

অসম চৰকাৰ



Government of Assam

# REPORT ON TEA INDUSTRY OF ASSAM

## IN THE BACKDROP OF COVID 19 PANDEMIC

STATE INNOVATION AND  
TRANSFORMATION AAYOG (SITA)  
GOVERNMENT OF ASSAM

IN COLLABORATION WITH  
ERNST & YOUNG LLP



MAY 2020



অসম চৰকাৰ



Government of Assam

# REPORT ON TEA INDUSTRY OF ASSAM

IN THE BACKDROP OF  
COVID 19 PANDEMIC

STATE INNOVATION AND  
TRANSFORMATION AAYOG (SITA)  
GOVERNMENT OF ASSAM

IN COLLABORATION WITH  
ERNST & YOUNG LLP

**State Innovation and Transformation Aayog (SITA), Government of Assam**  
1st Floor, Block - A, Janata Bhavan, Dispur, Guwahati - 781006

**Website:** [www.sita.assam.gov.in](http://www.sita.assam.gov.in)

**e-mail:** [vchairmanassam2016@gmail.com](mailto:vchairmanassam2016@gmail.com)

**Phone:** +91 361 2237496

**MAY 2020**



**Sarbananda Sonowal**



**Chief Minister, Assam  
Guwahati**



**MESSAGE**

The tea industry plays an important role in the economic growth of the state and the Government is taking up positive steps on priority basis for holistic development of this industry. In view the economic losses incurred by the tea estates during the coronavirus induced nationwide lockdown, the responsibility of the State Government assumes more significance. The Government has already directed the Assam Gas Company Limited (AGCL) to give relief to tea estates of the state by waiving minimum demand rate.

In today's challenging situation, this report on tea industry of the State is one of the key initiatives taken up by SITA that captures the views of the industry stakeholders and interventions required post COVID 19, both in short and long term for the revival of the tea industry.

**(SARBANANDA SONOWAL)**





## MESSAGE

The tea industry of Assam accounts for 51% of the total tea produced in India and 11.7% of the global tea production. Along with being labour intensive the industry is also the largest employer of women in the organised sector across the country.

One of the long term solution is re-calibrating the tea production mix in Assam for CTC tea to a more sustainable ratio which will have a twin effect of correcting the surplus supply of CTC tea with better price realization and also increasing the production of CTC tea in Assam to meet the increasing demand for orthodox tea in the International market. There is also a need for a tea mission in the state to ensure Assam's predominant position in the global tea industry.

Further, the report on tea post COVID 19 will assist the Government in deliberating on the views of the various stakeholders and take necessary steps for the tea industry in Assam.

(DR. HIMANTA BISWA SARMA)



## CHANDRA MOHAN PATOWARY

Minister  
Industries and Commerce,  
Transport, Parliamentary Affairs,  
Skill, Employment and Entrepreneurship Development  
and Act East Policy Affairs Departments  
Government of Assam



### MESSAGE

Branding the Assam tea is the need of the hour for getting the due price and recognition in the international markets, to promote branding, quality and market linkages of Assam tea the state government is setting up a Tea Park at Chaygaon based on the model of the Dubai Tea Park. There is also a need to conduct a study for better management, marketing, technical support, packaging and design of Assam tea.

The plucking of Assam tea is considered to be the best in the world as it is done manually while most of the other tea producing countries use machines for the purpose, these practices can be highlighted during promotion of the tea brand of Assam in the international markets.

Further, the strategy report will help the Government to take short term and long-term initiatives for the revival of the tea industry in Assam in a post-covid scenario.

(Chandra Mohan Patowary)



**Dipok Kumar Barthakur**

**Vice-Chairman**

State Innovation & Transformation Aayog (SITA), Assam  
Block-A, 1<sup>st</sup> Floor, Janata Bhawan  
Dispur, Guwahati-781006.



Tel. & Fax No. 0361-2237496 (O)

Mobile No. 99540-28650

e-mail : vchairmanassam2016@gmail.com



## MESSAGE

Tea is the second most consumed drink in the world after water. Assam, the single largest tea producing region of the world, contributes 11% to the global tea production. Tea Industry in Assam is synonymous to the rich industrial and economic history of Assam.

Tea industry employs over 1 million people directly in Assam and more importantly, a very high percentage of women are engaged in this all important industry of Assam's economy. Therefore, Tea industry is one of the core focus area of Government of Assam.

Challenges faced by the industry due to COVID - 19 are unique and requires exceptional remedies. The report draws attention to the challenges faced by the industry of late. The report suggests several pre-emptive and remedial measures for immediate relief and for short and long term as well.

On behalf of State Innovation & Transformation Aayog (SITA), Assam, I would like to thank all our experts, viz. Dr. Mridul Hazarika, Dr. Kamal Malla Bujarbaruah, Shri Kashinath Hazarika, Shri Bidyananda Barkatoky of North Eastern Tea Association and professionals of EY team for their hard works and dedicated services in bringing out this valuable document.

  
(Dipok Kr. Barthakur)



**Nitin Khade, IAS**  
Chief Executive Officer



State Innovation & Transformation Aayog (SITA), Assam  
Block-A, 1<sup>st</sup> Floor, Janata Bhawan  
Dispur, Guwahati-781006.



## MESSAGE

The Covid-19 outbreak has thrown up new challenges for the almost-two-century-old tea industry of Assam. The Covid-19 pandemic has wrought havoc at a time, when the sector was readying itself for the first flush season from March to April. The lockdown and other restrictions have impacted the production cycle of tea and is causing serious impact on the economy of Assam.

Tea sector contributes almost 5% to the state's GSDP and also employs over 10 lakh people directly and impacts the lives of more than 40 lakh people indirectly. Therefore, Tea sector is a core focus for the Government of Assam. In recent times, even before the onset of Covid-19, the sector was facing challenges in certain areas, which were of serious concern for various stakeholders, but by and large, the issues could be addressed with proper strategy and roadmap. But unprecedented series of restrictions imposed due to Covid-19 outbreak have compounded existing problems and the sector risks have also exponentially shot up. Liquidity crunch at the grower level, a possible fall of demand, both domestic and international, disruption of logistics and other supply chain components, are some of the major concerns that need to be identified, dissected and studied.

The report highlights some of the immediate, short and long-term interventions required to be taken with respect to tea industry, to enable it to survive, sustain and promote the glory of 'Assam Tea'.

(Nitin Khade)



## Contents

<b>Tea Industry Overview.....</b>	<b>1</b>
Global Overview .....	1
India Overview .....	2
Tea: the State drink of Assam .....	3
Every 9th cup of tea sipped anywhere in the world, is from lush gardens of Assam .....	3
Value Chain of Tea Industry in Assam .....	4
Contribution to State's Economy .....	4
Small Tea Growers (STG) – The Emerging Sector .....	5
Transformational changes in the Assam Tea Sector .....	5
Production and Quality issues in Assam Tea Sector .....	6
<b>Impact of COVID-19 on Tea Industry of Assam.....</b>	<b>9</b>
Understanding the pandemic .....	9
Impact of COVID 19 in Assam's Tea Industry .....	10
Cost of Production of Large Tea Gardens .....	11
Need for realigning export destinations and product mix .....	12
SWOT Analysis of Tea Industry of Assam in COVID-19 scenario .....	12
Immediate challenges faced by Assam Tea Industry.....	13
Impact of COVID 19 on community involved in Tea Value Chains .....	13
<b>Proposed Interventions for Sector Revival, Sustainability and Growth.....</b>	<b>15</b>
<b>Annexures.....</b>	<b>21</b>
<b>Annexure 1: Role of Technology in Tea manufacturing supply chain.....</b>	<b>23</b>
Disruptive Technologies and Innovations adopted in production of Tea/Other crops: .....	23
Block Chain: Reimagining Tea Supply Chains .....	25
<b>Annexure 2: Editorial Team and Contributors.....</b>	<b>28</b>

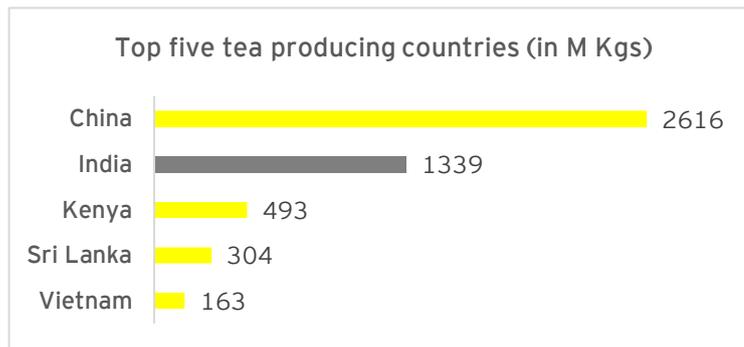


# Tea Industry Overview

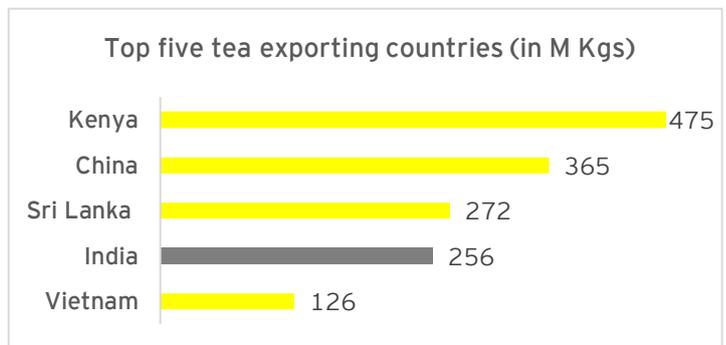
## Global Overview<sup>1</sup>

Tea is the second most consumed drink in the world after water and Turkey was the largest tea consuming country in the world in 2016, with a per capita tea consumption of approximately 3.16 kilograms per year. Several factors influence the demand for tea, including the traditional price and income variables, demographics such as age, education, occupation, and cultural background. In addition, health has a great influence on tea consumption which led to the recommendation that strengthening consumer awareness of the health benefits of tea consumption through an international generic promotion programme. Apart from consumption, other main drivers of international tea prices are trends and changes in per capita consumption, market access, the potential effects of pests and diseases on production, and changing dynamics between retailers, wholesalers and multinationals.

**Production<sup>2</sup>:** World tea production (Black, Green and Instant) increased by 3.5 percent to 5.90 million tonnes in 2018. Growth in world output was due to major increase in the major tea producing countries with China remaining the largest tea producing country with an output of 2.62 million tonnes, accounting for more than 44 percent of the world total, while production in India, the second largest producer, also increased to reach 1.34 million tonnes in 2018. Kenya, Sri Lanka, Vietnam, Indonesia and others contribute to the remaining 1.94 million tonnes of tea production in the World.

