

LOW FREQUENCY TAPPING SYSTEMS FOR REDUCTION IN COST OF PRODUCTION OF NATURAL RUBBER

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Although India stands first in productivity of natural rubber (1600 kg/ha/year), cost of production is also highest. Topography, agroclimate and social conditions are the causes for the high cost of production. Due to high slopes in the plantations, tasks for cultural operations are much lower compared to other rubber growing countries. Due to high rainfall, rainguarding is essential in the traditional rubber growing regions except in Kulasekharam. Expenses for disease control measures are also very high. Tapping task in India is between 300-400 trees/tapper while in Malaysia the task is 600 trees or more.

Low price of natural rubber and increased cost of cultural operations have led to seeking methods to reduce cost of production. Increasing productivity by improved exploitation of clones is one of the approaches for reducing cost of production of natural rubber. Increasing the labour productivity, especially of tapper is also an important method to reduce the cost of production. Controlled Upward Tapping (CUT) was already recommended and adopted for increasing production, labour efficiency and economic life. Third daily tapping was recommended for high yielding clones with the objective of preventing high incidence of panel dryness (brown bast). Although alternate daily tapping is the recommended

frequency for medium yielding clones, due to various reasons, these clones are also subjected to third daily tapping in estates and medium holdings. Studies were started by Rubber Research Institute of India in 1995 for achieving sustainable increase in productivity by yield stimulation under third daily tapping frequency. Experiments on panel change were also laid out during this time for further increase in productivity.

Increasing task for tapping, periodic tapping, low frequency tapping are some of the methods adopted for reduction in cost of production. Experiments with these objectives were initiated in RRII from 1988 onwards. Reduction in length of tapping cut was considered essential for increasing task. Fourth daily (d/4) and (d/6) frequencies were attempted to bring about substantial reduction in cost of tapping. However, efforts were intensified from mid nineties.

Experiments at Ivorycoast had shown success in achieving sustainable yield increase by mild stimulation under third daily tapping frequency. It was also shown that, with stimulation, fourth daily tapping can also be done successfully. However, attempts to further reduce the frequency did not succeed. In Malaysia success of d/4 frequency of tapping is not convincing and weekly tapping was

failure. It is necessary that, trees have to be stimulated under low frequency tapping for achieving comparable yield to that of d/3 and d/2 frequencies of tapping. Number of stimulations to be given will vary with agroclimate, clone, age of the trees and frequency of tapping. Stimulation schedules will also have to be standardized.

Success of sustainable yield increase under d/3 frequency of tapping and achieving of similar yield under d/4 and d/6 frequencies in India are reported here. Success of weekly tapping is the first time in the world. Under third daily tapping frequency, 15 to 30% sustainable yield increase could be achieved. Table 1 shows results of experiments conducted in clone RRII 105 in various locations. Response of clones RRIM 600, GT 1 and PB 217 are presented in Table 2. In general response is more under estate conditions.

In the case of high yielding clones like RRII 105 and PB 217, three annual stimulations (April, September and November) are recommended. However, for clone PB 217, as the d.r.c. is low, no stimulation may be done in the initial two years after opening. In the case of medium yielding clones like RRIM 600 and GT1, four annual stimulations (April, August, October and December) are recommended under third daily (d/3) frequency of tapping.

Yield response of different clones to fourth daily tapping (d/4) with stimulations are presented in Tables 3, 4 and 5. Comparable yield to that under d/3 frequency of tapping with stimulation could be achieved from d/4 frequency of tapping except in of RRIM 600 at New Ambadi estate. In the case of RRIL 105, RRIM 600 and PB 217 annual yield of more than 2000 kg/400 trees/year could be achieved. Based on the results, six annual stimulations (April, June, August, September, November and December) are to be given to clone RRIL 105. In the case of clone PB 217, five annual stimulations (April, June, August, October and December) may be given. In the case of clone GT 1, seven annual stimulations have to be given in the months of March, April, June, August, October, December and January.

Annual data obtained from weekly in 1997-98, 1998-99 and 1999-2000 (11th, 12th and 13th year of tapping) are presented in Table 6. Data obtained earlier showed poor yield in the initial two years. However, in the subsequent years monthly stimulation is enough to get comparable yield to that under d/3 frequency with stimulation is enough to get comparable yield to that under d/3 frequency with stimulation (Table 4). Subsequent experiments have shown that higher frequency of stimulation can overcome the low yield problem in the initial years. Stimulation schedules recommended for weekly tapping of clone RRIL 105 is fortnightly in the initial two years after opening and monthly stimulation in the subsequent years. Method of stimulation recommended is 2.5% ethephon on the panel in all the above cases.

Cost benefit analysis of data obtained from Vengathanam estate showed that increased yield due to mild stimulations under d/3 frequency of tapping of clone RRIL 105 results in net increase in income of Rs. 6,634/- per ha. Similar yield increase at New Ambadi estate in clone RRIM 600 was Rs. 7,414/-.

Comparison of d/3 frequency with d/4 frequency has shown net saving of around Rs. 2,427/ha/year. Conversion to d/6 frequency would result in additional benefit of Rs. 2,226/ha/year. Thus conversion of d/3 frequency to d/6 frequency would result in net saving of Rs. 4,653/ha/year.

