to compete with the other global tea-producing forces.”*

All interviewees confirmed that adopting technology may increase the efficiency and competitiveness of the tea market. An expert pointed out, *“Modern technology may help to achieve economies of scale through producing high-quality tea. Technology for tea plantation, tea processing, and packaging may reduce the dependency on human labor.”* Another interviewee stated, *“Use of new machinery and tools, provision of timely and effective information, the advancement of research to explore high yielding variety; application of scientific irrigation schemes and innovation may add value in tea products. Installation of proper instruments to measure the Maximum Residue Level (MRL) of various pesticides may remove the distrust and suspicion of Bangladeshi tea to international buyers”*. Bangladesh’s tea industry is technology back-warded. Technology installation may introduce a new dimension for the tea industry.

#### **4.5 Economic issues:**

As an important agricultural crop, tea plays a significant economic role in the economy of Bangladesh as foreign currency acquisition, a source of employment for millions of families in the rural area and government revenues. All interviewees agreed that the Bangladesh tea industry has a great impact on economic development. An interviewee mentioned, *“Growing demand for tea both in local and international markets increasing the opportunity of the potential market. Bangladesh’s tea market acts as the largest consumer and producer of tea by consuming nearly 100% of its total production. Changing the consumption pattern of domestic consumers and production cost competitiveness create new opportunities for the tea industry. The tea industry is a good source of revenue for the government.”* An interviewee mentioned, *“Several local and international tea companies are working to popularize some tea brands through introducing different value-added tea varieties in the market. Consumers are now searching for different flavors and variants of tastes besides traditional black tea. Small-holding tea cultivation in plain land creating opportunity for Bangladesh.”*

In addition, respondents stated, *“Though tea is the second largest cash crop of Bangladesh, this industry is facing a crisis of national and private investment which causes a small growth rate of tea production every year. Private investors are not interested to invest due to the long gestation period, low rate of return and high rest rate.”* Therefore, at present the major economic challenge the tea industry is facing is “the investment crises”. According to the respondents, *“As a labor-intensive industry, labor costs account for 55-60% of the total production cost. The wages of the laborers are very low, they acquire very little portion of the consumer prices of tea. For this reason, laborers are losing their motivation, switching their jobs and are irregular in their duties.”*

#### **4.6 Legal factors:**

According to the respondents, like other industries, the development of Bangladesh’s tea industry is confined by some legal and bureaucratic complexities. An expert asserted, “*Government laws and regulations relating to different issues such as land disputes settlement, tax and tariff matters and maintaining stakeholder’s interest are the major legal difficulties. Worsen law and enforcement situations inside the tea gardens have made the legal environment vulnerable.*”

Another expert mentioned, “*With the traditional auction system, price is determined by the brokers which deprives tea gardeners and laborers. Absence of mechanisms to measure Maximum Residue Levels (MRL) to ensure safety standards affect the export market of tea.*”

Along with these issues, the experts confirmed the positive government support and interest in the development of the tea industry. An expert mentioned, “*Government has undertaken several projects to reform the tea industry through motivating and organizing small-scale tea cultivation in the Northern part of Bangladesh. Under these schemes, they are providing different technical and financial support, training for skill development and setting up tea-processing factories in the nearby area.*”

**Findings:**

Table 2: Summary of main themes of the findings

<b>Factors/Issues</b>	<b>Challenges</b>	<b>Opportunities</b>
<i>Political</i>	<ul style="list-style-type: none"> <li>*Lack of governance from public authority</li> <li>*Dominance behavior of tea garden owners and managers</li> <li>*Reluctant role of political parties</li> <li>*Ineffectual body of trade union</li> </ul>	<ul style="list-style-type: none"> <li>*Role of NGO’s and agencies</li> <li>*Awareness about labor rights</li> </ul>
<i>Environmental</i>	<ul style="list-style-type: none"> <li>*Limited awareness of sustainability issues</li> <li>*Crisis of arable land for extension</li> <li>*Climate change</li> <li>*Transformation to organic plantation</li> <li>*Lack of research &amp; innovation</li> <li>*Old tea bushes</li> <li>*Conventional plantation practice</li> </ul>	<ul style="list-style-type: none"> <li>*Infilling, re-plantation &amp; extension</li> <li>*Small-holding tea cultivation</li> <li>*Favorable weather condition</li> <li>*Good quality tea production</li> <li>*Distinctive taste, color and liquor of tea</li> <li>*Tea tourism</li> </ul>