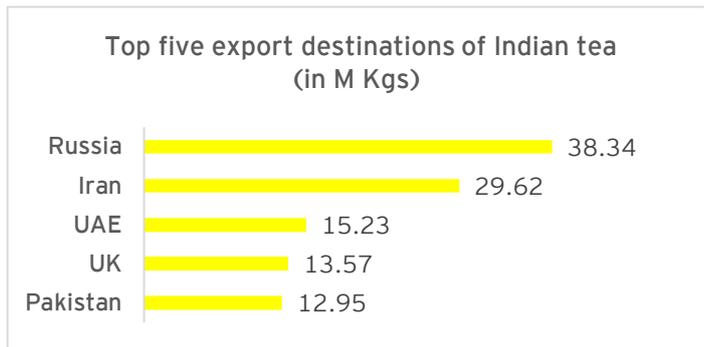


**Exports<sup>3</sup>:** The global export quantity came to about 1.86 million metric tons, with global sales from tea exports by country totalled to an estimated US\$7.76 billion in 2018. The exports of the four major exporters of tea, namely Kenya, China, Sri Lanka and India, represented more than two-thirds of total export. From 2007 to 2018, the most notable rate of growth in terms of exports, amongst the main exporting countries, was attained by India, while exports for the other global leaders experienced more modest paces of growth. In value terms, China (\$1.7B), Sri



Lanka (\$1.6B) and Kenya (\$1.4B) appeared to be the countries with the highest levels of exports in 2018, together accounting for 56% of global exports.

Imports<sup>4</sup>: In value terms, tea imports amounted to \$7.7B in 2018, the amount of tea imported worldwide amounted to 2M tonnes, rising by 3.6% against the previous year. The total import volume increased at an average annual rate of +1.4% from 2007 to 2018; the trend pattern remained relatively stable, with somewhat noticeable fluctuations in certain years. The imports of the twelve major importers of tea, namely Pakistan, Russia, the UK, the U.S., Egypt, Iran, the United Arab Emirates, Viet Nam, Germany, Saudi Arabia, Iraq and Poland, represented more than half of total imports.

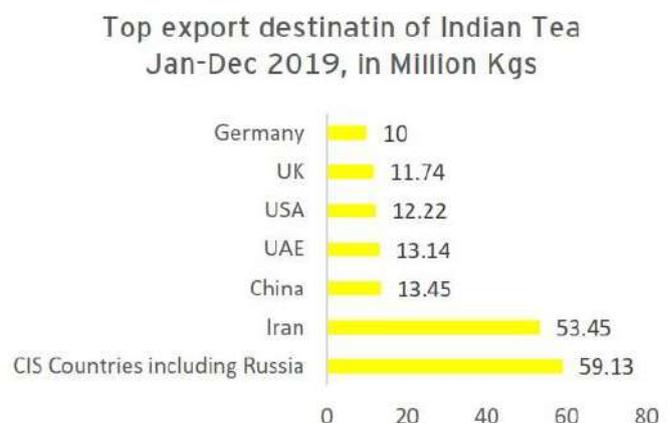


### India Overview<sup>5</sup>

India is the second largest producer of tea in the world after China and as of 2011, the largest consumer of the beverage using nearly 30 percent of the world's tea output. Despite this, the country also exports the most tea globally behind China and Sri Lanka. Tea found in India is categorized into 3 types namely Assam tea (highest cultivation), Darjeeling tea (Superior quality tea) and Nilgiri tea (subtle and gentle flavours). While famous Indian teas in the world come from Darjeeling and Assam, Ayurvedic practices have also resulted in a variety of herbal teas. Adding holy basil, cardamom, pepper and/or mint leaves to tea among other herbs and spices enhances its ability to draw from the latter's medicinal value. Adding milk and sugar to this concoction helps cloak the strong, sometimes bitter flavours.

Due to soil and climatic requirements, tea cultivation is confined to certain parts of the country, mainly in the states of Assam, West Bengal, Tamil Nadu and Kerala (80% of total harvest is accounted by Assam and West Bengal). In these regions, tea farm ownership is fragmented; large-size plantations account for roughly 20% of the total number of tea producers while some 80% of the farms have less than 8 hectares. These small tea growers have seen their contribution rising in recent years between 2014-15 and 2017-18, their share of India's tea production has risen from 34% to 47%.

Exports<sup>6</sup>: Tea exports from India was valued at over USD 58 billion in 2019 with Russia as the main export partner for Indian tea in terms of volume, at nearly 38 thousand metric tons in fiscal year 2019, Iran and the UAE followed that year. India exported tea worth nearly eleven billion Indian rupees to Iran in financial year 2019. Even though Iran

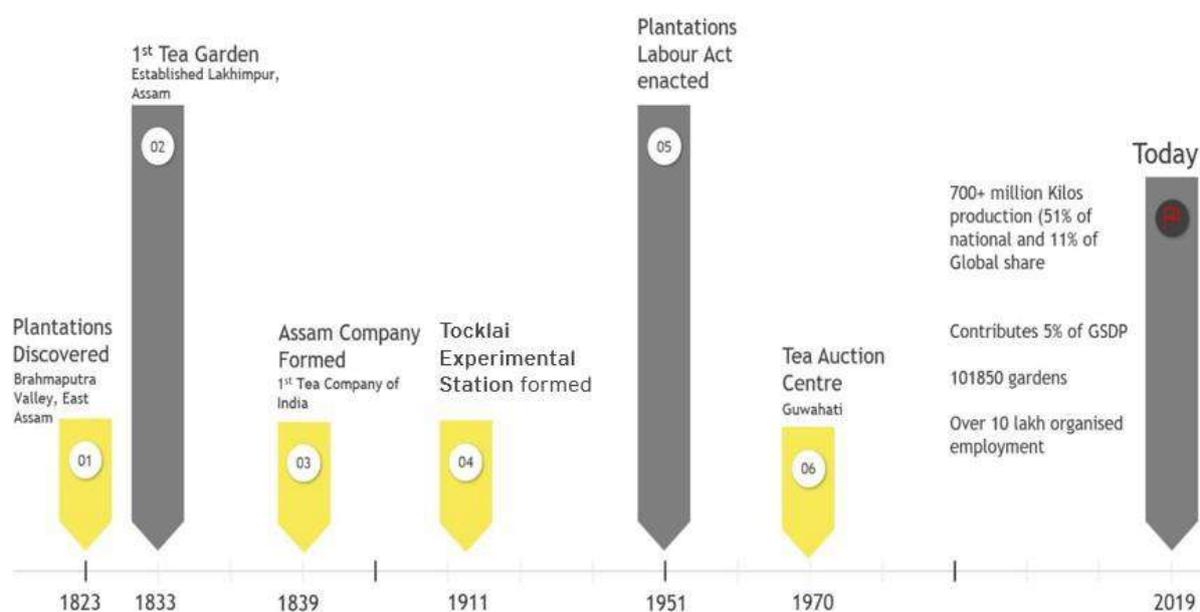


imported the highest worth of Indian tea, Russia imported the highest volume of the Indian tea the same year.

### Tea; the State drink of Assam

The Tea industry in Assam is about 197 years old, dating back to 1823 when British East India Company officials first discovered the tea plants growing in the upper Brahmaputra Valley of Assam. In 1833, Government of Assam started a tea garden in the Lakhimpur district and with the produced fine quality tea from this garden in 1938. The commercial circle of the city of London took keen interest in tea plantations in Assam. **Assam Company** was formed in 1839 to take over the experimental holdings of the East India Company's Administration over the tea gardens established in Assam. This was the 1<sup>st</sup> company in India to undertake the commercial production of tea.

In 1911, the **Tocklai Experimental Station** (later renamed as Tocklai Tea Research Institute) was established in Jorhat with a view to carry out research on cultivation and manufacture of tea. This Research Station has been very useful in disseminating knowledge for the increase of yield for the tea industry. The **Guwahati Tea Auction Centre** started in 1970 revolutionized marketing of tea from Assam. Challenges like imposition of West Bengal Entry Tax on Assam Tea, transport bottleneck were addressed with the operationalization of the Auction Centre in Guwahati. In 2012, Government of Assam declared Tea as the state drink of Assam.



**Every 9th cup of tea sipped anywhere in the world, is from lush gardens of Assam**

Assam is the single largest tea-growing region in the world. The Annual Tea production in the State is over 715 million kgs<sup>7</sup> in 2019. Assam in 2019 accounted for 51% and 11% share of Total Domestic and Global tea Production respectively.

## Impact of COVID 19 on Tea Industry of Assam

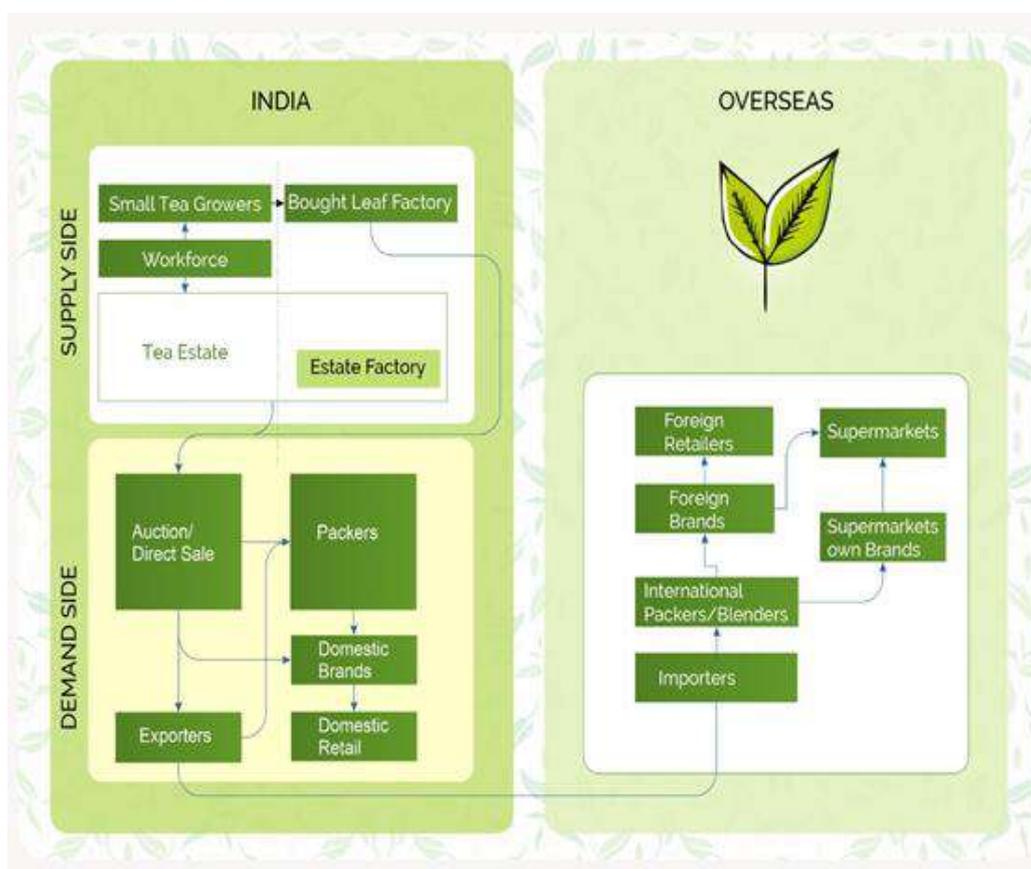
Region	2018					2019				
	BG	SG	Total	BG%	SG%	BG	SG	Total	BG%	SG%
Assam Valley	341.04	304.10	645.14	52.86	47.14	350.61	320.17	670.78	52.27	47.73
Cachar	46.38	0.39	46.77	99.17	0.83	44.41	0.60	45.01	98.67	1.33
<b>Total</b>	<b>387.42</b>	<b>304.49</b>	<b>691.91</b>	<b>55.99</b>	<b>44.01</b>	<b>395.02</b>	<b>320.77</b>	<b>715.79</b>	<b>55.19</b>	<b>44.81</b>

