



# Infrastructure Development of Industrial Estates in Tripura

Demand Assessment Report

Final Report

Strictly private and confidential

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# 1. Context of the assignment



# Context of the assignment

## 1.1. Background

Government of Tripura (GoT) applied for financing under Project Readiness Financing (PRF) facility from Asian Development Bank (ADB). The PRF loan is sought for project readiness activities, for preparing a sector development program and preparation of the project and design activities for investment-ready ensuing project(s) for the “Infrastructure Development of Industrial Estates in Tripura” in/ around 15 industrial estates of 6 districts in the state. The Department of Industries & Commerce (DoI&C) GoT is the executing agency (EA) with Secretary, DoI&C as the Project Director (PD). The PD will be assisted by a project management unit (PMU) established under implementing agency (IA)–Tripura Industrial Development Corporation Limited (TIDCL) with suitable resources.

In this regard, Tripura Industrial Development Corporation Limited (TIDCL or “Client”) intends to develop an industrial strategy and investment plan for the state. As part of TIDCL’s mandate of industrial development in the state, it has appointed individual consultants from PricewaterhouseCoopers Pvt. Ltd. (“PwC” or “Consultant”) for formulating strategy and action plan for development of industry strategy. The consultants have built on the outputs of North East Economic Corridor (NEEC) Report developed by Asian Development Bank as a guiding document. The NEEC report provides a view on the priority sectors for the region supported by value chain and OD analysis for the sectors. Further NEEC reports concludes on the infrastructure status in the region and identifies projects which will enable the development of overall North East Region. As part of this engagement the consultants have been mandated to conduct analysis and derive outputs to support the PRF loan. The scope of work of the consultants comprises the following:

- a. Outline the economic profile of various districts/ areas in the immediate vicinity of each industrial node/ large industrial area or cluster/ border growth centre or urban growth centre;
- b. Prepare an overview of the industrial scenario of the districts of the industrial nodes/ areas, which shall include:
  - (1) taking inventory of the types of industries available in the districts,
  - (2) mapping of competition at the state and district levels, and
  - (3) mapping of existing industrial clusters/ hubs along with available transport network and ancillary facilities;
- c. Prepare suitable product/ activity mix for the delineated zones within the industrial nodes/ areas or growth centres;
- d. Determine the product mix for the processing and non-processing areas of the industrial node/ area taking into account the land requirement, while ensuring compatibility with land-use planning proposals delineated in master planer surrounding existing land-uses, any provisions in the NER regional plan/ city development plan, etc., and whether any adaptation and/or mitigation measures are to be incorporated in project planning and design/ implementation;
- e. Assess and plan for export-oriented industries which can be located in the industrial node/ area or growth centres; and
- f. Align industrial planning with quality infrastructure to foster industrial development, including development of SMEs, meeting national standards/ benchmarks/ rules and regulations, and/or international standards and best practices.

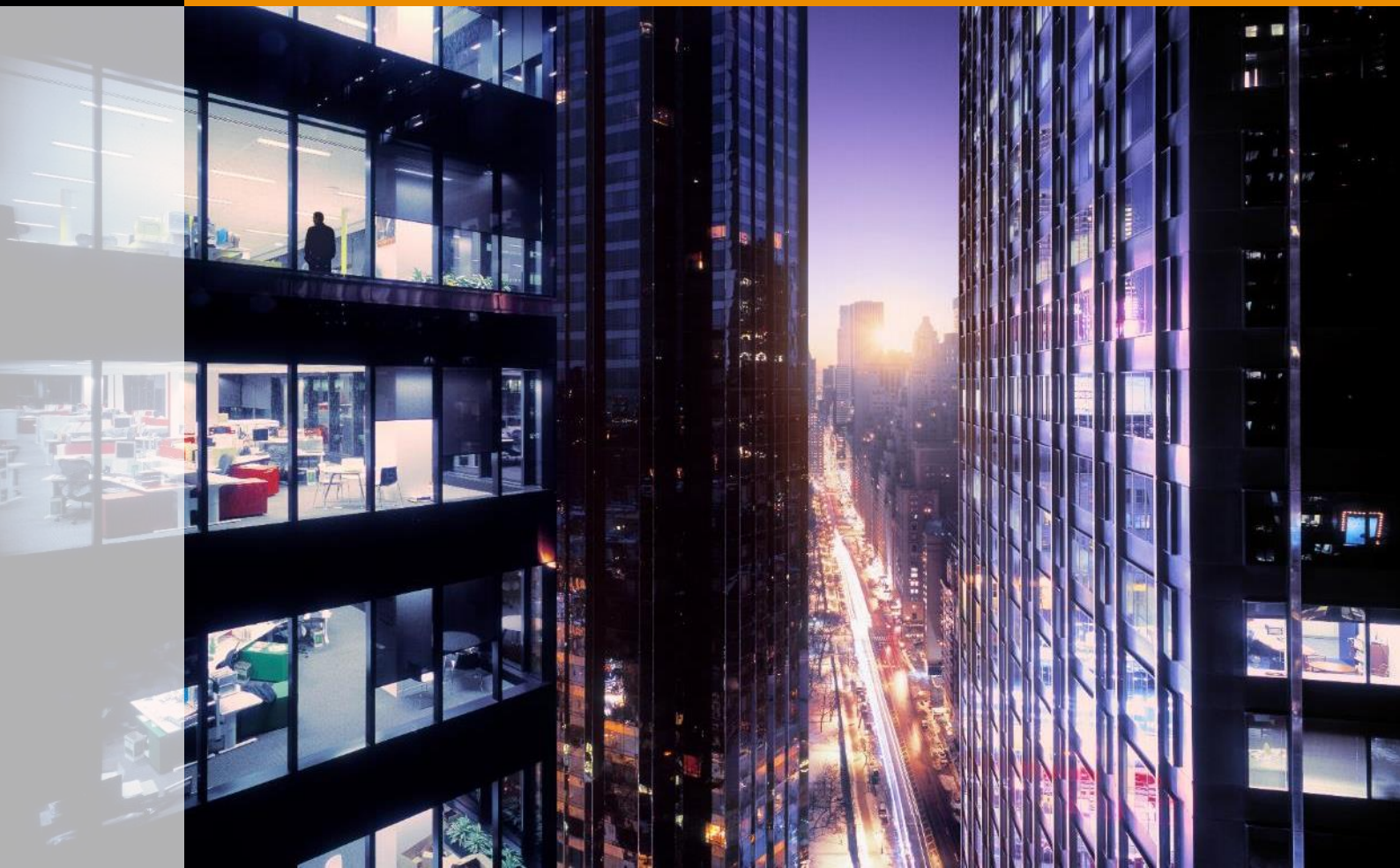
## 1.2. Objective

The objective of the report is to provide strategic support to TIDCL to enable the agency to carry out the development of industrial estates in Tripura. Therefore, report covers the following topics —

- The mapping/ planning/ strategizing for developing regional value chains of the North East region (NER). This study will be in coordination with the North East Economic Corridor (NEEC) study report separately undertaken by ADB;
- The identification of suitable priority sectors for Tripura based on demand and raw material availability;
- The mapping of the identified priority sectors to industrial estates and an assessment of the estates’ demand for industrial land.



## 2. Introduction





# Introduction

## 2.1. Economic Profile of North-East

To achieve India's commitment of becoming a USD 5 trillion economy by 2025, it is important to propel industrial development in the whole nation, especially the North-Eastern Region (NER). The North East Region (NER) of India is fast gaining attention for its rich economic resources and strategic location. It has large deposits of oil, natural gas, coal, and limestones, and a sizable proportion of land under cultivation for agro-horticulture products, tea, bamboo, and rubber.

Tripura is home to a wide variety of flora and fauna. About half of the state's land area is under forest cover. The Sal, a valuable tropical hardwood, is widely found. Various varieties of bamboo can also be found across Tripura. The region's geography and prevailing climatic conditions make it ideal for high-value horticulture. Tea, rubber, cash crops, and many kinds of fruits are cultivated in Tripura.

The NER is strategically located. Its geographic proximity to South East Asia makes its location even more favorable in relation to India's Act East policy, serving as the country's gateway to South East Asia. The region shares its land border with Myanmar which may act as a gateway for India to foster trade relations with other ASEAN countries. With increased ASEAN engagement becoming a critical part of India's foreign policy, the NER states have become strategically significant as important cultural and physical bridges. The NER also shares its border with the BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) nations (a group of seven countries i.e., Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka, and Thailand). The region has enormous potential to serve these neighboring nations and treat them as target markets. It connects the product market of the rest of the country and the robust South and Southeast Asian markets.

Apart from this, the fact that the Government of India (GoI) set up a separate Ministry of Development of North Eastern Region in September 2001 speaks to the region's position as a crucial driver of India's Act East Policy (called the Look East Policy in its earlier form) and overall development as well.

However, despite its rich natural capital, strategic position, and government intervention, the fact remains that the NER contributes 2.8% to the nation's GDP<sup>1</sup>, low in comparison with other states (the group of southern Indian states, for instance, contributes ~30% to economy<sup>2</sup>). The region has great economic potential across many sectors including agriculture, oil and gas, and tourism. But inadequate infrastructure limits its growth and production, and ability to attract investors and reap the benefits of its natural proximity with South Asian nations. Challenging terrains, limited connectivity, and an inadequate business ecosystem are among the primary causes for low private investments and the generally dilapidated condition of industry in the region.

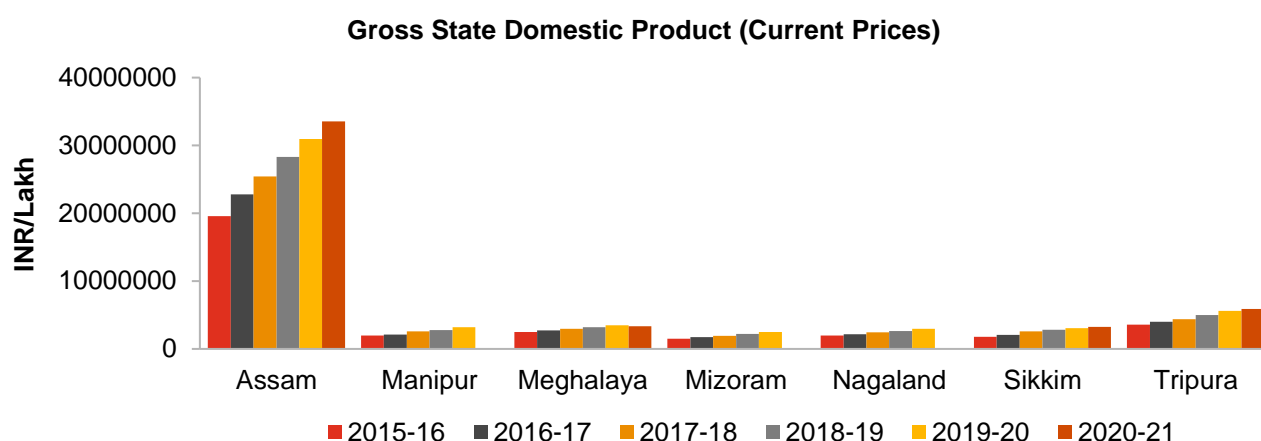
The NER has an abundant natural resource base as well immense potential for horticulture and agriculture. The economic opportunities can be translated into high growth industries if developed, owing to the existence of potent input market catalysts like social (diversity, cultural richness), physical (potential energy supply hubs), human (inexpensive, skilled labour) and natural (minerals, forests, biodiversity) capitals.

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<sup>1</sup> Gross State Domestic Product (Current Prices), : National Statistical Office, Ministry of Statistics and Programme Implementation, (2021)

<sup>2</sup> Gross State Domestic Product (Current Prices), : National Statistical Office, Ministry of Statistics and Programme Implementation, (2021)

Figure 1: Economic structure of NER



Source: Reserve Bank of India (RBI)

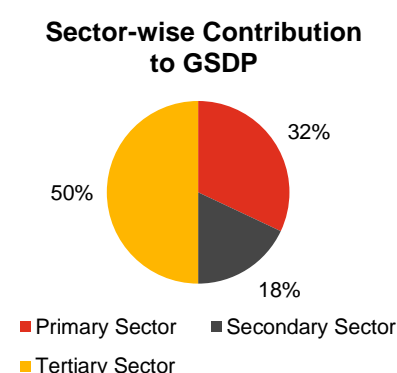
Examining macroeconomic trends reveals that the Gross State Domestic Product (GSDP)s of the states in the NER have shown a rising trend (except for Meghalaya which registered a slight fall between 2019-20 and 2020-21). Between 2015-16 and 2020-21, each of the states has registered an increase in its GSDP, indicating that their economies have been expanding steadily. The economy of the NER is largely characterized by the presence of agro-, mineral-, or forest-based industries.

The **primary sector** accounts for 31.4% of the states' income<sup>3</sup>, revealing the importance of the agriculture sector in the region. Traditionally, two primary types of farming practices are seen in the region. They are settled agriculture and slash and burn cultivation. Settled agriculture is prominent in the plains, valleys, and gentler slopes, and slash and burn cultivation (known locally as *jhum*), is especially popular in the hilly regions of Meghalaya, Mizoram, and Nagaland. Over 70% of the population in the NER states is involved in agriculture.<sup>4</sup> Rice, cereals, pulses, and oilseeds are among the major crops grown in the region. Besides this, growing of cash crops like cotton and developing commercial plantations for rubber and tea cultivation is underway. Further, state governments in the NER are now focusing on gaining from the immense scope of the bamboo and high-value floriculture sectors to usher in accelerated growth.

The **secondary sector** in the NER contributes to just about 18%<sup>5</sup> of the states' incomes. The contribution of industries is a small share of their NSDP at below 20%. The NER's industrial development level remains lower than that of the rest of India even though there is potential for growth across a diverse set of sectors, for instance, tea, petroleum, petroleum refineries and petroleum products, chemicals and fertilizer, plywood, pulp and paper, cement, and thermal power-generating units.

The presence of a strong cottage industries is another characteristic of the NER. Silk yarn, cloth, and other forest-based industries like bamboo products, furniture, and a variety of domestic utility goods are produced by the industry. Further, industries producing cement, bricks, plywood, tea, and special varieties of rice and ginger can also be found in the NER.

Figure 2: Sector-wise Contribution to GSDP



Source: NITI Aayog

Sectors like oil and gas, tea, and timber are predominantly based in Assam, while activities around mining, sawmills, and plywood are present in other parts of the region. Among the NER states, Assam is the most industrialized with a diverse manufacturing base. The primary concern in developing the sector further is the inadequate domestic market presence. Besides this, a major barrier to the growth of industry in the region is

<sup>3</sup> North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).

<sup>4</sup> North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).

<sup>5</sup> North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).

the distinctly sparse presence of the private sector- less than 1%<sup>6</sup> of the corporates in India are present there. Also, the lack of transport connectivity with other parts of India poses a significant challenge to the growth of the secondary sector. Though the region has a huge potential for exports. However, this has not translated into reality. In 2019-20 and 2020-21, the NER accounted for only 0.16% of India's exports.

The **tertiary sector** accounts for almost 50% of the income of the NER states. Also, the sector's share in state domestic product values has been showing an upward trend. A majority of the contribution in the services sector is led by public administration indicating a huge dependence of the state on government jobs. The other major sub-sector is trade, hotels, and restaurants. These two sectors account for more than 50% of contribution in the services sector.

To promote economic development in the region, the Gol has initiated multiple schemes aimed at promoting industrialization in the region. A few of the latest initiatives are as follows:

- **North East Special Infrastructure Development Scheme:** was approved by the Gol in 2017. Under the scheme, 100% centrally funding is provided to the State Governments of North Eastern Region for projects of physical infrastructure relating to the:
  - Development of physical infrastructure for water supply, power, and connectivity.
  - Development of social infrastructure, education, and health
  - Tourism projects

In Tripura, there are currently 4 education sector, 3 health sector, 1 power sector, and 3 roads and bridges related ongoing projects under the scheme.<sup>7</sup>

- **North East Industrial Development Scheme:** This scheme aims to push industrialization into the NER by providing financial assistance of up to INR 200 Crore/unit with few caveats. The scheme covers the manufacturing and service sectors, and aims to stimulate the growth of MSMEs in the two sectors. It came into effect in 2017 for a period of five years. In FY 2021-22, INR 30 Crore was released to the NER states. The benefits provided under the scheme, similar to those provided under the NESIDS, are as follows:
  - a. Central Capital Investment Incentive for access to credit
  - b. Central Interest Incentive
  - c. Central Comprehensive Insurance Incentive
  - d. Income Tax Reimbursement
  - e. Goods and Services Tax Reimbursement
  - f. Employment Incentive
  - g. Transport Incentive
- **North-Eastern Development Finance Corporation (NEDFi):** To ignite the entrepreneurial spirit in the region, the NEDFi Opportunity Scheme for Small Enterprises (NoSSE) was launched to aid first generation entrepreneurs who are setting up industrial units and are short of equity. It is the designated nodal agency responsible for the disbursal of Central incentives to industries in the NER.
- **North East Venture Fund:** Similar to the NEDVFC's NoSSE, the NEDFi has set up a fund of INR 100 Crore to provide financial assistance to start ups in the region. It is a wholly owned subsidiary of the NEDFi that aims to promote entrepreneurship while maximizing returns on investments. For this, it provides capital as well as other forms of support.
- **UDAN 3.0:** This is a regional connectivity scheme, aimed at enhancing aerial connectivity and increasing the routes covered in the region. The scheme, introduced in 2016, will run for 10 years.
- **Special Accelerated Road Development Programme- SARDP-NE:** This initiative has been taken up by the Ministry of Road Transport and Highways. This programme envisages providing road connectivity to all

<sup>6</sup> North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).

<sup>7</sup> Sector Wise Sanctioned, Completed, and Ongoing NESIDS Projects (2022-23), <http://nesids.mdoner.gov.in/>.

the district headquarters in the NER by constructing highways with a minimum of two lanes. The SARDP-NE Phase 'A' is expected to be completed by 2023-24.

- **National Highways and Infrastructure Development Corporation:** this is a company owned fully by the Govt's Ministry of Road Transport and Highways which works to establish, design, build, operate, maintain, and upgrade National Highways and Strategic Roads including interconnecting roads in parts of the country which share international boundaries with neighboring countries. It aims to enhance regional connectivity to promote cross-border trade and commerce, and to help safeguard India's international borders. It is also focused on improving road connectivity and efficiency of the international trade corridor through the expansion of 500 km of roads in the North Bengal and the NER to enable efficient and safe transport regionally with other South Asia Sub-regional Economic Cooperation (SASEC) member countries. Some of the projects are being funded by the ADB.

## 2.2. Overview of Tripura

Tripura became a full-fledged state on 21 January 1972. It is the third smallest state in the country. On its northern, southern, and western sides, it is flanked by Bangladesh and the length of its international border with Bangladesh is about 856 km, or about 84% of its total border. It shares the rest of the border with Assam and Mizoram. The border with Assam is 53-km-long while with Mizoram is 109-km-long. The state has eight districts, namely Dhalai, Gomati, Khowai, North Tripura, Septhajala, South Tripura, Unakoti, and West Tripura. The state is spread across 10,491 sq km. of which 60% is forest area. Only 27% of its total area is under cultivation. Further, Tripura has 87.22% literacy rate which is more than the national average.

The following table provides some key insights into the socio-economic scenario of the State:

**Table 1: Key Insights: Tripura**

Key Insights: Tripura	
GSDP at current price (Lakh/INR) – 2020-21	58879.53
Estimated Population (2021)	40,90,000
Population density	350 persons per sq. km
Literacy Rate	91.1%
Value of Exports (Crore/INR)- 2020-21	16.39
Value of Imports (Crore/INR)- 2020-21	716.87
Tourist inflow (2018-19)	5,29,879 <sup>8</sup>
Overall SDG Index Score (2020-21)	65

**Source:** Economic Review of Tripura (2020-21), Directorate of Economics and Statistics, Government of Tripura (2021).

### Profile of the districts in Tripura

Tripura has eight districts, namely Dhalai, Gomati, Khowai, North Tripura, Septhajala, South Tripura, Unakoti, and West Tripura. This section provides a glimpse into each one.

<sup>8</sup> Department of Tourism, Government of Tripura  
([https://tripuratourism.gov.in/sites/default/files/TRIPURA\\_TOURISM\\_POLICY\\_\\_3rd\\_Feb\\_2020\\_1230.pdf](https://tripuratourism.gov.in/sites/default/files/TRIPURA_TOURISM_POLICY__3rd_Feb_2020_1230.pdf))



1. **Dhalai:** Socio-economically, this is the most backward district in Tripura.<sup>9</sup> In 2006, the Ministry of Panchayati Raj named Dhalai one of the country's 250 most backward districts (out of a total of 640). It is the only district of Tripura which receives grants from the Union Government under the Backward Regions Grant Fund (BRGF).

Demographically, it has large tribal population, constituting more than half of the total population, and 25% of the households in the district are classified as Below Poverty Line (BPL).<sup>10</sup> The district has a literacy rate of 96.79%, higher than Tripura's 96.82% and India's 74.04%.

The district's economy is majorly dependent on primary sector. An overwhelming 76% of the total workers are involved in agriculture.<sup>11</sup> Out of this, 37% are cultivators, 26% are marginal farmers, 10% work as agricultural labour, and 3% work in agri-allied sectors.<sup>12</sup> The gross cropped area in the district is 35,753.0 Ha, and it produces 1,01,632 MT of vegetables and 1,82,953 MT of fruits.<sup>13</sup> Agriculture, however, remains largely subsistence level– the practice of Jhum cultivation continues in many parts of the district. With increasing plantation activities like horticulture and sericulture, jhum cultivation has decreased to an extent in the last few years. Further livestock rearing for meat and dairy purposes is also an important livelihood in the region. The yearly meat production is about 3585.79 MT while egg and milk production are 1.99 crore and 13924.29 MT, respectively.<sup>14</sup>

13,272 Ha of land is used for non- agricultural purposes. 6% of the total working population are cottage industry workers and 18% are engaged in other livelihoods.

A water quality assessment carried out by the TIDC at the district's headquarter, Ambassa, reveals that the groundwater in the region has an acceptable pH limit of 7.1 and is free of toxic contaminants, making it suitable for a wide variety of uses. It does however have a high amount of dissolved iron (0.57 mg/l) which, if not controlled, may hinder crop growth and damage irrigation equipment. The water also has a high volume of dissolved solids (286 mg/l).

Dhalai has 16 reported registered factories.<sup>15</sup> These include manufacturing units that produce wood/wooden based furniture, paper and paper products, and electrical machinery and equipment.

Dhalai is home to one Industrial Area, namely the Infrastructure Development Centre (IIDC) at Lalchari covering 54 acres, and two tea estates in Kamalpur and Halahali. Besides this, sericulture is an upcoming sector and the current area under sericulture is 169.6 Ha.<sup>16</sup> There are 5 handloom units and 1650 handloom weavers in the district, and it also has 4 registered handicraft units and 204 trained handicraft artisans.<sup>17</sup>

The region has some key strengths- a huge natural resources base, fertile land, climate conducive to a wide variety of crops, adequate and well spread rainfall, a high literacy rate, and its strategic location and connectivity via NH 44.

2. **Gomati:** this district was created in 2012. With 72% of the rural population living below the poverty line,<sup>18</sup> socio-economically it is among the relatively underdeveloped regions of Tripura. Out of a population of 4,41,538, 42.70% of the population is tribal.<sup>19</sup>

In the district the primary sector is the most dominant with agriculture being the primary occupation in the region. 12.6% of the working population are cultivators, 8-9% are agricultural laborer's and 1.61% are dependent on trade and commerce.<sup>20</sup> Paddy is the main food crop grown. Potato, sugarcane, mesta, jute, and mustard are some other crops grown in the district. Tea, coffee, rubber, jackfruit, banana, mango, and pineapple are the major plantation crops. However, only 31.61% of the land in the district is cultivable and

<sup>9</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>10</sup> <https://dhalai.nic.in/about-district/>

<sup>11</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>12</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>13</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>14</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>15</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>16</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>17</sup> District Profile: Dhalai, Tripura, Government of Tripura (2016).

<sup>18</sup> <https://gomati.nic.in/>

<sup>19</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

<sup>20</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

land holdings are small.<sup>21</sup>

A water quality assessment carried out by the TIDC at the district's headquarter, Udaipur, reveals that the groundwater in the region has an acceptable pH limit of 7.2, and does not contain toxic contaminants, making it suitable for a wide variety of uses. However, like in Ambassa, here too, the groundwater is rich in iron (0.5 mg/l). Further, the water has been found to have high turbidity (14 NTU).

The district has 204 reported registered factories that employ 2208 people<sup>22</sup>. Sericulture and handicrafts are among the important secondary sector activities pursued in Gomati. 139.6 Ha are currently being used for sericulture and there are 688 weavers.<sup>23</sup> There are 6 handloom units and 16,370 workers engaged in handloom weaving while the handicrafts industry has 2,380 artisans.<sup>24</sup> Besides this, an industrial estate has been set up at Dhajanagar in an effort to catalyze industrial growth in the region. One of the major strengths of the district is its 100% literacy rate. Further, it is marked by lush green and fertile valleys along the river Gomati, making it suitable for the development of agriculture-allied industries.

3. **Khowai:** lies between West Tripura and Dhalai. It also shares a border with Bangladesh. The estimated total population of the district is 3,27,564 while the estimated literacy rate is 87.78%.<sup>25</sup>

Primary sector activities are most common in the district. There are 32,079 farmer families in the area.<sup>26</sup> The irrigation system upon which agricultural activities depend is entirely controlled by the local drainage system i.e., streams, rivers, canals, springs, and dug out wells. The net sown area is 24824 Ha, the gross cropped area is 44192 Ha, and the area under food grain cultivation is 21949 Ha.<sup>27</sup> There is little fallow cultivable land left as more than 70% of the district is hilly and forest covered, and the terrain is mostly undulating.<sup>28</sup>

Paddy is the main crop grown across the region. Beans, cowpea, and brinjal are cultivated during the monsoon. Among fruit crops, banana, papaya, citrus fruits, mango, areca nut, and litchi are cultivated. Mining is another important primary sector activity. Extraction of brick earth is carried out to provide raw material to brick kilns in the district.

The major secondary sector activity in Khowai is brick manufacturing. It has 15 brick kilns.<sup>29</sup> The availability of brick earth makes the district suitable for further expansion of the sector. As part of its efforts to improve industrial prospects in the district, the Tripura government has set up a Government Industrial Training Institute in the district, to create a skilled labor pool.

4. **North Tripura:** The North Tripura District has a geographical area of 1422.19 sq km and a population of 4,44,579.<sup>30</sup> It is mostly hilly and shares a boundary of 53 km with Assam, of 109 km with Mizoram, and a 96-km-long international boundary with Bangladesh.<sup>31</sup>

The economy of North Tripura is primarily based on primary sector activities like agriculture, animal resource development and fisheries. The main crops grown in the district include paddy, orange, pineapple, jackfruit, banana, lemon, Areca nut, and mango. Fisheries are also an important source of income, and many small- and medium-scale fisheries are in the region. Further, North Tripura also houses tea gardens, and rubber and bamboo plantations. The Jampui Hills region has been a major orange producing area. However, due to diversion of land for non-agricultural activities, there was a fall in orange production. The government is currently trying to revive citrus farming in the region.

The secondary sector is still growing in the district. It houses one industrial estate in Dharmanagar and an IIDC at Dewanpasa. Its closeness with Bangladesh and abundant horticultural output both make it a potential hub for food processing. The presence of the IIDC and the industrial estate will act to catalyze

<sup>21</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

<sup>22</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

<sup>23</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

<sup>24</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

<sup>25</sup> <https://khowai.nic.in/>.

<sup>26</sup> District Profile Gomati District, Tripura, Government of Tripura (2018).

<sup>27</sup> District Survey Report: Khowai District, Tripura, Government of Tripura (2018).

<sup>28</sup> District Survey Report: Khowai District, Tripura, Government of Tripura (2018).

<sup>29</sup> District Survey Report: Khowai District, Tripura, Government of Tripura (2018).

<sup>30</sup> <https://northtripura.nic.in/>.

<sup>31</sup> <https://northtripura.nic.in/>.

industrial growth in the region. There are 248 reported registered factories in North Tripura that employ 4482 people.<sup>32</sup> There are also many micro and small enterprises as well as artisan units in the district. There are 26 ready-made garments and embroidery units employing 182 persons; 12 wood/wood-based furniture units with 100 employees; 7 leather-based units employing 135 persons; 1 chemical-based unit with 16 employees; 7 rubber, plastic and petro-based units employing 170 persons; 2 mineral-based units employing 115 persons; 21 steel-based units employing 480 persons; 34 engineering units employing 110 persons; 42 repairing and servicing units employing 480 persons; and 96 other units employing 2694 persons.<sup>33</sup>

The existing manufacturing units in North Tripura will support the state government's current efforts to expand the secondary sector in the district.

5. **Sepahijala:** covers 1043.04 sq. km and has a population of 5,42,731<sup>34</sup>. Only about 12% of the district is occupied by small hilly ranges while the remaining 88% is almost plain land, bordering Bangladesh on the west and the south. The literacy rate of the district is 97.76%.<sup>35</sup>

The main sources of livelihood are mostly primary sector based. A large number of people are involved in horticultural farming (vegetables and fruits) and rubber cultivation. The main crop cultivated in the district is paddy. Seasonal crops like potato, cabbage, radish, pulses, oilseeds, pineapples, and maize are also cultivated. Cash crops like rubber and tea are grown in many areas as well. The gross cropped area 93,399 Ha while 313 Ha of fallow land are yet to be developed.<sup>36</sup> Much of the agriculture is rain-fed or and by the local drainage system of streams, rivers, canals, and dug out wells. A few important rivers flowing through the district are Burima/Bijoy, Kachigung and Gomati. Mining is another important primary sector activity. Extraction of brick earth is carried out to provide raw material to brick kilns in the district.

The major secondary sector activity in Sepahijala is brick manufacturing. It has 25 brick kilns.<sup>37</sup> The availability of brick earth makes the district suitable for further expansion of the sector. The district also has a commercial power plant, the Monarchak Solar Power Station, that is run by the North Eastern Electric Power Cooperation.

6. **South Tripura:** covers 1514.322 sq km and as per the Census (2011), the total population of the region is 4,30,499.<sup>38</sup> It shares a 204.487 km border with Bangladesh. The district is connected to Agartala by NH – 08.

Anticlinal hill ranges forms the watersheds from which various drainage channels emerge. The district is drained by many perennial rivers, and the major rivers are Gomti, Muhuri, and Feni. A water quality assessment carried out by the TIDC at various locations in the district, namely Belonia, Sabroom, and Wards 2,4, 5, and 13 of Santirbazar, reveals that the groundwater in the region has a permissible pH limit. It does not contain toxic contaminant. However, the water in Belonia contains the highest volume of chlorides (35 mg/l) of all the locations included in the study. It also contains a high amount of calcium carbonate, increasing alkalinity. Additionally, it is relatively more turbid (5.4 NTU), falling above the permissible limit. The water in Sabroom and the four wards of Santirbazar, on the other hand, are less turbid, and have been found to have an acceptable taste and odour.

The economy of South Tripura district is mainly primary sector based. Paddy, pineapple, jackfruit, banana, nuts, and mango are cultivated here. Fisheries are one of the main sources of income. There are several rubber and bamboo plantations in the region as well. 70% of the workers are dependent on agriculture for their livelihood.<sup>39</sup> The tribal population continues to practice Jhum cultivation (shifting cultivation).

The district also has a vibrant secondary sector with 167 MSMEs.<sup>40</sup> These include, among others, 61 fabricated metal producers; 32 bricks/ cement producers; 23 food based units; 11 motor vehicle/cycle/automobile repair and service centres; 9 candle/decorative article/furniture and wooden fixtures/stamp manufacture units; 1 automobile battery servicing 1 ; 3 rubber sheets/ tyre retreading units; 3 screen printing, still photography/ computer servicing units; 4 bamboo and cane article/ wooden product manufacturing units; 1 jute article producer; 5 filtering and purifying machinery/ iron removal plant/ pumps

<sup>32</sup> Brief Industrial Profile of North Tripura District, Gol.

<sup>33</sup> Brief Industrial Profile of North Tripura District, Gol.

<sup>34</sup> <https://sepahijala.nic.in/>

<sup>35</sup> District Survey Report: Sepahijala District, Tripura, Government of Tripura (2019).

<sup>36</sup> District Survey Report: Sepahijala District, Tripura, Government of Tripura (2019).

<sup>37</sup> District Survey Report: Sepahijala District, Tripura, Government of Tripura (2019).

<sup>38</sup> Brief Industrial Profile of Tripura (South) District, Gol.

<sup>39</sup> <https://southtripura.nic.in/economy/>

<sup>40</sup> Brief Industrial Profile of Tripura (South) District, Gol.

and compressors repair units; 2 textile garments/tailoring units; and 5 agarbatti/bio-fertilizer making units. 1321 persons are employed in these units.<sup>41</sup>

Further, the state has four industrial areas – the Dhajanagar Industrial Estate, the Jalefa IIDC, the Sarasima IIDC, the Gokulpur IIDC, and a sawmill at Belonia.

7. **Unakoti:** covers 686.97 sq km and has a population of 2,98,194.<sup>42</sup> It shares a total international boundary of about 50 km with Bangladesh and is connected to the rest of Tripura by NH-44. The literacy rate of the district is 86.91%.<sup>43</sup>

Primary sector activities provide livelihoods to a large section of the district's population. Paddy is the main crop grown here. Beans, cowpea, brinjal, banana, papaya, citrus fruits, mango, Areca nut, and litchi are also cultivated. The total cropped area in Unakoti is 22,442 Ha. Livestock and poultry farming are major sources of livelihood for the people of the region.

There is some level of manufacturing activity in the district as well. There are 46 registered factories employing a total of 3994 persons.<sup>44</sup> These include wood and tea-based units and brick kilns.

8. **West Tripura:** is the most industrialized district in Tripura, covering 3544 sq kms.<sup>45</sup> It has all the essential infrastructure such as a well-developed airport, railway station, urban transportation, and rural transportation facilities. It has a population of 17,24,619.<sup>46</sup>

Rural West Tripura is mainly dependent on primary sector livelihoods such as agriculture and allied activities. Paddy cultivation is the main agricultural activity. There are nineteen tea estates which makes the district the largest producer of tea.

There are 1,863 registered industrial units and a total of 2,000 industrial units in West Tripura,<sup>47</sup> indicative of the flourishing secondary sector in the district. It also houses five industrial parks estates— the Arundhutinagar (AD Nagar) Industrial Estate, the Badharghat Industrial Estate, the Dukli Industrial Estate, Bodhjunnagar Growth Centre, and the Bodhjunnagar Export Promotion Industrial Park. Industries like steel plants, plastic- and rubber-based industries function out of these industrial estates. Dry fish, raw hides and skin, coir mattress, and fresh ginger are the major exportable products made in the region.

The government has identified the following tertiary sector industries that can be set up in the region— automobile battery servicing; clinical laboratories; dyeing and printing units; fast food centres/ restaurants; pest control services; printing presses; watches and clocks repairing, sales and services; cycle and cycle rickshaw repairing; repairing of household electrical appliances; and web designing.<sup>48</sup>

**Natural Resources:** Tripura is well-endowed with natural resources, such as agro-horticultural and forest resources including a wide variety of medicinal plants, oil and natural gas, and mineral deposits.

The state, with climatic and geographical conditions that make it suitable for the cultivation for many kinds of horticultural and floricultural cultivation, is known for its vibrant food processing, bamboo, and sericulture industries. Local flora and fauna bear a very close affinity and resemblance with floral and faunal components of Indo-Malayan and Indo-Chinese sub-regions.

This section provides a brief exploration of the natural resource base of the region.

- a. **Bamboo:** The state is a home to 21 species of bamboo, and an area of 7,195 hectares is used for bamboo cultivation.<sup>49</sup> Tripura's total bamboo yield is 1,88,512 MT/year out of which 82.7% is Muli

<sup>41</sup> Brief Industrial Profile of Tripura (South) District, Gol.

<sup>42</sup> <https://unakoti.nic.in/demography/>

<sup>43</sup> <https://unakoti.nic.in/demography/>

<sup>44</sup> <https://unakoti.nic.in/factories-boilers/>

<sup>45</sup> Brief Industrial Profile of Tripura (West) District, Gol.

<sup>46</sup> Brief Industrial Profile of Tripura (West) District, Gol.

<sup>47</sup> Brief Industrial Profile of Tripura (West) District, Gol.

<sup>48</sup> Brief Industrial Profile of Tripura (West) District, Gol.

<sup>49</sup> ENVIS Centre (<http://trpervis.nic.in/test/forest.html>).



Bamboo, 8.5% is the B. Tulda (Mrittinga) variety, while other varieties constitute the remaining 8.8%.<sup>50</sup> Further, it houses the largest bamboo flooring unit in India with a turnover of INR 25 Crore.<sup>51</sup>

- b. **Rubber:** Tripura produces 83,701 mt of rubber<sup>52</sup> making it the second largest producer of rubber in India after Kerala. The area under rubber cultivation is 85,000 hectares. The state has more than 1 lakh rubber growers. Rural economy of INR 1,200 Crore is rubber-based and its cultivation has helped settle tribal *jhumias* (shifting cultivators).<sup>53</sup>
- c. **Tea:** It is the fifth largest tea producing state of India. The state has 58 tea gardens as of February 2020 that cover an area of >6,885 hectares.<sup>54</sup> There are a total of 23 tea processing factories, of which 4 are cooperatives, 2 are public sector ones while 17 are privately owned.
- d. **Tropical harvest:** Tripura has the optimal climatic conditions for the cultivation of various tropical fruits and horticulture crops like pineapple, jackfruit, and oranges. Plantation crops like Areca nut, Coconut, Cashew, various winter and summer vegetables, spices, and flowers can also be cultivated here. As per the third advance estimate of 2019-20, the total fruit production in the state is 562.46 thousand MT, while vegetables and spice yields are 811.67 thousand MT and 33.15 thousand MT respectively. The total area under horticulture in the state is 121160 ha. An additional 1370 ha area for fruit cultivation, 1142.6 ha for Areca nut cultivation, 5050 Ha for vegetables and 200 Ha for open field flower have been brought under cultivation during 2019-20 which has benefitted nearly 30,000 farmers in the state.<sup>55</sup>
- e. **Natural gas:** Tripura is endowed with natural gas (~97 methane) with estimated availability of 400 BCM, this is commercially exploitable but due to lack of physical infrastructure to transport it to main nodes, it is still untapped. For the upstream segment, Assam and Tripura are the primary hydrocarbon producers.
- f. **Medicinal Plants:** Tripura's tropical climate supports the growth of various plants with medicinal value. It is home to 266 medicinal plants, 581 herbs and 379 species of trees. Out of the 266 medicinal plants identified by the Tripura Forest Department, 12 are suitable for cultivation and income generation.<sup>56</sup> Between 2008 and 2011, 1,513 kg Gamar seeds were marketed by the Medicinal Plant Board of Tripura to Oushadhi Pharmaceuticals. Further, from 2011 to 2014, Kalmegh amounting to 984 kg was marketed by the board, generating sales proceeds of INR 33,209.<sup>57</sup>
- g. **Sericulture:** In Tripura, mulberry sericulture was introduced at a small level during the 5th five-year plan on the recommendation of the North Eastern Council. Initially it was confined only to government farms but was slowly expanded into villages. At present, there are 20 sericulture clusters functioning across the state's 8 districts.<sup>58</sup> In 2020-21, 3.6 MT silk was produced in the state while 40.3 MT of mulberry cocoons were harvested.

<sup>50</sup> Government of Tripura (<https://www.indianchamber.org/wp-content/uploads/2019/03/DESTINATION-TRIPURA-INVESTMENT-SUMMIT.pdf>)

<sup>51</sup> Government of Tripura (<https://www.indianchamber.org/wp-content/uploads/2019/03/DESTINATION-TRIPURA-INVESTMENT-SUMMIT.pdf>)

<sup>52</sup> Government of Tripura (<https://www.indianchamber.org/wp-content/uploads/2019/03/DESTINATION-TRIPURA-INVESTMENT-SUMMIT.pdf>)

<sup>53</sup> Government of Tripura (<https://www.indianchamber.org/wp-content/uploads/2019/03/DESTINATION-TRIPURA-INVESTMENT-SUMMIT.pdf>)

<sup>54</sup> ENVIS Centre (<http://trpensis.nic.in/test/forest.html>).

