

IMPROVING THE VIABILITY OF THE NATURAL RUBBER INDUSTRY OF SRI LANKA

BY

A. B. DISSANAYAKE

INTRODUCTION

The Natural Rubber (NR) plantation industry originated in Sri Lanka with the arrival of 1916 young *Hevea* plants in 1876 from the Kew Gardens, London. These were planted at the Botanical Gardens at Henarathgoda and Peradeniya from where seeds were sent to other South East Asian Countries (Anon, 1951). Today, rubber is planted over a total extent of nearly 15 million ac (5.95 million ha) which produced in 1971, 3.02 million metric tons of NR (Anon, 1972). This is 3.76% of the total production of rubber, natural as well as synthetic. The selling price of rubber has been gradually dropping throughout the last decade while the cost of production as with all costs has been increasing steadily. This study was, therefore, undertaken to get a true picture of the viability of NR industry and to find out how its viability can be improved.

Production of Rubber in Sri Lanka

Allowing for marginal rubber land, Sri Lanka has a total of about 500,000 ac under rubber (Chanmugam, 1970). The production of rubber for the last 20 yr is given in Table 1. This shows that from 1951 to 1955 the total production dropped by about 2.1%. In 1956, production started increasing and has now reached the figure of 156,644 tons in 1970 (Chanmugam, 1970). According to this figure and the calculated acreage in tapping the national average yield is only 707 lb per ac. The national average yield has however increased from as low as 380 lb per ac in 1951 to the present level of 707 lb. The national average has nearly doubled in 20 yr a good achievement for any crop.

Price of Rubber

The price of Ribbed Smoked Sheet (RSS) over a period of 11 yr is given in Table 2. It can be easily seen that the price of RSS has been dropping regularly over the last decade and was at a very low level in 1972. The reasons for this drop in price are many and varied but one of the important is said to be the excess production of rubber.

If we look at the total production and consumption of rubber (NR+SR) for a few years we would tend to agree with his view (Table 3). However, if we were to study the production and consumption of NR and SR separately the position appears to be very different. Tables 4 and 5 give the production and consumption of NR and SR respectively. It shows that the consumption of NR had always been greater than production in every year, except 1971. The position is just the reverse in the case of SR. IN ALMOST EVERY YEAR there has been an excess of production over consumption resulting in a cumulative over production of 930 thousand tons over the last 12 years.

The price of any commodity is determined by the supply of and the demand for it. In this sense the excess production of SR is clearly responsible for the lowering of the price of rubber. It is agreed that the price of rubber should not rise to a level very much higher than that at which SR can be produced. Such a rise can be considered dangerous

to the NR industry as substitution with SR could then take place rapidly. It is therefore, necessary to ensure that NR is produced at the lowest cost so that it will be always competitive with SR in price. Let us, therefore, study the factors affecting production efficiency of NR.

FACTORS AFFECTING PRODUCTION EFFICIENCY OF NR

1. Clones
2. Manuring and other cultural practices
3. Tapping
4. Yield stimulation
5. Other research findings.

Clones :

The old seedling rubber with which the rubber plantations in Sri Lanka were originally planted had very low yield potentials. A yield of 400-500 lb per ac (555-666 kg/ha) was considered high for that material, but today there are new clones with very high yield potentials capable of yielding over 2500 lb per ac (2775 kg/ha) that is nearly six times the yield of the old seedling material (Chandrasekera, 1972).

There are clones under experiments with yield potentials of over 3000 kg/ha. This shows that planting material is one of the most important factors that affect production efficiency and therefore a factor to be exploited fully.

Manuring and other cultural practices :

Manuring and other scientific cultural practices are necessary to ensure optimum growth and thereby the maximum potential yield of the tree. Without the necessary cultural practices and manuring, the tree will not attain its potential or maximum girth and will therefore not yield its possible maximum.

Tapping systems :

At present the S/2, d/2, 100% system of tapping is generally regarded as the most acceptable system of tapping. But it must be noted that tapping is the most expensive item in the cost of production of raw NR. Therefore, every effort must be made to establish the most economic system of tapping for each clone. It is known that different tapping systems give higher yields at different age levels of the tree and for different clones. Thus changes in tapping systems in estates are often carried out because of a new clone or the age of the trees. Experiments are in progress and there is evidence that the less intensive S/2, d/3, 67% system of tapping may become popular at the time of tapping and even later on, with stimulation.

