AN ECONOMIC STUDY OF COVER CROPS IN RUBBER SMALL HOLDINGS

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Leguminous cover crops enhance the growth as well as yield of the rubber tree. Besides acting as a protective cover against soil erosion, legumes reduce the immaturity period of the rubber tree and save nitrogenous fertilizer. Cover crops trail on the weeds and suppress their growth, thereby reducing the expenditure on weeding. But till date the economic aspects of raising cover crops have not been studied and hence the present study.

Methodology

The study was conducted in Kottayam District. Two sampling frames were constituted using the list of cultivators growing cover crops and those growing no cover crops, from the records of the concerned regional offices of the Rubber Board. Seventy two samples from the first and fifty samples from the second category were selected by simple random sampling technique making the total sample size at 122. The study was restricted to the small holdings. Data collection was done during the period December 1988 to August 1989 using a pretested questionnaire, keeping the reference period of the study as 1988-1989.

The cost of cover crop establishment and maintenance in the holdings was computed. The difference in weeding cost between the two categories was analysed separately and compared.

Salient features of the samples.

The taluk-wise distribution of samples in the study area and some features of the sampled units are shown in Table I. The average size of holdings with cover crops was found to be slightly large, compared to holdings without cover crops. The stand per hectare was also slightly less in the holdings with cover crops. From these findings it can be concluded that the relatively better off growers showed a tendency to adopt scientific crop management practices.

Results and discussion

The cost of weeding and cover crop establishment and management was worked out and is shown in Table II. In the holdings with cover crops the costs decreased from the first year to the seventh year. There was a sudden decrease in the total costs from the third year onwards as compared to the first two years. This is mainly due to the decrease in weeding cost from the third year onwards as the cover crops got established firmly by the second or third year.

Table I:
Features of the samples

1. Distribution of the samples

Name of taluk	*No.of samples with cover crops*	*No.of samples without cover crops*
Meenachil	28	10
Changanacherry	44	40
Total	72	50

2. Hodlings size and stand per hectare.

Description	*Holdings with cover crops*	*Holdings without cover crops*
Size of holdings(ha)	0.64	0.45
Average stand per ha.	471	486

Table II: Cost of weeding, cover crop establishment and mangement cost (Rs/ha)

I. Cost of the growers with cover crop.

A. Cost of Labour

Item of cost	Ist year	2nd year	3rd year	4th year	5th year	6th year	7th year	Total
Sowing	117.25	77.00	4.55	--	--	--	--	198.80
Weeding	423.85	347.90	135.80	95.90	54.25	56.35	64.75	1178.80
Cover cropmanagement	1.05	64.75	140.00	135.45	101.50	84.70	67.55	595.00
Cover crop manuring	8.75	30.10	--	--	--	--	--	38.85
Sub-total cost	**550.90**	**519.75**	**280.35**	**231.35**	**155.75**	**141.05**	**132.30**	**2011.45**

B. Material cost

Fertiliser	0.72	27.67	--	--	--	--	--	28.39
Farmyard manure	1.03	24.75	--	--	--	--	--	25.78
Wood ash	1.73	--	--	--	--	--	--	1.73
Planting materials	27.00	--	--	--	--	--	--	27.00
Sub-total cost	**30.48**	**52.42**	**--**	**--**	**--**	**--**	**--**	**82.90**
Total cost	**581.38**	**572.17**	**280.35**	**231.35**	**155.75**	**141.05**	**132.3**	**2094.35**

II. Cost of growers without cover crop (Rs/ha)

Cost of weeding	**961.80**	**1064.70**	**813.40**	**618.10**	**429.10**	**369.60**	**326.20**	**4582.90**

In these holdings weeding cost was slightly high in the sixth and seventh year of planting compared to fifth year of planting, possibly due to regeneration of weeds, once the cover crops die off.

The maximum cover crop management cost was incurred during the third and fourth year of planting synchronising with the luxurient growth of the covers. This cost is less in the sixth and seventh year of planting, since the cover crop was almost destroyed when the canopy closed the entire area.

Most of the growers were reluctant to apply manures and fertilisers for the cover crop. Only 13 farmers out of 72 (18 per cent) applied manures and fertilisers for the cpver crops. Regarding fertiliser application for cover crop no scientific principles were followed. Most of them applied a portion of the fertiliser nutrients intended for the rubber tree along with the manuring of rubber. So also none of the growers interviewed followed the recommended cover crop seed treatment like hot water treatment, scarification etc.

Labour requirement

The total labour requirement for weeding, cover crop establishment and management for the entire period of immaturity was 57.47 man days in the holdings with cover crops and 130.94 man days for weeding in the holdings without cover crops.

Costs of the growers without cover crops

As mentioned earlier the average size of holding was relatively less for growers without cover crops.

The maximum weeding cost was incurred during the second year of planting and since then there was a progressive decrease in the total weeding cost. One possible reason for the non-establishment of cover crops may be due to the low level of managerial input.