<sup>55</sup> Government of Tripura (<https://www.indianchamber.org/wp-content/uploads/2019/03/DESTINATION-TRIPURA-INVESTMENT-SUMMIT.pdf>)

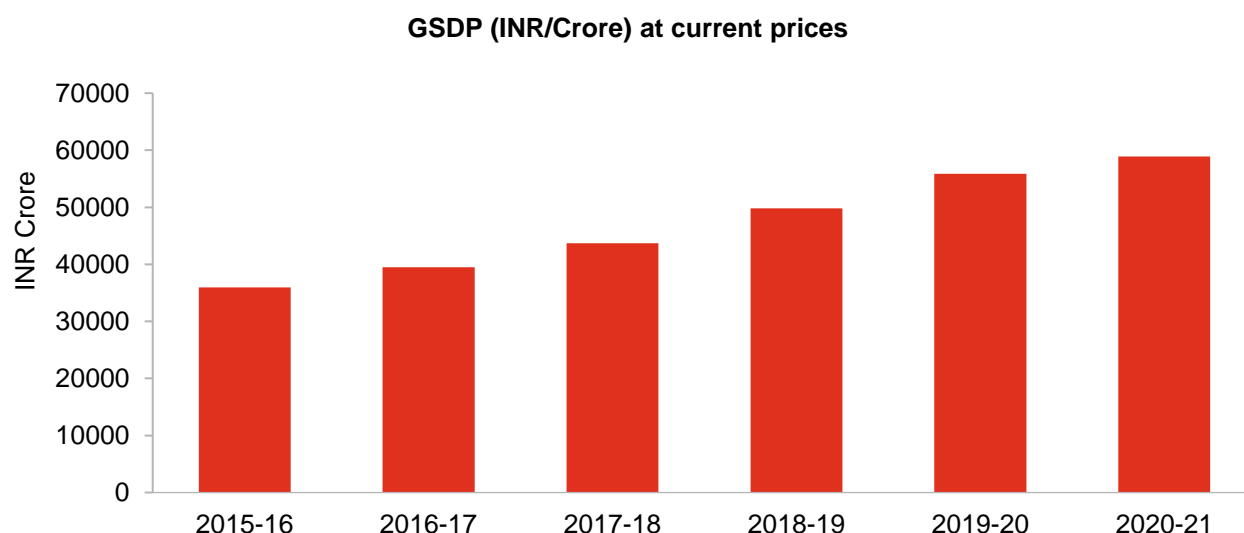
<sup>56</sup> Government of Tripura ([https://farmersportal.tripura.gov.in/PDF/profile/forest/Medicinal\\_New.pdf](https://farmersportal.tripura.gov.in/PDF/profile/forest/Medicinal_New.pdf))

<sup>57</sup> Government of Tripura ([https://farmersportal.tripura.gov.in/PDF/profile/forest/Medicinal\\_New.pdf](https://farmersportal.tripura.gov.in/PDF/profile/forest/Medicinal_New.pdf))

<sup>58</sup> North Eastern Development Finance Corporation Ltd (<http://databank.nedfi.com/>)

## Economic Profile of Tripura:

**Figure 3: Tripura's GSDP at current price**



Source: Directorate of Economics & Statistics, Government of Tripura

Tripura has been registering an upward trend in its GSDP, revealing a steady growth of the state's economy. The annual growth rate of GDP (at constant prices) per capita is 8.84%<sup>59</sup>. The NSDP of the state has grown at a CAGR (in INR) of 10.15% between 2015-16 and 2020-21.<sup>60</sup>

While there has been a clear increase in Tripura's GSDP, Tripura remains industrially backward, the primary reason for this being its geographical isolation. The low availability of infrastructure has made economic development and decentralization challenging, which has kept the state from realizing the full potential of its diverse resource base.

It is a primarily agrarian state, with more than 40% of the population depending on agriculture and allied activities<sup>61</sup>. However, only about 26% of the land in the state is cultivable, as the rest of the terrain is hilly and forested, which constrains the amount of land available for farming. Rice is the most widely grown crop in the state. Its climate is suitable for a variety of horticultural/ plantation crops as well, including pineapple, jackfruit, tea, rubber, and bamboo. The undulating topography of the land favors fruit production.

The contribution of the primary sector to the state's GSDP was 43.02% in 2020-21, marginally lower than that of the tertiary sector. As stated above, geographical conditions in Tripura are suited to the cultivation of horticultural crops such as banana and pineapple, and several horticultural schemes have been initiated, including programmes for the development of fruit trees, and of kitchen gardens.

Cropping accounted for 45.42% of the sector's GSDP while livestock rearing and mining and quarrying contributed 11.69% and 21.21%, respectively. Other major primary sector activities in the state include forestry and logging. Small and marginal farmers constitute about 96% of the total farmers in Tripura against 78% that of country. Agriculture and allied activities are main backbone of the state's rural economy. In 2020-21, INR 1091.30 Crore was spent by the state government on agriculture and allied services.

The secondary sector contributed 10.86% to the state's GSDP between 2020-21. Within the sector, the share of construction in the GSDP was 48.86%, making it the most profitable secondary sector activity in the state while water supply had the lowest contribution at 3.1%. The manufacturing sector accounted for 21.48% of the secondary sector's GSDP, indicative of the need to strengthen manufacturing activities in the state.

The tertiary sector's share in Tripura's GSDP in 2020-21 was the highest of the three sectors at 46.13%. The largest contributor in the tertiary sector in Tripura is public administration. Public administration had the largest share out of all tertiary sector activities at 28.11%. Trade, hotels, and restaurants were a close second, with a

<sup>59</sup> Economic Review of Tripura 2020-21

<sup>60</sup> Ministry of Statistics and Programme Implementation

<sup>61</sup> Economic Review of Tripura 2019-20

24.01% share in the GSDP. The smallest share was that of financial services at 6.01%, followed by transport, storage- and communication-related services, which accounted for 8.45%.

There has been a gradual shift in economic base from primary to tertiary sector activities. Manufacturing activities have not seen similar growth owing to low industrialization and infrastructure related challenges. To remedy this, the government has taken various steps to increase industrialization and attract investments. The state currently has one SEZ, five industrial estates, six industrial areas, and four PSUs.<sup>62</sup>

The table provided here shows the sector-wise contribution to the GSDP and is indicative of the weak secondary sector of the state, which consistently contributes the least to the GSDP.

**Table 2: Sector-wise Percentage Contribution to GSDP at current prices**

Sector	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19 (2nd RE)	2019-20 (1st RE)	2020-21 (ADV)
Primary	33.48	32.67	33.29	41.22	43.18	43.05	40.15	41.43	43.03	43.02
Secondary	14.11	15.27	14.19	15.01	12.95	13.65	13.49	13.43	11.69	10.86
Tertiary	52.41	52.06	52.52	43.77	43.87	43.3	46.36	45.14	45.28	46.13

Source: Economic Review of Tripura 2020-21

**Investment Trends:** Tripura has recorded impressive growth rate during the last decade; the state's economy achieved a growth rate of 9.2% in real terms during 2014-15.<sup>63</sup>

- a. **Foreign Direct Investment (FDI):** Owing to the relative lack of industrialization in the state, the FDI inflow into Tripura is lower than that of many other Indian states. FDI inflow into Tripura stood at USD 122 million between April 2000 and September 2019. Between October 2019 and March 2021, inflows stood at USD 0.43 million.<sup>64</sup> Out of the total FDI sums India draws, the share of the NER states in this is less than 1%.<sup>65</sup>

According to the GoI's Department for Promotion of Industry and Internal Trade, the top ten sectors that attract FDI inflows are the services sector, computer software and hardware, telecommunications, trading, construction development (townships, housing, built-up infrastructure, and construction development projects), automobile industry, construction (infrastructure) activities, chemicals (other than fertilizers), drugs and pharmaceuticals, and hotels and tourism.

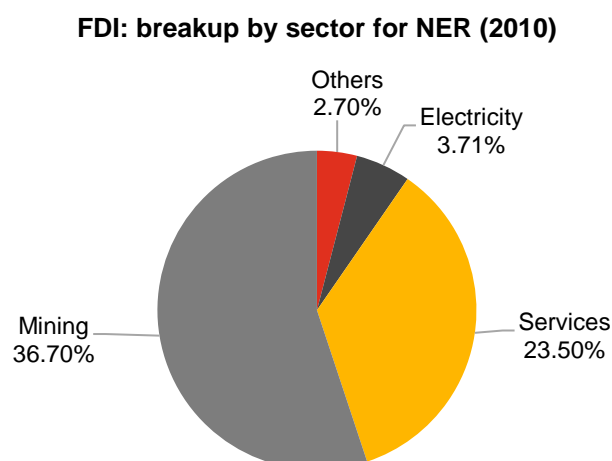
<sup>62</sup> Niti Aayog

<sup>63</sup> TIDC (<https://tidc.tripura.gov.in/about-tripura>)

<sup>64</sup> Department for Promotion of Industry and Internal Trade (DPIIT)

<sup>65</sup> Northeast Economic Corridor: Bringing People and Markets Together, ADB (2020).

Figure 4: FDI Breakup of NER region



Source: CMIE database

the FDI breakup by sector for the NER states shows that mining attracted the largest share of investments followed by the service sector. Considering the overall share of Tripura's foreign investments alongside that of other states in India, despite its huge manufacturing potential and high literacy rate, the region attracts low FDI inflows.

- b. **Exports and Imports:** Tripura's foreign trade is focused on Bangladesh. The total volume of trade has increased manifold- from a meagre INR 4.12 Crores during 1995-96 to about INR 537.08 Crores during 2018-19<sup>66</sup>.

The following table shows the trade volume during last few years as well as the rising level of exports:

Table 3: Trade Volume of Tripura

Year	Imports (Crore/INR)	Exports (Crore/INR)	Total (Crore/INR)
2014-15	357.65	1.02	358.67
2015-16	381.76	1.96	383.72
2016-17	300.23	4.6	304.83
2017-18	384.22	6.46	390.68
2018-19	522.42	14.66	537.08

Source: Department of Industries & Commerce, Government of Tripura

<sup>66</sup> Department of Industries & Commerce, Government of Tripura



Given below are tables showing the composition of imports and exports between 2020-21:

**Table 4: Composition of Exports**

S. No.	Commodity	Total Value (INR Cr)
1.	Fresh Ginger	4.51
2.	Seeds of Cumin	4.34
3.	Grapes	2.31
4.	Pomegranate	1.73
5.	Citrus	1.51
6.	Dry Fish	0.88
7.	Wood Apple	0.36
8.	Onion	0.08
9.	Fresh Orange	0.07
10.	Tamarind	0.07
11.	Other commodities	0.53
<b>Total</b>		<b>16.39</b>

Source: Directorate General of Commercial Intelligence and Statistics (DGCIS), Annual Industries Survey (AIS)

**Table 5: Composition of Imports (2020-21)**

S. No	Commodity	Total Value (INR Cr)
1.	Variety of fish- Small fish	248.61
2.	Food Items	157.67
3.	Cement	130.13
4.	Dry Fish	47.31
5.	Steam Coal	42.37
6.	Plastic Items	19.72
7.	Steel Sheets	14.47
8.	PVC Pipes/ Tube	12.05
9.	Flavor Drinks	9.84
10.	MS Rod	6.94
11.	Other commodities	27.76
<b>Total</b>		<b>716.87</b>

Source: DGCIS, AIS

Primary sector exports dominate the total exports of the state, emphasizing the need to strengthen the secondary sector. With the state government focusing on bamboo and rubber products, and food processing, secondary sector exports in nearby markets can be increased.

Apart from the export commodities mentioned in the table above, other major exports from Tripura include limes, jackfruit, and pineapples. Its primary foreign trade partner, Bangladesh, has also been importing spare parts of CNG-run vehicles, broomsticks, and rubber latex from the state since 2018.

**Existing Infrastructure:** To fully understand the investment trends in Tripura, it is important to look at the current physical infrastructure of the state.

Though it can be said to be strategically located in terms of its potential to help build India's trade relations with South East Asia, the Partition of India in 1947 left Tripura greatly disadvantaged in terms of connectivity. Prior to partition, the distance by road from Agartala to Kolkata for instance was about 500 km. After partition, the route to Kolkata via the Siliguri land corridor became 1,700 km long. Connectivity through various waterways too was severed.

1. **Roadways:** Tripura currently has 6 National Highways spread over 854 km, and 4 in-principle declared National Highways covering 229.25 km.<sup>67</sup> The National Highway, linking Agartala to Guwahati, has been upgraded and extended up to Sabroom (the southern-most point in the State), which is about 75 km. away from Bangladesh's Chattogram port. The state is currently developing the Kailashahar – Kumarghat section of NH-208, the Khayerpur – Amtali section (Agartala bypass) of NH-08, the Agartala – Khowai section of NH-108B, the Kailashahar – Kurti bridge of NH-208A, the Manu – Simlung section of NH-44A, and the Churaibari – Agartala section of NH-08 (strengthening with paved shoulder). Besides this, two RCC Bridges over river Muhuri and over river Gomati are being developed and geometric improvement on the 21.789 km long Churaibari – Agartala section of NH-44 has also been undertaken.

Apart from this, a new bridge, the Maitri Setu has been constructed as an important roadway in the state. The bridge is a 150-metre (490 ft) bridge on the Feni River. It links Tripura with Bangladesh's Chattogram port, and thus provides a shorter and more economical route between the state and Bangladesh as well as between India's eastern and western states. The bridge was opened to the public in March 2021.

2. **Railways:** Currently, the rail route in Tripura covers 264 km. This network is entirely broad gauge. In 2019, it completed the 38 km Belonia–Sabroom rail line, connecting Sabroom, Tripura's southernmost town, to the rail network. This was the last section of a new 114 km broad gauge Agartala–Sabroom rail line.

Currently, the major outgoing commodity by rail are bricks and stones which are shipped by rail to Assam, West Bengal, and Odisha. Meanwhile, food grains (mainly from Punjab and Haryana) arrive in Tripura by rail. The main origin stations for goods in Tripura are Jirinia, Belonia, and Kumarghat, while the main destination stations are Agartala and Belonia.

The Agartala–Akhaura broad-gauge rail line connecting Tripura and Bangladesh, a major 12-km-long rail project, is under construction in the state. The length of the section in India is expected to be 5.5 km and the remaining 6.5 km is expected to be in Bangladesh. The entire cost of the project, including the rail line in Bangladesh, will be borne by the GoI. The Ministry of Development of North Eastern Region is financing the work on the Indian side, while the GoI's Ministry of External Affairs is financing the work on the Bangladeshi side.

3. **Airports:** Owing to the hilly terrain, landslides, and other socioeconomic factors, air travel is the most efficient way of commuting to and from Tripura. This means that while industries like tourism and information technology depend squarely on flying, others (whose cargo is not transported by air) are also dependent on air-based transport for personnel to run and expand their businesses. Agartala Airport is the second busiest airport in North East and efforts are currently underway to make it an international one. People in Tripura are dependent especially on the flights operating between Agartala-Kolkata and Agartala-Guwahati. Besides, recent improvements have been made to air connectivity with other sectors of the country- from Agartala to Delhi, Mumbai, Bangalore, Hyderabad and Chennai. The runway at the airport has been extended to 7,500 feet and an Instrument Landing System has been successfully installed making night operations possible.
4. **Inland Waterways:** Two inland waterway routes that can connect the rest of India to Tripura are Kolkata–Ashuganj–Agartala and Kolkata–Daudkandi–Sonamura. They shorten the distance between Agartala and Kolkata significantly (the current road distance via the Chicken Neck Corridor is ~1,650 km).

As India and Bangladesh signed a Protocol on Inland Water Transit and Trade (PIWT&T) in 1972, which allows inland vessels of one country to transit through the routes of the other country specified in the

<sup>67</sup> PWD (R&B), Tripura

protocol, the development of these waterways have the potential to benefit both nations.

5. **Electricity:** The state is presently a power-surplus one. In 2019-20, 712,16 MU of power was generated in the state.<sup>68</sup> The Tripura State Electricity Corporation Ltd has a total capacity of 110 MW from 3 generating stations, namely the Gomuti Hydro-electric Project, the Baramura Gas Thermal Power Station and the Rokhia Gas Thermal Power Station. In addition to this, it has diesel based generating units of 5.85MW, which have been in operation since pre-1947.<sup>69</sup> Further, there is also an ONGC-run power plant in Udaipur district's Palatana village.
6. **Industrial Infrastructure:** In order to improve industrial infrastructure, the Tripura Industrial Development Corporation Ltd. Is to set up a Special Economic Zone (SEZ) at Paschim Jalefa, Sabroom, South Tripura District. This will be a multi-sector SEZ.

Other infrastructure for trade includes **Land Custom Stations (LCSs)** and **Border Haats**. Tripura currently has 8 notified LCSs at Agartala, Srimantpur, Muhurighat, Khowaighat, Dhalaighat, Manughat, Old Raghonabazar and Sabroom. However, out of these, the Dhalaighat LCS is operational for immigration purposes only and the Sabroom LCS is yet to become operational.

Further, two Border Haats, located at the Srinagar-Chhagalnaiya and Kamalasagar-Tarapur border points have been set up on the Tripura- Bangladesh border. Both the haats are functional and have contributed not only to boosting the local economy but to strengthening the ties between the people of the two countries.<sup>70</sup> New haats have been proposed for development at Raghna (North Tripura) and Kamalpur (Dhalai). In addition, a site has already been selected for a similar haat at Kathalia (Nirbhaypur) in Sipahijala and the site selection process is underway for a haat at Khowai. The goods sold by people from Tripura include local handicrafts, horticultural produce like banana and jackfruit, cosmetics, steel utensils, saree, and unstitched cloth. Sellers from Bangladesh trade in dry fish, bakery items, sarees, plastic goods, fruits like green apple and watermelon, and some local vegetables.

**Industrial policy:** To promote economic development, Tripura offers various incentives to its investors under the Tripura Industrial Investment Promotion Incentive Scheme (TIIPIS), 2022<sup>71</sup>, which will remain in force for a period of five years, ending on 31<sup>st</sup> March 2027.

A brief of the same are provided in the table below.

Incentive	Benefits	Special Provisions for Thrust Sectors <sup>72</sup>
Capital Investment Subsidy	30% on fixed capital investment subject to a ceiling of INR 100 Lakh per enterprise.	For thrust sector industries subsidy rate is 40% and the ceiling is INR 125 Lakh per enterprise
Procurement Preference	15% on all purchases through tenders by State Government Agencies on products manufactured by eligible enterprises	-

<sup>68</sup> Tripura State Electricity Corporation Ltd. Agartala

<sup>69</sup> TSECL

<sup>70</sup> Department Of Industries & Commerce, Government Of Tripura

<sup>71</sup> Tripura Industrial Investment Promotion Incentive Scheme (TIIPIS), 2022, Government of Tripura (<https://industries.tripura.gov.in/sites/default/files/TIIPS-2022.pdf>).

<sup>72</sup> The state has identified the following as its thrust sectors: **(I) Manufacturing Sector:** Industrial units which are using bamboo, rubber, agriculture and horticultural produce and natural gas as their major raw materials during production; Tea manufacturing; agar oil extraction industry; rubber wood processing industry; industrial units using plastic waste/e-waste as major raw material during production; Municipal Waste Processing; packaging material manufacturing activity; agricultural waste processing industry; industries manufacturing/using bio-degradable plastics; industries making cutlery items using areca nut leaves or bamboo, and **(II) Service Sector:** tourism promoting activities (water sports, ropeways, adventure and leisure sports, and floating restaurants) with a minimum investment of INR 3 Crore (excluding cost of land); hospitals/nursing homes with minimum investment of INR 3 Crore (excluding cost of land) with a minimum capacity of 25 beds.

Industrial Promotion Subsidy	Subsidy equal to the net amount of the “Goods and Services Tax” actually paid by an enterprise. Subject to an overall ceiling of INR 80 Lakh per annum. The aggregating limit of entitlement of an enterprise for 5 years cannot exceed 150% value of investment made in plant and machinery.	The annual upper ceiling of the subsidy is INR 125 Lakh per enterprise.
Export Promotion Subsidy	Paid to industrial enterprises on exporting goods through the Land Custom Stations in the state at a rate of 10% on value of export. Subject to an upper ceiling of INR 50 Lakh per annum. Only for the items manufactured in Tripura, provided an enterprise achieves at least 20% value addition within the state.	-
Power charges	Provided to all eligible industrial units with connected load of above 20 HP at a rate of INR 5.00 per unit without any upper ceiling. Industrial units with connected load up to 20 HP will be provided partial reimbursement of power charges at 25% of power charges actually paid by the enterprise, subject to a maximum amount of INR 15.00 Lakh per enterprise per annum.	Annual upper ceiling is INR 25 Lakh per enterprise per annum.
Partial Reimbursement of Interest on Term Loans	4% of the interest on term loan availed by the enterprise. Subject to an upper ceiling of INR 5.00 Lakh per enterprise per annum.	Rate of 5% with an upper ceiling to INR 12 Lakh per enterprise per annum.
100% Reimbursement of Standard Certification charges/ fees/ expenses	One-time payment for standard certifications in 12 selected areas issued by national and international bodies. Also applicable for reimbursement of fees/ charges on account of yearly renewal of standard certifications. One-time full reimbursement of fees payable for acquiring Technical Know-how/ Technology Transfer from any recognized national/ international research laboratories/ technical institutes/ universities.	-
100% Exemption from the payment of Earnest Money and Bid Security Deposits	For all eligible local enterprises on tenders floated by State Government Agencies.	-
Employment Cost Subsidy	-	Full reimbursed to eligible Micro, Small and Medium Enterprise belonging to the thrust sector on contribution made towards EPF and ESI Scheme. Subject to employment



		of 20 or more skilled and semi-skilled workers who are domicile of Tripura.
Subsidy on fees paid for Credit Guarantee of loans	Paid to micro and small enterprises on loans granted by Banks/ NBFCs.	-
Subsidy for participation in fares and exhibitions	-	To be reimbursed at a rate of 50% of the expenditure incurred for travelling expenses of one person and transportation of goods. Subject to an upper ceiling of INR 1.00 Lakh for each participation. This is further subject to two maximum participations a year per unit.
State Transport Subsidy	50% of transportation cost incurred for transportation of secondary raw materials by rail from the railway station nearest to the location of the seller to the Railway Station nearest to the location of the buyer as per Railway Standard Parcel Rate	-
Operational Subsidy to industrial units	New eligible industrial units availing fixed capital investment subsidy from any subsidy scheme of the State/ Central Government to be provided all operational subsidies	-
Special Incentives to Industrial Enterprises that continue to operate for five (5) years a. Industrial Promotion Subsidy b. Power Charge Subsidy c. Employment Cost Subsidy	a. Industrial Promotion Subsidy: provided to enterprises at 25% of Goods and Services Tax actually paid after 5 years of operation with the condition that the aggregating subsidy amount paid since commissioning of the project shall not exceed the 150% of investment in plant and machinery b. Power charges will be provided to all eligible industrial units with connected load of above 20HP at a rate of INR 5.00 per unit without any upper ceiling. The industrial units with connected load up to 20 HP will be provided partial reimbursement of power charges at 25% of the power charges actually paid by the enterprise, subject to a maximum amount of INR 15.00 Lakh per enterprise per annum. c. Employment cost subsidy for MSMEs employing 20 or more persons domiciled in Tripura at a rate of 50% of employer contribution paid towards EPF and ESI after 5 years of operation.	a. - b. the annual upper ceiling is INR 25 Lakh per enterprise. c. -

Similarly, central schemes also provide various incentives to industries in the state. Under the GoI's North East Industrial Development Scheme, the following incentives are provided to eligible industrial units on a reimbursement basis:

**Central Capital Investment Incentive for Access to Credit:** 30% of investment in plant and machinery with an upper limit of INR 5 Crore per unit.

**Central Interest Incentive:** 3%

on working capital credit advanced by eligible banks/financial institutions for the first 5 years from the date of commencement of commercial production of a unit.

**Central Comprehensive Insurance Incentive (CCII):** Reimbursement of 100% insurance premium on insurance of building and plant and machinery for 5 years from the date of commencement of commercial production of a unit.

**Goods and Service Tax (GST) Reimbursement:** Reimbursement up to the extent of the Central Government's share of CGST and IGST for 5 years from the date of commencement of commercial production of a unit.

**Income Tax Reimbursement:** Reimbursement of the Centre's share of income tax for the first 5 years, including the year of commencement of commercial production of a unit.

**Transport Incentive (TI):** The following are the subsidies provided under this-

- a) 20% of the cost of transportation including the subsidy currently provided by the Railways/ Railway PSU for movement of finished goods by rail.
- b) 20% of the cost of transportation for finished goods, for movement through inland waterways.
- c) 33% of the cost of transportation of air freight on perishable goods (as defined by the International Air Transport Association) from the airport nearest to the place of production to any airport within the country.

**Employment Incentive (EI):** The Centre pays 3.67% of the employer's contribution to the Employees Provident Fund (EPF) in addition to Government bearing 8.33% Employee Pension Scheme (EPS) contribution of the employer in the Pradhan Mantri Rojgar Protsahan Yojana (PMRPY).

The overall cap for benefits under all the components is INR 200 Crore per unit.

**Challenges Faced by Tripura:** Limited private investments and rudimentary physical infrastructure restrain the state's growth potential.

Though it now has essential infrastructure, this is hardly sufficient to stimulate industrialization. Reasons for the current state of insubstantial development are mentioned below:

#### **Geographical:**

- Due to restrictions, the only way possible to traverse is through its own boundaries by passing Chicken's Neck (via Siliguri corridor), which increases travel time manifolds.
- Geographical isolation from rest of India escalates the logistics cost and time for the products to reach target markets, reducing its competitiveness.

#### **Climate:**

- Coupled with the geographical isolation of the state, the climate of Tripura, with its long rainy season of 6 months, limits the working season to 4-6 months. Thus, projects completion time and costs both increase substantially.

#### **Funding and financing:**

- Tripura is special category state and dependent on its funding from the central government. But the "management of its long international border imposes huge administrative and financial costs"<sup>73</sup> on Tripura.
- Also, as a result of the relatively slow pace of industrialization and high unemployment, the state has a limited tax base.<sup>74</sup>

<sup>73</sup> Economic Review Of Tripura (2019-20), Directorate of Economics and Statistics, Government of Tripura (2020).

<sup>74</sup> Economic Review Of Tripura (2019-20), Directorate of Economics and Statistics, Government of Tripura (2020).

### **Absence of skilled labor:**

- Although, Tripura has a high literacy rate of 87.22%, that does not assure high skilled labor or relevant talent for carrying out any activity to run the industry.

### **Inadequate infrastructure:**

- Irregular topography makes it difficult and creates transportation choke points.
- Absence of cold storages and proper warehousing facility lead to agri-wastage and lowers the income of farmers.
- The development of agriculture and allied activities, especially for integration into global value chains, is crucial.

### **Environmental challenges:**

- While Tripura's forest cover provides huge ecological as well as economic benefits to the state, there is an 'opportunity cost in terms of the area that becomes unavailable for other economic activities and this results in development and fiscal disability'<sup>75</sup>.

**Considering the challenges to, and opportunities for industrial development in Tripura, the following sections of this report aim to identify suitable priority sectors for the state. Further an estimation of the land demand for each of the selected priority sectors will be provided as well. Then each priority sector shall be mapped to the industrial estate it is best suited for. This mapping will be done based on infrastructure availability at the park, and ease of market access and raw material availability.**

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<sup>75</sup> Economic Review Of Tripura (2019-20), Directorate of Economics and Statistics, Government of Tripura (2020).

### 3. Priority Sectors

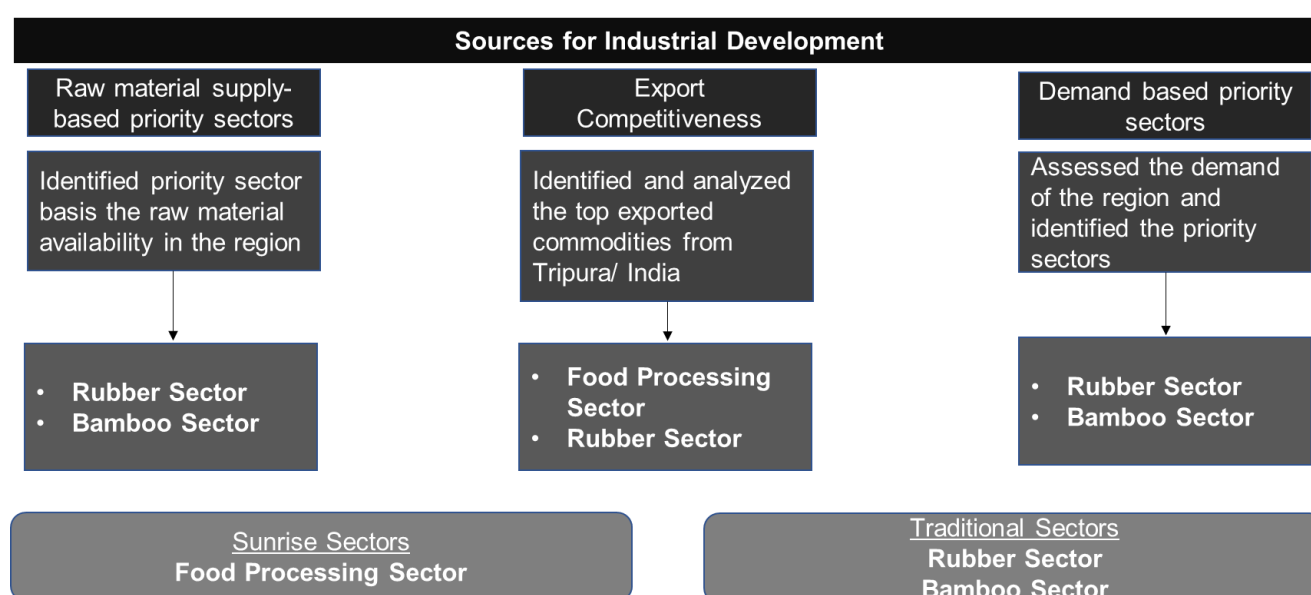


# Product Selection: Identification of Priority Sectors

The selected priority sectors should be able to develop/ enhance the capability of the region for serving both current and emerging needs of the market. The framework given below builds on ADB's, a feasibility study to develop an economic corridor in NER. The NEEC report has identified priority sectors for the region which included agro-processing, bamboo, oil and gas, rubber processing, cement and medical tourism.

The following sector identification framework for Tripura explains the step-by-step process of identifying the priority sectors (both traditionally strong and sunrise sectors) and focusses on both current performance and future potential of industries/ sectors in Tripura.

**Figure 5: Framework adopted to identify priority sectors for Tripura**



A three-criteria framework has been used to identify priority sectors.

- Export competitiveness:** Towards this criterion the team has undertaken assessment of potential exports from Tripura. Further value-added products which can be competitive have been identified based on origin destination analysis. This assessment will help in arriving at a list of products with high export potential.
- Import substitution:** India's top imported commodities over recent years have been analysed with respect to the raw materials available in Tripura. The feasibility of Import Substitution Industrialization (ISI) has been studied.
- Demand based priority sectors:** This criterion, helped identify priority sectors based on regional demand

A prioritized list of sectors has been compiled based on the outcomes of these four criteria. Using this list, further division into two different categories, i.e., traditionally strong and sunrise sectors has been prepared.

## 3.1. Identification of priority sectors

As discussed in the previous sub-section on selection framework, identification of priority sectors is done using the following four criteria:

### 3.1.1. Export competitiveness

In this subsection, products from Tripura which can be exported have been identified. Currently, few commodities mostly in their natural form are being exported to various countries. These include vegetables and fruits.



Tripura has a significant trade deficit, with an import value of INR 717 crores and an export value of INR 16.39 crores (FY 2020-21). Below mentioned is the volume of total trade from FY 2006-07 till 2020-21.

**Table 6: Volume of Trade- Imports and Exports of Tripura**

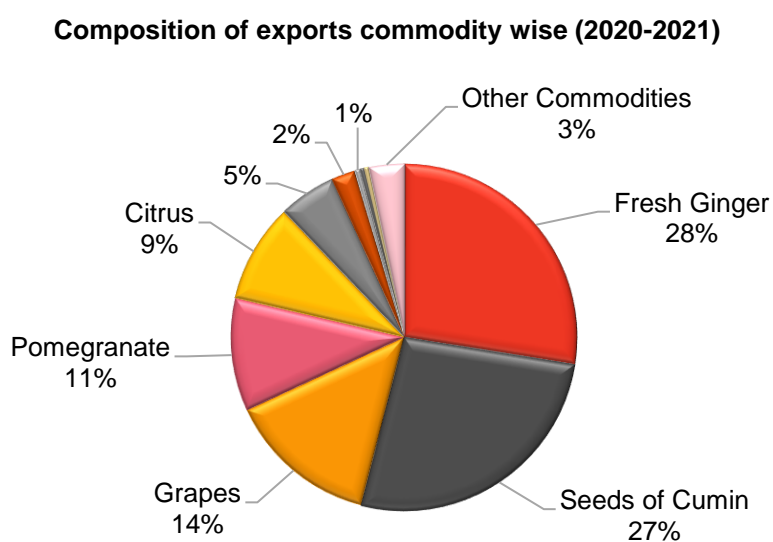
Year	Imports (Rs. in Crores)	Exports (Rs. in Crores)	Total
2006-07	48.69	0.87	49.56
2007-08	84.15	1.51	85.66
2008-09	125.94	0.26	126.20
2009-10	162.88	0.42	163.30
2010-11	255.88	1.71	257.59
2011-12	329.05	1.55	330.60
2012-13	342.65	0.41	343.06
2013-14	229.89	0.41	230.24
2014-15	357.65	1.02	358.67
2015-16	381.76	1.96	383.72
2016-17	300.23	4.60	304.83
2017-18	384.22	6.46	390.68
2018-19	522.42	14.66	537.08
2019-2020	644.78	30.34	675.12
2020-2021	716.87	16.39	733.26

Source: <https://ecostat.tripura.gov.in/eco-review-2020-21.pdf> (Economic survey 2021)

Given below is the composition of export commodities in FY 2020-21. It may be observed that all the products which are being exported are in their natural form and no major processing of the goods is happening, leading to low value exports.



**Figure 6: Composition of exports commodities**



Source: <https://ecostat.tripura.gov.in/eco-review-2020-21.pdf>

However, considering the favourable weather conditions in the region, there are a wide variety of crops that are available. The table below highlights the various crops and the production quantity in FY2020-21

**Table 7: Crops and their production in FY 2020-21**

S. No.	Crops	Area (Ha)	Production (Lakh MT)	Productivity (MT/ Ha)
1.	Mango	10288	52366	5.09
2.	Pineapple	9859	143744	14.58
3.	Orange	4707	21087	4.48
4.	Jackfruit	5491	133251	24.27
5.	Banana	10677	110400	10.34
6.	Litchi	933	3219	3.45
7.	Lime/ Lemon	5014	24167	4.82
8.	Papaya	3146	31775	10.10
9.	Sapota	91	569	6.25
10.	Musambi	1190	2404	2.02
11.	Guava	673	3156	4.69

12.	Others	2208	19210	8.70
<b>Total</b>		<b>54277</b>	<b>545348</b>	<b>10.05</b>

Source: Horticulture and Soil Conservation, Tripura

Currently, most of the fruits are not processed and are being sold in their natural form. The food processing industry in the state is still at a nascent stage. Further it could also be noted that fruits such as pineapple and jackfruit are extremely popular crops from the region. In 2018, the President of India also named Queen variety of pineapple as the state fruit of Tripura.

Only about 5-10% of the total produce is currently processed in India in contrast to developed countries like USA where 95% of the produce undergoes food processing. As per Agricultural and Processed Food Products Export Development Authority, there is huge potential for food processing industry in the northeast region. The table below highlights the food processing potential for major crops in north east. Among these crops, Tripura is famous for Pineapple and Jackfruit.

**Table 8: Marketable surplus in some of the key crops grown in NER**

Product Name	Production in NER (MT)	Consumption in NER (MT)	Market Surplus (MT)	Market Surplus as % of production
<b>Ginger</b>	355454	49241	306213	86.1
<b>Lemon</b>	215287	38605	176682	82.1
<b>Orange</b>	589736	86606	503130	85.3
<b>Pineapple</b>	777144	38891	738253	95.0
<b>Jackfruit</b>	492898	82295	410603	83.3
<b>Rice</b>	6754700	6387320	367380	5.4
<b>Maize</b>	350000	10246	339754	97.1
<b>Banana</b>	1208197	243846	964351	79.8
<b>Chili</b>	122444	89760	32684	26.7
<b>Litchi</b>	78847	3666	75181	95.4
<b>Papaya</b>	216462	80259	136203	62.9
<b>Grapes</b>	23980	4054	19926	83.1

Source: Agricultural and Processed Food Products Export Development Authority

Considering the above food processing potential and the availability of produced fruit in the region, food processing has been considered as one of the priority sectors in Tripura.

Currently, Tripura has competitive advantage in the production of pineapple, jackfruit, rice, food grains, etc. Upon further analysis, it is found that rice and food grains produced in the region are locally consumed with a surplus of less than ~10-20%, but in the case of fruits like pineapple, jackfruit, and orange the market surplus after consumption can go be as high as ~85-90%. This indicates a huge potential for setting up of fruit processing industries. Further, organic farming is gaining a lot of prominence and the state government has certified 2,000 hectares of land for organic farming. This may further boost the growth of organic farming and organic food processing in Tripura.

### 3.1.2. Demand based priority sectors

In this subsection, products whose current demand is being met through imports, but which can be manufactured competitively in Tripura are identified. Demand based priority sectors is a strategy focusing on promoting domestic production to foster industrialisation. The strategy aims towards self-sufficiency by protecting and incubating local industries so that the goods produced by them are competitive with the products that are currently being imported.

Currently India imports various products. However, considering the availability of natural resources in Tripura, products which can be manufactured in Tripura using natural rubber could be targeted for domestic manufacturing.

Tripura is the second largest producer of rubber in the country, after Kerala. Total rubber production of the state stood at ~90,712 MT with a yield of 1350 kg/hectare/year which is slightly less than the national average, the total area under plantation is ~86,892 hectares of land. Tripura contributes ~9% of India's total production.

Among all the imports, the products which use rubber as major raw material have been identified and listed in the table below.

Products
1. Tyres
2. Tubes
3. Flaps
4. Contraceptives
5. Other Hygienic & Pharmaceutical Products
6. Conveyor Belting
7. Latex Foam Sponge
8. Other Rubber Articles

Source: Primary research, Study Team Analysis

A detailed value chain analysis on the products listed above in the next section will help in shortlisting those which can be manufactured in Tripura.

### 3.1.3. Raw material-based priority sectors

Tripura is endowed with a vast natural resource base. It is rich in natural resources such as bamboo plantation, natural gas, rubber, tea, and medicinal plants.

- Plantations: Tripura has an area of 2005.75 sq.km of bamboo plantation with a total yield of 1,88,512 MT/yr.<sup>76</sup>, 58 tea gardens covering an area of >6,885 hectares, as of February 2020<sup>77</sup> and 85453.63 hectares of rubber plantation<sup>78</sup>. As per the study of the National Bureau of Soil Survey and Land Use

<sup>76</sup> <https://www.destinationtripura.com/bamboo.html>

<sup>77</sup> ENVIS Centre (<http://trpervis.nic.in/test/forest.html>).

<sup>78</sup> <https://tidc.tripura.gov.in/rubber/>

Planning, an ICAR organization located in Nagpur under the Ministry of Agriculture, the maximum area that can be brought under rubber cultivation in Tripura is 1 lakh Ha.<sup>79</sup>.

10. Horticulture: Tripura's geography and climatic condition, as well as the soil types means that horticulture in the state has great scope for development. The climate is conducive to the growing of a number of tropical and sub-tropical fruits and vegetables. Fruits like Pineapple, Jackfruit, Orange, Banana, Litchi, Lemon /Limes as well as plantation crops like Areca nut, Coconut, Cashew, various winter and summer vegetables, spices, and flowers can be cultivated here. Further, the topography of the state is such that it is suitable for horticultural crops.

Further based on industrial output as per the ASI data of Tripura, a long list of sectors that have the potential to grow in the state have been identified. They have been identified based on natural resources availability in the state. The list is given in the table below.

**Table 9: List of sectors and products along with their output**

Sectors	NIC code (Product)	Products	Tripura Output (2017-18) (INR Lakhs)
Manufacture of food products	103	Processing and preserving of fruits & vegetables	786
Manufacture of food products	105	Manufacture of dairy products	2650
Manufacture of food products	106	Manufacture of grain mill products, starches & starch products	12440
Manufacture of food products	107	Manufacture of other food products (coffee, tea, mate, spices, bakery)	24747
Manufacture of food products	108	Manufacture of prepared animal feeds	1704
Manufacture of beverages	110	Manufacture of beverages	6344
Manufacture of tobacco products	120	Manufacture of tobacco products	565
Manufacture of textiles	131	Spinning, weaving & finishing of textiles	82
Manufacture of products of bamboo, cork, straw and plaiting materials	162	Manufacture of products of bamboo, cork, straw & plaiting materials	1431
Printing and reproduction of recorded media	181	Printing and service activities related to printing	1258
Manufacture of coke & refined petroleum products	192	Manufacture of refined petroleum products	10822

<sup>79</sup> Department of Industries and Commerce, Government of Tripura (<https://industries.tripura.gov.in/rubber-overview#:~:text=As%20per%20the%20study%20of,point%20in%20terms%20of%20area.>).

