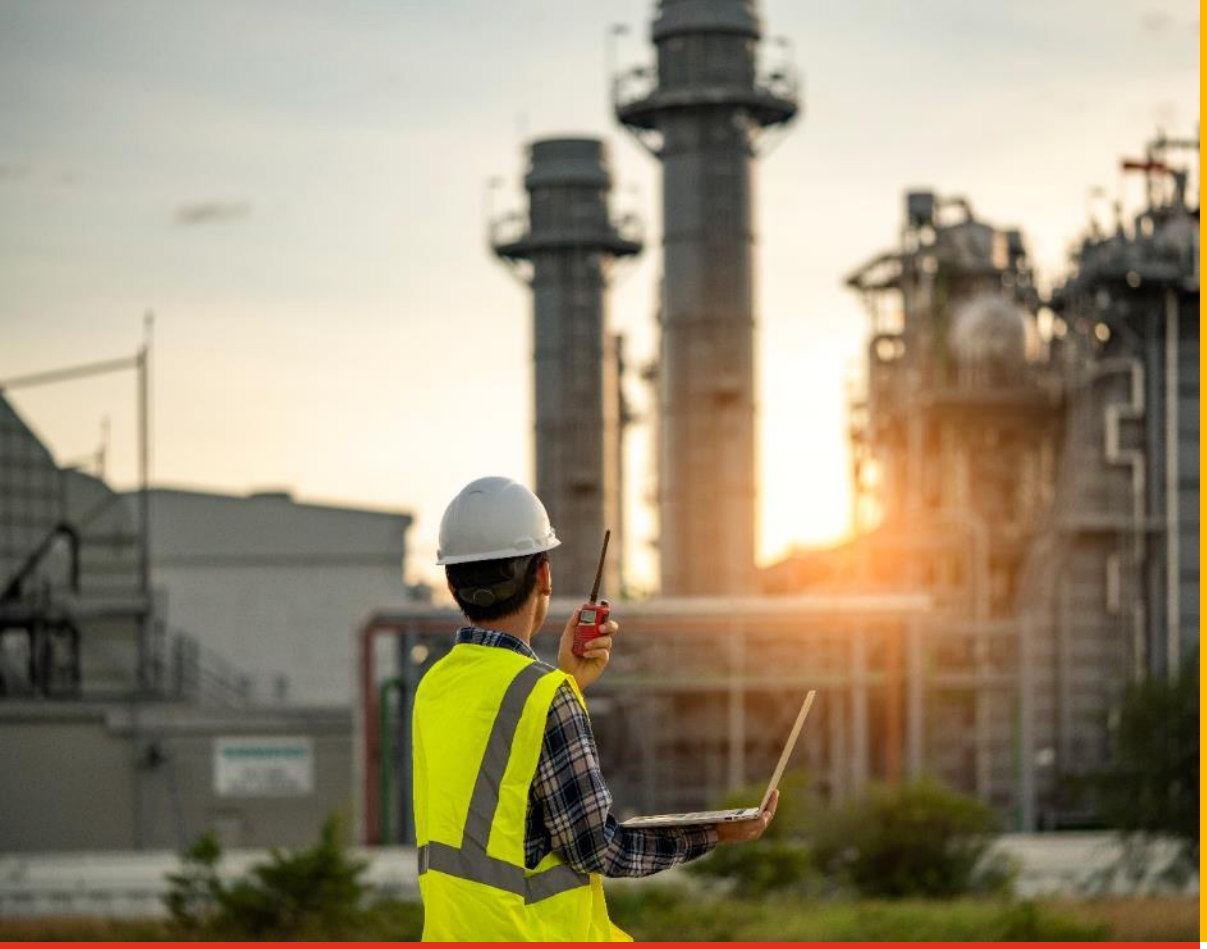

Infrastructure Development of Industrial Estates in Tripura

Industrial Strategy Report

September 2022

Final Report

Strictly private and confidential

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1. Context of the assignment

1 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 competitiveness 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, the report covers the following topics

- The mapping/ planning/ strategizing for developing regional value chains of the Northeast region (NER).
- Development of overall industrial strategy for Tripura
- Strategy to promote Tripura as a regional hub for evacuation and regional distribution through the Chattogram Port (Bangladesh).
- Identification of priority sectors and products and competitiveness analysis to identify potential markets.

2. Introduction

2 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.

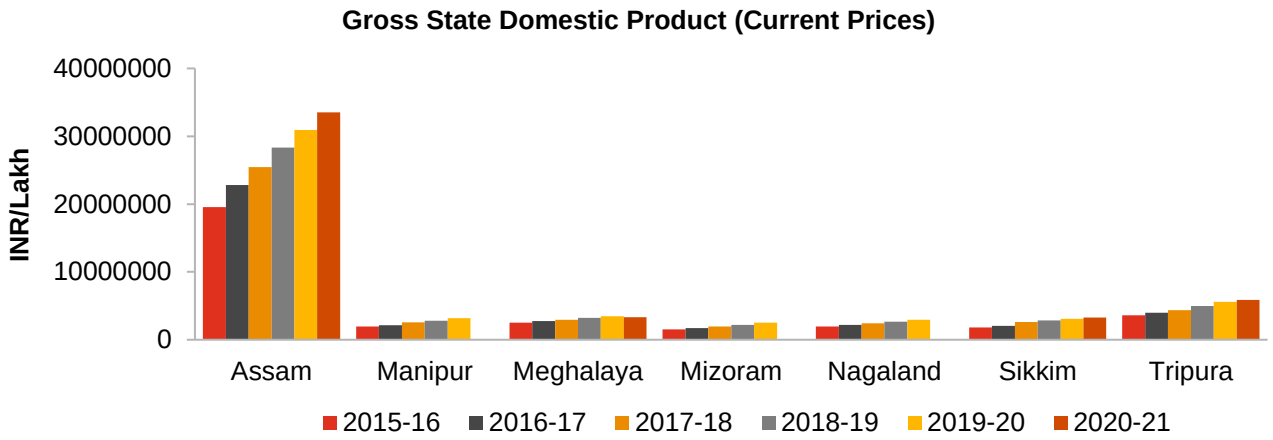
However, despite its rich natural capital, strategic position, and government intervention, the fact remains that the NER contributes 2.8% to the nation's GDP[1], low in comparison with other states (the group of southern Indian states, for instance, contributes ~30% to economy[2]). The region has great 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.

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

2 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.

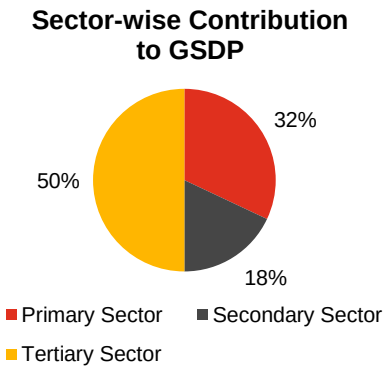
The **primary sector** accounts for 31.4% of the states' income[3], revealing the importance of the agriculture sector in the region. Traditionally, two primary types of farming practices are seen in the region. They are settled agriculture and slash and burn cultivation. Settled agriculture is prominent 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.[4] 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%[5] 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 dive

e 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

[3] North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).
[4] North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).
[5] North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).

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 the distinctly sparse presence of the private sector- less than 1%[6] 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 GoI 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 GoI 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.[7]
- **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

[6] North Eastern Region District SDG Index Report and Dashboard 2021-22, NITI Aayog (2021).
[7] 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 GoI'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 Tripura: Overview

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, Sephaijala, 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 (2019-20)	40,12,000
Population density	350 persons per sq. km
Literacy Rate	87.2%
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[8]
Overall SDG Index Score	58

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, Sephaijala, South Tripura, Unakoti, and West Tripura. This section provides a glimpse into each one.

1. **Dhalai:** Socio-economically, this is the most backward district in Tripura.[9] 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

[8] Department of Tourism, Government of Tripura (https://tripuratourism.gov.in/sites/default/files/TRIPURA_TOURISM_POLICY__3rd_Feb_2020_1230.pdf)

[9] District Profile: Dhalai, Tripura, Government of Tripura (2016).

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).[10] The district has a literacy rate of 96.79%, higher than Tripura's 96.82% and India's 74.04%.

The districts economy is majorly dependent on primary sector. An overwhelming 76% of the total workers are involved in agriculture.[11] Out of this, 37% are cultivators, 26% are marginal farmers, 10% work as agricultural labour, and 3% work in agri-allied sectors.[12] 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.[13] 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.[14]

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.[15] 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.[16] 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.[17]

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,[18] 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.[19]

   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.[20] 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

[10] https://dhalai.nic.in/about-district/
[11] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[12] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[13] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[14] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[15] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[16] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[17] District Profile: Dhalai, Tripura, Government of Tripura (2016).
[18] https://gomati.nic.in/
[19] District Profile Gomati District, Tripura, Government of Tripura (2018).
[20] District Profile Gomati District, Tripura, Government of Tripura (2018).

pineapple are the major plantation crops. However, only 31.61% of the land in the district is cultivable and land holdings are small.[21]

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[22]. 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.[23] There are 6 handloom units and 16,370 workers engaged in handloom weaving while the handicrafts industry has 2,380 artisans.[24] 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%.[25]

   Primary sector activities are most common in the district. There are 32,079 farmer families in the area.[26] 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.[27] 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.[28]

   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.[29] 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.[30] 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.[31]

   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.

[21] District Profile Gomati District, Tripura, Government of Tripura (2018).
[22] District Profile Gomati District, Tripura, Government of Tripura (2018).
[23] District Profile Gomati District, Tripura, Government of Tripura (2018).
[24] District Profile Gomati District, Tripura, Government of Tripura (2018).
[25] https://khowai.nic.in/.
[26] District Profile Gomati District, Tripura, Government of Tripura (2018).
[27] District Survey Report: Khowai District, Tripura, Government of Tripura (2018).
[28] District Survey Report: Khowai District, Tripura, Government of Tripura (2018).
[29] District Survey Report: Khowai District, Tripura, Government of Tripura (2018).
[30] https://northtripura.nic.in/.
[31] https://northtripura.nic.in/.

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 industrial growth in the region. There are 248 reported registered factories in North Tripura that employ 4482 people.[32] 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.[33]

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[34]. 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%.[35]

   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.[36] 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.[37] 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.[38] 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.[39] The tribal population continues to practice Jhum cultivation (shifting cultivation).

[32] Brief Industrial Profile of North Tripura District, GoI.

[33] Brief Industrial Profile of North Tripura District, GoI.

[34] https://sepahijala.nic.in/

[35] District Survey Report: Sepahijala District, Tripura, Government of Tripura (2019).

[36] District Survey Report: Sepahijala District, Tripura, Government of Tripura (2019).

[37] District Survey Report: Sepahijala District, Tripura, Government of Tripura (2019).

[38] Brief Industrial Profile of Tripura (South) District, GoI.

[39] https://southtripura.nic.in/economy/

The district also has a vibrant secondary sector with 167 MSMEs.[40] 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 and compressors repair units; 2 textile garments/tailoring units; and 5 agarbatti/bio-fertilizer making units. 3321 persons are employed in these units.[41]

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.[42] 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%.[43]

   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.[44] These include wood and tea-based units and brick kilns.

8. **West Tripura:** is the most industrialized district in Tripura, covering 3544 sq kms.[45] 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.[46]

   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,[47] 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, Bodhjungnagar Growth Centre, and the Bodhjungnagar 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.[48]

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.

[40] Brief Industrial Profile of Tripura (South) District, GoI.
[41] Brief Industrial Profile of Tripura (South) District, GoI.
[42] https://unakoti.nic.in/demography/
[43] https://unakoti.nic.in/demography/
[44] https://unakoti.nic.in/factories-boilers/
[45] Brief Industrial Profile of Tripura (West) District, GoI.
[46] Brief Industrial Profile of Tripura (West) District, GoI.
[47] Brief Industrial Profile of Tripura (West) District, GoI.
[48] Brief Industrial Profile of Tripura (West) District, GoI.

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.[49] Tripura's total bamboo yield is 1,88,512 MT/year out of which 82.7% is Muli Bamboo, 8.5% is the B. Tulda (Mrittinga) variety, while other varieties constitute the remaining 8.8%.[50] Further, it houses the largest bamboo flooring unit in India with a turnover of INR 25 Crore.[51]

b. **Rubber:** Tripura produces 83,701 mt of rubber[52] 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).[53]

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.[54] 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.[55]

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.[56] 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.[57]

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.[58] In 2020-21, 3.6 MT silk was produced in the state while 40.3 MT of mulberry cocoons were harvested.

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49 ENVIS Centre (http://trpenvis.nic.in/test/forest.html).

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

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

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

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

54 ENVIS Centre (http://trpenvis.nic.in/test/forest.html).

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

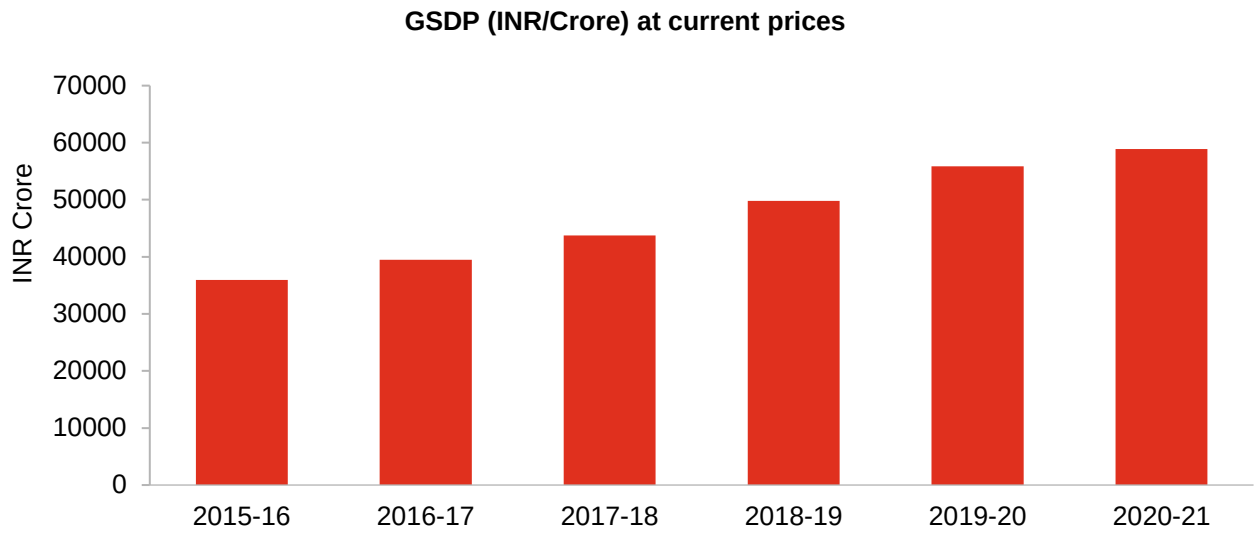
56 Government of Tripura (https://farmersportal.tripura.gov.in/PDF/profile/forest/Medicinal_New.pdf)

57 Government of Tripura (https://farmersportal.tripura.gov.in/PDF/profile/forest/Medicinal_New.pdf)

58 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%[59]. The NSDP of the state has grown at a CAGR (in INR) of 10.15% between 2015-16 and 2020-21.[60]

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[61]. 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.

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[59] Economic Review of Tripura 2020-21
[60] Ministry of Statistics and Programme Implementation
[61] Economic Review of Tripura 2019-20

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 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.[62]

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

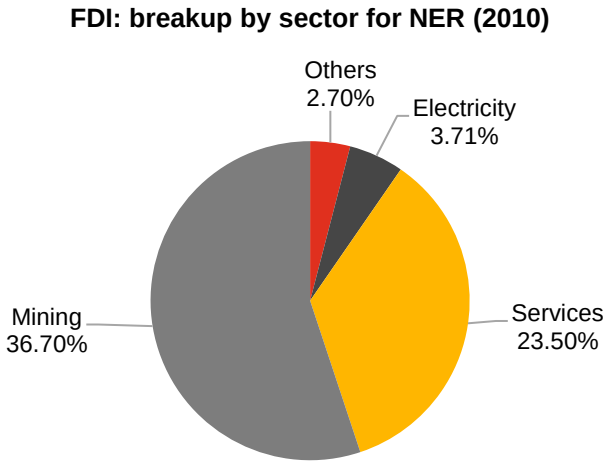
Investment Trends: Tripura has recorded impressive growth rate during the last decade; the state's economy achieved a growth rate of 9.2% in real terms during 2014-15.[63]

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.[64] Out of the total FDI sums India draws, the share of the NER states in this is less than 1%.[65]

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.

62 Niti Aayog
63 TIDC (https://tidc.tripura.gov.in/about-tripura)
64 Department for Promotion of Industry and Internal Trade (DPIIT)
65 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[66].

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

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

[66] Department of Industries & Commerce, Government of Tripura

S. No.	Commodity	Total Value (INR Cr)
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
Total		**16.39**

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
Total		**716.87**

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.[67] 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).

[67] PWD (R&B), Tripura

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 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.[68] 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.[69] 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 Raghnabazar 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.[70] 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[71], which will remain in force for a period of five years, ending on 31st March 2027.

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

Incentive	Benefits	Special Provisions for Thrust Sectors [72]
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

[68] Tripura State Electricity Corporation Ltd. Agartala

[69] TSECL

[70] Department Of Industries & Commerce, Government Of Tripura

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

[72] 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.

Incentive	Benefits	Special Provisions for Thrust Sectors [72]
Procurement Preference	15% on all purchases through tenders by State Government Agencies on products manufactured by eligible enterprises	-
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	-

Incentive	Benefits	Special Provisions for Thrust Sectors [72]
	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	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	a. - b. the annual upper ceiling is INR 25 Lakh per enterprise. c. -

Incentive	Benefits	Special Provisions for Thrust Sectors [72]
b. Power Charge Subsidy c. Employment Cost Subsidy	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.	

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"[73] on Tripura.
- Also, as a result of the relatively slow pace of industrialization and high unemployment, the state has a limited tax base.[74]

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'[75].

The industrial strategy outlined in the subsequent section responds to the challenges and opportunities identified herein.

[73] Economic Review Of Tripura (2019-20), Directorate of Economics and Statistics, Government of Tripura (2020).
[74] Economic Review Of Tripura (2019-20), Directorate of Economics and Statistics, Government of Tripura (2020).
[75] Economic Review Of Tripura (2019-20), Directorate of Economics and Statistics, Government of Tripura (2020).

3. Industrial Strategy

3 Industrial Strategy

The framework adopted for industrial strategy in the report combines the potential of sectors along with regional strengths which has been validated through stakeholder consultations. In order to achieve the growth objective of the Lakshya 2047[76] plan and support India's '5 Trillion' economy plan, it is essential to have the right industrial development strategy. The following is a brief description of the elements contributing towards an industrial development strategy for Tripura.

- **Product Selection** – This involves identifying products which can be manufactured competitively in Tripura owing to resource availability like raw materials and market demand. Identifying a set of priority sectors which help to streamline industrial policy making and to ensure that government spending is optimally focused. Such sectors may be sunrise industries, or new industries arising due to technological, regulatory, economic, or social change. Or they may be existing industries which are resurging after a period of low growth due to changing conditions within the industry or the overall market environment. The identification of high growth potential, thus, allows governments to focus on supporting the sectors that have the potential to fast-track industrial growth.

  Since Tripura is currently aiming to catalyse industrial development, a similar exercise was carried out to earmark the sectors with high growth potential. Three criteria were used for the identification of priority sectors.

1. Export competitiveness: after examining India's export profile, an assessment of products that could potentially be manufactured in Tripura was carried out. Out of these, value-added products which can be competitive were identified based on competitiveness analyses. Among these, those with high demand in regional markets were used to further shortlist suitable manufactures. This assessment was used to curate a list of products with high export potential.

2. Demand based priority sectors: India's top imported commodities over the recent years were analysed. Then, based on raw materials availability in Tripura, some imported products were shortlisted based on their suitability for manufacture in Tripura. Finally, the viability of Import Substitution Industrialization (ISI) was examined after considering the domestic manufacturing cost and cost of current imports. This was found to be viable as the GoI has rolled out several support schemes for MSMEs involved in import substitution under the AatmaNirbhar Bharat scheme.

3. Raw material-based priority sectors: here, priority sectors were identified by assessing the raw material availability in the state and its production capacity. Considering Tripura's large natural capital base and geographical and climatic conditions, industries that would be able to benefit from these factors were identified. Out of this, the sectors showing high demand and export competitiveness were then shortlisted.

The method for product selection as well as the identified priority sectors have been discussed in further detail in Section 4.

- **Industrial infrastructure** – one key investor concern that shapes investment decisions is the availability of key industrial infrastructure in a location.[77] Thus, host locations need to develop physical infrastructure to support industrial activity to attract investors as well as to achieve the larger objective of fast-tracking holistic industrial growth. Apart from creating physical infrastructure that supports industrial operations, the industrial sites must also provide infrastructure that eases the overall operations process.

  In devising an industrial strategy, therefore, it is important to formulate an industrial infrastructure development plan. Such a plan has been devised as part of this engagement with the objective of making

[76] Released in January 2022, Lakshya 2047 is a vision document outlining the path to holistic development for Tripura. It focuses on six aspects- environment, forests, and climate change, agriculture, social outcomes, industry and investment, administrative reforms, and infrastructure and logistics.

[77] Guiding Principles for Policies Toward Attracting Foreign Direct Investment, OECD (2003).

Tripura's industrial parks attractive to investors. For this, any improvements to existing critical infrastructure in the state's brownfield parks were identified and a list of required critical infrastructure for each greenfield park was curated. Then, the products suitable for manufacture at each park were mapped and a plan to develop product specific infrastructure was formulated.

Finally, keeping in mind the growing popularity of 'smart industrial parks' as a means for improving "operational efficiency in areas such as energy, logistics, environment, security, and business activities"[78], infrastructural interventions that could be undertaken to develop Tripura's parks into smart parks were identified. After developing critical as well as sector-specific infrastructure for industries, it is beneficial to also provide smart infrastructure as this facilitates business activities in a number of ways. As a result, investors are attracted to smart industrial parks— operating costs are often lowered as a result of increased efficiency in management of, for example, energy, logistics, environmental monitoring, and government liaison.[79]
The nature of infrastructural interventions required to make Tripura's industrial estates attractive to investors is evaluated in greater detail in Section 5.

- **Logistics** – In addition to infrastructure, logistics play a huge role in the development and growth of industry. In India, 13% of the total price of manufactured goods is attributed to logistics as compared to 8% in developed countries. The benefit of having a logistics cluster is evident from the UAE's experience. Its logistics and transportation cluster is an essential sector in the region's economy and was responsible for 10.4% of non-oil GDP in 2005— Dubai's port is now one of the biggest and most efficient in the world, ranked among the ten busiest ports globally.[80]

  For Tripura specifically, interventions aimed at improving logistical infrastructure and efficiency are important as its geographical isolation from the rest of India escalates logistics costs as well as the time taken for goods to reach target markets, significantly affecting competitiveness.

  To bridge this gap while also increasing the profits for manufacturers operating out of the state, a multi modal logistics park is essential. An MMLP is being planned at Sabroom in South Tripura. There is also a plan to develop an SEZ near Sabroom while an Integrated Check Post (ICP) is being developed by the Land Port Authority of India. Integrated and synergistic development of these facilities can provide a one-stop solution for logistics and warehousing requirements of the state and the rest of the NER.

  An assessment of current logistical issues reveals that such a park will not only help to reduce overall transportation time but overall costs by approximately 8-20% as well, making products in Tripura more competitive, and aiding overall industrial growth.