Yield stimulation :

Ethrel is now accepted as the most promising yield stimulant which before it has been fully tested has revolutionised to some extent production efficiency. The Rubber Research Institute of Malaysia (RRIM) has shown that the yield of rubber can increase 100% with the use of Ethrel stimulation six times a yr but on an average, an increase of about 60% could be obtained. However, under conditions in Sri Lanka it is not possible

to stimulate with Ethrel six times a yr due to interference by rain. If we allow for very heavy rainy periods Ethrel can be applied about four times a yr in Sri Lanka with an increase in yield of $\frac{60 \times 4}{6} = 40\%$.

Then again Ethrel is not recommended for use in virgin bark at all (that is Panels A and B) and in Panel C to a limited extent. More frequent use is recommended in Panel D and 5-6 yr before replanting. With a tapping life of about 30 yr at any one time about 50% of the tapped acreage is therefore available for stimulation. Thus the yield increase obtainable in any one year under normal circumstances could be $\frac{50 \times 40}{100} = 20\%$. In any year, 20% increase in annual production can be expected.

But, if necessary over a limited period of time (six months to one year) the production of rubber can be increased to much higher levels by the complete inclusion of Panel C and even B and A. This imparts a degree of ELASTICITY OF SUPPLY to the NR industry, which it did not have before. Then again Ethrel stimulation can be very useful specially when the yield of rubber starts dropping after reaching the maximum yield. As you all know, the maximum yield is reached about 7-8 yr after tapping and starts dropping at about the 14-15th yr after tapping. Ethrel can be used at this stage to maintain the earlier higher levels. At this level even if there is no reduction in the c.o.p. per lb the increase in yield will bring about an increase in the total revenue to the estate.

Other research findings

Under Sri Lanka conditions, the distribution of rainfall is such that continuous tapping is hindered to a great extent. No tapping is done, not only on rainy days but also on days where the trunk of the tree is wet due to rain the previous night. Then there are cases of washouts and partial washouts due to thin drizzles during and after tapping. Under these conditions the use of rainguards can help to save a fair number of tapping days. Partial washouts can always be saved by the use of the open channel type of rain-guard being tested at the R.R.I.S.L. Further it has been observed that trunks of trees tend to dry up quicker as free flow of water down the trunk is prevented by the use of rainguards. These are bound to save a fair number of tapping days. Approximately there could be an increase of at least 15-20% in the number of tapping days. (Satchuthanathavale, 1973).

Cost of production

Let us now take a look at the cost of production of R.S.S. which is the main form of rubber produced from Sri Lanka.

C.O.P. per lb

Table 6 gives the cost of production (c.o.p.) of R.S.S. in estates of 100 acres and over, grouped according to the average yield per acre. When the average yield per acre is 800 lb/ac (889 kg/ha) or less, the c.o.p. of R.S.S. is in the region of 77.7 cts/lb (171.7 cts/kg) but this figure is observed to drop to 55.0 cts/lb (121.6 cts/kg) when the average yield is 1200-1400 lb per ac (1334-1554 kg/ha). The c. o. p. has dropped by 22.7 cts/lb (50.1 cts/kg) for an increase in yield of 600 lb/ac (666 kg/ha.). For easy comprehension (within the yield limits given) it can be said that the c.o.p. per lb drops by 3.8 cts for every 100 lb increase in average yield per acre.

Net returns per acre

Using these figures the net returns per ac has been worked out for different price levels of R.S.S. 1 (Table 7). I have used the lowest outstation price as 83 cts per lb (183 cts per kg) as this is the FLOOR PRICE fixed recently by the Government. Other price levels used are 90 cts. (199 cts per kg) and 100 cts per lb (221 cts per kg). The figures within brackets (in Table 7) are the revenue per lb in cents. This shows that although there is no loss even at the lowest price level and the lowest yield per ac, estates at this level are marginal where profitability is concerned.

DISCUSSION

Although total production of all rubbers is in excess of consumption, the total quantity of NR produced has been consumed almost every year. Over the years NR shows an excess of consumption over production. For the last 12 years consumption had exceeded production by 885 thousand tons. This is not possible over a period of time as one cannot consume more than what one produces. However, this position has been made possible by releases of NR from stock-piled rubber in the U.S.A. For the 12 years, releases from stock-piles had amounted to 877 thousand tons. This really means that every pound of NR produced plus the stock-pile releases have been consumed and goes to prove that there is a great demand for NR. But the price cannot be expected to rise as there is an excess production of SR which has a tendency to depress prices.

However, Irfan ul Haque of the I.B.R.D. works out that on the basis of SR price trends, the price of R.S.S. 1 in 1980 will be between 19-24 US cents ((Haque, 1972). This is equivalent to 123½—156.0 rupee cents. Allowing for freight, insurance, handling, export tax and cess deductions the spot price Colombo is in the region of 94—1.07½ cents. I am sure all of you would agree that at these prices the NR industry is very viable.