Manufacture of chemicals & chemical products	201	Manufacture of basic chemicals, fertilizer and nitrogen compounds, plastics and synthetic rubber in primary forms	119
Manufacture of rubber & plastic products	221	Manufacture of rubber products	18929
Manufacture of rubber & plastic products	222	Manufacture of plastic products	2444
Manufacture of other non-metallic minerals (cement, ceramic)	239	Manufacture of non-metallic mineral products (cement, ceramic)	42482
Manufacture of basic metals	241	Manufacture of basic iron & steel	6308
Manufacture of basic metals	243	Manufacture of basic precious & other non-ferrous metals & casting of metals	89
Manufacture of fabricated metal products, except machinery and equipment	259	Manufacture of other fabricated metal products; metalworking service activities	1024
Manufacture of electrical equipment	273	Manufacture of wiring and wiring devices	200
Manufacture of furniture	310	Manufacture of furniture	1390

Source: DGCIS, AIS

Further the above long list has been refined by analyzing regional concentration of upstream and downstream industries (location quotient [LQ]).

The LQ quantifies how concentrated an industry is in a region compared with a larger geographic area such as the state or country. It reveals what makes a particular region unique when compared with the national average<sup>80</sup>. Industries with a high LQ are typically (but not always) export-oriented industries, which are important because they bring money into the region rather than simply circulating money that is already in the region. Industry LQs are calculated by comparing the industry's share of regional output with its share of national output. LQ is always positive.  $LQ > 1$  can be interpreted as indicating that the industry under study is more concentrated in the region than the national average. The basic uses of industry LQs include:

- determine which industries make the regional economy unique,
- identify the export orientation of an industry and identify the most export-oriented industries in the region,
- identify emerging export industries beginning to bring money into the region, and
- identify endangered export industries that could erode the region's economic base.

For a given industry,  $i$ , and for any given region,  $j$ , the LQ is defined as follows:

<sup>80</sup> F. Strotebeck. 2016. *The Location Quotient – Assembly and Application of Methodological Enhancements*. [https://www.researchgate.net/publication/299536337\\_The\\_Location\\_Quotient\\_-\\_Assembly\\_and\\_Application\\_of\\_methodological\\_enhancements](https://www.researchgate.net/publication/299536337_The_Location_Quotient_-_Assembly_and_Application_of_methodological_enhancements) (accessed 29 May 2020).

$$LQ_{ij} = \frac{\frac{x_{ij}}{x_{ik}}}{\frac{x_{kj}}{x_{kk}}}$$

where  $x_{ij}$  represents output of industry  $i$  in region  $j$ ,  $x_{ik}$  is the total output of industry  $i$  in all regions,  $x_{kj}$  is the total output of all industries in region  $j$ , and  $x_{kk}$  is the total output of the overall region.

The values of LQ for the selected long list sectors are shown below

**Table 10: List of sectors and products along with their LQ**

Sectors	Product	LQ
Manufacture of rubber & plastic products	Manufacture of rubber products	11.10
Manufacture of other non-metallic minerals (cement, ceramic)	Manufacture of non-metallic mineral products (cement, ceramic)	8.56
Manufacture of food products	Manufacture of other food products (coffee, tea, mate, spices, bakery)	4.33
Manufacture of beverages	Manufacture of beverages	4.16
Manufacture of furniture	Manufacture of furniture	3.47
Manufacture of products of bamboo, cork, straw and plaiting materials	Manufacture of products of bamboo, cork, straw & plaiting materials	3.19
Manufacture of food products	Manufacture of grain mill products, starches & starch products	2.19
Manufacture of food products	Processing and preserving of fruits & vegetables	1.68
Manufacture of food products	Manufacture of prepared animal feeds	1.6
Printing and reproduction of recorded media	Printing and service activities related to printing	1.5
Manufacture of food products	Manufacture of dairy products	0.81
Manufacture of rubber & plastic products	Manufacture of plastic products	0.62
Manufacture of tobacco products	Manufacture of tobacco products	0.6
Manufacture of coke & refined petroleum products	Manufacture of refined petroleum products	0.59



Manufacture of basic metals	Manufacture of basic iron & steel	0.52
Manufacture of fabricated metal products, except machinery and equipment	Manufacture of other fabricated metal products; metalworking service activities	0.42
Manufacture of electrical equipment	Manufacture of wiring and wiring devices	0.12
Manufacture of basic metals	Manufacture of basic precious & other non-ferrous metals & casting of metals	0.05
Manufacture of chemicals & chemical products	Manufacture of basic chemicals, fertilizer and nitrogen compounds, plastics and synthetic rubber in primary forms	0.02
Manufacture of textiles	Spinning, weaving & finishing of textiles	0.01

Source: DGCIS, AIS

Based on the above assessment, the following sectors can be shortlisted as priority sectors due to availability of raw materials and locational advantages in the region.

**Table 11: Manufacturing sectors identified based on above parameters**

Sectors	Products
<b>Manufacture of food products</b>	• Processing and preserving of fruits & vegetables
	• Manufacture of grain mill products, starches & starch products
	• Manufacture of other food products (coffee, tea, mate, spices, bakery)
	• Manufacture of prepared animal feeds
<b>Manufacture of products of bamboo, cork, straw, and plaiting materials</b>	• Manufacture of products of bamboo, cork, straw & plaiting materials
<b>Manufacture of rubber &amp; plastic products</b>	• Manufacture of rubber products

Source: Primary research and Study Team Analysis

Based on the assessment of above filter criteria and considering all the stakeholder's consultation during site visits resulted in identifying the following priority sectors:

The shortlisted priority sectors are:

11. Food processing
12. Rubber
13. Bamboo

Food processing has the potential for exports specifically in pineapple and jackfruit segment. While considering the import of fish in the state, processing of fish could be considered as one of the priority segments. Rubber and bamboo industry has huge availability of raw material in the region further supported by domestic and regional demand. Based on the current investments and industrial scenario of the region, the next section segregates the identified sectors into traditional and sunrise sectors.

## 3.2. Classification of priority sectors

In this section, the shortlisted priority sectors have been classified into two categories: traditional sectors and sunrise sectors (emerging new sectors).

### Traditional sectors

Traditionally, strong sectors have been identified based on their previous contribution to manufacturing output, contribution to exports, and number of people employed. These sectors are well established and are sectors wherein Tripura already has a competitive edge compared to other states.

Owing to incentives being provided through Tripura Bamboo Mission and successful setting up of rubber park in the state, there is an established ecosystem in Tripura focusing on manufacturing of rubber and bamboo-based products. Hence rubber and bamboo sectors can be classified as traditional sectors.

### Sunrise sectors

Some of the key features of sunrise sectors are high growth rates and future potential. These sectors usually need initial impetus in terms of fiscal incentives and policy support to help them attain their true potential. Tapping into these sectors can further help aid further diversification of Tripura's economy. As highlighted above, most of the food products are currently being consumed in their natural form or are being exported in their natural form. This shows the potential for growth in food processing industry. However due to lack of existing supply chains, there is a need for certain impetus to support the growth in this sector. Hence, the food processing sector has been classified as a sunrise sector.

Based on these observations, two categories are as follows:

**Table 12: Classification of priority sectors**

Traditional sectors	Sunrise sectors
<ul style="list-style-type: none"> <li>Rubber processing</li> <li>Bamboo industry</li> </ul>	<ul style="list-style-type: none"> <li>Food processing industry</li> </ul>

## 3.3. Rubber Sector:

### 3.3.1. Rubber industries in India

India is amongst the largest rubber producing countries of the world. In FY 2019-20, India produced 7.12 lakhs tonne of Natural Rubber (NR) accounting 5.1% of world's total rubber production. India is the second biggest consumer of rubber with a consumption of 11.34 lakhs tonne of NR accounting 8.4% of total world's consumption. Out of India's total production 68.4% is primary processed, low value-added product such as Ribbed Smoke Sheet (RSS). The average yield of NR in India is 1459 kg/hectare/year. Given below is the overall performance of sector in India.

**Table 13: Rubber consumption in India**

FY 2019-20	Natural Rubber	Synthetic Rubber	Reclaim Rubber	Total (tonnes)
Production (T)	712000	399400	137010	1248410
Consumption (T)	1134120	649610	136110	1919840
Import (T)	457223	314378	NA	771601
Export (T)	12872	NA	NA	12872

Source: Rubber board of India

Data indicates that India's total rubber consumption including natural, synthetic, and reclaimed rubber is outnumbering India's total production. Hence, to satisfy the overall demand, nation imported 7.71 lakh tonne of rubber and its articles. Around 40% of India's demand met from imports. Another significant reason behind import of rubber is its price in international market. Indigenously produced NR is 25% costlier than the imported one. 45% of total rubber import is RSS. Sheet rubber, block rubber and latex account for 47%, 43% and 8% respectively in NR consumption. 68% of NR consumption in India is in the automotive tyre sector.

Apart from imports, India has made marginal exports of low value-added products in FY 2019-20 of 12,872 tonnes of natural rubber. Almost 91% of the total exported rubber was in the form of block rubber. Since, rubber articles/ products fetch higher rates than RSS, Cenex etc hence, it is imperative to manufacture such product indigenously.

Traditional rubber-growing states comprising Kerala and Tamil Nadu account for 81% of production. Major non-traditional rubber growing regions are the Northeastern states of Tripura, Assam and Meghalaya, Odisha, Karnataka, Maharashtra, and West Bengal. Sheet rubber is the most preferred form of processing accounting for around 70% of processed rubber. Block rubber and latex comprise 17% and 12% respectively of rubber production in the country. Major rubber producing states in India are as follows:

**Table 14: Major rubber producing states in India**

S. No.	State	Production of NR (2018-19) (T)
1.	Kerala	490460
2.	Tripura	53050
3.	Karnataka	38200
4.	Assam	24300
5.	Tamil Nadu	21500

Source: Rubber board of India

Globally and locally natural rubber is largely grown by smallholders and 91% of rubber planted area and 92% of production is in smallholding sector (below 10 ha). There are around 1.3 million rubber growers and 0.6 million workers in rubber plantation sector in India. Average size of holding is the lowest in India among the major NR producing countries at 0.57 ha.

Rubber and its articles can be classified further with the help of the ITC HS system code. For rubber, the ITC HS code is HS-40 (two-digit level). The table below outlines the relevant categories along with their description:

**Table 15: Rubber and its articles along with ITC HS codes**

ITC HS Code	Name/ Description
40	Rubber and articles thereof
4001	Natural rubber and gums, in primary form, plates, etc
4002	Synthetic rubber
4003	Reclaimed rubber in primary forms or in sheets

<b>4004</b>	Rubber waste, parings, and scrap (except hard rubber)
<b>4005</b>	Compounded unvulcanised rubber, in primary forms
<b>4006</b>	Un-vulcanized rubber as rods, tubes, discs, rings, etc.
<b>4007</b>	vulcanized rubber thread and cord
<b>4008</b>	Rubber plate, sheet, strip, rod etc., except hard
<b>4009</b>	Rubber tube, pipe, hose, except hard rubber
<b>4010</b>	Conveyor and similar belts or belting of rubber
<b>4011</b>	New pneumatic tyres, of rubber
<b>4012</b>	Tyres, retreated, used pneumatic, solid, cushioned
<b>4013</b>	Inner tubes of rubber
<b>4014</b>	Hygienic or pharmaceutical articles of rubber
<b>4015</b>	Rubber clothing and accessories, except hard rubber
<b>4016</b>	Articles of vulcanised rubber except hard rubber,
<b>4017</b>	Hard rubber (e.g., ebonite) in all forms, articles, scrap

As India's consumption is higher than its production and moreover, India manufactures low value-added products, therefore, to satisfy the demand it is important to import the rubber and its articles from other nations. Below table shows the top five destination in terms of value from where India imports rubber and its articles:

**Table 16: List of top countries from where India imports rubber**

<b>Partner Country</b>	<b>FY 2019 (USD millions)</b>
<b>Indonesia</b>	290
<b>Thailand</b>	286
<b>Korea</b>	286
<b>People's Republic of China</b>	284
<b>Japan</b>	269

Source: <http://www.dgciskol.gov.in/>

Conventionally, natural rubber is not an export-oriented commodity due to deficit in production. Marginal export happens to adjust temporary demand-supply imbalances in the natural rubber domestic market. Below table shows the top five destination in terms of value where India exports rubber and its articles:

**Table 17: List of top countries to where India exports rubber**

Partner Country	FY 2019 (USD millions)
USA	548
Germany	196
UAE	130
UK	103
Bangladesh	99

Source: <http://www.dgciskol.gov.in/writereaddata/Downloads/20210224114037Commodity%20Profile%20of%20Rubber.pdf>

To make India self-reliant in the rubber industry, Tripura may take a leap forward taking advantage of its suitable climatic conditions such as fertile soil, availability of sunshine and longer monsoons.

### 3.3.2. Rubber sector of Tripura

Natural rubber is one of the most important cash crops of Tripura; The state is the second largest producer of rubber in the country, after Kerala.

Total rubber production of the state stood at ~90,712 MT in FY 2020-21 with a yield of 1281 kg/hectare/year which is less than the national average, this gets produced on ~86,892 hectares of land under rubber cultivation.

Tripura contributes ~9% of India's total production. There are more than 1 lakh rubber growers in the state. Rubber sector is a labour-intensive sector therefore, growth of this sector might open avenues for employment for semi-skilled laborers. Given below is the item wise production of rubber in Tripura:

**Table 18: Item wise production of rubber in Tripura**

Production (Item wise)			
Items	Production (Kg)	Production (MT)	%
Latex for sheet	53989597.37	53989.60	59.62
Latex for Cenex/ Creep	4362213.00	4362.21	4.81
FC for Indian Standard Natural Rubber (ISNR)	32359727.00	32359.73	35.67
<b>Total</b>	<b>90711537.37</b>	<b>90711.54</b>	<b>100</b>

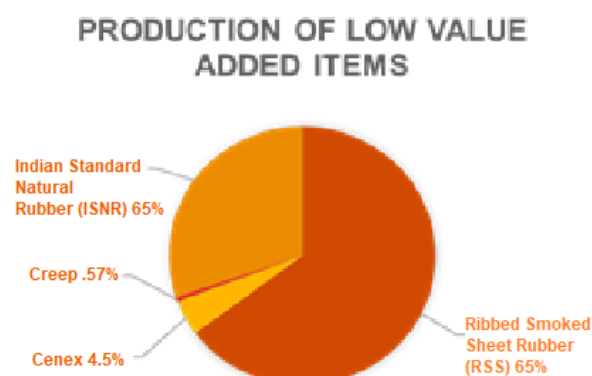
Source: TIDC

At present, most of the rubber produced in Tripura is being marketed as raw material for other industries or being supplied as a primary processed low value-added product like RSS to the other states of India. In Tripura, currently there are few industries focused on producing rubber threads from Cenex used by textile industry.

Due to current restrictions on exports via ICP at Agartala, manufacturers in Tripura are not able to export their products to Bangladesh.

Furthermore, shipments to Bangladesh need to be sent through Kolkata escalating the cost and time, making the product uncompetitive. Hence, they are being sent to manufacturers in Gujarat.

**Figure 7: Manufacturing Share of Rubber in Tripura**



Source: Rubber Board of India, TIDC

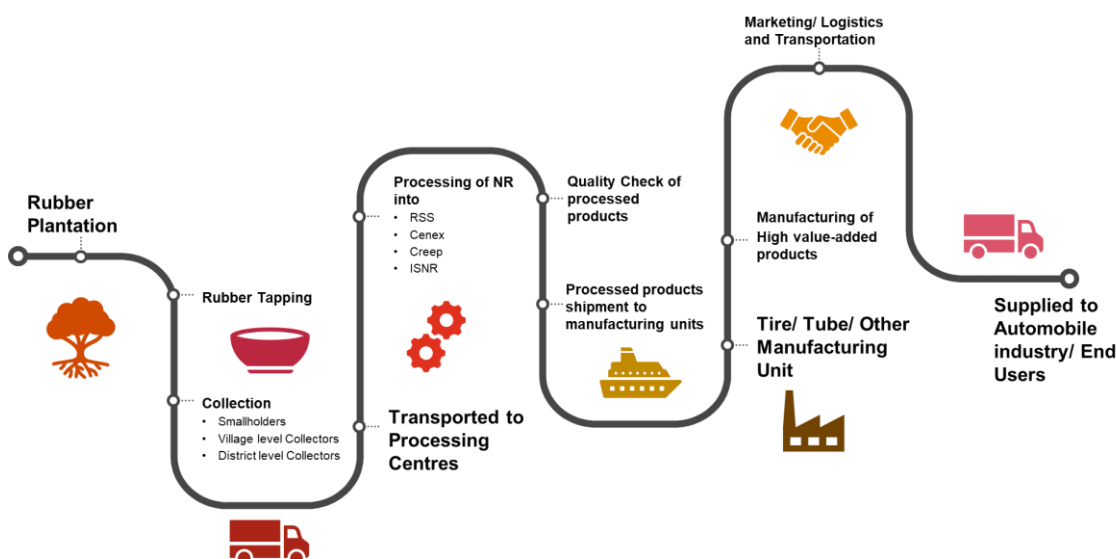
One of the main reasons manufacturers from Tripura are not being competitive, is the time taken for transportation compared to alternate sources of rubber producing states. It is estimated that the time taken to transport products from Kerala to the target market is 3 to 4 days, whereas for Tripura it takes ~8 days, rendering the products from the state Tripura uncompetitive.

However, strategic roads and rail network are being built, which will improve the connectivity to rest of India. Large number of rubber-based manufacturers could be attracted to make investments in the region. A detailed value chain analysis in the next section has been used to highlight the various products that can be manufactured in Tripura.

### Rubber industry value chain

The value chain begins from rubber plantations and ends terminates at units manufacturing a wide range of latex-based products. Given below is the value chain of rubber industry:

**Figure 8: Value chain of rubber industry**





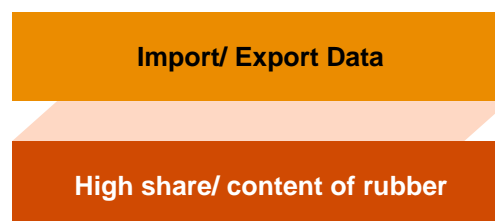
Source: Primary research, Study Team Analysis

India has a huge potential of exports for rubber products and the report suggests that Tripura's strategic location can be leveraged as this is in line with India's Act East Policy. The manufacturing of high value-added products like tubes, tyres, surgical gloves, rubber contraceptives, etc can be promoted in the state. At present, only primary processing is being undertaken to produce RSS as a major product.

Mentioned below is the framework to identify priority products for the Rubber sector. This framework is used to shortlist the products from rubber sector.

- c. **Import/ Export Data:** Import and export data of multiple products has been gathered and analysed to understand the current scenario of the respective rubber products. Products which are getting imported at large quantity, may be considered to be substituted with domestically produced products to promote Aatmanirbhar Bharat. Also, products which are getting exported at large quantity and at competitive pricing are being considered as potential products for manufacturing in Tripura.

**Figure 9: Framework to shortlist priority products**



Source: Study Team

- d. **High share/ content of rubber:** The manufacturing processes of multiple products has been analysed. Those products wherein the majority of raw material is either primary processed RSS or latex concentrate have been considered.

Shortlisted products as per the framework are as follows:

**Figure 10: Shortlisted products of rubber as per framework**

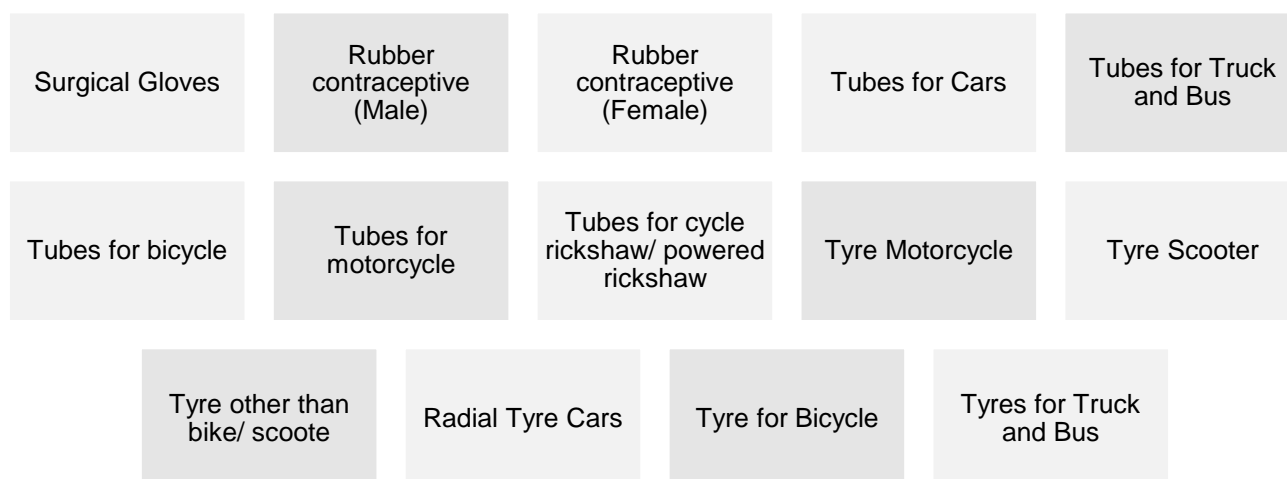
	Similar ecosystem required		Similar ecosystem required			Similar ecosystem required			
	Surgical Gloves	Rubber Contraceptive	Tyres motorcycle	Tyres for others	Radial tyre cars	Tube for Bicycle	Tube for Bike	Tube for Cycle Ricksha	Tubes for cars
1 Import/ export data analysis	✓	✓	✓	✓	✓	✓	✓	✓	✓
2 High share of rubber in the product	✓	✓	✓	✓	✓	✓	✓	✓	✓
3 Similar infrastructure requirement	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: Primary research, Study Team Analysis

In the study, **more than 75 rubber products** have been identified (**a list of which has been provided in the annexures**) out of which **14 products** have been shortlisted for manufacture in Tripura. They have been selected based on the following parameters:

- High share of rubber in raw materials required for production
- Production processes requiring minimal technical knowhow
- Products with high expected growth rate
- Products needing minimal infrastructure
- Products with high domestic demand (based on analysis of import data)

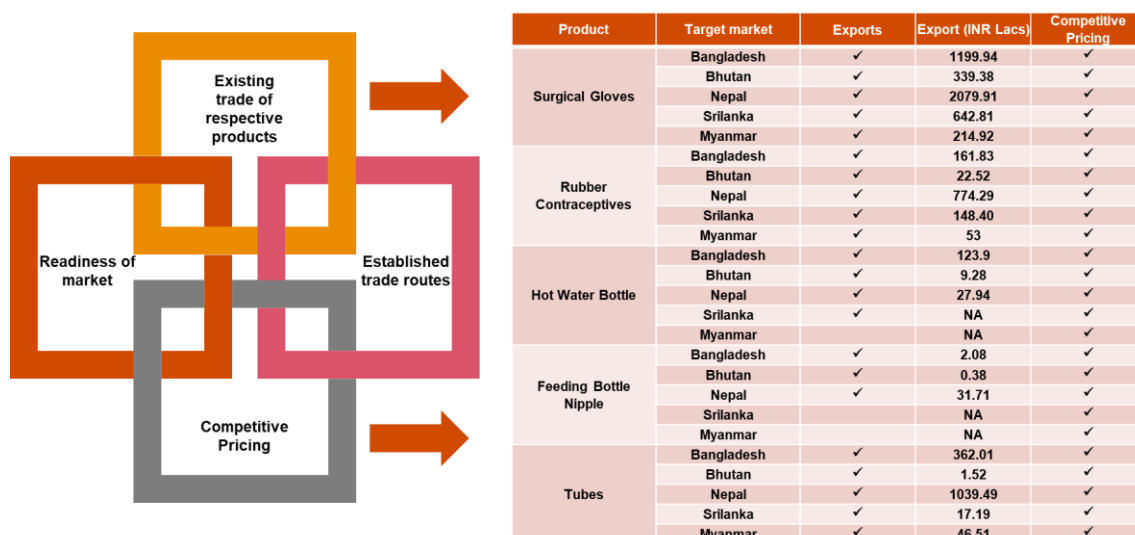
Figure 11: List of shortlisted products of rubber



### 3.3.3. Analysis of product competitiveness

After shortlisting the products, the competitiveness of identified products in target markets have been assessed. The assessment focused on comparing the landed cost of identified product in target market to the landed cost of product in case they are manufactured in Tripura. Considering that most of the products identified are value added products which are currently being imported into India, the assessment focuses on comparing the imported landed price of products with the manufacturing cost in Tripura. Based on the assessment, the products got mapped to their target markets and accordingly, industrial strategy for each product has been proposed. Apart from catering to demand from rest of India, the requirements of nearby growing markets such as Bangladesh, Bhutan, Nepal (BBN), Sri Lanka and Myanmar can be addressed by industries in the state. The criteria for selecting the target market are given below:

Figure 12: Criteria for selecting the target market



Source: Primary research, Study Team Analysis

A framework has been used to identify international target market for the priority products wherein 4 criteria which a target market must meet have been selected.

- Readiness of market: Similar products are already available in the target market.
- Existing trade route of respective product: India must already export similar products to these markets.
- Established trade routes: Direct and already established routes to target market.
- Competitive pricing: The selling price of the existing products in the target market must be competitive with the projected products.

Analysis of each product was undertaken individually. The framework given has been used to conduct competitiveness analysis:

**Figure 13: Framework adopted to conduct O-D analysis**



## 1. Surgical Gloves:

Surgical gloves have been shortlisted as one of the priority products as more than 90% of raw material used to manufacture it is the latex concentrate. Natural rubber has sufficient production locally.

The imports of surgical gloves have surged up to 23.84% from 2016-17 to 2020-21. Surgical gloves are getting imported in India at a large quantity from many South Asian countries like Malaysia, Vietnam etc. The usage of surgical gloves is not limited to healthcare industry but also have wide range of applications in the masses like food stalls, industries etc.

Manufacturers in Tripura can get a cost advantage of almost 30% due to locally available raw material.

- The cost of importing a single unit of glove is estimated at INR ~3.8
- Cost of domestically manufactured glove is in the range of INR ~2.6 per unit.

### Major target markets for surgical gloves

Apart from rest of India where the gloves can be supplied at a competitive price, it has been observed from the export's data that neighbouring countries like Bangladesh, Bhutan, Nepal, Sri Lanka, and Myanmar (BBNSM) could also be targeted due to their proximity to Tripura.

**Table 19: List of target markets for gloves**

Target Market	Price in Target Market (INR)	Exports from India in 2021-22 (USD/Million) <sup>81</sup>
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<sup>81</sup> EXIM databank

<b>Bangladesh</b>	13.0	1.36
<b>Sri Lanka</b>	7.5	0.09
<b>Nepal</b>	7.0	3.68
<b>Myanmar</b>	5.0	0.93

Sources: <https://www.daraz.com.bd/tag/medical-hand-gloves/>; <https://www.daraz.lk/products/latex-powdered-surgical-glove-i119907433-s1034500949.html?spm=a2a0e.searchlistcategory.list.29.33d4f3c951EEwn&search=1>; <https://www.daraz.com.np/products/powdered-latex-examination-gloves-i107331142-s1028724667.html?spm=a2a0e.searchlistcategory.list.22.1a9c727aWN7S2V&search=1>; <https://www.shop.com.mm/products/latex-powdered-examination-gloves100pcs-1box-i103760068-s1028396894.html?spm=a2a0e.searchlistcategory.list.72.7f8678a0KgSgTL&search=1>. Month Accessed: August 2020

The selling price of surgical gloves in these countries is around INR ~8 per piece, much higher than the cost price for manufacturing in Tripura. Hence the regional markets provide ample opportunity for the products.

## 2. Rubber Contraceptive (Males/ Females):

Major raw material required to manufacture rubber sheath contraceptives is latex concentrate. In FY 2020-21, the total imported quantity of sheath contraceptives for males stood at ~218.29 Crore pieces worth INR ~5.5 Crore, and for female contraceptives ~1.2 Crore pieces were imported worth INR ~8.74 lakh.

Further India also exports this product. In FY 2020-21, India has exported rubber contraceptives (males) worth of INR ~367.77 Cr and INR ~59.22 Cr of female contraceptives. India exported contraceptives to Brazil, the People's Republic of China, Nepal, Poland, Bangladesh etc.

Based on primary consultations, the cost of manufacturing is ~INR 1.7.

### Major target markets for rubber sheath contraceptives (M/F)

The selling price per unit in the target market is highlighted in the table below.

**Table 20: List of target markets for contraceptives**

Target Market	Price in Target Market (INR)*	Exports from India in 2021-22 (USD/Million) <sup>82</sup>
<b>Bangladesh</b>	8.5	0.79
<b>Sri Lanka</b>	16.0	0.17
<b>Nepal</b>	20.0	1.22
<b>Myanmar</b>	50.0	0.96

Sources: <https://www.daraz.lk/products/romantic-condom-assorted-aroma-i162737049-s1103430010.html?spm=a2a0e.searchlist.list.17.6e7a6b03xFFVxH&search=1>; <https://www.daraz.com.np/catalog/?from=filter&q=condom>; <https://www.daraz.com.bd/products/sensation-dotted-coffee-condom-single-pack-3x-i167616119-s1101396248.html?spm=a2a0e.searchlist.list.7.43263633I9cjVZ&search=1>; <https://www.shop.com.mm/products/durex-performa-last-longer-condom-i103284017-s1027887147.html?spm=a2a0e.searchlistcategory.list.20.14ce69aasA9hNQ&search=1>. Month Accessed: August 2020

It can be observed that manufacturers in Tripura will be cost competitive and hence this product could be targeted to be manufactured in Tripura.

## 3. Tubes for bicycle, motorcycles, cycle rickshaw, cars, and trucks:

<sup>82</sup> EXIM databank

Vehicular tubes are dependent on the two industries they are tyre industry and automobile industry. Growth of these two industries leads the growth of the tube industry. As per ICRA, Tyre industry is expected to grow 7-9% in next 5 years. Also, automobile industry is expected to reach USD 250-288 by FY 2026.

Currently India is dependent on Imports to meet its demand. Import numbers of different types of tubes are shown below

- In FY 2020-21, India imported **bicycle tubes** of worth INR ~3.3 Cr for 3.9 lakh units,
- For **motorcycle tubes** value of import stood at INR ~3.3 Cr for purchasing ~2.3 lakh units
- Import of 6.5K units of **rickshaw tubes** for an import value of INR ~7.83 lakh.
- For **Cars** value of import stood at INR ~3.7 lacs for purchasing ~90 lakh units
- Import of ~20K units of **rickshaw tubes** for an import value of INR ~2.94 Cr.

Based on primary consultations cost of manufacturing a bicycle tube is INR ~75, motorcycle tube is INR 120, cycle rickshaw tube is INR ~80 and car tube is INR 200. These domestically manufactured products are cheaper compared to current import cost. Hence manufactures in Tripura could target supplying tubes to other parts of the country.

Further, Tubes are also exported in regional market. Given below is the table in which value wise export and import for all types of tubes are showcased.

**Table 21: Value wise export and import for all types of tubes**

S. No.	Product	Export (Value INR Lacs) (FY 2020-21)	Import (Value INR Lacs) (FY 2020-21)
1.	Tubes for bicycle	17656.30	330.83
2.	Tubes for motorcycle	2989.75	331.58
3.	Tubes for cycle rickshaw	787.06	7.83
4.	Tubes for cars	4215.82	3.70
5.	Tubes for truck and bus	15807.66	294.82

Source: <https://tradestat.commerce.gov.in/eidb/lcomcnt.asp>

Considering the cost advantages of manufacturing in Tripura and connectivity to Chattogram Port, manufactures can target exports.

#### 4. Tyres for bicycles, motorcycles, scooter, auto, car, truck, and bus:

About 68% of natural rubber consumption in India is by the automotive tyre industry. Almost 50% of raw material required to make tyres is rubber of which 30% is natural rubber and remaining is synthetic rubber to increase its strength. Vehicular tyres are export oriented products, though the market share of Indian exported tyres is very minimal in global market, but this may be increased by tapping the potential of Tripura in manufacturing and exporting the tyres to South Asian nations.

India is dependent on imports for various type of tyres. The table below highlights the cost of import and compares the same with cost of domestically manufactured tyres.

**Table 22: Details of imports (value, quantity and cost) and costs of manufacturing locally for tyres**

Product	Import Value (INR)	Import Quantity (Nos)	Cost per unit (Imports)	Cost per unit (domestic production)
<b>Tyre Motorcycle</b>	62.22 Cr	356360	1746.11	500

<b>Tyre Scooter</b>	19.05 Lakh	1670	1140.72	450
<b>Tyre other than bike/scooter</b>	84.95 Lakh	5760	1474.83	400
<b>Radial Tyre Cars</b>	357.25 Cr	1359620	2627.60	2580
<b>Tyre for Bicycle</b>	3.17 Cr	168980	188.08	150
<b>Tyres for Truck and Bus</b>	151.27 Cr	166240	9099.89	7000

Source: Tradestat, Primary research, Study Team Analysis

Domestically produced tyres have an edge over imported one in terms of costing. Hence tyre manufacturing can be explored in Tripura.

### Major target markets

Apart from meeting the demand from rest of India, neighbouring nations like Bangladesh, Bhutan, Nepal, Sri Lanka etc can also be targeted by manufacturers in Tripura.

## 3.4. Bamboo and bamboo products in India

Bamboo is one of the fastest-growing types of woody grass in the world. It belongs to the Gramineae family and can survive even in stressed climatic and edaphic conditions. It can grow in different soil conditions, varying from organically poor to mineral rich, and from adequately watered to drought-affected soil. India is the second-largest bamboo producer in the world. It has the largest area under bamboo cultivation at nearly 16 million hectares out of the 31.5 million hectares of the global cultivated area<sup>83</sup>. Despite accounting for about 50% of the world's cultivation area, India accounts for only a 5% global share by market value of bamboo products. Low yields of the existing bamboo plantations and lack of commercial utilization of bamboo resources are considered the possible reasons for India's low market share.

With over 1,500 species within 87 genera, bamboo lends itself to over 1,200 end uses. All parts of bamboo can be used in the production of varied products. Table below presents the different uses of bamboo:

**Table 23: Different uses of bamboo**

Part of bamboo plant	Use
Leaves	Fodder, medicine, manure
Twigs	Brooms
Top	Chopsticks, scaffolding, furniture
Middle Upper	Blinds, mats, carpets, handicrafts
Middle Lower	Flooring, laminated furniture
Base	Charcoal, pulp

<sup>83</sup> Forest Survey of India, Ministry for Environment, Forests and Climate Change. 2019. *India State of Forest Report 2019*. Dehradun.



Shoots	Vegetables
Sheath and rhizome	Handicrafts
Leftovers and processing wastes	Charcoal, pulp, fuel

Sources: Government of Assam. 2003. Draft Assam Bamboo and Rattan Policy, 2003. Guwahati.

The global bamboo market is projected to grow at a compound annual growth rate (CAGR) of about 5% from \$68.8 billion in 2019 to \$98.3 billion in 2022. While India's global bamboo market share is a mere 5%, the People's Republic of China occupies more than 75% of the market despite having only about 15% of the global cultivation area. With the market growing at such a great pace, India may strive to hold a larger share of the global market by capitalizing on its untapped bamboo resources. As of 2017, the domestic demand for bamboo was around 28 million metric tons (MMT). Due to the unavailability of forest bamboo for commercial utilization, the lack of commercial production, low yield, and many other contributing factors, domestic demand is not fully met by home-grown bamboo. This implies that a large portion of bamboo consumed in India, 15 MMT or about 54% of bamboo consumption, is imported from other countries. This presents a market opportunity for domestic bamboo producers to replace the imports of bamboo and bamboo products amounting to around INR4.6 billion<sup>84</sup>. The commercial planting of bamboo, planting in degraded and riverine areas, and introducing high-yield varieties of bamboo can significantly reduce the import dependency of a commodity, which Indians take pride in having in abundance.

### 3.4.1. Bamboo output and processing in Tripura

Topographically Tripura consists of a number of hill ranges, hillocks and hilly terrains interspersed with fields. Tripura is one of the major bamboo producing states in India. Bamboo grows all across the state of Tripura covering over nearly 16-18 different species. Tripura bamboo handicrafts are considered to be among its best in the country for the exquisite designs, wide range of products and artistic appeal.

Tripura being a small North East state, bamboo activity is spread over all the four districts of the state. However, it is thickly concentrated in South and West Tripura. Many species of bamboo are available in Tripura for diversified utilization. The table below highlights the various uses of bamboo as shown in table below. Almost all species of bamboo are used by the artisans for craft/handicraft making in the study areas and other places of Tripura except *Bambusa balcooa* and *Melocana baccifera*. *Melocana baccifera* is a dominant species with over 80 % coverage. It is primarily used for incense stick and domestic needs such as gate, fencing and construction.

**Table 24: Bamboo species used for arts and crafts**

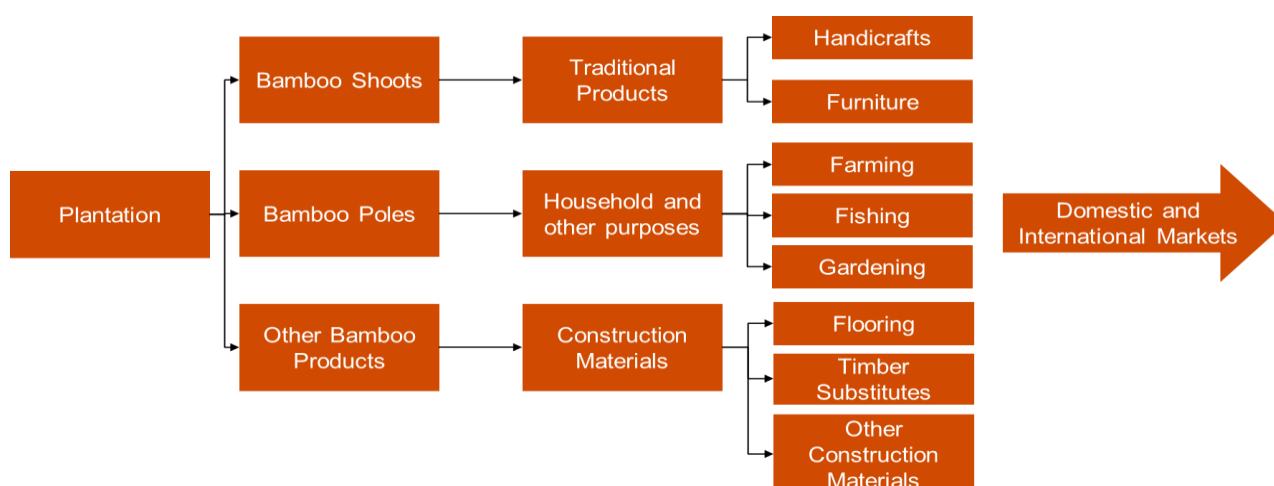
Local Name	Botanical Name	Jewelry	Craft	Mats	Furniture	Incense Stick
<b>Kanakaich</b>	Thyrsostachys oliveri		✓		✓	
<b>Barak</b>	Bambusa Balcooa				✓	✓
<b>Bom</b>	Bambusa Cucharensis		✓	✓	✓	
<b>Mal/ Makhla</b>	Bambusa Pallida		✓	✓		
<b>Paura</b>	Bambusa Polymorpha		✓			
<b>Mirtinga</b>	Bambusa Tulda	✓	✓	✓		

<sup>84</sup> Department of Commerce, Government of India. Data from Financial Year 2019–2020.