  Additionally, the proposed park has the potential to ensure that agricultural goods from rural areas remain well connected to markets both within the NER and outside. This is an important advantage considering Tripura's focus on food processing. The park can also help improve the export-oriented manufacturers' access to regional markets apart from Bangladesh. Further, the park can facilitate better access to certain raw materials from neighboring regions.

  The need for a multi-modal logistics park in Tripura has been further explained in Section 6.

- **Policy** – Infrastructural support is only one among the many factors affecting investment decisions. Investors' choice to invest in a particular location is based on various other considerations as well, key among which is the overall policy environment.

  An industrial strategy needs to, therefore, consider, above and beyond the provision of infrastructural support to industry, ways in which to make investing in a location attractive and viable. This can be done in several ways, one among which is providing investment incentives. These can be broadly classified as fiscal and non-fiscal. While fiscal incentives act to reduce upfront investment costs and investment risks, non-fiscal incentives focus on improving investors' experience of operating in a particular location and increasing the ease of doing business there.

  The United Nations Conference on Trade and Development (UNCTAD) finds that over the past 10 years,

[78] 'Smart industrial estate … uplifting economic and social fundamentals?', SCB Economic Intelligence Centre (2019).
[79] Smart industrial estate … uplifting economic and social fundamentals?', SCB Economic Intelligence Centre (2019).
[80] Transportation & Logistics 2030, PwC (2010).

there has been a widespread adoption of formal industrial development strategies globally that entail the use of detailed investment policy tools,[81] especially fiscal incentives and investment promotion and facilitation measures.

Tripura already provides several fiscal incentives and has taken steps to implement Ease of Doing Business reforms in order to provide non-fiscal support to industries. In section 7 these policies and measures have been examined. The identified gaps have led to recommendations that could be addressed by the state government, based on policy benchmarking with some high-growth states of India.

Policy level interventions that are implemented to attract investors are important as they give host locations a competitive edge over locations with similar resource and infrastructure bases. In order to attract investments for its industrial estates over the long term, it is therefore important for Tripura to devise comprehensive provisions for such incentives. In the following section therefore the four pillars of the industrial strategy recommended for Tripura are outlined as follows –

a. Selection of products that can be manufactured competitively in the state, based on raw material availability, export potential, and domestic demand.

b. Development of adequate infrastructure to support industrial growth.

c. Development of a multi modal logistics park in order to improve logistical efficiency, enhancing the access to raw materials and the potential markets.

d. Implementation of policy measures that incentivize investments and ease the process of establishment and operation of businesses. While there are some existing measures that aim to fulfil these objectives, the report recommends measures that can help the state attract investments in the identified priority sectors. Hence the report proposes implementation of existing and proposed measures.

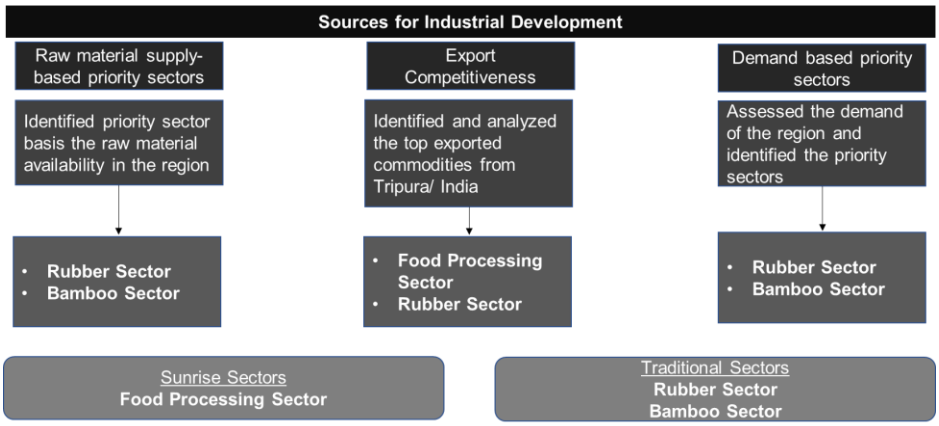
3.1 Strategy Element 1: Identification of priority sectors and priority sectors

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.

[81] World Investment Report, UNCTAD (2018).

Figure 5: Framework adopted to identify priority sectors for Tripura



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

1. **Raw material-based priority sectors:** As a part of this criterion, priority sectors will be identified by assessing the raw material availability in the state and its production capacity.
2. **Export competitiveness:** In this criterion the consultant has undertaken assessment of potential exports from Tripura. Further value-added products which can be competitive have been identified based on competitiveness analysis. This assessment will help in arriving at a list of products with high export potential.
3. **Demand based priority sectors:** As a part of this criterion consultant has analysed India's top imported commodities over the recent years. Further based on the raw materials available in Tripura, the consultant shall shortlist imported products in India which can be manufactured in Tripura. Finally, the consultant will explore whether the Import Substitution Industrialization (ISI) is feasible considering the domestic manufacturing cost and cost of current imports.

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.

3.1.1 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

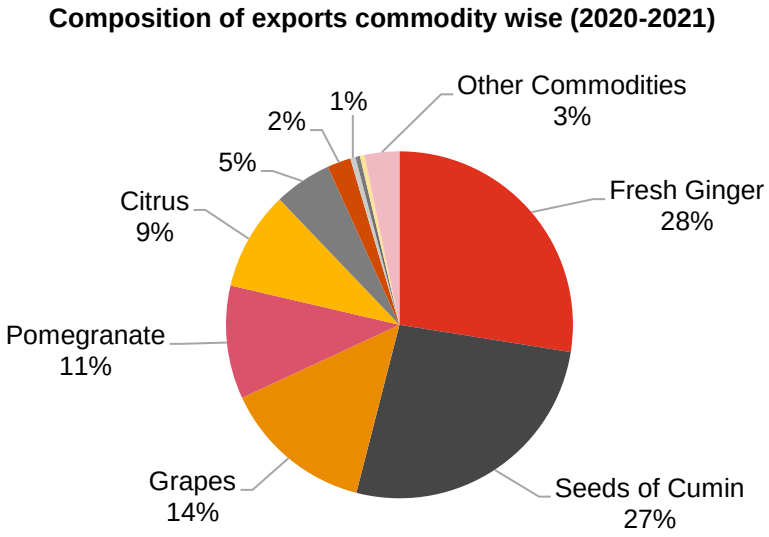
Year	Imports (Rs. in Crores)	Exports (Rs. in Crores)	Total
2006-07	48.69	0.87	49.56
2007-08	84.15	1.51	85.66
2008-09	125.94	0.26	126.20
2009-10	162.88	0.42	163.30
2010-11	255.88	1.71	257.59

Year	Imports (Rs. in Crores)	Exports (Rs. in Crores)	Total
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
Total		**54277**	**545348**	**10.05**

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. The state 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.[82]

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
Ginger	355454	49241	306213	86.1
Lemon	215287	38605	176682	82.1

[82] CCS National Institute Of Agricultural Marketing, 2018.

Product Name	Production in NER (MT)	Consumption in NER (MT)	Market Surplus (MT)	Market Surplus as % of production
Orange	589736	86606	503130	85.3
Pineapple	777144	38891	738253	95.0
Jackfruit	492898	82295	410603	83.3
Rice	6754700	6387320	367380	5.4
Maize	350000	10246	339754	97.1
Banana	1208197	243846	964351	79.8
Chili	122444	89760	32684	26.7
Litchi	78847	3666	75181	95.4
Papaya	216462	80259	136203	62.9
Grapes	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.

1. Plantations: Tripura has an area of 2005.75 sq.km of bamboo plantation with a total yield of 1,88,512 MT/yr.[83], 58 tea gardens covering an area of >6,885 hectares, as of February 2020[84] and 85453.63 hectares of rubber plantation[85]. As per the study of the National Bureau of Soil Survey and Land Use 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.[86].
2. 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.

[83] https://www.destinationtripura.com/bamboo.html

[84] ENVIS Centre (http://trpenvis.nic.in/test/forest.html).

[85] https://tidc.tripura.gov.in/rubber/

[86] 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.).

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
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

Sectors	NIC code (Product)	Products	Tripura Output (2017-18) (INR Lakhs)
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[87]. 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:

$$LQij = \frac{\frac{xij}{xik}}{\frac{xkj}{xkk}}$$

where xij represents output of industry i in region j, xik is the total output of industry i in all regions, xkj is the total output of all industries in region j, and xkk is the total output of the overall region.

[87] 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 (accessed 29 May 2020).

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

Sectors	Product	LQ
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
Manufacture of food products	• 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
Manufacture of products of bamboo, cork, straw, and plaiting materials	• Manufacture of products of bamboo, cork, straw & plaiting materials
Manufacture of rubber & plastic products	• 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:

1. Food processing
2. Rubber
3. 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.

3.1.4 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
• Rubber processing • Bamboo industry	• Food processing industry

3.1.5 Overview of Priority Sectors

3.1.5.1 Rubber Sector:

3.1.5.1.1 Rubber Sector 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.

We can further classify rubber and its articles with the help of adopting ITC HS system code. For rubber ITC HS code is HS-40 (two-digit level). Below table 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
4004	Rubber waste, parings, and scrap (except hard rubber)
4005	Compounded unvulcanised rubber, in primary forms
4006	Un-vulcanized rubber as rods, tubes, discs, rings, etc.
4007	vulcanized rubber thread and cord
4008	Rubber plate, sheet, strip, rod etc., except hard

ITC HS Code	Name/ Description
4009	Rubber tube, pipe, hose, except hard rubber
4010	Conveyor and similar belts or belting of rubber
4011	New pneumatic tyres, of rubber
4012	Tyres, retreated, used pneumatic, solid, cushioned
4013	Inner tubes of rubber
4014	Hygienic or pharmaceutical articles of rubber
4015	Rubber clothing and accessories, except hard rubber
4016	Articles of vulcanised rubber except hard rubber,
4017	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

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

Partner Country	FY 2019 (USD millions)
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.

3.1.5.1.2 Tripura's Rubber Sector

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

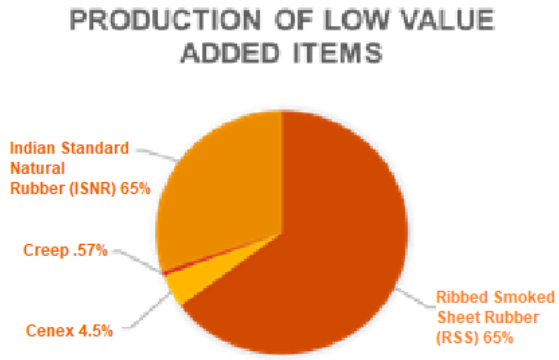
Production (Item wise)			
Items	**Production (Kg)**	**Production (MT)**	**%**
Latex for sheet	53989597.37	53989.60	59.62
Latex for Cenex/ Creep	4362213.00	4362.21	4.81
FC for **Indian Standard Natural Rubber** (ISNR)	32359727.00	32359.73	35.67
Total	**90711537.37**	**90711.54**	**100**

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

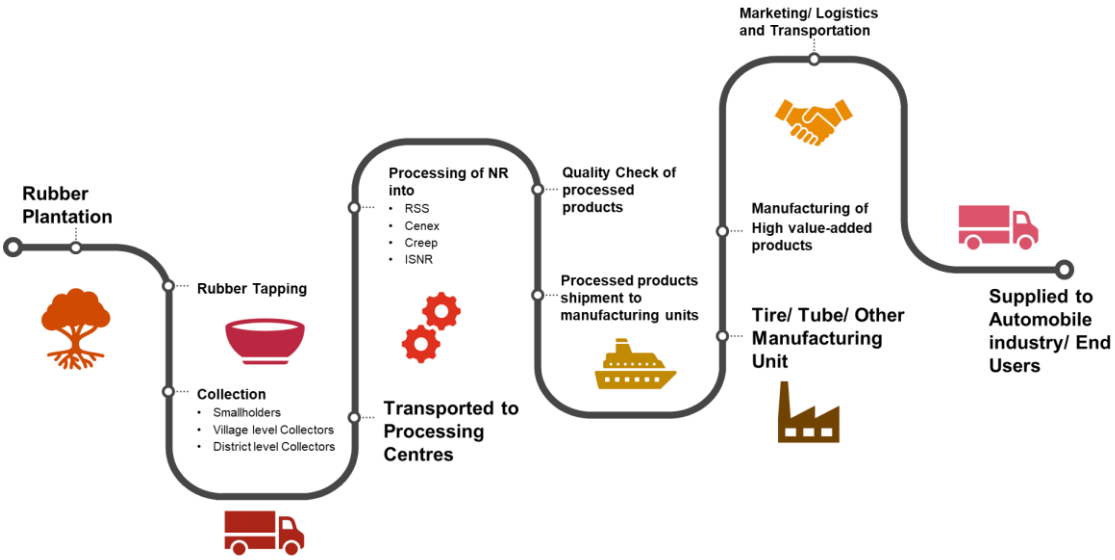
One of the main reasons manufacturers from Tripura are not being competitive, is the time taken for transportation compared to alternate sources of rubber producing states. It is estimated that the time taken to transport products from Kerala to the target market is 3 to 4 days, whereas for Tripura it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



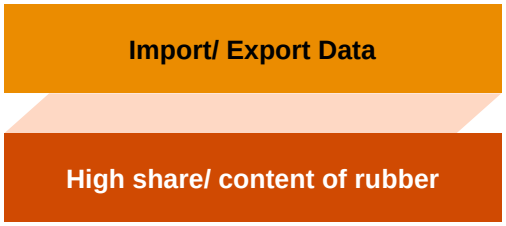
Source: Primary research, Study Team Analysis

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.

a. **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.

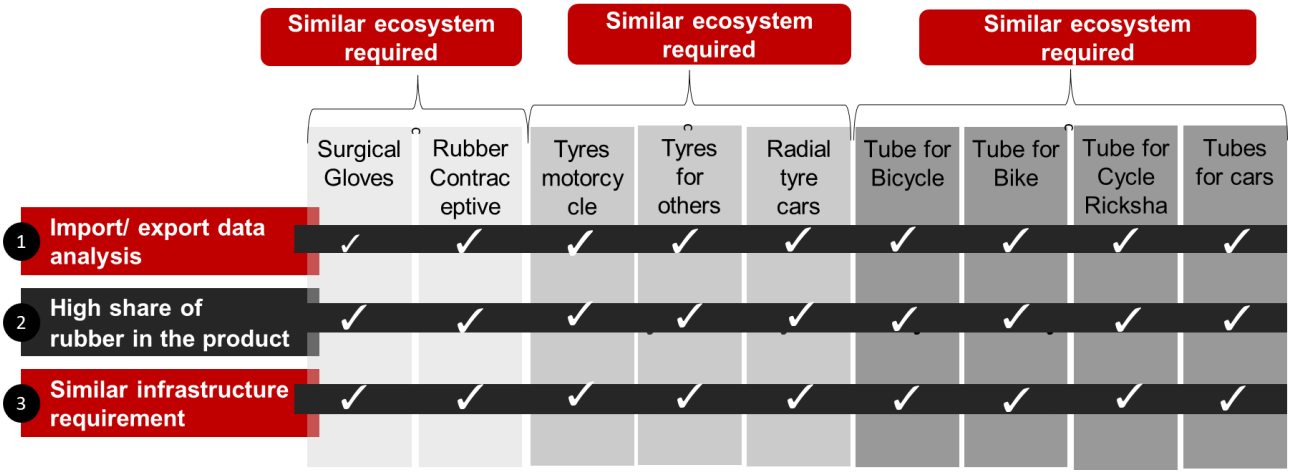
Figure 9: Framework to shortlist priority products



b. **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



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:

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

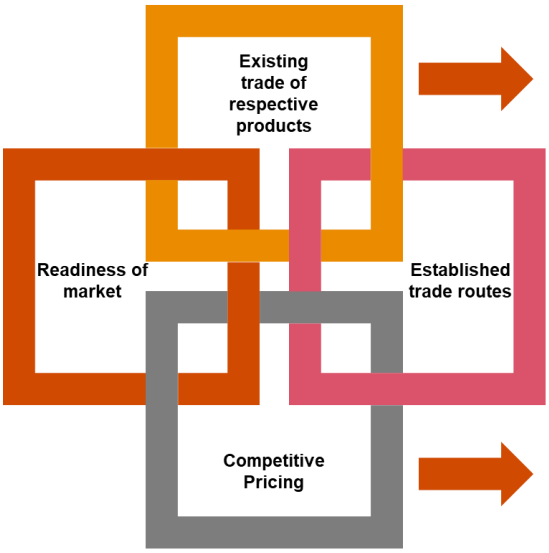
Figure 11: List of shortlisted products of rubber

Surgical Gloves	Rubber contraceptive (Male)	Rubber contraceptive (Female)	Tubes for Cars	Tubes for Truck and Bus
Tubes for bicycle	Tubes for motorcycle	Tubes for cycle rickshaw/ powered rickshaw	Tyre Motorcycle	Tyre Scooter
Tyre other than bike/ scoote	Radial Tyre Cars	Tyre for Bicycle	Tyres for Truck and Bus	

3.1.5.1.3 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



Product	Target market	Exports	Export (INR Lacs)	Competitive Pricing
Surgical Gloves	Bangladesh	✓	1199.94	✓
	Bhutan	✓	339.38	✓
	Nepal	✓	2079.91	✓
	Srilanka	✓	642.81	✓
	Myanmar	✓	214.92	✓
Rubber Contraceptives	Bangladesh	✓	161.83	✓
	Bhutan	✓	22.52	✓
	Nepal	✓	774.29	✓
	Srilanka	✓	148.40	✓
	Myanmar	✓	53	✓
Hot Water Bottle	Bangladesh	✓	123.9	✓
	Bhutan	✓	9.28	✓
	Nepal	✓	27.94	✓
	Srilanka	✓	NA	✓
	Myanmar		NA	✓
Feeding Bottle Nipple	Bangladesh	✓	2.08	✓
	Bhutan	✓	0.38	✓
	Nepal	✓	31.71	✓
	Srilanka		NA	✓
	Myanmar		NA	✓
Tubes	Bangladesh	✓	362.01	✓
	Bhutan	✓	1.52	✓
	Nepal	✓	1039.49	✓
	Srilanka	✓	17.19	✓
	Myanmar	✓	46.51	✓

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.

a. Readiness of market: Similar products are already available in the target market.

b. Existing trade route of respective product: India must already export similar products to these markets.

c. Established trade routes: Direct and already established routes to target market.

d. Competitive pricing: The selling price of the existing products in the target market must be competitive with the projected products.

An analysis was undertaken individually for each product. The framework given below has been used to conduct competitiveness analysis:

Figure 13: Framework adopted to conduct competitiveness 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)
Bangladesh	13.0
Sri Lanka	7.5
Nepal	7.0
Myanmar	5.0

Sources: https://www.daraz.com.bd/tag/medical-hand-gloves/; https://www.daraz.lk/products/latex-powdered-sugical-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 market for contraceptives

Target Market	Price in Target Market (INR)*
Bangladesh	8.5
Sri Lanka	16.0
Nepal	20.0
Myanmar	50.0

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.7.43263633l9cjVZ&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:

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/Icomcnt.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)
Tyre Motorcycle	62.22 Cr	356360	1746.11	500
Tyre Scooter	19.05 Lakh	1670	1140.72	450
Tyre other than bike/ scooter	84.95 Lakh	5760	1474.83	400
Radial Tyre Cars	357.25 Cr	1359620	2627.60	2580
Tyre for Bicycle	3.17 Cr	168980	188.08	150

Product	Import Value (INR)	Import Quantity (Nos)	Cost per unit (Imports)	Cost per unit (domestic production)
Tyres for Truck and Bus	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.

3.1.5.2 Bamboo and bamboo products:

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[88]. 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
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.

[88] Forest Survey of India, Ministry for Environment, Forests and Climate Change. 2019. *India State of Forest Report 2019*. Dehradun.

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[89]. 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.

3.1.5.2.1 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

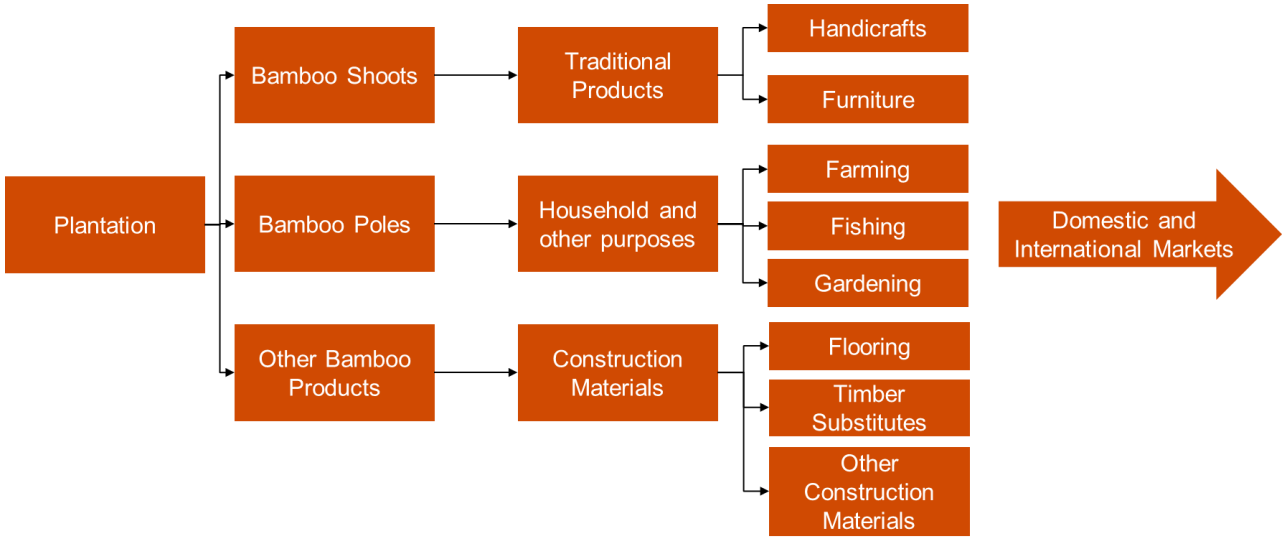
Local Name	Botanical Name	Jewelry	Craft	Mats	Furniture	Incense Stick
Kanakaich	Thyrsostachs oliveri		✓		✓	
Barak	Bambusa Balcooa				✓	✓
Bom	Bambusa Cucharensis		✓	✓	✓	
Mal/ Makhla	Bambusa Pallida		✓	✓		
Paura	Bambusa Polymorpha		✓			
Mirtinga	Bambusa Tulda	✓	✓	✓		
Barji/ Jai	Bambusa Vulgaris	✓	✓		✓	
Rupai	Dendrocalamus longispathus	✓	✓	✓	✓	
Lathi Baans	Dendrocalamus strictus		✓		✓	
Muli	Melocana baccifera			✓		✓

[89] Department of Commerce, Government of India. Data from Financial Year 2019–2020.

