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## The Potential of Rubber Plantation on the Backdrop of Geomorphological and Climatic Conditions of Assam

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**Abstract :** Assam, located in the North Eastern part of the country possesses suitable conditions for the plantation of rubber plants (*Hevea Brasiliensis*) with monsoonal rainfall, tropical climate and lateritic soil. The neighbouring state of Tripura with the collaborative efforts of the state Government and Rubber Board of India have made tremendous strides in increasing the rubber plantation of the state through well thought out schemes and plans. Assam too can emulate the success of Tripura if the state government shows the same level of impetus as the climate and geomorphic conditions are similar with Tripura. Rubber plantation can help in tackling the problem of unemployment in the state and can have a profound impact on the insurgence problem by diminishing social unrest through financial stability.

**Keywords:** *Hevea Brasiliensis*, monsoon, tropical, rubber plantation

**Introduction :** The state of Assam is located in the North – Eastern part of India sharing its interstate borders with the other six north eastern states (Arunachal Pradesh, Nagaland, Manipur, Mizoram, Meghalaya and Tripura), West Bengal and its international borders with Bhutan and Bangladesh.

It encompasses a total area of 78,438 km<sup>2</sup> ranging between 24<sup>07</sup> N- 28<sup>00</sup> N latitude and 89<sup>42</sup> E – 96<sup>02</sup> E longitude. Topographically, the state can be divided into the Brahmaputra valley, the Barak Valley and the mountainous Assam ranges. It experiences a subtropical climate with high seasonal temperature variations and mean annual rainfall varying from 1500 mm to 3750 mm. According to 2011 census, the population of Assam is 31.17 million with rural and urban populations accounting for 85.92% and 14.08% respectively. The forest area of Assam is 27,671 km<sup>2</sup> (35.28% of the total area).

The rubber plant, *Hevea Brasiliensis* belonging to the Family Euphorbiaceae holds the potential to play a pivotal role in changing the fortunes of a large chunk of the total population of Assam. The importance lies in the fact that the latex produced in this tree is the source of natural rubber. The climatic requirement for the growth of these trees incorporate 200-300 cm of rainfall, temperatures in the range of 20<sup>0</sup>-30<sup>0</sup>C, about 75% humidity with a minimum of 5-6 hours of sunlight and the state of Assam fulfills all of them. They grow best in well drained porous soils which are mildly acidic in nature having pH 5-6<sup>[1]</sup>. In India, rubber plantation is mainly localized in the Western Ghats with the state of Kerala being the leader. But of late, the North Eastern region, particularly Tripura and Assam have been viewed as next hub of rubber plantation of the country. The paper will focus on the viability of the plan of large scale rubber plantation in Assam and its possible socio economic impact using available stats regarding the topic. An effort has also been made to throw some light into the success story of introducing rubber plantation in Tripura.

**Methodology :** The paper is based on secondary data collected from different papers and websites. Care has been taken to maintain the credibility of the data.

**Results and Discussion :** In keeping with the suitable climatic conditions and land area, Rubber Board of India has envisaged Assam to be the next major zone of rubber plantation. The neighbouring state of Tripura where Rubber Board was first set up in 1967, in the following years, saw a massive rise of interest in rubber plantation among the indigenous people of the state. As of 2010-2011, a total of 11,673 hectare of land in

Tripura is covered by rubber plantation, which amounts to 1.11 % of the total area of the state . Tripura Government constituted the Tripura Rubber Mission in January, 2006 to intensify the rubber plantation growth in the state . The primary objective of the Tripura Rubber Mission is to increase the rubber plantation to 85,094 Hectare within twenty years from 2006-2007 to 2025-2026 <sup>[2]</sup>.The state of Kerala, which is the leader in rubber production in the country, contributes 92% of the total produce and in doing so consumes 20% of the total agricultural land of the state. The rubber production is dependent on various factors such as the climate, soil quality and the amount of rainfall. Hence ,most areas of the country are rendered unsuitable for rubber plantation.The total production of the country in natural rubber varies both yearly as well as monthly as can be seen from Table 1 and Table 2 respectively.

Year ( April to March)	Rubber Area (Ha)	Tappable Rubber Area (Ha)	Production (Tonne)	Average Yield (Kg/Ha)	Consumption (tonne)	Import (Tonne)	Export (Tonne)	Average Price of RSS-4 at Kottayam (Rs/100 Kg)
2005- 2006	597,610	447,015	802,625	1,796	801,110	45,285	73,830	6,699
2006- 2007	615,200	454,020	852,895	1,879	820,305	89,799	56,545	9,204
2007- 2008	635,400	458,830	825,345	1,799	861,455	86,394	60,353	9,085
2008- 2009	661,980	463,130	864,500	1,867	871,720	77,762	46,926	10,112
2009- 2010	686,515	468,480	831,400	1,775	930,565	1,77,130	25,090	11,498
2010- 2011	711,560	477,230	861,950	1,806	947,715	1,90,692	29,851	19,003
2011- 2012	734,780	490,970	903,700	1,841	964,415	2,14,433	27,145	20,805
2012- 2013	757,520	504,040	913,700	1,813	972,705	2,62,753	30,594	17,682
2013- 2014	778,400	518,100	774,000	1,629	981,520	3,60,263	5,398	16,602
2014- 2015	795,135	533,675	645,000	1,443	1,020,910	4,42,130	1,002	13,257
2015- 2016p	810,800	558,900	562,000	1,437	994,415	4,58,374	865	11,306
2016- 2017	820,000	586,000	691,000	1,553	1,044,075	4,26,434	20,920	13,549

P: Provisional

Table 1 : Annual trends in Area, Production, Consumption, Import, Export and Average Prices of Natural Rubber in India ( According to Rubber Board of India)