Assam's Tea Production in Million Kilograms ( BG- Big Growers, SG-Small Growers)

### Tea Garden Statistics in Assam

TEA GARDENS		TEA MANUFACTURING UNITS		WORKERS	
Big Tea Gardens- 783	Small Tea Gardens - 1.18 lakhs	Tea factories (with plantation) -508	Bought Tea Leaf Factories (without plantation) - 296	Big tea gardens - 7.33 lakhs	Small tea gardens ~3 lakhs

### Value Chain of Tea Industry in Assam



### Contribution to State's Economy

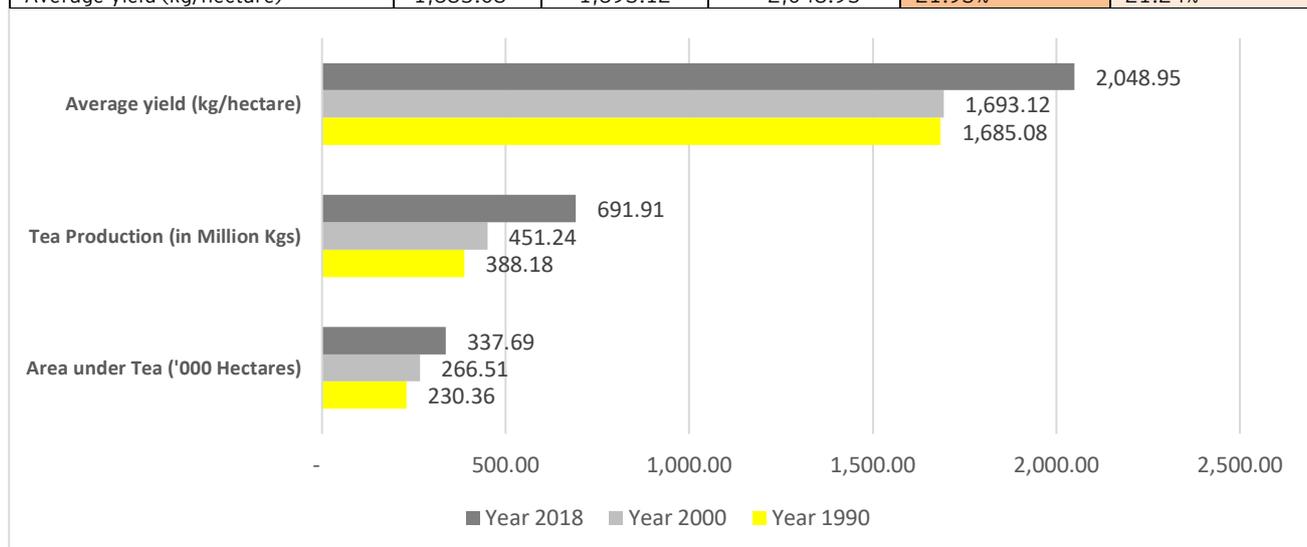
Tea Industry contributes nearly 5% of Assam's GSDP. Assam Tea Industry plays an important role in the state's as well as national economy. It has its international reputation and commands significant share in the World Tea Market. Assam Orthodox tea has been also registered under Geographical Indication (GI) tag. <sup>8 9</sup>

### Small Tea Growers (STG) - The Emerging Sector

The Tea Board of India defines a Small Tea Grower as a person who has a tea cultivation of up to 25 acres. But in the current scenario, most growers own less than 2 acres of land. A sizable number of small farmers especially in upper Assam have taken up tea cultivation during last 15 years. In 2018, Assam produced around 691.91 million kg out of which 304.49 million kg (44.01%) were from the Small Tea Grower segments.<sup>10</sup> Trend is increasing, and the production may exceed 500 million kg in the coming years. Further, from the total tea production of India in 2018 which was 1338.63 million kgs<sup>11</sup>, almost 52% of tea were from the Small Tea Growers segments thereby showcasing as one of the most enterprising revolutionary segments of Indian Tea Industry.

### Transformational changes in the Assam Tea Sector

Parameter	Year			Growth (1990 vs 2018)	Growth (2000 vs 2018)
	1990	2000	2018		
Area under Tea ('000 Hectares)	230.36	266.51	337.69	46.59%	26.71%
Tea Production (in Million Kgs)	388.18	451.24	691.91	78.24%	53.34%
Average yield (kg/hectare)	1,685.08	1,693.12	2,048.95	21.93%	21.24%



Source: Tea Board of India

- ▶ Area under tea has increased by 46.19% thereby resulting in the increase of tea production as well by 78.24% since 1990. Thus, major transformational changes have taken place in the Assam Tea industry in the last 25 years. This change is majorly due to the increase in the contribution of the no. of Small Tea Growers and their production during the last 15 years.
- ▶ Average yield (kg/hectare) in the State has also increased approximately by 22% since 1990.
- ▶ Further, the average tea auction price in Assam was Rs 150 per kg and all India price was Rs 130.90 per kg in 2014. The price has marginally increased to Rs 156.43 in Assam and Rs 138.83 in India in 2018.
- ▶ The tea garden worker wages in Assam have increased by around 22 percent in 2018 (compared to 2017).

- ▶ Further, the Assam Tea Industry has given an average daily employment to more than six lakh persons in the State, which is around 50 percent of the total average daily number of labours employed by tea industry in the country.

### Production and Quality issues in Assam Tea Sector<sup>12</sup>

Currently, the Indian Tea Industry have been noticed to experience matters of concern especially in the following two critical factors:

1. Tea consumption per capita in India is almost stagnant at 750 grams per annum. Increased supply from small tea growers, stagnant exports, have made imbalance in the demand-supply equilibrium i.e. due to increased growth of production of teas, more is the supply (availability), lesser is the demand of teas, thereby rendering to lower price than expected in the market.
2. The escalating cost of production (COP) per kg of tea has been gradually found higher than the selling price of tea per kg in the markets.

Category	Issues
<b>Organized sector - Larger Tea Estates</b>	<ul style="list-style-type: none"> <li>▶ 60% of the total crop of any estate is produced during the period from July to end October and these 4 months come as the most critical months to maintain the desired standard of teas with quality owing to the various challenges like adverse weather conditions and high absenteeism of workers to keep the plucking in order of desired rounds for making quality tea productions. Thereby, the industry being the largest labour-oriented industry must depend on the labour availability at the time when it is required to function in the peak growing period.</li> <li>▶ Planters face innumerable problems not only to maintain checks but also the factory operations must be run beyond its capacity for continuous flow of heavy crop for longer rounds of plucking. Some factory continues to operate 24 hours to complete the process with very little attention to the basic requirements of hygienic factors of the tea which take away the quality.</li> <li>▶ Tea is a fixed cost-intensive industry, with labour costs accounting for around 60 per cent of the total cost of production. Hence, increase labour costs have witnessed an adverse effect especially on the Bulk tea players on operating margins over the last few years. With this sharp increase of around 22 per cent in cash wages, organised bulk tea players have witnessed further contraction in operating margins, despite any commensurate rise in tea prices.</li> <li>▶ Almost 60% of the tea gardens in the organized sector are very old and have crossed the economic longevity period.</li> </ul>

<sup>12</sup> Telephonic interview with Mr. Uddhab Chandra Sarmah, Retd. Executive Director, Warren Tea Ltd.