Local Name	Botanical Name	Jewelry	Craft	Mats	Furniture	Incense Stick
Dolu	Schizostachyum dullooa		✓			
Pencha Baans	Dendrocalamus hamitonii		✓		✓	

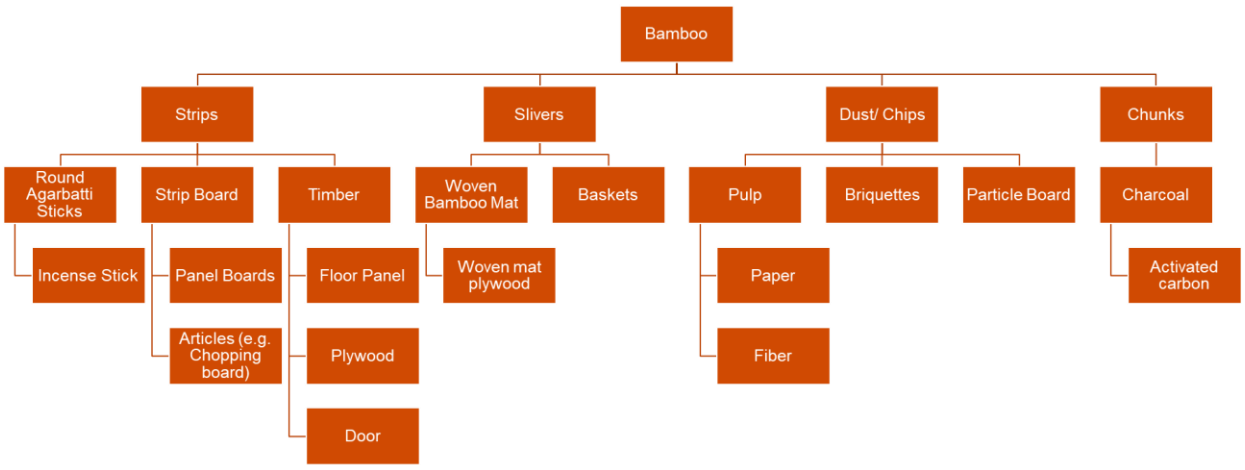
Source: https://www.ijcmas.com/9-6-2020/Animesh%20Sil,%20et%20al.pdf

Figure 14: Given below is the 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)[90] in Mizoram but also because it has the second highest growing stock of bamboo in the state, at 4164.17 T.[91] 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

[90] Bamboos of Mizoram, EF&CC Department, Govt. of Mizoram
[91] Bamboos of Mizoram, EF&CC Department, Govt. of Mizoram

Hailakandi, a unit of M/S Hindustan Paper Corporation Limited, which is the largest user of bamboo resources in the state. [92] Further, the Teliakhalepur bamboo processing cluster is also located in Karimganj district in the Barak valley[93]. 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[94].

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.274 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.

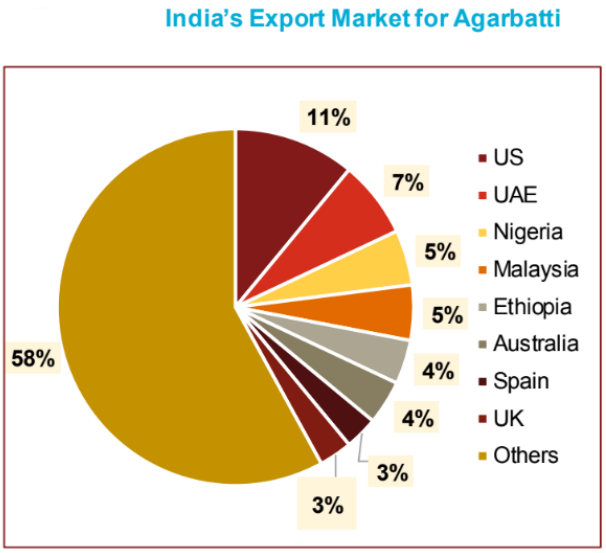
In India, agarbattis are considered to be a staple feature of devotional activities. It is now branching out as products associated with aromatherapy, meditation, and yoga. The major products in focus are agarbatti round sticks and raw incense sticks since their manufacture contains only bamboo as raw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

[92] Bamboos in India, ENVIS Centre on Forestry, Forest Research Institute (2015).

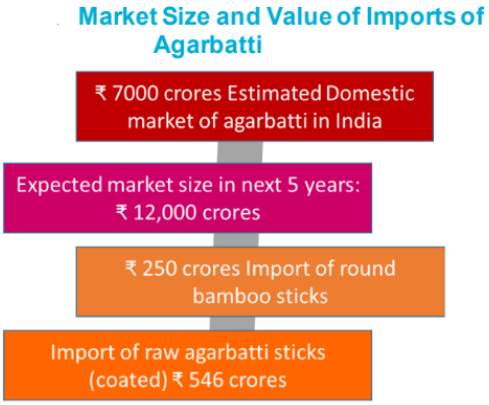
[93] Ministry of Textiles, GoI (http://www.craftclustersofindia.in/site/index.aspx?mu_id=3&Clid=290).

[94] 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



UAE = United Arab Emirates, UK = United Kingdom, US = United States.
Source: ADB study team analysis.



Sources: Industry sources; A. Vishnoi. 2019. Government in Huddle as Fragrance of Chinese agarbattis Spreads Far and Wide. *The Economic Times*. New Delhi.

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.276

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.[95] 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

[95] NEEC Report

Nepal	51,039.91	62,928.78
Total	**88,987.69**	**95,004.74**

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 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.[96]

  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.[97]

  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[98]. 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 in Tripura. 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”[99], “making it highly prone to attack by biological organisms”[100].

“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.”[101] 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.

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[96] 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).

[97] 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).

[98] 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).).

[99] Preservative Treatment Methods For Bamboo: A Review, Kerala Forest Research Institute (2000).

[100] Preservative Treatment Methods For Bamboo: A Review, Kerala Forest Research Institute (2000).

[101] Eco-Friendly Preservation Of Bamboo Species: Traditional To Modern Techniques, Kaur, P. J Et Al, BioRes 11(4), 2016.

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**.[102]

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.

Currently, in Tripura, bamboo is treated with boric acid borax and seasoned.[103] 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.

3.1.5.3 Food Processing Sector:

3.1.5.3.1 Food Processing Sector in India

Agriculture is one of the major contributors to the 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.

[102] Eco-Friendly Preservation of Bamboo Species: Traditional To Modern Techniques, Kaur P. J. et al, BioRes 11(4), 2016.
[103] Tripura Forest Development and Plantation Corporation Limited (2022).

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%)	Pharmaceutic als, 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%)
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%)

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 73rd 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.

3.1.5.3.2 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. [104]

Table 28: Crop Production in Tripura

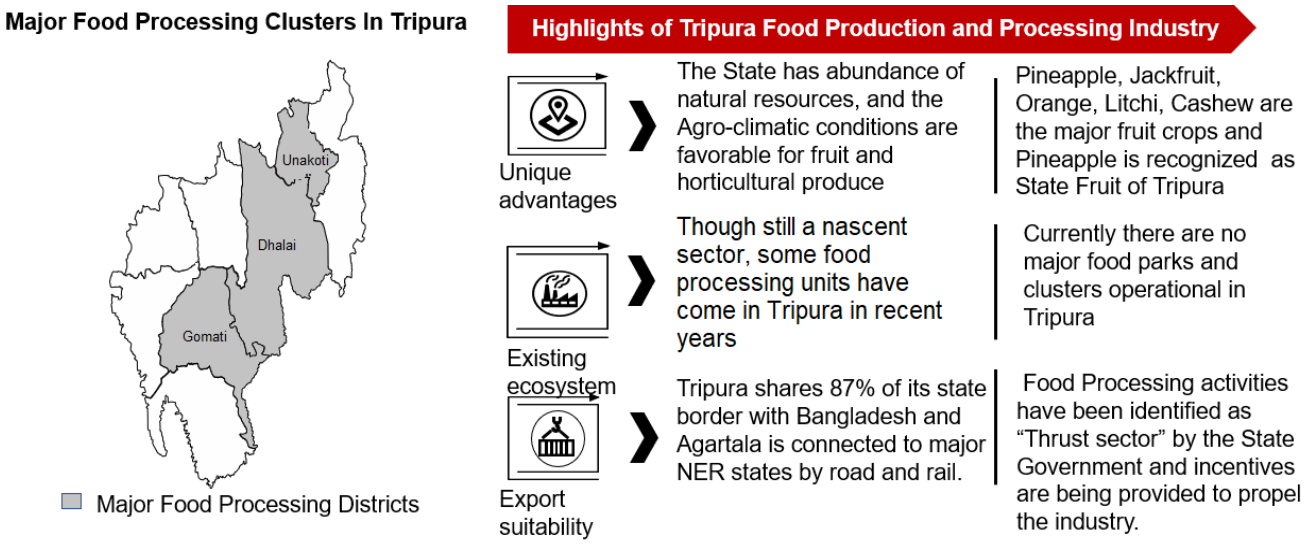
Product	Production in NER ('000 tonnes)	Consumption (%)	Marketable Surplus (%)
Rice	6,755	94.6	5.4
Banana	1,208	20.2	79.8
Potato	1,113	82.4	17.6
Cabbage	912	25.8	74.2
Pineapple	**777**	**5.0**	**95.0**
Orange	**590**	**14.7**	**85.3**
Tomato	517	32.3	67.7
Jackfruit	**493**	**16.7**	**83.3**
Cauliflower	479	30.7	69.3
Brinjal	398	79.0	21.0

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.

[104] APEDA, Agri exchange

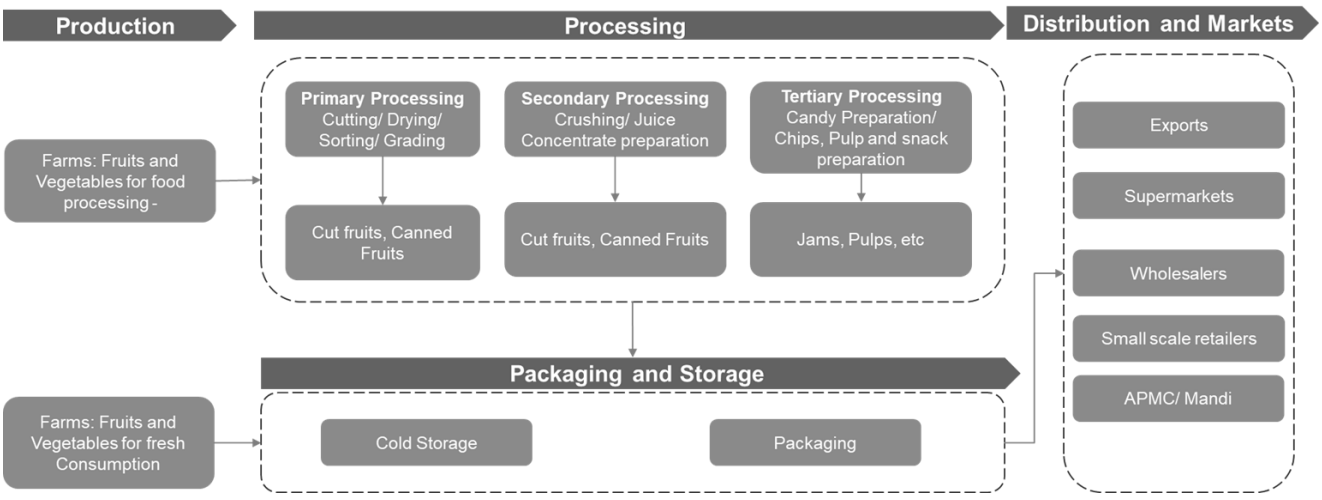
Figure 18: Major food processing cluster in Tripura



3.1.5.3.3 Value chain of the food processing industry

In Tripura, 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.

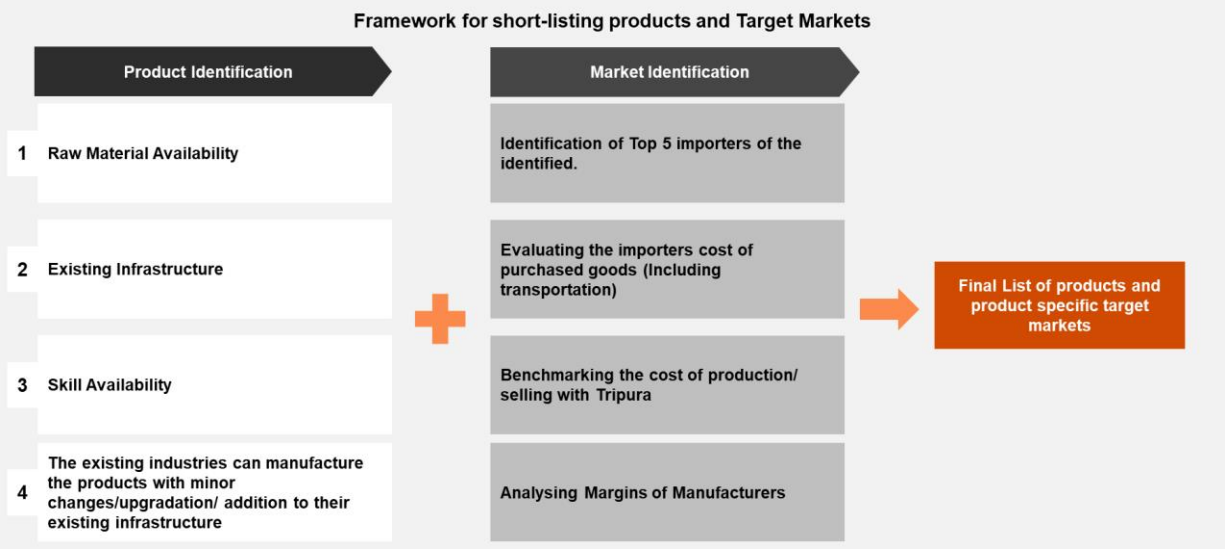
Product identification

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 but 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)[105]		
State	**Area under cultivation ('000 Ha)**	**Output ('000 MT)**
Assam	80.81	77.90
Meghalaya	16.93	24.99
Mizoram	11.86	7.27

[105] Handbook Of Processing Of Areca nut, Indian Institute of Food Processing Technology Ministry of Food Processing Industries, Tamil Nadu (2021).

Nagaland	0.39	2.30
Tripura	5.99	20.41

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[106]. 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.[107] Last year, India's areca nut exports to Bangladesh and Myanmar amounted to USD 0.99 million and USD 1.22 million, respectively.[108] The states currently exporting to these countries are Gujarat, and Maharashtra and Tamil Nadu, respectively.

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.[109] 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:

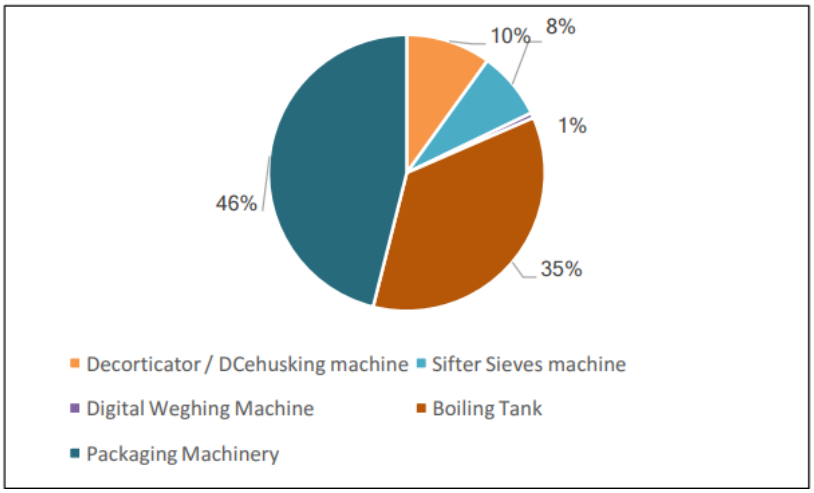
[106] Livelihood Option through Arecanut Cultivation in Tripura: A Case Study of Noagang and its Neighbouring Villages, Kuki, Vanlalrema et al, International Research Journal of Social Sciences, 5(1), 2016. (http://www.isca.in/IJSS/Archive/v5/i1/10.ISCA-IRJSS-2015-298.pdf)

[107] Directorate General of Commercial Intelligence and Statistics, 2021.

[108] Directorate General of Commercial Intelligence and Statistics, 2021.

[109] 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)

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:

i. **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.

ii. **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.

iii. **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 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.[110]

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.

[110] Areca nut Processing, Ministry Of Food Processing Industries, GoI. (http://www.niftem-t.ac.in/pmfme/dpr-arecanut.pdf)

3.1.6 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. [111]

Table 30: 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, Study team analysis

With limited food processing infrastructure, there is little possiblility 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
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.

[111] APEDA

Product competitive analysis

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

Market diversification as cost analysis

HS Code	Product	Country	Pricing Rs/kg	Pricing in Tripura (Rs/kg)	Transport cost (Shipping Freight)	Total Cost	Margin for Tripura exporters
200820	1. Ready to serve beverages/ squashes, 2. Candied pineapple pieces, 3. Canned pineapples tidbits, 4. Pineapple Pulp 5. Freeze dried pineapple snacks,	USA	99	79	26	105	-6
		Germany	97	79	19	98	-1
		Spain	112	79	19	98	14
		Russia	80	79	20	98	-18
		UK	112	79	20	99	14
081090	1. Canned jack fruit bulbs 2. Dried jack fruit slices 3. Preserves/ Jams 4. 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
80430	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
200941	Pineapple juice, unfermented, Brix value <= 20 at 20°C	France	62	43	19	62	1
		Netherlands	43	43	19	61	-19
		USA	52	43	26	69	-17

HS Code	Product	Country	Pricing Rs/kg	Pricing in Tripura (Rs/kg)	Transport cost (Shipping Freight)	Total Cost	Margin for Tripura exporters
		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

HS Code	Product	Country	Pricing Rs/kg	Pricing in Tripura (Rs/kg)	Transport cost (Shipping Freight)	Total Cost	Margin for Tripura exporters
		Japan	245	426	2	428	-183
		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 manufacurers in Tripura are summarised in the table below.

Table 32: 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, People's Republic of China, Japan, Spain
200941	Pineapple juice, unfermented, Brix value <= 20 at 20°C	France
200949	Pineapple juice, unfermented, Brix value > 20 at 20°C	Netherlands, Spain, Japan, Italy

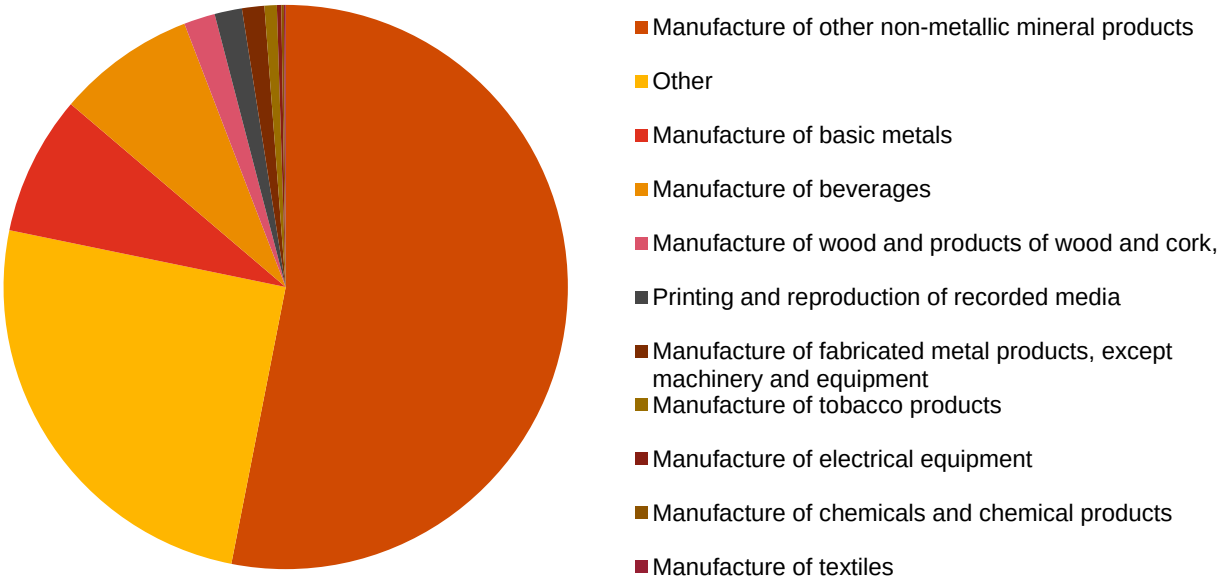
HS Code	Product	Identified Markets for export
200911	Orange juice, frozen, not fermented or spirited	Germany, Japan, People's Republic of China, France
200912	Orange juice, not frozen, of a Brix value not greater than 20	France, UK
200919	Orange juice, not fermented, spirited, or frozen	Belgium, UK, Germany, France, Poland
330112	Essential oils of orange	People's Republic of China
081090	Canned jack fruit bulbs, Dried jack fruit slices, Preserves/ Jams, Fruit Snacks	Germany, Netherlands

Source: Tradestat, Primary research, Study Team Analysis

3.1.7 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.

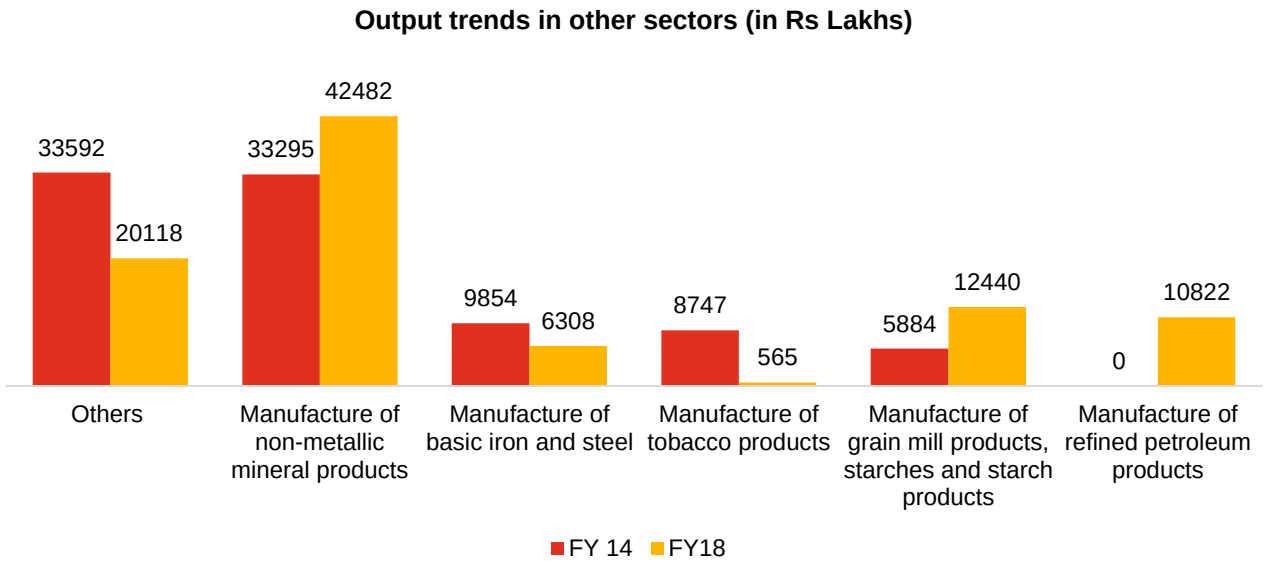
Figure 22: Manufacturing output of other sectors



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"[112] 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

[112] Medical Tourism: Treatments, Markets and Health System Implications: A scoping review, OECD (2011).

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.
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[113], 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,[114] 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 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,

[113] 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/)

[114] 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.).

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.[115] 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 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.

Table 33: 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,	Nepal	1.82
			Bangladesh	1.32

[115] Disposable Syringe, Ministry Of Micro, Small & Medium Enterprises, GoI (http://www.dcmsme.gov.in/old/publications/pmryprof/chemical/ch11.pdf).

		Uttarakhand, and Uttar Pradesh	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.[116]

   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).[117] 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.[118] The factory has been manufacturing rubber wood products since 2012. The plant's current

[116] Rubber Wood, The Rubber Board Of India (http://www.indiannaturalrubber.com/advantages.aspx).

[117] Political Economy of Natural Rubber Cultivation in Tripura, S. Mohanakumar, Social Scientist, 4(11/12), 2016.

[118] Use of Rubber Wood in Tripura, Tripura Farmers Portal and Kisan Call Center, Government of Tripura (mofpi.gov.in/PLISFPI/incentives-sales-investment).

capacity is 2000 cum per annum.[119] 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 34: 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[120], 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.[121] 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.[122] 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.