<b>Barji/ Jai</b>	Bambusa Vulgaris	✓	✓		✓	
<b>Rupai</b>	Dendrocalamus longispathus	✓	✓	✓	✓	
<b>Lathi Baans</b>	Dendrocalamus strictus		✓		✓	
<b>Muli</b>	Melocana baccifera			✓		✓
<b>Dolu</b>	Schizostachyum dullooa		✓			
<b>Pencha Baans</b>	Dendrocalamus hamitonii		✓		✓	

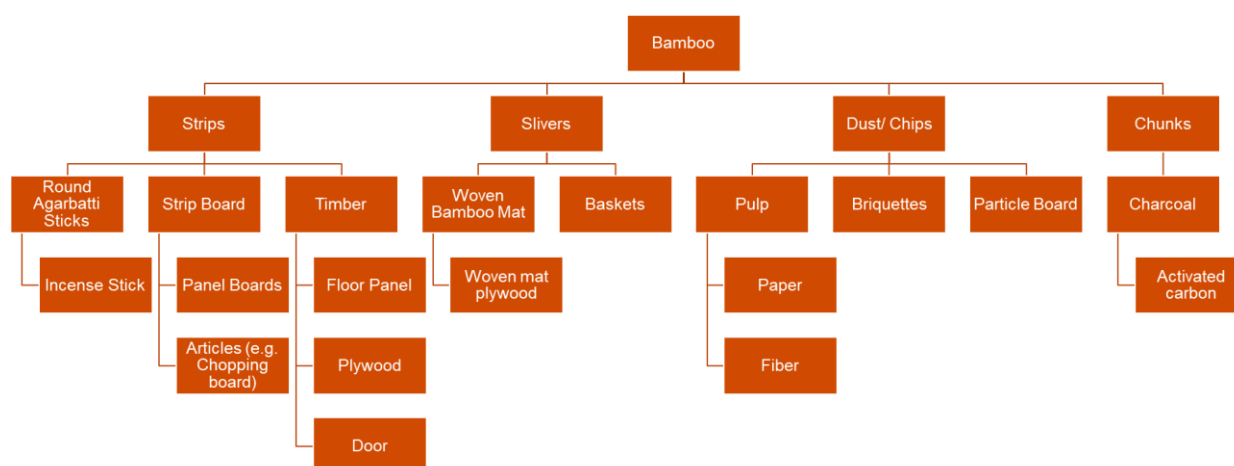
Source: <https://www.ijcmas.com/9-6-2020/Animesh%20Sil,%20et%20al.pdf>

**Figure 14: Value chain of the bamboo industry:**



As per the NEEC report, more than 1,200 end uses for bamboo were identified. The picture below highlights the various finished and unfinished products of bamboo.

**Figure 15: Finished and unfinished products from bamboo**



Source: Study Team Analysis

The possible products that can be produced using the species found in NER, as listed in Table 8.4, have been compared based on the parameters described below:

- **Readiness of market.** Readiness is the availability of demand for the product in the region.
- **Size of opportunity.** Opportunity size relates to the monetary value of the product.
- **Suitability of raw material.** Suitability is determined by whether the available species can be used as feedstock.
- **Availability of skill and technology.** Availability refers to whether a technology has been developed and/or if the local people are skilled in using it.
- **Scalability and scope of mechanization.** This refers to whether the product can be manufactured in a large integrated setup.

Based on these parameters, a list of priority products has been proposed and is given in Table below.

**Figure 16: Comparison of various bamboo products**

Product	Readiness of Market	Size of Opportunity	Suitability of raw material	Availability of skill and technology	Scalability	Scope of mechanisation
Biofuels	Yes	Huge	Any	Yes	High	Yes: High
Bioplastics	Yes	Huge	Any	Yes	Medium	Yes: High
Briquettes and activated charcoal	Yes	Huge	Any	Yes	Medium	Yes: High
Timber Substitute	Yes	Medium	Any	Yes	Medium	Yes: High
Agarbatti Sticks	Yes	Medium	Specific	Yes	High	Yes: High
Pulp and paper	Yes	Medium	Specific	Yes	Medium	Yes: High
Panels and flooring	Yes	Medium	Specific	Yes	Medium	Yes: High
Handicraft	Yes	Medium	Specific	Yes	Medium	Yes: High
Bamboo Shoots	Yes	Medium	Specific	Yes	High	Yes: Medium
Bamboo Fiber	Yes	Medium	Specific	Still developing	Currently low	Yes: High
Woven Products	Yes	Low	Specific	Yes	Low	Yes: Low
Scaffolding	Yes	Low	Specific	Yes	Low	Yes: Low

Source: Study team analysis

Based on the abovementioned parameters, the priority products identified are:

- Timber substitutes
- Agarbatti sticks
- Panels and flooring

Apart from its own bamboo resources, the bamboo sector in Tripura could also access raw material from neighboring states as bamboo is found across the NER.

Among Tripura's neighbors is Mizoram's bamboo rich Mamit district. The district can become a viable source of raw material not only because it has the highest area under bamboo (52.8% of its total area)<sup>85</sup> in Mizoram but also because it has the second highest growing stock of bamboo in the state, at 4164.17 T.<sup>86</sup> Further, located only ~116 km away from the bamboo focused Dharmanagar industrial estate in North Tripura, it is easily accessible by road via NH 108.

There is an abundant bamboo resource base in Assam. However, the Barak valley, the region with which Tripura shares a border, may not be a potential source of raw material. This is because a large number of bamboo processing units already exist in the lower Assam region, including the Cachar Paper Mills in Hailakandi, a unit of M/S Hindustan Paper Corporation Limited, which is the largest user of bamboo resources in the state.<sup>87</sup> Further, the Teliakhalepur bamboo processing cluster is also located in Karimganj district in

<sup>85</sup> Bamboos of Mizoram, EF&CC Department, Govt. of Mizoram

<sup>86</sup> Bamboos of Mizoram, EF&CC Department, Govt. of Mizoram

<sup>87</sup> Bamboos in India, ENVIS Centre on Forestry, Forest Research Institute (2015).

the Barak valley<sup>88</sup>. As Assam's own demand for bamboo is high, Tripura's bamboo industry may not be able to tap into the former's raw material base.

## Product Competitive Analysis

### Timber Substitutes

Bamboo is a sustainable building material and can be used as a substitute for timber. Lately, India has been facing widespread scarcity of timber resources, and this has resulted in the need to shift to more environmentally friendly, renewable, and largely available building material. As a result of this, bamboo products like bamboo plywood and veneer board are being used to meet the housing needs of the people, especially in rural areas. They can be further used to produce finished goods like blinds and wooden floors or can be used by other industries as inputs<sup>89</sup>.

Among the various uses of bamboo products listed above as wood substitutes, bamboo mat plywood has a ready market in India. Bamboo products like bamboo boards, bamboo veneers, bamboo mats, and corrugated roofing sheets are gaining widespread attention with opportunities in emerging markets due to their physical and mechanical performance in terms of stability, strength, and hardness.

Bamboo mat plywood is equal in quality and price to waterproof, exterior grade plywood. It is manufactured in Tripura and supplied in various states across India to both private customers and government sector buyers. As per NEEC ADB study the premium plywood market was estimated in size at INR30 billion in 2018 indicating an opportunity of INR3 billion for bamboo mat plywood.

### Agarbatti

The agarbatti (incense stick) industry in India is a labor-intensive cottage industry. The process of agarbatti manufacturing in India was first started in Thanjavur of Tamil Nadu and from there it has gradually expanded to other parts of the neighboring states. This industry now reigns in Karnataka, Andhra Pradesh, Kerala, Odisha, Tamil Nadu, Gujarat, Dadra and Nagar Haveli, Bihar, Tripura, and Assam. The raw materials for this industry are available in and around Cuttack, Bhubaneswar, and Kolkata.

This industry is presently expanding in NER, wherein the raw materials like bamboo sticks and binder materials required for the manufacture of agarbattis, as well as labor are sufficiently available.

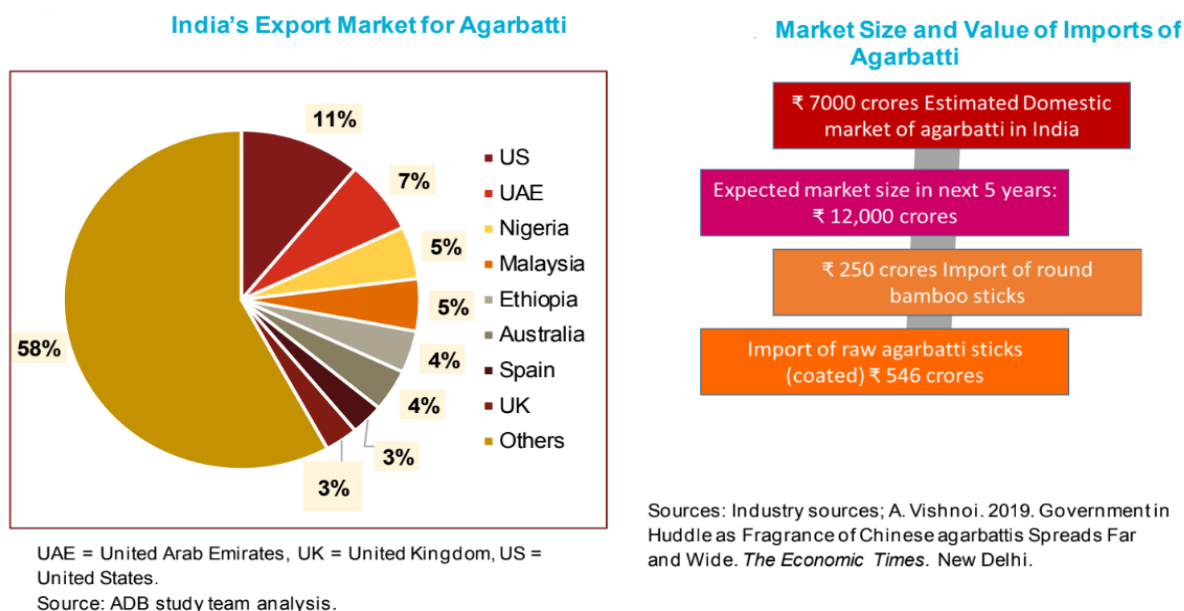
In the recent past, Tripura used to supply about 60% of bamboo sticks utilized by the Indian incense stick industry.<sup>274</sup> However, there was a drastic change in this situation as the stock of Muli bamboo, which is used to make incense sticks, declined steeply due to gregarious flowering in 2003–2009. The scarcity of this particular species of bamboo has adversely affected the agarbatti industry. In 2011, there was a drastic reduction in the import duty on bamboo sticks from 30% to 10%, which encouraged imports from the PRC and Viet Nam. The imported bamboo sticks were better in terms of uniformity of dimensions and quality because of large-scale mechanized production, compared with Indian bamboo sticks, which were made manually. In the case of Tripura, almost the entire production of bamboo sticks was made manually.

In India, agarbattis are considered to be a staple feature of devotional activities. It is now branching out as products associated with aromatherapy, meditation, and yoga. The major products in focus are agarbatti round sticks and raw incense sticks since their manufacture contains only bamboo as raw material.

<sup>88</sup> Ministry of Textiles, GoI ([http://www.craftclustersofindia.in/site/index.aspx?mu\\_id=3&Clid=290](http://www.craftclustersofindia.in/site/index.aspx?mu_id=3&Clid=290)).

<sup>89</sup> A. Hazra. 2008. Industrialization of the Bamboo Sector. CII: Study on Technological Upgradation of the Bamboo Sector in India. <https://www.semanticscholar.org/paper/Industrialization-of-the-Bamboo-sector-Hazra/9d23c3a980b2fc614e462b46cd3cbacff792c82d>.

Figure 17: Agarbatti: India's Import and Export



The agarbatti round sticks that are made in NER cost about INR55 to INR94 per kg in the wholesale market in NER, while those imported from the PRC and Viet Nam cost from INR60 to INR90 at the port of landing. The major ports for import of agarbatti are Nava Sheva in Mumbai, Mundra in Gujarat, and Kolkata. Since the supply chain of bamboo is not well developed in the NER, the short-term focus must be on targeting the export market, with tie-ups with large players such as ITC and Cycle agarbatti. In the medium term, NER can build its supply chain to reduce wastage and target the domestic cities such as Guwahati, Patna, and Kolkata.

### Floor panels

The global market for bamboo flooring is expected to reach INR100 billion in 2024. The bamboo flooring manufacturing sector is currently dominated by Chinese firms in the export market. This is also the case in the domestic market in India due to the lack of quality domestic products. Bamboo flooring is in high demand in markets in Japan, North America, and the European Union (EU). Almost 95% of bamboo floors sold in the EU each year comes from the PRC.<sup>276</sup>

The bamboo flooring manufacturing industry has huge scope for development in NER as the use of bamboo flooring is seen in the states like Assam and Mizoram where houses are built on elevated land and mountain valley slopes.

The use of bamboo flooring is among the highest value-added applications of bamboo. The bamboo flooring is a quality product that has a wide range of uses and a large, global consumer market. It has certain advantages over hardwood floors due to its smoothness, brightness, stability, high resistance to termite and water damage, insulation qualities, and flexibility.

There is increasing demand for responsibly sourced, sustainable materials including wood, and bamboo fulfills the brief. Also, bamboo flooring does not require specific species for manufacturing. Hence, forest bamboo available in NER can be utilized for bamboo floor manufacturing. Further, being a premium product, the transportation cost, which is on a higher side for NER, can be absorbed.

### Major target markets for floor panels

The EU, Malaysia, and Australia were the major importers of bamboo flooring in 2014, comprising about 60% of global imports, with the PRC alone contributing 91% of the total export market. In India, Tier 1 cities such as Bangalore, Mumbai, and Ahmedabad are adopting wooden flooring for domestic and commercial furnishings. The domestic market for wooden flooring in India is estimated at INR 15 billion. Capturing 5% of the domestic market for wooden flooring would translate into an opportunity of INR750 million. Once the industry has an established supply chain and has achieved economies of scale, the export market can be targeted.

Bamboo floor panels manufactured in India cost from INR150 to INR200 per square foot, while imported panels cost INR100 to INR180 per square foot. However, as per industry sources there is an acceptance of domestically manufactured products in the domestic market due to better quality and hence the higher price

may be absorbed.

**Bamboo Waste-Based Products:** Various value-added products can be manufactured by processing the bamboo waste generated as a by-product of the manufacturing of the bamboo products identified in the preceding discussion.

Adopting a “zero-waste approach” can help Tripura achieve environmental sustainability by boosting the utilization of the whole bamboo and reducing wastage and can help in achieving broader socio-economic goals as well. Waste generated after the production of Agarbatti sticks, for instance, can be used for the production of smaller bamboo-wood items like toothbrushes, toothpicks, clips, and boards. Further, the dust from bamboo processing can be used as biomass for papermaking as well as for making briquettes. Such waste parts can also be used to produce bio-CNG. Some possible uses of bamboo waste have been discussed below.

- **Briquettes:** Bamboo dust from the production of bamboo flooring and panels can be used to make briquettes. Further, waste from the manufacture of Agarbatti sticks too can be used for this as well.

The briquettes produced from the densification or briquetting process can be used to cater to the fuel needs of MSMEs in the states. They can be used as an alternative to more expensive coal briquettes. Additionally, as briquettes are a useful source of fuel for the food processing industry which requires fuels with lower heat content, the production of bamboo waste-based briquettes could be especially beneficial for Tripura as one of the state’s priority sectors is food processing.

Currently, in the NER, briquettes are made using rice husk and sawdust.<sup>90</sup> In order to increase production and optimize bamboo usage, waste from bamboo processing across the NER can also be utilized for briquette manufacture. In the production of bamboo handicrafts, for instance, only some specific parts of the plant are used. The waste generated as a byproduct of the primary processing of bamboo can be used for other purposes while the shavings from handicraft production can be utilized for briquette making.

Bamboo wastes can either be used as the sole raw material or can be used in combination with other biomass such as rice husk and sawdust. Several brownfield industrial parks in the state have sawmills whose byproducts can be sourced for this. Briquette making MSMEs can be set up near bamboo processing parks to keep transportation costs low and to make such units lucrative.

Apart from use within the state, bamboo briquettes can also be considered for export in regional markets like Bangladesh, Bhutan, and Nepal— all countries that already import briquettes from India. Tripura’s locational advantages can make the state a viable exporter. The table below provides an overview of briquettes exported to the identified countries.

**Table 25: Export of Briquettes from India (2021-22)**

Country	2017–2018	2018–2019
Bangladesh	32,143.96	19,500.30
Bhutan	5,153.21	3,374.18
Nepal	51,039.91	62,928.78
<b>Total</b>	<b>88,987.69</b>	<b>95,004.74</b>

Source: Study team analysis

Briquettes manufactured in the NER fall in the price range of INR 4.5 to INR 7 per kg, while in the rest of India the price ranges from INR 5 to INR 6 per kg. However, the use of abundantly available bamboo wastes can make briquettes produced in Tripura more competitive, suitable for domestic markets as well.

- **Bamboo charcoal and gas:** Bamboo can be converted into bamboo charcoal and gas using a process called **pyrolysis**. Waste generated during the primary processing of bamboo can be used for this. Gasifiers using bamboo waste as a source of fuel can be used for thermal applications, replacing

<sup>90</sup> NEEC Report

traditional fuels. Apart from primary processing waste, this gasification can be done using low-quality bamboo as well.

Gasification is a thermo-chemical conversion which is carried out through process of oxidation and reduction with limited air supply. Apart from energy, it can produce a range of valuable byproducts. The process generates a combustible gas called **producer gas** while **active charcoal** is a useful by-product. The gas can be used in thermal application or in mechanical/electrical power generation. It is eco-friendly as it provides smokeless combustion. Further, gasification of bamboo as a whole has lower operating cost than other methods of power generation.

Besides this, **bamboo waste charcoal** can be produced by heating bamboo waste with a controlled supply of air. For this too, waste generated after primary processing and during the production of Agarbatti sticks can be used for carbonization in kilns. This process produces uniform quality charcoal. It has good outputs and requires minimum investment. The charcoal can not only serve to fulfil the heating needs of rural communities but can also reduce the burden on forest ecosystems by reducing felling of trees for firewood. Bamboo charcoal has much higher calorific value than wood, making it a viable alternative to the timber. Bamboo vinegar is a byproduct of the charcoal making process. It is made by condensing the gases coming out of bamboo charcoal.

Demand for activated charcoal from India already exists in Bhutan, Nepal, Sri Lanka, the Netherlands, Qatar, Turkey, Kuwait, France, Germany, Bulgaria, Slovakia, and Ethiopia. It is used primarily for the purification of gold, water, and air. Currently, most of the activated charcoal exported from India is made using coconut shell. However, as was discussed above, bamboo can also be used in the manufacture of charcoal. The raw material used in the production of activated carbons is mostly waste generated from industrial or agricultural production. The biomass generated from bamboo, like culms, leaves, and roots, is suitable for the production of activated carbon because of the following properties:

- low content of inorganic ash-forming components
- high content of carbon
- potential extent for activation
- low degradation in storage
- high density and sufficiently volatile content
- stability of supply in the producing country
- inexpensive materials.

**Activated charcoal** can be made from waste bamboo chunks, culms (stalks), branches, and roots or bamboo residue (for briquette charcoal). Different grades of activated charcoal can be produced for varied applications. Tripura can target the domestic food and pharma manufacturers for food- and pharma-grade activated charcoal.

For export, the state is better positioned than current bamboo charcoal exporting states like Tamil Nadu, Kerala, and Maharashtra, to cater to demand in both Bhutan and Nepal. Within the domestic market, efforts need to be made to encourage manufacturers of food and pharma products to use activated bamboo charcoal.

- **Bamboo-based bioethanol:** Biofuels are fuels derived from organic materials including plant materials and animal wastes. They include ethanol that can be used to blend with gasoline and are seen as a viable option to address energy security concerns in India.

Bioethanol production through enzymatic saccharification requires waste from the bamboo industry as the feedstock. The production of bioethanol can therefore help strengthen bamboo waste processing infrastructure and capability. Bamboo-based bioethanol is a 2G biofuel, or an advanced biofuel, as it uses nonedible cellulosic biomass. Bamboo is suitable for biofuel production as it has the advantage of having higher heating values and lower moisture content than other commonly used feedstocks.

Based on the analysis in the NEEC report, the most prolific bamboo species in the NER like *Dendrocalamus Hamiltonii*, *Bambusa Tulda*, *Bambusa Balcooa*, and *Bambusa Pallida*, are all species that are suitable for bioethanol production owing to high glucose and ethanol yield. This is because



bamboo belongs to the grass family, and its cell wall is primarily composed of cellulose, hemicellulose, and lignin. Pretreatment is used to separate the cellulose from lignin and hemicellulose, and the cellulose is then fermented to bioethanol. The hemicellulose may be converted to various chemicals like acetic acid and furfural.

It is expected that the demand for bioethanol will rise in the coming years in Tripura as well as the other NER states since the product is blended with gasoline, which has a proven market. The conversion of bamboo to bioethanol also produces other value-added products like acetic acid and furfural, which have their own markets. The table below gives an overview of the expected demand in Tripura and the NER.

**Table 26: Predicted Ethanol Demand in NER ('000 MT)**

Year	Tripura	NER Total
2025	17	200
2026	18	212
2027	20	224
2028	21	237
2029	22	250
2030	24	265
2031	25	280
2032	27	296
2033	29	313
2034	31	331
2035	33	350

Source: Study team analysis

The projected demand for bioethanol in Tripura is expected to grow over the coming years. Using bamboo waste to produce bioethanol will help the state meet this demand in a sustainable way.

- **Bamboo waste-based particleboards:** Non-conventional building materials, produced from agro-industrial waste, have been gaining popularity in recent years. Primary processing bamboo waste, including tops, bases and small diameter stems, can be used to manufacture high performance structural panels of bamboo particulates.<sup>91</sup>

As it has been found that the strength of bamboo particleboards are similar to those made of wood, use of bamboo waste for production is sustainable not only as it allows for the reuse of waste but also because the growth of rate of bamboo is higher than traditional sources of timber, making it a more environmentally friendly choice.

The manufacturing process itself is simple, requiring minimal infrastructural intervention— the bamboo waste is first sorted according to particle size. It is then treated in a kiln to reduce its starch content, for which it is submerged in heated water. This treated waste is dried. Once dried, it is mixed with adhesive and is finally placed in molds for pressing.<sup>92</sup>

<sup>91</sup> Bamboo Particulate Waste – Production Of High-Performance Structural Panels, Cortez-Barbosa Juliana et al, in Non-Conventional Building Materials Based On Agro-Industrial Wastes, Tiliform (2015).

<sup>92</sup> Bamboo Particulate Waste – Production Of High-Performance Structural Panels, Cortez-Barbosa Juliana et al, in Non-Conventional Building Materials Based On Agro-Industrial Wastes, Tiliform (2015).

As Tripura will have abundant access to bamboo waste, such particleboards can be manufactured in the state, especially with projections predicting that the Indian particleboard market is expected to register a CAGR of over 12% during between 2022 and 2027<sup>93</sup>. Within the state, these particleboards can potentially help increase the overall competitiveness of particleboard furniture by lowering the cost of acquiring the same.

Thus, bamboo waste can be used in a number of ways. The Kumarghat, Dharmanagar, and Kathalia industrial parks have been identified as being suitable for bamboo-based industries. These parks can take steps to increase the processing of bamboo waste. Additionally, the Dharmanagar park already has functional sawmills. Here, waste from the sawmills can also be used in the production of briquettes.

In keeping with the green industrial framework proposed for the state, the processing of bamboo waste will help the adoption of green procurement practices and sustainable finance by increasing the reuse of raw materials.

In order to further optimize usage of bamboo resources and minimise wastage, **bamboo treatment** practices must be encouraged. After harvesting, it is important to treat bamboo which, in general, is not durable. Unlike durable timbers, it does not contain “toxic extractives to impart natural durability”<sup>94</sup>, “making it highly prone to attack by biological organisms”<sup>95</sup>.

“Brown-rot fungi such as *Oligoporus placenta* and white-rot fungi such as *Trametes versicolor*, as well as bacteria and subterranean termites, deteriorate bamboo culms in storage.”<sup>96</sup> The service life of bamboo is also dependent on its end-use. Studies also find that untreated bamboo has a service life of only two to five years.

Although bamboo, requires treatment, it can be challenging to treat it owing to its anatomical structure— unlike wood, bamboo has ununiformly distributed vascular bundles (vessels and thick-walled fibres). The number and nature of bundles in the inner and outer parts of the culm vary. Thus, the outer periphery is largely fibrous while and the inner part has parenchyma and vessels.

Further, while bamboo have no ray cells that can transport preservatives across the culm wall, the outer wall is siliceous and hard, making it less permeable than the inner layer. As a result, the treatability of bamboo varies along the culm’s height and across the culm’s thickness.

Preservatives with good diffusive properties to facilitate diffusion from the vessels into the surrounding fibres and parenchyma tissues need to be used to ensure successful treatment. While this can be done for harvested green bamboo, it is more challenging to treat dried bamboo as entrapped air in the latter increases the interfacial tension, this restricts the flow of preservative fluids. However, the treatability of bamboo can be significantly improved by ponding.

Treatment methods for green bamboo include the **butt treatment method** where freshly felled culms are kept standing in a preservative solution; the **modified boucherie method** where the bamboo sap is displaced by preservative chemicals using gravity; steeping freshly cut culms in **preservative solutions** through complete submergence; and the **steaming and quenching method** that involves first steaming green bamboo at about 100°C and then “quenching” it in water-borne preservative solutions. Similarly, the methods for treating dry bamboo include **steeping**; the **hot and cold method** which involves keeping the bamboo in a tank heated at about 90°C and filled with creosote-fuel oil mixture for about 3-6 hours and then cooling the preservative; and the **vacuum pressure method**.<sup>97</sup>

Popular alternatives to chemical-based treatment methods include **water leaching** where bamboo culms are submerged in running or stagnant water to aid the washing out/fermenting of starch, carbohydrates, and other water-soluble substances; **smoking** where bamboo is fumigated at an air temperature of 50 to 60 °C (using its own branches and leaves) for a long period to reduce water-soluble constituents which makes it inedible for insects; use of **botanical extract-based preservatives** like neem, cedar or eucalyptus oil, or camphor-based extracts to delay rot and prevent insect/fungal attacks; and use of organic acids including acetic acid, formic acid, and propionic acid to preserve bamboo, or of citric acid, formic acid, propionic acid, and sorbic acid to inhibit mold growth on bamboo species.

<sup>93</sup> India Particle Board Market - Growth, Trends, Forecast (2022 - 2027), Mordor Intelligence ([https://www.mordorintelligence.com/industry-reports/india-particle-board-market#:~:text=The%20Indian%20particle%20board%20market,tables%20\(finished%20with%20HPL\).](https://www.mordorintelligence.com/industry-reports/india-particle-board-market#:~:text=The%20Indian%20particle%20board%20market,tables%20(finished%20with%20HPL).)).

<sup>94</sup> Preservative Treatment Methods For Bamboo: A Review, Kerala Forest Research Institute (2000).

<sup>95</sup> Preservative Treatment Methods For Bamboo: A Review, Kerala Forest Research Institute (2000).

<sup>96</sup> Eco-Friendly Preservation Of Bamboo Species: Traditional To Modern Techniques, Kaur, P. J Et Al, BioRes 11(4), 2016.

<sup>97</sup> Eco-Friendly Preservation of Bamboo Species: Traditional To Modern Techniques, Kaur P. J. et al, BioRes 11(4), 2016.

Currently, in Tripura, bamboo is treated with boric acid borax and seasoned.<sup>98</sup> To facilitate wider adoption of bamboo treatment across bamboo-focused industrial estates, warehouses and common treatment facilities can be developed. Vats for submerging and treatment can be developed at the proposed treatment facilities. Further, to facilitate the adoption of alternative treatment methods like fumigation and water leaching, furnaces and tanks could also be considered for development.

The development of such treatment facilities is important to meet the state's demand for treated bamboo. This will allow for further development of the existing bamboo-based industries in the state.

## 3.5. Food processing sector

### 3.5.1. Food processing industry in India

Agriculture is one of the major contributors to Indian economy contributing to ~20% of India's GDP and generates ~38% of the total employment. India has solidified affirmed its position globally in agricultural produce market standing ranking second in the quantity production of rice, wheat and many fruits and ranks ranking third in production of milk, ghee, pulses, ginger, banana, papaya, etc. With abundance of raw materials present in India, the country is rapidly expanding its presence in the food processing industry, which aims to address the issues of food security, food inflation and providing nutritious food to the people.

The food processing industry plays a huge role in India's economy as is seen in the table below.

**Table 27: Comparison between industries basis certain criteria**

Parameters						
Rank	Total No. of Factories	No. of factories in operation	Fixed Capital	Employment generated	Output	Gross value added
1.	Food Products (15.82%)	Food Products (16.50%)	Basic Metals (18.69%)	Food Products (11.22%)	Food Products (12.83%)	Coke & Refined Petroleum Products (10.40%)
2.	Other Non-Metallic Mineral Products (12.09%)	Other Non-Metallic Mineral Products (12.29%)	Other Industries (14.74%)	Textiles (10.28%)	Basic Metals (14.00%)	Basic Metals (11.00%)
3.	Textiles (7.30%)	Textiles (7.02%)	Coke & Refined Petroleum Products (13.04%)	Wearing Apparel (7.35%)	Coke & Refined Petroleum Products (12.22%)	Pharmaceuticals, Medicinal chemical and Botanical Products (7.67%)
4.	Fabricated Metal Products (6.68%)	Fabricated Metal Products (6.16%)	Chemicals & Chemical Products (8.75%)	Basic Metals (7.06%)	Chemicals & Chemical Products (8.85%)	Food Products (7.35%)

<sup>98</sup> Tripura Forest Development and Plantation Corporation Limited (2022).

5.	Rubber & Plastic Products (6.02%)	Rubber & Plastic Products (5.97%)	Food Products (6.40%)	Motor Vehicles, Trailers & Semi Trailers (6.73%)	Motor Vehicles, Trailers & Semi-Trailers (7.68%)	Motor Vehicles, Trailers & Semi-Trailers (8.22%)
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Source: Annual Report 2021-22, Ministry of Food Processing Industries, GoI.

It is seen that food products industry, compared to various other industries, has both the largest number of factories and the highest number of factories in operation. It also provides the largest employment. According to the latest ASI data, the total number of persons engaged in registered food processing sector was 20.05 lakhs. The unregistered food processing sector employed 51.11 lakh workers as per the 73<sup>rd</sup> Round of the NSSO and constituted 14.18% of employment in the unregistered manufacturing sector. Further, the industry also figures among the top five sectors with respect to fixed capital, gross value addition and output as can be seen from the table above.

With the exception of parameters such as fixed capital and gross value added, the sector has a pre-eminent position in most indicators of industrial contribution. Notable parameters include 16% of the factories generating 11% of the total employment.

### 3.5.2. Food processing industry in Tripura

Tripura being an agrarian state can focus on perishable food-based products like oranges, pineapple, jackfruit, etc. which are currently grown in the state. Many agrarian products are produced in surplus and are disposed/spoil due to improper storage infrastructure.<sup>99</sup>

**Table 28: Crop Production in Tripura**

Product	Production in NER ('000 tonnes)	Consumption (%)	Marketable Surplus (%)
Rice	6,755	94.6	5.4
Banana	1,208	20.2	79.8
Potato	1,113	82.4	17.6
Cabbage	912	25.8	74.2
Pineapple	777	5.0	95.0
Orange	590	14.7	85.3
Tomato	517	32.3	67.7
Jackfruit	493	16.7	83.3
Cauliflower	479	30.7	69.3

<sup>99</sup> APEDA, Agri exchange

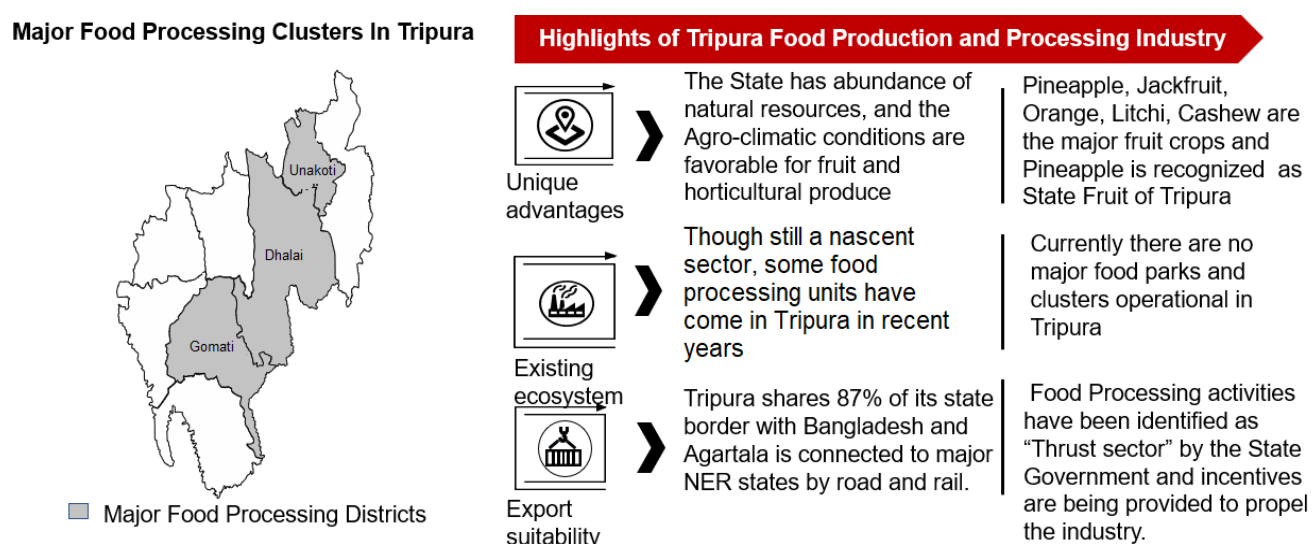
Brinjal	398	79.0	21.0
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Source: APEDA (2015–2016), Department of Agriculture Cooperation and Farmers Welfare, Study team analysis.

The Tripura government can aim to develop the food processing industry to further process the current market surplus into primary, secondary, and tertiary products to earn higher profits and also increase the shelf life.

Tripura has a pilot project focusing on the food processing industries pertaining to pineapple, orange, and jackfruit wherein the state is among the top three producers of the fruit. It should also be noted that the finished goods can now be sold in local and international markets. Tripura already has food processing ecosystem setup in the form of a Mega Food Park in Agartala and has an edge in exports as it shares 87% of its borders with Bangladesh through which it can access the Chattogram port.

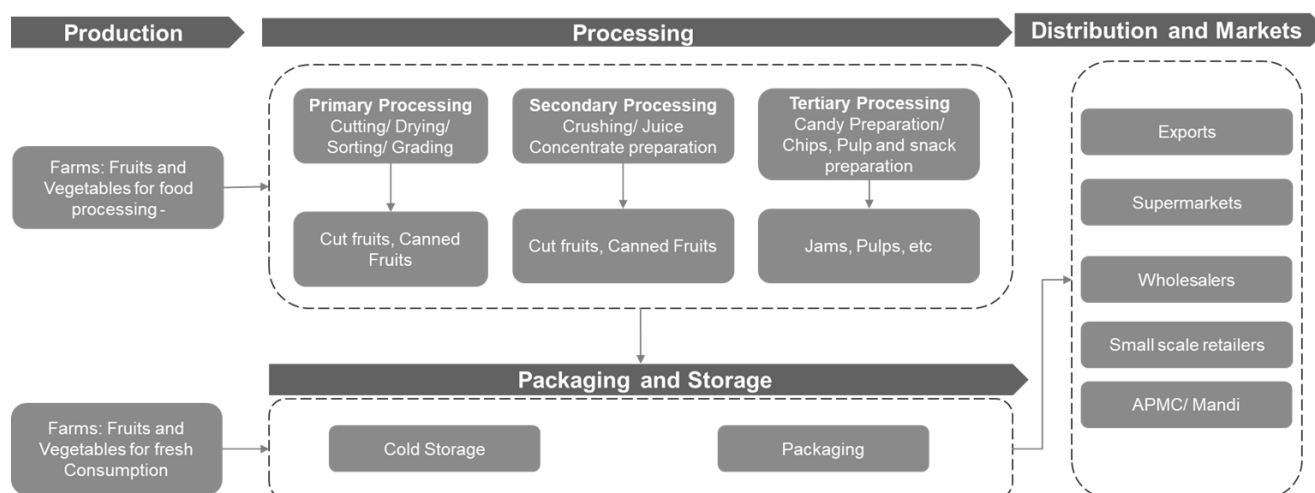
**Figure 18: Major food processing cluster in Tripura**



### 3.5.3. Value chain of the food processing industry

The three main products identified for food processing are pineapple, jackfruit, and orange. Gomati, Dhalai and Unakoti districts are major fruit cultivation pockets in the state.

Figure 19: Value chain of food processing industry



To identify the various products and markets that can be targeted, the following methodology was used.

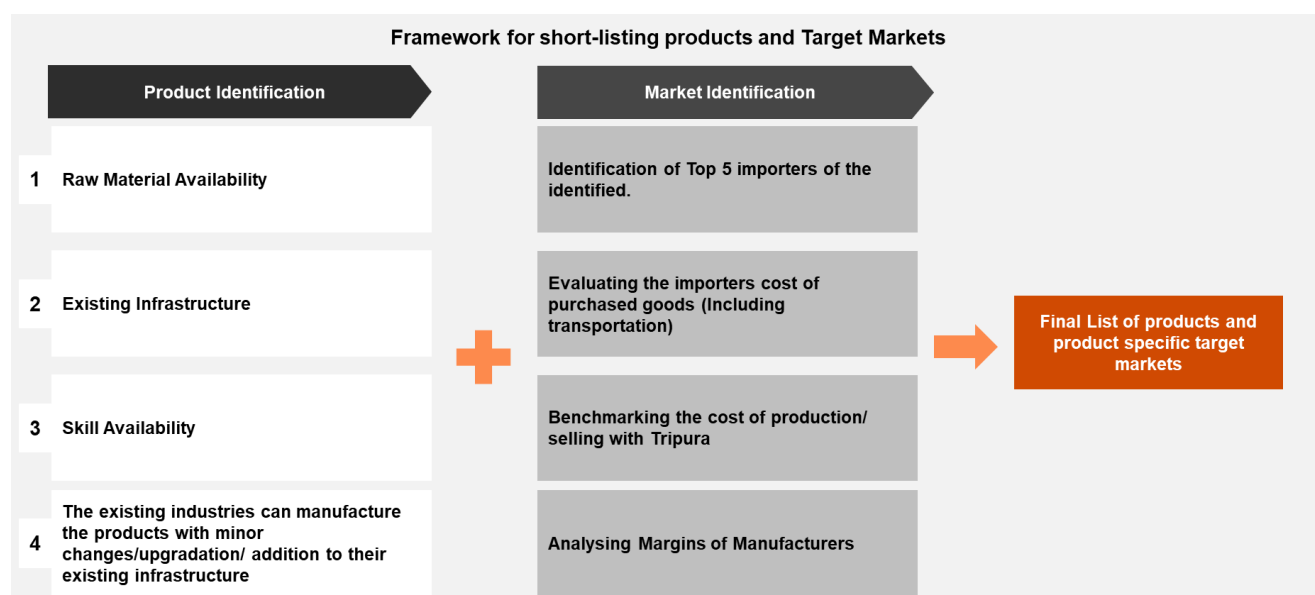
### Product identification

For identifying the right products, the parameters of raw material availability, existing infrastructure such as prior existing factories and their product lines, skill availability and further prioritizing products which can be produced with little to no modification of the infrastructure have been identified.

### Market identification

Market identification involves identifying the top five importers of the identified products and benchmarking the cost of goods including shipping and identifying the potential markets where goods produced in Tripura are profitable.

Figure 20: Framework for shortlisting products and target markets



Besides jackfruit, pineapple, and orange, **areca nut** can also be suitable for processing in Tripura.

Areca nut, or the Areca catechu, is a tropical plant found extensively in South East Asia. It is a species of palm. The fruit is called the betel nut, or supari in India. It is an important commercial plantation crop and has masticatory uses. It is also used during various religious, social and cultural functions in India. In many regions, the nut is also used by locals as human and veterinary medicine.

India ranks first in terms of both area under cultivation (58%) and production of areca nut (53%). Karnataka, Kerala, Assam, Meghalaya, Tamil Nadu, and West Bengal are among the largest areca nut producing regions in the country.

Within the NER, five states (including Assam) produce areca nut. An overview of the region's production is given in the table below.

**Table 29: Areca Nut Production In India (2017-18)**

Areca Nut Production in NER (2017-18) <sup>100</sup>		
State	Area under cultivation ('000 Ha)	Output ('000 MT)
Assam	80.81	77.90
Meghalaya	16.93	24.99
Mizoram	11.86	7.27
Nagaland	0.39	2.30
Tripura	5.99	20.41

Source: Tripura Forest Department

Tripura has the third highest output of areca nut. The climatic conditions in the state are conducive to its cultivation. It is popular among farmers as it offers the possibility of intercropping, particularly with perennial crops like banana, pepper vines, cacao and cardamom, when it is young. This helps generate income during the long gestation period of the crop. Due to this widespread availability of areca nut, the crop can be considered as suitable for food processing in Tripura. The **Gomati, Dhalai, and South Tripura districts** are all areca producing belts.

To increase existing output, research finds that Tripura can benefit from the use of modern agricultural inputs such as fertilizer, pesticide, hybrid seeds, and irrigation<sup>101</sup>. Here, encouraging organic matter recycling can also be beneficial for areca nut cultivation in Tripura— on average, 5.5 to 6.0 tonnes of waste is generated per ha of areca plantations annually, which can be used as an organic source of nutrients for areca palms after composting. Government interventions in the form of subsidies and access to institutional finance for smallholders can also boost areca nut cultivation, which can in turn bolster the growth of areca nut processing.