	<ul style="list-style-type: none"> <li>▶ Most of the tea gardens have shifted their plantation towards “Quantity” clone category of tea and very less percentage of very good quality clones are found.</li> <li>▶ The Producers at present must comply with the requirements of the various buyers according to the choice of the consumer’s taste. Now, the markets being dominated mostly by the giant buyers, for facilitating their packaging purpose, they give direction to the producers to conform certain parameters which eventually baffles the producers to conform to the most vital quality parameters (Leaf appearance/ Infusion / Liquor) for the final product.</li> </ul>
<p><b>Small Tea Growers (STG)</b></p>	<ul style="list-style-type: none"> <li>▶ The quality and brand equity of Assam teas have been greatly diluted with nearly 300 million of teas of the large STG segments of production. This segments of STGs preferred more of quantity-oriented clones rather than quality clones owing to the easy cultivation practices which help them to have quick harvest within short span of time. Packers prefer these teas for blending purposes since the price of teas fall in the range of common and medium Assam average bracket.</li> <li>▶ Further, Improper tea cultivation practices, non-adoption of technology, improper management of soil, No recommended field practices for pruning ,plucking , bringing up of young teas , pest and weed management and use of manures and fertilisers, non-follow of PPC ( Plant Protection Code), lack of awareness of residual level of pesticides, lack of awareness to proper storage and Application of chemicals, lack of awareness to use of proper PPE (Personal protection equipment) are some of the many concerns in the STG segments that degrade the quality of tea production.</li> <li>▶ Shortage of manpower in the STG segment compels them to extend the plucking round during the time of paddy cultivations and post puja period mainly. Further, instead of hand plucking many growers resent to use small knife for harvesting.</li> <li>▶ It so happens that leaf must be thrown away on the road owing to the non-acceptance by the estate or the BLF during that time due to having no space to accommodate the bought leaf from outsources.</li> <li>▶ Agents (in the Value Chain of STG) are either not keen or are not able to motivate the STG's under them for quality assurances.</li> <li>▶ Very less concern for leaf handling right from plucking site to factory discharge. Concern for damages to leaf and the quality lacks attention of awareness for quality.</li> <li>▶ Ignorance in areas of storage of chemicals and fertilisers. Lack of awareness of the risk involved due to improper storage of chemicals and fertilisers.</li> <li>▶ Lack of adequate awareness about the environmental pollution due to use of inorganic fertilizers and chemicals.</li> <li>▶ They always look for the short-term gain. The long-term sustainability of their plantation areas requires a great deal of attention to motivate.</li> </ul>

	<ul style="list-style-type: none"> <li>▶ Because of small holding areas, the plantation areas are not considered as the sole business for their economic livelihood. So, no permanent workers are considered necessary in most of the small holders.</li> <li>▶ There is lack of loyalty/dedication as far as the supply chain to factory is concerned. The growers always look for the opportunity where high price can be realized. For the supply of their leaf, traceability comes out as a big challenge for the BLFs for their product in case complaints of Minimum Residue Limit (MRL) is registered.</li> </ul>
<p><b>Bought Leaf Factories (BLF)</b></p>	<ul style="list-style-type: none"> <li>▶ Product Traceability in terms of source of leaf received is not traceable. Hence, it poses a big threat for MRL of pesticides. Further, the BLF owners does not have responsibility towards the source i.e. the green leaf suppliers.</li> <li>▶ Minimum scientific approach is practiced producing good standard quality tea by accepting good standard green leaf.</li> <li>▶ Contract with Green Leaf supplying agents is made at the beginning of the year with some anticipated targets given to the Agents for supply of leaf to be procured at the efforts of Agents.</li> <li>▶ The quality concept in making a safe and hygienic product out of the raw materials right from the initial stage in the factory does not receive adequate attention. Thus, the teas made from BLFs are usually graded as 'Common Teas' and do not fetch the desired price from the buyers. They are basically being branded as Fillers only.</li> <li>▶ Concept of Good Manufacturing Practices (GMP) is not adequate for the BLF segments. Most of the manufacturing process practiced by them, defy the compliance of GMP on scientific bases and eventually the products turn up to be the cheapest common teas, thereby tarnishing the image of Assam tea - the Green Gold of Assam.</li> </ul>

# Impact of COVID-19 on Tea Industry of Assam

## Understanding the pandemic

In early January 2020, when coronavirus outbreak was starting to build up as a pandemic in the city of Wuhan in China, it seemed like a far cry to evolve into a worldwide pandemic that would lead to unprecedented human, social and economic disruption, leaving hardly any life untouched. However, in under 3 months (by April 2020), the virus has spread to over 160 countries, with the number of COVID-19 confirmed cases surpassing 2.9 million worldwide, with the death toll exceeding 2,00,000. In the last few months, Corona's epicenter has shifted from China to Europe to the US.

For any economic institution, pandemics are known unknowns. While in almost any risk inventory, disaster-scenario planning, pandemics are mentioned as a possibility to prepare for; however, they are usually perceived as so unlikely, that they can hardly be labelled as top of an average manager's mind.

The only known method till now to control the spread of this pandemic is "social distancing" to break the chain of virus spread through human contact. Consequently, country after country went into lockdown to completely minimize physical interactions of humans. However, as the economic consequences of the confinement measures are becoming clear, concerns about unemployment, likely persistently changing ways of doing business incorporating social distancing, demand-supply disruptions and the fear of regressing into a global depression, have become palpable.

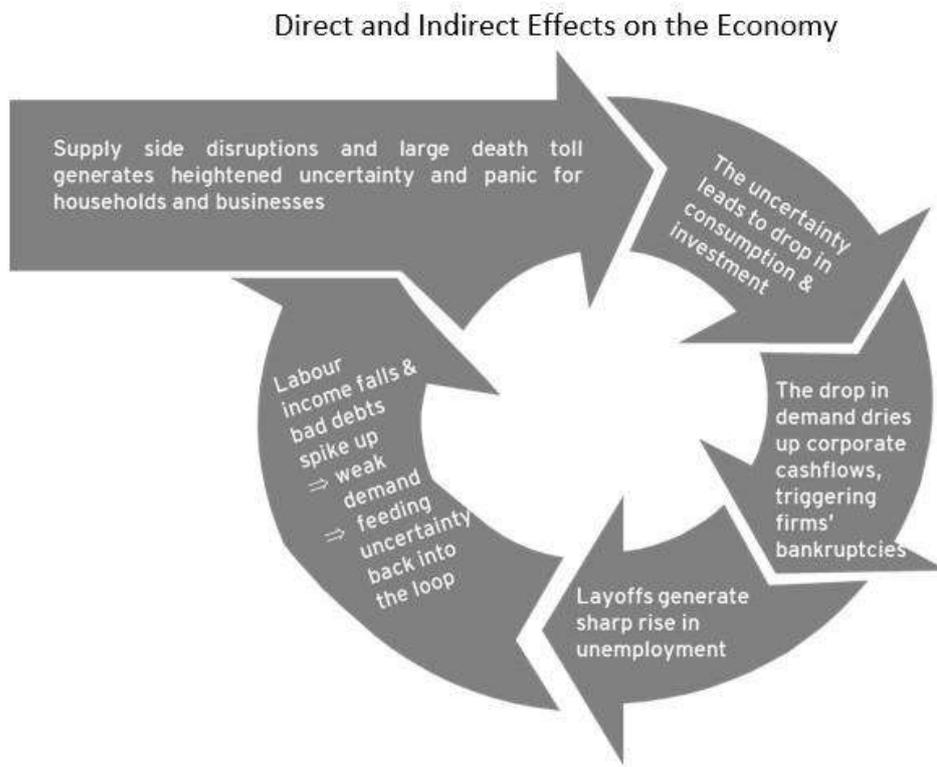
The coronavirus pandemic will go down in the history books as the most expensive crisis (so far). Perhaps WWI and WWII were more expensive, but we're not done yet! The economic impact of the COVID-19 will be a function of the magnitude and speed at which it spreads and duration over which it lasts. Overall, demand effects probably much larger than the initial supply shock. Large drop in demand thus force these firms to close. This leads to a rise in layoffs and a further drop in consumption. Economy enters a depressing loop!

As the coronavirus pandemic has been the biggest disruption to the world economy ever since the 2008-09 Global Financial Crisis, Indian economy's condition during the coronavirus outbreak can also be measured taking 2008 as a point of reference. While India entered the 2008 crisis coming off years of strong growth, the story is different this time around, with the economy going through a slowdown, pre COVID.

The global financial crisis in 2008-09 was a massive demand shock, but our workers could still go to work, our firms were coming off years of strong growth, our financial system was largely sound, and our government finances were healthy. None of this is true today as we fight the coronavirus pandemic.

In India, a 9-week nationwide lockdown, imposed to stop the spread of the coronavirus has led to widespread chaos and suffering, especially among the country's 300 million poor. Amongst the most impacted states, Maharashtra, Gujarat, Tamil Nadu, Delhi which have become the hotbeds of COVID positive cases, also happen to be key industrial and business epicenters of India further dampening the economic recovery sentiment.

Overall, even before the onset of COVID-19 pandemic across the world and in India, the Indian economy was slowing down with a real GDP growth rate of 4.7% in 3QFY20, which would now be revised significantly downwards because of the deleterious economic and health effects of the COVID- 19 pandemic. Moody's has projected India's GDP growth at 2.5% in 2020.



### Impact of COVID 19 in Assam's Tea Industry

Assam's tea industry is highly likely to suffer from the COVID 19 induced lockdown. On the supply side, the tea gardens have stopped operations from 22<sup>nd</sup> of March till 14<sup>th</sup> of April. Government of India has allowed the tea gardens to operate with 50% workforce. Due to prolonged lockdown, tea leaves have overgrown and nearly a third of the crops must be skiffed. Skiffing itself shall take 14-21 days and involve considerable amount of labour cost.

Due to the seasonal nature of the industry, plucking generally begins by mid-March. Hence, it is assumed that plucking in tea gardens were limited to ~5-7 days and hence 80% of the crop for the month of March were lost. Similarly, due to resumption of plucking from 15<sup>th</sup> April, with 50% workforce and considering the process of skiffing, it is estimated that 72.5% of crops were lost in the month of April. For the month of May, wherein certain portion of the gardens shall be under skiffing and with operational efficiency of 50% for the 1<sup>st</sup> three days, it is estimated that the crop loss shall be 5%.

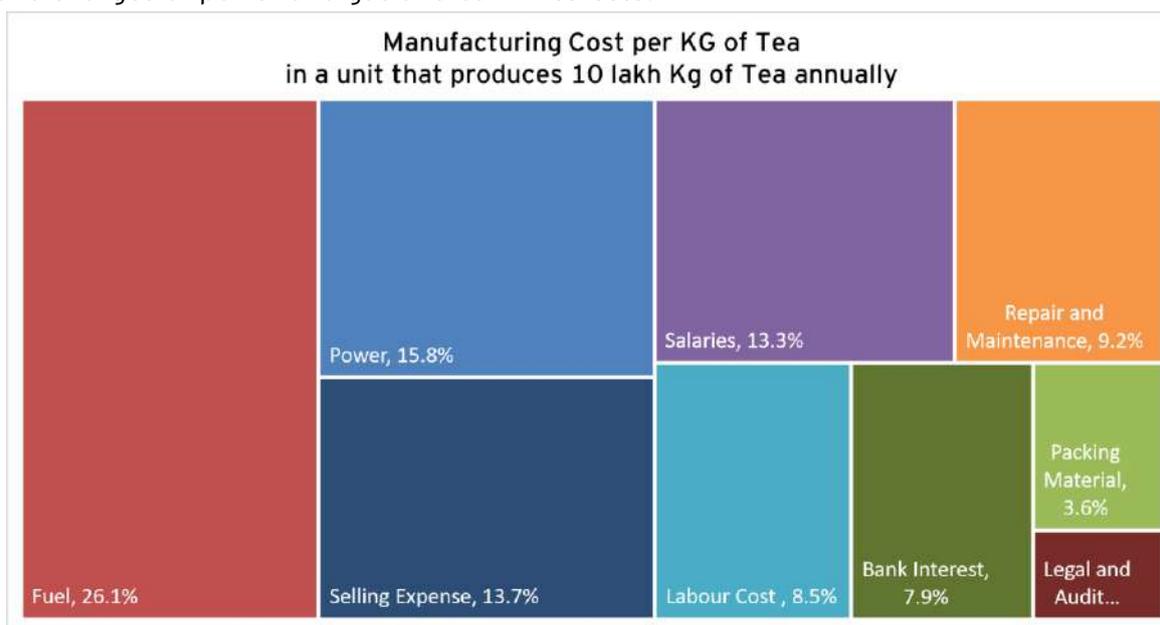
	Mar-20	Apr-20	May-20
Number of days plucking was done/shall be done	~6 days	~ 5 to 7 days	~ 25-27 days
Estimated % of production loss	80%	72.5%	5%