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

[119] Plantations in Tripura (https://slbctripura.pnbindia.in/pdf/Plantations_Tripura.pdf).

[120] 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)

[121] Forest Products Annual Market Review 2020-2021, United Nations And The Food And Agriculture Organization Of The United Nations (2021).

[122] Status And Utilization Of Rubberwood (Hevea Brasiliensis Mull.Arg.) In India, Sunny, P.P et al (2017).

maintaining a density of ~600 trees per hectare appears to be most suitable for the NER.[123] 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[124], rubber wood yield in plantations varies between 140 to 200 m3/ha. The table below provides the potential rubber wood availability of various rubber cultivars grown in India.

Table 35: Potential Rubber Wood Yield Before Felling

Available trunk volume/ha	
Variety of rubber	Available trunk (m^3/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 36: 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.

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

[123] 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).

[124] 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).

indicate rubber wood processing capacity in the state. Skill development measures may be beneficial in further increasing this capacity.

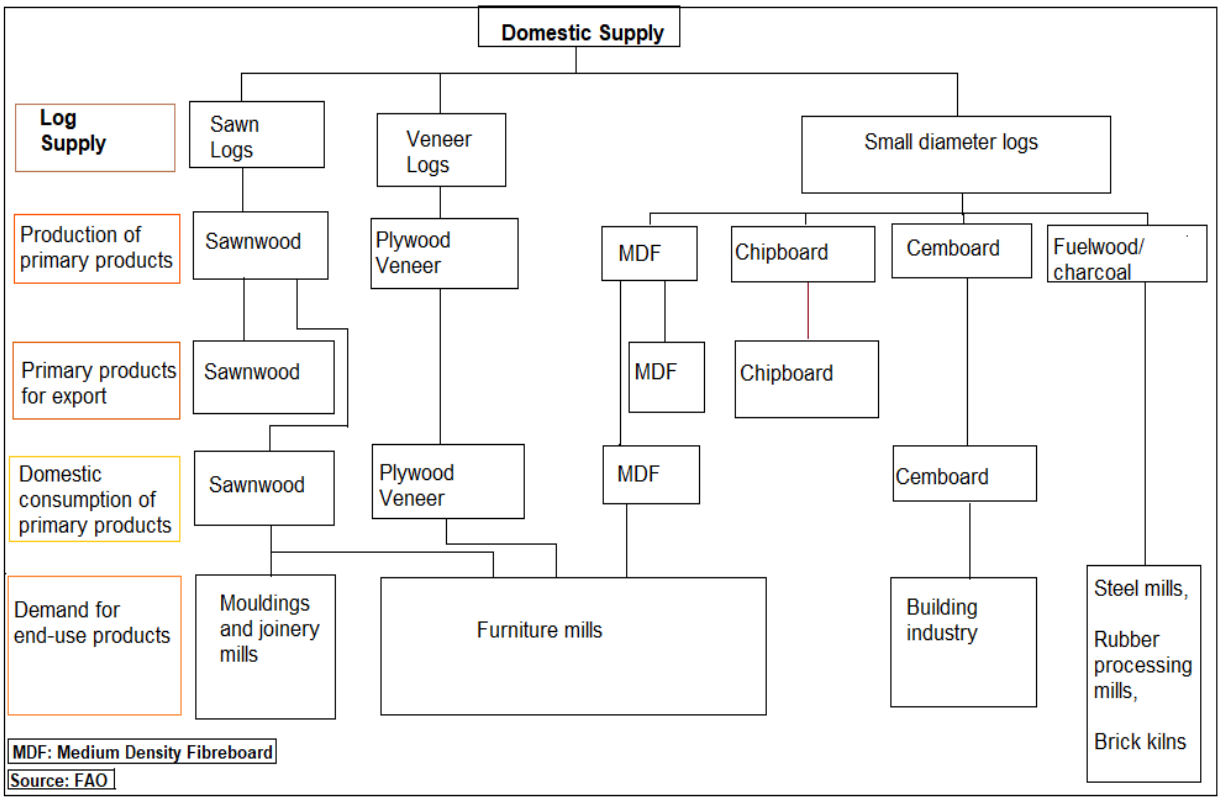
Further, **rubber wood-based plywood** is a popular product that can also be manufactured in Tripura. This plywood can be used for both construction and decorative end uses. Besides this, **medium density fibre boards (MDFs)** and **particleboards** may also be considered for manufacture. Manufacturing 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.[125] Out of this, exports to Bangladesh accounted for USD 65.88 million.[126]

   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 nubs, 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 37: 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%.[127]

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

[125] Directorate General of Commercial Intelligence and Statistics, 2021.
[126] Directorate General of Commercial Intelligence and Statistics, 2021.
[127] Bicycle Industry in Bangladesh: Pedalling into Global Market, DataBD (2020). (https://databd.co/bicycle-industry-in-bangladesh-pedalling-into-global-market/#ref_1)

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.[128] 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.[129] 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.

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 38: 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

[128] 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)

[129] Directorate General of Commercial Intelligence and Statistics, 2021.

S. No.	Sector	Products	Target market
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
16.	**Bamboo**	Timber Substitute	Domestic market in India and Regional Markets
17.		Agarbatti	Domestic market in India and Regional Markets
18.		Floor Panels	Domestic market in India and Regional Markets
19.	**Food Processing**	Canned pineapple	Spain, UK
20.		Pineapple squash	Spain, UK
21.		Pineapple concentrates	Spain, UK
22.		Frozen pineapple snacks	Spain, UK
23.		Pineapple pulp	Spain, UK
24.		Canned jack fruit bulbs	Netherlands,Germany
25.		Dried jack fruit slices	Netherlands,Germany
26.		Preserves/ Jams	Netherlands,Germany
27.		Fruit snacks	Netherlands,Germany
28.		Orange juice, frozen, not fermented or spirited	Germany, Japan, People's Republic of China, France
29.		Orange juice, not frozen, of a Brix value not greater than 20	France, UK

S. No.	Sector	Products	Target market
30.		Orange juice, not fermented, spirited, or frozen	Belgium, UK, Germany, France, Poland
31.		Essential oils of orange	People's Republic of China

In order to produce proccessed 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 39: Existing Food Processing Units

Crop	Product	Company	Location
Jackfruit	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
Pineapple	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

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.

3.1.8 Interventions needed to attract investments to Tripura's priority sectors

To promote industrial development, while it is important to identify sectors with a high growth potential, it is equally important to take steps to support these sectors. Such steps can include infrastructural and policy-level interventions.

The Tripura government has undertaken various projects focused on improving industrial infrastructure. Having recognized the key role of industrial parks in catalysing industrial growth, the state government has developed 11 such parks, namely the Bodhjungnagar Park, the RK Nagar Park, the Sarasima IIDC, the Dharmanagar IIDC, the AD Nagar Park, the Santirbazar IIDC, the Kumarghat Park, the Dewanpasa IIDC, the Dukli Park, and the Badarghat Park. It is currently also working to develop six greenfield parks. These are the Jalefa and Lalchhari IIDCs and the Sonamukhi, Nagicherra, Kathalia, and Bijoypur Industrial Areas. Apart from this, the road, rail, air, and telecom infrastructure in the state is being improved as well.

However, the existing critical infrastructure in the industrial estates of the state can be improved. Among the basic infrastructure that can be further developed are boundary walls and CCTVs which are important in ensuring the security of the estates. Internal road networks could also be improved as this will ensure the smooth transportation of raw materials into, and finished goods out of the parks.

Stable water, power, and gas supply networks too are among the basic requirements for industrial activity. Steps can be taken to improve these supply facilities across the brownfield parks of the state. Adequate supply of water, for instance, is necessary for the smooth operation of both food processing and rubber-based units. Since these are both among the identified priority sectors in Tripura, it is essential to prioritise the development and/or improvement of water supply to industrial parks housing food processing and rubber industries.

Further, drainage systems and waste disposal systems, like ETPs and STPs, can be improved where necessary in order to comply with prevalent environmental legislations and to maintain cleanliness in the parks. Sewage, for instance, needs to be treated to acceptable standards before discharge into inland water bodies after disinfection or reuse.

Other required additional infrastructure, or 'good-to-have' infrastructure, includes warehousing units, truck terminals and common facilities centres. These will ease operations of the businesses located on park premises. Common warehousing facilities will be attractive for MSMEs that cannot afford to invest in individual warehousing units, for example. It is critical to develop truck terminals as well as these will ensure efficient transportation of both raw materials and finished goods.

Once the critical industrial infrastructure discussed above has been developed, developing additional enabling infrastructure that caters to the specific needs of the identified priority sectors can also be developed. These include–

Infrastructure	Description
Cold Chains	• An efficient cold chain is required to provide end to end solutions such as pre-cooling, reefer vans etc. Precooling centres can be set up major districts and production centre to protect food from degradation.
Quality and FPO Labs	• Quality labs are needed to ensure standardization of food making processes by standardizing raw materials, finished goods etc. The FPO labs would aid in getting food certifications, providing a one stop solution for all testing compliances.
Food Processing Training Centre	• Having a food processing training centre within parks will help find relevant work force in a more efficient manner. It can also provide hands-on experience and skilling on post-harvest handling, preservation, and processing activities.
Testing Facilities for Rubber Products	• Testing facilities (for both chemical and physical testing) for all rubber /polymer products and facilities for their certification to any international standards are needed.
Common Infrastructure for Bamboo Processing	• Infrastructure for bamboo processing, including bamboo stick-making facilities, Bamboo Plastic Composite (BPC) facilities, strand woven bamboo block units, vacuum pressure treatment plants, resin/glue plants, and bamboo charcoal plant, could be developed.
Common Facility Buildings	• Common infrastructure required for business facilitation include canteens, meeting halls, business centres, infirmaries, bank/bank extension counters, couriers, freight forwarders, and packing material suppliers.

Skilling Centres:

Workforce availability is among the major factors based on which any industry considers investing in a location. Any industrial set up will engage three types of workers: skilled, semi-skilled and unskilled. Industries prefer local people to save on relocation costs, among others. Therefore, consistent availability of skilled manpower becomes important. To ensure the success of industrial projects, it is important to devise a skills and capacity development plan. This will enable the smooth operation of industry and will also ensure that ease of doing business for industries.

For skill development programs for its thrust sectors, the following have been started in Tripura:

a. Rubber: a sector skill council (SSC) for the rubber sector, the Rubber Skill Development Council (RSDC), has been established with support from the Ministry of Skill Development and Entrepreneurship. To provide skilled manpower to the industry, the RSDC has involved all stakeholders in the rubber ecosystem to contribute towards the development of standards, trainings, and assessments. Further, a three-year-long Bachelor of Vocational Education (B.Voc) program in rubber technology is offered at the Department of Rubber Technology at Tripura University. The program is designed to train students for jobs through in-depth theory classes and hands-on skill-based training, on-the-job training, and industry exposure. A project to upgrade the skills of OBC rubber tappers in the state has been started as well. The project involves the introduction of rain guarding, skilled tapping, and scientific latex processing and train 100 rubber workers, of whom women account for over 21% to achieve gender equality. Additionally, other initiatives for skilling and up-skilling are provided to improve harvesting, processing, estate management, marketing, value addition, good agriculture practices, institutional support for planting and re-planting practices.

b. Food processing: Under the GoI's Ministry of Food Processing Industries, financial grants are provided to Tripura as part of the Prime Minister Kisan Sampada Yojana (PMKSY) scheme for food processing related activities. These also provide support for human resources development and institution development. Similarly, the PM Formalization of Micro Food Processing Enterprises (PM FME) initiative (2020-25) provides support to units for training and capacity building.

Further, the state government set up the Pineapple and Jackfruit Mission in 2022. The state has introduced the initiative to promote crop production as well as crop value addition for pineapple and jackfruit. The program will run for a period of five years.

c. Bamboo: The state government's Tripura Bamboo Mission initiative works towards the integrated development of the state's bamboo sector. The objective of the mission is to scale up the sector's turnover. Bamboo is a major livelihood provider and bamboo handicraft making is a traditional skill passed on generationally. Hence, the key focus of the mission has been to generate sustainable livelihoods for bamboo handicraft artisans by enabling them to build their own institutions and production centres, and by building their capacities and skill levels. Now, as advanced technologies are enabling the production of new bamboo products, the TBM has been working to provide the youth with newer industry relevant skills to make them employable.

In order to further broaden access to skill development facilities in the state, it is being proposed that sector-specific training centres be set up for each of the identified priority sectors. For instance food processing training labs could be set up to provide hands-on experience and skilling for processing activities. Similarly, facilities could also be developed for the bamboo and rubber sectors, Further, it is recommended such facilities and opportunities be made gender inclusive to broaden their reach.

Smart industrial infrastructure: As smart industrial parks have been found to be attractive to investors on account of their improved operational efficiency, the report recommends interventions needed in the proposed industrial parks. For greenfield parks, smart features are proposed to be incorporated during the designing and planning of industrial parks. While for brownfield parks, these features are proposed to be retrofitted after all the critical infrastructure has been developed.

Possible interventions for the creation of smart parks include the development of ICT facilities, common facilitation centres, and use of improved operating and monitoring systems like SCADA.

Gender inclusive infrastructure: Various infrastructural projects with **gender-responsive features** have been proposed for Tripura as these can contribute to increasing women's participation in the workforce. One recommendation is to develop gender inclusive training and skilling centres. Another proposed intervention to broaden women's access to workspaces is the development of gender inclusive transportation facilities. These recommendations have been made keeping in mind women's safety concerns as well as social constraints on their mobility.

Beyond the provision of infrastructure, investment-seeking locations also have to take steps to create a business environment attractive to investors. This is because investors consider a range of factors while making investment decisions, only one among which is infrastructural support. Another important factor is "the quality of the enabling environment"[130]. In order to create such an environment, host locations often roll out policies that incentivise investments by reducing upfront investment costs, reduce risks, and ease the establishment and operation of businesses.

In Tripura's case, in order to offset locational disadvantages, it is recommended that the current fiscal and non-fiscal incentives provided by the state government as well as the overall institutional capacity of bodies like the TIDC and the DIC be improved. Further, the benefits of other policy improvements for Tripura, like the development of a comprehensive land allotment policy to govern land allotment in industrial parks, could also be appraised. These measures have been discussed in detail in the following sections.

3.2 Strategy Element 2: Development of adequate infrastructure to support industrial growth

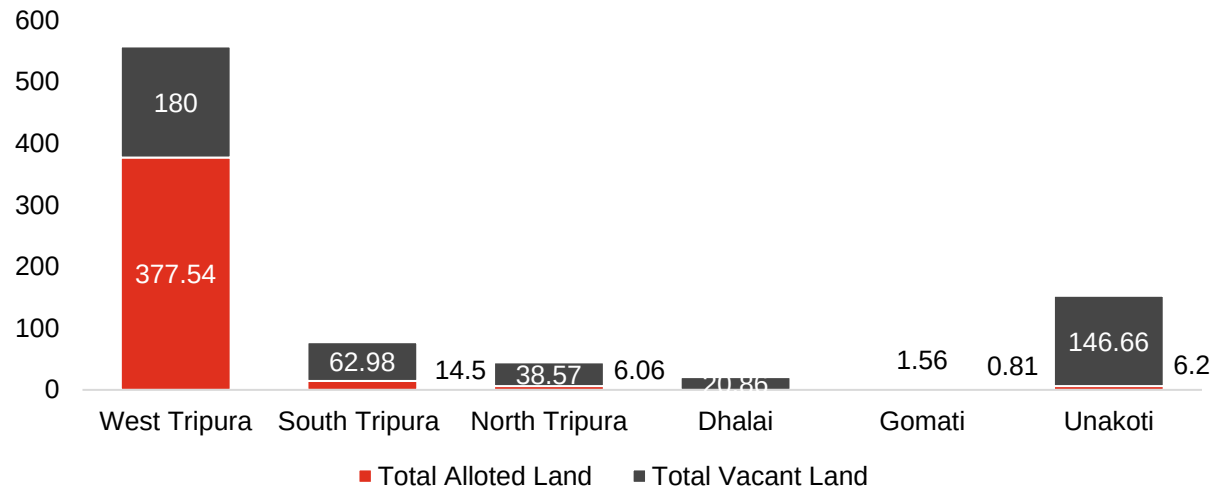
Tripura is in its budding stage of industrial development. Tripura Industrial Development Corporation (TIDC) is the nodal agency for development of industrial parks in the region. Currently there are 17 Industrial Parks in

[130] Investment Incentives And FDI In Selected ASEAN Countries, OECD (2004).

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) Dewanpassa (~34 acres), Sonamukhi (~130 acres) and Jalefa (~39 acres)

Figure 25: Land Availability in industrial parks of various districts



Source: TIDC

The land for industries is allotted by TIDC on lease basis. The lease period is around 30 years. Mapping of priority sectors to each individual park is based on proximity to raw material, proximity to demand, land availability and industrial ecosystem. The table below maps the priority sectors to each industrial park based on the framework mentioned above.

Table 40: Mapping of Industrial parks to priority sectors

Priority sectors	Bamboo	Rubber	Food processing
Kumarghat	✓	-	✓
Dharmanagar (Mission Tilla)	✓	-	-
Dewanpasa	-	-	✓
Lalcheri, Ambassa	-	-	✓
Sonamukhi	-	-	✓
Bodhjungnagar	-	✓	-
RK Nagar	✓	✓	-
AD Nagar	-	-	-
Dukli	-	-	✓

Badharghat	-	-	-
Nagicherra	-	✓	-
Dhajanagar (Udaipur)	-	-	-
Sarashima, Belonia	-	✓	-
Jalefa, Sabroom	-	-	✓
Santirbazar	-	✓	-

Source: Primary research, Study Team Analysis

Mapping of Priority Sectors to Districts:

After having identified Tripura's priority sectors and the infrastructure needed to support these sectors in the previous sections, it is important to map the identified sectors to districts based on raw material availability, existing capability and ecosystem, and market access.

1. **North Tripura:** Out of Tripura's 17 industrial estates, 4 are located in North Tripura. These are the Kumarghat, Dharmanagar, Dewanpasa, Lalchari Ambassa, and Sonamukhi parks. Considering their access to raw material, demand centres, and existing industrial ecosystems, the 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. Additionally, Assam, with its abundant bamboo resources, can also serve as a potential source for raw material. 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. Further, both regions have furniture/handicraft clusters that use bamboo as a raw material. These indicate the existence of the required capability for bamboo processing which may be further strengthened through targeted investments towards sector development as wells as skill development initiatives.

Besides this, the Dewanpasa, Lalchari Ambassa, and Sonamukhi parks could **prioritize the food production sector** due to their locational advantages, which allow easy access to raw materials like jackfruit. Since Lalchari is located in 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 with the Tripura government currently making efforts to revive citrus cultivation in the Jampui Hills (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[131]
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.

Thus, it is recommended that industrial estates in North Tripura target sectors based on natural resource availability and demand in regional markets.

2. **West Tripura:** West Tripura is the most industrialized region in the state. A few of the industrial parks in the region are located in Bodhjungnagar, RK Nagar, and Nagicherra. Considering their access to the rest of India and the existing industrial ecosystem, the **rubber sector** holds the most potential in this region. One of the key reasons for this is that Tripura's rubber park is situated in the Bodhjungnagar Industrial Area where

[131] http://nopr.niscair.res.in/bitstream/123456789/7967/1/NPR%205%284%29%20302-305.pdf

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 through Dhaka via the Agartala integrated check post and the Akhaura check post crossing. Further, all three parks will benefit from the presence of the Regional Rubber Training Centre located in the state capital.

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 can no longer 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 this can help the region 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 an added advantage for the park's bamboo processing units.

The Dukli industrial park, spread over 45.77 acres, can consider prioritizing the food processing sector 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 easy transportation of raw materials and processed food products to potential markets. 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 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.

Thus, it is recommended that industrial estates in West Tripura target sectors based on the demand of states outside the NER and of regional markets like Bangladesh as well.

3. **South Tripura:** The industrial areas in South Tripura are located at Sarasima, Sabroom, and Santirbazar.

Being in South Tripura, both Sarasima and Santirbazar have easy access to Bangladesh. This makes them suitable locations for **rubber processing** as they will find a market for various rubber products, including latex, in Bangladesh. Within India, the two towns are linked to Agartala by road via 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, they also enjoy proximity to raw materials as the second largest district in terms of area under rubber plantations is South Tripura.

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 will give it access to the Chattogram port in Bangladesh via the Maitri Setu, which will not only enable access to markets in Bangladesh but in the larger South Asian region as well.

Further, 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. It also has 23 registered food processing-based industrial units, making sourcing of skilled labour easier. Additionally, access to some edible wild plants whose growth is largely restricted to this region may be beneficial to the expansion of food processing at the SEZ. These include passionfruit, used to make squash and preserves, and the Harabari plant whose fruit is used in pickles.

Since districts in South Tripura have the advantage of access to a port, it is recommended that

industrial estates in the region target export-oriented sectors.

To identify the sector specific infrastructure needs which will help in attracting investments into the region, a benchmarking analysis has been done. The benchmarking analysis has focused on identifying the common infrastructure provided to investors as part of the park. Based on the focus sectors identified, the following benchmarks have been chosen for the identified priority sectors

1. Food processing - Northeast Mega Food Park situated in Assam
2. Rubber - Rubber Park situated in Ernakulum
3. Bamboo - Bamboo Technology Park in Assam

Food Processing

The North East Mega Food Park situated in Assam. The food park can support 30 -35 large food processing units and has a cumulative investment of ~250 crores. The Food Park is expected to generate an annual turnover of 400-500 crore and generate an employment of for ~30000 people (Including Direct and Indirect jobs).

The food park was designed with separate Central Processing Unit and individual network of primary processing units and collection centres.

The Central Processing unit is located in a well-connected region which offers the following advantages-

a. Well-connected to all the primary processing and collection centres
b. Proximity to Guwahati for ease of distribution
c. Proximity to urban centre for skill procurement and labour
d. Ease of availability of water, power, and other facilities

The Assam food processing park provides related infrastructure to support the industrial units. Given below is a description of the infrastructure assets provided by the Assam Mega Food Park in the common processing unit

Table 41: Infrastructural needs of food processing sector

Infrastructure	Description
Warehousing	• The food processing industry depends on seasonality and timing of harvest and cannot rely on just in time approach for its manufacturing. Hence it heavily depends on the warehousing facilities within the park for both raw materials and finished goods
Cold Chains	• An efficient cold chain is required which provides end to end solutions such as pre- cooling, Reefer vans etc. precooling centres can be set up major districts and production centre to protect the food from degradation
Quality and FPO Labs	• Quality labs help in standardization of food making process by standardizing raw materials, finished goods etc. The FPO labs would provide assistance in getting food certifications providing a one stop solution for all testing compliances
Truck Terminals	• Truck terminal needs to be constructed based on the expected capacity of the food park to allow for proper unloading and loading of vehicles

Infrastructure	Description
Food Processing Training Centre	• Having a food processing training centre within the park helps to find relevant work force in a more efficient manner. It would also provide hand on experience and skilling on post-harvest handling, preservation, and processing activities
Common Facility Buildings	• Common facilities required for business facilitation are Canteen, Meeting Hall, Business Centre, First-Aid facilities, Bank/Bank Extension Counter, Couriers, Freight Forwarders, Packing Material Supplier
Water Supply System	• A capacity of 2 lac litres ensures smooth operation of food processing units. The water supply must include provision of potable & treated water
Power Substation	• A power substation of 5MVA is installed in the vicinity of the Food Park
Other Infrastructure	• Waste Disposal (Water and Solid), Firefighting systems, Road, Drainage, Power, and telecommunication systems are some of the other infrastructures which are generally present in every industrial park.