In addition to the above, considerable benefit is expected from increased economic life. Under d/4 frequency

one panel can be tapped for at least 8 years and under d/6 frequency the duration can be increased to 10 years. Combined with CUT, economic life can be increased to at least 50 years from the current 30 years or so, provided sufficient stand exists. This will lead to considerable reduction in immature area.

Benefit to tappers from low frequency tapping is also substantial. At yield level of 2,200 kg/400 trees/year, conversion from d/3 to d/4 frequency would result in increased allowance of Rs. 4,222/year. Conversion from d/3 to d/6 would increase the allowance to tapper by Rs. 12,672/year (Table 7). This will lead to substantial increase in the standard of living of tappers. Our experience has shown increased demand by tapper for deployment

Table 1 : Mean annual dry rubber yield (kg/400 trees) in clone RRIL 105 under d/3 frequency of tapping in different locations during 1995-2000

Location	Control	Stimulated
Vengathanam (Mundakayam)	1766 (100)	2244 (126)
Ambanaad (Punalur)	1344 (100)	1754 (130)
Kalarickal (Kottayam)	2199 (100)	2549 (116)
Palampra (Kanjirappally)	2097 (100)	2434 (116)

Table 2 : Mean annual dry rubber yield (kg/400 trees) under d/3 frequency of tapping in three clones in two locations

Location	Clone	Control	Stimulated
New Ambadi (Kulasekharam)	RRIM 600	1573 (100)	1936 (126)
Nedw Ambadi (Kulasekharam)	GT 1	1863 (100)	2364 (122)
HML Cheruvally (Pathanamthitta)	PB 217	1328 (100)	1567 (118)

Rubber

in fields under low frequency tapping.

While adopting d/4 and d/6 frequencies of tapping it may be ensured that tapping is done regularly. Whenever tapping is not done due to absence of the tapper or holiday, the field/block scheduled for such day/s may be tapped on the next day. If such blocks are tapped on the 8th or 12th day, there will be severe temporary reduction in yield. It is essential that rainguarding must

be done for low frequencies of tapping. Delayed/second collection will also have to be done around eight months. Whenever d.r.c. is low (<30%) stimulation may be suspended till it is improved.

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Palampara Estate, Kanjirappally
Kalarikkal Plantation, Kottayam
Kannukuzhi Plantation, Kottayam
Experimental Farm Unit, (RRII),
Pampady, Kottayam.

Table 3 : Yield performance (kg/400 trees) of different clones under d/4 frequency of tapping with different levels of stimulation in 1999-2000.

Location	Clone	T1	T2	T3
Ambanaad estate (Punalur)	RRII 105	1713	1780	1865
Ambanaad estate (Punalur)	GT 1	995	1143	1219
New Ambadi (Kulasekharam)	RRIM 600	1949	2047	1913
HML, Koney (Pathanamthitta)	PB 217	1768	2053	2279

Table 4 : Effect of tapping frequency and stimulation on yield response (kg/ha) in clone RRII 105 (Panel BO-1)

Treatments	1997-1998	1998-1999	1999-2000
1/2S d/2	1810	2817	2085
1/2S d/3 + Stim. 3/Y	1919	2590	2602
1/2S d/4 + Stim. 7/Y	1739	2498	2395
1/2S d/6 + Stim. 12/Y	1268	1931	2458

Table 5 : Annual dry rubber yield (kg/400 trees) in clone RRII 105 under d/3 and d/4 frequencies in Kannukuzhy plantation, Kottayam.

Year	d/3	d/4
1996 - 1997	1769	1732
1997 - 1998	1704	1720
1998 - 1999	1659	1889
1999 - 2000	2062	2172
Mean	1799	1878

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Table 6 : Effect of different tapping systems on yield performance of clone RR11 105 in 11th, 12th and 13th year of tapping (SFCK, Mullumala, Punalur).

Treatments	1997-1998	1998-1999	1999-2000	Mean Yield (kg/400 trees)
1/2S d/3	1910	1462	2515	1963
1/3S d/2	2865	1972	2472	2377
1/3S d/3 + Stim. 12/Y	2692	2228	3156	2693
1/2S d/6 + Stim. 12/Y	2690	3386	2992	3023

Table 7 : Cost benefit analysis of d/4 and d/6 frequencies of tapping over d/3 frequency (Amount in rupees).

Item	d/3	d/4	d/6
Number of Tapping days	100	75	50
Cost of Tapping	12000	9000	6000
Cost of Stimulation	204	408	816
Over poundage/ha	2754	3121	3489
Total expenditure on tapping and stimulation	14958	12529	10305
Net saving on cost of tapping/ha	—	2429	4653
Total overpoundage/tapper	8262	12484	20934
Net increase overpoundage/tapper over d/3	—	4222	12672

Bench mark yield = 2200/kg/year (Scrap - 20%)

Ovrpoundage (latex - @ Rs. 2.25/kg; scrap - Rs. 0.60/kg)

(Standard class - 6 kg for latex; 2 kg for scrap)

Daily wage of tapper = Rs. 120/-

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