International Journal of Ecology and Environmental Sciences 44 (1): 27-31, 2018
ISSN: 2320-5199 (Online)

Short Communication

Perspectives on Rubber Monoculture in Tripura, North-East India

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ABSTRACT

This paper discusses the sustainability and legal aspects of past and prevalent rubber monoculture in Tripura, a Himalayan foothill state in the South-western part of North-East India. The state being in the sub-tropical region with humid climate, has been proven to be suitable for Rubber (*Hevea brasiliensis*) cultivation. Favourability of climate and success from earlier trials by the Rubber Board in early 1960s with support from various agencies in the state, witnessed extensive rubber cultivation in the last five decades. Rubber cultivation is seen as an opportunity to provide livelihoods to the farmers and the rural mass in general. Conversely, it is believed to have brought in newer complexities in the scientific management of forests in Tripura and to address long term sustainability issues. Considering these perspectives, this paper presents the current status of rubber cultivation and attempts to highlight its various advantages and disadvantages in the state by drawing on experiences from the last fifty years.

Keywords: Biodiversity; Communities; Ecological Balance; Ecosystem Services; *Hevea brasiliensis*; Livelihood

INTRODUCTION

Rubber plant or *Hevea brasiliensis* (Willd. ex A.Juss.) Müll.Arg., an exotic deciduous plant native to the Amazonian rain forest in Brazil was first introduced in the state of Tripura in 1963 by the Forest Department as an alternative to the traditional shifting agriculture with technical support from the Rubber Board of India. Policy makers were of the opinion that shifting agriculture was degrading the natural forests to which they found opportunities to introduce *H. brasiliensis* in the community forests thereby encouraging monoculture crops in natural forest areas. The total area of land under rubber plantation in the state stands at 74,335 ha (Table 1). Of late, it has been estimated that about 70 % of these areas are shared by small growers in the community owned forest lands. A target of 1,00,000 ha has been set to be diverted to rubber plantation in Tripura by the end of 2020. The Rubber Board and the Government of Tripura through promotion and implementation of extensive rubber plantation schemes are targeting the community owned forest lands to achieve this. As of now, the implemented schemes are being carried out with the sole objective of increasing rubber production in the country by utilizing the potential areas in Tripura and also in other NE states. The objective of providing economic returns to farmers through rubber cultivation in private lands and encouraging settled agriculture as envisaged are reported to be only secondary. However, with the recent establishment of rubber based industries, it has been able to provide the growers with opportunities to sell their produce locally. This has provided some financial security to the cultivators but at the cost of diversion of natural forests which were once rich in Non- Timber Forest Products (NTFPs) that supported immediate livelihoods of the communities.

Table 1. Area under rubber plantation in Tripura

Time (Years)	Area (ha)	Successive Increase in Area (ha)
1977	574	0
1982	3590	3,01
1987	10,085	6,495
1992	17,860	7,775
1997	23,936	6,076
2002	30,575	6,639
2007	35,760	5,185
2012	57,620	21,860
2016	74,335	16,715

Note: Restructured data based on Economic Review of Tripura, 2015-16.

The Tripura Forest Development and Plantation Corporation Ltd (TFDPCL) and Tripura Rehabilitation Plantation Corporation Ltd (TRPCL) are playing major roles in extending rubber cultivation among the communities. The TFDPCL alone owns 8422.73 ha rubber plantations making it the single largest owner of rubber estate in the country. Rubber plantation programmes are also being implemented by the Tripura Tribal Areas Autonomous District Council (TTAADC).

Rubber Cultivation Implemented as Jhumia Rehabilitation Tool

Initially, policy makers in the state conceived and adopted rubber cultivation in forest lands as an integrated approach to check forest degradation due to shifting cultivation and to resettle the Jhumias. Cultivation of rubber was imposed as an alternative to shifting cultivation by facilitating distribution of free planting materials and funds to raise block plantations. Finding it lucrative, many farmers took up rubber cultivation in their long inherited forest lands compromising with the future availability of land for growing other agricultural crops. This gradually led to conversion of vast areas of community forest lands to rubber plantations in the state. Though this has reduced shifting cultivation in the state, the farmers were left with reduced land area for carrying out cultivation of short rotation seasonal agricultural crops. Introduction of rubber in the early 1960s in Tripura was an experiment and field trial conducted by the Tripura Forest Department and the Rubber Board to explore the possibilities for extensive cultivation in the state. The so called rehabilitation programme witnessed diversion of natural forests and existing adjacent fallow lands which had the potential to regenerate and recover to their original state. Thus, the introduction of rubber in these areas has been observed to suppress natural succession and the self regulating capacity of the ecosystem.