Rubber Sector

The Rubber Park situated in Ernakulum is one of the most successful rubber parks in India. It is a joint venture by KINFRA (Govt of Kerala) and Rubber Board (Govt of India). The park is the first of its kind and is spread across 110 acres. There are a total of 55 units within the park.

The park has some major advantages due to which it has been operating successfully, which are

a. Availability of rubber testing and certification centre within the premise
b. Abundance to raw materials
c. Distance to sea and air terminals (<30km)
d. Adequate infrastructure.
e. Robust Single Window Clearance

The Rubber Park ensures the provision of certain required infrastructure as mentioned below to support the functional units within its premises.

Table 42: Infrastructural needs of rubber sector

Infrastructure	Description
Power	• 110/11kV Substation at the Park has a capacity of 25 MVA. This is connected to an ultra-modern distribution network using 11kV underground cables.
Water	• An artificially constructed pond inside the park has a capacity of 25 million litres. Storm water of 65 acres of the Park's land is collected here. There is 1.5 MLD water supply system with 0.45 MLD overhead storage. Augmentation of the capacity by another 1.5 MLD is about to be completed.
Waste Management System	• The capacity of the present plant is 250 Cu. M. Augmentation of the treatment capacity to 500 Cu. M by adding another unit of 250 Cu. M is about to be completed.

Testing Facilities	• Testing of all Rubber /Polymer products and their certification to any international standards can be done at the NABL accredited J.J Murphy Research Centre in the Park.

Bamboo Sector

The concept of Bamboo Park is in its nascent stage. One of the successful bamboo parks established in India is Bamboo Technology Park in Assam. The bamboo technology park was established with collaboration with private players. It has been established in an area of ~4acres (allottable land) and focusses on value-add bamboo products. It is located at 39km from the airport and 5km form Chaygaon and has excellent connectivity to NH 37(3 km away). It provides excellent infrastructure facilities which are listed below.

Table 43: Infrastructural needs of bamboo sector

Infrastructure	Description
Common Infrastructure	• Bamboo stick-making facility, Bamboo Plastic Composite (BPC) facility, Strand woven bamboo block unit, Vacuum pressure treatment plant, Resin/Glue Plant, Bamboo charcoal plant,
Value added Facilities	• Administrative and marketing centre, product design centre
Trunk Infrastructure	• Internal Roads and drainage, Overhead tank with water supply network, Street lighting system,

Based on the above assessment, and the infrastructure requirements have been summarised by categorising them into basic infrastructure needs and good to have infrastructure.

Basic Infrastructural Needs – Infrastructure such as roads, water connection and land development etc. which need to be finished on priority to attract industrial players to set up units within the industrial region.

Table 44: Summary of immediate logistic and infrastructural needs of priority sectors

Priority Sector	Road	Railways	Ports	Effluent Treatment	Water	Power	Urban Connectivity
Rubber	✓	✓	✓	✓		✓	✓
Bamboo	✓					✓	✓
Food processing	✓		✓	✓	✓	✓	✓

Good to have Industrial Infrastructure- The infrastructure which is not essential for industrial processes but adds value to the ecosystem such as display centres, industrial training centres etc. Further to the immediate infrastructure provided as mentioned above, each sector has certain desirable infrastructure requirements. Such facilities will help in enhancing the value proposition of the sites from the perspective of an industrial investor. The facilities such as Testing and certification labs, food processing training centre help in providing conducive environment for development of the sector.

Priority Sector	Sector Specific Infrastructure required
Bamboo	• Bamboo stick-making facility, Bamboo Plastic Composite (BPC) facility, Strand woven bamboo block unit, Vacuum pressure treatment plant, Resin/Glue Plant, Bamboo charcoal plant
Food processing	• Quality and FPO Labs and Food Processing Training Centre
Rubber	• Testing of all Rubber /Polymer products and their certification to any international standards.

Other infrastructure projects: Apart from assessing the availability of critical and good to have infrastructure in a location, investors also make investment decisions based on the availability of skilled labour pools, ICT infrastructure, the quality of mass transit systems, and availability of climate resilient infrastructure that can reduce costs of disruptions caused by the physical impact of climate events.

Hence, it is proposed that the following supporting infrastructure be developed in Tripura:
a. Skilling Centres: It is widely accepted that human capital investment will deliver key economic and social goals.[132] This is especially true as many investors often make investment decisions after considering the availability of human resources in a location.

Keeping in mind this role played by the availability of relevantly skilled labour pool in attracting investors, it has been recommended that skilling facilities and infrastructure be developed in Tripura. While both national and state level skilling initiatives and agencies like the Tripura Skill Development Mission already exist , it would be beneficial for the state to supplement these by setting up sector-specific training centres for each identified priority sector.

Facilities like food processing training centres (FPTCs), for instance, can be set up to provide hands-on experience and skilling on post-harvest handling, preservation, and processing activities. For this, the state is proposing to set up such centres at parks focused on the food processing sector, namely the Dewanpasa, Jalefa, Sonamukhi, Lalchari, and Bijoypur parks.

Similarly, processing capacity for the bamboo and rubber sectors too could be developed. Training facilities for rubber tapping and processing could be set up at Sarasima, Santirbazar, and Nagicherra as the parks in these locations are suited for rubber processing. As the R.K Nagar and Bodhjungnagar industrial estates are adjacent to each other, a common skill development facility could be developed for them.

Meanwhile, skilling centres for bamboo could be developed at R.K Nagar, Kumarghat, Dharmaghat, and Kathalia parks to bolster the bamboo processing capabilities of these locations.

Further, it has been proposed that training and skilling centres be made **gender inclusive** to broaden their accessibility as the constraints faced by men and women in accessing workplace opportunities are vastly different. To help increase women's participation in the workforce, training centres can be developed with the following gender responsive features:

a. Ensuring provision of separate male/female toilets
b. Providing childcare facilities (like creches) for working mothers
c. Developing gender-segregated training spaces
d. Offering training sessions with flexible timings of to help women accommodate the sessions into their schedules
e. Improving accessibility by providing safe transport to and from the training location as this has been seen to be a significant barrier to the uptake of training programmes among women.[133]

[132] The Importance, Scope And Measurement Of Human Capital, OECD (1998).
[133] Gender and skills development, UNESCO (2012).

Thus, bearing in mind the importance of gender inclusive infrastructure in mainstreaming the interests of women workers, gender inclusive skilling centres have been proposed for the Dewanpasa, Jalefa, Sonamukhi, Lalchari, and Bijoypur parks

b. ICT Enablement at Industrial Parks

With the proliferation of ICT in today's world, its centrality to business efficiency, and potential to improve various aspects of industrial operations, it would be beneficial in attracting investments for the state. ICT assists industries in several critical activities including design, manufacturing, R&D, and distribution and sales. It is important, therefore, for parks to provide optical fiber cables connectivity to its tenants. While work to develop ICT availability has already begun in the Bodhjungnagar Park, similar work needs to be undertaken in other parks as well.

It is recommended that the use of SCADA (Supervisory Control and Data Acquisition) systems will enable smooth park operation and maintenance by monitoring the utilities and facilities provided by them for functions such as billing, demand projection and capacity planning. The system comprises both hardware and software that facilitate data capture within industrial processes by connecting sensors that monitor equipment such as motors, pumps, and valves, to an onsite or remote server. SCADA systems will therefore not only allow the parks to provide high quality infrastructure over a long period but also allow for monitoring from multiple locations, making the process more convenient and time efficient.

Based on an infrastructure assessment of the state's industrial estates, it has been proposed that the smart features mentioned above be developed in the Bodhjungnagar, R.K Nagar, and SEZ Jalefa parks. These parks have been chosen based on their potential to attract investors owing either to current infrastructural readiness and/or locational advantages.

In order to equip other parks with similar ICT infrastructure, it is important to make provisions for the development of the same during the planning phase. Currently, as various greenfield parks in the state are in this phase, it is recommended that such provisions be incorporated in the masterplans for these parks.

c. Climate-resilient industrial infrastructure: Keeping in mind Tripura's rain prone weather, it may also be beneficial to develop climate-resilient industrial infrastructure. This can be done through the development of **utility corridors**.

As infrastructure networks are affected by the physical impacts of climate events, it is essential to build resilience to such impact, in Tripura's case to extreme precipitation events. This helps in reducing direct losses as well as indirect costs of disruption in operation. Being a rain-prone region, Tripura too could benefit from developing utility corridors. These are passages, underground or above ground, that carry utility lines such as electricity transmission, water supply pipes, and sewer pipes. They can also sometimes carry communications utilities like fiber optics. Such corridors, comprising junction boxes and covered trenches, carrying critical utility lines. could be developed in Tripura's industrial estates. Utility corridors could be provided up to the plot level to connect all utilities to the industry and avoiding as far as possible road damages.

Apart from being climate resilient, another major benefit of this is that utilities installation within a single structure requires coordination and planning which can help reduce the overall utility construction and installation time. This reduction in construction time can, in turn, reduce delay to the overall project and result in time and money savings for the parks.

Considering the benefits of utility corridors, it has been proposed that such corridors be developed at the industrial estates in Bodhjungnagar, R.K Nagar, and Jalefa. They can later be developed across other existing parks and be incorporated into the design for future parks as well.

d. Development of urban connectivity: apart from developing internal industrial infrastructure for industrial estates, it is also essential to develop connectivity between industrial parks and urban centres. Based on the infrastructure assessment, it is recommended that external roads be developed at the Nagicherra, Lalchari, Sonamukhi, and Jalefa industrial estates.

Apart from this, it has also been recommended that interconnected internal pedestrian and public transportation networks be developed at the industrial parks at Bodhjungnagar, R.K Nagar, and Jalefa. It is important that parks have such public transport linkages to facilitate easy workforce movement that is affordable. Studies have found that workers increasingly consider the availability of convenient public transportation options an added benefit for selecting one place of employment over another.[134]

Finally, it is also recommended that these transport facilities be developed with gender responsive features as men and women have different transportation needs and constraints. Transportation is the gateway through which women access income opportunities. **Gender inclusive transportation** can reduce travel time, increase opportunity access, and alleviate personal safety concerns.
Some practices included in the gender inclusive transportation plan of the National Industrial Corridor Development Programme (NICDC) that could be adopted in Tripura include-
(a) Clean and hygienic public toilets should be planned with female token/ticketing personnel at toilets on the travel routes of women.
(b) Proper lighting of streets to make streets safer to travel during night.
(c) Taking into consideration the time poverty faced by women land use planning should ensure that skilling centres are not too far from residential areas.
(d) During the planning phase, it may be ensured that the embarkation and disembarkation points of public transport routes are located away from establishments such as liquor stores, bars, and pubs.
(e) Travel routes of women should be planned to keep in mind easy accessibility to police stations.
(f) Encouraging commercial on street activities like fast food shops and other vendors/ retail shops to make the feel safer for women at night.

Some other measures to make public transport facilities more suited to addressing the needs of women travellers include-

a. Developing dedicated waiting spaces for women on platforms, bus stations
b. Providing women-only carriages

It has been recommended that gender inclusive transportation facilities be developed at the Bodhjungnagar, R.K Nagar, and Jalefa parks. Such features can later be incorporated into other brownfield parks and into the design for future industrial estates as well.

3.2.1 Attracting the Private Sector to develop infrastructure

In the preceding section, many large capital-intensive infrastructure projects that are required in Tripura have been identified. In order to share the burden and risks associated with the development of such infrastructure projects, the possibility of developing some of the required infrastructure through PPPs can be considered.

An analysis of the existing industrial parks in the state reveals that the projects identified for development in Tripura can be classified into 3 major categories-

1. Internal projects: ETPs, STPs, warehouses, cold storage facilities
2. External projects: external roads near two industrial estates
3. Value added projects: common infrastructure for bamboo processing, testing facilities for rubber, food processing training centres

It is important to develop basic critical infrastructure in industrial estates and attract some industrial units, as this can make it easier to attract private sector developers.

Further, one way to attract private sector players to develop these would be by providing incentives to private sector infrastructure developers. Assam has a similar incentive under which it provides private developers a 30% subsidy on the costs of the development project, excluding the value of the land. The subsidy amount is subject to a ceiling of INR 3 Crore. Tripura too could implement a similar incentive scheme with a tailored ceiling amount depending on the criticality of the project.

[134] Public Transportation: A Key to Solving the Labor Crisis?, Colliers (2019).

An ADB report on PPPs[135] finds that the following are some of the major concerns of the private sector regarding infrastructure projects -

1. **Improvements in enabling environment**: this includes measures to foster efficiency and transparency in the bidding process, ensure sanctity of contracts, encourage competition, promote market-driven tariffs, and separate regulatory and adjudication authorities. The need for developing appropriate legislative framework for PPPs, clarification of entry conditions, suitable contractual structures, and clarification of incentives and concessions has also been highlighted by the private sector.

2. **Standardized procurement procedures**: refers to developing a standardized prequalification and bidding procedure, along with guidelines for ensuring efficiency, predictability, and ease of approval process.

3. **Project development and structuring facility**: A key impediment to successful commercialization of projects in India has been the absence of rigorous project development. Many of the projects bid out by government have been inadequately structured and unsuitable for PPP. A project development facility (PDF) that provides project sponsors the resources to procure consultancy and expert services for conducting prefeasibility studies and assessments is required.

4. **Land acquisition and environmental clearances**: it is suggested that to ensure mutually beneficial and successful partnerships, clearances be obtained by the implementing private sector partner. This is because several projects in India have been stalled with huge time and cost overruns due to delay in land acquisition and transfer of its possession to the private sector. The private sector could deliver much faster if these clearances are handled by the project sponsor. Building in environmental and social dimensions of PPPs needs to be made part of the project development cycle.

In order to address the investor concerns highlighted above, it has been recommended that Tripura take the following steps:

a. reexamine the non-fiscal incentives provided by the state government in order to decrease regulatory burdens on the private sector. This includes streamlining the process of acquiring clearances in order to make the process more cost and time effective.

b. enhance the capacity of investor support bodies like the TIDC to provide consultancy and expert services for conducting prefeasibility studies and assessments.

c. develop a **Project Development Mechanism** (PDM) that allows for the prioritization of projects and advance preparation for them. A PDM can increase the ability of the private sector to deliver projects more efficiently.

d. develop and implement a land allotment policy and a green industrial policy. While a land allotment policy will streamline the process of acquiring land for PPPs, a clearly articulated green industrial policy will help incorporate environmental dimensions into PPPs.

By addressing the investor concerns discussed in this section, Tripura will be better positioned to attract the private sector for industrial development.

Conclusion: Host locations must focus on providing the infrastructure required to support industrial activities This is important as investors' decisions to invest in a particular location are based on the availability of adequate infrastructure— this is one of the primary considerations that affects investment decisions. Thus, host locations need to develop physical infrastructure that can attract investments and can support the larger objective of fast-tracking holistic industrial growth.

Enabling of Industrial Ecosystem for Priority Sectors

The critical infrastructure needed across Tripura's industrial estates has been identified. This includes water

[135] Facilitating Public Private Partnership for Accelerated Infrastructure Development in India, ADB (2006).

and power supply systems, warehousing and cold storage units, and waste management tools (such as ETPs and STPs). Further, sector specific infrastructural needs have also been examined and identified. For the bamboo sector, this includes bamboo stick-making units, Bamboo Plastic Composite (BPC) facilities, strand woven bamboo block units, vacuum pressure treatment plant, resin/glue plant, and bamboo charcoal plant. For the rubber sector, testing facilities for all rubber /polymer products and facilities for their certification to any international standards are required. Finally, for the food production sector, apart from cold chains and warehousing facilities, quality and FPO labs and food processing training centres are needed.

All the parks also need administrative and marketing centres, internal roads and drainage systems, overhead tanks for water supply, power substations, and street lighting.

These infrastructural development projects can be undertaken in a phased manner, based on their criticality to supporting industrial activities in the state's industrial estates. This has been discussed in detail below.

a. Critical infrastructure: refers to the infrastructure that is most vital for the functioning of industrial units in the parks. Under this, it is recommended that power and water supply, trunk infrastructure like streetlighting and industrial sheds, ETPs and STPs, external roads, and feeder lines be developed first.

b. Good to have infrastructure: is needed once the critical internal and external infrastructure of a park has been fully developed. Such infrastructure acts to further facilitates the operation of industry in a location. Business support services like common facilitation centres (CFCs) that accommodate various business support services (such as conference venues, auditoriums etc.), testing labs, certification centres, warehousing facilities, and cold storage facilities in its industrial parks are proposed to be developed as part of industrial infrastructure in Tripura. Such infrastructure could be developed by TIDC or an appropriate agency to provide support to industries/investors etc. Further, the report recommends setting up such cells as part of DIC in each district.

To support its identified priority sectors of food processing, rubber, and bamboo, gender inclusive food processing training centres with facilities for imparting training on post-harvest handling, preservation and specifically processing, facilities for both chemical and physical testing for all rubber/polymer products, and common facilities for bamboo processing could also be developed in the state. This will not only help promote and support the thrust sectors and MSMEs, but will also act as an incentive in mobilising investments.

A special cell within the TIDC could be developed to provide investor support services, or an appropriate agency/vehicle could be set up to do so at the respective industrial parks.

c. Smart Industrial Park Infrastructure: The industrial parks in Tripura can also be equipped with '**smart industrial park**' infrastructure. This includes developing ICT support; climate resilient infrastructure through the development of utility corridors with lines for water distribution, sewerage, telecommunication, and electricity; and public transport facilities with interconnected internal pedestrian and public transportation networks as well as gender responsive features to widen workplace access for women. While for brownfield parks, such infrastructure can be developed after the development of all other critical infrastructure, in the case of greenfield parks, smart features could already be incorporated into the design of the parks.

d. Futuristic infrastructure: As ICT can play a central role in easing both business operations and park operation and maintenance, it is recommended that Tripura develop optical fiber cables connectivity across its parks. Further, it could consider the use of SCADA (Supervisory Control and Data Acquisition) systems to enable smooth park operation and maintenance.

The development of this infrastructure needs to be prioritised to make the state's industrial parks investment ready— ensuring infrastructure availability should be a key ingredient of Tripura's industrial strategy as it is directly connected to the success of the state's industrial estates.

3.3 Strategy Element 3: Development of a multi-modal logistics park in order to improve logistical efficiency

3.3.1 Tripura's geographic location

Tripura is a landlocked state that shares about 84% of its border, an 856-km-long stretch, with Bangladesh. Further due to its peculiar topography, the challenges of transportation and the lack of infrastructure in terms of storage and procurement are among the major barriers to industrial growth in the state.

Currently, as highlighted in the NEEC report, cargo movement within the NER is hindered by many challenges, primary among which is the underdeveloped state of logistical infrastructure. The report recommends the setting up of multi modal logistics parks at various strategic locations across the NER to improve the competitiveness of the goods produced and rationalize logistics costs in the region. After considering Tripura's locational advantages, it has been found that the state's geographical location gives it a unique set of advantages as a potential logistics hub that can help address these challenges. This section will examine those advantages to establish the suitability of Tripura as such a hub.

Tripura's border with Bangladesh is the first advantage. Bangladesh is one of India's closest trade partners within South Asia. Further, it is an important market for various products from the NER as well as from the rest of India. Among India's export destinations, Bangladesh ranks fifth highest highlighting its importance as a trade partner.[136] Thus, Tripura's shared border with the nation is advantageous as the state is a strong physical and cultural bridge between India and Bangladesh.

Apart from sharing a border with Bangladesh, Tripura also shares borders with two other states in the NER- a 53-km-long one with Assam and a 109-km-long one with Mizoram. It is connected to Assam via NH-208A and NH-8 while it is linked to Mizoram through the NH 108.

Within the state too, rail connectivity has been developed. In 2019, the 38 km Belonia–Sabroom rail line, connecting Sabroom, Tripura's southernmost town, to the rail network was completed. This was the last section of a new 114 km broad gauge Agartala–Sabroom rail line.

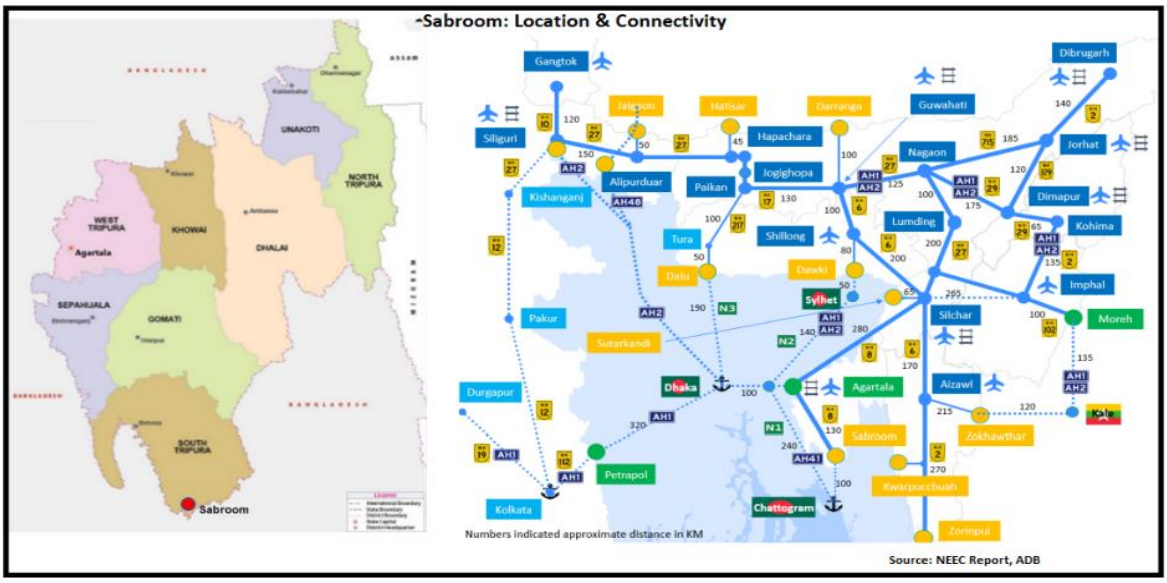
Further, the construction of an Agartala–Akhaura broad-gauge rail line connecting Tripura and Bangladesh, a major 12-km-long rail project, is underway in the state. The length of the section in India is expected to be 5.5 km and the remaining 6.5 km is expected to be in Bangladesh.

3.3.2 Improved Connectivity: strategic infrastructure projects

Due to the strategic importance of the NER, several infrastructure projects have been undertaken to improve the connectivity of the region with the rest of India. The picture below highlights the road networks connecting the Sabroom region with the rest of the north east area along with railways infrastructure projects which are currently being developed.

Figure 26: Sabroom Connectivity Map

[136] India Trade Portal



a. The Maitri Setu connects **Sabroom district** in south Tripura to Ramgarh in Bangladesh. It was inaugurated in March last year. The bridge, it is expected, will prove to be a strong link of business, unlocking untapped markets.

   The double lane bridge leads to Ramgarh, approximately 80 km away from the Chattogram port. This means that the bridge has now given the landlocked NER access to a waterway.

b. Within Tripura, railway connectivity has been improved. Various new trains to other parts of the NER as well as the rest of India have been started.

   Agartala is connected with important junctions like Guwahati, New Jalpaiguri, Sealdah, and Anand Vihar at New Delhi by some express train like the Tripura Sundari Express and the Kanchanjangha Express. Other Indian cities connected to Tripura by rail include Bangalore, Bhopal, Deoghar, Firozpur, Jiribam, and Secunderabad.

   Apart from passenger trains, goods trains ply up to Agartala and Udaipur. Some local trains also run in between Udaipur and Dharmanagar. Agartala railway station at Badharghat is the main junction of the state.

