

Intercropping in immature rubber plantation of Dhalai district in Tripura

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SUMMARY

An attempt was made to assess the overall growth and benefits of intercropping in immature rubber plantation. The result indicated that through intercropping, growers can earn additional income. Banana and pineapple are more popular intercropping crops in survey areas. Banana cultivation is more profitable if compared with pineapple and through banana cultivation growers are able to cover 70-76 per cent cost of first three years. Therefore, intercropping in rubber plantation showed a new path for earning income in immature rubber plantation.

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Key words : Rubber plantation, Benefit, Cost, Cultivation grower and pineapple, Banana, Intercropping

Intercropping is the practice of growing two or more crops in close proximity. Careful planning is required, taking into account the soil, climate, crops, and varieties. It is particularly important not to have crops competing with each other for physical space, nutrients, water, or sunlight. Intercropping of compatible plants also encourages biodiversity, by providing a habitat for a variety of insects and soil organisms that would not be present in a single crop environment.

Intercropping with short-term crops provides a significant additional income during the long immature period of rubber tree growth when no latex is produced. Rubber was grown either as a sole crop, or intercropped for the first 4 years with banana. The intercrop comprised an additive series of one, two or three rows of banana to one row of rubber. Growth of rubber was monitored for 6 years, *i.e.* up to the time that tapping for latex began and a logistic growth function was fitted to girth data in order to assess growth.

Hevea brasiliensis is the most important commercial source of natural rubber- a product of vital important

recovered from its latex. It is a native of the Amazon River basin of South America. It was introduced to tropical Asia in 1876 through Kew Garden in the UK with the seeds brought from Brazil. The tree is now grown in the tropical regions of Asia, Africa and America.

One of the main challenges that Indian Government is facing after independence is provision of social justice to Indian scheduled tribes for the improvement of their socio-economic status. North-east India consists of seven states and in each state there are various types of tribal people live. They are basically poor and previously always exploited by outsiders. However, after independence, the government of India took some initiatives for tribal development. Indian constitution has made separate provisions for the upliftment and well-being of the tribal people in India.

Tripura is a state in Northeast India. Northeast India is the easternmost region of India consisting of the contiguous Seven Sister States, Sikkim, and parts of North Bengal (districts of Darjeeling, Jalpaiguri, and Koch Bihar). Linguistically the region is distinguished by a preponderance of Tibeto-Burman languages. Northeast India has a predominantly humid sub-tropical climate with hot, humid summers, severe monsoons and mild winters.

Objectives:

The basic objectives of this paper are as follows to analyze the opportunity of intercropping in immature rubber plantation and to assess the benefits of growers through intercropping .

The present study was conducted in Dhalai district of Tripura. The Dhalai district was selected purposely

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since rubber plantation is grown by a large number of tribal people there. The district consists of four sub-divisions (*i.e.* Ambasa, Kamalpur, Langtarai valley and Gandachara), out of three were selected. Gandachara sub-division was not surveyed because it is the most backward hilly part of Tripura where rubber plantation is not yet started. The ten villages were then selected from each sub-division by using stratified random sampling. In all, thirty villages were taken for the present study. To select respondents, a list of rubber growers was prepared from each identified village in consultant with local personnel and a few community members of the area concerned. Thus, the total sample consisted of 150 respondents where all are tribal because in Dhalai district 95 per cent people are tribal and in this district government is running rubber plantation program for rehabilitation of tribal people. Data were collected by the investigator with the help of a well prepared, structured interview schedule employing personal contact. Thereafter, data were analyzed, tabulated and interpreted in the light of the objective of the study.

The results obtained from the present investigation as well as relevant discussion have been presented under following heads :

Opportunity of intercropping in immature rubber plantation:

During the initial years of a plantation when the interspaces receive plenty of sunlight, a variety of intercrops can be cultivated. Intercrops should be planted atleast 1.5 m away from bases. Care should be taken to mature rubber and intercrops adequately as per recommendation for each crop and to leave the crop residues in the field itself.

Banana:

Nendran which is non-ratoon type are more appropriate for intercrops during the initial two years. During the first year 1200 plant/ha can be grown and in second year it will be 600. In first year it should be planted in double row system and in second year single row system. The pseudostem, leaves and mother rhizome left after harvest can be used for mulching rubber. Rubber and banana were usually planted at the same time. Spacing for the former was 2 x 8 or 2 x 10 m, the latter 2 x 2 m. Tending, irrigating and fertilizing were carried out to promote their growth. In the North-Eastern states cultivars like 'Sabri' and 'Champa' which are ratoon type are popular. About 500 suckers may be planted in a single row system and allowed to grow for the initial 2-3 years.

Medicinal plants:

Some shade tolerant medicinal plants can be grown in rubber plantations. *Alpinia oxyphylla*, *Amomum longiligulare*, *Morinda officinalis*, *Strobilanthes haenianus* (Karimkurinji), *Adhatoda vasica* and *Plumhago rosea* are basically can be grown in rubber garden. Experimental planting that they did not adversely affect the growth and yield of rubber.

Food crops:

Different crops of food, fodder and vegetables are cultivated in rubber plantations. The most common crops are sweet potatoes, maize, sorghum, cassava and peanuts, etc. All these crops are harvested once a year, some even twice. Many vegetables like cowpea, cucumber, amaranthus etc. can be grown during the initial 2-3 years. Basically villagers cultivate vegetables for their own consumption purpose.