SUSTAINABILITY ISSUES OF RUBBER MONOCULTURE

The prevalent practice of monoculture rubber plantation in Tripura is crucial in terms of future availability of land and forest based resources. The diverse needs of changing demographic scenario of this agrarian state cannot be fulfilled solely by rubber monoculture. It is important to note that above 31% of the state's population constitute the 19 indigenous communities who are confined to forest areas and are mostly dependent on natural forest resources for their day to day sustenance. With expanding rubber monoculture plantation in these areas, ecosystem provisioning services are seeing a gradual decline making the communities resource scarce. This change encourages encroachment of new areas for food, fodder, shelter etc. thereby exposing the undisturbed forests to unsustainable resource extraction and gradual depletion. Over a period of time, this phenomenon results in land-use changes leading to loss of local biodiversity and decline in ecosystem services and functions. For once a natural forest supporting multiple forest based resources and abundant biodiversity, the rubber plantation sites are reduced to a single crop culture for as long as 20-35 years. Post these years it becomes even more difficult to manage these areas to newer interventions. Hence, sustainability of land and associated forest resources are compromised in a way that it becomes practically impossible to recover in the future.

LEGAL ASPECTS OF RUBBER CULTIVATION IN INDIA

The Role of the Rubber Act, 1947

The promotion and development of rubber cultivation was initiated with the enactment of the Rubber Act, 1947 and ensuing amendments to this act up to 2009. The Rubber Act, 1947 and subsequent amendment initiated and took forward the promotion of rubber industry by establishment of the Rubber Board under the Ministry of

Commerce and Industry, Government of India. This act empowered the Rubber Board with functions and duties for promotion of rubber industry in the country. Since then, the Rubber Board was entrusted with the task of implementing centrally sponsored rubber plantation and development schemes in major rubber growing states of India viz., Kerala, Tamil Nadu, Tripura and other North Eastern states.

The Forest (Conservation) Act, 1980 and Rubber Cultivation in Tripura

Looking into the current controversies amongst stake-holders and the impending ecological consequences of rubber plantations in forest areas, it is important to note and relate the prevalent practice to other relevant laws viz., the Forest (Conservation) Act, 1980 and the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006. Prior to the implementation of the Recognition of Forest Rights Act, 2006 and the period after the enactment of Forest (Conservation) Act, 1980 and the subsequent amendment to this act in 1988 i.e., between 1981 and 2007, about 35,760 ha (Figure 1) of land was brought under rubber plantations in Tripura, of which greater areas were previously forest lands. As per the provisions of Section 2(ii) of the Forest (Conservation) Act, 1980 and its subsequent amendment in 1988, cultivation of rubber in forest lands in the state of Tripura from 1988 to 2006-2007 appears to be diversion of mostly forest land for non-forestry purpose which clearly indicates violation of the relevant provisions of this act.

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 and Rubber Cultivation in Tripura

Post implementation of the Recognition of Forest Rights Act, 2006 witnessed a different scenario of rubber boom in Tripura with about 74,335 ha (Figure 1) of land under rubber plantation of which vast areas are owned by small to marginal growers. From the year 2007, the trend of successive increase in the area under rubber plantation has seen a sharp rise as compared to that of earlier years (Figure 2). The communities ignorant of the impending ecological consequences and left with no other alternatives are utilizing the provisions of right to cultivation for livelihood laid down by the Recognition of Forest Rights Act, 2006 to convert the Patta lands to monoculture rubber plantations. It has also been reported that Government of Tripura has consented to cultivation of rubber in Patta lands granted under the Recognition of Forest Rights Act, 2006 to the Scheduled Tribes and Other Traditional Forest Dwellers in the state.