	<ul style="list-style-type: none"> <li><i>*Lack of modern Irrigation</i></li> <li><i>*Short Pruning period</i></li> <li><i>*Use of chemical pesticides and fertilizers</i></li> </ul>	<ul style="list-style-type: none"> <li><i>*Value-added tea &amp; green tea production</i></li> <li><i>*Tea-infused by product</i></li> <li><i>*Suitable location</i></li> </ul>
<i>Socio-cultural</i>	<ul style="list-style-type: none"> <li><i>*Below-standard labor wages</i></li> <li><i>*Crisis of labors</i></li> <li><i>*Working environment</i></li> <li><i>*Poor socio-economic condition of laborers</i></li> </ul>	<ul style="list-style-type: none"> <li><i>*Equal rights</i></li> <li><i>*Women empowerment</i></li> <li><i>*Employment of poor and marginalized rural people</i></li> </ul>
<i>Technological</i>	<ul style="list-style-type: none"> <li><i>*Outdated machineries and technology</i></li> <li><i>*Poor internet facilities</i></li> <li><i>*Traditional irrigation method</i></li> <li><i>*Orthodox machine use</i></li> <li><i>*High dependency on human labor</i></li> <li><i>*Weak marketing practices</i></li> </ul>	<ul style="list-style-type: none"> <li><i>*Advanced technology innovation</i></li> <li><i>*Initiation of ICT in every aspect</i></li> <li><i>*New clone variety with high productivity</i></li> <li><i>*Institution for research and innovation</i></li> </ul>
<i>Economical</i>	<ul style="list-style-type: none"> <li><i>*Achieving economies of scale</i></li> <li><i>*Crisis of local &amp; foreign investment</i></li> <li><i>*High production cost</i></li> <li><i>*Local &amp; International competition</i></li> <li><i>*High prices</i></li> </ul>	<ul style="list-style-type: none"> <li><i>*Upward domestic &amp; global demand</i></li> <li><i>*Low labor cost</i></li> <li><i>*Employment opportunity</i></li> <li><i>*Demand for value-added or organic tea</i></li> <li><i>*Strong transportation network</i></li> </ul>
<i>Legal</i>	<ul style="list-style-type: none"> <li><i>*Liberal import law</i></li> <li><i>*Land Disputes</i></li> <li><i>*Practicing unfair human rights</i></li> </ul>	<ul style="list-style-type: none"> <li><i>*Expansion of auction house</i></li> <li><i>*Existence of BTB</i></li> <li><i>*Favorable Govt. policy</i></li> </ul>

Source: compiled by author

## **5. Theoretical and Practical Implications:**

By highlighting the major challenges of the sustainable tea industry of Bangladesh, this research can add value to the existing literature. PESTLE analysis is a well-known strategic tool used to explore and monitor the macro-environmental aspects that have a severe impact on an industry. This study identifies some significant, useful insights into how the tea industry is facing challenges and opportunities in an emergent economy like Bangladesh. For example, the tea industry not only suffers from environmental issues but also includes political, socio-cultural, technical, economic and legal matters. Therefore, the study's findings provide policymakers, tea

gardeners, stakeholders and academics with helpful suggestions that will guide them better understand the essential elements of macro-environmental factors.

