

## **RUBBER HARVESTING AND THE SUSTAINABILITY OF THE RUBBER INDUSTRY**

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As far as extent under rubber in Sri Lanka is concerned, the maximum hectorage ever recorded had been 200,000 ha in 1970s and it is about 127,000 ha at present, The total rubber production in Sri Lanka does not correlate with the extent for the simple reasons of variety improvement and improved nursery techniques and agromanagement practices recommended and practiced over the long period of time. However, the average productivity remains below expected due to many factors, the growth condition and the clone, level of adoption of agromanagement and harvesting practices affecting adversely.

### **Tappable clearing and recommended practices**

Rubber tree becomes tappable after about 5-6 years when the tree achieves the girth over 50 cm measured at 150 cm height from the graft union or the ground level. When a clearing has more than 60% trees fulfilling this requirement, the clearing is considered tappable and at this stage the trees above 45 cm girth at the same height are also recommended to be tapped.

Incorrect and adhoc harvesting practices due to lack of knowledge or due to just ignorance of owners of lands or harvesters have led to many complicated issues resulting poor yields, short life span and increased number of dry trees in fields. The most important or critical factor which can affect the tree or the sustainable yield is the “harvesting frequency” than anything else. There are two different sets of clones too based on tapping frequency, d2 clones which are to be tapped every other day and d3 clones which should be tapped once in every three days. If a d3 clone is mixed with d2 clones in a clearing and if the trees are harvested at d2 frequency, then the trees of d3 clones soon become stressed and ultimately become dry giving no latex at all perhaps, permanently. Extensive harvesting, seems to be a common issue and a growing threat to the sustainability in Sri Lanka as well as in other rubber growing countries too. This was discussed during the technical sessions at the 6<sup>th</sup> Annual Conference of Association of Natural Rubber Producing Countries held in Colombo during 8<sup>th</sup> to 11<sup>th</sup> October 2013.

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However, all rubber clearings planted by the small holder sector, roughly covering about 60% of the total extent are of d2 clones yet they tend to become stressed at daily tapping. As far as tapping frequency is concerned each half of the tree or one panel should be tapped for 6 years at d2 tapping frequency and 8 years at d3 frequency. The recommended opening height of a rubber tree to mark the first cut is 48" above the graft union or the ground level. The recommended shaving thickness is 1/20". The expected number of tapping days possible per year is 320 out of 365 days leaving all festival holidays, paddy harvesting periods and heavy rainy days out. Accordingly, at d2 tapping the number of days each tree gets tapped is half of 320 which is 160. When shaving thickness at each tapping is 1/20" then the required height of the panel per year is  $(160 \times 1/20) 8"$ . Thus, 48" of the panel should be used within a period of 6 years. When rain guards are not used this should be further low. If a rubber tree is tapped without damaging the cambium smooth bark renewal for next round of harvest (Figure 01).



**Figure 1.** Proper harvesting without damaging the cambium

However, during the past 7-8 years, there are many complaints from large estates as well as from small holder farmers, about high incidence of dry trees and low yields in their fields. In almost all the cases there was one obvious factor common to all fields i.e. higher bark consumption rate than the recommended 8" per year at d2 tapping. A survey was conducted by the Plant Science Department of RRISL in 2010 covering around 5000h of large estates. And the average bark consumption rate was 4 years per panel which was alarming as the percentage of dry trees in such clearings was much higher than the generally expected 5-10 percent after panel B. The other common issue was very low yields and there by low productivity. This condition was changing from bad to worse gradually as in order to recover the poor yields more and more number of recovery tapping had been practiced.

### **Economical impact of excessive bark consumption**

The crop loss due to consuming the bark or the panel at a higher rate can be calculated very simply as follows. Though the national productivity level is 1400 kg/ha/year for this calculation it is taken as 1000kg/ha/year as most rubber fields yield only about 1000 kg/ha/year in Sri Lanka. The average bark consumption rate is considered as 4 years a panel against 6 years of expected average.