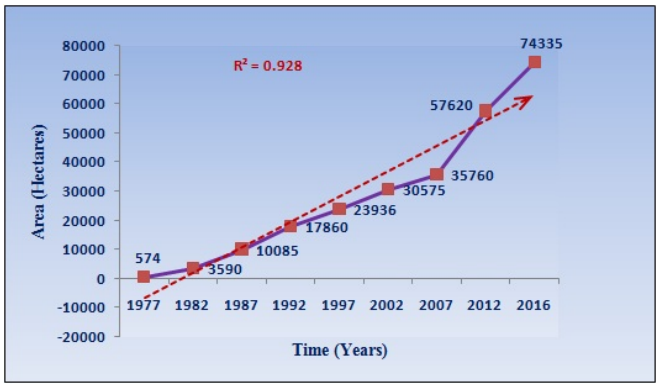

Figure 1. Increasing area under rubber cultivation in Tripura

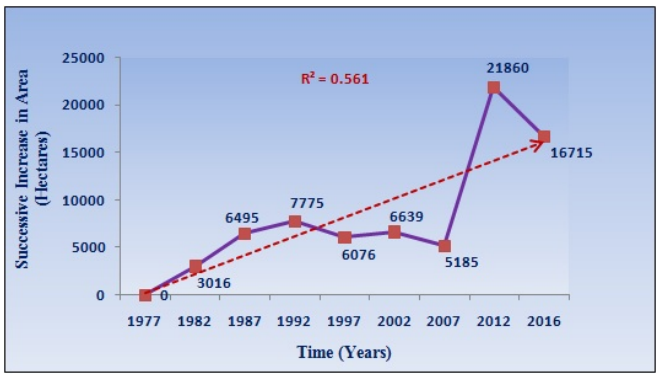

Figure 2. Trend of successive increase in area under rubber plantation

RUBBER MONOCULTURE AN IMPEDIMENT TO ECOLOGICAL BALANCE

The past experiences of over five decades of rubber development in the state of Tripura have seen tremendous success from production point of view making Tripura the second largest natural rubber producing state in India. But, this boom has taken a toll on the forests resources of the state by diversion of natural areas to monoculture rubber plantations. Review of studies indicates that monoculture rubber cultivation has associated negative primary and secondary impacts on the ecology and the environment at large. The shift from tropical forests and traditionally managed swidden fields to large scale rubber monoculture results in a loss of ecosystem services (Hu et al. 2008) and significant

changes in ecological functions, socio-economic conditions and human welfare (Hauser et al. 2015). The marginal farmers with small land holdings could suffer the most as the small area of land, which earlier used to be diverse, is converted to monoculture rubber plantations. In the initial phase of cultivation, *Hevea brasiliensis* takes about 7-8 years to mature for latex production which is quite a long time for the poor growers. The entire phase of cultivation is accompanied by ecological changes in the plantation sites and associated negative impacts on the biophysical and socio-economic environment. Loss of biodiversity is one of the potential dangers associated with sprawling rubber plantation (Li et al. 2007). Felling and smouldering of vegetation in the early phase of preparation for plantations accounts for loss to local biological resources in the herb and shrub layer namely; medicinal plants and other Non Timber Forest Products (NTFPs) and is also marked by decline in vegetal carbon stocks and contributes to rise in CO_2 levels. Majumder et al. (2014) reported that the conversion of natural forest into deciduous monoculture of rubber might disrupt the pattern of spatial and temporal controls over nutrient cycling. Considering all these findings, it is evident that associated negative ecological and socio-economic impacts of rubber monoculture have lasting implications on the natural forests and the communities dependent on them. It creates an imbalance in the provisioning services of the forest ecosystems by reducing the availability of forest-based resources and subjecting the newer pristine forest areas to exploitation.

CONCLUSION

In Tripura, expansion of rubber cultivation has had its advantages and disadvantages with stakeholders particularly sections of farmers and supporting industries benefitting the most at the cost of increasing diversion and encroachment of forest lands for rubber monoculture. The communities ignorant of future long term consequences are converting forest lands to unsustainable rubber plantations compromising the immediate environment that supports their livelihoods. Solution to this unsustainable practice needs to be found out taking into consideration the environmental and socio-economic factors. Suitable alternatives and proven technologies need to be extended in the old growth and existing young rubber plantations sites to minimize its impacts on forest areas and support sustainable rubber cultivation. An integrated approach that works across key resource linkages can be a promising option to obtain maximum economic returns from rubber plantation sites as well as address long term sustainability. One such intervention identified and implemented in many rubber producing countries is the integration of stakeholder validated intercropping concept involving medicinal plants and other locally tradable plant species. This would diversify farmer's product portfolio in a consolidated area and restrict further diversion and exploitation of forest areas for rubber monoculture.

Addressing sustainable rubber cultivation at the policy level by ensuring integration of scientifically proven interventions in rubber promotion schemes and imposing legal restrictions on further expansion of rubber plantations in forest areas can have long term positive implications to the prevalent problems. An essential component in achieving this objective would be by incorporating greater participatory mechanism involving stakeholders at the grassroots level during policy decisions.

ACKNOWLEDGEMENTS

Besides referring published works, interaction and discussions with forest officials and farmers from Tripura and authors' own field works have been useful in bringing out these perspectives to the readers. We extend profound gratitude to all those who provided valuable inputs and information during field works.

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Received 31 August 2017
Accepted 27 December 2017