Based on the month wise production in tea gardens of Assam in last 3 years, annual production for 2020 has been estimated at 742.6 million kilograms (considering CAGR of 2017-19, all other factors of production remaining constant). **Based on that, as on today, the production loss of the Tea industry is estimated at 69.38 million kilograms. Considering the average price of 2019 (Rs 152.6), the revenue loss of Assam's tea industry is estimated at Rs. 1059 Crores.**

Months	2017	2018	2019	2020 (estimated)	Production Loss %	Estimated Loss (in M Kgs)
January	1.31	1.42	0	0.0	0%	0.00
February	0.37	0.54	0.44	0.5	0%	0.00
March	21.09	21.95	32.91	41.1	80%	32.9
April	44.24	48.32	44.92	45.3	72.5%	32.8
May	62.53	56.59	66.52	68.6	5%	3.43
June	70.48	78.75	75.25	77.8	0%	0.00
July	91.09	93.71	97.02	100.1	0%	0.00
August	102.61	115.49	97.37	94.9	0%	0.00
September	85.47	100.57	108.48	122.2	0%	0.00
October	104.13	98.1	98.8	96.2	0%	0.00
November	62.8	60.91	70.43	74.6	0%	0.00
December	29.05	15.76	23.65	21.3	0%	0.00
<b>Total Production</b>	<b>675.17</b>	<b>692.11</b>	<b>715.79</b>	<b>742.6</b>		<b>69.38</b>

### Cost of Production of Large Tea Gardens<sup>13</sup>

Tea is a highly labour intensive industry. On the cultivation side, 65% of cost incurred is on wages for labour. Rest 35% on plant upkeep and management including procurement of fertilizers, pesticides etc. On the manufacturing side, fuel (26%), power (16%), salaries and labour cost (22%), selling expenses (13.7%) and bank interests (8%) are the major cost heads. A major portion of the working capital of tea gardens are spent on fixed costs including, wages and salaries, contract demand charges of power and gas and bank interests.



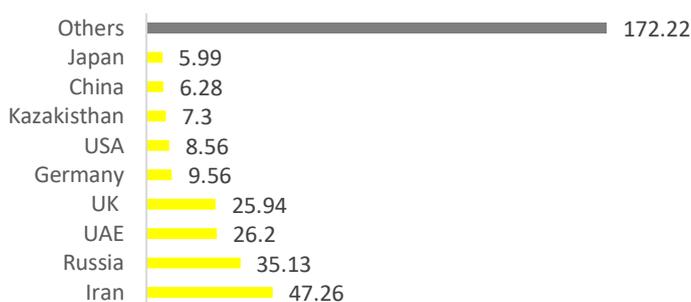
<sup>13</sup> North Eastern Tea Association

### Need for realigning export destinations and product mix

In the year 2018-19, Tea worth US\$ ~214 million has been exported from Assam's Tea Gardens<sup>14</sup>. Globally, Iran, Russia, UAE, UK, China, USA, Germany and Japan are some of the largest consumers of Assam Tea.

At present, countries including Russia, USA, UK, Germany, Iran are reeling under lockdowns due to the ongoing pandemic. Supply chain disruptions along with fall in out-of-home consumption of tea may severely affect the demand for tea in such destinations. At the same time, countries like China, Japan, UAE and few countries in Middle East, Kazakhstan have considerably opened economic activities.

Export of Assam Tea in 2018-19 (US\$ mn)



The tea industry may have to be cautious of the emerging situation in various tea consumption regions. For compensating the dip in consumption of some of the traditional markets, a strategy for realignment of export to destinations, where consumption of tea is expected to be higher, must be in place. Strategy should also consider realignment of the product mix (Orthodox/CTC) that Assam offers based on the consumption pattern of such destinations.

### SWOT Analysis of Tea Industry of Assam in COVID-19 scenario <sup>15</sup>

Strength	<ul style="list-style-type: none"> <li>▶ Peak plucking season starts from May till September which contributes to 60% of annual plucking.</li> <li>▶ The second flush (May-June) which attracts better price in market, is expected to be harvested fully.</li> <li>▶ There is hardly any leftover stock from previous financial year.</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>▶ The industry is experiencing a severe liquidity crunch due to delayed commencement of plucking.</li> <li>▶ Restoration of the supply chain including free movement of trucks is yet to stabilise.</li> <li>▶ Severe Loss of revenue from lockdowns owing to inability to pluck during the 1<sup>st</sup> flush (March-April).</li> <li>▶ Use of new technology in Tea Industry in Assam is limited as compared to China. Benefits of technology is yet to be harnessed upto a substantial potential by tea gardens of Assam.</li> </ul>
Opportunities	<ul style="list-style-type: none"> <li>▶ Promotion of tea as immunity booster in line with Ministry of Ayush's promotion overdrive of Ayurvedic products.</li> <li>▶ Possibilities of further exploring markets like China and other Far east and Middle East where economic activities have either resumed or wasn't severely disrupted</li> <li>▶ Possibility of exploring direct selling, B2C mechanisms especially e-commerce.</li> </ul>

<sup>14</sup> DGCIS EXIM Analytics, GoI, <http://www.dgcisanalytics.in/>

<sup>15</sup> Telephonic interview with Mr Bidyananda Barkotoki, Advisor, NETA

## Impact of COVID 19 on Tea Industry of Assam

<b>Threats</b>	<ul style="list-style-type: none"> <li>▶ Biggest market for Assam tea, including Maharashtra and Gujarat are reeling under COVID related lockdown and containment. Extended lockdowns may affect overall demand for tea.</li> <li>▶ Similarly closure of economic activities and border restrictions may affect demand and supply chains in international market.</li> <li>▶ Crop and revenue loss may escalate basis the precautionary and containment measures adopted in future.</li> </ul>
----------------	--

### Immediate challenges faced by Assam Tea Industry

Challenges Ahead	Description
Shortage in Working Capital	<p>Due to seasonal nature of the industry, December to February is a non-plucking period and no substantial production is done during the period. Although, the industry keeps on incurring fixed costs including labour, salaries, bank interests, contract demand charges with power discom and gas company.</p> <p>Considering that, it is expected that large tea gardens may face considerable to severe working capital shortage in short term.</p> <p>This condition may be aggravated by the long term weakening financial health of the large tea gardens in past.</p>
Supply Chain Management	<p>Based on the current scenario on COVID 19, it is expected that the nationwide lockdown shall be relaxed/discontinued. However, the transport sector shall take time to recover.</p> <p>States like Maharashtra, Gujarat, Madhya Pradesh, Rajasthan, Delhi which are some of the largest markets for Assam tea are reeling under COVID 19. Transportation and logistics in such states may get affected in near future.</p>

### Impact of COVID 19 on community involved in Tea Value Chains

Value Chain	Impact L/M/H	Remarks
Plantation		<ul style="list-style-type: none"> <li>▶ The impact in plantation value chain among the community will be low in the tea sector as in the forthcoming months, plantation of tea bushes is barely minimum.</li> </ul>
Plucking/ Pruning		<ul style="list-style-type: none"> <li>▶ The plucking activity in tea estates is carried out in a manner which automatically fulfils the criterion of social distancing. The spacing between tea bushes is generally 105 cm (row to row) and each plucker is allotted two rows. Hence, the distance maintained between two pluckers is more than two meters. Out of all the field activities in a tea estate, about 65% of the total workforce is engaged in plucking activity.</li> <li>▶ The overgrown tea will have to be cut and removed before starting fresh plucking.</li> </ul>

## Impact of COVID 19 on Tea Industry of Assam

		<ul style="list-style-type: none"> <li>▶ Further, the forthcoming months shall be the peak tea production period hence, plucking/pruning activity will be at the highest in the tea estates</li> </ul>
<b>Processing</b>		<ul style="list-style-type: none"> <li>▶ Medium impact on community as processing involves limited workers, however due to restrictions on transportation and unavailability of workers, tea leave from STGs are not able to reach BLFs or Large tea estates.</li> <li>▶ Further, from July onwards, generally due to peak production period, most factories operate 24 hours. However, with restrictions due to C19, the factories may not operate as usual and run for limited hours.</li> </ul>
<b>Packaging</b>		<ul style="list-style-type: none"> <li>▶ Low impact on community as packaging involves less workers and is usually done by machines.</li> </ul>
<b>Distribution</b>		<ul style="list-style-type: none"> <li>▶ Low impact on community, however, with restrictions on vehicle movement and non-availability of workers, the private companies have been unable to transport tea from the warehouses to meet the demand.</li> </ul>