   Apart from this, work to set up a rail network between **Akhaura** in Bangladesh and Agartala is underway. This line will connect to both Dhaka and Chattogram (Akhaura-Bhairav-Tongi-Dhaka and Akhaura-Laksham- Chattogram). Once completed, the route will cut down travel time between Kolkata and Agartala by 21 hours. This link will allow for greater integration not only between Tripura and Bangladesh but will also for greater integration of the NER with the rest of India.

c. Recent improvements have been made to the Agartala Airport's connectivity with other sectors of the country- from Agartala to Delhi, Mumbai, Bangalore, Hyderabad, and Chennai. Further, work to expand the airport to an international one is also ongoing. This will not only increase domestic connectivity but international links as well.

The recent infrastructural developments in Tripura coupled with its strategic geographic location make it a suitable site for a regional logistics hub.

3.3.3 Locational Advantage

The NER is connected to the rest of India by a narrow strip called the Siliguri Corridor, popularly referred to as the Chicken's Neck. The 22-km-wide freight corridor runs across North West Bengal, neighboring Nepal, Bhutan, and Bangladesh. The vulnerability of this link between India and the NER is evident from the fact that any infringement or sudden disruption on this stretch would restrict any direct land access to and from the NER. Further, the long-winding route, apart from being time-consuming, also raises logistical costs significantly, and this in turn is detrimental for trade. It is therefore important to establish alternative land and sea routes between the NER and India. In this context, the Maitri Setu, through Bangladesh, will not only prove to be of vital strategic advantage but also a necessity. The bridge, which has been constructed to solve these problems, also presents Tripura with the opportunity to grow into a robust export centre especially since its location is well suited for this purpose.

Within the NER, Tripura is the closest to the port in Chattogram at 210 km via Sabroom, where the proposed park is to be established. So far, only Kolkata, including its port system and airport, is the main international gateway for the NER. The opening of this new route to Chattogram through Sabroom will have a positive economic impact on the states in the region. High transport cost savings can be achieved by using the alternate gateway of Chattogram Port in Bangladesh compared with Kolkata via the Siliguri Corridor.

Apart from this, the following factors add to Sabroom's suitability as a logistics hub–

a. Both rail and road connectivity are available to Sabroom as part of the core network and it is about 80 km from Gomati river, a new inland waterway proposed to be added to the IBP routes through Sonamura border point.

b. Road connectivity is available on the core network through NH 8 to Agartala (onward to Bangladesh) and Silchar, which further connects to Imphal, Moreh (Myanmar) via NH 37 and Shillong (onward to Guwahati) via NH 6.

c. Rail connectivity is available on the core network through the Silchar–Agartala–Belonia–Sabroom line to other NER states and the rest of India, and to Bangladesh via the Agartala–Akaura rail link with onward connection to Chattogram Port.

d. The Land Ports Authority of India has planned an integrated check post (ICP) at Sabroom. The Department of Commerce, GoI has approved an SEZ at Sabroom. On the other side of the border, the Bangladesh Export Zone Authority has planned a special manufacturing and economic zone near Benlonia. Sabroom's aforementioned proximity to Bangladesh means that the earlier issue of poor cross-border infrastructure connectivity, which hindered the manufacturing and services sectors from reaching out to new markets, may be resolved. Through the Maitri Setu, there is now a route providing direct access for Tripura to the seaport of Chattogram through Ramgarh. Being a focal point of trade within a vast area, this will lead to an enhanced trade link between the rest of India with the NER and Bangladesh.

Tripura's connectedness with the other states of the NER is also advantageous. Rail networks have been extended in order to connect the various states in the region. Railway links have been extended to connect Silchar–Agartala–Belonia–Sabroom. The first Jan Shatabdi express train connecting Manipur with Tripura via Assam started operating in January 2022. The Sealdah to Guwahati Kanchenjunga Express has also been extended up to Agartala.

A new broad-gauge line from Agartala to Sabroom has also been constructed for better connectivity within the state. The completion of this rail network is also an important link between Bangladesh's Chattogram Port and the NER states as the port is 72 kms away from the border town. As a result, its location is suitable as a regional logistical hub within the NER as well. Further, the Akhaura-Kolkata train will enable better domestic access to Tripura while. Connectivity outside the state has also been bettered - the Humsafar (weekly) Express now links Tripura to Bangalore. Such infrastructural improvements have further acted to cement Tripura's locational advantage in this respect.

Other Indian states, which can access Tripura through rail and air networks, will also be able to target new markets both domestically and in Bangladesh. Recent improvements that have been made to the Agartala

Airport's connectivity with other sectors of the country will enable states outside the NER to have easier access to Tripura. The ongoing work to upgrade the Agartala airport will increase international connectivity as well.

Therefore, owing to its location, Tripura will be able to become a hub for imports and exports as well as well as an important strategic base for the region.

3.3.4 The strategy to capitalise on the linkage with Chattogram Port

Cargo movement has many challenges in NER[137]:

i. skewed modal transport mix with majority of freight movement by road, primarily due to lack of intermodal facilities to enable easy transfer;

ii. underdeveloped material handling infrastructure with highly unorganized warehousing landscape comprising a large number of small, private, and unorganized warehouses that provide little or no value-added services and lack economies of scale associated with integrated and large warehousing facilities;

iii. inefficient fleet mix with smaller, inefficient trucks resulting in higher per metric ton costs;

iv. a service model that compromises efficiency as many firms try to compete through the factor advantage of low wages which have leads to hiring poorly skilled personnel, thereby eschewing investments in information technology and equipment technology and consequently sacrificing productivity gains and service quality.

Logistics hubs, in addition to the infrastructure for enabling multimodal freight transfers, will be able to provide[138]:

i. mechanized warehouses and specialized storage solutions such as cold storage;

ii. mechanized material handling, intermodal transfer container terminals, and bulk and breakbulk cargo terminals;

iii. value-added services such as customs clearance, bonded storage yards, quarantine zones, testing facilities, and warehousing management services; and

iv. late-stage manufacturing activities such as kitting and final assembly, grading, sorting, labeling, and packaging activities, reworking, and returns management are also possible.

NEEC report estimates suggest that such a park will reduce transport costs by about 10% by enabling freight movement on higher sized trucks and rail, which will also result in lower carbon dioxide emissions and less traffic congestion in cities[139]. Further, shifting warehouses and wholesale markets currently located inside the city, to logistics parks (driven by lower rentals) would free up urban spaces, enabling congestion reduction. In addition, modern and mechanized storage solutions provided by logistics parks will enable reductions in storage and handling losses.

Support to priority sectors: Importantly, the creation of procurement facilities will allow Tripura's small-scale rubber tappers and horticultural farmers to access markets for their products while also enabling big industrial players to access raw materials with ease. The NEEC report finds that the existing challenge of value chain wastages can be mitigated through the development of a comprehensive network of primary processing centres, which can be undertaken as part of the development of the infrastructure network for this logistics park. This will aid the growth of the food processing sector in the state.

Additionally, the provision of specialised cold storage and warehousing facilities will again ease raw material access, reducing overall wastage. This is vital not only for the food processing but also the rubber sector.

Links to new markets: The Sabroom bridge plays an important role in strengthening bilateral trade and ties between India and Bangladesh, Further access to the Chattogram port through the bridge will enable the North

137 Northeast Economic Corridor: Bringing People and Markets Together, ADB (2020).
138 Northeast Economic Corridor: Bringing People and Markets Together, ADB (2020).
139 Northeast Economic Corridor: Bringing People and Markets Together, ADB (2020).

East to access the ASEAN countries' markets as well as other markets in South and South-East Asia. It will also enable other nations to do the same. This will make Tripura a major import-export hub.

As Tripura's first-ever SEZ is also being set up at Sabroom, the site has the potential to become the commercial capital of the NER. Developing a logistics park focused on aggregation, warehousing, and cross-border trade between India and Bangladesh as well within the larger South Asia region in the border town will amplify Tripura's position as an important regional trade centre and a regional logistics hub as well. This will bring economic benefits to the rest of India too.

Conclusion: The preceding section has highlighted the various advantages of developing of a Multi-Modal Logistics Park in Sabroom. It is clear that the park will improve competitiveness and reduce cost of logistics in the NER region as a whole.

Sabroom has been chosen as the location for the proposed aggregation hub as the region as it is connected to the rest of the NER region by a network of national and state highways. It is connected to Agartala, Silchar, Guwahati, other towns in Assam, and the rest of India by NH 8. Additionally, the region's closeness to Bangladesh means that other states in the NER can access regional markets as well.

For Tripura, it will also facilitate access to regional and international markets via the Maitri Setu. This is especially beneficial for the state as food processing, an export-oriented sector, has been identified as a priority sector for the state. Taking advantage of the location of the proposed logistics park, processed food items will be able to access markets not only in Bangladesh but in Europe as well. This is important as the competitiveness analysis described in Section 3 shows that value-added food products from the state will find markets in Europe. Further, rubber products, especially latex, will find markets in Bangladesh, which currently imports such products.

Another advantage of setting up a logistics park in Sabroom is that this will facilitate the NER's access to raw materials from neighboring regional markets.

Apart from this, the proposed MMLP would help in the reduction in time for transportation and in lowering logistics spending, thus increasing the competitiveness of the products manufactured in Tripura.

As it has the potential to provide a competitive advantage to industries in Tripura, the proposed logistics park is required to be developed to support industrial growth in the state.

3.4 Strategy Element 4: Implementation of policy measures to incentivize investments and ease establishment and operation of business

While each of these sectors has the potential to grow on their own, a conducive policy environment will make it easier for potential investors and entrepreneurs to build successful businesses in the state. An industrial policy can integrate the state into the global value chain to boost its economic profile through import- and export-related activities.

Most importantly, such a policy moves beyond the provision of infrastructural support to industry and takes steps to make investing in a particular location attractive and viable. While this has several dimensions, these incentives and policies can be broadly classified as fiscal and non-fiscal incentives.

The various fiscal and non-fiscal incentives that can be provided by the Tripura government to achieve its target investments and land demand are discussed below.

Fiscal Incentives

Government interventions such as tax reductions, grants, and subsidies implemented to support various industrial activities of individuals and organizations are called fiscal incentives. These reduce the risk of starting new enterprises and improve competitiveness, encouraging business creation and expansion projects across the state.

There are various kinds of fiscal incentives, some of which are as follows-

Table 45: Fiscal Incentives

Incentive	Policy Description
Interest Subsidy	• Subsidy granted for eligible industries and entrepreneurs on their term loan.
Fixed Capital Cost Subsidy	• Subsidy on fixed capital cost during the initial stages of development. It should be noted that some states include/exclude land in this category.
GST Subsidy	• Reimbursement of Net SGST paid during the initial incubation period of the industry to improve margins and help them scale.
Electricity Duty exemption	• The industry is exempt from payment of the whole or part of the electricity duty for prior decided term and upper limit mentioned in the industrial policy
Stamp Duty Exemption	• Stamp Duty and other expenses which are related to direct transfer and purchase of land are exempted.
Mandi Tax Exemption	• All industries in food processing and other Agro related sectors will be exempted from mandi tax imposed on the agricultural produce. This may include state mandis, direct producing farmers and mandis outside the state too, with a predefined upper limit as per industrial policy.
Diversion/Conversion of Land Use exemption	• All industries and entrepreneurs can be exempted from land conversion charges (on having industrial purpose)
Quality Certification Subsidy	• Certification plays a key role in export and hence export units and other eligible units can avail quality certification exemptions for various national and international certifications
Technology Patent Subsidy	• To promote innovation the state can pursue to exempt industries from obtaining patents based on original work/ research post successful registration and sanction of the patent
Transport subsidy	• Transport subsidy is generally given to export oriented units on Transportation of finished goods to nearest seaport/airport

Tripura already offers many of these to its investors under the TIIPIS 2022[140], which will remain in force till March,2027. Detailed descriptions of the same are provided in the table below. These are general incentives

[140] Tripura Industrial Investment Promotion Incentive Scheme (TIIPIS), 2022, Government of Tripura (https://industries.tripura.gov.in/sites/default/files/TIIPS-2022.pdf).

provided to all eligible industrial units in the state.

Table 46: Fiscal Incentives

Incentive	Benefits	Special Provisions for Thrust Sectors[141]
Capital Investment Subsidy	30% on fixed capital investment subject to a ceiling of Rs.100 Lakhs per enterprise. For thrust sector industries	subsidy rate is 40% and the ceiling is Rs. 125 Lakhs per enterprise
Procurement Preference	15% on all purchases through tenders by State Government Agencies on products manufactured by eligible enterprises	-
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 Rs.80 Lakhs 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 Rs.125 Lakhs 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 Rs. 50 Lakhs 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 20HP at a rate of Rs.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 Rs. 15.00 Lakhs per enterprise per annum.	Annual upper ceiling is Rs.25 Lakhs per enterprise per annum.

[141] 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.

Partial Reimbursement of Interest on Term Loans	4% of the interest on term loan availed by the enterprise. Subject to an upper ceiling of Rs.5.00 Lakhs per enterprise per annum.	Rate of 5% with an upper ceiling to Rs.12 Lakhs 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 Rs. 1.00 Lakhs 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 Rs.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 Rs. 15.00 Lakhs 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 Rs.25 Lakhs per enterprise. c. -

Besides this, under the 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.

d) 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).

A benchmarking analysis comparing the fiscal incentives provided by Tripura to industries, however, reveals that the incentives packages in the state can be enhanced. The creation of targeted incentive schemes to cater to the needs of specific sectors for instance can help the state attract investors to those sectors.

Telangana, for instance, has identified IT as one its thrust sectors. In order to incentivise continued investments in the sector, the state provides special incentives to existing IT/ ITES/ BPO companies operating with a minimum of 1,000 workers for a sustained two-year-period, as part of its IT policy**.**

Similarly, Tamil Nadu has included a special package of incentives in its new industrial policy in order to propel its sunrise sectors. Under its Research and Technology Adoption Fund, the state will encourage and support the adoption of innovative technologies in focus and sunrise sectors.

Tripura too could consider improving its incentive schemes. This is because while the availability of incentives is among the 'secondary considerations' of investors, it has proved to be an important policy variable in strategies to attract investments.[142]

Benchmarking with neighboring states: Similar benchmarking with the incentives schemes of two neighboring states, Assam, and Meghalaya, was also carried out. The table below provides an overview of the incentives provided by the two states.

Name of state	Policy	Incentives provided
Assam	Industrial and Investment Policy of Assam, 2019	• Power/Electricity Subsidy • Interest Subsidy • VAT/CST/SGST/TAX Exemption/Reimbursement • Stamp duty reimbursement • Freight/Transport Subsidy • Subsidies for Technology Transfer and Quality Certification, ZED Certification • Financial assistance to MSMEs listed in Stock Exchange

[142] Tax Incentives and Foreign Direct Investment, UNCTAD (2000)

		• Assistance for Environmental Compliance • Incentives to Private Sector Infrastructure developer
Meghalaya	Meghalaya Industrial and Investment Promotion Policy, 2012	• Capital Investment Subsidy • Subsidy on the cost incurred for Feasibility Study and Project Reports • Development Subsidy for charges payable to statutory bodies for any permission or registration, and for the procurement of know–how • Interest Subsidy • Power Subsidy • Subsidy on cost incurred on Quality Control Measures • Reimbursement of Stamps Duty & Registration Fees • Sales Tax/VAT Remission • Refund of Central Sales Tax • Subsidy on Pollution Control Measures • Special Incentives for Food Processing Industries

This examination reveals that while Tripura does provide some incentives not provided by these states, like capital investment subsidies and employment-based incentives, it could consider offering some others. These include subsidies on pollution control measures, subsidies on the cost incurred for feasibility study and project reports, and subsidies for technology transfers.

Thus, it is recommended that Tripura examine the incentives policies provided by fast-growing states as well as its neighbors and adopt more comprehensive incentives packages in order to attract investments. It is further recommended that the state consider providing sector-specific incentives. These could include:

1. **Bamboo sector**: The government of neighboring Assam has a set of comprehensive incentives to support the growth of the state's bamboo sector.[143] It provides subsidies for propagation and cultivation, the development of bamboo treatment and seasoning plants and bamboo carbonisation plants, the establishment of processing units for value addition to bamboo, the promotion and development of infrastructure for bamboo depots and godowns, and the promotion of bamboo mandis, rural haat, and bamboo bazaars, the upgradation

[143] State Bamboo Development Agency, Government of Assam (https://sbda.assam.gov.in/portlets/policy-incentives).

of tools, equipment and machinery in common facility centres for bamboo processing, and for skill development and research and development. Further, it works to provides grants to innovative startups in the bamboo and cane sector.

Apart from the existing fiscal incentives provided to the sector, Tripura too could consider providing similar sector specific benefits to investors.

2. **Rubber sector**: schemes similar to that of Kerala's Rubber Production Incentive Scheme (RPIS) could be implemented to increase raw material availability. Under the scheme, the Kerala government buys a maximum of 150 kg per Ha from a grower per month at a price of INR 150/kg which is higher than current prices and the difference is paid as subsidy. This scheme would not only support the growth of the bamboo sector but would also help achieve larger social objectives.

Further, specific tax breaks can be given to the MSMEs manufacturing rubber products in the state for pre-defined periods. Examining similar schemes of countries like Malaysia too can help Tripura devise more comprehensive incentives for the sector.

3. **Food Processing sector**: it is recommended that Tripura examine the policy practices of states like Andhra Pradesh and tailor general fiscal incentives to support the sector more effectively. Examples of such effective sector specific subsidies include-
a. Technology upgradation support: 25% of the cost of new/upgraded equipment (limited to INR 1 Crore)
b. 50% of the cost of setting up primary processing centres and primary collection centres (limited to INR 2.5 Crore)
c. 35% of the cost of setting up of cold chain infrastructure for agriculture/horticulture/dairy/meat produce (up to INR 5 Crore).

Further, the provision of differential power tariff subsidies based on the energy consumption of different equipment (for instance, ripening units or cold storages) could also be an effective way to invest investments for the food processing.

Such tailored incentives have the potential to help Tripura attract a sustained stream of investments.

Non-Fiscal Incentives

While fiscal incentives provide financial handholding, non-fiscal ones are aimed improving investor experience. As a result, these are primarily policy measures that improve the ease of doing business.

Ease of Doing Business

Ease of Doing Business (EoDB) initiatives are rolled out to ensure the fast-tracking of regulatory clearances and investment facilitation services. This ensures fast and transparent governance and is the cornerstone to improving business environment and investor trust.

Tripura is one of the few states which has completed the EoDB reforms as directed by the Department of Expenditure for which the state was allotted INR 148 Crore. Currently, Tripura ranks 29th in Ease of Doing Business in India. Its rank is indicative of the scope of improvement of the business environment in the state. Other states with similar business interests, like Mizoram, Assam, West Bengal, and Kerala, rank comparatively higher.

Since investors play a critical role in the improvement of the economy, it is important to provide them with a conducive business environment which includes a policy environment where there is ease of dealing with formalities.

As part of its EoDB measures, the Tripura government established the "Single Window Approval by All Government Agencies in Tripura (SWAAGAT)". This approval system allows investors to acquire all the required clearances from the government on one portal. The table below provides a list of the critical pre-establishment clearances that can be acquired through the portal.

Table 47: Pre-Establishment Clearances

S. No.	Description of Clearance (Consent for Establishment)
1	New Factory Plan Drawing Approval
2	Principal employer registration under Contract Labour Act
3	Principal employer registration under ISMW Act
4	Principal employer registration under Building & Other Construction Workers Act
5	Licence under Beedi & Cigar
6	Registration under Plantation Labour Act
7	Building Plan Drawing Approval
8	Application for Feasibility & Estimation of Water Connection
9	Application for Water Connection
10	Application for Excise LOI
11	Application for NOC for Establishment
12	Application for Building Plan Approval
13	Application for Provisional NOC
14	Application for building approval from ULB
15	Application for Estimation of Connectivity
16	Application for Temporary Power Connection
17	Application for Permanent Power Connection

Further, various pre-operation clearances can also be applied for and acquired using the same portal. These are described in the table below.

Table 48: Pre-Operation Clearances

S. No.	Description of Clearance (Consent for Operation)
1	Application for licence as manufacturer of weights and measures
2	Application for the grant of a licence to manufacture for Sale of drugs
3	Application for Grant of Licence to Manufacture for Sale and Distribution of Class A or Class B medical device
4	Application for NOC from Electrical Inspectorate

S. No.	Description of Clearance (Consent for Operation)
5	Application for Approval of license
6	Application for license
7	Registration and Grant or Renewal of Factory License
8	Occupancy Certificate/No objection Certificate
9	Application for NOC for Operation

Besides the services listed above, some other services offered on the SWAAGAT portal include:

Table 49: Other services on SWAAGAT Portal

S. No.	Other Services
1	Application for retails license
2	Industrial estate land allotment
3	Factory license amendment
4	Approval for revised plan drawing of existing factories
5	Applications for dealer and repairer licenses
6	Registrations for importers of packaged commodities of partnership firms and of co-operative societies

It is important to streamline clearance processes in the pre-establishment and pre-operations stages as investors are required to acquire a large number of clearances at these points of a business's lifecycle. Doing so can give a location a competitive advantage over locations likely to attract similar investments and industries. A benchmarking exercise has been conducted comparing the practices of some fast-growing states in India in order to identify practices that can help Tripura achieve a similar competitive advantage.

Benchmarking: The EODB measures of fast-growing states have been examined to identify the best practices that can be adopted by Tripura.

Examining the clearance process of fast-growing states like Andhra Pradesh, Assam, Haryana, and Gujarat reveals that Tripura performs well in terms of the streamlined provision of EoDB services and ranks just behind Andhra Pradesh. While the process to acquire all the necessary pre-operational and pre-establishment clearances and permits takes 42 days in AP, it takes 51 days in Tripura.

While Tripura performs better than both Haryana and Gujarat in terms of time taken for processing to provide permits, it lags behind AP for the same. Processes like the sanctioning of power supply, securing a water connection, factory plan approvals, and license granting procedure for the manufacture of bulk drugs/formulations/cosmetics all take longer in Tripura than in Andhra Pradesh.

Similarly, the time taken for the granting of some permits is considerably lower in other states. For instance, fire NoCs, an important clearance required by industries, are issued in Tripura in 14 days, However, in Gujarat the same process is completed in seven days. Further Gujarat's provides for VAT and CST registration in one dayWhile Tripura takes longer to provide the same registration.

Hence, the report recommends that Tripura should focus on reducing the time taken for clearances which could help investors in setting up their industries faster. This can be achieved through self certifications instead of physical verifications by departments.

Apart from ensuring the swift granting of permits and clearances, in an effort to intensify investor support measures, AP has also brought all industrial inspections under one **Central Inspection Portal**, enabling centralized scheduling, inspector allocation and monitoring to minimize interruptions to businesses.

Like AP, Tamil Nadu too has introduced similar EoDB measures. In a significant move to reduce regulatory burdens on investors, 165 redundant Acts have been repealed and 300+ compliances have been done away with. Besides this, the state has increased factory license validity from 10 to 15 years as well. Other investor support measures taken by Tamil Nadu include-

a. setting up a virtual conferencing facility for investors to schedule and resolve their queries with the relevant state agencies/ departments.

b. creating a dedicated **project facilitation team** to ensure timely disposal of all Single Window Applications filed by investors

c. development of the Biz-Buddy dedicated **industrial grievance helpdesk**. This is an online wizard for redressing grievances of investors/industries in a transparent, time-bound and hassle-free manner. It connects investors to 20+ departments,100+ agencies, and 150+ officers to facilitate speedy resolution of industry related grievances of any kind. The portal also has an inbuilt escalation matrix, up to the Chief Ministerial level. This has resulted in an 80% reduction in investor issue resolution time.

