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SOCIO-ECONOMIC DIMENSIONS OF PARTICIPATORY TRIALS ON LOW FREQUENCY TAPPING (LFT) IN KERALA

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Demonstration plots were established in the rubber smallholdings in different locations popularizing low frequency tapping (LFT) system by participatory monitoring and evaluation. The main objectives of the study were to analyse the socio-economic profile of the participating smallholdings and to identify the contributory factors/barriers for the adoption/non-adoption of LFT by the growers. The database consisted of a sample survey covering 48 participating rubber small growers and the tappers attached to the holdings. The analysis showed that the average size of demonstration plots (0.89 ha) is higher than the average size of rubber smallholdings in Kerala (0.50 ha) indicating that holding size is one of the factors prompting the adoption of LFT. The dependence on hired labour for tapping is higher and the size of holding (number of trees) emerges as the key factor facilitating the adoption of LFT in the case of holdings dependent on hired labour. The resistance from tappers to LFT was observed only in the smaller holdings mainly due to the loss of tapping days and increase in work load due to higher yield from unit area. The growers overcome the resistance by (i) resorting to self-tapping; (ii) by assuring employment to tappers in other grower's holdings; and (iii) by offering incentives for extra crop production. Availability of family labour is a key factor influencing the adoption of LFT in smaller size groups with less than 1 ha. rubber area. Despite the positive signals emerging from the scheme the scale neutrality of LFT remains suspect in the unique regional context of Kerala with smaller size of the holdings and higher dependence on hired labour. The study highlighted the need for appropriate institutional arrangements to overcome the in-built deficiencies of size and rigidities of the labour market for the effective implementation of LFT from a long-term perspective.

Keywords: Demonstration plots, Family labour, Low frequency tapping (LFT), Socio-economic evaluation, Stimulation

INTRODUCTION

Innovations and diffusion of new technologies are important factors in an economy's quest for sustainable growth. In India's natural rubber (NR) sector, though the introduction of high yielding clones has resulted in steady increase in yield levels and the adoption of advanced harvesting methods have been thwarted by a host of factors. Given the clone, the tapping system which determines the number of tapping days according to the frequency of tapping and the tapping intensity, is one of the major factors influencing the productivity per unit area (Sivakumaran, 2000). Technological innovations in crop exploitation systems of

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NR has been widely accepted as effective measures to increase the land and labour productivity (Nayagam *et al.*, 1993; Vijayakumar *et al.*, 2002), to enhance the economic life of the trees (Vijayakumar *et al.*, 2000) and to reduce the cost of harvesting. One of the major outcomes of these efforts is the practice of low intensity tapping system consisting of lower frequency of tapping (LFT) or shorter tapping cuts (Vijayakumar *et al.*, 1990). LFT with judicious application of ethephon stimulation could be employed to enhance crop productivity and reduce labour input (Sivakumaran and Hashim, 1985; Gohet *et al.*, 1991; Zarin *et al.*, 1991). Higher productivity per tapper makes LFT more attractive and helps to reduce the requirement of skilled tappers. In countries like Malaysia, LFT coupled with higher task size had led to marked reduction in tapper requirement and thereby reduced the cost of production (Vijayakumar *et al.*, 2000).

In the emerging scenario, the persistent uncertainties in NR price, increasing cost of production and the shortage of skilled labour for tapping, have underlined the significance of LFT in Kerala. LFT with stimulation not only reduces cost of harvesting but also helps to mitigate the problem of skilled tappers shortage. Though concerted experimental efforts on LFT have been in existence since late 1970s in major NR producing countries the reported level of adoption and success varied across the NR producing countries (Vijayakumar, *et al.*, 2003). In India, the Rubber Research Institute of India (RRII) has initiated various experiments and introduced harvesting techniques under the LFT since 1988 (Vijayakumar, *et al.*, 2003). However, the extent of adoption was very low with 66 per cent for the estate sector (Chandy *et al.*, 2005) and less than 10 per cent for the smallholding sector (Viswanathan and Rajasekahran, 2001). To popularize the practice of LFT and to bring research as close as possible to the growers a participatory approach was introduced by the Latex Harvest Technology (LHT) division of RRII during 2009. Under this programme, demonstration plots were established in the rubber smallholdings in different locations in the traditional rubber growing regions by participatory monitoring and evaluation.

A socio-economic evaluation of the demonstration plots having d3 tapping with stimulation was made to understand the factors influencing the adoption/non-adoption of new technology by the growers.