Apart from this, Tripura can be a suitable site for areca nut processing owing to its location. The state has access to some of India's important areca nut markets, including Bangladesh and Myanmar. These two nations accounted for ~27% of India's total areca nut exports in 2021-22.<sup>102</sup> Last year, India's areca nut exports to Bangladesh and Myanmar amounted to USD 0.99 million and USD 1.22 million, respectively.<sup>103</sup> The states currently exporting to these countries are Gujarat, and Maharashtra and Tamil Nadu, respectively.

<sup>100</sup> Handbook Of Processing Of Areca nut, Indian Institute of Food Processing Technology Ministry of Food Processing Industries, Tamil Nadu (2021).

<sup>101</sup> Livelihood Option through Arecanut Cultivation in Tripura: A Case Study of Noagang and its Neighbouring Villages, Kuki, Vanlalrema et al, International Research Journal of Social Sciences, 5(1), 2016. (<http://www.isca.in/IJSS/Archive/v5/i1/10.ISCA-IRJSS-2015-298.pdf>)

<sup>102</sup> Directorate General of Commercial Intelligence and Statistics, 2021.

<sup>103</sup> Directorate General of Commercial Intelligence and Statistics, 2021.



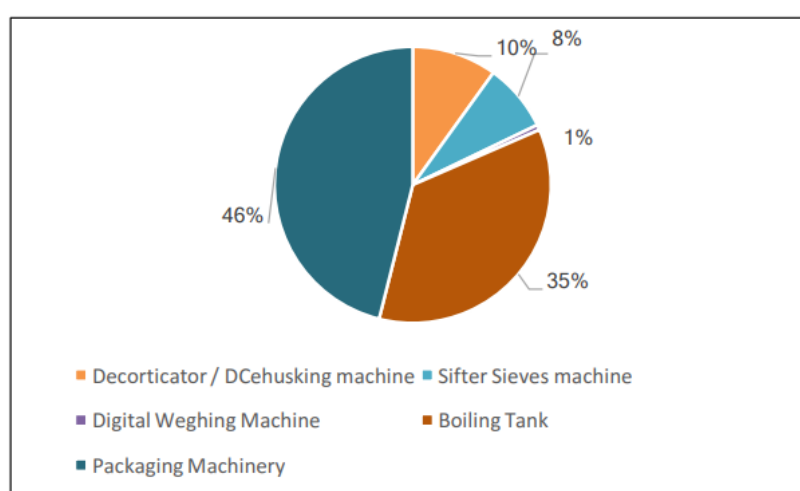
Owing to its relative proximity to both Bangladesh and Myanmar, Tripura is more advantageously located to cater to both these markets. The development of a proposed border haat at Dhalai's Kamalpur will further enable the state to cater to Bangladesh's markets. The subsequent reduction in transportation and logistics costs can make areca nut exports from Tripura more competitive.

Within India, the state already has an established market in Assam and to a lesser extent in Mizoram as well.<sup>104</sup> Traders from Assam's Karimganj are among the primary buyers of areca nut from the state.

The processing of areca nuts into special-grade dried areca nuts, whole areca nuts, split areca nuts, and unroasted and sliced areca nuts, requires minimal infrastructure, thus making it suitable for Tripura's current industrial ecosystem. The main steps involved in the processing of areca nuts include bunch harvesting at 6-7 months, de-husking, peeling, splitting, boiling, coating, and drying.

According to the estimations of the Indian Institute of Food Processing Technology (IIFPT), MoPFI, the share of expenses for various processing stages is as follows:

**Figure 21: Cost of Areca Nut Processing**



Source: Ministry Of Food Processing Industries, GoI.

The possible value-added products that can be produced from areca nut in Tripura include:

- Dried ripe nuts:** this is the most popular traded form of areca nut. Fully ripe, nine-month-old fruits that are yellowish-orange or red are the best suited for this. Here, ripe fruits are dried in the sun for 35 to 40 days on dry levelled ground.

For drying and de-husking, the fruits can sometimes be cut longitudinally into halves and sundried for about 10 days after which the kernels are scooped out and given a final drying.

- Kalipak:** another form of processed areca nut, it is made from 6- to 7-month-old nuts with a dark green colour. The nuts are de-husked, cut into pieces, and boiled in extracts from previous boiling (kali) that are diluted with water. The nuts are then coated in kali (the concentrated extract obtained from boiling 3 to 4 batches of Kalipak) and dried.
- Scented suparis:** many varieties of such scented suparis can also be produced using areca nut. For this, dried areca nuts broken into bits, blended with flavour mixtures and packed. Rose essence as well as menthol are common flavoring agents.

At times, saccharin is used for sweetening. Additives like colour and flavour are added.

All three of the products discussed above can be produced in Tripura owing to abundant access to raw material and relative ease of processing. Apart from these, the production of areca nut extracts for medicinal use can

<sup>104</sup> Livelihood Option through Arecanut Cultivation in Tripura: A Case Study of Noagang and its Neighbouring Villages, Kuki, Vanlalrema et al, International Research Journal of Social Sciences, 5(1), 2016. (<http://www.isca.in/IJSS/Archive/v5/i1/10.ISCA-IRJSS-2015-298.pdf>)

also be considered for markets within the NER. The nut is known to help in preventing oral cavities, dry mouth, gum infection and swelling; improving digestion; reducing inflammation; relieving asthma; and improving wound healing, digestion, and metabolism. It is also known to have anti-diabetic and antioxidant properties.<sup>105</sup>

Further, tannins, a by-product of the processing of immature nuts, can be used for dyeing clothes, tanning leather, and as a food colour. The nuts themselves also contain 8-12% of fat, which can be extracted and used for confectionery purposes. This refined fat is harder than cocoa butter and can be used for blending.

As **Gomati, Dhalai, and South Tripura** are among the major areca nut growing regions, areca processing can be undertaken in the Lalchari, Sonamukhi, and Jalefa industrial estates.

### 3.5.4. Product and market identification

Further analysis based on stakeholder consultation indicates that Tripura currently produces pineapple and jackfruit and faces similar issues of wastage. Major growth pockets of the each of the products production have been identified as below.<sup>106</sup>

**Table 30: Major growth pockets of shortlisted products**

Product	State	Major Growth Pockets
<b>Pineapple</b>	Tripura	Dharmanagar, Unakoti, Fatikrai, Kumarghat, Vanghmuri, Phuldurgsai, Sakhan.
		Khowal, Sidhai, Kalyanpur, Ranirbazaar, Jambal, Bisalgarh, Barjula, Sonamura, Kathalia, Khowal, Teliamura.
		Kamalpur, Halhari, Salema, Kanchanpur, Bahudurpura, Sakhn, Rabiraipara.
<b>Jack Fruit</b>	Tripura	South Tripura, North Tripura, Gomati and Dhalai
<b>Orange</b>	Tripura	North district, Dhalai, Gomati district, West district

Source: TIDC, Study team analysis

With limited food processing infrastructure, there is little possibility for value addition. As a consequence much of the pineapples produce gets wasted due to the perishable nature of the fruit.

Some of these value added products of pineapple, which can be produced with minimal additional trianing and equiment are:

**Table 31: Value added products**

Pineapple	Jack Fruit	Orange
Canned pineapple	Canned jack fruit bulbs	Orange juice, frozen, not fermented or spirited
Pineapple squash	Dried jack fruit slices	Orange juice, not frozen, of a Brix value not greater than 20
Pineaplle concentrates	Preserves/ Jams	Orange juice, not fermented, spirited, or frozen

<sup>105</sup> Areca nut Processing, Ministry Of Food Processing Industries, Gol. (<http://www.niftem-t.ac.in/pmfme/dpr-arecanut.pdf>)

<sup>106</sup> APEDA

Frozed pineapple snacks	Fruit snacks	Essential oils of orange
Pineapple pulp	-	-

Source: Study team analysis

Apart from diversification of products, the food processing companies can also diversify their target markets in terms of export based on margins and profitability.

### Product competitive analysis

Considering the cost of raw material, manufacturing cost and logistics cost, competitive analysis of major products is shown in table below.

**Table 32: Market Diversification and Cost Analysis**

HS Code	Product	Country	Pricing Rs/kg	Pricing in Tripura (Rs/kg )	Transport cost (Shipping Freight)	Total Cost	Margin for Tripura exporters
<b>200820</b>	1. Ready to serve beverages/ squashes,	USA	99	79	26	105	-6
		Germany	97	79	19	98	-1
	2. Candied pineapple pieces,	Spain	112	79	19	98	14
	3. Canned pineapples tidbits,	Russia	80	79	20	98	-18
	4. Pineapple Pulp	UK	112	79	20	99	14
<b>081090</b>	1. Canned jack fruit bulbs	USA	80	128	2	130	-50
		Netherlands	240	128	19	147	94
	2. Dried jack fruit slices	USA	71	128	26	154	-84
	3. Preserves/ Jams	Saudi Arabia	46	128	4	132	-86
	4. Fruit Snacks	Germany	182	128	19	147	35
<b>80430</b>	Fresh or Dried Pineapple	USA	48	25	26	51	-4
		Netherlands	58	25	19	44	15
		People's Republic of China	60	25	2	27	33
		Japan	59	25	2	27	32
		Spain	59	25	19	44	15
<b>200941</b>		France	62	43	19	62	1

HS Code	Product	Country	Pricing Rs/kg	Pricing in Tripura (Rs/kg )	Transport cost (Shipping Freight)	Total Cost	Margin for Tripura exporters
	Pineapple juice, unfermented, Brix value <= 20 at 20°C	Netherlands	43	43	19	61	-19
		USA	52	43	26	69	-17
		Germany	48	43	19	61	-14
		Belgium	47	43	19	61	-14
200949	Pineapple juice, unfermented, Brix value > 20 at 20°C	Netherlands	98	43	19	61	36
		USA	31	43	26	69	-38
		Spain	110	43	19	62	48
		Japan	120	43	2	45	76
		Italy	99	43	19	62	37
200911	Orange juice, frozen, not fermented or spirited	USA	30	38	26	64	-34
		Germany	108	38	19	57	52
		Japan	153	38	2	40	113
		People's Republic of China	110	38	2	40	70
		France	73	38	19	57	17
200912	Orange juice, not frozen, of a Brix value not greater than 20,	France	57	38	19	57	0
		Belgium	34	38	19	57	-23
		UK	65	38	20	58	7
		Netherlands	41	38	19	57	-16
		Germany	50	38	19	57	-6
200919	Orange juice, not fermented, spirited, or frozen	Belgium	113	38	19	57	56
		UK	103	38	19	57	46
		Germany	126	38	19	57	69
		France	59	38	19	57	2
		Poland	108	38	19	57	51
330112	Essential oils of orange	USA	386	426	26	453	-67
		Germany	432	426	19	445	-13
		Japan	245	426	2	428	-183

HS Code	Product	Country	Pricing Rs/kg	Pricing in Tripura (Rs/kg )	Transport cost (Shipping Freight)	Total Cost	Margin for Tripura exporters
		People's Republic of China	819	426	2	428	390
		UK	401	426	20	446	-45
081090	Canned jack fruit bulbs, Dried jack fruit slices, Preserves/ Jams, Fruit Snacks	People's Republic of China	80	128	2	130	-50
		Netherlands	240	128	19	147	94
		USA	71	128	26	154	-84
		Saudi Arabia	46	128	4	132	-86
		Germany	182	128	19	147	35

Source: Tradestat, Primary research, Study Team Analysis

Based on the above analysis, it can be seen that exporting food products to Europe is generally more profitable. Hence the products and markets to be targeted by manufacturers in Tripura are summarised in the table below.

**Table 33: Identified markets for shortlisted products**

HS Code	Product	Identified Markets for export
200820	5. Ready to serve beverages/ squashes, 6. Candied pineapple pieces 7. Canned pineapples tidbits 8. Pineapple Pulp 9. Freeze dried pineapple snacks	Spain, UK
081090	10. Canned jack fruit bulbs 11. Dried jack fruit slices 12. Preserves/ Jams 13. Fruit Snacks	Netherlands, Germany
80430	Fresh or Dried Pineapple	Netherlands, People's Republic of China, Japan, Spain
200941	Pineapple juice, unfermented, Brix value $\leq 20$ at 20°C	France
200949	Pineapple juice, unfermented, Brix value $> 20$ at 20°C	Netherlands, Spain, Japan, Italy
200911	Orange juice, frozen, not fermented or spirited	Germany, Japan, People's Republic of China, France

<b>200912</b>	Orange juice, not frozen, of a Brix value not greater than 20	France, UK
<b>200919</b>	Orange juice, not fermented, spirited, or frozen	Belgium, UK, Germany, France, Poland
<b>330112</b>	Essential oils of orange	People's Republic of China
<b>081090</b>	Canned jack fruit bulbs, Dried jack fruit slices, Preserves/ Jams, Fruit Snacks	Germany, Netherlands

Source: Tradestat, Primary research, Study Team Analysis

In order to produce processed foods, Tripura can focus on attracting existing food processing companies. Some existing producers of the identified food products are listed in the table below.

**Table 34: Existing Food Processing Units**

Crop	Product	Company	Location
<b>Jackfruit</b>	Canned ripe jackfruit bulbs	Kollur Food Products	Goregaon, Maharashtra
	Dried jackfruit slices	Kerala Naturals	Kottayam, Kerala
	Raw jackfruit chunks in brine	Pahari Roots	Mumbai, Maharashtra
	Jackfruit Chips	Pristine Tropical Fruits and Agro	Malappuram, Kerala
<b>Pineapple</b>	Pineapple Slices	Bhutan Fruit Products Pvt Ltd	Samtse, Bhutan
		Welsell Foods	Chennai, Tamil Nadu
		Miltop Exports	Jamnagar, Gujarat
	Pineapple Pulp	Mala's	Panchgani, Maharashtra
	Pineapple Preserve/Jam	Nature Land Organics	Ganganagar, Rajasthan
		Bhutan Fruit Products Pvt Ltd	Samtse, Bhutan
		Himsrot	Dehradun, Uttarakhand

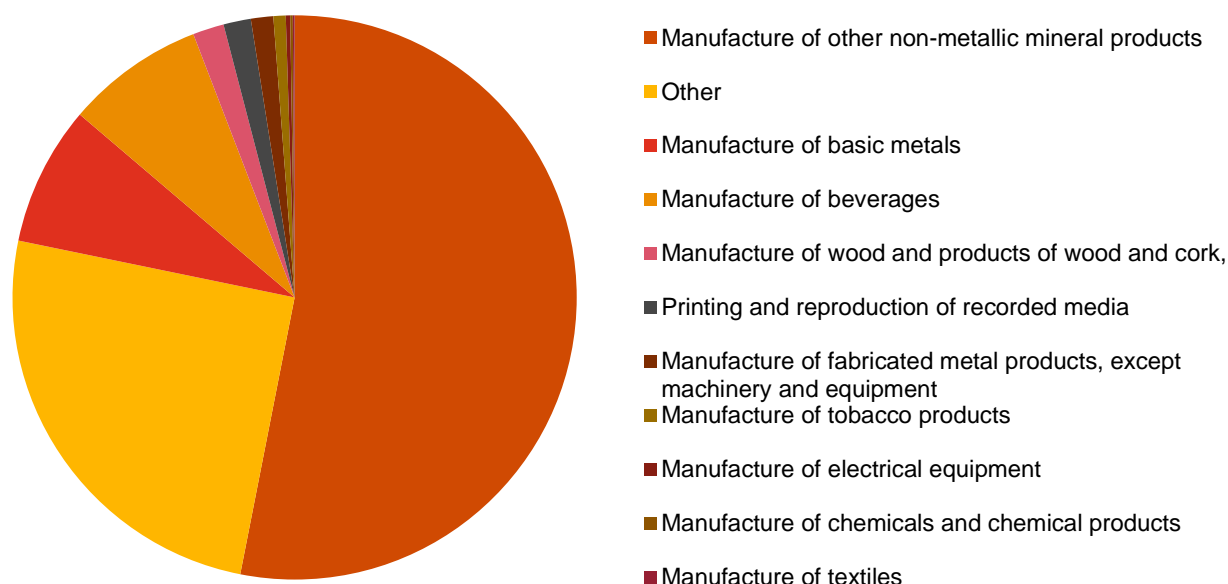
	Ready to serve pineapple beverage	Ganesh Products Private Limited	Kolkata, West Bengal
		Shree Guruji	Indore, Madhya Pradesh
	Candied Pineapple	Brill International	Delhi
		Qualinut Organic	Bangalore, Karnataka
		Ghasitaram Sweets & Gifts	Goregaon, Maharashtra



### 3.6. Other Sectors

Apart from the identified sectors Tripura's economy shows a healthy growth rate. The focus sectors contribute ~49 – 51% of the states manufacturing output according to the ASI Data. Among the other sectors Manufacture of other non-metallic mineral products, Manufacture of basic metals contribute ~30%, Manufacturing of other miscellaneous products together contribute to ~86% of Non-priority sector's manufacturing output.

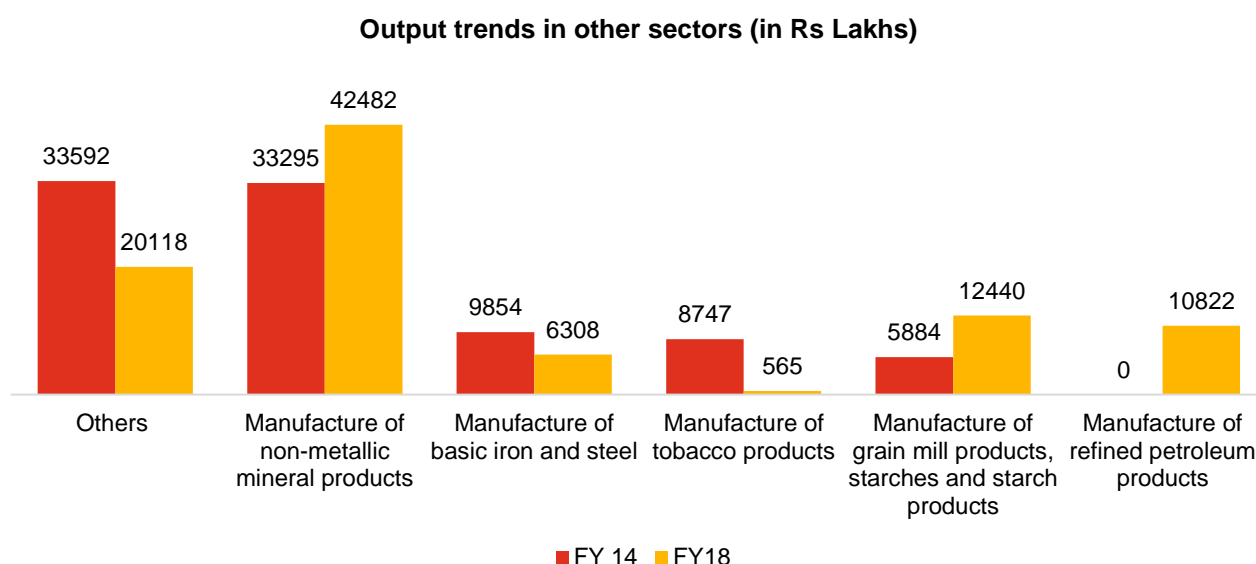
**Figure 22: Manufacturing output of other sectors**



Source: ASI

These other sectors are currently growing at a rate of 2.28% as per the ASI Data. These industries are expected to grow at a similar pace and generate further land demand and economic growth.

**Figure 23: Sectoral contribution within other sectors**



Source: ASI

From FY14 to FY 18 the petroleum products emerged as new sector and sectors such as nonmetallic mineral products and grains mill products and starch products have seen a growth. On the other hand sectors such as

iron & steel, tobacco products and other miscellaneous products have seen declining growth trend. Of the other sectors the petroleum-based sectors benefit from a favourable resource position, however the growth depends on the extraction and development of fields in the state. The initiatives in this sector are largely in the domain of central agencies such as ONGC.

**Other possible focus sectors:** Apart from the sectors discussed above, some other sectors that could be developed in Tripura include **medical tourism**, and the manufacture of **medical equipment, rubber wood, products** and **automobile spares**. These have been selected based on the state's locational advantages and access to raw materials. They are:

1. **Medical Tourism:** The phenomenon of “consumers electing to travel across international borders with the intention of receiving some form of medical treatment”<sup>107</sup> is described as medical tourism. While the treatment sought may span the full range of medical services, the most commonly sought treatment includes “dental care, cosmetic surgery, elective surgery, and fertility treatment”.

### Treatment

The medical tourism value chain comprises three components:

- **pre-procedure stage:** here, the medical tourist searches, identifies, and finalizes the process of reaching the destination for treatment. Tourists concerns at this stage include quality and cost of treatment, connectivity, ease of access, and ease of purchase. Important enablers at this stage then include brand perception, pretreatment consultation services, ease of connectivity and visa procedures, concierge services, cultural match, and insurance coverage availability.
- **procedure stage:** this is the central stage of the value chain where the tourist is treated. It begins when the medical tourist is picked up at the airport and continues through the treatment process, ending with the patient's discharge. The important enablers at this stage include expertise of medical staff, accreditation of facilities, and standards of living arrangements (hotel or apartment).
- **post-procedure stage:** the convalescence period following the medical procedure. It comprises two important components, namely **post-operative care** and **follow-up care**.

Currently, in India, the medical tourism market is a growing one, with both medical tourist arrivals (MTAs) and market size showing growth. The sector, valued at USD 2.4 billion in 2018, is expected to increase to USD 8.3 billion by 2025. Bangladesh, Bhutan, Nepal, and Myanmar account for more than 50% of India's MTAs. This creates a unique opportunity for Tripura to emerge as a regional medical tourism hub, especially with regard to Bangladesh.

The state shares a long border with Bangladesh. Besides enjoying a locational advantage, Tripura also fares well in terms of cultural affinity with the country due to civilizational ties, similarity in food and culture, and the absence of language barriers. Apart from allopathic healthcare facilities, Tripura also has a large number of homeopathic and ayurvedic facilities, which can enable it to attract patients seeking alternatives to allopathic treatments. The state capital Agartala, due to its accessibility and existing medical infrastructure, has the potential to leverage its proximity to international borders. In 2017, the city attracted ~3,100 Bangladeshi MTAs, about 51% of the NER's total Bangladeshi MTAs.

Agartala is a suitable location for the development of the sector as it is the most industrialised region in the state. It also houses an international airport, facilitating patients' access to healthcare facilities.

However, in order to realise the benefits of its locational advantages and cultural ties, it is crucial to first improve Tripura's current medical services ecosystem and increase private sector participation. In order for the state to emerge as a medical tourism hub, its medical ecosystem needs to be able to satisfy the patient concerns outlined at each stage of the value chain above.

Currently, there is a need for the state to develop and strengthen both **pretreatment consultation facilities** as well as **upstream linkages with hospitals** in target markets like Bangladesh. Similarly, a network of partners for **customer engagement** and **facilitation of travel logistics in source countries** can be developed.

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<sup>107</sup> Medical Tourism: Treatments, Markets and Health System Implications: A scoping review, OECD (2011).

While there are six state hospitals— Agartala Government Medical College and G.B. Pant Hospital, the Atal Bihari Vajpayee Regional Cancer Centre, Indira Gandhi Memorial Hospital, the Netaji Subhash State Homeopathic Hospital, the State Ayurvedic Hospital at Agartala, and the Modern Psychiatric Hospital at Narsinghar, six district hospitals, and 12 sub-divisional hospitals in Tripura, none of these are NABH- or JCI-accredited. Facilitating **NABH- and JCI-accreditation** of hospitals in the state will help build Tripura's image as a viable medical tourism location. Co-ordination between hospitals and hotels in Agartala can be further strengthened as well, and hotels in the city need to be equipped to cater to patient needs.

### Transportation and access

Agartala is easily accessible from Bangladesh by road. The approximately 128-km-long route between Dhaka and Tripura can be covered in about four and a half hours. Since the country is Tripura's primary target market for medical tourism, it is essential to continue to develop **road transport linkages**.

The existent Agartala-Dhaka-Kolkata 'Maitri' (friendship) bus service, for instance, could be further strengthened to provide an affordable mass transit option to medical tourists. Additionally, the required regulatory facilities to ease the entry of such tourists can be developed at the ICP Agartala, located at the Agartala-Akhaura border point along the border between the state and Bangladesh.

Additionally, it is important to continue to develop road transport linkages to the rest of India as well. Costs of consumables as well as maintenance costs are higher because of higher logistics costs associated with the transport of goods from the rest of India to Tripura. Developing all-weather roads to quicken delivery of goods can be one way to lower logistics costs.

Once the medical tourism ecosystem develops further, the issue of limited **air connectivity**, an impediment to the arrival of medical tourists from potential target markets including Bhutan, Nepal, and Myanmar can be addressed as well.

Currently, the Guwahati airport is the only international airport in the NER to have direct air links with potential international markets, especially Bangladesh and Bhutan. While the Agartala Airport is connected to Delhi, Kolkata, and Bengaluru, which all have better connectivity to target markets, these cities themselves are major medical tourism hubs. Thus, it is important for Tripura to strengthen air linkages with the target markets in order to emerge as a competitive destination.

Although air connectivity is already being enhanced<sup>108</sup>, connectivity of air ambulances from Tripura to neighboring international markets also needs to be developed. These only offer domestic services to places such as Chennai and Kolkata.

### Availability of medical professionals

Besides government hospitals, there are also several well-known private hospitals in the state, including the Dr. B. R. Ambedkar Memorial Teaching Hospital, the Institute of Laparoscopic Surgery Hospital, and Apollo clinics. Additionally, in 2021-22, various specialists, including a consultant for cardiothoracic vascular surgery, a neurosurgeon, an assistant anesthetist, and two surgical oncologists,<sup>109</sup> were engaged in hospitals in the state. Despite this, the **per capita availability of doctors** in Agartala is low compared with the rest of India. The availability of market-relevant **skilled manpower** is a key hindrance to Agartala's development as a medical tourism hub. It would be beneficial to take steps to provide adequate livelihood opportunities to nurses, doctors and other medical personnel trained in Tripura to curb outmigration of skilled personnel. Further, offering educational opportunities for super-specialised branches of medicine can also help develop a skilled workforce.

### Market development

Further, it is important for hospitals in Agartala to **collaborate with hospitals** in target countries to establish itself as a key regional destination for medical tourism. Many healthcare providers in India already do this in a number of ways, including inviting foreign medical graduates to observe the different medical treatment procedures. This helps them get patient referrals through the visiting

<sup>108</sup> Tripura formally approved a proposal to start international flights to Bangladesh in August 2022. (<https://indianexpress.com/article/north-east-india/tripura/tripura-nod-operate-flights-bangladesh-year-8107591/>)

<sup>109</sup> Health and Family Welfare Department, Government Of Tripura ([https://health.tripura.gov.in/?q=dhs#:~:text=i\)%20There%20are%20six%20State,Modern%20Psychiatric%20Hospital%20at%20Narsinghar.](https://health.tripura.gov.in/?q=dhs#:~:text=i)%20There%20are%20six%20State,Modern%20Psychiatric%20Hospital%20at%20Narsinghar.))

graduates. Further, hospitals also organize medical camps in other countries, and develop ties with health ministries of various nations in order to establish themselves as suitable locations for medical tourists.

Hospitals in the state capital need to **develop strong pretreatment consultation facilities** as well. This can be done through the use of online platforms— posting testimonials of treated patients on hospital websites and providing a chat room for initial discussions with prospective patients can be beneficial. Besides this, hospitals need to form **upstream linkages with hospitals in target markets to improve patient outreach**. Creating a network of partners for both **customer engagement and travel logistics facilitation** in source countries too will be beneficial. Coordinating with travel agencies in source countries can ease logistical burdens on international patients. For this, hospitals can consider steps like partnering with airlines to enable special processing on flight tickets for patients undergoing medical treatments.

Developing **stronger coordination between hospitals and hotels**, or the provision of concierge services to international patients and accommodation facilities, to ensure patients' smooth stay helps satisfy a key patient need. Linkages between healthcare providers and hotels need to be developed for this. Further, hotels must be given institutional support to equip them to cater to patient needs. Here, collaboration with the state's Tourism Department may also be beneficial in developing cost-friendly accommodation facilities for patients.

On the regulatory front, India provides **medical e-visas** for patients and their attendants from various countries. However, the benefits of such visas are not extended to patients from Bangladesh, who account for a majority of MTAs in India, for treatment in Guwahati and Agartala. If not addressed, this can hinder the growth of Tripura as a medical tourism hub.

2. **Medical supplies:** While the potential of Tripura in becoming a hub of medical tourism has been identified, one of the major challenges to this is the state's reliance on other states for medical supplies. The consequent increase in cost of treatment can be addressed if certain medical supplies are produced in Tripura itself.

Due to the availability of rubber, the manufacture of **surgical gloves** and **contraceptives** in the state has been identified as being viable. Besides this, medical disposables like **disposable syringes, blood bags, and bamboo fiber gauze** can also be manufactured in Tripura. This is because the manufacturing processes for these are not overly complex. They require minimal infrastructural intervention, which makes them suitable considering the current state of Tripura's industrial ecosystem

The raw materials of the products too are relatively easy to source. Disposable syringes, for instance, require polypropylene (a synthetic resin built up by the polymerization of propylene), needles, and packing material.<sup>110</sup> As polypropylene is widely produced across India, it can be sourced easily for syringe manufacture. The approval of the implementation of a petrochemical project at the Numaligarh Refinery Limited (NRL) in May 2022 can further ease access to essential raw materials— after its development, linkages with the NRL-based plant can reduce the costs of sourcing polypropylene.

Similarly, the major raw material needed for bamboo fiber gauze is bamboo pulp. Considering the state's abundant bamboo resources, bamboo gauze can be manufactured in Tripura. Cotton-based sutures, bandages, and linen are typically suitable for manufacture in cotton producing areas. This makes them unsuitable for competitive production in Tripura as the cost of transporting raw material will increase the cost of production significantly. Production of bamboo fiber gauze, on the other hand, has the potential of reducing the use of cotton gauze which has to be sourced from other states. Additionally, as bamboo fibre possesses a unique antibacterial agent, "bamboo Kun", which imparts both antibacterial and deodorizing properties to bamboo, bamboo gauze does not need any artificial synthesized antimicrobial agent. Therefore, bamboo gauze can enjoy a competitive advantage in the market owing to lower production cost.

Further, apart from fulfilling demand for such equipment within the state, they can also be produced for export as India already has established markets for syringes, blood transfusion bags, and dressing articles (bamboo-based gauze can be exported as a viable alternative to traditional cotton-based dressing articles due to its cost advantages and antibiotic properties). The table below provides an overview of some suitable export markets.

<sup>110</sup> Disposable Syringe, Ministry Of Micro, Small & Medium Enterprises, GoI (<http://www.dcmsme.gov.in/old/publications/pmryprof/chemical/ch11.pdf>).

**Table 35: Value of Export of Selected Medical Equipment Exports (2021-22)**

S. no	Product	Current exporters	Importing Countries	Value of Imports (Million USD)
1	Syringes	Haryana, Gujarat, Maharashtra, Uttarakhand, and Uttar Pradesh	Nepal	1.82
			Bangladesh	1.32
			Myanmar	0.14
			Bhutan	0.15
2	Blood transfusion bags	Kerala, Haryana, Gujarat, Tamil Nadu, Maharashtra, and Delhi	Nepal	0.26
			Bangladesh	0.54
			Myanmar	0.04
			Bhutan	0.01
3	Medical gauze	Tamil Nadu, Maharashtra, Haryana, Gujarat, Karnataka, Goa, Uttar Pradesh, Kerala	Nepal	2.63
			Bangladesh	0.81
			Myanmar	0.05
			Bhutan	0.08

Source: EXIM databank

Tripura's location positions the state to serve the target markets better than some of the current exporting states. Its relative closeness to the target markets will result in reduced transportation costs, making the selected medical equipment produced in the state more competitive.

3. **Rubber wood:** Natural rubber is one of the most important cash crops of Tripura, where ~86,892 hectares of land is under rubber cultivation. Rubber trees reach maturity at approximately 7-9 years, which is when latex extraction begins. After 25-30 years of tapping, the trees no longer produce latex and can be harvested for low-cost, light wood. The successful utilization of mature rubber trees can boost the profitability of rubber plantations as the long gestation period of the trees is marked by a period of expenses without any substantial returns. This can also be beneficial to smaller landholders, apprehensive of the initial cost of raising rubber trees.

Rubber wood can be used in a number of ways including for making furniture, furniture parts, flooring, ceiling, paneling, molded components, internal door and window shutters, utility products, balusters, laminated and finger jointed panel boards, interior décor items, wood carvings, veneer plywood, fiber boards, block boards, flush doors, pulp and paper, bent wood articles, and packing cases. Apart from being an inexpensive source of wood, it is also easier to process rubber wood— operations like

sawing, cross cutting, and machining are smoother and easier.<sup>111</sup>

Rubber wood has the potential to fetch about INR 4.5 Lakh per hectare at the terminal stage of the life of the plantation (on the completion of 25-30 years of the trees).<sup>112</sup> Due to the existence of vast rubber plantations in the state, increasing the efficiency of utilization of rubber wood in Tripura can decrease dependence on other sources of wood and increase the overall sustainability of the rubber sector as well. The state's Tripura Forest Development and Plantation Corporation (TFDPC), a profit-making PSU, already runs a Rubber Wood Factory, a Timber Treatment Plant, a carpentry unit called Unakoti Crafts and Furniture, and a rubber wood door factory called Pilak Door Factory. The factory is equipped with the machinery needed for the manufacture of not only doors but also windows and kitchen shutters.<sup>113</sup> The factory has been manufacturing rubber wood products since 2012. The plant's current capacity is 2000 cum per annum.<sup>114</sup> The furniture manufacturing facility produces both high end furniture and utility furniture for schools on a fairly large scale. The table below provides an overview of the TFDPC's output:

**Table 36: Production of Rubber Wood Items in Tripura**

Rubber Wood Production (INR Lakh)		
Product	2019-20	2020-21
Rubber wood (sawn)	220.12	193.71
Production of furniture	666.78	500.90
Production of doors and other items	79.87	36.49

Source: Tripura Forest Development and Patriation Corporation (TFDPC) Ltd, 2021.

With projections predicting that the global wooden furniture market is expected to reach USD 309.99 billion by 2028, growing at a CAGR of 4.73% during 2021-2028<sup>115</sup>, it may be beneficial for Tripura to strengthen its rubber wood production and processing industries. The TFDPC's rubber wood factory indicates the existence of rubber wood processing capability. Further skilling could be undertaken in collaboration with the corporation to create a relevantly skilled labour pool. Additionally, the Rubber Department at the Tripura University may also consider offering trainings relevant to rubber wood processing and treatment to broaden access to skilling opportunities.

In recent years, the PRC, Vietnam, Malaysia and Thailand have been important sources of sawn wood, often rubber wood.<sup>116</sup> Further, one of the wooden products imported by India is plywood. Between 2021-22, India imported plywood worth USD 103.64 Million. Effective rubber wood utilization can help drive down imports of both sawn wood and rubber wood-based products. Tripura could play an important part in meeting domestic demand for rubber wood and its products.

Within India, there is an annual requirement of 40 million cubic meters of timber against domestic availability of 29.25 million cubic meters.<sup>117</sup> Here, again, Tripura's rubber wood has the potential to fulfil domestic demand while also reducing the burden on rain forests and other sources of timber.

<sup>111</sup> Rubber Wood, The Rubber Board Of India (<http://www.indiannaturalrubber.com/advantages.aspx>).

<sup>112</sup> Political Economy of Natural Rubber Cultivation in Tripura, S. Mohanakumar, Social Scientist, 4(11/12), 2016.

<sup>113</sup> Use of Rubber Wood in Tripura, Tripura Farmers Portal and Kisan Call Center, Government of Tripura ([mofpi.gov.in/PLISFPI/incentives-sales-investment](http://mofpi.gov.in/PLISFPI/incentives-sales-investment)).

<sup>114</sup> Plantations in Tripura ([https://slbctripura.pnbindia.in/pdf/Plantations\\_Tripura.pdf](https://slbctripura.pnbindia.in/pdf/Plantations_Tripura.pdf)).

<sup>115</sup> Global Wooden Furniture Market Is Expected To Reach USD 309.99 Billion By 2028 : Fior Markets, GlobeNewsWire (2021). (<https://www.globenewswire.com/news-release/2021/02/19/2178607/0/en/global-wooden-furniture-market-is-expected-to-reach-usd-309-99-billion-by-2028-fior-markets.html>)

<sup>116</sup> Forest Products Annual Market Review 2020-2021, United Nations And The Food And Agriculture Organization Of The United Nations (2021).

<sup>117</sup> Status And Utilization Of Rubberwood (Hevea Brasiliensis Mull.Arg.) In India, Sunny, P.P et al (2017).

**West Tripura** and **South Tripura** districts are both major rubber-producing districts— in terms of area under natural rubber cultivation in the state, West Tripura accounts for 40%. The promotion of the rubber wood sector in these districts will allow for forward integration, where aged rubber trees that cannot be tapped can be processed to make furniture. Besides these districts, plantations can also be found in North Tripura and Dhalai. The State Forest Department had introduced rubber trees in the state as early as 1963 in trial plantations in localities like Patichhari and Manu, and since 1980, private plantations too have increased in number.

Like the TFDPC, the Tripura Rehabilitation Plantation Corporation (TRPC) is also actively engaged in raising rubber plantations in fourteen subdivisions of the state. Secondary research shows that maintaining a density of ~600 trees per hectare appears to be most suitable for the NER.<sup>118</sup> Thus, as land under rubber cultivation in Tripura is ~86,892, it is being estimated that the number of trees in the state's plantations is trees, at various stages of their lifecycles is ~5,21,00,000.

The potential to extract rubber wood from these existing trees depends on the variety of rubber being grown in the plantations. According to one study<sup>119</sup>, rubber wood yield in plantations varies between 140 to 200 m<sup>3</sup>/ha. The table below provides the potential rubber wood availability of various rubber cultivars grown in India.

**Table 37: Potential Rubber Wood Yield Before Felling**

Available trunk volume/ha	
Variety of rubber	Available trunk (m <sup>3</sup> /Ha)
PB-86	130
TIJR 1	109
GT 1	124
RRIM 600	67

Source: Food and Agriculture Organization

Apart from rubber plantations, rubber trees are also found in recorded forest areas (RFAs). The diameter class distribution of these trees is as follows:

**Table 38: Diameter Class Distribution of Rubber Trees**

Diameter Class Distribution of Rubber Trees (in '000)		
10-30 cm	30-60 cm	>60 cm
39,996	2963	0

Source: Forest and Trees Resources in States and Union Territories, Forest Survey of India (2021)

Mature trees on rubber plantations are commonly 20-30 meters tall with a relatively slim trunk of up to 30 cm diameter at breast height. Thus, trees with diameters of more than 30 cm can be assumed to be older trees, close to the end of their lifecycles. These, then, can be assumed to be viable sources of rubber wood over the next few years.

<sup>118</sup> High density planting - an option for higher productivity of rubber (*Hevea brasiliensis*) in north eastern region of India, Dey, S.K et al, Journal of Plantation Crops (India) 41(3) (2013).

<sup>119</sup> Asia-Pacific Forestry Sector Outlook Study: The Utilization, processing and demand for Rubberwood as a source of wood supply, Food and Agriculture Organization ([https://www.fao.org/3/Y0153E/Y0153E04.htm#P362\\_31211](https://www.fao.org/3/Y0153E/Y0153E04.htm#P362_31211)).



Here, it is important to point out that while raising rubber trees for both latex and rubber wood has a large number of benefits, the growth of trees is affected by tapping, and can limit their rubber wood output.

As has been seen in the preceding discussion, **sawn rubber wood**, **rubber wood furniture**, and **rubber wood doors** are already being produced in Tripura. These existing rubber wood factories indicate rubber wood processing capacity in the state. Skill development measures may be beneficial in further increasing this capacity.