Low
  Medium
  High

# Proposed Interventions for Sector Revival, Sustainability and Growth

## 1. Supply Side Interventions

<p><b>Short Term (3-months)</b></p>	<p><b>Interventions by Organizations</b></p> <p><b>Safety and Hygiene</b></p> <ul style="list-style-type: none"> <li>▶ There is a need to proactively implement extra precautions to prevent infection of the workforce. SOP for social distancing, isolation of symptomatic workers and testing on symptomatic workers may be developed and workforce should be sensitized. IEC material with localized content for dissemination amongst workers is critical. Innovative sensitization campaigns can also be carried out that may help to getting the message through to the target audience for eg: Short sensitization plays that could be circulated in WhatsApp and local channels.</li> <li>▶ Tea Gardens may monitor and track employee health status, follow MoHFW mandated protocols, define travel and social distancing guidelines &amp; quarantine requirements and plan for flexible work shifts.</li> <li>▶ Operation crisis and risk management strategies needs to be activated and overseen at leadership levels</li> <li>▶ Identification and prioritization of steps to protect relationships with top customers, critical suppliers, and strategic partners.</li> <li>▶ NGOs and CBOs may be involved by Government of Assam to monitor and train on safety and hygiene especially amongst Small Tea Growers.</li> <li>▶ In addition to the social distancing guidelines and sanitization required to ensure that the sector remains COVID-19 free, it is imperative that Assam's Tea Sector expedite compliance to Good Hygiene Practices (GHP) and Good Manufacturing Practices (GMP) laid out in schedule 4 of Food Safety and Standards (Licensing and Registration of Food Business) Regulation, 2011.</li> <li>▶ Safety Masks, Hand Sanitizers, Soaps and disinfectants for sanitization should be made available to the workforce involved in plucking and processing during C19 times. While the organizations could bear the cost of the gear, part of expenses should be subsidized by Government of Assam.</li> <li>▶ Proactive and mandated use of Arogya Setu app by all Tea Garden workers and staff for better monitoring and safety.</li> </ul> <p><b>Interventions by Government /Regulatory Bodies</b></p> <p><b>Social Security</b></p> <ul style="list-style-type: none"> <li>▶ All Tea workers who are deployed for any activities including plucking, processing, transportation and other aspects of production and distribution</li> </ul>
-------------------------------------	---

<p><b>Short Term (3-months)</b></p>	<p>of Tea during COVID-19 impact period, and who are not covered under insurance scheme of Central/ State Government, may be insured against death due to C-19.</p> <ul style="list-style-type: none"> <li>▶ Directorate of Tea should ensure that all benefits eligible to tea workers under PM Garib Kalyan Yojana (PMGKY), PM Garib Kalyan Anna Yojana (PMMGKAY), PMJDY and PM Ujjwala Yojana should be made available. In addition, one-time cash incentive of INR 3000 /- as an advance support for a period of 3 months may be provided to the tea workers through DBT/ cash as feasible for Tea Garden workers.</li> <li>▶ Convergence of Tea Board with MGNREGA may be explored leading to availability of low-cost labor for creation of assets like irrigation structures, drains etc. on tea estates. Precedence of MNREGA linkage with other plantation boards i.e. rubber board and fruit plantations already exist.</li> </ul> <p><b>Provident Fund:</b></p> <ul style="list-style-type: none"> <li>▶ Under 'Pradhan Mantri Garib Kalyan Yojana' (PMGKY), Government of India has announced contribution of provident fund for three months to Employees' Provident Fund Organization (EPFO) for establishments employing less than 100 employees.</li> <li>▶ However, provident fund of tea workers in Assam is managed by Assam Tea Employees Provident Fund Organisation (ATEPFO) instead of EPFO.</li> <li>▶ Government of Assam may consider extending similar benefit to the tea industry in Assam. Government of Assam may contribute employees and employers' portion of PF contribution for at least, forthcoming 3 months. This will substantially help units already under financial pressure.</li> </ul> <p><b>Liquidity</b></p> <ul style="list-style-type: none"> <li>▶ The Tea Industry may consider voluntary wage deduction or deferment or both of employees to ensure liquidity for forthcoming 3-4 months.</li> <li>▶ In view of the present liquidity crisis, Government of Assam may consider subsidising fertiliser and ensure adequate supply of fertiliser for the Tea Industry.</li> </ul>
<p><b>Medium and Long Term (6 months to 1 year)</b></p>	<p><b>Interventions by Government/ Regulatory bodies</b></p> <p><b>Quality and Risk Assessment of Tea value chains</b></p> <ul style="list-style-type: none"> <li>▶ A detailed Value Chain Analysis in Tea with an objective to identify quality and risks can help to further create plans for process improvement within the production system. Failure mode and effect analysis (FMEA) technique may be used to perform a risk assessment within the manufacturing process</li> </ul>

<p><b>Medium and Long Term (6 months to 1 year)</b></p>	<p>specially in STGs and BLFs to identify weaknesses or deficiencies which may affect the product or products. As most of stakeholders in the STG and BLF segment may not have the resources to carry out similar studies the same could be funded by regulatory bodies or government.</p> <p><b>Farmer Producer Organizations and Contract Farming</b></p> <ul style="list-style-type: none"> <li>▶ As more than 95% growers are small holder farmers, Farmer Producer Organizations development and promotion program may be initiated. Government of Assam/Tea Board of India may consider analyzing the benefits of introducing Farmer Producer Organizations in Tea Sector.</li> <li>▶ With an objective of organizing the STG sub-segment, study on benefits and effects of Contract Farming amongst small tea growers may be explored by Government of Assam and Tea Board. Contract Farming also helps in ensuring greater market connect.</li> </ul> <p><b>Market Volatility</b></p> <ul style="list-style-type: none"> <li>▶ Government of Assam may consider maintaining a price stabilization fund to manage price volatilities or any disruptive situation like the current pandemic. The fund would maintain a corpus jointly contributed by government, growers, donors and funding agencies, which would provide a cushion to growers in disruptive times.</li> </ul> <p><b>Regulatory Mechanism</b></p> <ul style="list-style-type: none"> <li>▶ Government of Assam may consider setting up an independent Assam Tea Plantations Regulatory Authority in the long run.</li> <li>▶ Government of Assam may consider conducting feasibility study for harnessing of non-conventional power in tea gardens (Grid interactive solar and Bio-fuel).</li> </ul> <p><b>Entrepreneurship</b></p> <ul style="list-style-type: none"> <li>▶ Incubation support should be provided for tea entrepreneurship by Industries and Commerce Department, Government of Assam under its start-up policy.</li> </ul> <p><b>Innovation</b></p> <ul style="list-style-type: none"> <li>▶ Tea Industry in Assam lacks innovation (plantation, processing, product diversification, marketing, promotion, use of technology) as compared to</li> </ul>
---	---

<p><b>Medium and Long Term (6 months to 1 year)</b></p>	<p>Tea Industry of China or Japan. Government of Assam may constitute a task force to assess the potential for innovation in tea industry and to find way forward. It will help the industry to come out of the traditional practice of tea production.</p> <p><b>Technology</b></p> <ul style="list-style-type: none"> <li>▶ In order to bring back Tea sector on its feet post COVID 19 situation, technology will act as an enabler for a quick turnaround in the sector. Tea sector of Assam needs to adopt new technologies like Fine Lead Count (FLC) tech driven by AI and data driven technologies which help remove human bias. <b>The government could incentivize adaption of such modern technologies which will help in better price realization for good quality leaves, help in grading of tea in batches, improve traceability of quality product to garden and section level.</b></li> <li>▶ Solutions which can reduce overall cost of plantation by an integrated system, along with an end-to-end logistics solution can be adapted by both STG and LTG engaged in plantation. For the STGs, there could be an incentivization for embracing new technology which could help encourage STG adopt the same.</li> <li>▶ Cost benefit analysis would be required before taking a decision on implementation of these technologies.</li> <li>▶ As majority of the plantation is more than 60 yrs old, subsidized funding for clone replantation can be provided by Tea Board. The costing may be worked out including innovative ways of financing.</li> </ul>
---	--

## 2. Demand Side Interventions

<p><b>Short Term (3-months)</b></p>	<ul style="list-style-type: none"> <li>▶ Government and Tea Board of India may consider promotion of tea as immunity booster in line with Ministry of AYUSH's promotion overdrive of Ayurvedic products. Tea Board of India describes tea as an immunity booster. (<a href="http://www.teaboard.gov.in/TEABOARDPAGE/MTE1">http://www.teaboard.gov.in/TEABOARDPAGE/MTE1</a>)</li> <li>▶ Government may allow tea sale through fair price shops</li> <li>▶ Markets like China, which have imposed less stricter lockdowns or who have substantially opened post COVID19 related restrictions may be targeted for export promotion</li> <li>▶ Opening up of channels like Government rationing can be explored. Example: Small Tea grower Federation of Tamil Nadu has supplied tea to the state of Kerala through Government procurement</li> </ul>
-------------------------------------	---

<p>Long Term (1 year)</p>	<p><b>Interventions by Organizations</b></p> <p><b>Supplementing income sources</b></p> <ul style="list-style-type: none"><li>▶ The tea stakeholders in the plantation sector should consider diversifying in business activities which will help supplement their sources of income from Tea. Product Diversification may be encouraged and promoted. Similarly, Tea gardens that includes land which are not suitable for tea cultivation can be allowed to open-up for commercial activities including, fisheries, cultivation of medicinal plants, horticulture, floriculture etc.</li></ul> <p><b>Perception Marketing</b></p> <ul style="list-style-type: none"><li>▶ Tea is by and large a price inelastic product and it is looked upon as common man's drink which may be a roadblock to realizing premium prices. Tea brands need to reimagine branding strategies in a way that can be more visible in popular media like films, series and other popular culture so that they can gain a competitive edge with competing beverages like coffee, which has grown its influence over the evolving young consumer in countries like India. It is important not to commoditize tea and rather market it as premium beverage which could add value to future price realization.</li></ul> <p><b>Interventions by Government</b></p> <p><b>Brand 'Assam Tea'</b></p> <ul style="list-style-type: none"><li>▶ The Government could set up special team to develop a strong brand strategy for the Assam Tea with fully laid out plans for branding and design that could be elemental to give the sector a fresh boost. Having a Brand strategy for Assam tea would enable Tea Companies and other stakeholders in Tea to adapt to the brand guidelines and enable them to modulate their internal brand communication to match the framework by the government. This would enable overall brand coherence for the sector. By proactively looking at global trends and consumer preferences regularly so that the 'Assam Tea' brand can always be modern and updated in order to have maximum and continued brand visibility. A special logo could be trademarked to promote the brand 'Assam Tea'. The unique history and nature of Assam's tea can provide a plethora of opportunities to create a brand story that would attract existing customers to adapt to this tea variety and help attracting new consumers for the beverage.</li></ul> <p><b>Integrated Marketing and Promotion Plan for 'Assam Tea'</b></p> <ul style="list-style-type: none"><li>▶ The Government need to develop an integrated marketing and promotion plan to promote the brand 'Assam Tea' which will help in boosting</li></ul>
-------------------------------	---

<p><b>Long Term (1 year)</b></p>	<p>consumption patterns in both domestic and international markets. There have been similar plans in other sectors like Tourism, Assam Silk. Assam Tea could be positioned as a special category of Tea compared to other types of Tea. Health benefits of Tea consumption could also be highlighted. A comprehensive plan engaging targeted audience at various geographies as per taste preferences and, demographics could become a key driver for promotion of the sector and the brand. Digital Media and even traditional media could be leveraged to create various aspects that make a strong brand. Beverage segment is replete with various examples of unique marketing and promotion strategy devised by beverage brands esp. campaigns by brands from carbonated soft drinks sector which have driven sales for more than a century and enabled them to keep their foothold intact in the fast-changing world.</p>
--------------------------------------	---

# ANNEXURES



## Annexure 1: Role of Technology in Tea manufacturing supply chain

In current tea production setting, disruptive technologies and innovations can play the vital role in tackling the problems such as low planting density, with high management cost; uneven budding, with a low yield; mismanagement of irrigation resources with huge requirement of water resources etc.