	Production (tonne)		Consumption (tonne)		Import (tonne)		Export (tonne)		Average price of RSS-4 at Kottayam (Rs /100Kg)	
	2015-16	2016-17p	2015-16p	2016-17p	2015-16p	2016-17p	2015-16	2016-17p	2015-16	2016-17
April	40000	39000	80815	83750	36957	34550	8	91	12058	13062
May	45000	46000	81765	86775	36964	35445	0	98	12510	13076
June	47000	50000	80955	88065	38923	37336	6	44	13098	13375
July	47000	52000	83400	88340	41917	41258	39	42	12537	14177
Aug	48000	58000	82725	87000	37413	48853	155	28	11665	13850
Sep	50000	60000	81600	84000	42713	52974	25	222	11218	12142
Oct	52000	62000	82650	85000	43276	44601	113	125	11410	11692
Nov	53000	65000	77880	87765	35226	40831	88	640	10954	12214
Dec	58000	70000	85250	85280	45586	25076	23	2232	10279	13370
Jan	52000	72000	84875	84600	39512	24279	214	6329	9780	14666
Feb	37000	62000	84320	87500	31864	15690	161	6212	9355	15942
Mar	33000	55000	88180	96000	28023	25541	33	4857	10812	15024
Year	562,000	691,000	994,415	1,044,075	458374	426434	865	20920	11306	13549

**Table 2:** Monthly Trends in Production, Consumption, Import, Export and Average Prices of Natural Rubber in India ( According to Rubber Board of India)

The importance given to rubber plantation in the country as a whole can be envisaged by the fact that in the year 2000-01 , the total area under rubber plantation was 562670 Hectares which augmented to 661980 Hectares by 2008-09 . Likewise in Assam , the growth of rubber plantation is taking place at a steady rate ( Table 3)

Year	Area under rubber plantation (in Hectares)
2000-01	12117
2001-02	12806
2002-03	13208
2003-04	13841
2004-05	14057
2005-06	14848
2006-07	15890
2007-08	18225
2008-09	23705

**Table 3:** Change of area under rubber cultivation in Assam (According to rubber Board of India)

In Tripura, which is now India's second largest grower of rubber, rubber plantation was initially encouraged by introducing two concepts i.e., block planting and group planting. In the former, plantation was done in blocks and until the rubber plants were not economically profitable, the land owners were put on monthly wages. When the rubber trees were old enough for rubber extraction, the beneficiaries were put back in charge of their land and the plants and the wage was revoked. In case of group planting the individual families were helped to initiate rubber plantation by bringing them under one umbrella so that they can avail the government help, make contact with the concerned personnel for proper guidance in terms of rubber plantation. There is plenty of scope for introducing such a concept to the indigenous people of Assam. The geomorphic and climatic conditions being similar, there is every chance that such a scheme will succeed in Assam too, particularly in the areas inhabited by tribal people. As of now, the westernmost districts of the state of Assam have adopted rubber plantation. However, the culture of rubber plantation is still eschewing with the larger chunk of the state. The chairman of Rubber Board has now requested the Chief Minister of Assam to send a proposal to the central Government to allocate more funds under Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) to rubber plantation<sup>[3]</sup>. If this comes to fruition, then we can expect an accelerated growth of the rubber plantation in the state.

Comparative studies between the western ghat areas and the Brahmaputra valley show that the two main controlling parameters for the prosperity of rubber plantation are temperature and precipitation. Both the areas are affected by monsoon, so the decisive factor becomes the temperature and the low winter temperature becomes the determinant<sup>[4]</sup>.

Rubber cultivation is a livelihood and therefore financial profit is a must for the cultivators. The rubber plantation requires a period of 7-8 years before it reaches maturity and this is the period where the government must step in with financial aid in order to propagate rubber plantation. The price of rubber in the international market is growing over the years and hence can be a real boon for a poverty ridden state like Assam. Just to give an analogy, the price of RSS-4 grade of rubber (Rs. Per 100 Kg) in the international market was 3094 in 1997-1998 which has soared to 11005 in 2009-2010 which means an increase by almost 4 times in a span of about 12 years.

Rubber trees, comes with its own set of added benefits on top of the obvious one of producing latex. It provides fire wood for the tribal people are in most parts still dependent on fire wood for cooking purpose. They make the soil more fertile, purifies the atmosphere through carbon sequestration and provide a green cover.

Not putting the cart before the horse, the proper infrastructure for the growth of rubber plantation must be put in place first. Awareness among the laymen about the possibilities of rubber plantation must be created. Resource persons must be made available for laying the blueprint and for suggestions. One noteworthy thing is that for rubber plantation, lands that are already in use for agricultural use must be untouched, otherwise the state will not be able to produce enough food. The most suitable places must be delineated at first. Each district should have one office for this purpose only so that people will know where to contact if in need.

**Conclusion:** Assam is a state beleaguered with problems. Rubber plantation can be a potent weapon in the fight against ever worsening unemployment issue of the state. Facilitating the people of the state to become financially stable can in the long run help the fight against the insurgence problem too. Assam has always lagged behind the other states in almost all noteworthy sectors despite its vast resources. Rubber plantation can also tackle the malpractice of jhum (Shifting) cultivation by giving the tribal people a substitute. For the success of rubber plantation, the Government of Assam must take sound initiatives and make plans for the long term instead of opting for short term glory. Assam must make use of what it has and in this case it has the suitable climatic as well as geomorphic conditions for rubber plantation. There is a scope for entrepreneurship in this regard as well. Help from the relevant research fraternity must be sought for by the Government. Rubber Board of India and the central government must also expedite in this endeavor. The people must be ready to work in a scientific manner. If all things add up, there is a real possibility of changing the fortunes of the state through rubber.

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