Based on the benchmarking above, it is recommended that the implementation of the following reforms be considered in order to increase EoDB in Tripura:

i) Reducing the time taken to provide various clearances during setting up of industries.
ii) Creation portals to centralize specific steps of the clearance process, like AP's inspection portal.
iii) Development of effective online help desks and support cells to address investors' queries and grievances.

3.4.1 Other Interventions

Apart from infrastructure provision, fiscal support, and EoDB considerations, factors like a predictable and non-discriminatory regulatory environment, sufficient and accessible investor support resources, and the overall quality of the enabling environment[144] also play a key role in incentivizing and mobilising investments. Some areas of policy intervention that could address these 'secondary investor concerns' in Tripura and help increase the inflow of investments include–

A. Institutional support capacity: in order to create an investor-friendly business environment, it is critical to have supporting institutions and organisations. Tripura currently has one state-level organisation, the Tripura Industrial Development Corporation Ltd, which aims to act as a catalyst in the process of the promotion and the development of industries in the state and to create industrial infrastructure in order to support economic development. At the regional level, the District Industrial Corporations carry out similar functions. It may be important to develop capacities at the DIC level.

A benchmarking analysis has been carried out for both the TIDC and the DICs below with similar investor support bodies that have been successful in mobilising investments. This has been done to identify the practices that can be adopted by the TIDC and DICs.

[144] Investment Incentives And FDI In Selected ASEAN Countries, OECD (2004).

Benchmarking the TIDC with similar industrial development bodies: The TIDC provides infrastructural support and financial assistance to eligible investors while also managing a food testing laboratory. It is the nodal industrial development body in Tripura.

However, when compared to similar bodies in other Indian states like the Andhra Pradesh Industrial Infrastructure Corporation **(APIIC)**, it can be seen that its functions can be further broadened. For instance, the APIIC, while being responsible for the maintenance of civic services in the state's Industrial Areas, also performs certain additional roles that were traditionally performed by the state's gram panchayats and municipal corporations. This gives the APIIC statutory powers to perform certain functions of local bodies across 287 Industrial Areas, housing complexes, mini-industrial estates, and commercial complexes falling under the purview of municipal bodies and gram panchayats in the state. . Since the management of industrial areas falls wholly under the APIIC, this allows for the simplification of regulatory procedures and raises the efficiency of various processes relating to industrial development The resultant increase in overall EoDB can act to mobilise investments by reducing undue administrative burdens on potential investors.

To promote local self-governance within Industrial Areas, the APIIC has also evolved the concept of **Industrial Areas Service Societies**. This enables the IAs to function more effectively in a decentralized administrative setup where the APIIC serves to act as a facilitator. Such a setup acts to further increase operational efficiency as it streamlines the management of industrial estates.

Like the TIDC and the APIIC, the Gujarat Industrial Development Corporation too serves as a nodal body for industrial development at the state level. In order to develop Special Investment Regions (SIRs) and turn them into global hubs of economic activity supported by world class infrastructure, the GIDC has a **four-tiered administrative mechanism** to facilitate the establishment, operations, regulation, and management of SIRs. Tripura too could appraise the benefits of outlining such targeted objectives and roles for each tier of the TIDC in order to enable the body to support industrial development more effectively.

Further, the GIDC has specialised 'Pre-Allotment', 'Post-Allotment' and 'Land and Planning' departments. While the first two enable the body to better deal with investor needs both during establishment and after, the third facilitates better planning of land use and allocation.

Thus, it is suggested that the organisational structure of the TIDC could be reexamined, and specialised departments may be created within it to better equip it to facilitate industrial development and to provide investor support.

Benchmarking the DICs with similar industrial development bodies: The functioning of Tripura's DICs can be improved through institutional reform, to better equip the bodies to catalyse regional industrial growth. DICs in Maharashtra are empowered to provide all the services and support needed by small and rural entrepreneurs. Some benefits schemes they offer to industries include:

a. Seed Money Scheme

b. DIC Loan Scheme

c. Entrepreneurship Development Training Program

d. District Award Schemes

It is also critical that DICs be empowered to support MSMEs as MSMEs have been recognized to be important engines of regional growth. Further, as DICs can play a vital role in supporting **skill development** at the district level, they need to be equipped to do so.

In order to further increase their effectiveness in supporting district-level industrial growth, it is recommended that DICs adopt the best practices followed by similar bodies, like Japan's Kohsetsushi Centres, UK's Manufacturing Advisory Services(MAS), and Germany's Fraunhofer Institutes,[145] which include:

[145] Strategic Recommendation Report: MSME Development Institute, Ministry Of Micro, Small & Medium Enterprises (GoI), 2013; https://www.swmas.co.uk/business-support/manufacturing-advisory-service-mas-business-growth-service; https://www.fraunhofer.de/en/institutes.html.

a. Promote technology adoption among MSMEs

b. Provide audit of MSME lean manufacturing and processes

c. Provide business advisory services to improve manufacturing

d. Support technology transfer and commercialisation

e. Promote tech/knowledge from universities

f. Teach innovation and new product development skills

g. Promote energy efficient manufacturing skills.

Benchmarking of international agencies such as Japan's Kohsetsushi Centres highlight that the DIC type institutions also collaborate directly with and undertake R&D activities in partnerships with MSMEs and provide access to research labs/prototyping facilities.

It is important to ensure high institutional quality as this is one of the determinants of investment – investors link good governance with higher economic growth while weaker institutions are linked to added investment costs and reduced profits.[146] Further, poor institutional support mechanisms often prolong clearances and licensing processes, which can dampen investment inflows. Efficient and transparent institutions, on the other hand, help address another investor need that is, administrative simplification, increasing EoDB.

Therefore, a necessary area of policy action should be the creation of high-quality institutions that are able to support investors. Here, it is being proposed that the existing institutions, the TIDC and the DICs, be strengthened, their existing functions clearly defined, and their role broadened in order to ensure that they continue to contribute to Tripura's industrial growth.

B. **Land allotment policy**: A clearly defined land allotment policy is an integral part of an industrial strategy. This not only streamlines the process of land allotment for investors, increasing EoDB, but also helps safeguard the interests of all stakeholders involved.

There are various important aspects of industrial land allotment that a specialized allotment policy regulates. Firstly, it determines the price of land parcels to be allotted. This is a complex process as the decided cost needs to cover the cost of the land acquisition and that of the infrastructure being provided as well. However, this only helps arrive at an average price. It is then important to devise a system of differential pricing in order to both target different kinds of investors and to recover the costs incurred by the government in procuring and developing the land. This needs to be done by considering the specific needs of investors as well as the overall policy objectives as set out in an industrial policy.

Land access is of crucial importance for economic development and is the bedrock of industrial activity. Thus, setting down a well-defined land allotment policy is a critical part of ushering in industrial growth. It defines the legal rights and conditions of access to this important resource and regulates its distribution among multiple stakeholders. Beyond this, land allotment policies shape land use and land management as well.

It is pertinent also to mention here that such a policy ensures the protection of investors' property rights and secures ownership.

Currently, Tripura does not have a specific policy of this kind. There are, as a result, no clear regulations governing the allotment process. The **process for lease cancellations**, for instance, is not regulated. The development of such a policy can be considered as this can have an enabling effect on industrial activities by attracting investors with differential pricing and streamlined allotment processes. Implementing this policy can act to improve the use of land resources and the conditions of property rights under which investors in the state function.

After examining the land allotment policies of Andhra Pradesh, Uttar Pradesh, and Maharashtra, it is

[146] Determinants of Foreign Direct Investment: A Sectoral and Institutional Approach, IMF (2010).

recommended that Tripura consider including the provisions listed below—
i) **Creation of a price fixation committee (PFC)**: to carry out complex land valuation processes and determining the level of infrastructure to be provided in industrial parks. It can monitor the progress of construction of infrastructure as well as carry out project monitoring in an industrial park. Such a committee may be constituted by the TIDC. A PFC is required also because it carries out the important function of setting the land allotment price. It needs to settle on a price that covers the costs involved in the acquisition and development of the allottable land.

Implementing policies related to land for large and mega projects and allotment of land in phases: This is an important function as allotment prices needed to be set in a way that not only helps the state government recover the costs of acquiring and developing the land parcels, but also to attract large investments.

ii) **Providing discretionary pricing and attractive terms:** The policy could include measures like early bird incentives for initial investors and incentives like shorter leases for MSMEs. In the long run, it could also focus on attracting larger industrial units. For this, pricing could be based on the size of the proposed industrial projects. The policy could have provisions to allot land parcels at subsidized rates to mega and ultra-mega industries. These industries will bring in large investments and will catalyse industrial growth by stimulating the development of various other ancillary or associated industries.

Further, such differentiation is critical to cater to different stages of the growth of an industrial park, or the overall industrial sector. In the nascent stages of industrial development, small-scale industries must be focused on with the provision of early bird land price incentives. However, in the later stages of industrial development, it is critically important to attract larger units who will ensure continued growth. To attract such industries, land parcels must be subsidized in order to make them more attractive than in other similar locations.

Different type of industries can be targeted using differential pricing as well. Penetrative pricing for thrust and sunrise sector industries are required to fast track growth while this is not as important for ancillary ones.

Various states' land allotment policies already have such provisions. The MIDC, for instance, prioritizes applications from industries which are categorized as mega projects by the Maharashtra government. Land allotment incentives are also given to investors with large scale investments who aim to start production as early as possible, which provide large scale employment, and those that bring in FDI.

iii) **Formulation of an application scrutinising process**: the applications of potential investors need to be carefully reviewed to check for investors' credit worthiness, land requirement, proposed land use etc., and to review investors' detailed project reports to aid the decision-making process regarding allotment. This will act as a way to check the suitability of investors to whom land is being allotted. Examining the DPR will ascertain the suitability of a particular project as it will reveal the overall impact that the project will have on the industrial activity and growth of a region.

The TIDC too could formulate similar review and scrutiny processes in order to select the most suitable projects and investors for Tripura's industrial parks to maximise the profitability and viability of the parks.

iv) **Defining rules for switch over of premises/alternate plots:** to facilitate hassle-free switching of plots in the case of its unsuitability for a specific industry's use, having clearly articulated guidelines for switching to alternate plots will be important. This will also help regulate and filter the number of such demands.

v) **Determining method of allocation (auctions etc.):** Specific allotment mechanisms such as tendering, auctions, or a first come first serve system may be used based on the type of plots being allotted. For premium plots, for instance, a first come first serve method or auctioning may be used.

vi) **Defining rules for implementation of projects**: these rules will serve as necessary checks and balances in order to ensure an industrial unit's compliance with its DPR. An important aspect of these rules is monitoring the stipulated time period for project implementation. Such checks ensure long-term commercial growth.

vii) **Defining rules relating to non-industrial land use**: Land parcels in industrial parks are not only used by industries. Various non-industrial activities also need to be undertaken on parks' premises to support industrial activity. These include training and skilling activities, ancillary services like logistics, testing centres, and

storage and warehousing facilities. Other such uses are dictated by the specific type of industrial activity the park is suited for. Various investors will be interested in acquiring land parcels to provide these services. The land allotment policy should have clearly defined provisions for land allotment to such investors as long as the overall objective of catalysing industrial growth is being met by the proposed non-industrial activities.

viii) **Cancellation, and withdrawal of allotment**: cancellation procedures must be clear and well-defined in land allotment policies in order to protect the interests of all stakeholders without acrimony. Cancellations due to non-compliance or failures to meet industrial growth objectives specified by investors in their DPRs can be facilitated through this. If, on the other hand, a project is unable to meet these objectives due to external reasons, such procedures can allow them to cancel their lease without penalty.

ix) **Process for acquiring permission for sub-letting of premises**: subletting can allow for a non-performing investor to seek the additional support needed by them from another industrial unit. In case an allotee is unable to comply with the projected commencement targets outlined in the DPR submitted by them, it can help to allow for subletting to the required third party. Again, the land allotment policy needs to align with the overall objectives of the industrial policy and ensure the commencement of sustainable industrial activity. Outlining a process and making provisions for the same is therefore required.

x) **Devising innovative land allotment models**: various different kinds of land allotment models can be devised for specific types of land parcels based on their location, the infrastructural support available to them, and other similar parameters. Further, models that speed up the allotment process can also be designed with the larger aim of improving investor experience. Focusing on providing this kind of non-fiscal incentive, in terms of EoDB, plays a central role in attracting investors.

Having targeted models of allotment, whether auction-based or otherwise, can act to also accelerate the recovery of the costs of land acquisition and development while still allowing for investment-enabling allotment pricing.

C. **Project Development Mechanism**: Tripura's industrial strategy could include, beyond providing from providing infrastructural support and fiscal incentives, administrative mechanisms and frameworks that support industrial development. One such mechanism is a **project development mechanism**. This allows prioritization of projects and advance preparation of the project documents envisaged to be implemented.

The objective of the Project Development Mechanism (PDM) is to enhance the readiness of projects in industrial parks by taking advance actions to prepare for the projects. It can enhance significantly project readiness through advance actions, fast tracking the process of setting up industries.

Tripura would benefit from such a framework as it would not only fast-track the growth of industrial parks by prioritising projects with the best prospects, but also because this would ensure efficient and optimal allocation of scarce resources like land. Further, this mechanism would help attract investors by cutting down on the time required for setting up businesses in the state.

D. **Promotion of SMEs through the provision of common infrastructure**: In envisioning enabling policies and incentives, it is important that Tripura pay special attention to rolling out policy measures that actively bolster Small and Medium-sized Enterprises (SMEs).

SMEs account for the majority of businesses worldwide and are important contributors to job creation and global economic development.[147] It is, therefore, essential to devise policies to support these in order to achieve holistic industrial growth. However, in developing countries, SMEs can often face a variety of challenges— research finds that enabling technical support can be scarce.[148]

To address this issue, the GoI has rolled out the Micro & Small Enterprises Cluster Development Programme (MSE-CDP) under which it focuses on, among other things, the development of common facility centres (for instance, infrastructure for testing, training, warehousing, and effluent and sewage treatment). Similar common facilities are also developed under the Revamped Scheme of Fund for Regeneration of Traditional Industries

[147] Small and Medium Enterprises (SMEs) Finance, World Bank (https://www.worldbank.org/en/topic/smefinance).

[148] Promoting Entrepreneurship And Innovative SMES In A Global Economy: Towards A More Responsible And Inclusive Globalisation, OECD (2004).

(SFURTI), aimed at providing sustained employment for traditional Industry artisans and rural entrepreneurs.

According to the Economic Review Of Tripura (2019-20)[149], Tripura has a total of 1,09,666 MSMEs (comprising 1,343 registered and 1,08,323 unregistered units). MSMEs play a vital role in propelling economic growth, providing sustainable livelihoods, and promoting equitable regional development.[150] Further, in the context of Tripura, they play a central role in the bamboo sector, one of the identified priority sectors. Most bamboo-based products are produced by MSMEs. As these products make the largest single contribution in the handicrafts sector, supporting bamboo sector MSMEs can help bring overall development to the state.

Therefore, it is imperative that steps be taken to promote SMEs in Tripura by broadening access to various enabling infrastructure. As part of this, it is recommended that the state develop various enabling common infrastructure in its industrial parks.

As export-oriented food processing has been identified as a thrust sector, it is recommended that services for quality certification be made more accessible. The agribusiness sector is important in almost all developing economies and is "characterized by SMEs that have high backward linkages with the rest of the economy, contribute particularly towards poverty reduction, job creation and improved health and nutrition"[151]. Recognising the economic role of agriculture-based industry, it is important to have certain other enabling common infrastructure including a gender inclusive food processing training centre with facilities for imparting training on post-harvest handling, preservation and specifically processing, and cold storage facilities.

For the rubber sector, too, it is important to have in place appropriate measures to provide quality certification facilities to improve and maintain the competitiveness of SMEs. Thus, it is recommended that facilities for both chemical and physical testing for all rubber /polymer products and facilities for their certification to any international standards be developed across the industrial parks in Tripura.

Finally, for Tripura's third identified priority sector, bamboo, the development of common facilities for bamboo processing, including 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 could be beneficial.

Apart from such sector-specific infrastructure, the benefits of developing common warehousing facilities for the storage of both raw materials and finished goods in Tripura could also be examined.

E. **Ecological concerns**: Green industrial policy measures can result in other socio-economic benefits, too—these policies can be beneficial as "investments in improving resource efficiency and recycling help reduce the demand for energy, water and virgin resources, thus reducing the need for large investments in new energy and water supply infrastructure and new extractive industries."[152] Further, they help in meeting broader social objectives too. The greening of industries creates jobs and alleviates poverty bringing both growth and development.

Implementing industrial greening policies can not only help attract private investment but can help realise several other socio-economic goals. The implementation of a green industrial policy will help host regions meet the UN-prescribed Sustainable Development Goals, including "No Poverty" (Goal 1), "Decent Work and Economic Growth" (Goal 8), "Industry, Innovation and Infrastructure" (Goal 9), "Sustainable Cities and Communities" (Goal 11), and Sustainable Consumption and Production (Goal 12), as well.

Looking at Asia, the region has been witnessing swiftly expanding green revenues and exports and deployment of climate change mitigation technologies. Coupled with this, is also a "growing trend among firms to become more environmentally responsible with the adoption of environmental management systems and approaches for pollution prevention and resource use efficiency, as well as participation in programs to reduce the

[149] Economic Review Of Tripura (2019-20), Directorate of Economics & Statistics, Government of Tripura (2020).

[150] Northeast Economic Corridor: Bringing People and Markets Together, ADB (2020).

[151] Promoting Entrepreneurship And Innovative SMES In A Global Economy: Towards A More Responsible And Inclusive Globalisation, OECD (2004).

[152] Green Industrial Policy, UN Environment Program.

environmental impact of their production processes". Thus, developing a green industrial process can play a significant role in attracting investors.

Recognizing the importance of such frameworks, several such policy measures have been introduced in India. The green industrial framework implemented as part of the Visakhapatnam–Chennai Industrial Corridor (VCIC), for instance, includes measures to minimize the ill effects of industrial activity on the environment, improve resource efficiency, reduce climate change impacts, promote a green transport network, support the creation of a green circular economy, and promote the practice of green procurement and sustainable finance.

In Tripura, which falls across important ecological hotspots and supports a wide variety of floral and faunal biodiversity, the need to be cognizant of environmental concerns, is especially pressing. Thus, it is recommended that a green industrial policy that includes measures similar to those included in the VCIC's green framework be developed in the state. These measures include:

i. The development of common effluent and sewage treatment plants: This will broaden access to such technology for small-scale industries and will enable the removal of toxic and non-toxic contaminants from wastewater and make it usable for various industrial purposes. Apart from promoting efficient water use, this common infrastructure will also reduce the environmental impact of industrial activity through discharge/emission.

ii. Reduction of environmental impact of industrial activity: by developing green belt along all the roads of industrial areas; using Power Purchase Agreements (PPA) to buy renewable energy for all companies; buildings/ townships with "Green Building" certifications in industrial areas; and using organic waste in 'Waste to Energy' plants to generate electricity.

iii. Improvement of resource efficiency: by using alternative aggregate material like fly ash, steel slag in roads and buildings; adopting resource, energy and water efficient technologies; using waste heat to produce electricity or transferring waste heat to other processes; developing infrastructure for inter-modal transport system; rainwater harvesting; and reusing treated waste-water/effluent.

iv. Promoting a green transport network: by developing inter-modal and co-modal transport systems; constructing dedicated heavy movement traffic lanes; developing traffic management tools and efficient public transportation with good connectivity; and switching to e-vehicles.

v. Creating a green circular economy: by developing guidelines to imbed the concept of a circular economy in the state; and setting up authorized recyclers for e-waste, hazardous waste, rare metals, ferrous material to promote industrial reuse of industries to use recycled waste.

vi. Practicing green procurement and sustainable finance: by increasing the reuse of raw materials; producing and procuring green products with eco-labelling; adopting better standards like ISO 14000, 140001, 9000 etc.; providing a differential subsidy schemes under MSME; providing electricity, financial loans in favor of companies adhering to environmental legislations; and creating a platform where MSMEs can get finance from international financial instruments for greening measures.

In the long term, the state should also implement incentives to promote the adoption of greening measures among industries. This will help the state achieve sustainable growth while also improving the quality of the environment, plugging resource wastage, benefitting from the socio-economic gains of green industry, and attracting big investors necessary to induce industrial growth. The measures rolled out by Tamil Nadu which provides the following incentives for greening industries under its Industrial Policy 2021 can be examined for this—

1. Special incentive for green industries in the sunrise sectors: incentives of up to INR 1 Crore
2. Special incentives for Industrial Parks: Under the Green Industry Incentive, green industries get a 25% subsidy on cost of capital of setting up of such undertakings. The subsidy amount however is subject to a limit of INR 5 Crore.
3. Special incentives for R&D projects: Green Industry Incentives for 5 years, subject to a ceiling of up to INR 1 Crore
4. Special Incentives for Foreign Direct Investment: Green Industry Incentives for 5 years, subject to a ceiling of

up to INR 1 Crore
5. Special incentives for Sub- Large Projects: The Green Industry Incentive will be given to projects for setting up environmental protection infrastructure. A 25% subsidy, with a ceiling of INR 1 Crore, on the cost of setting up such infrastructure for safety and energy efficiency solutions, water conservation solutions greening solutions and pollution control solutions is provided under this provision.

Thus, it is recommended that Tripura devise a green industrial policy and also provide incentives to promote the adoption of greening measures among industries to address concerns about the negative environmental impacts of industrial activity.

F. **Specific support schemes for exporters and smallholders**: In today's globalized world, businesses have access to new markets for doing business. Governments across countries have focused on taking advantage of the current hypermobility of goods by implementing export facilitation measures such as the provision of consultancy services, information preparation and analysis, the development of marketing strategies and implementation plans, provision of
advertising services, and financial support and grants. Existing research also suggests that government intervention in promoting exports are important drivers of the overall success of export-oriented industries.[153]

The GoI also has rolled out several such measures. Under the Service Exports from India Scheme (SEIS), for example, service providers of certain eligible services are entitled to duty credit scrip at notified rates on the net foreign exchange earned. Additionally, the Export Promotion Capital Goods (EPCG) scheme facilitates import of capital goods for pre- production, production and post-production at zero customs duty. Further, under the Transport and Marketing Assistance (TMA) for Specified Agriculture Products scheme, the GoI helps agricultural exporters by providing aid for the international component of freight and marketing for export of specified agriculture products to specified destinations.

In Tripura, the food processing, bamboo, and rubber sectors have been identified as having export potential. In order to realise the benefits of Tripura's location and abundant raw material base, it is important that the state's government take steps to promote and support export activities in the region. As part of this effort, a multi modal logistic park has already been proposed for development in the state's southern reaches, in Sabroom. Further, Tripura already provides businesses with an export promotion subsidy of 10% of the value of exported goods with a ceiling of INR 20 Lakh per annum.[154]

However, benchmarking with fast growing Indian states like Maharashtra and Tamil Nadu reveals that a more holistic export facilitation policy could be introduced in Tripura. Both states have implemented a variety of measures to catalyse the growth of their respective export-oriented sectors. Maharashtra, for instance, has in place provisions that support the export of gems and jewelry, petrochemicals, engineering items, metal and metal products, drugs and pharmaceuticals, readymade garments, agro-based products, and plastic and plastic items. The state not only awards businesses for their export performance but also gives a space rent subsidy scheme to small scale industries for participation in international exhibitions through which they can find buyers. Similarly, Tamil Nadu offers financial assistance to the MSME sector for participation in trade fairs abroad, a full subsidy on space rent and shipment of exhibits, and provides funding for producing publicity material, covering up to 25% of the costs. In order to catalyse the growth of exports, the best practices of such states could be adopted in Tripura too.