Technologies such as Unmanned Aerial Vehicle (UAV) commonly known as drones carrying the high-speed camera, are aiding farmers to better plan and monitor their crops, to ensure greater productivity. Knowledge-based software developed for water management are being used to come up with precise solutions for the farmer, specific to his farming practices, geographical area and availability & quality of freshwater resources. IoT system-based water pumps enables farmers to operate the entire system from his mobile phone - set the quantity of water to be pumped and time of watering his field and get a real-time report of the critical health parameters of the pump system.

**Internet of Things (IOT) technology** uses sensors to collect parameters such as temperature, humidity, conductivity, and PH value, which are sent to the server, and monitors the growth environment of crops in real time. Wireless sensor network and routers are designed and deployed in the tea plantation for collecting soil moisture in real time. All data were transmitted by wireless sensor network. The images of the tea leaves are collected by the high-speed camera loaded onto UAV for analysis of the tea deficiency. Precision fertilization and precision irrigation are carried out according to the analysis results, which provide a reference for improving the scientific and technological level of domestic tea industry in production and management.

### **Disruptive Technologies and Innovations adopted in production of Tea/Other crops:**

**Use of UAV (Drones):** Africa's tea growing nations, especially Uganda and Malawi, are very active in using this technology. Drones are now becoming as core to tea farming as smartphones. Countries like China used them majorly for their fruit orchards through strong Provincial government support and Brazil is a major innovator in drone manufacturing, software and use of it. Major component of UAV are Fixed wing drones (mini-planes) which can carry loads of up to 80 pounds - of chemical sprays, water, seeds, packages, fertilizer, sensors, and cameras. Other types are Copters which are generally smaller and take off and land vertically. These are suited for small tea farms.

Cameras which are ranges from high-resolution multi-pixel visual image equipment and through to near-infrared ones. Multispectral camera remote sensing imaging technology uses Green, Red, Red-Edge and near Infrared wavebands to capture both visible and invisible images of plants. These images integrate with specialized software which output the information into meaningful data. This land telemetry, soil and plantation data allow the grower to monitor, plan and manage the farm more effectively saving time and money along with reducing the use of pesticides. Images obtained through Infra-red plant diagnostics is so effective that the signs of plant stress are apparent through sensors ten days before the physical damage is visible. The most sophisticated sensors measure the height of plants in real-time and precisely outlines land masses and elevation changes. They alert farmers to drainage and soil erosion, track disease spreading

and pest attacks and build 3D representations etc. The geospatial data can be transmitted through software to standalone laptop or to network connection via an Internet wireless “cloud” service to one of the many commercial and collaborative development agencies that interpret images and send back maps, alerts, and “prescription mapping” etc.

In Hangzhou, Zhejiang Province of China, **drones** are being used to transport tea leaves as it takes only two minutes to fly over the mountains while tea pickers spent one hour to climb the mountain for tea leaves. Many tech companies like US-based PrecisionHawk and Airinov in France claim their drone-based farming systems can increase farmers' yields. Airinov's, multispectral cameras are used to analyse nitrogen absorption at stages of a crop's development. This helps farmers work out the best time to add fertiliser and where it is needed most, reducing wastage of this expensive resource. Simactive, a firm that provides software to process imagery from drones and satellites offers farmers the ability to turn drone-captured imagery into 3D maps of their fields to show how water may flow across them - useful when determining how flooding or run-off might affect crops and soil. In the small Central American nation of El Salvador, Large unmanned hexacopters fitted with 20-litre tanks for carrying fertiliser or pesticides follow pre-mapped routes and spray crops accordingly with a single spray team can service 40 hectares.

**Use of IoT applications:** Development of the Internet of Things (IoT) is shaping the future of smart agriculture industry. Agri based industries are now upgrading and becoming more technology driven. By using various smart agriculture gadgets, farmers have gained better control over the process of growing crops, making it more predictable and efficient.

Currently, Smart agriculture, is mostly used to denote the application of IoT solutions in agriculture. IoT is transforming agriculture through collecting data, tons of data by smart agriculture sensors e.g. weather conditions, soil quality, crop's growth progress, plant health. This data can be used to track the efficiency of staff performance and equipment. With the help of data, the ability to predict the output of the production allows to plan for better product distribution. Cost management and waste reduction can be achieved by being able to see any variances in the crop growth, grower will be able to mitigate the risks of losing the yield by taking the appropriate and timely actions. Activities such as irrigation, fertilizing, or pest control can be automated through process automation by using smart devices, grower can automate multiple processes across production cycle and standards of crop quality and growth capacity can be improved as well.

There are various IoT sensors, devices and applications developed to be used in agriculture. For monitoring of Climate Conditions, some examples of agriculture IoT devices are all METEO, Smart Elements, and Pycno. For Crop Management, Arable and Semios can serve as good representations. For End-to-End Farm Management Systems usually include several IoT devices and sensors, installed on the premises as well as a powerful dashboard with analytical capabilities and in-built accounting/reporting features. This offers farm monitoring capabilities remotely and allows to streamline most of the business operations.

In mountain near Ya'an City, Sichuan Province in Southwest China, a grower has implemented the IoT solution application consists of LoRa gateways and sensor nodes such as wireless air temperature and humidity sensor, wireless light intensity sensor, wireless soil moisture and temperature sensor. With the solution deployed in the tea plantation, grower easily monitored the environmental data such as air humidity, temperature, Light Intensity, Soil Moisture &

Temperature which are crucial to tea quality. With the help of a QR code, the farm location and real time data of the farm from where tea is produced can be made available to end customers, by simply scanning the QR code on the tea's packaging. Thus, the tea-growing environment is traceable by the customers, proving the tea they are enjoying is in fact from the specific location. Through this tea grower can gradually build up his brand with loyal customers, and supply to end-users directly with a better price.

**Use of Blockchain:** In tea supply chains, authentication, transparency, worker rights, farmer payments, or safety are the major concerns. Blockchain is the technology platform for bringing together any and every transaction record within a trade complex - industry, consortium, supply chain, payments system. It's secure, tamper-proof, comprehensive and easy to access for registered parties.

With the help of the block chain tea traceability platform can be developed to ensure every tea brick has a traceable origin, verified proper distribution and logistics, and authentic qualification. In October 2019, the Tea Board of India released an expression of interest (EoI) requesting firms to develop end-to-end traceability solution for tea traceability that would utilize blockchain and other technologies, according to Ledger Insights. Since then, India's Yes Bank as well as international companies such as Amazon and Infosys have demonstrated interest in the Tea Board's request, with the Tea Board expected to soon award a contract for the blockchain traceability project. The Tea Board will initially focus on the traceability of orthodox tea blends or loose-leaf traditional teas, which should help growers to realize higher profits. Meanwhile, China, which is the largest producer of tea in the world, recently launched the Yunnan Pu'er Tea Traceability Platform, in collaboration with VeChain and a few local partners.

Singapore-based blockchain application platform VeChain is emerging as a strong player across block chain and has targeted supply chain management as a major target for innovation. With VeChain technology helps tea producers and stakeholders by increasing efficiency and productivity in all stages of production in the supply chain as well in traceability efforts. VeChain signed a partnership agreement with Anhui Tea Industry Association (gross value of tea industry in Anhui is estimated to reach \$7.1 billion by 2020 and has 670 enterprise members and 194 individual industrial and commercial household members) to accelerate the development of tea industry across the province by leveraging the VeChainThor blockchain technology.

### **Block Chain: Reimagining Tea Supply Chains**

#### **Overview<sup>16</sup>**

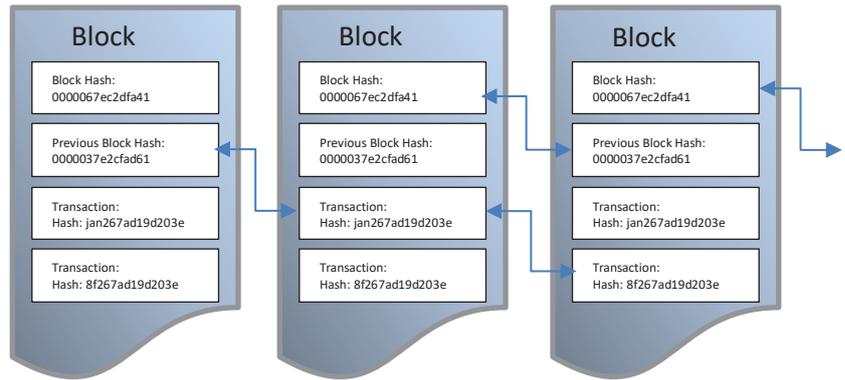
Blockchain is a technology for a distributed and immutable ledger which can record transactions and track assets in a business network. Assets include both tangible (Car, Apartment, land etc ) or intangible (Copyrights, Trademarked content, Branding etc). Anything that has value can be traced and traded on a blockchain network which reduces risk and better cost efficiency for all involved stakeholders. Blockchain technology in Tea would enable stakeholders of tea value chain to track their product in its journey from plantation to any point in the supply chain or till the cup of the consumer.