## **6. Discussion:**

With the discussion of interviewees, some major findings are come out. First of all, most of the tea gardens are owned by private proprietors and labor rights are highly dependent on the compassionate behavior of tea garden owners. Political parties should ensure equal citizenship rights and participation in election manifestos. Second, tea cultivation and its productivity diverge according to climatic variation. Practicing the traditional cultivation method, climate change, short pruning periods and lack of irrigation in dry seasons affect the quality and yield size of tea plantations. Proper and organic use of pesticides and fertilizers, the introduction of scientific irrigation systems, re-plantation, infilling, and extension can positively affect tea production. To exploit the beneficial effects of climate change, high-yielding clones with superior quality and stress tolerance tea trees need to be cultivated. Third, the tea industry contributes largely to the rural economic environment and development. Therefore, proper measures to protect labor rights and the removal of wage discrimination can improve employee satisfaction. Different survival strategies need to adapt to better livelihood, educational status (adult education, educational campaign, etc.) and easy access to different credit opportunities (micro-credit, bank loan, etc.). Fourth, the tea industry is suffering from a lack of accurate estimates of the formulation of long-term industry-wise action plans. Private and public investment in small-holding tea cultivation and least-developed estates help the tea industry to turn around. Funds need to allocate or continue research and innovation to increase production with high-yielding tea varieties and patronize the tea industry. For the welfare and development of the tea sector, the government should search for international donor organizations to receive

assistance or loans. Fifth, to achieve efficiency and competitiveness in the tea industry, sustainable technical innovation may contribute deeply to achieving economies of scale of tea production and maximum use of resources without compromising the quality of tea. Sixth, though the tea garden laborers are covered by the Bangladesh Labor Act 2006, they enjoy fewer rights in terms of workers in the other sectors. Effective labor unions, equal implementation of labor acts in every sector, positive interest of political parties and tea board authorities can contribute to the socio-economic development of tea laborers.

## **7. Conclusion:**

Sustainable farming is relatively a new concept to developing countries and requires skills and awareness from farmers, industry owners, policymakers and stakeholders. The results of this study are based on empirical evidence, identifying the challenging and prospective factors of the sustainable tea industry of Bangladesh with PESTLE analysis. For this purpose, an interviewing process was conducted using thematic analysis. The participants of the interviewing sessions are the stakeholders and experts in the tea industry.

Therefore, the findings of this study have a novel contribution to exploring the challenges and opportunities to transition to a sustainable farming process. Conversion decisions from forests into tea plantations can negatively impact the world environment. Adulteration of land causes threatened biodiversity of plant species, the natural flow of water, soil erosion, and pollution of the environment. Hence, the decision to future extends of tea land demands land suitability assessment before the plantation. To achieve sustainability, the negative aspects of political, economic, social, technical, environmental, and legislative have been discovered and corrective measures need to be considered and the positive aspects should be improved and enhanced. Changing climate extensively affects tea production, and requires the introduction of mitigation

and adaptation measures (Noori, *et al.* 2016). Modern information and communication technologies in agricultural farming can minimize the adverse impacts on farmers (Awan *et al.* 2019). In a study on the Vietnamese tea industry, Le *et al.* (2021) identified the conversion benefits of agroecological tea production methods, such as the improvement of physical, biological and chemical properties of soil, mitigating the chemical hazard to human health and the environment, reduction chemical residue and increase tea quality. Despite the huge demand in the local and international markets, the organic tea farming process still accounts for a small percentage of the total production of tea in Bangladesh. Organizing an awareness program about organic tea cultivation and consumption can strengthen adaptive measures as a climate-smart management strategy (Sumi & Kabir, 2018; Jayasinghe & Kumar, 2021; Rahman, 2022). To maximize contribution to the green, resilient, and inclusive development (GRID) of Bangladesh, higher education and research institutions can play a very significant role. Even though the tea industry depends heavily on labor, workers are deprived of fair wages and basic civil rights (Hassan, 2014; Majumder, S.C. & Roy, S.C. 2012). Effective social dialogue among the government, Tea Plantation Workers' Union (BCSU) and the Tea Owners Association are needed to ensure gender equality, fair wages, decent working conditions and human rights for higher labor productivity.

### **Consent**

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

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