Accordingly, the crop loss on A & B virgin panels is 4000 kg (2 years on each of A & B panels @ 1000 kg/ha/year). The crop loss from C & D panels due to excessive rate would again be,  $4 \times 1000 = 4000$  kg. When a tree is tapped at a higher rate, bark renewal on C & D panels will be only partial and about 30% crop loss is expected throughout the 8 years, i.e.  $8000 \times 30/1000 = 2400$  kg. Therefore, the total crop loss is 10400 kg. If a kilo of a rubber is sold @ Rs.350/- then the monetary loss is  $10400 \text{ kg} \times \text{Rs.}350.00$ , which is Rs.3.64 million. This is for 1 hectare of land for its 24 year revenue period and at present about 90000h are under tapping i.e. mature rubber. Furthermore, the crop loss due to trees becoming dry has not been taken into account here, and this is as high as 30% and this amount should also be added to see the gravity of individual and the national income loss.

It is often discussed that the main reason for high bark consumption is the lack of skill of the tappers and thus shaving a thicker bark than recommended 1/20". But however, if that is the case, the dry tree percentage should be minimum and more evidently the crop should not be decreased as complained by almost all. In fact, when the crop is lower than the expected only, attention is paid on quality of tapping and also come to know about the increasing numbers of dry trees in the clearing.

The main reason for high intensity harvesting in the estate sector seems to be wrong estimates prepared for each field. In order to achieve the estimated targets, the only strategy adopted is increasing the number of tappings. Though recovery tapping is recommended with a ceiling of two per week and 6 per month, it can easily lead to daily tapping with one or two extra tappings. Daily tapping is harmful even for a short period which is seen in crop reduction.

### **Calculating the current rate of bark consumption and precautionary measures**

Adopting the correct frequency of tapping being most vital factor for sustainability, RRISL conducted a series of workshop since 2010 to educate the Extension Officer, Field Officers and the Managers on this issue.

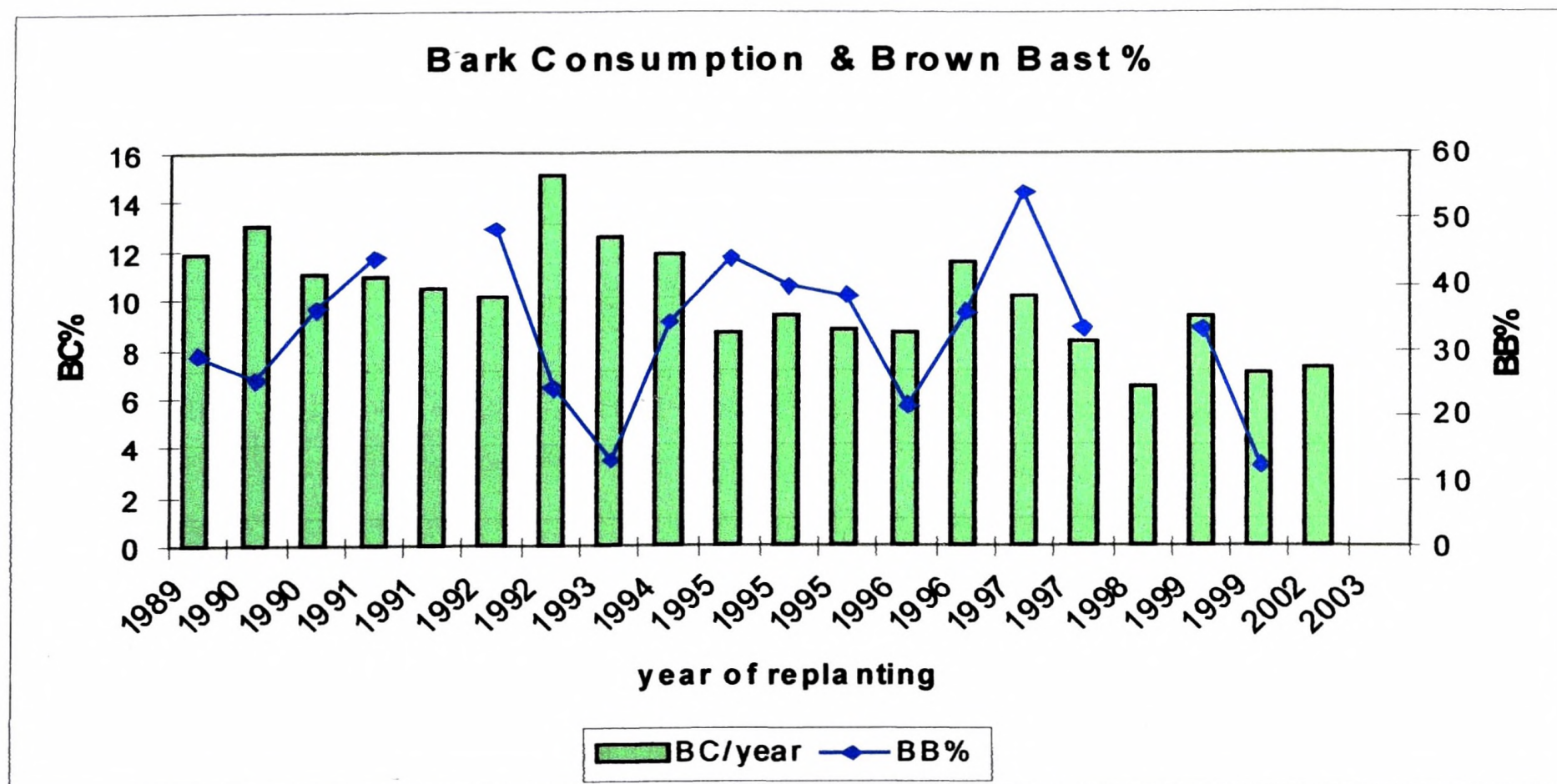
We could successfully advise the granting of the situation and also educate them to monitor by themselves the rate of bark consumption. Manual measuring of the bark consumption and the number of years in tapping can be used to calculate the tapping or bark consumption rate. More over the RRISL has produced a chart called "Ready Reckoner Chart" which enables one to read the bark consumption rate without calculating (T U K Silva, et al, 2012). This chart can be purchased from RRISL with necessary training on its usage.