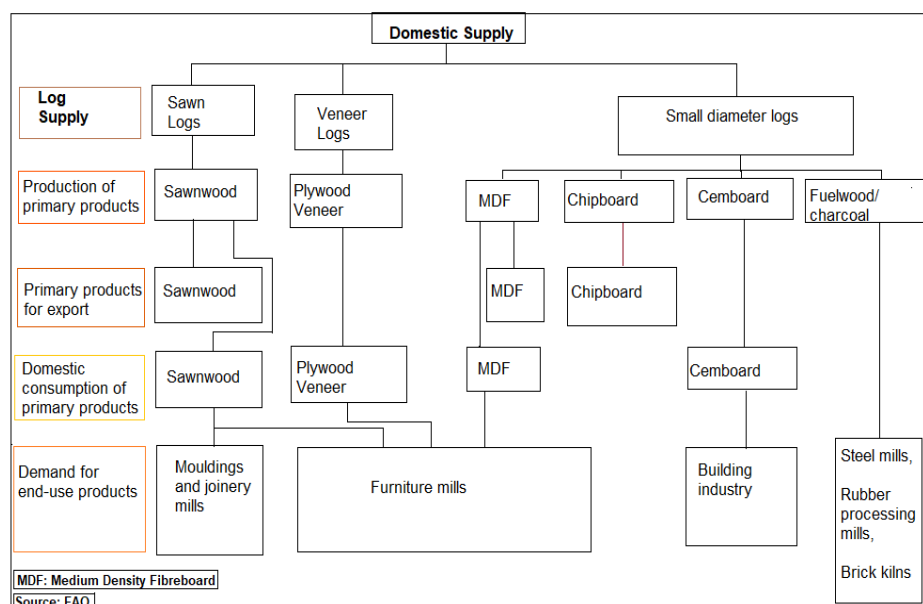
Further, **rubber wood-based plywood** is a popular product that can also be manufactured in Tripura. This plywood can be used for both construction and decorative end uses. Besides this, **medium density fibre boards (MDFs)** and **particleboards** may also be considered for manufacture. Manufacturing these will enable the use of sawmill waste as well.

Rubber wood in the form of small logs, off-cuts, edges, slabs and branches is used for **particleboard** manufacture. Some particleboards are laminated with overlays of a wide range of colors and patterns. This product is sought after by the furniture manufacturers for making wardrobes, cabinets, tables, chairs, partitions and kitchen cabinets. However, in transporting logs to sawmills for processing, long distances will need to be avoided as untreated rubber wood is vulnerable to insect and fungal attacks. Alternatively, sawing will need to be accompanied by chemical treatment, immediately after harvest. Sawmills integrated with drying facilities can also produce sawn wood for export or to meet domestic demand for furniture wood.

After primary processing, secondary level processing can be undertaken to make value added finished products—rubber wood’s “qualities for machining, acceptable durability, light natural color and adaptability in accepting paints and other finishes, makes it an ideal wood for furniture”, for instance.

The figure below outlines the possible flow of rubber wood logs.

**Figure 24: Flow of Rubber Wood Logs**



Apart from the various possible uses outlined above, good quality rubber wood charcoal and briquettes can also be derived from rubber wood waste. Charcoal kilns can be used to produce charcoal. Other than this, unprocessed rubberwood can be sold in local markets for household use, as an alternative to other wood-based fuels.

4. **Automobile spares:** Besides focusing on the priority sectors that have been identified as suitable for Tripura, the state can also consider focusing on automobile spares manufacturing. India is a major exporter of automotive spare parts. The country exported car spares worth USD 6265.71 million in 2021 alone.<sup>120</sup> Out of this, exports to Bangladesh accounted for USD 65.88 million.<sup>121</sup>

<sup>120</sup> Directorate General of Commercial Intelligence and Statistics, 2021.

<sup>121</sup> Directorate General of Commercial Intelligence and Statistics, 2021.

Tripura's location can facilitate easy access to Bangladesh's markets, enabling manufacturers located in the state to export spares at more competitive prices than manufacturers based out of the current exporting hubs, namely Maharashtra, Tamil Nadu, Karnataka, West Bengal, the National Capital Region, Gujarat, Uttar Pradesh, and Haryana. These regions do not enjoy the geographical proximity to Bangladesh, which Tripura does.

States like Tamil Nadu and Gujarat are already established hubs for the manufacturing of spares for OEMs and have automobile component manufacturing clusters. Thus, it is recommended that Tripura focus on attracting MSMEs to cater to the aftersales market in Bangladesh instead. The state can also cater to the demand of the aftersales market in other states within the NER.

An examination of the spares exported by India, demand in regional markets, the current level of industrial development in Tripura, and the existing industrial ecosystem, it has been found that **bicycle spares, including rims and chains, and automotive nuts and bolts** may be suitable for manufacture in the state.

The table below shows the value of exports of the identified spares to Bangladesh in 2021-22.

**Table 39: Export of Automobile Spares to Bangladesh (2021-22)**

Product	Value of Exports in 2021-22 (USD/Million)
Bicycle Rims	0.88
Bicycle Chains	2.92
Nuts and Bolts	10.56

Source: Directorate General of Commercial Intelligence and Statistics, 2021.

It may be viable to focus on bicycle spares as the use of bicycles in Bangladesh is substantial— data shows that the country's market demands nearly 1.5 million bicycles a year and sees an annual growth of 30%.<sup>122</sup>

Further, both these products as well as automotive nuts and bolts have relatively simple manufacturing processes. They can thus be manufactured in Tripura, keeping in mind the state's current level of industrial development.

The presence of several large steel manufacturers in neighboring Assam will aid access to the required raw materials as well. Tripura is linked by both road and rail to the state, which will facilitate the transportation of steel. For the manufacture of bolts, for instance, the primary raw material required is mild steel round bars. This can be sourced from existing steel producers in Assam. The manufacture of nuts also involves procuring hexagonal steel rods.<sup>123</sup> Apart from this, the state being a power surplus one also makes it a suitable location for such manufactures, which require uninterrupted and stable power supply.

Besides catering to the market in Bangladesh, such manufactures from Tripura can also aim to meet domestic demand— in the last year, India imported nuts and bolts worth USD 856.87 million.<sup>124</sup> Thus Tripura could cater to the demand for such products in the aftersales markets in other states within the NER. Though West Bengal is already a major producer of automobile spares in the eastern region, Tripura's closeness to other NER states makes it better positioned to meet their demands.

<sup>122</sup> Bicycle Industry in Bangladesh: Pedalling into Global Market, DataBD (2020). ([https://databd.co/bicycle-industry-in-bangladesh-pedalling-into-global-market/#ref\\_1](https://databd.co/bicycle-industry-in-bangladesh-pedalling-into-global-market/#ref_1))

<sup>123</sup> Action Plan for Project Profile "Nuts and Bolts" Under Public Procurement Policy, Ministry of MSME, Govt. of India (2021). (<http://dcmsme.gov.in/Nuts%20and%20Bolts.pdf>)

<sup>124</sup> Directorate General of Commercial Intelligence and Statistics, 2021.

Owing to ease of both raw material and market access, Tripura can, then, be an attractive location for spare parts manufacturing MSMEs.

### Summary of products and target markets for Tripura

Based on the above analysis the identified products and their target markets have been summarized below.

**Table 40: Shortlisted priority products to be manufactured in Tripura**

S. No.	Sector	Products	Target market
1.	Rubber	Surgical Gloves	Domestic market in India and Regional Markets
2.		Rubber Contra (M)	Domestic market in India and Regional Markets
3.		Rubber Contra (F)	Domestic market in India and Regional Markets
4.		Tyres for Truck and Bus	Domestic market in India and Regional Markets
5.		Tubes for Cars	Domestic market in India and Regional Markets
6.		Tubes for Truck and Bus	Domestic market in India and Regional Markets
7.		Tubes for bicycle	Domestic market in India and Regional Markets
8.		Tubes for motorcycle	Domestic market in India and Regional Markets
9.		Tubes for cycle rickshaw/ powered rickshaw	Domestic market in India and Regional Markets
10.		Floor Covering and Mats	Domestic market in India and Regional Markets
11.		Tyre Motorcycle	Domestic market in India and Regional Markets
12.		Tyre Scooter	Domestic market in India and Regional Markets
13.		Tyre other than bike/ scooter	Domestic market in India and Regional Markets

14.		Radial Tyre Cars	Domestic market in India and Regional Markets
15.		Tyre for Bicycle	Domestic market in India and Regional Markets
1.	<b>Bamboo</b>	Timber Substitute	Domestic market in India and Regional Markets
2.		Agarbatti	Domestic market in India and Regional Markets
3.		Floor Panels	Domestic market in India and Regional Markets
1.	<b>Food Processing</b>	Canned pineapple	Spain, UK
2.		Pineapple squash	Spain, UK
3.		Pineapple concentrates	Spain, UK
4.		Frozen pineapple snacks	Spain, UK
5.		Pineapple pulp	Spain, UK
6.		Canned jack fruit bulbs	Netherlands, Germany
7.		Dried jack fruit slices	Netherlands, Germany
8.		Preserves/ Jams	Netherlands, Germany
9.		Fruit snacks	Netherlands, Germany
10.		Orange juice, frozen, not fermented or spirited	Germany, Japan, People's Republic of China, France
11.		Orange juice, not frozen, of a Brix value not greater than 20	France, UK
12.		Orange juice, not fermented, spirited, or frozen	Belgium, UK, Germany, France, Poland
13.		Essential oils of orange	People's Republic of China

Based on the above assessment, 31 products have been identified across 3 major sectors of rubber, bamboo and food processing which can be prioritised for manufacture in Tripura. Rubber and bamboo products will be primarily focused on catering to the domestic market and the surrounding

regional economy, while the food processing sector should focus on tapping the European markets. Hence, the connectivity of Tripura to rest of India and to Europe through Bangladesh shall play a key role in the development of these sectors in the region.

## 4. Demand assessment and projections of priority sectors





# Demand assessment and projections of priority sectors

## 4.1. Food processing

Being an agrarian state, it is feasible for Tripura to focus on perishable produce like oranges, pineapple, and jackfruit which are currently grown in the state.<sup>125</sup> The major growth pockets of each of the products' production have been identified below.

**Table 41: Major Growth Pockets of Shortlisted Products**

Product	State	Major Growth Pockets
Pineapple	Tripura	Dharmanagar, Unakoti, Fatikrai, Kumarghat, Vanghmuri, Phuldurgsai, Sakhan.
		Khowal, Sidhai, Kalyanpur, Ranirbazaar, Jambal, Bisalgarh, Barjula, Sonamura, Kathalia, Khowal, Teliamura.
		Kamalpur, Halhari, Salema, Kanchanpur, Bahudurpura, Sakhn, Rabiraipara.
Jack Fruit	Tripura	South Tripura, North Tripura, Gomati and Dhalai
Orange	Tripura	North district, Dhalai, Gomati district, West district

Source: TIDC

Pineapple has been a traditionally cultivated fruit crop in Tripura. The agro-climatic conditions of the state make it suitable for large-scale pineapple farming. The varieties grown in the state (mainly Queen and Kew) are famous for their quality and aroma. The crop accounts for 16% of the total area under fruit crop cultivation and 23% of the total fruit production in the region. Tripura is the fourth largest producer of pineapple in India after Kerala, West Bengal and Assam, accounting for approximately 9% of the total production in the country.<sup>126</sup> Further, its closeness to Assam, which is among the states with the highest output of pineapple, will enhance Tripura's access to the fruit. Some of Assam's pineapple growing belts include Nagaon, Kamrup, Karbi Anglong, N.C. Hills, Goalpara, Dhemaji, and Sonitpur Dhubri.<sup>127</sup>

Tripura is a major cultivator of jackfruit, the largest producer in the NER. Tripura accounts for 16.84% of jackfruit production in India.<sup>128</sup> Other states producing similarly high volumes include Orissa, Assam, and West Bengal. Increased interest in the crop as a meat alternative presents an interesting opportunity for the growth of jackfruit production – regarded as a superfood due to its high nutritional value, raw jackfruit has gained popularity due to its pork-like texture. The major jackfruit producing districts in the state are Dhalai, South Tripura, North Tripura, and Gomati. Food processing helps increase the shelf life of this surplus and can increase high-value exports from the state.

The Jampui Hills of North Tripura district is an orange-producing area. While output from the region has fallen, orange cultivation has now spread to the Ampu and Killa of blocks of Gomati district, the Baramura region of Khowai district, and the Sakhan Hills in Dhalai district. With the state government concentrating on reviving the Jampui Komola, or the Jampui orange, the state's orange production is expected to increase. Though the fruit is mainly consumed in fresh form, it can be processed into jams and jellies. Further, it is popularly used in manufacturing peel oil, citric acid, and cosmetics in international markets.

Some of these crops already have established markets both domestically and outside — oranges from the NER, for instance, are shipped to Delhi, Mumbai, and Kolkata in India, and to Bangladesh and Nepal outside.

<sup>125</sup> Agricultural and Processed Food Products Export Development Authority (APEDA)

<sup>126</sup> CCS National Institute Of Agricultural Marketing, 2018.

<sup>127</sup> National Horticultural Board ([https://nhb.gov.in/report\\_files/pineapple/PINEAPPLE.htm](https://nhb.gov.in/report_files/pineapple/PINEAPPLE.htm))

<sup>128</sup> National Horticulture Board (2015-2016).



The table below shows the production of these shortlisted priority horticultural crops for food processing in Tripura.

**Table 42: Crops and their production in FY 2020-21**

Sr. No.	Crops	Area (Ha)	Production (Lakh MT)	Productivity (MT/ Ha)
1	Pineapple	9859	143744	14.58
2	Orange	4707	21087	4.48
3	Jackfruit	5491	133251	24.27
<b>Total</b>		<b>20057</b>	<b>298082</b>	<b>14.86</b>

Source: Horticulture and Soil Conservation, Tripura

Currently food processing is at a nascent stage in the region. However, the sector has a high growth potential. Based on raw material availability, some value-added food products that can be manufactured in Tripura are shown in the table below.

**Table 43: Value added products**

Pineapple	Jack Fruit	Orange
Canned pineapple	Canned jack fruit bulbs	Orange juice, frozen, not fermented or spirited
Pineapple squash	Dried jack fruit slices	Orange juice, not frozen, of a Brix value not greater than 20
Pineapple concentrates	Preserves/ Jams	Orange juice, not fermented, spirited, or frozen
Frozen pineapple snacks	Fruit snacks	Essential oils of orange
Pineapple pulp	-	-

Source: Study Team Analysis

Out of the three identified crops, squash and juice can be extracted from both pineapple and orange. Further, pineapple and jackfruit can be canned. All three crops can be made into preserves and jams as well. These three horticultural crops have more than 80% production surplus, owing to limited consumption in the region, a result, in part, of their high commercial value.

Food processing creates a profitable opportunity for the use of this excess that can induce growth and strengthen the stakeholders involved in the production of the three crops. Further, an Origin-Destination analysis suggests that exporting food products to Europe is generally more profitable. Based on this, the products, and markets to be targeted by manufacturers in Tripura are summarised in the table below.

**Table 44: Identified markets for shortlisted products**

HS Code	Product	Identified Markets for export
200820	1. Ready to serve beverages/ squashes, 2. Candied pineapple pieces 3. Canned pineapples tidbits 4. Pineapple Pulp 5. Freeze dried pineapple snacks	Spain, UK
081090	1. Canned jack fruit bulbs 2. Dried jack fruit slices 3. Preserves/ Jams 4. Fruit Snacks	Netherlands, Germany
80430	Fresh or Dried Pineapple	Netherlands, PRC, Japan, Spain
200941	Pineapple juice, unfermented, Brix value $\leq 20$ at 20°C	France
200949	Pineapple juice, unfermented, Brix value $> 20$ at 20°C	Netherlands, Spain, Japan, Italy
200911	Orange juice, frozen, not fermented or spirited	Germany, Japan, PRC, France
200912	Orange juice, not frozen, of a Brix value not greater than 20	France, UK
200919	Orange juice, not fermented, spirited, or frozen	Belgium, UK, Germany, France, Poland
330112	Essential oils of orange	PRC
081090	Canned jack fruit bulbs, Dried jack fruit slices, Preserves/ Jams, Fruit Snacks	Germany, Netherlands

Source: Tradestat, Primary Research, Study Team Analysis

Considering that around ~65% of the total pineapple produced, ~60% of the total orange produced, and ~62% of the total jackfruit produced is expected to be processed over a period of 15 years, the table below highlights the produce expected to be processed for all shortlisted crops.

**Table 45: Produce to be processed**

Sr. No.	Crops	Produce to Be Processed (tonnes)
1	Pineapple	~93,500
2	Orange	~13,000

3	Jackfruit	~83,000
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Food processing activities fall into three categories. These are:

- Primary processing:** this includes basic cleaning, grading, and packaging of agricultural produce such as fruits and vegetables.
- Secondary processing:** this involves altering the basic product slightly just before the final preparation. An example is the milling of paddy to produce rice.
- Tertiary processing:** this entails the production of high value-added ready-to-eat consumables. Examples include instant foods, drinks, and jams and preserves.

For the produce identified for processing in the table above, primary sector processing would include cleaning, sorting, and packaging produce. The outputs of primary processed food are best suited for regional and local markets. The shelf life of identified priority products highlights the markets which can be targeted after primary processing. Raw jackfruit has a longer shelf life than the ripe kind, oranges can be stored for up to a week without refrigeration and whole pineapples last 2-3 days. The kew variety of pineapple, with a stronger flavour and aroma, is more suitable for canning, the queen variety is more suited for primary processing, having the longer shelf life. These products can find potential markets in the NER region as well as in Bangladesh.

Secondary processing involves canning and pulping produce. All three of the identified crops can be canned. Tender jackfruit, pineapple slices and pulp, and orange pulp are all possible products that can be manufactured through secondary processing. The value of these would be slightly higher than those of primary processed goods. With the increase in shelf life, the possible markets that can be tapped into for these products include Spain, UK, France, Japan, the Netherlands, and Germany. Ready to cook dried pineapple slices will also find markets within India.

The highest value addition in fresh produce occurs after tertiary processing. The scope for this in the identified crops is high. Both oranges and pineapples can be made into ready-to-serve beverages/ squashes. Further, they can also be processed into candied fruit, jams, and preserves. Jackfruit too can be made into ready-to-serve snacks.

Potential markets for these products include the Netherlands, Spain, Japan, the PRC, Italy, France, Germany, Poland, Belgium, and UK. Additionally, citrus oil extracts will find a market in the PRC for its medicinal and cosmetic uses. Importantly, both secondary and tertiary processing of pineapple and jackfruit can help make transportation of the otherwise bulky fruits easier, and the higher export value of these products can absorb the expense of processing. While the food processing sector in Tripura has potential to grow, certain infrastructural developments are needed to ensure this. The NEEC report identifies that the aggregation of commodities and the setting up of primary processing centers, for instance, can enhance the shelf life of the produce. Pre-processing centers (PPCs) and primary collection centers (PCCs) need to be set up as well. These will serve as local collection and aggregation centers at the district level, catering to villages or a group of districts depending on the scale of production. These centers need to have a basic processing and storage set up so that they can efficiently perform cleaning, grading, sorting, and packaging while fulfilling the primary objective of the aggregation of produce. Investment in cold storage facilities is also imperative in this regard.

It could be concluded that the land demand for the food processing sector will likely be high as each level of processing has specific infrastructure needs. The land demand for primary processing will be the highest as the volume of produce being handled will be the largest. The land demand for secondary and tertiary processing units will be comparatively lower as the volume of produce to be processed will be lower.

## 4.2. Rubber

Natural rubber is one of the most important cash crops of Tripura. With more than 1 lakh rubber growers in the state, the production of rubber is shown in table below.

**Table 46: Rubber Production in Tripura**

Production (Item wise)
------------------------

Items	Production (Kg)	Production (MT)	%
Latex for sheet	5,39,89,597.37	53,989.60	59.62
Latex for Cenex/ Creep	43,62,213	4,362.21	4.81
FC for ISNR	3,23,59,727	32,359.73	35.67
Total	9,07,11,537.37	90,711.54	100

Source: TIDC

Currently most of the rubber is produced in Tripura is being marketed as raw material for other industries or being supplied as a primary processed low value-added product like RSS to the other states of India. However, based on the examination of value chains, products have been identified based on two factors, the first factor being products which are currently getting imported into India and secondly products where more than 80% raw material used is natural rubber. The identified products and their current imports are shown in table below

**Table 47: Imports of identified rubber products**

Product	Imported quantity	Imported price
Surgical gloves	~36.17 Crore	INR ~274.66 Crore
Rubber Contraceptive (Males/ Females)	~31.18 lakh Kgs	INR ~5.5 Crore
Tubes	6.47 lakhs	INR ~ 9.6 Crore
Tyres	~17 lakhs	INR ~512 Crore

Source: EXIM databank

The domestic demand for surgical gloves and rubber tyres appears to be the highest among the imported rubber products listed above. In terms of value of imports, both tubes and tyres, however, constitute the highest amount. Tripura can, therefore, consider focusing on the manufacture of these products to fulfill domestic demand for them. Further exports of the above products in the neighboring countries have also been considered since products manufactured in Tripura might have the competitive advantage of lower transportation cost when manufactured in Tripura. The table below highlights the exports of the identified above products to neighboring countries

**Table 48: Exports of identified rubber products**

Product	Exported quantity
Surgical gloves	~4.8 Crores
Rubber Contraceptive (Males/ Females) (Kgs)	~4.5 Crores
Tubes	~ 0.24 Crores
Tyres	~3 Crores

Source: EXIM databank

One of India's export markets for rubber is Bangladesh. From 2015-2019, its export-value share was ~3%.<sup>129</sup> In 2021-22, India's rubber exports<sup>130</sup> to the nation amounted to 2.53% of the overall rubber exports.<sup>131</sup> In Bangladesh, products from India accounted for 30% of the country's total rubber-based imports.<sup>132</sup>

Keeping in mind the existing demand for Indian rubber products in Bangladesh, it can be a viable market for such products from Tripura, especially as it shares an 856-km-long border with the state. This makes it easily accessible to the state. Further, the transportation linkages between the country and Tripura are currently being improved as has been stated in previous sections.

The following table lists the value of India's exports of the products identified for manufacture in Tripura to Bangladesh:

**Table 49: India's Rubber Exports To Bangladesh (2021)**

S. no	Product	Value of Exports (Million USD)
1	Contraceptives	0.79
2	Surgical gloves	1.36
3	Rubber tyres	73.36
4	Rubber tubes	6.42

Source: Export Import Data Bank, Department of Commerce, Gol (2022).

The states with the highest rubber exports to Bangladesh in 2021 were Tamil Nadu (USD 33 million), Gujarat (USD 17 million), Maharashtra (USD 12 million), West Bengal (USD 11 million), Telangana (USD 7 million), Kerala (USD 7 million), Goa (USD 6 million), Haryana (USD 5 million), Uttar Pradesh (USD 5 million), and Delhi (USD 3 million). The table below lists the major states exporting each identified rubber to Bangladesh:

**Table 50: States in India exporting rubber products**

S. No.	Product	States Exporting To Bangladesh
1	Surgical Gloves	Kerala, Andhra Pradesh, Tamil Nadu, Karnataka, Telangana, West Bengal, Delhi
2	Rubber Contraceptives	Telangana, Kerala, West Bengal, Uttarakhand, Uttar Pradesh, Gujarat
3	Tyres	Tamil Nadu, Maharashtra, West Bengal, Gujarat, Telangana, Goa, Kerala, Haryana, Uttar Pradesh, Puducherry, Jharkhand, Punjab, Andhra Pradesh, Karnataka, Delhi
4	Tubes	Tamil Nadu, Maharashtra, Gujarat, West Bengal, Goa, Telangana, Punjab, Kerala, Haryana, Uttar Pradesh, Jharkhand, Puducherry, Andhra Pradesh, Himachal Pradesh, Karnataka

Source: Export Import Data Bank, Department of Commerce, Gol (2022).

The table above indicates that Tripura's has locational advantage over the states currently producing rubber-based goods for export, in terms of access to markets in Bangladesh. The Agartala–Akhaoura broad-gauge rail line connecting Tripura and Bangladesh, currently under construction, will further improve the connectivity

<sup>129</sup> India's International Trade of Rubber in the Recent Past – Some Insights, Directorate General of Commercial Intelligence and Statistics, 2021. (<http://www.dgciskol.gov.in/writereaddata/Downloads/20210224114037Commodity%20Profile%20of%20Rubber.pdf>)

<sup>130</sup> Rubber products refers to "rubber and articles thereof" (HS Code: 40).

<sup>131</sup> Export Import Data Bank, Department of Commerce, Gol (2022).

<sup>132</sup> UN COMTRADE statistics.

between Bangladesh and Tripura. Similarly, the recently developed Maitri Setu on the Feni River links Tripura with Bangladesh's Chattogram port, and will further facilitate Tripura's market access. The existence of such trade routes makes Bangladesh an ideal target market for exports.

Besides the existence of trade routes, Tripura also has a considerable advantage over many other rubber processing regions— its access to rubber. Most of the states listed above, with the exception of Kerala and Tamil Nadu, are not traditional rubber growing states.<sup>133</sup> Maharashtra, Karnataka, West Bengal, Goa, and Andhra Pradesh are among the non-traditional rubber producing states. However, in comparison to states like Haryana, Punjab, Jharkhand, Gujarat, and Uttar Pradesh which do not have easy access to raw materials, Tripura is a more suitable site for rubber-based manufacturing as it has abundant access to raw material. The resultant difference in overall costs of production can make products from Tripura more competitive for export.

The data above shows that it will be more viable to focus on the manufacturing of surgical gloves and rubber contraceptives while targeting regional international markets. This is because exports of these two products are the highest among the four commodities listed above.

These products are all viable also because of the easy availability of raw materials. West Tripura accounts for the highest share of rubber output in the state. However, rubber is also widely cultivated in the North Tripura, South Tripura, and Dhalai districts, making access to raw material easy. The primary raw material used for the manufacture of surgical gloves for instance is centrifuged latex concentrate, or Cenex. Tripura already produces 43,62,213 kg of Cenex. Similarly, contraceptives too are made from latex, which, again, means that sourcing raw materials for production will be easy.

Latex is also one of the primary materials used in the production of tyres and tubes alongside Sulphur and some forms of synthetic rubber. However, with rising concerns about the environmental impact of using synthetic rubber, there is now a growing interest in using natural rubber in tyre production. Investors can take advantage and invest in ancillary industries that will enable tyre and tube production.

To estimate the demand for rubber, it has been estimated that 50% of imports to India and 50% of Indian exports to regional countries is met through manufacturers from Tripura. Considering the same, the quantity of exports along with rubber consumption of manufacturing in Tripura is highlighted in table below over a period of next 15 years.

**Table 51: Estimated rubber consumption in Tripura over next 15 years**

Product	Products manufactured in Tripura	Rubber quantity (Tons)
Surgical gloves	~21 Crores	~1500
Rubber Contraceptive (Males/ Females)	~1,500 Crores	~22500
Tubes	~0.2 Crores	~2000
Tyres	~0.6 Crores	~4900

Source: Primary Research, Study Team Analysis

Considering the ease of manufacturing process, it is estimated that surgical gloves and rubber contraceptives manufacturing will be setup first in Tripura in the short term, followed by tubes and tyres manufacturing in the medium to long term. The latter both require more specialised machinery and are therefore more capital intensive. It can be assumed then that such manufacturing units will be set up in the state only if the rubber processing ecosystem is a vibrant one.

The NEEC report states that investments worth INR 1.1 billion and INR 2.4 billion will need to be made in the short term and the medium and long term, respectively, for Tripura's rubber sector to thrive and cater to the demands of domestic and international markets. These enabling investments will help attract further investment

<sup>133</sup> Production of Natural Rubber, Ministry of Commerce & Industry, Gol.

from rubber-based industries. While surgical glove and contraceptive manufacturing possibilities can attract MSMEs, tyre and tube production will gradually attract bigger companies and higher investments.

### 4.3. Bamboo

There are 20 varieties of bamboo plantations that are possible in Tripura. Each type of plantation has specific uses. The varieties available along with maturity period, location and uses are highlighted in the table below

**Table 52: Bamboo varieties in Tripura**

Sl. No	Name of the Variety	Scientific name	Maturity Period	Average height	Average thickness	Areas the variety is available in	Traditional usages of the variety
1	Mirtinga	Bambusa tulda	4-5 yrs.	6-15 meter	1.0 cm	All over Tripura	Incense stick, Shoot for diet, fencing
2	Barak	Bambusa balcooa	5-6 yrs.	15-30 meter	2.7 cm	All over Tripura	Shoot for diet, Culm for construction, Fencing.
3	Paura	Bambusa polymorpha	4-5 yrs.	15-25 meter	1.0 cm	Sepaijala and Dhalai District	Handicrafts items, basket making
4	Rupai	Dendrocalamus longispathus	4-5 yrs.	10-20 meter	0.7 cm	All over Tripura	Handicraft, mat making, rural fencing, industrial product
5	Bom/Betu	Bambusa cacharensis	4-5 yrs.	8-20 meter	1.2 cm	All over Tripura	Roofing, Construction & making handicrafts item
6	Pecha	Dendrocalamus hamiltonii	4-5 yrs.	12-25 meter	1.4 cm	West Tripura, North Tripura	Basket making, Shoot for diet, fencing
7	Dolu	Schizostachyum dullooa	2- 3 yrs.	6-10 meter	0.4 cm	Unakoti, North and Khowai Tripura	Handicrafts, basket & mat making, shoot
8	Kanak Kaich	Thyrsostachys oliveri	2-3 yrs.	5-15 meter	1.0 – 1.7 cm	West Tripura and Sipahijala Tripura	Furniture making, Fishing rod, javelin & construction



Sl. No	Name of the Variety	Scientific name	Maturity Period	Average height	Average thickness	Areas the variety is available in	Traditional usages of the variety
9	Muli	Melocanna baciferra	2-3 yrs.	6-12 meter	0.4 cm	All over Tripura	Construction of house, rural fencing, bridge, Shoot for diet & handicrafts
10	Makal	Bambusa palida	4-5 yrs.	13-20 meter	1.7 cm	South Tripura, West and Sepahijala Tripura	House building, basket & mat making
11	Bari/jai	Bambusa vulgaris	4-5 yrs.	10-20	1.5 cm	All over Tripura	Fencing, construction, Shoot for diet
12	Lathi Bans	Dendrocalamus strictus	4-5 yrs.	10-15 meter	1.1 cm	Gomati Tripura	Structural use, ladder, paper pulp, furniture & fencing
13	Kata Barak	Bambusa bambus	3-5 yrs.	15-25 meter	2.1 cm	West Tripura	Construction, pulp & paper, fencing
14	Kata bans	Bambusa salarkhanii	4-5 yrs.	10-15 m	1.7 cm	All over Tripura	Clumps used in construction and as a source of pulp and paper, fencing, shoots edible
15	Tetua	Bambusa jaintiana	4-5 yrs.	10-15 m	1.2-1.7 cm	Northern part of Tripura	Handicraft items, basket making and fencing.
16	Makla/ Kali	Bambusa nutans	4-5 yrs.	15-20 m	2.2 cm	All over Tripura	Shoot for diet, Culms for construction
17	Kailyai	Gigantochloa andamanica	3-4 yrs.	8-15 m	08 cm	South Tripura	Shoot for diet, Culms used for building huts, making baskets, fencing.

Sl. No	Name of the Variety	Scientific name	Maturity Period	Average height	Average thickness	Areas the variety is available in	Traditional usages of the variety
18	Kali Bans	Oxytenanthera nigrociliata				South Tripura	Culms used for Construction and Fencing, Shoot for diet,
19	Lata bans	Melocalamus compactiflorus	1-2 yrs.	4-7 m	2.2 cm	North Tripura	Basket and hat making
20	Asper	Dendrocalamus asper	4-5 yrs.	15-20 m	0.8 cm	Allover Tripura	Shoots addible. Construction f house, bridges, etc.

Source: Tripura Bamboo Mission

Though at least twenty species of bamboo are available across Tripura, supply varies greatly across locations and in different years. Further, it must be kept in mind that each variety of bamboo has specific uses and while some degree of substitution in the manufacturing process is possible, this cannot be done for all products.

The Muli bamboo variety comprises about 80% of the bamboo resources of Tripura and it is the only single stand bamboo (non-clump forming). It is the most widely used species in the state. It can be used for construction purposes, rural fencing, bridge building, consumption (shoot), and handicrafts as well. The Mrittinga variety, used in incense stick production, for consumption (shoot), and for fencing, comprises 8.5% of the bamboo resources of the state while other varieties account for 8.8%. Thus, it is viable to focus on both aggarbatti production and furnishing manufacture (flooring and panels) in the state. There are currently 13 bamboo mat-making units, 13 basket weaving units, one handicrafts unit, two furniture manufacturing units, and 29 incense making units spread across the state. Further, there are 13 major handicrafts shops as well.<sup>134</sup>

Besides this, Tripura already has the largest bamboo flooring unit in India which has a turnover ~INR 25 Crore. Further, the bamboo depots at Kumarghat Industrial Estate and Chakmaghat ensure hassle free raw material availability for bamboo-based units. The district wise plantation area in the state is shown in table below

**Table 53: District wise bamboo production in Tripura**

Sr. No	West	Sepahijala	Gomati	South	Khowai	Dhalai	Unakoti	North	Total(Ha)
2019-19	14	41.3	34	62	35	85	15	6	292.3
2020-21		13.5						9.16	22.66
2021-22	4.56	3.96		10.77					19.29
<b>Total</b>	<b>18.56</b>	<b>58.76</b>	<b>34</b>	<b>72.77</b>	<b>35</b>	<b>85</b>	<b>15</b>	<b>15.16</b>	<b>334.25</b>

Source: TIDC

South Tripura district accounts for the highest area under bamboo cultivation in the state, followed by Sepahijala, West Tripura, and North Tripura. The state's bamboo park is located in R.K Nagar, adjacent to the Bodhjunnagar Industrial Growth Centre. It is equipped with important amenities, common facilities for industrial units, and technology and support facilities to promote a green bamboo industrial zone in the state. Another bamboo park at Kumarghat can further strengthen the growing sector.

<sup>134</sup> Tripura Bamboo Mission.

In order to extract the maximum volume of bamboo at the largest possible size (without cutting leaves and twigs) that can be loaded on to vehicles (truck or tractors) for transportation, PPCs can be developed. This will allow for optimal usage of Tripura's vast bamboo resource base.

Based on examinations of bamboo sector value chains and OD analysis, the products identified for growth in Tripura are

- Agarbatti sticks
- Panels and flooring
- Timber substitutes

As per the NEEC report, there are more than 1,200 end uses for bamboo. An integrated bamboo park can help the development of this sector. Being a traditional industry in Tripura, a skilled labour force is also relatively easy to find. However, the Forest Department of Tripura, along with JICA, IGDC, and the Tripura Bamboo Mission, has taken up massive training programmes for rural artisans in order to increase value addition in the bamboo sector. This is being done through community capacity building in elevating bamboo products as bamboo sub-sector industrial avenues for the state. 850 artisans have been provided with tool kits as part of this effort.

The state government already is already also focusing on turning the state into an incense-production hub in the years to come. Additionally, the TBM is creating facilities for the processing of bamboo which will be given on lease and run as PPPs.

As per Tripura Bamboo Mission, the current status of bamboo processing plants is shown in table below

**Table 54: Bamboo processing plants in Tripura**

Sl. No	Name of the Unit	Locations	No. of Machine Installed	Annual Production (Mt)
1	Green Park Industries	Kumarghat Industrial Estate, Shed No. 01 & 09	8	155
2	M/s. Shyamal Debnath	Kumarghat Industrial Estate, Shed No. 18	8	140
3	M/s. A.K. Chowdhury	Kumarghat Industrial Estate, Shed No. 14	8	140
4	P.S Green Gold	North Ganganagar, Dharmanagar	4	5
5	M/S R.K Enterprise	Shed No. 7, Kumarghat Industrial Estate	8	120
6	Santosh Bambootech Pvt. Ltd.	Shed No. 2 & 3, Kumarghat Industrial Estate	16	300
7	A.K Stick	Shed No. 4 at Kumarghat Industrial Estate	8	120
8	Pioneer Bamboo Stick	Bamboo Park, Bodhjunnagar	25	450
9	Stick villa Industries	Amtali, Agartala, West Tripura	3	45

Sl. No	Name of the Unit	Locations	No. of Machine Installed	Annual Production (Mt)
10	M.L.C.C.S Ltd.	Majhlishpur, Mohanpur, West Tripura	3	12
<b>Total</b>			<b>88</b>	<b>1487</b>

Source: TIDC, TBM

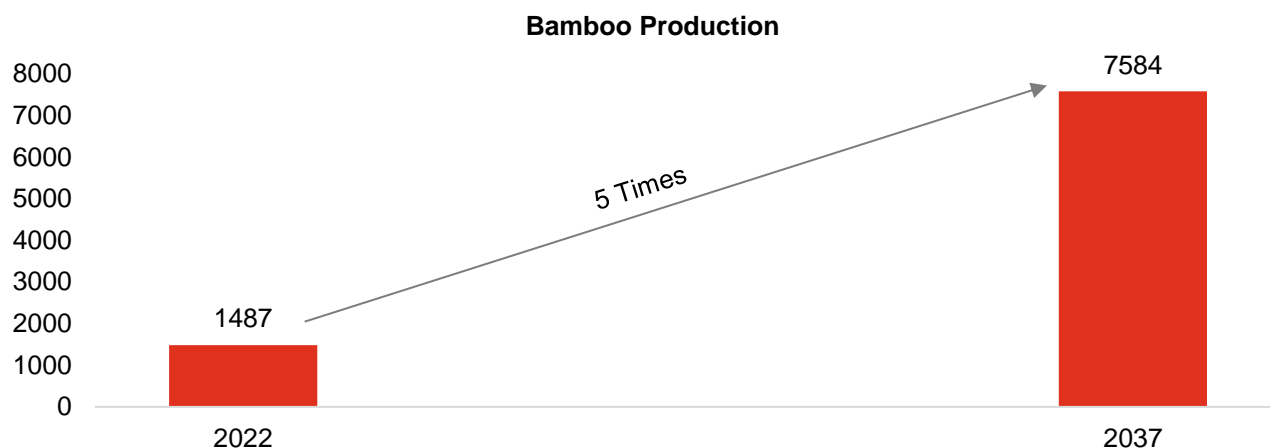
Considering an annual production of 1487 MT from 10 existing bamboo processing plants. The table below highlights the proposed interest from private players to set up bamboo manufacturing plants in Tripura as per the Tripura Bamboo Mission. However, based on primary consultations it was highlighted that there are technical challenges related to bamboo cutting and availability of bamboo in the region throughout the year and hence the study team estimates that the number of bamboo production units are expected to increase by ~5 times over the next 15 years. Hence for the proposed manufacturing units the annual production for 51 units is expected to be ~7,584 MT.

**Table 55: Number of bamboo processing plants in Tripura**

S. No.	Category	2020-21	Present Status	2021-22	Present Status
1	Management of bamboo waste in primary processing units	2	0	2	0
2	Handicrafts/ Cottage industry	12	8	17	13
3	Establishment of processing unit for value addition for bamboo (Agarbatti Making Unit)	11	2	11	1
4	Bamboo furniture making	3	2	4	1
5	Bamboo incense stick making	19	4	14	2
6	Bamboo shoots processing unit	1	1	3	0
	<b>Total</b>	<b>48 (Proposed)</b>	<b>17</b>	<b>51 (Proposed)</b>	<b>17</b>

Source: TIDC, TBM

Considering the interest expressed by private sector and the past experience of Tripura Bamboo Mission, it is forecasted that over a period of next 15 years the output of annual production is estimated to increase by 5 times and around 51 units of bamboo processing plants will be established in Tripura.



Source: Study Team Analysis

Considering the availability of bamboo across Tripura as well as the demand for specific bamboo-based commodities, certain products have been identified as being viable for manufacture in the state. These are agarbatti sticks, panels and flooring, and timber substitutes. Private sector interest as well as our own analysis both underscore the potential profitability of manufacturing these products.

The sector, once strengthened, has the ability to attract MSMEs for the production of these commodities. Considering the interest shown by private sector investors and availability of raw materials in the state, incense stick makers and bamboo furnishing units will likely be set up in the state over this period.

In conclusion estimated land demand for the products of Tripura's priority sectors can be summarized as follows

1. **Food processing:** Traditionally, food processing had two functions, namely, to make food easier to digest and to preserve food during times of scarcity. Today, food processing can be broadly placed in three categories-

- a. **Primary processing:** this includes basic cleaning, grading, and packaging of agricultural produce such as fruits and vegetables.
- b. **Secondary processing:** this involves altering the basic product slightly just before the final preparation. An example is the milling of paddy to produce rice.
- c. **Tertiary processing:** this entails the production of high value-added ready-to-eat consumables. Examples include instant foods, drinks, and jams and preserves.

Initially, much of the land demand of food processing units in Tripura will come from the primary and secondary processing sectors. This means that large parcels of land will be required to help the industry gain a foothold in the state. Primary sector food processing especially requires large tracts of land as it involves processing the largest amount of output of all three sectors.

Once the food processing industry evolves and finds stable markets, land demand from the tertiary processing sector will increase. Further, land demand for food processing activities may also continue to increase because of the growing profitability of the sector in the future.

2. **Rubber:** Currently, low value addition in the rubber sector prevents Tripura from competing with other rubber producing states, such as Kerala, Tamil Nadu, and Karnataka, and prevents it from capturing the regional export market despite its locational advantage.

