

MAXIMISING YIELDS IN RUBBER PLANTATIONS

A Nugawela

Achieving maximum total yields from plantations is vital to reduce cost of production. This will also enable to recover the capital and management costs whilst realising profits. It appears that only the exploitation systems are considered with regard to maximising yields. Nevertheless there are many other important factors we need to consider to maximise yields in an estate. In any plantation the total yield per annum depends mainly on the,

- A). mature extent and
- B). yield per hectare

Both the mature extent and yield per hectare have to be at optimum levels to maximise total annual yields.

A. Mature extent

Total yields will be highest if 100% of the extent is of mature rubber. As the rubber tree can be tapped only for a limited period due to ageing and exhausting of the tappable bark rubber plants have to be uprooted when yields are poor and uneconomical. If trees can be tapped obtaining economic yields for an indefinite period replanting would not become necessary and 100% of the extent can be maintained as mature rubber.

According to the recommended tapping systems and our bark consumption rates the maximum possible period a rubber tree could be tapped is 24 years. Together with the 6 year immature period the life cycle of a tree is about 30 years. This will result in replanting 3.3% ($100/30$) of the total extent annually. As the immature phase is around 6 years the total immature extent in an estate will be 19.8% (3.3×6). The balance 80.2% ($100-19.8$) will be of mature rubber. Hence the maximum possible mature extent will be 80.2% of the extent of plantation. Our objective should be to achieve this maximum possible mature extent of 80.2%. This is an important factor to maximise yields and income whilst minimising the annual capital expenditure. Nevertheless, in some of our plantations the mature extent is much less than this and is in the region of 65-70% of the total extent. In such estates steps should be taken to achieve correct mature extent.

B. Yield per hectare

The average yield per hectare in a plantation is determined by factors like a). clonal composition b). stand c). yield potential of individual trees and d). number of tapping days.

B.1 Clones

Yield potentials vary according to the clone. The same of seedling rubber, clone PB 86 and newly recommended 100-series clones is about 400, 1200 and 2500 kg per hectare per year. Therefore, by including high yielding clones in replanting programmes yields can be increased with no additional costs involved to the estate. This is the most economical way of increasing yields in plantations. An estate should have a combination of many high yielding clones. The maximum area allowed per clone is 40 of the total extent. Otherwise, if a particular clone becomes susceptible to a devastating disease and if that clone comprises a large extent of the estate yields will drop significantly, resulting in an uneconomic plantation.

B.2 Stand

The Rubber Research Institute at present recommends 500 plants per hectare. The full yield potential of a clone, *i.e.* a yield per hectare of 2000-2500 kg per hectare per year from RRIC 100 series clones, could be realised only if the recommended number of plants per unit area is present. Otherwise the yield per hectare will drop proportionately to the drop in the stand. Therefore, attempts should be made to maintain the full stand from planting to uprooting. Use of quality planting material, adopting correct planting techniques and planting at the correct time are essential for this. Further to maintain the full stand filling of vacancies and replacing weak plants should be undertaken until it is possible and economical to do so. Our objective should not be to plant 500 points and then achieve a stand of 400. There is ample evidence that 500 plants can be grown per hectare with no competition and yield losses.

B.3 Yield potential of tree

Even though the full stand is present if the plants are not healthy and vigorously growing the potential yield of the clone can not be realised. To ensure the potential yield from a tree quality planting material has to be used and recommended agronomics adopted.

To raise quality planting material recommendations on nursery practices should be adopted. A vigorous culling programme is recommended so that only healthy plants will be used for planting. Culling has to be undertaken at germination bed, stock nursery and polybag nursery stages. If we start a germination bed with 100 seeds we may end - up with 25 - 30 quality polybag plants suitable for planting. When undertaking planting plant requirement has to be correctly estimated and then we should open nurseries capable of giving that requirement. An additional 10% of the plant requirement has to be raised for infilling casualties and replacing weak plants. About 50% of these additional plants will have to be in the form of stumped buddings to be used in the 2nd & 3rd years of the clearing.

To maintain the plants in a healthy and a high yielding state during the entire mature period it is also important to adopt correct tapping systems and maintain the correct tapping angle and bark consumption rates.

Adoption of the recommended tapping systems is important to sustain high yield levels. A 30° tapping angle is important to cut the maximum number of latex vessel rings during tapping. If the slope of the cut is different number of vessels cut will be less and also the latex flow time will be reduced resulting in a crop loss.

High bark consumption rates as evident in many estates will reduce tapping cycle and also the yields from renewed barks. Reduced tapping cycles results in shorter replanting cycles and hence large immature extents. Further, a minimum of 12 years should be given together with the necessary inputs for proper bark renewal. In order to maintain correct tapping angle and bark consumption rate guide lines has to be used.

B.4 Tapping days

Total annual yields also depends on the number of tapping days. Yields will be highest if tapping can be undertaken in all 365 days of the year. Nevertheless, this is not possible due to holidays and rain-interference.

Tapping days lost due to rain interference could be minimised by resorting to ringuards. In wet regions 70-80 additional tapping days are possible with the help of ringuards. Further the number of late tapping days could be reduced. Due to additional tapping days and converting late tapping into normal tappings a 20-25% yield increase is possible. The alternative to the use of ringuards is recovery tapping. When recovery tapping is done it will result in daily tapping. As daily tapping is not advisable there is restriction on the number of recovery tappings that could be undertaken. Additional yield possible by recovery tapping is much less than yield increase possible by the use of ringuards.

Exceeding the recommended number of recovery tappings will reduce the yield potential of individual trees and hence should be avoided. Some estates

undertake double tapping in all possible tapping days. This results in over exploitation of plants resulting in poor yield potentials and dry trees. Therefore, it is not at all beneficial to exceed the recommended number of recovery tapping days. It should be noted that poor yield potential of trees will result in a reduced intake per tapper resulting in significantly high tapping costs.

If total annual yields in a plantation is low and therefore it is unable to recover even the capital and management costs, it may be due to one or more of the reasons discussed above, *i.e.* less mature extents, poor stands, poor yield potentials of trees and less number of tapping days. Therefore, for each plantation the reasons for the uneconomic situation should be identified and a strategy should be designed to overcome such a situation. Thereafter the management of the plantation should be according to this specific plan. This will ensure an improvement in the adoption rate of our technology. Poor adoption of the Rubber Research Institute recommendations results in reasons discussed above causing poor yields in plantations.