---

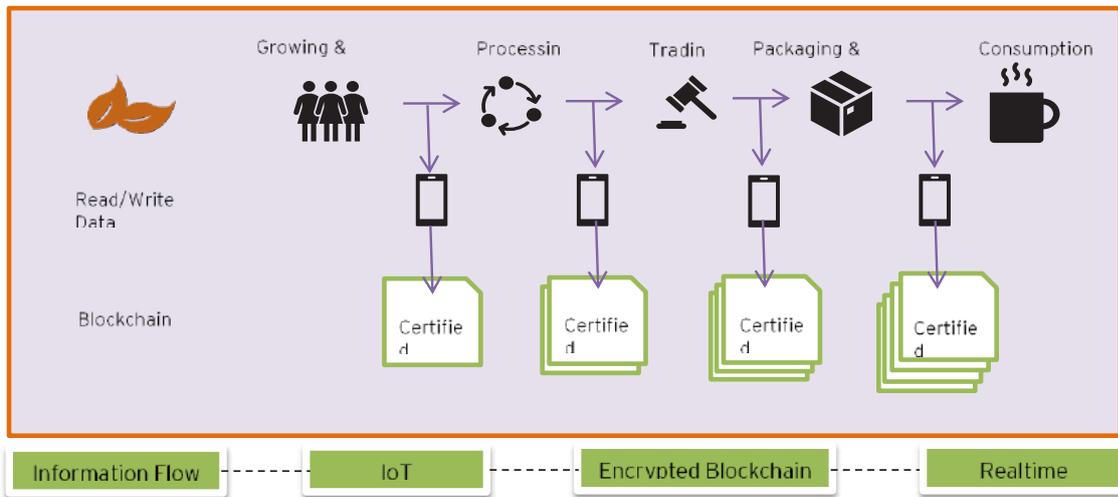
<sup>16</sup> Blockchain for dummies-3<sup>rd</sup> IBM Limited Edition

## Impact of COVID 19 on Tea Industry of Assam

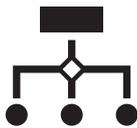
Integration of block chain in Tea value chain could be a game-changer in enabling tea traceability where end consumers would be able to trace the origin of their tea through digitization of the marketing channel. Traceability would amongst a spectrum of other benefits could also be a key driver for better price realisation and quality control for Assam Tea.



### Simplified process of block chain in Tea Supply Chain



### Key characteristics of block-chain



#### Distributed ledger technology

All stakeholders have access to a distributed ledger system where immutable records of transactions are maintained. Transactions/feedback are recorded only once and only in this secured ledger which removes the duplication of information and ledgers usually maintained in different systems of the various stakeholders. This ledger is not maintained in a single computer nor in a centralised system but in a distributed system across multiple systems.



#### Records are immutable

Information registered in Blocks of the block chain are tamper proof and cannot be changed after its been recorded to the shared ledger. A wrong transaction recorded can only be added upon by a new transaction which can negate the error. However, both transactions would then be registered and visible.



#### Smart contracts

Smart contract is a set of rules which is stored on the blockchain to expedite transaction automatically. A smart contract can be used to define various types of conditional transaction or feedback.

### Key Advantages for Tea Sector for adapting block chain<sup>17</sup>

#### Provenance tracking

Consumers, retailers, distributors, importers, exporters, processors and all the other stakeholders in the tea value chain, right from the plantation stage would be able to track the provenance of the product i.e., tea. They would be able check change in origin, ownership and change in the product condition or its attributes throughout its transition through the value chain till the consumption stage. Provenance is growing in relevance to trace sustainability of the product and the production machinery and has become important for modern consumers across the globe. Also, it can make it easier for importers to trace the origin and quality of the tea.

#### Prevention of counterfeiting

A visible audit trail to all relevant value chain stakeholders prevents ease of counterfeiting tea products. Tea sector has faced challenges in preventing counterfeiting which are in two forms 'adulteration' and 'passing off'. In adulteration, tea leaves are sometimes mixed with other plant leaves and even inorganic substances. In 'passing off' claims about a certain tea brand or type may not be true. For eg: Retailers may be 'passing off' a different cheaper variety of tea in the name of 'Assam Tea'. Blockchain through its secured technology enabled ledger system could contribute in making the supply chain more transparent and less prone to counterfeiting.

#### Inventory and pilferage tracking

Block chain technology can ensure end-to-end visibility from tea processors and brokers to retailers ensuring transparency and authenticity in a complicated and complex supply chain. Retailers can also plan about which tea products to sell first depending on the date of expiry or price or any other attribute.

#### Tracking critical parameters

Blockchain can be paired with other technologies like Internet of Things (IoT) which can also bring an array of new features for the stakeholders to monitor including shipping conditions of the product like temperature, humidity, moisture etc. Blockchain technology can enable regulatory bodies and inspection agencies to easily check for regulatory compliances for the product by giving them access to the history of the product from its point of origin through its various stages of handling.

---

<sup>17</sup> 'Does blockchain hold the key to a new age of supply chain transparency and trust?'-Capgemini Research Institute

## Annexure 2: Editorial Team and Contributors

### Editorial team:

1. Adil Zaidi, Partner & Leader - Economic Development Advisory, EY LLP
2. Amit Vatsyayan, Partner & Leader - Agriculture & Skills, EY LLP
3. Mitrabhanu Choudhury, Vice President, Economic Development Advisory, EY LLP
4. Anshuman Saikia, Vice President and Markets Lead - North East, EY LLP
5. Amit Bajaj, Vice President, EY LLP
6. Arunabh Sarma, Project Manager, EY LLP
7. Kaustav Bhagwati, Senior Project Associate, EY LLP
8. Anuj Sarma, Senior Project Associate, EY LLP
9. Amlan Bhuyan, Senior Project Associate, EY LLP

### Contributors:

1. Dr. Mridul Hazarika, Advisor SITA & former Vice-Chancellor Gauhati University.
2. Dr. Kamal Malla Bujarbaruah , Advisor SITA & former Vice-Chancellor Assam Agricultural University Jorhat, Assam .
3. Shri Kashinath Hazarika , Member SITA & former CMD North Eastern Development Finance Corporation Ltd , Guwahati, Assam
4. Shri Bidyananda Barkakoty, Advisor, North Eastern Tea Association (NETA) & former Vice Chairman, Tea Board of India.
5. Smt. Nirupama Talukdar, Director of Economics & Statistics, Govt. of Assam

## Our offices

### Ahmedabad

2nd floor, Shivalik Ishaan  
Near C.N. Vidhyalaya  
Ambawadi  
Ahmedabad - 380 015  
Tel: +91 79 6608 3800

### Bengaluru

6th, 12th & 13th floor  
"UB City", Canberra Block  
No.24 Vittal Mallya Road  
Bengaluru - 560 001  
Tel: +91 80 4027 5000  
+91 80 6727 5000  
+91 80 2224 0696

Ground Floor, 'A' wing  
Divyasree Chambers  
# 11, O'Shaughnessy Road  
Langford Gardens  
Bengaluru - 560 025  
Tel: +91 80 6727 5000

### Chandigarh

1st Floor, SCO: 166-167  
Sector 9-C, Madhya Marg  
Chandigarh - 160 009  
Tel: +91 172 331 7800

### Chennai

Tidel Park, 6th & 7th Floor  
A Block, No.4, Rajiv Gandhi Salai  
Taramani, Chennai - 600 113  
Tel: +91 44 6654 8100

### Delhi NCR

Golf View Corporate Tower B  
Sector 42, Sector Road  
Gurgaon - 122 002  
Tel: +91 124 443 4000

3rd & 6th Floor, Worldmark-1  
IGI Airport Hospitality District  
Aerocity, New Delhi - 110 037  
Tel: +91 11 4731 8000

4th & 5th Floor, Plot No 2B  
Tower 2, Sector 126  
NOIDA - 201 304  
Gautam Budh Nagar, U.P.  
Tel: +91 120 671 7000

### Hyderabad

Oval Office, 18, iLabs Centre  
Hitech City, Madhapur  
Hyderabad - 500 081  
Tel: +91 40 6736 2000

### Jamshedpur

1st Floor, Shantiniketan Building  
Holding No. 1, SB Shop Area  
Bistupur, Jamshedpur - 831 001  
Tel: +91 657 663 1000

### Kochi

9th Floor, ABAD Nucleus  
NH-49, Maradu PO  
Kochi - 682 304  
Tel: +91 484 304 4000

### Kolkata

22 Camac Street  
3rd Floor, Block 'C'  
Kolkata - 700 016  
Tel: +91 33 6615 3400

### Mumbai

14th Floor, The Ruby  
29 Senapati Bapat Marg  
Dadar (W), Mumbai - 400 028  
Tel: +91 22 6192 0000

5th Floor, Block B-2  
Nirlon Knowledge Park  
Off. Western Express Highway  
Goregaon (E)  
Mumbai - 400 063  
Tel: +91 22 6192 0000

### Pune

C-401, 4th floor  
Panchshil Tech Park  
Yerwada  
(Near Don Bosco School)  
Pune - 411 006  
Tel: +91 20 4912 6000

# Impact of COVID 19 on Tea Industry of Assam

Ernst & Young LLP

EY | Assurance | Tax | Transactions | Advisory

## About EY

EY is a global leader in assurance, tax, transaction and advisory services. The insights and quality services we deliver help build trust and confidence in the capital markets and in economies the world over. We develop outstanding leaders who team to deliver on our promises to all of our stakeholders. In so doing, we play a critical role in building a better working world for our people, for our clients and for our communities.

EY refers to the global organization, and may refer to one or more, of the member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit [ey.com](http://ey.com).

Ernst & Young LLP is one of the Indian client serving member firms of EYGM Limited. For more information about our organization, please visit [www.ey.com/in](http://www.ey.com/in).

Ernst & Young LLP is a Limited Liability Partnership, registered under the Limited Liability Partnership Act, 2008 in India, having its registered office at 22 Camac Street, 3rd Floor, Block C, Kolkata - 700016

© 2020 Ernst & Young LLP. Published in India.

All Rights Reserved.

EYINXXXXXX

ED None

This publication contains information in summary form and is therefore intended for general guidance only. It is not intended to be a substitute for detailed research or the exercise of professional judgment. Neither Ernst & Young LLP nor any other member of the global Ernst & Young organization can accept any responsibility for loss occasioned to any person acting or refraining from action as a result of any material in this publication. On any specific matter, reference should be made to the appropriate advisor.

[ey.com/in](http://ey.com/in)

[@EY\\_India](https://twitter.com/EY_India) [in EY](https://www.linkedin.com/company/ey) [YouTube EY India](https://www.youtube.com/channel/UCv31111111111111111111) [f EY Careers India](https://www.facebook.com/EY_Careers_India) [@ey\\_indiacareers](https://www.instagram.com/ey_indiacareers)





**GOVERNMENT OF ASSAM  
STATE INNOVATION AND TRANSFORMATION AAYOG**

1st Floor, Block - A, Janata Bhavan, Dispur, Guwahati - 781006

Website: [www.sita.assam.gov.in](http://www.sita.assam.gov.in)  
e-mail: [vchairmanassam2016@gmail.com](mailto:vchairmanassam2016@gmail.com)  
Phone: +91 361 2237496

ALL RIGHTS FOR THIS DOCUMENT ARE RESERVED WITH STATE INNOVATION  
AND TRANSFORMATION AAYOG (SITA), GOVERNMENT OF ASSAM.

DESIGNED & PRINTED BY INSIGHT BRANDCOM