Being the second largest producer of rubber in the country gives the state easy access to raw materials. However, currently, Tripura lacks ancillary industries that manufacture enabling products for the rubber processing sector which will be a major impediment to the manufacture of high value-added products like tyres and tubes. The NEEC report states that investments worth INR 1.1 billion and INR 2.4 billion will need to be made in the short term and the medium and long term, respectively, for Tripura's rubber sector to thrive and cater to the demands of domestic and international markets.

One advantage that Tripura enjoys is that it already has a rubber park that houses several primary processing industries, majorly manufacturing derivatives of natural rubber such as Indian Standard natural rubber, centrifuged latex, and ribbed smoked sheets. Thus, there is some degree of existing machinery and expertise to support the sector's growth already.

In terms of land demand, as surgical gloves and contraceptives will be the rubber products that will be manufactured in Tripura initially, land demand will be high. After the development of the appropriate ecosystem and the inflow of larger private players, tyre and tube manufactures will also begin, meaning that demand will remain high. This will follow the growth of the surgical gloves and contraceptives industries as tyre and tube manufacturing is more capital intensive and requires more complex machinery.

3. **Bamboo:** Given the vast bamboo resources readily available in Tripura, along with the wide variety of bamboo plants that can be grown in the state, bamboo-based manufactures have a huge growth potential. The NER already makes a significant contribution to fulfilling the demand for bamboo products domestically.

The existence of a bamboo park, a flourishing bamboo handicrafts industry, flooring and panel making units, and agarbatti-making units means that the state already has the some of the infrastructure required for the by the sector. The TBM already has plans to make Tripura an incense manufacturing hub in the years to come. Further, bamboo is increasingly being seen as a viable timber substitute. The accessibility of bamboo in Tripura therefore provides an important potential growth opportunity to the bamboo sector.

With predictions stating that the global bamboo market is projected to grow to USD 98.3 billion in 2022, Tripura also has the chance to become a leading supplier of bamboo globally. The primary sectors within bamboo-processing that the state should focus on, based on demand trends, are bamboo furnishings and agarbatti stick-making.

The following section presents the estimated land demand for each priority sector as well as a discussion on the methodology used to estimate the same.



## 5. Land Demand Estimation





# Land Demand Estimation

## 5.1. Tripura's Topography

Site visits and secondary research reveal that much of the land in both the brownfield and greenfield parks of Tripura is undulating. This is due to the unique topography of the state. It has three distinct physiographic zones<sup>135</sup>:

- i) hill ranges
- ii) undulating plateau land and
- iii) low-lying alluvial land.

Geographically, the state is part of the Purvanchal (Eastern) Mountains. It is a low lying plain pierced by a series of low drawn spurs projecting from the Lugai /Mizo hills. The region is also part of the Surma valley, built by river-borne detritus. There are six prominent hill ranges running parallel from north to south that are separated by narrow valleys, each about 20 km wide. From East to West, these ranges are:

- Jampui Kakhautang
- Longthorai
- Atharamura
- Sardaug
- Baramura

These hill ranges traverse Tripura in roughly the north-south direction and continue southward into the Chittagong Hill Tract.

As a result of its unique topography, many industrial parks in the state are smaller in size than comparable parks located in other states in India. This is because gorges and ridges fragment the terrain, and it is challenging to find large plots with contiguous land parcels. This hilly topography has historically impaired transportation and communication within the state. Another consequence of the fragmentation of terrain is that land filling and development costs are considerably higher than in other locations.

Keeping in mind Tripura's topography and its aim to develop industrial estates, it is important to estimate the demand for industrial land in the state to streamline land filling, development, and reclamation pursuits. Further, it is also useful to understand land demand to ensure sustainable land use as the development of certain economic activities requires the conversion of land from natural/semi-natural to artificial covers, often irreversibly. Currently, Tripura has a total of 6294.29 sq. km of forest lands— more than half the state's land area is under forest cover.<sup>136</sup> Further, a total of 1404.78 sq. km of land is under non-agricultural use. The state has a total of 2144 Ha of fallow land. It is this fallow land as well as 2578 Ha of culturable wasteland and 1189 Ha of fallow land other than current fallow land<sup>137</sup> that can potentially be used as industrial land.

**Estimating Land Demand:** Industrial land demand will be estimated basis the potential of each industry. As the number of industries in Tripura is limited, forecasting future land requirement considering sector growth will not provide a realistic view. Hence, land estimate projections shall focus on the overall potential of each industry and the land required to process the commodities. Explained below is the overall land requirement of each priority sector.

### Rubber Industry:

It is difficult to assess the land demand for rubber product manufacturing as the manufacturing process for different products is diverse and has different land needs. However, even with this diversity, several basic common processes are identifiable. These common processes are mixing, milling, extruding, calendaring,

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<sup>135</sup> Tripura Tourism  
(<https://tripuratourism.gov.in/geography#:~:text=The%20State%20has%20three%20distinct,ranges%20generally%2020%20km%20wide.>).

<sup>136</sup> Tripura Forest Department, Government of Tripura (<https://forest.tripura.gov.in/forest-of-tripura>).

<sup>137</sup> Directorate of Economics and Statistics (DES), GoI.

building (fabrication), Vulcanizing, and finishing.

Rubber product manufacturing begins with the production of a rubber mix from raw and/or synthetic rubber, carbon black, oils and miscellaneous chemicals. This stage involves weighing and loading of appropriate ingredients into an open mixer, the "Banbury" mixer. The area where the chemicals are weighed and added to the machine is called the compounding area. The mixed rubber mass is discharged to a rubber sheeting mill or other machinery which forms it into a long strip or sheet. The hot rubber passes through a water-based "anti-tack" solution, which prevents the sheets from sticking together as they cool to room temperature. The sheets are cooled through the application of cool air or by contact with cooling water.

After cooling, the sheets are passed through another mill to warm them for further processing on extruders and calendars. Extruders transform the rubber into various shapes or profiles. Calendars receive hot strips of rubber from mills and squeeze them into reinforcing fibers or cloth-like fiber materials, thus forming thin sheets of rubber coated materials. Calendars are also used to produce nonreinforced, thickness-controlled rubber sheets. Extruded and calendared rubber is combined with wire, polyester and other reinforcing materials to produce various rubber products. Adhesives, called cements, are sometimes used to enhance the bonding of product layers.

All rubber products also undergo vulcanization (curing). During the process, polymer chains in the rubber matrix cross-link to form a final product of durable elastic, thermo-set rubber. This gives rubber its elastic quality. Finally, finishing operations may include grinding, printing, washing, wiping, and buffing.

A competition analysis has been used to identify the products that can be manufactured in Tripura most competitively for regional markets. Further, out of the products that are currently being imported by India, those that can be manufactured in the state have also been identified. These are **surgical gloves, male and female rubber contraceptive, tubes, and tyres**. It has been assumed that 50% of imports to India and 50% of exports to regional countries will be met through manufacturers from Tripura over a period of the next 15 years. A demand analysis for each individual product has revealed that the rubber consumption for manufacturing these products in Tripura during the forecast period will be ~30,000 tonnes

The investment required for each priority product has been calculated based on stakeholder consultations and secondary research. To estimate the total investment required for the rubber sector, it has been assumed that Tripura's rubber products will fulfill 50% of domestic demand (import substitution) and 50% of the demand from regional markets. Based on the current imports and exports as highlighted in section 4.2, the quantum of rubber needed to manufacture the products has been estimated based on primary consultations with rubber manufacturers. The quantity of rubber needed for surgical gloves and contraceptives is estimated at ~0.005 kgs per unit, for tyres of motorcycles is estimated at 1 kg per piece, for car tyres at 2.5 kgs per piece, for truck tyres at 6 kgs per piece and for tubes at 0.11 kgs per piece.

The cost of machinery has been estimated based on primary consultations and secondary research. Further, it has been assumed that this investment in machinery and equipment accounts for about ~60% of the total capital expenditure. The following section outlines the estimation process for the total investment cost.

**Table 56: Total estimated investments in rubber**

Product	Total Rubber to be Processed for Product (Tonnes)	Cost of Processing 1 Ton of Rubber (INR)	Total Cost of Processing (INR Crore)	Total Capital Expenditure (INR Crore)
Surgical Gloves and Rubber Contraceptives (Male/Female)	~24,000	~1,05,000	~250	420
Tyres for Truck and Bus and Vehicular Tubes for Cars	~3,000	~1,70,000	~51	85
Other tyres (including for two wheelers, bicycles, motorcycles,	~2,900	~4,40,000	~125	210

scooters, radial car tyres etc)				
<b>Total</b>			<b>~426</b>	<b>715</b>

Thus, based on the estimated total capital expenditure, the study team estimates that the investments from rubber focused industries will be **INR ~ 715 Crore**.

In order to calculate the land demand, a **land to capital ratio** of 0.59 hectares/ Million USD has been assumed based on secondary research. Considering an exchange rate of 1USD to INR 75, the estimated land required is calculated in table below.

Parameter	Value
Total Required Investment in Crore INR	~715
Total Required Investment in USD	~9.9
Required Investment in Million USD	~99.3
Estimated Land Requirement in Hectares	~58.6
<b>Estimated Land Requirement in Acres</b>	<b>~145</b>

Thus, the total estimated land requirement for Tripura's rubber sector is **~145 acres**.

It is important to further understand the nature of land demand over the forecast period. For Tripura's rubber industries, in the short-term, considering the current industrial ecosystem and the lack of downstream and ancillary industries, manufacturing of rubber contraceptives and surgical gloves is expected to attract investments into the state as they are relatively simpler to manufacture, requiring minimal technological and infrastructural intervention. As a result, initially, the demand for industrial land in the near term is expected to be approximately 20% of the overall land demand. Further these industries are expected to further expand in the medium term and attract ancillary industries and large industries manufacturing such products. Hence the industrial land demand in the medium term is estimated at 30% of total estimated industrial land from rubber sector.

However, as Tripura's rubber industry ecosystem develops Tripura will be able to attract industries focusing on tyre and tube manufacturing. These industries require larger plots of land to set up their manufacturing units since they use large machinery. Thus, in the long run, the demand for land for rubber processing is estimated at 50% of the total land demand from rubber sector.

Further, industrial estates housing rubber manufacturing units will need to provide various infrastructure like power substations for uninterrupted electricity, an artificially constructed pond, ETPs, STPs, and testing and certification facilities. These estates will also need large land parcels.

Much of the land for rubber-based industries is likely to be centred in and around West Tripura. This is because the region accounts for 40% of the total area under natural rubber cultivation in the state, meaning that rubber units will have easy access to raw material here. Further, West Tripura is also the most highly industrialised region in the state and has easy air access to Bangladesh's rubber market.

As the rubber sector grows, demand for land for rubber processing will also grow in South Tripura. This is because industries here will have easy access to Bangladesh through the Maitri Setu, enabling them to find markets for various rubber products including latex. There is already a Latex Centrifuging Factory and a natural rubber processing plant in the district's Takmacharra area. Additionally, the units will enjoy proximity to raw materials as South Tripura district has the second highest area under rubber plantations in the state.

Based on the factors considered in the discussion above, it has been assumed that the immediate or short-term land demand will account for 20% of the sector's total land demand while the medium- and long-term demand will account for 30 and 50%, respectively. The table below summarises the short-, medium-, and long-term land offtake assumption based on the discussion in the preceding section-

Land Demand Estimate: Rubber Sector (in acres)	
Short-term	~29
Medium-term	~43.5
Long-term	~72.5
Total demand	145

### Bamboo Industry:

As highlighted in section 4.3, Bamboo has a diverse range of uses. Based on examinations of bamboo sector value chains and OD analysis, the products identified for growth in Tripura are Agarbatti sticks, panels and flooring and Timber substitutes.

Based on primary consultations it was highlighted that there are technical challenges related to bamboo cutting and availability of bamboo in the region throughout the year and hence the study team estimates that the number of bamboo production units are expected to increase by ~5 times over the next 15 years. Hence for the proposed manufacturing units the annual production for 51 units is expected to be ~7,584 MT.

Further primary consultations highlight that the land requirement for each furniture making unit can be taken as ~2 acres. The study team has assumed that ~21 such units will be established in Tripura over the next 15 years and hence the land requirement for such units is estimated at ~35 acres.

Further, it has been estimated that 25 agarbatti processing units will be setup in Tripura over the next 15 years. The annual bamboo demand from these 25 units is estimated at 3725 MT. Based on secondary research and consultations, it has been assumed that the land required to process 12 MT bamboo for manufacturing Agarbatti sticks is ~5000 sq ft, and hence considering 25 units being set up the overall land required for Agarbatti plants is estimated at ~37 acres.

Finally, the study estimates that ~5 timber substitutes plants shall be setup in Tripura which are expected to process 735 MT of bamboo on a yearly basis. Based on secondary consultation, the study team estimates the same land requirement for timber substitutes as estimated for incense producing units. Hence it has been estimated that these five plants will require ~7 acres of land. The total land requirement for the bamboo sector is estimated at **~80 acres**.

Using the land to capital ratio of 0.59 hectares/million USD, the total investment required for 80 acres comes to **~400 Crore**.

At the industrial level, bamboo processing starts with treatments to increase the shelf life of unprocessed bamboo using preservative treatments, inter-nodal injections, and dip diffusion. Then, the manufacturing process starts with preliminary processing which involves procedures like crosscutting, splitting, knot removing, width sizing, planing, and slab-making.

Mat-based products like blinds and strip-based products like housing material and furnishing are then manufactured from the processed raw material. Rolled bamboo sticks are used to make incense sticks as well. Further, bamboo flooring units, after compressing bamboo sheets, produce flooring material to serve as an alternative to wood-based flooring.

Industrial units need large plots of land as they need to accommodate large equipment to efficiently process

bamboo. Further, the warehousing requirement for the bamboo sector is high as uncut bamboo is highly space consuming.

Keeping in mind these considerations, the short-term land demand of the bamboo sector in Tripura has been estimated to be low as small-sized units and clusters will likely be the first to be set up in the state for the manufacture of products such as handicrafts, and Agarbatti sticks.

Over time, existing bamboo units may expand to manufacture other products. This means they will need to expand in order to accommodate infrastructure like bamboo stick-making facilities, Bamboo Plastic Composite (BPC) facilities, strand woven bamboo block units, vacuum pressure treatment plants, resin/glue plants, and bamboo charcoal plants. This will drive up land demand in the medium-term.

As the sector develops, over the medium-term, land demand will grow further. The improved raw material availability and local bamboo processing capabilities are likely to attract large brands to set up units in the state. These will require large land parcels. The more mechanised bamboo flooring industry may also set up large units in Tripura. Over the long term, the demand for industrial units is estimated from panels and flooring and Timber substitutes related industries.

Land demand for bamboo units will be high in North and South Tripura as these regions both share borders with Bangladesh. North Tripura also shares a border with Assam. This will prove to be an advantage as the neighboring regions will serve as local markets for bamboo products. Bamboo availability is high in the Dhalai, Gomati, and Unakoti districts as well.

Based on the factors considered in the discussion above, it has been assumed that the short-term land demand is estimated at 20% of the sector's total land demand while the medium- and long-term demand will account for 30 and 50%, respectively. The table below summarises the short-, medium-, and long-term land offtake assumption based on the discussion in the preceding section-

Land Demand Estimate: Bamboo Sector (in acres)	
Short-term	~16
Medium-term	~24
Long-term	~40
Total demand	80

### Food Processing Industry:

The food processing sector has a high growth potential in Tripura owing to the state's high agricultural and horticultural production levels, which is conducive to the cultivation of a wide variety of produce.

Food processing involves procuring, sorting, cleaning, extracting, and cooking. Based on the Gol's guidelines,<sup>138</sup> a small-scale fruit and vegetable processing unit requires a plot of 0.5 acres, with a built-up area that includes a processing hall, a storage area for raw materials, a storage area for finished goods, a washing area, lavatory facilities for workers, and a guard room.

Considering that around ~65% of the total pineapple produced, ~60% of the total orange produced, and ~62% of the total jackfruit produced is expected to be processed over a period of 15 years, the table below highlights the produce expected to be processed for all shortlisted crops.

<sup>138</sup> Model Project Report on Fruit & Vegetable Processing Unit, National Bank For Agriculture And Rural Development (2014).

**Table 57: Produce to be processed in Tripura**

Sr. No.	Crops	Produce to Be Processed (tonnes)
1	Pineapple	93,500
2	Orange	12,700
3	Jackfruit	82,800

Based on model project report for fruit and vegetable processing by National Bank for Agriculture and Rural Development, it has been estimated that approximately 1 acre of land is required for a 600 MT processing plant.

Considering a total of 1,89,000 MT of produce is expected be processed, the land demand for the food processing sector is estimated to be **~315 acre**. Of the three priority sectors, the food processing sector has the highest estimated land demand.

Based on secondary research, the total investment requirement for the sector has been estimated at ~ 2.1 crores per acre based on the cost of equipment and machinery needed to process the produce. Hence the total investment requirement of the sector is estimated at **INR ~664 Crore**.

In order to develop a robust food processing sector, it is crucial to set up primary collection centres, primary processing centres, and central processing facilities. This makes the sector's land demand relatively higher than that of the bamboo sector.

The three crops identified as having the highest processing and export potential are pineapple, jackfruit, and oranges. This means that Unakoti district will be one among the various viable locations for citrus-based processing units. Dhalai is another location that may attract such processing units– the district produces 1,01,632 MT of vegetables and 1,82,953 MT of fruits. In the case of pineapple, production units will likely be located in the North district, Sepahijala, and the South district. For jackfruit, industries will be able to access raw material most easily in the North district, Gomti, and Dhalai.

However, overall, much of the land demand of the food processing sector will be concentrated in South Tripura as the sector is export oriented. Being in South Tripura will give units access to the Chattogram port in Bangladesh via the Maitri Setu. This will ease market access not only in Bangladesh but in the larger South Asian region as well.

The industrial land demand for food processing sector has been equally spread across the short, medium and long-term owing to high potential and existing ecosystem in Tripura. In the short term, primary processing units are expected to be setup focusing on sorting, grading, and cleaning. As the ecosystem develops, in the medium term secondary processing units are expected to attract investments into the region. Finally in the long terms with increased availability of skilled labour and access to western countries through Bangladesh, tertiary processing units (large-scale units manufacturing ready-to-eat goods) are likely to be set in Tripura.

The table below summarises the short-, medium-, and long-term land offtake assumption based on the discussion in the preceding section-

Land Demand Estimate: Food Processing Sector (in acres)	
Short-term	~94.5
Medium-term	~110.35

Long-term	~110.35
Total demand	315

## Major takeaways

The discussion above highlights the land demand for each priority sector. While it is estimated that the food processing sector will require the highest amount of land at ~315 acres, the rubber and bamboo sectors will require ~145 acres and ~80 acres, respectively. This is partly due to the fact that food processing is of three kinds— primary, secondary, and tertiary, each with a high land demand. Further, the sector requires a large amount of sector-specific infrastructure as well. Similarly, rubber processing is land intensive as it too requires various kinds of large physical infrastructure. Bamboo, however, does not require similarly large infrastructure.

The industrial land demand for each sector is dependent on land availability, existing industrial ecosystem, and proximity to target markets. Rubber manufacturing units need to be in areas that ensure easy access to regional domestic markets since the products being focused on have been chosen keeping in mind the possibility of import substitution. This includes surgical gloves and contraceptives, incense sticks, and bamboo furnishings. Hence the initial land demand will come from MSMEs producing surgical gloves and contraceptives. As the ecosystem develops and further investments are made to improve the existing infrastructure, state will be able to attract large players manufacturing tyre and tubes. Industrial land demand from MSMEs will focus on smaller parcels of land while land demand from tyres and tube manufacturers shall require large parcel of contiguous land. Hence state shall focus on attracting anchor tenants once the ecosystem is developed.

Several of the existing industrial parks, namely the Bodhjunnagar, RK Nagar, AD Nagar, and Dukli parks, already have infrastructure to support these sectors. Hence initial investments will be focused on districts in West Tripura, where a large number of the state's brownfield parks exists. Being in the district will also allow for easy market access as the state's capital city, Agartala. The city is well connected by air and rail to other parts of India.

In the case of the bamboo sector, connectivity to areas producing the Muli bamboo variety will be critical as this variety accounts for the largest part of the state's bamboo resources and can be used as raw material for many the priority products identified for the sector. As per NEEC report, major bamboo producing areas in Tripura are Khowai, Dhalai and West Tripura. Considering the access of West Tripura to raw materials and also to regional markets supported by existing ecosystem, it is estimated that the initial land demand for bamboo-based industries will be preferred in the district.

For agro based industries, access to raw material plays a key role in choice of land for setting up industry. North Tripura has the highest agricultural output. To ensure the shelf life of the fruit increases, it is necessary that the primary processing centres are established close to the food producing areas. Hence the initial industrial land demand from food processing may be in the North region of Tripura. Development of industrial parks such as Lalcheri and Sonamukhi parks will play a key role in supporting primary processing of agro based industries. The secondary and tertiary food processing companies are expected to target the international market as highlighted in the origin destination analysis and hence industrial land demand from such companies shall be focused on South Tripura given its access to the Chattogram port in Bangladesh via the Maitri Setu, enabling access not only to markets in Bangladesh but in the larger South Asian region as well.

## Non-priority Sectors

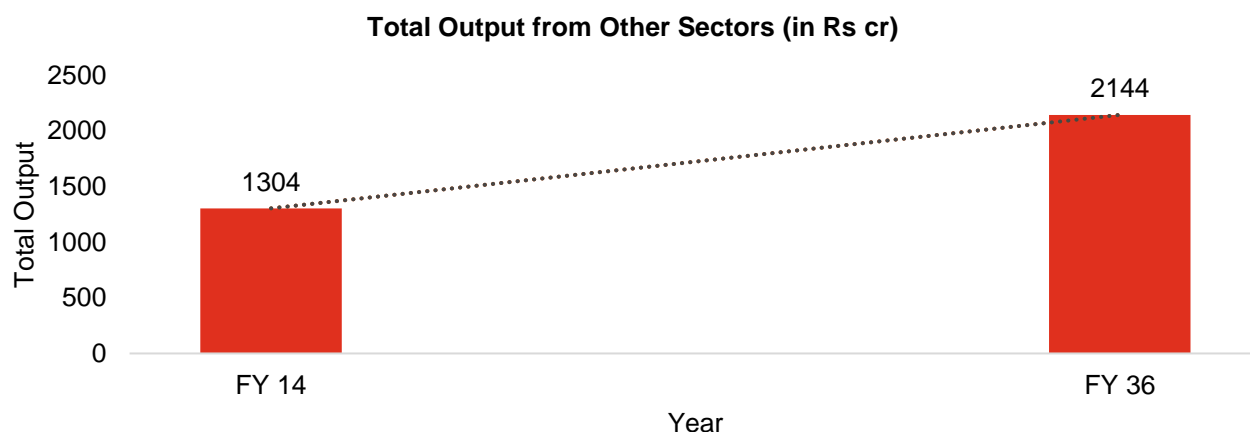
For estimation of land demand for the other sectors in Tripura, the Northeast region's incremental capital output ratio (ICOR) has been used. The ICOR is generally used to understand how much marginal investment is required to increase the production by 1 unit. A lower ICOR for a region indicates that the region is more efficient in production of a particular good and on the other hand higher ICOR represents regions inefficiencies in its production capabilities.

The ICOR has been taken as 4 as stated in the North East Vision document. Currently, the non-priority sectors are growing at a rate of 2.2% based on ASI data.

Considering the growth in Tripura's economy, it is estimated that other sectors are expected to generate a land demand of **~506 acres**.



**Figure 25: Trends in Total output of other sectors**



Source: ASI, Study Team Analysis

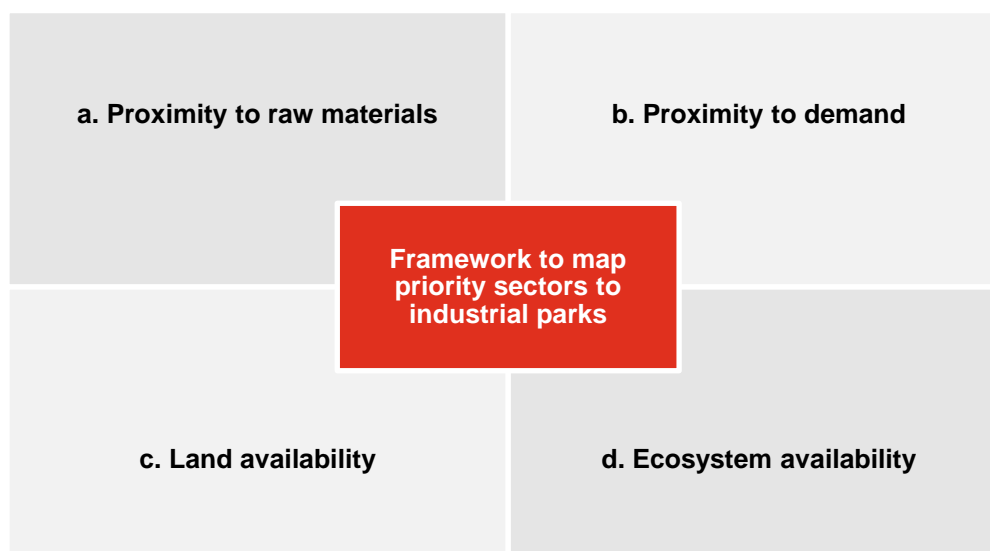
**Table 58: Land Demand projection of Non-Priority Sectors**

Financial Year	13-14	14-15	15-16	16-17	17-18	
Output of Tripura in non-focus sectors (in Crore)	1304	1505	1340	1264	1428	
					ICOR	4
					Land Capital ratio	5.4 crore/acre
					Total Land Demand	~506 acres

Source: ASI, Study Team Analysis

## 5.2. Mapping of Land Demand with existing Industrial Parks

Based on the priority sectors identified in the previous section, the industrial infrastructure of the state may be mapped to the sectors. The mapping will ensure the availability of sector specific infrastructure in each industrial park making them competitive and attractive to investors. To map the priority sectors to each individual park, the following framework has been used.



### 5.2.1. Profile of industrial land in Tripura

Tripura is in its budding stage of industrial development. Tripura Industrial Development Corporation is the nodal agency for development of industrial parks in the region. It aims to act as a catalyst in the process of promotion and development of industries and create industrial infrastructure to support economic development of the state. Currently there are 17 Industrial Parks in Tripura of which 6 are present in West Tripura, 5 are present in South Tripura, 2 each are present in North Tripura and Unakoti and 1 each are present in Gomati and Dhalai

Of the total 580 acres of vacant land majority (~82.9%) of the land is available in 7 industrial parks namely Bijoypur (~90 acres), Bodhjungnagar (~74 acres), R.K.Nagar (~77 acres), Kathalia (40.3) Dewanpasa (~34 acres), Sonamukhi (~130 acres) and Jalefa (~39 acres).

The land for industries is allotted by TIDC on lease basis. The lease period is around 30 years.

The North East Economic Corridor study by ADB has highlighted that the development of a **Multi-Modal Logistics Park** in Sabroom will improve competitiveness and reduce cost of logistics in the NER region as a whole. Hence in addition to these industrial parks a logistic park is envisioned at Sabroom. The logistic parks will support the priority industries to ship their goods to various demand centres through the Chattogram Port.

Figure 26: Land Availability in industrial parks of various districts

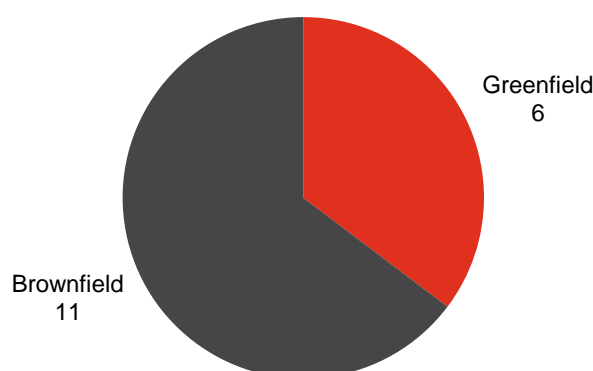
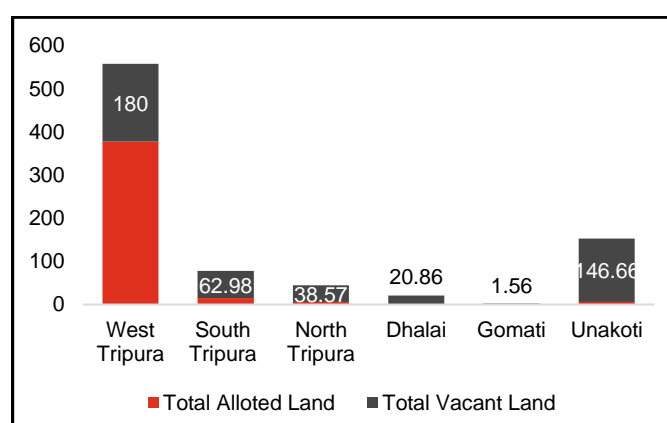


Figure 27: Industrial Land Profile



### **Districts in North Tripura are targeting sectors based on natural resource availability and sectors that cater to regional markets.**

Out of the 17 industrial parks listed above, four (4) are located in North Tripura. These are Kumarghat, Dharmanagar (Mission Tilla), Dewanpasa Lalchari, Ambassa, and Sonamukhi. Considering the access to raw material, demand centres and existing ecosystem, Kumarghat and Dharmanagar parks could focus on prioritizing bamboo-based industries. Dharmanagar's borders with Bangladesh and Assam will prove to be an advantage as the neighboring regions will serve as local markets for the park's bamboo products. Kumarghat already has a round bamboo stick unit at, equipped with 50 round stick making machines that has a monthly production capacity of 60 MT, and Dharmanagar has an incense production cluster. Both regions also have furniture/handicraft clusters that use bamboo as a raw material. These indicate the existence of the required ecosystem for bamboo processing which may be further strengthened through targeted investments towards sector development.

On the other hand, Kumarghat, Dewanpasa, Lalchari Ambassa, and Sonamukhi parks could prioritize the food production sector due to access raw materials like jackfruit. Kumarghat is in the Unakoti district, making it a potential hub for citrus fruit processing. Similarly, since Lalchari is in the Dhalai district, it has the advantage of sourcing agricultural produce easily – the district produces 1,01,632 MT of vegetables and 1,82,953 MT of fruits, of which there is ample surplus. The Dewanpasa, Dharmanagar, and Sonamukhi industrial estates are also suited for citrus-based food processing industries, especially as the Tripura government is currently making efforts to revive citrus cultivation in the Jampui Hills, which was traditionally a major citrus growing pocket.

Apart from jackfruit, orange, pineapple, banana, lemon, Areca-nut, and mango are also grown in the region which the parks can source for processing. Moreover, the district is home to a wide variety of wild edible fruits<sup>139</sup> that present an interesting opportunity for the food processing sector. The abundance of bael, for instance, is an advantage as it is used to make a summer beverage. Also, a particular variety of wild mango, the *Mangifera sylvatica* Roxb., can be found easily through the summer months in North Tripura. It is highly valued by local people and can be used to produce jams and preserves.

### **Districts in West Tripura are targeting sectors catering to the rest of India and regional markets.**

West Tripura is the most industrialized region in Tripura. A few of the industrial parks in the region are the Bodhjunnagar, RK Nagar, and Nagicherra parks. Considering the access to rest of India and existing ecosystem the rubber sector is the most promising for this region.

One of the key reasons for this is that Tripura's rubber park is situated in the Bodhjunnagar Industrial Area where infrastructure and facilities, including a common effluent treatment plant, access to a warehouse, a laboratory, stable water supply, and sewerage facilities, are being provided. Besides this, the park's closeness to Agartala, the state capital, means that it has easy access to markets across the country as well as to Bangladesh's latex market. The R K Nagar park will also be able to exploit this locational advantage. All three parks will benefit from the presence of the Regional Rubber Training Centre located in Agartala.

Another advantage is easy access to raw materials— in terms of area under natural rubber cultivation in the state, West Tripura accounts for 40%. The parks, therefore, enjoy proximity to raw materials as well. Nagicherra houses a Tripura Forest Development and Plantation Corporation-owned rubber wood processing centre. Promotion of the rubber sector here will allow for forward integration where aged rubber trees that cannot be tapped can be processed to make furniture. The presence of a Horticultural Research Centre in Nagicherra further makes the site viable for rubber production as it will be able to benefit from the centre's expertise with plantation crops.

Apart from rubber, the park at RK Nagar will also benefit from prioritizing its bamboo sector. It houses the Tripura Bamboo Park, located around 20 km west of Agartala city. The park is already attracting investors interested in setting up units in the park. In this regard, the presence of bamboo plantation clusters at Hezamara, Mohanpur, Belbari, and Mandwi are also a boon for the RK Nagar park's bamboo processing sector.

Dukli industrial park, spread over 45.77 acres shall prioritize food processing due to its ability to access jackfruit and pineapple which are grown extensively across the district. Dukli town is connected to the rest of Tripura through rail and road networks ensuring transportation of raw materials and processed food products to potential markets easy. The park can find R&D support from the Horticultural Research Complex and the Horticultural Society of Tripura. Processed food products from the park also have access to the Central

<sup>139</sup> <http://nopr.niscair.res.in/bitstream/123456789/7967/1/NPR%205%284%29%20302-305.pdf>

Warehousing Corporation's 19,250 MT warehouse located in Agartala. West Tripura is also home to various edible wild plants. The *Borassus flabellifer*, used for jaggery production, elephant apple, which has medicinal value, and tamarind, used as a condiment, are found exclusively in this region of the state. Access to these throws up new opportunities for the food processing sector in the district, especially for small-scale enterprises.

**Districts in South Tripura have the advantage of access to a port and hence export oriented sectors shall be targeted.**

South Tripura district's industrial areas at Sarasima, Sabroom and Santirbazar. Priority sectors mapped to these parks are rubber processing and food processing.

Being in South Tripura, they have easy access to Bangladesh where they will find a market for various rubber products including latex. Within India, the two towns are linked to Agartala by NH 8 and rail, giving them access to domestic markets as well. There are currently three MSMEs already based out of the district, indicating the existence of rubber processing capacity in the region. There is also a Latex Centrifuging Factory and a natural rubber processing plant in the district's Takmacharra area. Additionally, the Sarasima and Santirbazar also enjoy proximity to raw materials as the second largest district in terms of area under rubber plantations is South Tripura.

Paddy, pineapple, jackfruit, banana, nuts, and mango are widely cultivated in the district, enabling unhindered access to the raw materials necessary for food processing. As the economy of South Tripura is mainly primary sector based, there is already extensive primary processing capacity in the region. Further, there are 23 registered food processing-based industrial units located there, making sourcing of skilled labour easier.

The biggest industrial park in South Tripura is the Sabroom Special Economic Zone, a multi-sector SEZ at Jalefa. It would be beneficial for the SEZ to focus on food processing as the sector is an export-oriented one. The SEZ's location, in Sabroom, will give it access to the Chattogram port in Bangladesh via the Maitri Setu not only to markets in Bangladesh but in the larger South Asian region as well. South Tripura too has some edible wild plants whose growth is largely restricted to this region, namely passionfruit, which is used to make squash and preserves, and the Harabari plant whose fruit is used in pickles. Access to these fruits too may be beneficial to the expansion of food processing at the SEZ.

The table below maps the priority sectors to each industrial park based on the framework mentioned above.

**Table 59: Mapping of Industrial parks to priority sectors**

Priority sectors	Bamboo	Rubber	Food processing
Kumarghat	✓	-	✓
Dharmanagar (Mission Tilla)	✓	-	-
Dewanpasa	-	-	✓
Lalchari, Ambassa	-	-	✓
Sonamukhi	-	-	✓
Bodhjunnagar	-	✓	✓
RK Nagar	✓	✓	-
AD Nagar	-	-	-

Dukli	-	-	-
Badharghat	-	-	-
Nagicherra	-	✓	-
Dhajanagar (Udaipur)	-	-	-
Sarasima	-	✓	-
Jalefa, Sabroom	-	-	✓
Santirbazar	-	✓	-
Kathalia Industrial Area	✓	-	-
Bijoypur Industrial Area	-	-	✓

### 5.3. Competition Analysis

Tripura is currently undertaking a variety of developmental projects with the objective of achieving industrial development. For this, the state has established industrial estates. Three priority sectors have also been identified to fast-track the growth of industry. Besides this, the state has taken several steps to incentivise investments in the chosen sectors, namely food processing, bamboo, and rubber.

However, in order to remain competitive, it is important for the state to identify its major competitors for investments. Investors are likely to favour one investment location over another owing to factors such as ease of accessing target markets and raw material availability. The identification of such competitors can help Tripura take steps to offset any locational disadvantages. The following analysis discusses the state's possible competitors in each of the sectors.

**a. Food processing:** While major food processing states like Andhra Pradesh, Gujarat, Haryana, and Maharashtra could be potential competitors for investments to Tripura's food processing sector, since the state is primarily focusing on fulfilling the demand of regional markets, it is better suited, owing to locational advantages, to do so than these states. The ease of access to its target markets, and the resultant price advantage, can make it more attractive to investors.

Each state in the NER has its own advantages in terms of raw material access for food processing. The region's tradition of indigenous organic cultivation also makes it a potential hub for organic food product manufacturing. There are currently five food parks in the NER, including one each in Assam and Tripura. The table below provides an overview of these parks.

**Table 60: Overview of major food processing parks**

State	Name of Food Park	Status	Total Allotable Industrial Area (acres)	Total Vacant Area (acres)	Total Shed Area (sq. m.)	Total Vacant Shed Area (sq. m.)	Potential Produce Suited For Processing
<b>Assam</b>	North East Mega Food Park, Nalbari	Operational	27	1.95	1,500	1,500	Turmeric, Pineapple, Banana, Orange (Mandarin), Lemon, Papaya, Jackfruit, Ginger, Potato, Tomato, Rabi & Kharif Vegetables
<b>Manipur</b>	Manipur Industries Food Corporation, Thoubal	Granted 'in-principal' approval	—	—	—	—	—
<b>Mizoram</b>	Zoram Mega Food Park, Aizawl	Ongoing	23.5	10.2	1,000	1,000	Spices (Ginger, Turmeric, Chili) Pineapple
<b>Nagaland</b>	M/s Doys Agri Resources, Dimapur	Ongoing	26.66	9.66	1,500	1,500	Chili, Pineapple
<b>Tripura</b>	Sikaria Agro Food Park	Operational	17.02	3.33	680	0	Ginger, Turmeric, Chilly, Pineapple, Jackfruit, Banana, Oranges, Guava, Papaya, Litchi
Source: Ministry of Food Processing Industries, GoI.							

The North East Mega Food Park is located in Nalbari district, in Assam. The park can support 30 -35 large food processing units and has a cumulative investment of INR ~250 Crore. Currently, there are 1.95 acres of allotable land and a total shed area of 1,500 sq. m available on the premises. It is expected to generate an annual turnover of INR 400-500 Crore and direct and indirect employment for ~30,000 people.

The park was designed with separate a Central Processing Unit and individual networks of primary processing units and collection centres. The Central Processing Unit is in a well-connected region and is easily accessible from both primary processing and collection centres. It is close to Guwahati which eases distribution as well as skill procurement and labour. It is also equipped with water, power, and other critical facilities.

The park is focused on processing turmeric, pineapple, banana, orange (mandarin), lemon, papaya, jackfruit, ginger, potato, tomato, and rabi and kharif vegetables.

The Manipur Industries Food Corporation is to be set up in the Thoubal district and has been granted 'in-principal' approval. Similarly, the parks in Mizoram and Nagaland are also yet to become fully operational. While the Zoram Mega Food Park, located in Mizoram's capital city Aizawl, has a total vacant allottable area of 10.2 acres, Nagaland's food park, M/s Doys Agri Resources, has a total vacant allottable area of 9.66 acres. The Mizoram park will primarily process ginger, turmeric, chili, and pineapple, and the Nagaland park will focus on processing chili and pineapple. Both parks will have food processing units which will be part of central processing centres where produce will be cleaned, graded, sorted, and packaged. Further, they will have enabling infrastructure like pre-cooling chambers, pressure ventilators, variable humidity stores, and specialised storage facilities, in line with MoPFI guidelines.

While the Nagaland food park is not likely to be a competitor to investments in Tripura's food parks as the transport links between the two are not well developed, the closeness of the Zoram Mega Food Park, located in Aizawl, could potentially be a disadvantage for Tripura. However, since both parks are currently being developed, it is also likely that investors will prefer to invest in the already-operational Sikaria Agro Food Park. Additionally, Tripura's relative closeness to the rest of India may act to sway investors to invest in the state.

As the Assam Food Park is the only fully operational one out of the parks listed above, it is likely to be the biggest competitor for investments into Tripura's Sikaria Agro Food Park. Its strong infrastructure, which includes a common facility building, warehousing facilities, standard design factories, cold storage units, and a food testing laboratory, also makes it attractive to investors.