Net effect of cover cropping

The net saving in costs is presented in Table III. The saving in weeding cost in the plantations raising cover crop was wroked out at Rs.3404/- per hectare over the entire immaturity period of seven years. The total cost required for the establishment and maintenance of cover crop came to Rs.916/- . Taking into account the cost of weeding and cover crop management, the net saving in total cost, compared to the holdings without cover crop came to Rs.2489/- per hectare for the entire immaturity period of seven years.

Fertiliser application for rubber

The fertiliser application for rubber in the area studied deserves mention. Irrespective of the fact whether cover crop was established or not there was a tendency for applying the same kind and quantity of fertilisers in both categories of holdings.

Studies conducted by the Rubber Research Institute of India and Malaysia reveal that the fertiliser requirements of rubber grown with legume ground cover and natural ground cover vary considerably during the latter half of immaturity and during the early years of maturity period.

The higher growth rate of rubber noticed in legume cover areas could be achieved in natural cover areas only with the application of extra doses of nitrogenous fertilisers adding to higher costs.

In order to achieve uniform plant growth in both categories of holdings, separate recommendations viz., 250kg of 12.12.12. NPK mixture per hectare (or its equivalents) for areas where leguminous ground covers are established and 400 kg of 15.10.6.NPK mixture per hectare (or its equivalents) for areas with no legume ground covers are recommended from the fifth year of planting till tapping stage. Unfortunately this recommendation was not followed by the sample growers. The majority of the growers applied 17.17.17 complex, Ammonium phosphate sulphate (Factramphos)

Table III:

Net saving in costs (Rs/ha)

Weeding cost in holdings with cover crops	1178.80
Cover crop establishment manuring and management	915.55
Total	2094.35
Weeding cost in holdings without cover crops	4582.90
Net saving in weeding cost	3404.10
*Net saving in total cost	2488.55

*Total cost include cost of weeding and cover crop establishment only.

with potash or strait fertilisers with no discrimination between the above two categories. One possible reason for following this practice may be lack of scientific knowledge.

In an experiment counducted by the Rubber Research Institute of India with leguminous ground cover (Pueraria phaseoloides) and natural cover showed that the annual yeild per hectare was higher in the legume cover area and a cumulative yeild increase of 466 kg was obtained in three years time. The additional yield obtained in legume cover area for the first three years of tapping more than justified the cost of establishing and maintenance of legume cover (Mathew et al., 1989).

Suggestions

The present study reveals the wide gap in the lab to land technology. Considerable cost can be saved by proper establishment and maintenance of ground covers with scientific fertiliser application. As a partial remedy extension activities may be strengthened.

Popularisation of shade tolerant cover crops are essential since most of the small growers resorted to intercropping during the initial years. After the removal of intercrops, usually by the third year, the chances of establishing Pueraria was relatively less compared to shade tolerant cover crops like Mucuna sp.

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REFERENCES

Rubber Board (1980). Hand Book of Natural Rubber Production in India. Pillay Radhakrishna, P. N. (Editor) 136, 175-176.

Mathew, M. Punnoose, K. I. Potty, S. N. and George, Elsie, S. (1989). A study of the response in yield and growth of rubber grown in association with legume and natural ground cover during the immature phase. Proceedings of the Seventh Symposium on Plantation Crops. Editors - M. K. Nair et al., Vol. 16 (supplement), 433-441.

Lightning Injury

Rubber trees of different ages are susceptible to lightning injury. The damage may be for a group of trees in lines or even in a scattered pattern. The extent of damage varies. The manifestation of visible symptoms of distress is rather sudden. Seriously effected trees are killed and they wilt in two to three days. Partial damage to some branches or portions of the main stem may also occur. In the affected portions, exudation of latex is observed and the bark seperates from the wood and the damaged bark is colonised by borer beetles in large numbers. A characteristic feature is that cambium is the tissue that gets damaged first and as a result, the cambium and the inner bark are coloured dared to dark violet. Dying of tissues starts from the cambium extending through the bark in an outward direction. Soon after lightning strike incidence of patch canker also increases.

An assessment of the damage may be made as early as possible after the lightning strike. Completely affected and dried up plants may be removed. In the case of partially affected plants, the damaged bark is scraped out, the exposed area washed clean with Aretan or Emisan or Ceresan or Agallol solution and after drying a wound dressing compound applied. It exposed to hot sun the treated portions may be white washed.

Sun-scorch

Young nursery seedlings often suffer from sun-scorch. The bark at the collar region dries up resulting in a girding effect and the affected seedlings dry subsequently. This is mainly due to heating up to the soil around the collar and could be prevented by mulching the nursery beds with dry organic matter by the advent of hot dry weather. Fresh green mulch should be avoided.

In young clearings the bark at or above the collar region on the side facing South of South-West often gets damaged due to sun-scorch. In buddings sometimes. the dead snags of stocks fall off leaving a cavity at the bud union. When this faces South or South West, sun--scorch effect becomes prominent and the bark on the scion dies. In these cases often the damaged bark is in the shape of a spearhead. The affected bark is colonised by wood parasite fungi like Diplodia causing further damage.