MATERIALS AND METHODS

The demonstration plots under d3 tapping with stimulation were established in the smallholdings which voluntarily agreed to adopt the conditions of participatory trial laid down by the LHT division of RRII. The growers were given technical support throughout the implementing period and the progress was monitored by periodical visits. This database is based on a sample survey covering 48 participating small rubber growers and tappers attached to the respective holdings.

RESULTS AND DISCUSSION

Table 1 shows that the average size of sample holdings was 3.80 ha and the average area under rubber was 2.74 ha which is higher than the average size of rubber smallholdings in Kerala (0.50 ha) indicating that holding size is one of the factors prompting the adoption of LFT (Rubber Board, 2011). It was also found that 67 per cent of the sample growers had other sources of income which has important implications on the nature of labour

Table 1. **Profile of the sample holdings**

Number of demonstration plots (ha)	48
Average area under the holdings (ha)	3.80
Average area under rubber (ha)	2.74
Average area under mature rubber	1.82
Average number of trees ha^{-1}	348
Growers with agriculture as the only source of income (%)	33.33
Growers with other sources of income (%)	66.67

employed and adoption of a new labour saving technique.

The average size of demonstration plots is 0.89 ha which is also higher than the average size of smallholdings in Kerala (Table 2). The average age was seven years of tapping, *i.e.*, fields with comparatively younger trees are included in the scheme so that the economic life of the trees can be enhanced as production period can be extended further by 4 to 8 years under d3 and d4 frequency of tapping at the basal panel (Vijayakumar *et al.*, 2000). The dependence on hired labour for tapping is higher with its inherent limitations on the adoption of LFTs beyond the d3 level. However, there exists an in-built flexibility for adopting new tapping technique in the case of growers dependent on family labour. The clone RRII 105 was the only one clone planted in 100 per cent of the demonstration plots which is in tune with the general trend observed in the smallholding sector in Kerala having 86 per cent of the area planted with RRII 105.

Table 2. **Profile of the demonstration plots**

Average size of plots (ha)	0.89
Average number of trees (ha)	339
Average age of trees (years of tapping)	7
Growers using hired labour for tapping (%)	68.75
Growers using family labour for tapping (%)	27.08
Growers using both hired and family labour for tapping (%)	4.17
Growers planted with RRII 105 (%)	100

Table 3 shows the profile of the demonstration plots for two types of sample growers *i.e.*, growers dependent on hired labour and family labour for tapping. The major differences between the two types are summarised in Table 3.

It is observed that the average size of holding (4.45 ha), average size of rubber area (3.30 ha) and average size of demonstration plot (0.91 ha) are higher for the growers dependent on hired labour. Hence, the size of holding (number of trees) emerges as the key factor facilitating the adoption of LFT in the case of holdings dependent on hired labour. The family labour dominated holdings have higher density of planting despite the smaller size of the plots. The

Table 3. **Profile of the demonstration plots based on labour utilization**

	Hired labour	Family labour
Average area (ha) under possession (Rubber +others)	4.45	2.42
Average rubber area (ha)	3.30	1.53
Average mature area (ha)	2.24	0.92
Average density in the mature area (ha)	337	395
Average area under demonstration plot (ha)	0.91	0.41
Average density in the demonstration plot (trees ha^{-1})	394	421

observed inverse relationship between the size of holding and density of planting is in tune with the general trend (Veeraputhran *et al.*, 2012). It was also found that there is a steady shift towards multiple grower dependence from the historically observed pattern of single grower dependence. The tapper resistance to LFT was observed only in the smaller holdings with lower number of trees. The two important reasons for the resistance from the tappers in the adoption of LFT are: (i) loss of tapping days and (ii) increase in work load due to higher yield from unit area. The growers overcome the resistance by (i) resorting to self tapping (ii) by assuring employment to tappers in other grower's holdings and (iii) by offering incentives for extra production.

CONCLUSION

The study found that all the growers who had completed one year under the scheme are convinced on the advantages of d3 tapping with stimulation. Due to demonstration effect, a few neighborhood growers have adopted the technology of LHT (d3) with stimulation. Moreover, few growers who are involved in this participatory programme have adopted LFT in more plots. Despite the positive signals emerging from the scheme the scale neutrality of LFT remain suspect in the unique regional context of Kerala with smaller size of the holdings and higher dependence on hired labour. The study highlighted the fact that size of holding is a major factor determining the adoption of d3 tapping with stimulation. There is a positive relationship between adoption of LFT and size of holding. Availability of family labour is a key factor influencing the adoption of LFT in smaller size groups with less than 1 ha area under rubber. Hence, institutional arrangements to overcome the in-built deficiencies of size and rigidities of the labour market are crucial for the effective implementation of LFT from a long-term perspective.

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