Apart from providing financial incentives, it is recommended that the state provide other support to export-oriented industries. Key among such support is providing facilities for international certifications as well as for testing laboratories for quality assurance and standardization of goods. Currently, the Bodhjungnagar Industrial Complex in West Tripura is the only industrial park in the state that has a Food Testing Laboratory. Similar testing and certification infrastructure for food processing and rubber needs to be developed across other industrial parks, too.

Besides having provisions to incentivise investments, it is important to also use industrial strategies to meet wider social objectives. In Tripura's case, a focus on supporting its smallholders can have considerable socio-economic benefits. Research finds that more than 96% farmers in Tripura belong to the marginal and small

[153] Globalization and its Socio-Economic Consequences, SHS Web of Conferences 92 (09016), (2021)
[154] Department of Industries and Commerce, Government of Tripura (https://industries.tripura.gov.in/state-scheme-details).

category, are financially frail, and often work in risk-prone environments.[155] Further, their incomes, too, are very low (INR 60,000/family/annum).[156]

While it is necessary to bring about industrial growth in the state, it is also essential to meet broader social objectives like poverty alleviation and improving livelihood security. In order to have a holistic industrial strategy that meets such objectives, it is recommended that steps to improve market access for smallholders and marginal farmers be taken in Tripura. This would also help the overall growth of two of its identified priority sectors — food processing and rubber.

It is recommended that as part of the development of the multi modal logistics park at Sabroom, networks for collection of produce from smallholders' farms be developed as well. In order to further market access, a mandi could also be set up at the proposed logistics park as this would not only benefit the farmers but would also ease access to raw material for industries operating in the state.

G. **Investment promotion:** can be understood as the steps taken to support a region's "competitiveness by branding it as a profitable investment destination, attracting quality investors and making it easy for businesses to establish or expand their operations"[157].

The various strategy elements described in the preceding sections all highlight ways to brand Tripura as an attractive investment site. Apart from these strategies, host destinations must also seek the attention of investors. A major part of this is building a brand for the location. Tripura too could benefit from doing this. It is recommended that the state take the following steps to do so-

1. Establish an investment promotion agency: such an agency could be part of the TIDC and DICs or an entirely new organisation. It would ideally provide guidance and information to investors; forge alliances with the private sector, business associations and other partners; market available opportunities to potential investors after researching them; facilitate investment; and provide aftercare services/support and policy advocacy.

2. Building an investment promotion website: Tripura already has some web portals where investors can find business opportunities. Having a dedicated centralized platform providing information on opportunities at the state-wide level could, however, better investors' access to information.

3. Hosting regular investment promotion events: the TIDC could host well-organized investment promotion events. It could collaborate with the NEDFi and host such events at venues like the NEDFi Convention Centre, or the NEDFi Pavillion.

Such events allow investment-seeking locations to highlight their strengths and to present specific investment opportunities to potential investors, and to establish contact with investors and the important intermediaries. Further, they give investors a chance to learn more about a location's investment climate from officials, investment promotion specialists and businesses currently operating in the area.

4. Developing literature in the form of pamphlets: the state government could consider working on developing periodically released pamphlets containing information not only about specific investment opportunities but also about the benefits of investing in the same. This can help publicise the opportunities to potential investors.

Investment promotion activities such as the ones highlighted above will help Tripura disseminate information to a wide pool of potential investors not only about investment opportunities in the state but will also enable it to market its strengths as an investment location as well.

Hence it is recommended that Tripura implement the policy measures highlighted in the preceding section. Doing so could help the state attract a steady stream of investors as each recommendation has been made keeping in mind various investor concerns and needs.

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[155] Production and Profit from Different Farming System Approaches in Tripura, Debnath C. et al, Indian Journal of Hill Farming (2019).
[156] Production and Profit from Different Farming System Approaches in Tripura, Debnath C. et al, Indian Journal of Hill Farming (2019).
[157] Investment Promotion and Facilitation (OECD Investment Policy Reviews: Egypt 2020), OECD (2020).

4 Conclusion

In conclusion, this document provides a detailed strategy for Industrial Development in Tripura. The industrial strategy will help Tripura in achieving its growth objectives as outlined in the Lakshya 2047 plan and to support India's 5-Trillion economy plan.

The strategy is based on four pillars–

a. Selection of products that can be manufactured competitively in the state, based on raw material availability, export potential, and domestic demand: the analysis undertaken for the selection of products for manufacture within Tripura, considering its rich natural resource base, and geographic proximity to, and language and cultural linkages with neighboring countries, reveals that the state has the potential to attract investments in food processing, and the rubber and bamboo sectors. Food processing has the potential for exports specifically in the pineapple and jackfruit segment. Both the rubber and bamboo industries too can benefit from the huge availability of raw material in the region. Further, each of the identified priority sectors will be supported by both domestic and regional demand.

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. At present, most of the rubber produced in Tripura is being marketed as raw material for other industries or is supplied as a primary processed low value-added product (like RSS) to the other states in India. However, considering the strategic roads and rail network being built, which will improve the state's connectivity to rest of India, a large number of rubber-based manufacturers could be attracted to make investments in the region. Based on value chain analysis, more than 75 rubber products have been identified out of which 15 have been shortlisted as these can be manufactured competitively in Tripura.

Nearly 16-18 different species of bamboo grow all across Tripura. Melocana baccifera is the dominant species with over 80 % coverage. It is primarily used in incense stick making and domestic needs such as gate and fence building, and construction. Based on a detailed value chain analysis, Agarbatti sticks, panels and flooring, and timber substitutes have been identified as priority products. A detailed competitiveness analysis has further identified potential target markets.

Tripura being an agrarian state can focus on the processing of perishable food-based products like oranges, pineapple, jackfruit, etc. The three main horticultural products identified for food processing are pineapple, jackfruit, and orange. The value chain of the food processing industry starts from the production of the fruits in Gomati, Dhalai and Unnakoti districts. From there, the various food products are produced and finally exported to local and international markets. Considering the cost of raw material and manufacturing and logistics costs, an competitiveness analysis of major products indicates that exporting food products to Europe is generally more profitable than exporting them to regional markets.

b. Development of adequate infrastructure to support industrial growth: one of the key investor concerns that shapes investment decisions is the availability of key industrial infrastructure in a location.[158] Thus, host locations need to develop physical infrastructure to attract investors as well as to achieve the larger objective of fast-tracking holistic industrial growth. Apart from creating physical infrastructure that supports industrial operations, host location governments must also provide infrastructure that eases the overall operations process.

In devising an industrial strategy, therefore, it is important to formulate an infrastructure development plan as well. Such a plan has been devised as part of this engagement with the objective of making Tripura's industrial parks attractive to investors. For this, any improvements to existing critical infrastructure in the state's 11 brownfield parks were identified and a list of required critical infrastructure for its 6 greenfield parks was curated. Further, based on proximity to raw material and potential markets, land availability and industrial ecosystem, the priority sectors for each industrial park were mapped. Based on this, and after considering suitable benchmarks, additional infrastructure requirements to attract investments were recommended. The

[158] Guiding Principles for Policies Toward Attracting Foreign Direct Investment, OECD (2003).

table below highlights the sector-specific infrastructure requirements for each priority sector.

Priority Sector	Sector Specific Infrastructure required
Bamboo	Bamboo stick-making facility, Bamboo Plastic Composite (BPC) facility, Strand woven bamboo block unit, Vacuum pressure treatment plant, Resin/Glue Plant, Bamboo charcoal plant
Food processing	Quality and FPO Labs and Food Processing Training Centre
Rubber	Testing of all Rubber /Polymer products and their certification to any international standards can be done at the NABL accredited J.J Murphy Research Centre in the Park.

Further, keeping in mind the growing popularity of 'smart industrial parks' as a means for improving "operational efficiency in areas such as energy, logistics, environment, security, and business activities"[159], infrastructural interventions that could be undertaken to develop Tripura's parks into smart parks were identified. After developing critical as well as sector-specific infrastructure for industries, it is beneficial to also provide smart infrastructure. This facilitates business activities in a number of ways and as a result, investors are attracted to smart industrial parks— operating costs are often lowered as a result of increased efficiency in management of, for example, energy, logistics, environmental monitoring, and government liaison.

Additionally, the development of gender inclusive skilling centres, urban linkages to industrial parks with gender responsive public transport links, and climate-resilient industrial infrastructure has been proposed for the industrial estates of the state.

As various large capital-intensive infrastructure projects have been proposed for the parks, it has been suggested that the possibility of developing some of the required infrastructure through PPPs be considered. This will allow the sharing the burden and risks associated with such projects. The projects suitable to be developed as PPPs have also been identified. Also, ways to attract the private sector to develop these have been outlined.

c. Development of a multi modal logistics park in order to improve logistical efficiency, increase competitiveness of commodities manufactured in the state, and their ease access to potential markets: Logistics play a key role in the development and growth of priority sectors. In India, 13% of the total price of manufactures is attributed to logistics as compared to 8% in developed countries. For Tripura specifically, interventions aimed at improving logistical infrastructure and efficiency is important as its geographical isolation from the rest of India escalates logistics costs as well as the time taken for goods to reach target markets, significantly affecting competitiveness.

To bridge this gap while also increasing the profits for manufacturers operating out of the state, a multi modal logistics park is essential. This has been proposed based also on the findings presented in the NEEC report that highlights the need for such parks across the NER.

As trade facilitation measures are essential enablers for facilitating the movement of goods and people between countries, thus boosting international trade and regional integration. In this context the Maitri Setu presents Tripura with the opportunity to grow into a robust export centre especially since its location is well suited for this purpose. Access to the Chattogram port through the bridge will enable the North East to access the ASEAN countries' markets as well as other markets in South and South-East Asia. It will also enable other nations to do the same. This will make Tripura a major import-export hub. Further development of a Multi-Modal

[159] 'Smart industrial estate … uplifting economic and social fundamentals?', SCB Economic Intelligence Centre (2019).

Logistics Park in Sabroom will improve competitiveness and reduce cost of logistics in the NER region as a whole.

Within Tripura, a land parcel near the Maitri Setu, Sabroom, is being looked at for the development of such a logistics park. There is also a proposed land port being developed at near Jalefa, Sabroom, which will help in faster processing of exports. The park aims to create a one stop solution for all the logistic and warehousing challenges for the Northeast's trade with Bangladesh.

An assessment of the current logistical scenario reveals that such a park will not only help reduce overall transportation time but also overall costs by approximately 8-20%, making products in Tripura more competitive, and aiding overall industrial growth. Additionally, the proposed park has the potential to ensure that agricultural goods from rural areas remain well connected to markets both within the NER and outside. This is an important advantage considering Tripura's focus on food processing. The establishment of the park can also help ease export-oriented manufacturers' access to regional markets apart from Bangladesh and facilitate better access to certain raw materials from neighboring regions.

d. Implementation of policy measures that incentivise investments and ease the establishment and operation of businesses: Investors' choice to invest in a particular location is based on various considerations, key among which is the overall policy environment. Recognising this, it is suggested that as part of its industrial strategy, Tripura consider policy interventions to make investing in the state attractive and viable. This can be done in several ways, one among which is providing investment incentives. These can be broadly classified as fiscal and non-fiscal.

Tripura already provides several fiscal incentives and has taken steps to implement Ease of Doing Business reforms in order to provide non-fiscal support to industries. The state through its industrial policy has announced a slew of fiscal incentives to attract investments. Further as part of non-fiscal incentives the Tripura government established the "Single Window Approval by All Government Agencies in Tripura (SWAAGAT)". This approval system allows investors to acquire all the required clearances from the government on one portal, significantly improving EODB within the state. An analysis of these measures provided in Section 7 highlights the gaps that could be addressed in Tripura, based on policy benchmarking with some high-growth states of India. The findings of the section highlight the steps that the Tripura government could consider taking in order to improve overall investor-readiness.

Apart from enhancing incentives-based policies, several **other incentives** to improve the overall quality of the investment environment could also be considered for implementation in Tripura. In order to do so, the overall institutional capacity of bodies like the TIDC and the DIC could be improved. Further, the benefits of other policy improvements, like the development of a comprehensive land allotment policy to govern land allotment in industrial parks, a green industrial policy, an export support scheme, and a project development mechanism, could also be examined. Besides these, steps to promote SMEs and to mainstream the interests of smallholders could be taken as well.

Suitable investment promotion activities have also identified as these can support a region's "competitiveness of by branding it as a profitable investment destination, attracting quality investors and making it easy for businesses to establish or expand their operations"[160]. It is important for host destinations to seek the attention of investors through investment promotion activities. The following steps were recommended for Tripura -
1. Establishing an investment promotion agency as part of the TIDC and DICs or as an entirely new organisation.
2. Building an investment promotion website.
3. Hosting regular investment promotion events in collaboration with bodies like the NEDFi.
4. Developing literature in the form of pamphlets to publicise any opportunities to potential investors.

The table below outlines an action plan based on the industrial strategy discussed above.

[160] Investment Promotion and Facilitation (OECD Investment Policy Reviews: Egypt 2020), OECD (2020).

Proposed Intervention	Description
Infrastructure development	It is important for Tripura to fulfil investors' needs for industrial infrastructure. Some required infrastructure projects that could be undertaken in a phased manner are described below: a. Critical infrastructure: it is recommended that power and water supply, trunk infrastructure like streetlighting and industrial sheds, ETPs and STPs, external roads, and feeder lines be developed first. b. Good to have infrastructure: developing business support services like common facilitation centres (CFCs) that accommodate various business support services (such as conference venues, auditoriums etc.), testing labs, certification centres, warehousing facilities, and cold storage facilities. Sector specific infrastructure like gender inclusive food processing, facilities for chemical and physical testing for all rubber/polymer products, and common facilities for bamboo processing could be developed, too. c. Infrastructure to be developed in the long term: developing 'smart industrial park' infrastructure, including developing ICT support; climate resilient infrastructure through the development of utility corridors with lines for water distribution, sewerage, telecommunication, and electricity; and public transport facilities with interconnected internal pedestrian and public transportation networks as well as gender responsive transportation facilities. d. Futuristic infrastructure: development of optical fiber cables connectivity and SCADA (Supervisory Control and Data Acquisition) systems. e. Development of urban linkages: as urban connectivity is a critical component of the external infrastructure for industrial estates, it has been proposed that external roads linking the estates and urban centres be developed. Two-lane carriageways have been recommended for the Nagicherra, Lalchari, Sonamukhi, and Jalefa parks. Further, it has been recommended that public transport networks be linked to the parks at Bodhjungnagar, R.K Nagar, and Jalefa.
Developing a more comprehensive incentives policy	Improving its incentive schemes by adopting elements from incentives schemes of other states: this is important because while the availability of incentives is among the 'secondary considerations' of investors, it has proved to be important in attracting investments.
Development of a multi-modal logistics park	This will help improve the competitiveness of the goods produced and rationalize logistics costs in the region. It can also serve to increase market access for smallholders.
Development of a land allotment policy	Tripura does not have a specific land allotment policy. There are, as a result, no clear regulations governing the allotment process. It is recommended that such a policy be devised and implemented as it can have an enabling effect on industrial activities by attracting investors with differential pricing and streamlined allotment processes. It can improve the use of land resources, the conditions of property rights under which investors in the state function, and in aiding overall industrial growth.

Development of investor support organisations	While the TIDC and the DICs do act to support investors and attract investments, it is important to further streamline their functioning through measures like capacity development, both at the organisational and individual levels.
Promotion of SMEs	Focus on broadening access to expensive infrastructure can help promote SMEs. It is recommended that the state develop common infrastructure facilities in its industrial parks, including quality certification facilities, gender inclusive food processing training centres, testing for all rubber /polymer products, certification facilities, common facilities for bamboo processing, common warehousing facilities for the storage of both raw materials and finished goods, and cold storage units.
Managing environmental impacts of industrial activity	The development of sound common effluent and sewage treatment plants in the state's industrial parks has been proposed as these will enable the removal of toxic and non-toxic contaminants from water, making it usable for various industrial purposes. This will help in meeting the following green objectives— i. Reducing the impact of industrial activity through discharge/ emission on the environment ii. Promoting efficient reuse of water In the long term, the state could also implement a green industrial policy in order to achieve sustainable growth.
Implementation of export support schemes	In order to catalyse the growth of exports, elements from export schemes of other states could be adopted in Tripura. Apart from providing financial incentives, it is recommended that other steps to support export-oriented industries also be taken. Key among such support is providing facilities for international certifications as well as for testing laboratories for quality assurance and standardization of goods.
Investment promotion activities	In order to establish Tripura as a viable investment location in the eyes of potential investors, it has been recommended that the state government pursue investment promotion activities like establishing an investment promotion agency, building an investment promotion website, hosting regular investment promotion events, and developing literature in the form of pamphlets to publicise opportunities to potential investors.
Implementation of support schemes for smallholders	It is recommended that as part of the development of the multi modal logistics park at Sabroom, networks for collection of produce from smallholders' farms be developed. In order to further market access, a mandi could also be set up at the proposed logistics park.

It is anticipated that the recommendations made in this report can help Tripura achieve holistic industrial growth and attract investments into its priority sectors. Annexures

5 Annexures

List of 75 Identified Rubber Products

S No.	HS Code	Commodity
1.	40021100	LATEX (SBR/XSBR)
2.	40021910	OIL EXTENDED STYRENE BUTADIENE RUBBER
3.	40021920	STYRENE BUTADIENE RUBBER WTH STYRENE CONTENT OF OVER 50 PERCENT
4.	40021930	STYRENE BUTADIENE STYREDE OIL BOUND COPOLYMER
5.	40021990	OTHERS SYNTHETIC RUBR AND PACTICE DRVD FROM OILS IN PRMRY FORMS/IN PLTS SHTS ETC MXTRS EXCL. LATEX
6.	40022000	BUTADIENE RUBBER (BR)
7.	40023100	ISOBUTENE-ISOPRENE(BUTYL) RUBBER (IIR)
8.	40023900	HALO-ISOBUTENE-ISOPRENE RUBR (CIIR/BIIR)
9.	40024100	LATEX,CHLOROPRENE RUBR
10.	40024900	OTHR CHLOROPRENE(CHLOROBUTADIENE) RUBR(CR)
11.	40025100	ACRYLONITRILE-BUTADINE RUBR LATEX
12.	40025900	OTHR ACRYLONITRILE-BUTADIENE RUBR (NBR)
13.	40026000	ISOPRENE RUBBER
14.	40027000	ETHYLENE-PRPYLENE-NON-CONJUGATED
15.	40028010	LATEX
16.	40028020	CHEMLY MODIFIED FORM OF NATURAL RUBBER INC GRAFT RUBBER
17.	40028090	OTHER FORM OF MXTURES OF NATURAL RUBBER
18.	40029100	OTHR RUBER LATEX
19.	40029910	FACTICE (RUBR SUBSTITUTE DRVD FROM OIL)
20.	40029920	TREAD RUBR COM,CUSHION COM, CUSHION GUM/ TREAD GUM FOR RESOL/REPAI/RETREA RUBR TYRE
21.	40029990	SYNTHETIC RUBBER SYNTAX,NOT NES.
22.	40070010	THREAD OF VULENSE RUBR,NOT COVRD ELSEWHERE
23.	40070020	CORD OF VULCNSE RUBR, NOT COVRED ELSEWHERE
24.	40070090	OTHER THREAD/CORD OF VULCNSE RUBBER
25.	40111010	RADIALS TYRES USED ON MOTOR CARS (INCL STATION WAGONS AND RACING CARS)
26.	40111090	OTHER TYRES USED ON MOTOR CARS (INCL STATION WAGONS AND RACING CARS).
27.	40112010	RADIALS TYRES USED ON BUSES/LORRIES
28.	40112090	OTHER TYRES USED ON BUSES/LORRIES
29.	40113000	NEW PNMTC TYRES OF A KIND USED ON AIRCRAFT
30.	40114010	TYRES FOR MOTORCYCLES
31.	40114020	TYRES FOR MOTOR SCOOTERS
32.	40114090	TYRES USES OTHER THAN MOTORCYCLES/ SCOOTERS
33.	40115010	MULTICELLULR POLYURETHANE(MCP) TUBES TYRE USED ON BICYCLES
34.	40115090	OTHER WHEELS
35.	40117000	OF A KIND USED ON AGRICULTURAL OR FORESTRY VEHICLES AND MACHINES
36.	40118000	OF A KIND USED ON CONSTRUCTION, MINING OR INDUSTRIAL HANDLING VEHICLES AND MACHINES
37.	40119000	OTHER WHEELS
38.	40121200	RETREADED TYRE USED ON BUSES/LORRIES

39.	40121990	RETREADED TYRE USED IN VEHICLE OTHER THAN TWO-WHEELER/MOTOR CAR/BUS/LORRY/AIRCRAFT
40.	40122010	USED PNMTC TYRES FOR BUSES/LORRIES/EARTH MOVING EQUIPMENT INCL LIGHT COMMRCL VEHICL
41.	40122020	USED PNMTC TYRES FOR PASENGER AUTO VEHICLEINCL TWO/THREE-WHEELER AND PERSONAL VEHICLES
42.	40122090	USED PNMTC TYRES FOR OTHER VEHICLES.
43.	40129010	SOLID RUBBER TYRES FOR MOTOR VEHICLES
44.	40129030	TYRE WITH METALLIC FRAMEWORK
45.	40129041	TYRE FLAPS USED IN TWO/THREE-WHEELER MOTORVEHICLES
46.	40129090	OTHER TYRE FLAPS
47.	40131010	INNER TUBES FOR MOTOR CARS
48.	40131020	INNER TUBES FOR TRACK AND BUS
49.	40132000	INNER TUBES OF RUBBER USED ON BICYCLES
50.	40139010	INNER TUBES FOR AIRCRAFT
51.	40139020	INNER TUBES FOR MOTOR CYCLES
52.	40139030	INNER TUBES FOR OFF THE ROAD VEHICLE N.E. S.OR INCLUDED
53.	40139041	INNER TUBES USED IN REAR TYRES OF TRACTORS
54.	40139049	INNER TUBES USED IN OTHER THAN REAR TYRES OF TRACTORS
55.	40139050	INNER TUBES USED IN TYRES OF CYCLE RICKSHA/THREE-WHEELER POWERED RICKSHAWS
56.	40139090	INNER TUBES USED IN OTHER VEHICLES
57.	40011010	PREVULCANISED NATRL RUBR LATEX
58.	40011020	NATRL RUBR LATEX NOT PREVULCANISED
59.	40012100	NATRL RUBR IN SMKD SHEETS
60.	40012200	TECHNICALLY SPCFD NATRL RUBR(TSNR)
61.	40012920	NATURAL RUBBER IN PALE CREPE
62.	40012930	NATURAL RUBBER IN ESTATE BROWN CREPE
63.	40012990	OTHER NATRL RUBBR NON-LATEX
64.	40013000	BALTA GUTTA-PERCHA ETC AND SMLR NATRL GUMS
65.	40141010	RUBBER CONTRACEPTIVES MALE(CONDOMS)
66.	40141020	RUBR CONTRACEPTIVES, FEMALE (DIAPHRAGMS) E.G.CERVICAL CAPS
67.	40149030	FEEDING BOTTLE NIPPLE
68.	40151100	SURGICAL GLOVES, MITTENS AND MITTS
69.	40151200	SURGICAL GLOVES, MITTENS AND MITTS OF A KIND USED FOR MEDICAL, SURGICAL, DENTAL OR VETERINARY PURPOSES
70.	40151900	OTHER GLOVES,MITTENS AND MITTS
71.	40159010	RUBBER APRON
72.	40159020	LABELS
73.	40159030	INDUSTRIAL GLOVES
74.	40159091	DIVING SUITS OF VULCANISED RUBR
75.	40159099	OTHERS ARTCLICLES OF APARL AND CLOTHING ACCESSORIES FOR ALL PUEPOSES EXCL.GLOVES/ APPRON AND DIVING SVITS ETC.

Thank you