Another very common reason for daily tapping is to get a substantial income to cover the COP during poor price periods. But when the price is attractive also, attempts are made to get more crop by practicing daily tapping to take an advantage of the high price. Whatever the reason, the result of high frequency harvesting is the same and the reduction of the crop, increased number of dry trees seems inevitable which are irreversible too. Those who realized or rather experienced the bad effects of high intensity harvesting early enough, took every possible measure to lower the bark consumption rate with no delay. Correct estimates should be prepared field wise in order to harvest the trees without inducing stress condition. Control up ward tapping (CUT) which is only  $\frac{1}{4}$  spiral upward cut with stimulation has been suggested for many fields as an alternative method of harvesting to cease the high rate of bark consumption on base panels. What is important is to prevent high rate of bark consumption rather than adopting remedial measures when the sustainability is threatened.

The correlation between frequency of tapping and the crop that can be obtained is totally the opposite to what most of the rubber growers believe and expect. The higher the frequency the lower the crop mainly due to stress condition that the tree under goes. Further, the number of tappings or the bark consumption alone per year will not be that reliable a figure unless the "frequency" of tapping is not known. Tapping daily for a period of a few weeks may cause stress to the tree resulting drying of trees. Latex produced in the tree is not meant for us to harvest. Yet, that is possible in a reasonable or rather judicious way, without causing a permanent damage to the tree.

#### **Bark consumption rate and Brown bast condition**

Following figure (Figure 2) is based on the data collected from one estate during the survey conducted on tapping quality. As you may see from figure 1, the percentage of dry trees in almost every clearing is far too higher than the expected 5-10% as the panel advances from A to D



**Figure 2.** Bark consumption rate (BC/year) and the brown bast condition (BB%) of clearings of one estate.

Sustainability of this particular estate is already threatened and all possible precautionary measures should be immediately and strictly adopted to lengthen the revenue life span of existing clearings until new clearings are established and proper harvesting establishes.

### References

Silva T U K, Seneviratne P, Amaratunge K A G B (2012). Development of Ready Reckoner to assess the impact of excessive bark consumption in S/2 d2 and S/2 d3 harvesting systems. *Journal of the Rubber Research Institute of Sri Lanka*, Vol 92: 22-31.