However, the Sikaria Park has certain advantages. The low availability of allottable plots in the Assam park could prove to be advantageous to Tripura— there are strong transport linkages between Nalbari and Agartala, where the Sikaria park is located. There are 4 long-distance trains that connect the two locations. Further, NH-6 also connects them by road. The two parks' focus on the processing of similar agricultural produce potentially means that interested investors unable to find plots in the Assam park could see the Sikaria food park as a viable alternative. The Dewanpassa Industrial Area, also being developed as a food processing focused park, can be another alternative for investors. Being located in North Tripura, it is close to Assam as well and has easy access to citrus produce.

Further, the Sikaria food park is better located with regard to access to raw materials. For instance, it is located in West Tripura, one of the major pineapple-growing pockets of the state. It is also only ~94 km away from Dhalai which is another pineapple-growing district. Meanwhile the Assam food park is about 315 km away from Karbi Anglong, ~188 km away from Nagaon, ~386 km away from Cachar, and 341 km away from N.C Hills. Its distance from these regions, the major pineapple growing areas within Assam, may prove to be a disadvantage for it, owing not only to higher transportation time and costs but also to the high perishability of the produce.

Additionally, the Sonamukhi Industrial Park, which will be developed as a food processing-focused park, will be able to accommodate food processing businesses once the plots in the Sikaria Park have been leased out.

It will be able to house a large number of industrial units as it has a total allottable area of 130 acres. It will also be attractive to investors due to its location in North Tripura. It has easy access to raw materials like jackfruit. Further, the industrial estate is well-suited for citrus-based food processing industries, too, especially as the Tripura government is currently making efforts to revive citrus cultivation in the Jampui Hills, which was traditionally a major citrus growing pocket. However, it is pertinent to note that though oranges are grown across the North district, Dhalai, Gomati, and the West district in Tripura, in terms of raw material availability, both Assam and Meghalaya are better placed than the state as they are the leading producers of citrus fruits in the NER. Tripura's output is the fifth highest within the region, after Nagaland and Mizoram, at 31,000 MT. As a result, it may have to compete for businesses looking to invest in orange-based food processing with these states.

In the case of jackfruit processing, as Tripura is the only major commercial producer within the NER, competition for investments in jackfruit processing will be minimal. Most of Tripura's jackfruit produce is already being shipped to other domestic and international destinations, largely as low value primary products. The state has an output of 2,92,000 MT, accounting for ~59% of total production within the NER. The major jackfruit growing pockets in the state include the North and South districts, Gomati, and Dhalai. Thus, it has the potential to attract investors to the jackfruit processing sector. The low output of Nagaland and Assam are advantageous for the state.

While there is some level of food processing activity across the NER, the bulk of such activity remains concentrated in Assam and Tripura. In 2021-22, the number of registered food processing units in Assam were 1,569, the highest in the NER. In Tripura, there were 105 such units. Assam is, therefore, Tripura's biggest



potential competitor. Both states are major fruit producing regions. Assam's horticultural crops output accounts for more than 50% of the NER's total output while Tripura's is the second highest at 13%.

Therefore, in terms of competing for investments in food processing, Assam remains a major competitor for Tripura. However, Tripura has many advantages that can help it remain competitive. Apart from the ones discussed above, the state's most significant advantage is its location. As food processing is an export-oriented sector, the state's link to Bangladesh's Chattogram port, the shortest and most direct one within the NER, can help it attract investments. This link allows it to access both regional and international markets with relative ease.

b. **Rubber:** While Tripura is the second largest rubber producer in India and faces no competition from other states in the NER, its competitors include other rubber producing states like Kerala, Karnataka, and Tamil Nadu.

Due to better connectivity to the rest of India, these states are better positioned to cater to the needs of domestic industrial belts like Ahmednagar, Chennai, Gurugram, and Jamshedpur. The cost advantage they enjoy over Tripura, owing to their location, in transporting finished goods is likely, therefore, to attract investors to these locations over Tripura.

Out of these states, Kerala can potentially be Tripura's biggest competitor for rubber sector investments.

**Table 61: Natural rubber output**

Natural Rubber Output (In Tonnes)				
State	2015-16	2016-17	2017-18	2018-19
Kerala	4,38,630	5,40,400	5,40,775	4,90,460
Karnataka	29,400	38,800	38,300	38,200
Tripura	44,245	50,985	50,500	53,050
Tamil Nadu	19,495	21,140	21,110	21,500
India Total:	5,62,000	6,91,000	6,94,000	6,48,000
Source: Rubber Board of India.				

The state houses a Rubber Park in Ernakulam. This is one of the most successful rubber parks in India. The first of its kind, it is spread across 110 acres and has a total of 55 units on its premises. The park has some major advantages due to which it has been operating successfully. These include the availability of rubber testing and certification facilities within the premises, abundant supply of raw materials, good transportation linkages, adequate infrastructure, and a robust single window clearance.

Apart from the Rubber Park, Kerala also houses the Kerala Rubber Limited (KRL), a public-private partnership (PPP) company by the Kerala government. This is being set up to help the state achieve its aim of making Kerala a latex hub by 2030 and is all set to begin operations soon. While these could both be competitors for investments, since Tripura too is developing its rubber parks to have similar advantages of raw material availability and infrastructural support, this could establish the state as a viable investment location.

The Industrial Rubber Park in the Bodhjunagar Industrial Area, for instance, is focused on developing enabling infrastructure that will help attract investors to the rubber sector and offset any locational disadvantages. The rubber park is suited to housing rubber industries manufacturing contraceptives, surgical gloves, and feeding bottle nipples for regional markets as allottable land availability on its premises is low. A

demand analysis has already established the viability of manufacturing these goods for both domestic and regional markets. Such production is viable also because the suggested manufactures require low technological intervention and can be produced in relatively smaller plots. Also, focussing on these products is viable as these are relatively simpler to manufacture, requiring minimal inputs and infrastructural intervention—they will, therefore, not require difficult to source raw materials. Manufacturing these will give investors the opportunity to fully capitalize on the locational benefit of raw material availability.

Further, with natural rubber production dipping in Kerala in recent years, from 5,40,400 tonnes in 2017 to 4,90,460 tonnes in 2020<sup>140</sup>, Tripura has the opportunity to increase its domestic market share, having recorded an increase in its NR production in the same period.

Also, it must be mentioned that investors could favour Tripura as an investment location because the state, unlike Kerala, is advantageously located to cater to the needs of the other states within the NER as well as of regional markets like Bangladesh. It has road access to the rubber market in Bangladesh already. This has not been able to stimulate growth in the state's rubber sector since Bangladesh has placed restrictions on entry of rubber through Tripura yet. The restrictions have meant that the state has to transport rubber through West Bengal, increasing both logistical burdens and time. This has kept rubber production and processing uncompetitive. However, it is expected that once the Maitri Setu, connecting South Tripura and Bangladesh, is operational, Tripura will be able to access the country's rubber markets as well as potential markets in ASEAN nations and in Turkey and Iran. Thus, in being able to fill this niche owing to its location, it will be able to attract investors to its rubber park.

The state's access to natural rubber, also makes it a viable investment location, especially as it has the largest rubber plantation area in India. The present deficiency in domestic supply of rubber products gives the state an opportunity to become a major rubber producing hub within eastern India.

While the Kerala rubber park can benefit from the presence of the Rubber Board in the state, the Bodhjungnagar rubber park can enjoy similar benefits from its closeness to the Regional Rubber Training Centre, located in Agartala.

As there are no other rubber parks in India, Tripura's largest potential competitor for rubber sector investments will be Kerala. But since the sector-specific infrastructural needs for natural rubber processing are low, it will have to compete with other industrial parks that house similar processing units. However, the locational advantages discussed above make the state a competitive location for such investments.

c. **Bamboo Sector:** Bamboo is cultivated in many states across India. States like Madhya Pradesh, Chhattisgarh, Odisha, and Maharashtra, for instance, all have higher bamboo-bearing areas than Tripura. These states, owing to their locations, are better suited to cater to the domestic bamboo market.

These states will not be attractive, however, to investors seeking opportunities to cater to regional bamboo markets. For such investors, Tripura would be the more attractive location, owing to its location and closeness to Bangladesh.

Also, the India State of Forest Report 2021 finds that the country lost 10,594 sq. km of bamboo-bearing areas since 2019. However, as Tripura saw an increase of 418 sq. km in its total bamboo-bearing area in this same period, the overall decrease may create an opportunity for the state. With potentially greater raw material availability, it is better positioned to fulfil the rising demand for bamboo domestically as well as internationally.

Within the NER, bamboo-based manufacturing has been identified a priority sector for all the states, especially since projections suggest that the global bamboo market is set to grow over the next few years. As most states in the region also have higher bamboo stocks than Tripura, they can be a viable source of raw material. However, it also means that Tripura may have to compete for investments in the sector owing to the better availability of raw materials in the other states.

Outside India, Myanmar, whose average bamboo yield is higher than India's, can be considered as a source of high-quality raw material.

Tripura's traditional bamboo products can help it to tap into the EU and the US markets, both major importers of

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<sup>140</sup> Rubber Board of India.

bamboo furniture. Since Assam, Manipur, Meghalaya, and Mizoram too produce a wide variety of bamboo products including floor panels and handicrafts, they can be potential competitors for investments in the sector.

Further, while earlier Tripura used to supply about 60% of bamboo sticks utilized by the Indian incense stick industry, today Assam has emerged as the more attractive destination for bamboo industry investors. The state has had great success in attracting investments to the sector— in 2020, N Ranga Rao & Sons (NRRS), India's largest agarbatti manufacturer and makers of Cycle Pure Agarbathies, had announced that it would be setting up a dedicated project for bamboo for incense sticks in association with the Assam government.

Assam also has a successful Bamboo Technology Park in Kamrup district. It was established in collaboration with private players. The park has been covers 20 acres and has ~6.61 acres (allotable land) focussing on value-added bamboo products. It provides excellent infrastructure facilities in the form of a bamboo stick-making facility, a Bamboo Plastic Composite (BPC) facility, a strand woven bamboo block unit, a vacuum pressure treatment plant, a Resin/Glue Plant, a bamboo charcoal plant, an administrative and marketing centre, and a product design centre. The park is located 39 km away from the airport and 5 km away from Chaygaon. It also has excellent connectivity to NH 37(3 km away). However, it is quite far away from the major bamboo producing regions in the state— it is about 355 km away from Cachar, ~286 km away from Karbi Anglong, ~310 km away from Dima Hasao, 157.7 km away from Nagaon, and ~344.6 km away from Lakhimpur.

In contrast, Tripura's bamboo sector focussed parks, including the Bamboo Park in the Bodhjunnagar Industrial Area, have the advantage of being closer to raw material. The resultant difference in raw material transportation costs and time may prove to be an advantage for Tripura in attracting investors to its bamboo sector.

Tripura's bamboo parks are also being equipped with enabling infrastructure to make them investor ready. The Bodhjunnagar Bamboo Park too aims to create not only the physical infrastructure required by bamboo-based industries, but to also provide state-of-the-art common facilities like bamboo raw material depots, bamboo splitting and slivering units, bamboo treatment and processing centres, drying chambers, testing labs, logistics hubs, warehouses, and machine maintenance centres.

Apart from these advantages, the Tripura Bamboo Mission has taken several initiatives that make the state an ideal investment location for bamboo sector investments. Some of these include —

1. Organising artisans and producers into grassroots institutions: so far, more than 1,000 SHGs, 60 producer societies/cooperatives and community owned institutions have been supported and promoted by the TBM. Around 100 new 'Bamboo Farmers' Groups' are also being promoted under the bamboo plantation activity in new areas.
2. Improving raw material availability: extensive bamboo plantation in the state is being undertaken in forest areas. The TBM is also implementing bamboo plantation drives in private lands through a cluster development approach. The TBM has, so far, implemented plantation drives over ~1,500 Ha of land. During these drives, commercially important bamboo species across were planted across various rural development blocks by 2016.
3. Undertaking capacity building: Over 45,000 artisans have been trained by the TBM on various aspects of bamboo plantation, production, and marketing.
4. Establishing Common Facilities Centres (CFCs): 21 cluster CFCs have been set up in state. As part of this, an exclusive Design and Product Development Cell has been set up by the TBM at A.D Nagar, in Agartala. Here, a dedicated team of designers, artisans and marketing experts has been deployed to develop trendy yet user friendly craft ideas and to carry out the prototyping of the same. The designs are tested in the market and transferred to potential producers/entrepreneurs after prototyping.
5. Facilitating and promoting trade: In order to facilitate trade, the TBM has also collaborated with private players like Mother Earth and Giskaa as well as online retailers such as eBay, flipkart, snapdeal, Indiamart.com, Tradeindia.com, and Indiatradezone.com
6. Developing the agarbatti sector: The TBM has played a key role in promoting the polishing and rolling of incense sticks, which increases the value of the product. It has also introduced mechanization in the incense sector by adopting globally acceptable technology. These interventions have resulted in value addition within the sector. More than 900 agarbatti rolling machines are being installed by the TBM across various agarbatti clusters in the state.

These interventions have resulted in not only strengthening bamboo production but also processing in Tripura. The resultant advantages to the bamboo sector can help the state attract investors.

Leveraging its abundant natural resource base as well as bamboo processing capabilities, Tripura can take steps to increase its market share and tap into emerging markets in the Middle East, Europe, Africa, and in countries in North and South America, in addition to focusing on the huge domestic market of INR 170 billion.

**Conclusion:** Out of the three identified priority sectors for Tripura, namely rubber, bamboo, and food processing, the state is likely to face competition for investments in the food processing and bamboo sectors from other NER states. For investments in the rubber sector, its potential competitors are situated outside the NER and include Kerala, Karnataka, and Tamil Nadu.

However, the locational advantages enjoyed by its industrial estates, especially in terms of regional market access and raw material availability, can be attractive for potential investors. Besides this, the availability of industrial land is another advantage the state has. Its shared border with Bangladesh, too, makes it a suitable site for the location of export-oriented processed food items and bamboo products.

## 6. Conclusion



# Conclusion

In conclusion, this document provides detailed insights into the projected industrial land demand in Tripura. The food processing, rubber, and bamboo sectors have been identified as the three priority sectors for the state. They have been selected based on the parameters of export competitiveness, import substitution, and raw material-based suitability.

While food processing has high export potential, specifically pineapple and jackfruit, both the rubber and bamboo industries have abundant raw material access in the region and are supported by domestic and regional demand.

Competitiveness analyses have been carried out to map the projected demand for products from each sector. In the case of the food processing sector, the analysis indicates that exporting food products to Europe is generally more profitable. For the rubber sector, a value chain examination has been used to identify rubber products that can be manufactured in Tripura. These include surgical gloves, rubber contraceptive (males/females), tubes, and tyres. In the case of the bamboo sector, value chain examination and an OD analysis have shown that the bamboo-based products that have growth potential in Tripura are agarbatti (incense) sticks, panels and flooring, and timber substitutes.

Considering the interest expressed by the private sector in the bamboo sector, over a period of the next 15 years, the annual production output is estimated to increase by 5 times and around 51 units of bamboo processing plants will be established in Tripura.

For food processing, considering that around ~65% of the total pineapple produced, ~60% of the total orange produced, and ~62% of the total jackfruit produced is expected to be processed over a period of 15 years, the table below highlights the produce expected to be processed for all shortlisted crops.

Sr. No.	Crops	Produce to Be Processed (tonnes)
1	Pineapple	~93,500
2	Orange	~13,000
3	Jackfruit	~83,000

An important export market for India's rubber is Bangladesh. In 2021-22, India's rubber exports<sup>141</sup> to the nation amounted to 2.53% of overall rubber exports.<sup>142</sup> The table below lists the major states exporting each identified rubber to Bangladesh:

S. No.	Product	States Exporting To Bangladesh
1	Surgical Gloves	Kerala, Andhra Pradesh, Tamil Nadu, Karnataka, Telangana, West Bengal, Delhi
2	Rubber Contraceptives	Telangana, Kerala, West Bengal, Uttarakhand, Uttar Pradesh, Gujarat
3	Tyres	Tamil Nadu, Maharashtra, West Bengal, Gujarat, Telangana, Goa, Kerala, Haryana, Uttar Pradesh, Puducherry, Jharkhand, Punjab, Andhra Pradesh, Karnataka, Delhi

<sup>141</sup> Rubber products refers to "rubber and articles thereof" (HS Code: 40).

<sup>142</sup> Export Import Data Bank, Department of Commerce, Gol (2022).

4	Tubes	Tamil Nadu, Maharashtra, Gujarat, West Bengal, Goa, Telangana, Punjab, Kerala, Haryana, Uttar Pradesh, Jharkhand, Puducherry, Andhra Pradesh, Himachal Pradesh, Karnataka
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Keeping in mind the existing demand for Indian rubber products in Bangladesh, it has been identified as a viable market for products from Tripura. The nation shares an 856-km-long border with the state, making it an easily accessible market. As the table above indicates, Tripura's enjoys a locational advantage over the states currently producing rubber-based goods for export, in terms of distance from markets in Bangladesh. Further, the transportation linkages between the country and Tripura are currently being improved through projects like the Agartala–Akhaurya broad-gauge rail line and the recently developed Maitri Setu on the Feni River. The existence of such trade routes makes Bangladesh an ideal target market for exports. Besides this, Tripura also has a considerable advantage over some other rubber processing regions— its abundant access to raw material. States like Haryana, Punjab, Jharkhand, Gujarat, and Uttar Pradesh do not have easy access to raw materials whereas Tripura does. This makes the state a more suitable site for rubber-based manufacturing as costs of production is likely to be lower in Tripura, making its products more competitive for export.

To forecast the demand for rubber, it has been estimated that 50% of imports to India and 50% of exports to regional countries will be met through manufacturers from Tripura. Considering the same, the quantity of exports along with rubber consumption of manufacturing in Tripura is highlighted in table below over a period of next 15 years.

Product	Products manufactured in Tripura	Rubber quantity (Tons)
Surgical gloves	~21 Crores	~1500
Rubber Contraceptive (Males/ Females)	~1,500 Crores	~22500
Tubes	~0.2 Crores	~2000
Tyres	~0.6 Crores	~4900

Further, considering the ease of the manufacturing process, it is estimated that surgical gloves and rubber contraceptives manufacturing will be setup first in Tripura in the short term followed by tubes and tyres manufacturing in the medium to long term.

Based on the demand projections for the next 15 years, aggregate investments for setting up manufacturing plants for priority sector products has been estimated as follows:

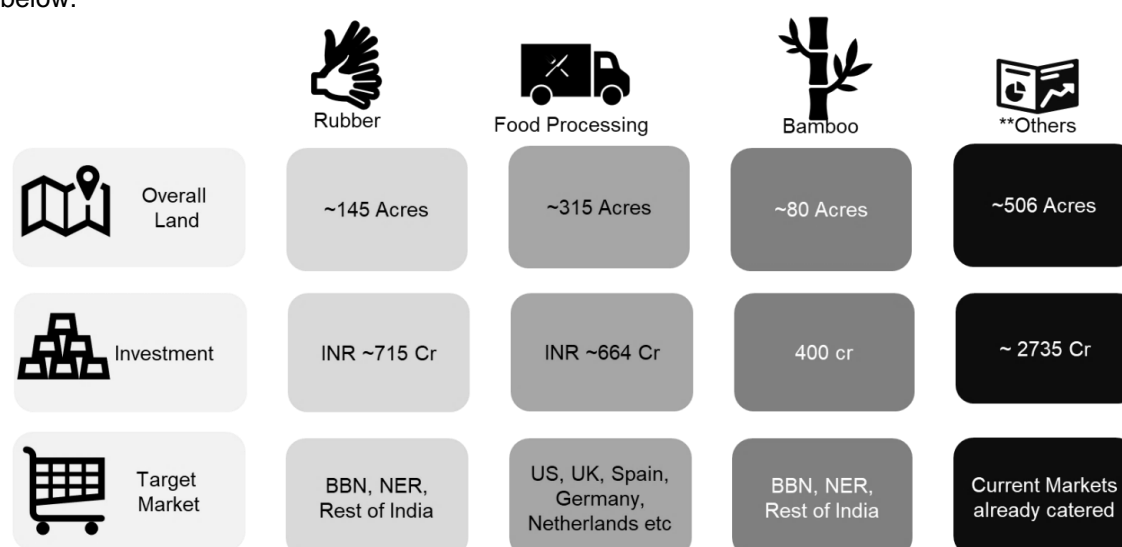
1. For rubber, the aggregated investment in plant and machinery of all the identified rubber products is estimated at INR ~429.27 Crore. Considering the share of plants and machinery is almost 60% of the total Capex, therefore, the total investment required is **INR ~715.46 Crore**. Additionally, the overall land required to manufacture these identified products is estimated to be ~58.62 hectares of land or **~145 acres of land**.
2. For the manufacture of bamboo products, it is estimated that approximately 5000 sft of land will be required for 12 MT of agarbatti production and 20,000 sft land for 40 MT of furniture production. Based on the demand assessment, the annual production of bamboo over a period of the next 15 years is estimated at 7,584 MT. Hence, the estimated total land demand for the sector is **~80 acres**. The investment required for these 80 acres is **INR ~400 Crore**.
3. The land required for the food processing industry varies significantly as it involves the setting up of primary, secondary, and tertiary processing. To estimating the land demand, it was assumed that 1 acre of land is required to process 600 tonnes of food. Based on this, land demand for food processing comes to be **~315 acre**. This projected demand may increase further if cultivation of pineapple, jackfruit, orange, and other fruits increases.



On mapping this identified land demand with existing Industrial Parks in the state, the following conclusions were drawn:

1. Since no industrial parks in the state currently have any available land with the infrastructure required by the food processing industry, ideal locations can be found for it based on other parameters like proximity to supply centres and regional centres. Based on these parameters, the Sonamukhi Industrial Area, Bijoypur Industrial Area, IIDC Lalchhari, IIDC Jalefa, and IIDC Dewanpassa have been identified as ideal locations for food processing units.
2. West Tripura and South Tripura have been identified as ideal locations for the rubber industry. Within the districts, the Bodhjungnagar, R.K. Nagar, Nagichhera, Sarasima, and Santirbazar parks have been earmarked as ideal for the sector.
3. The bamboo sector's land demand is ~80 acres but bamboo supply is distributed across the state. So, to cater to the state's demand various industrial parks need to have bamboo processing units distributed in small land parcels. The industrial parks shortlisted for bamboo sector industries are Kumarghat Industrial Estate, Dharmanagar Industrial Estate, R.K. Nagar Industrial Area, and Kathalia Industrial Area. Beyond this, it can also be viable to envision a bamboo park in North Tripura to cater to the demands of other districts like Unakoti for bamboo.

An overview of total investment and land requirement for all three priority sectors is provided in the figure below.

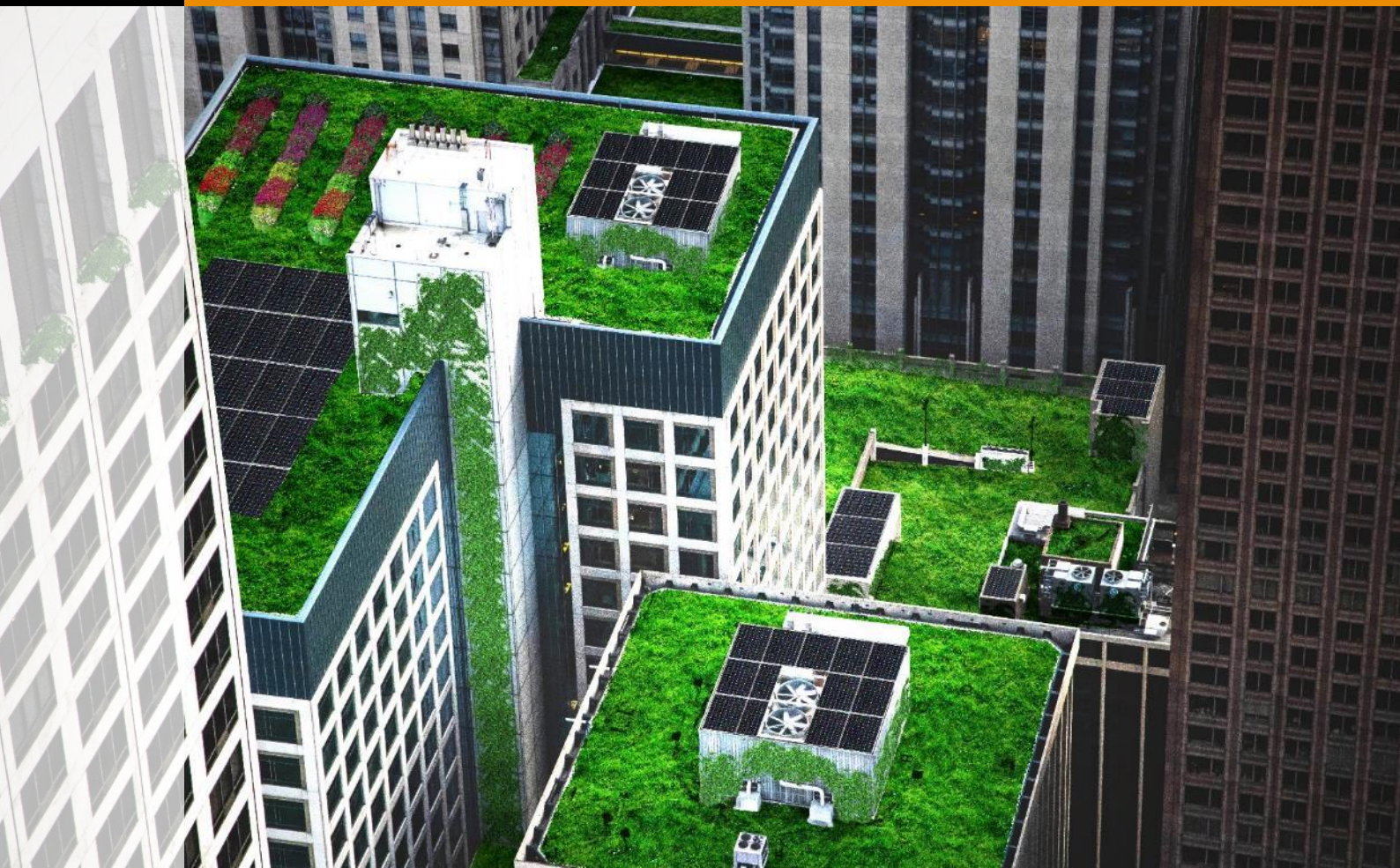


\*\*Apart from the priority sectors other sectors are assumed to grow at similar rates and assumed to have an ICOR of 4

Source: Study Team Analysis

The analysis provided here has identifies the priority sectors that Tripura would benefit from focusing on and has provided an assessment of the projected demand for each sector's products as well as the land needed by the sectors. The planning process for Tripura's upcoming industrial parks can be streamlined to cater to the land needs highlighted in this document.

## 7. Annexures



# Annexures

## Minutes of meetings

Date: 04/10/21

### Project Discussion

#### Participants

Govt of Tripura: Mr. T.K. Chakma (IAS, Director of Industries, and commerce)

PwC team: Mr. Ashrith Reddy, Mr. Praween Singh

Director industries has highlighted that India Bangladesh MoU's would provide a doorway for Tripura to improve its economy. Further from an infrastructure upgradation initiative, He highlighted the railway line which is currently being built will connect Gangasagar in Bangladesh to Nischintapur in India (10.6 km) and from Nischintapur to Agartala railway station (5.46 km). It is expected that this railway line shall be completed in next 1 year and shall provide improved access to East India. Further the road linkage to Chattogram port was also highlighted and further emphasized that this shall act as a logistics hub not only for the State but also for the entire region.

**Industrial Estates: Bodhjunnagar, Tulakona and R.K. Nagar**

### Discussion 1: Rubber industry

#### Participants

Abhisar Buildwell Pvt Ltd: Mr. K.C. Jena (Unit head)

TIDC: Mr. Kushal Choudhary (Junior engineer)

PwC team: Mr. Ashrith Reddy, Mr. Praween Singh

#### Points discussed

- The company produces rubber thread which is used in undergarments.
- The output from rubber plant (Latex) goes as an input into the centrifuge plant.
- The function of the centrifuge plant is to process the natural rubber latex into high quality latex concentrate. To setup a centrifuge plant it costs around 60 lakhs. 1 machine has the output capacity of 7 tonnes per day. 20,000 MT is the amount of input for the centrifuge plant, and it produces an output of 6000 MT. 6000 MT is the input for the rubber thread maker which then gets converted into 4000 MT of rubber thread.
- The output from the centrifuge machine can be used as an input for producing rubber thread, gloves, rubber seeds and condoms. Rubber thread comprises of 85% output from the centrifuge plant which is the raw material and approx. 15% is chemical input. When both are mixed it becomes rubber thread. From the wastage of the centrifuge plant ISNR (Indian Standard Natural Rubber) comes out. ISNR is then used in the tyre making process.
- The company mentioned that there is no condom manufacturer in the North east.
- For transportation purposes the company uses large trucks and not container trucks. 3 of these large trucks are equivalent to the size of one container truck.
- The company highlighted that they do not face any major power cuts in the region
- The company also highlighted that there is water supply being provided by TIDC. However there is no water requirement for the operations of the plant.

## Concerns and needs

- Damages due to transportation

Currently the company is using roads as their mode of transportation. 75% of their material goes to Gujarat, Kolkata, and Delhi.

When packaging the rubber thread, the company sticks one end of the thread to the side of the box. This is done to avoid the thread getting entangled and getting damaged. Unfortunately, their products do sometimes get damaged during transportation. If trans-shipment is involved, the company believes that their goods tend to get more damaged due to mishandling.

When asked about the upcoming railways/seaways, the company was of the view that since they do not provide end to end logistics support, they won't help industry much in reducing the overall cost. Hence even if the railway line or the port connectivity is completed, they will mostly rely only on road transport. However, if any major 3P logistic player can provide end to end logistic service, then the company may be interested in using the services.

Due to this, the company wants corrugated box manufacturers to set up their companies in Tripura. This would help the company to reduce costs as currently these boxes are being manufactured by their parent company in mainland India.

- Exports to Bangladesh

Power is very critical for the company. Any disruption in power could cause huge losses. They are currently satisfied with the power supply provided by the government.

Bangladesh is one of the largest garment industries in world. Since rubber is also used in garment production the company wishes to export to them. However, Bangladesh currently has restrictions on exports in place through Agartala. Currently to send shipments to Bangladesh, the company must send their products via Kolkata. It takes 8-9 days for the products to reach Kolkata. This results in time and cost escalation making the product uncompetitive.

- Competition faced

The company faces major competition from Kerala. Kerala is the largest producer of rubber plantations since the soil is suitable for the plantations and rubber is easy to grow. However, the main differentiator is the transportation time. The time taken to transport products from Kerala to the target market is 3 to 4 days, whereas for Tripura it takes 8 days. Due to this there is an increase in warehousing costs leading to lower margins.

- Potential target industries

Considering that various products such as gloves, rubber thread, condoms etc can be manufactured using similar process and also given the availability of raw material in the region, the company highlighted the potential to attract such industries in the region.

## Discussion 2: Food processing industry

### Participants

PRAN beverage India Pvt. Ltd: A. Majumdar (Asst. General Manager)

TIDC: Mr. Kushal Choudhury (Junior engineer)

PwC team: Mr. Ashrith Reddy, Mr. Praween Singh

### Points discussed

- PRAN beverages manufactures wafers made of potatoes and tomatoes, red chilli, green chill, tomato sauces, noodles. They source their raw materials locally except for potato which they import from Bangladesh from their parent company. Dry cake which is produced by PRAN beverages is famous in NE. They also produce potato products for which Lays is their main competitor in the NE.



- The transport of raw material in Tripura is difficult due to underdeveloped roads. Since the parent company of PRAN beverage is based in Bangladesh, the company imports from Bangladesh. However considering the border restrictions, they are not allowed to export their finished products to Bangladesh.
- The company buys machinery from Italy, America, and India. Machinery is not a concern. The government provides power supply, and the company faces no shortage of the same. The government has provided bore wells which are being used by the company. The company further highlighted that the single window portal has been effectively implemented.
- The main markets catered to are Assam and Mizoram (NE).

### **Concerns and needs**

- Fruit related concerns

#### i)Pineapples

They currently face a lack of infrastructure for cold storage which would lead to wastage of pineapples. For pineapples, the company wants to create jams & jellies. Further there is a need to establish common markets which can act as an aggregator and improve the availability of raw material.

#### ii)Jackfruits

Currently jackfruit chips are produced by the company. The company is not sure about the quantity of raw material being available.

- Raw material transportation problems

The company's main mode of transport currently is by road and by using trucks. They believe trains would be very helpful and are awaiting the proposed railway line to be completed. This would help in reducing the transportation costs and help the company expand their market to east India.

- Difficulty in sourcing skilled manpower

The company faces difficulty in sourcing skilled manpower for food tech. They would like it to introduce courses for these skills. The current courses of ITIs are not as per the industry requirements.

- Output loss since company cannot employ women at night

PRAN beverages currently has a workforce of 650-700 workers (approx.) Women contribute to 50% of the company's workforce. Since the company cannot promote night duties for women due to safety issues, they are currently unable to run the plant 24/7 even though raw material supply is available for these hours.

- Potential for market expansion

If transportation costs are reduced, then they believe they can cater to larger markets. Transport costs and export restrictions placed by Bangladesh are the major inhibitors to the profits of the company.

### **Discussion 3: Bamboo industry**

#### **Participants**

Mutha Industries Pvt Ltd: Rabin Bose (VP)

TIDC: Mr. Kushal Choudhury (Junior engineer)

PwC team: Mr. Ashrith Reddy, Mr. Praween Singh

#### **Points discussed**

- Mutha Industries Pvt Ltd produces flooring, house furniture, office furniture, doors etc. made of bamboo. They also customize bamboo items as per customer requirements.
- Out of 130 species that are available in India, 21 species of bamboo are available in Tripura. Mutha Industries requires one specific species as their raw material.

- The raw material required for their products is mature bamboo. Mature bamboo is available in the remote interiors of Tripura. The firm mentioned that there is no information available on the amount of mature bamboo that is available in the region. Further there is also shortage of raw material in the region.
- 30 tonnes of mature bamboo are the company's daily requirement. The current cost is INR 3,500 per pound for purchasing bamboo. The company's workforce currently comprises of 200 direct workers, 300 indirect (harvesting, delivering in trucks etc.)
- The company takes up specific projects of the government and private sector. They are not into the retail industry. Their current focus is on projects within the country, e.g. Delhi, Mumbai, West Bengal. The company has been exploring export opportunities but has not yet been successful.
- The company mentioned that they face competition from the PRC for their products.

### **Concerns and needs**

Raw material shortage is a major problem faced by the company and the following factors contribute to this shortage.

- Restrictions on planting in tribal areas

The bamboo industry in Tripura is an unorganized sector. Land is available in tribal areas, however there are restrictions on planting in these areas. Due to low returns, farmers prefer rubber plantation over bamboo plantation.

- High cost of procuring raw materials

The cost of procuring mature bamboo from remote locations is very high due to difficulties in getting transportation and labour in these remote locations and finding the right bamboo species which have matured.

Currently transport cost contributes to 15% of the company's balance sheet while products from other parts of India have transportation cost in the range of 3-5%.

- Locals cut bamboo shoots resulting in shortage of bamboos

The locals tend to cut these bamboo shoots at an early stage, thus not allowing the bamboos to mature leading to wastage.

- Incorrect timing of bamboo harvesting

Mature bamboo takes 4 years to grow, when the locals harvest the bamboo, they tend to harvest the immature bamboo as well. This immature bamboo gets wasted.

The company believes that support could be provided regarding educating the locals on the correct time for harvesting mature bamboo. The company believes that the government should highlight opportunities and attractive schemes to help the bamboo industry.

- Interest in partnership with the government

A PPP partnership potential with the company was discussed where the company will be responsible for procurement of the produce while the government shall be responsible for ensure land supply.

Figure 28: Photos from Day 1





Date: 05/10/21

### **Industrial estates: A.D. Nagar, Badharghat, Dukli and Nagichhera**

TIDC: Mr. Manish Bhadra (junior engineer)

PwC team: Mr. Ashrith Reddy, Mr. Praween Singh,

The estates were very old. The estates already had existing small-scale industries. The estate is very small size and is fully occupied.

### **Tripura Mega Food Park**

The Sikaria Mega Food Park is the first designated center of excellence for food technology in the state of Tripura and is a venture of Sikaria Group and the State Government of Tripura assisted by the Ministry of Food Processing Industries (MOFPI).

### **Participants**

Sikaria: Mr. Rohit Singla

TIDC: Mr. Manish Bhadra (Junior engineer)

PwC team: Mr. Ashrith Reddy, Mr. Praween Singh

### **Points discussed**

- The firm sees a lot of potential for food processing in pineapples, jackfruit, and turmeric.
- Tripura grows an estimated 1.28 lakh MT pineapples every year, making pineapples one of the largest markets in the state. There are majorly 2 types of pineapples available in Tripura, Queen and Kew pineapples. Tripura is famous for their Queen pineapples as they are golden yellow in color, have a pleasant aroma and are tasty. The Queen pineapple is quite popular across India.
- The beverage industry asks for certification from a food testing facility while procuring any processed food. For this, the company would need to send a sample to the lab and get it tested. Then the report and sample need to be sent to the buyer. If the company wants to get the sample tested, they will have to send it by road as domestic flights do not allow transport of liquid products. This leads to higher wait times and increase in product cost.
- Tripura currently does not have a food testing facility, because of which the company must send the sample to Kolkata for testing. If the company wanted to send their samples to Mumbai it takes a lot of time as the testing would happen in Kolkata and then the product is sent to Mumbai. Considering that pulp does not have a long shelf life, this creates issues related to getting the produce tested.
- In the food park, there are no factories that are currently operating, they are under implementation. However, the company plans to transport their products by road and by air. 18 plots are currently allotted in the park but have not started manufacturing and 12 plots are empty.

## Concerns and needs

- Water shortage

Food processing requires a lot of water. The company currently faces a shortage of water supply. They need to look at ground water for water supply. Their capacity for cold storage is 545 MT.

They face no issues and are satisfied with the current power supply.

- Problems faced due to a lack of a food testing facility in the state

From an industrial policy aspect, the company would like domestic airlines to allow liquid items onboard, for samples and product delivery.

- Single window concept

The company was not aware of the single window services offered by the government and the type of licenses that are provided through this system. Awareness about the same needs to be created.

- Bangladesh exports

The company wants to export to Bangladesh but is unable to do so due to the export restrictions.

**Figure 29: Photos from Day 2**



### **Industrial Estate: Kumarghat, Dharmanagar, Dewanpass, Lalchhari and Sonamukhi (North Tripura)**

Due to a landslide occurrence, team had to return. The roads in North Tripura are severely underdeveloped and are winding roads. The landslide caused a very lengthy roadblock of all transport vehicles as they were forced to come to halt for a timespan of more than 1 day. Considering that these vehicles could carry perishables, this blockage would lead to major wastages.

Upon enquiring, the team understood that landslides are a common phenomenon in north Tripura during the monsoon season. This causes major blockages for road transport and since currently many companies in the state are dependent on the same, connectivity issues continue to be a major inhibitor to the development of the state.

Date: 07/10/21

### **Industrial estate: Dhajanagar, Sarasima, Jalefa and Santirbazaar (South Tripura)**

- **Dhajanagar**

It is an 18-acre industrial estate which unfortunately has a very narrow entrance and is an old estate. Very few small industries are available.

- **Santirbazaar**

Santirbazaar is 19.2 acres. No industries are present. The estate requires basic investment right from setup. Maps are available for the estate.

- **Jalefa**

It is 41 acres and is a well-developed industrial area.

- **Sarasima**

It is 32 acres and currently is occupied with stone crusher industries. 4 sheds are not occupied right now but there are plans to use them, but not for rubber since the ITI building is setup in the surrounding. Belonia railway station has been setup close to the estate which would have passengers and goods carrier coaches. This railway setup would provide major relief to transportation concerns.

### **Bangladesh border**

- **SEZ Sabroom**

This is Tripura's first special economic zone. The SEZ would be focused on four sectors, including agro-based processing such as food processing, rubber, bamboo, and textile sector. It is in South Tripura and is next to the Bangladesh border. TCS and Apollo hospital have also taken land in Sabroom. It is 70 km from the port. A 93-acre logistic hub will be setup. The distance between Sabroom and Agartala is 135km. A bridge on the Feni river will connect Sabroom with Chattogram in Bangladesh.

### **Potential sectors identified for further exploration**

- **Fisheries**

Fish is an important constituent of daily diet of more than 95% of Tripura's population. There appears to be high demand for fisheries but not enough supply.

- **Pineapple**

- **Jackfruit**

Tripura is the biggest producer of jackfruit in the country and the best quality jackfruits are available during June-August. Tripura's jackfruit has been exported to Germany, London, and Dubai as well.

- **Rubber products such as gloves condoms etc.**

- **Tire manufacturing**



Figure 30: Photos from Day 3