Further there is evidence to show that the price of SR will rise. The reason for this expected rise in the price of SR are :

- (1) higher cost of petroleum products.
- (2) very high cost of capitalisation necessary for new SR factories.
- (3) the necessity to replace equipment in almost all factories that sprang up during World War II.
- (4) high labour costs in developing countries.

A rise in price of SR will in turn push up the price of NR to higher levels than those mentioned above.

Anyway, c.o.p. studies have shown that even at as low a price (ourstation) as -/83 cts per lb and as low an average yield as 800 lb per ac there is no loss but the profit is marginal. It is so small that a slight increase in the c.o.p. per lb or a slight drop in the selling price per lb could make any estate of that level uneconomic. But we have seen that the c.o.p. drops by 3.8 cts per lb when the average yield rises by 100 lb per ac and at average yield levels of 1200 and over the c.o.p. per lb is low enough to give substantial profits in the region of about Rs. 350/- per ac at the lowest price level assumed

in this study. At higher price levels the profits will be much higher. Thus it is imperative that for their own sake as well as for that of our country, estates with low average yield levels in the region of 800 lb per ac or lower make an effort to improve their average yield to higher levels at least to about 1200 lb per ac.

We have seen that the yield potentials of the new clones are high and that clones with still higher potential yields are being tested in the breeding programmes of the R.R.I.S.L. Thus, the scope for increasing the average yield per acre is very good as the national average yield per ac per yr is only 707 lb. To get the benefits of these clones, these must be planted in the field, hence the importance of replanting. On the basis of the economic life span of a rubber tree being 33 years, replanting has to be done at 3% of the acreage a year. At this rate an estate can be fully replanted in 33 years and in the 34th yr the first area to be replanted (which is now 33 years and therefore uneconomic) can be replanted again. This has another advantage in the sense that in any one year 18% of the acreage will be young plantations and 82% of the acreage will always be in tapping so that wide fluctuations in the yield will not take place.

There is also the added advantage that any new clones being recommended can be used as every year 3% is being replanted. Thus, for the future stability of the NR industry replanting is very important. However, the rate of replanting had been dropping from some time and has now dropped below the required level of 3%. The reasons for the reluctance to replant was examined and found to be (Dissanayake, 1971):

- (1) A sense of uncertainty of the future due to low prices.
- (2) The replanting subsidy is considered insufficient as the cost of replanting had risen.
- (3) The fairly lengthy immature period of the rubber tree of over six years.

In attempting to remedy the above, the Government has fixed a floor price for R.S.S. 1 at -/83 cts per lb, so that the sense of uncertainty is removed.

To overcome the insufficiency of finances in replanting, the Government is considering the possibility of giving fertilizer at subsidised rates. This will also help to improve the yield of plantations in tapping.

With regard to the fairly lengthy immature period of the rubber tree, breeding experimenters at the R.R.I.S.L. have isolated clones which achieve 20 inches girth in about 4½ yr (Fernando, 1969). Further during the unproductive period intercropping of rubber land could be undertaken. Experiments have been undertaken to test out feasible crops. At present any person replanting rubber has to apply for a permit to intercrop. A more positive approach where the crops that could be grown are given at replanting is recommended.

Considering the points discussed it can definitely be stated that the NR industry is viable and that the viability could be greatly improved by replanting.

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TABLE 1

PRODUCTION OF RUBBER IN SRI LANKA 1951-1970

Year	Production	Increase for 5 yr period	% increase for 5 yr period
1951	105,000		
1955	93,830	-11,170	-2.1
1956	95,389		
1960	98,838	3,449	3.6
1961	97,588		
1962	104,046		
1963	104,751		
1964	111,562		
1965	118,311	20,723	21.2
1966	131,015		
1967	143,204		
1968	148,719		
1969	150,834		
1970	159,158	28,143	21.5

Source— Calculated from data extracted from the Rubber Statistical Bulletin I.R.S.G.

TABLE 2
PRICE OF R.S.S. 1961-1971

Year	Singapore S\$/M. tons	Sri Lanka cts/lb
1961	1842	100
1962	1724	98
1963	1597	93
1964	1502	90
1965	1514	91
1966	1441	89
1967	1192	79
1968	1171	88 ^{a/} (70.4)
1969	1539	104 (83.2)
1970	1244	91 (72.8)
1971	1016	79 (63.2)

a/ Figures in brackets refer to the price in pre-devaluation rupee cents.
The rupee was devalued in 1967.

- Source— i. Rubber Statistical Bulletin.
ii. Administrative Reports of the Rubber Controller, Sri Lanka.