Pineapple:

Rubber was spaced at 2 x 8 or 2 x 12 m and intercropping spacings for coffee and pineapple were 1.5 x 1.5 or 1.5 x 2 m and 0.5 x 0.6 or 0.4 x 0.5 m, respectively. Pineapple was harvested from the second year and lasted for five years. In slope lands the trenches should be taken across the slope parallel to the contour terraces to reduce soil erosion. In Kerala, the cultivar 'Maurtius' is mostly cultivated. In North-Eastern states the cultivar 'Queen' is popular.

Economic crops:

Economic plants such as tea, coffee, pepper, sugarcane, lemon grass and Sisal hemp are interplanted with rubber trees simultaneously and usually harvested for the first time beginning the third year. The harvests last for more than five years with great economic benefits.

Ginger and turmeric:

Since thorough digging of the soil is required for the cultivation of these crops they may be grown only on level and near level lands. They may be grown for the initial two years.

Assessment of income from intercropping:

Rubber plantations in North-east India are mostly situated on sloping and undulating lands. On hilly land soil conservation measures are necessary. June/July is the best season for planting and so all preparations should be completed before that period. In order for intercropping land was prepared carefully through ploughing, trench digging, ridging and fertilizer applying which increased

the production costs. This type of intercropping is more popular in rural areas where labour cost is less.

Table 1 shows that intercropping in rubber plantation is not popular in survey areas. The basic reason is the alternative land. Growers have more amount of land and they cultivate vegetables and fruits in other fertile land and those growers who use intercropping process are well known about it. They also got information from Forestry department and other rubber related institution like Rubber Board, Tripura Rehabilitation Plantation Corporation (TRPC).

Table 1 : Intercropping followed by rubber growers

Opinion	Number of rubber growers	
	Rural	Percentage
Yes	25	16.66
No	125	83.33
Total	150	100

Source: Field survey

Table 2 shows that banana cultivation is more popular in immature rubber plantation as intercropping. There are many reasons for more banana cultivation. The basic reason is more probable income and the others are banana roots also help for increasing productivity of the soil, banana leaves are used as livestock food, banana tree is also used at festival time and mores. Growers also showed interest for growing pineapple. But number was less if compared with banana. Other intercropping plants

Table 2 : Types of intercropping in survey areas

Type of intercropping	Number of rubber growers	
	Rural	Percentage
Banana	20	80
Pineapple	05	20
Economic crops	0	0
Ginger and turmeric	0	0
Medicinal plants	0	0
Agar	0	0
Total	25	100

Source: Field survey

Table 3 : Cost and benefits analysis of intercropping (In a hectare)

Intercropping crops	Total revenue from crop (Rs.)	Total cost for crop cultivation (Rs.)	Net profits from cultivation (Rs.)
Banana	Rs. 30000-33000	Rs. 7000-8000	Rs. 23,000- 25,000
Pineapple	Rs.10,000-13,000	Rs.3,000-5,000	Rs. 7,000-8,000
Economic crops	0	0	0
Ginger and turmeric	0	0	0
Medicinal plants	0	0	0
Agar	0	0	0

Source: Field survey

like tea, agar, ginger, turmeric and medical plants are not cultivated in survey areas.

Table 3 shows that banana is more profitable than pineapple in intercropping. The basic reason for less income from pineapple is the less price of pineapple in local market. In local markets there is more demand of banana and also there is various types of banana from where growers can earn more money.

Rubber plant is two types:

Immature plant and mature plant. If age of any rubber plant is more than 6 years then that plant is called mature plant and before 6 years plant is immature. In immature plantation second and third years intercropping can be done. And after third years intercropping can not done in rubber plantation because generally rubber plants are taller in that period and so intercropping is not productive. The total cost of rubber plantation in first three years is nearly 65000 ruppes per hectare and those grower who are growing banana in rubber plantation (Second and third year) are easily earning Rs. 46000-50000 as profit *i.e.* it covers nearly 70.76-76.92 per cent of the cost. Those growers who are cultivating pineapple are able to earn Rs. 14,000-16,000 as profits *i.e.* 21.53-24.61 per cent of the cost.

Conclusion:

The above analysis shows that intercropping in rubber plantation is not so popular in Dhalai District of Tripura. In immature rubber plantation growers can cultivate various crops/fruits like banana, pineapple, tea, ginger, tormaric, agar etc. Those growers who are interested in intercropping are basically produce banana and pineapple. Though banana cultivation growers are able to cover nearly 70.76-76.92 per cent cost in first three years of immature rubber gardens. The basic reason that growers are more focusing for cultivating banana is good price in market, uses as food for animals, increase productivity of the soil and uses in festival/worship period.

Therefore, intercropping in rubber plantation shows

Table 4 : Comparative benefits from Intercropping in rubber plantation (In hectares)

Cost of rubber plantation in first three years	Intercropping crops	Total profits from intercropping in 2nd and 3rd year	% of rubber costs cover through intercropping
Rs.65,000 (approximately)	Banana	Rs. 46,000-50,000	70.76-76.92
	Pineapple	Rs. 14,000-16,000	21.53-24.61
	Economic crops	0	0
	Ginger and turmeric	0	0
	Medicinal plants	0	0
	Agar	0	0

Source: Field Survey

a new way for earning additional income from rubber plantation and it also helps solving nutrition problem among tribal people.

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