TABLE 3

TOTAL SUPPLY AND CONSUMPTION OF RUBBER NR + SR + STOCKPILE
RELEASES (1961-1972) IN 1000 M. TONS

Year	Total production NR+SR	Stockpile releases	Total supply	Total consumption of rubber	Excess
1961	4,162.5	29.8	4,192.3	4,150.5	+ 41.8
1962	4,460.0	67.5	4,527.5	4,487.5	+ 40.0
1963	4,622.5	95.3	4,717.8	4,695.4	+ 22.8
1964	5,155.0	103.2	5,258.2	5,110.5	+147.7
1965	5,480.0	121.6	5,601.6	5,487.5	+114.1
1966	5,867.5	159.1	6,026.6	5,937.5	+ 89.1
1967	6,002.5	100.8	6,103.3	5,937.5	+165.8
1968	6,685.0	73.9	6,758.9	6,830.0	- 71.1
1969	7,460.0	37.8	7,497.8	7,422.5	+ 75.3
1970	7,762.5	32.8	7,795.3	7,627.5	+167.8
1971	8,010.0	21.1	8,031.1	7,982.5	+ 48.6
1972*	5,495.0	34.3	5,529.3	5,527.5	+167.8
		877.2			+843.7

Source—Calculated from the Rubber Statistical Bulletin I.R.S.G.

* up to August only.

TABLE 4

TOTAL PRODUCTION AND CONSUMPTION OF NATURAL RUBBER
(1961-1972) IN 1000 METRIC TONS

Year	Production of natural rubber	Consumption of natural rubber	Excess
1961	2,125.0	2,157.5	- 32.5
1962	2,152.5	2,250.0	- 97.5
1963	2,100.0	2,257.5	-157.5
1964	2,270.0	2,285.0	- 15.0
1965	2,380.0	2,415.0	- 35.0
1966	2,437.5	2,577.5	-140.0
1967	2,487.5	2,490.0	- 2.5
1968	2,632.5	2,847.5	-215.0
1969	2,885.0	2,982.5	- 37.5
1970	2,895.0	2,992.5	- 97.5
1971	3,002.5	2,977.5	+ 25.0
1972*	1,955.0	2,035.0	- 80.0
	Total Excess		-885.0

* up to August only.

Source—Calculated from the Rubber Statistical Bulletin I.R.S.G.

TABLE 5
TOTAL PRODUCTION AND CONSUMPTION OF SYNTHETIC RUBBER
(1961-1972) IN 1000 TONS

Year	Production of synthetic rubber	Consumption of synthetic rubber	Excess
1961	2,037.5	1,975.0	+ 62.5
1962	2,307.5	2,237.5	+ 70.0
1963	2,522.5	2,437.5	+ 85.0
1964	2,885.0	2,825.5	+ 59.5
1965	3,100.0	3,072.5	+ 27.5
1966	3,430.0	3,360.0	+ 70.0
1967	3,515.0	3,447.5	+ 67.5
1968	4,052.5	3,983.5	+ 69.0
1969	4,575.0	4,440.0	+135.0
1970	4,867.5	4,635.0	+232.5
1971	5,007.5	5,005.0	+ 2.5
1972*	3,540.0	3,492.5	+ 47.5
	Total Excess		+928.5

* up to August only.

Source—Calculated from the Rubber Statistical Bulletin I.R.S.G.

TABLE 6

COST OF PRODUCTION OF RUBBER ESTATES (OVER 100 AC) IN SRI LANKA

ITEM	Yield levels			
	800 lb/ac	800—1000 lb/ac	1000—1201 lb/ac	1200—1400 lb/ac
Overhead charges	23.9	21.8	17.9	14.7
Cost of maintenance	6.5	7.6	6.8	6.9
Cost of extraction	32.2	28.8	27.3	23.9
Cost of manufacture	8.7	8.4	8.3	8.7
Other expenses	5.3	1.2	2.1	0.8
Total cost of production	77.6	67.8	67.8	55.0

Source—Survey carried out by the Author in 1969.

TABLE 7

NET RETURNS PER AC OF ESTATES IN SRI LANKA AT DIFFERENT
AVERAGE YIELD LEVELS AND AT DIFFERENT PRICE ASSUMPTIONS.

Price assumptions (Outstations)	Yield levels in lb/ac			
	800	800—1000	1000—1200	1200—1400
=/83 cts/lb	42.44 (2.3)	152.00 (15.2)	247.20 (20.6)	390.00 (28.0)
=/90 cts/lb	98.44 (12.3)	222.2 (22.2)	331.20 (27.6)	490.00 (35.0)
100 cts/lb	178.40 (22.3)	322.00 (32.2)	451.20 (37.6)	630.00 (45.0)

Source—Calculated from Table 6.

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