

# ECONOMIC REVIEW

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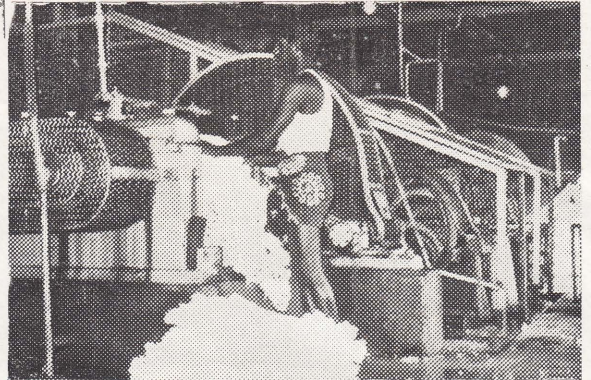
RUBBER

## RUBBER PRODUCTION AND MANUFACTURE

Methods of production and manufacture among rubber growers have changed very little over the last eighty years. Particularly among the small holders, who account for a larger share of the production and acreage in Sri Lanka, methods of tapping, rubber making and marketing are much the same as those adopted in the early years of this century. The picture (at left) shows a rubber tapper making an incision in the bark of a tree which causes the liquid latex to flow.



The latex that collects into cups at the lower end of the tree are taken away in buckets for rubber manufacture. The latex is poured into trays for coagulating. Rubber may be processed into pale crepe or smoked sheet. After emerging from the coagulation trays, the wet slabs of rubber are run through a succession of creping mills that roughen the rubber's surface and gradually reduce its thickness to facilitate drying. The sheet rubber that comes out through the rollers is then hung up to dry, in smoke from burning wood or oil, to obtain the "smoked sheet" of commerce.



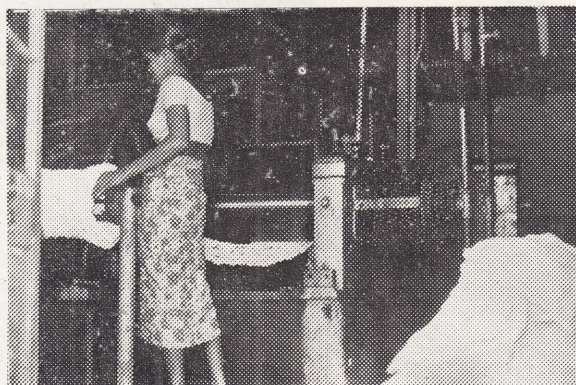
Crepe rubber being produced on a bigger machine.



A small holder is seen pouring the latex into trays for coagulation.



Smoked sheet rubber being carried to stores after processing by small holders.



A female worker controls rollers in the processing of crepe rubber in a small factory.



Manufactured rubber being loaded on to a lorry for transport to Colombo from where it is exported.

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THE ECONOMIC REVIEW is intended to promote knowledge of and interest in the economy and economic development process by a many sided presentation of views & reportage, facts and debate.

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- The economy's prospects in 1981
- Integrated rural development in Sri Lanka
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### COVER ARTIST

Gunaratna M. Gamage, a student of the Colombo University's Faculty of Fine Arts.

# Diary of Events

## October

- 1 The Government approved a proposal of the Ministry of Trade and Shipping to obtain a loan of US\$ 13 million to purchase ships from Argentina and South Korea.

The Ministry of Plan Implementation introduced a new incentive scheme for voluntary sterilization, which provides for payment of Rs. 500/- to any person, male or female, who undergoes a sterilization voluntarily.

Industrialised nations blocked a proposal at UNCTAD in Geneva for an international commission to help solve the debt problem of developing countries. These industrialised nations said the World Bank and International Monetary Fund already exist for this purpose, so it isn't necessary to create another institution. Instead, the 122-nation Board of UNCTAD adopted a compromise resolution, stated an Associated Press (AP) report from Geneva.

- 6 The Organisation of Petroleum Exporting Countries (OPEC) was planning to abandon the dollar standard and switch to "a basket of 16 currencies" for all its oil transactions, reported a New York-based energy publication, the 'Energy User News'.

- 7 Notes confirming the understanding reached between the Governments of Japan and Sri Lanka for the provision of a commodity loan of Yen 3.4 billion (approximately Rs. 280.84 million or US\$ 16.323 million) were exchanged in the Ministry of Finance and Planning in Colombo. The proceeds of the loan will be utilized by the Government of Sri Lanka to purchase a wide range of commodities for economic development and will include fertilizer, industrial raw materials, machinery and equipment, rubber manufactures, road motor vehicles, vegetables seeds, etc.

The Manila based Asian Development Bank approved a US\$ 12.8 million (Rs. 208 m) concessional loan to Sri Lanka to help develop a project in its tea industry, according to a report from Manila. A second loan amounting to Rs. 170 million for highway development in the Mahaweli area was also approved.

- 8 The Government approved recommendations made by the President concerning the activities of multi-nationals. Specifically, the Bata Shoe Company will be restricted to 32 per cent of the local shoe market which it now holds and any further expansion will require Government's authority.

The Sri Lanka-Middle East Conference imposed a minimum War Risk surcharge of \$ 4 (US) per revenue ton against shipments to all Persian Gulf destinations situated North of 24 degree North latitude, excluding Khorranshahr and Basrah. This surcharge is applicable to all vessels that commenced to load within a two week period from October 3.

The New York-based Rizaco International proposes setting up a massive Rs. 12.8 billion Petroleum refinery at Trincomalee with a capacity to refine 200,000 barrels of crude oil per day for export, with

100 per cent foreign capital, according to Industry and Scientific Affairs Ministry sources.

- 9 The Indian Government decided to extend almost all the facilities currently available in its export processing zones to 100 per cent export oriented units, irrespective of where they are located in India, reported the Indian Financial Express.

The Ministry of Industries and Scientific Affairs signed an agreement in Colombo with Intersite BV Netherlands, the sixth largest mining company in Netherlands, to collaborate with the Mining and Mineral Corporation to undertake large-scale Geotechnical surveys, advanced mineral investigations on land and offshore in Sri Lanka.

- 10 Industrial and developing governments completed a review in Geneva of their four years efforts to negotiate a string of international commodity agreements through UNCTAD and conceded that progress has been negligible. Third world countries blamed industrial nations for the impasse, stated an Associated Press (AP) report from Geneva.

- 14 An Air Transport agreement signed between Sri Lanka and Philippines which agrees in principle to the national carriers of each country flying through each others territory was approved by the Ministers.

- 16 Parliament stripped former Prime Minister Mrs. Sirima Bandaranaike and a former Minister Mr. Felix Dias Bandaranaike of their civic rights for seven years.

- 23 An agreement was concluded in Washington for World Bank aid of Rs. 856 million to develop Mannar and Puttalam Districts as integrated district development projects under a 5 year programme commencing January 1981.

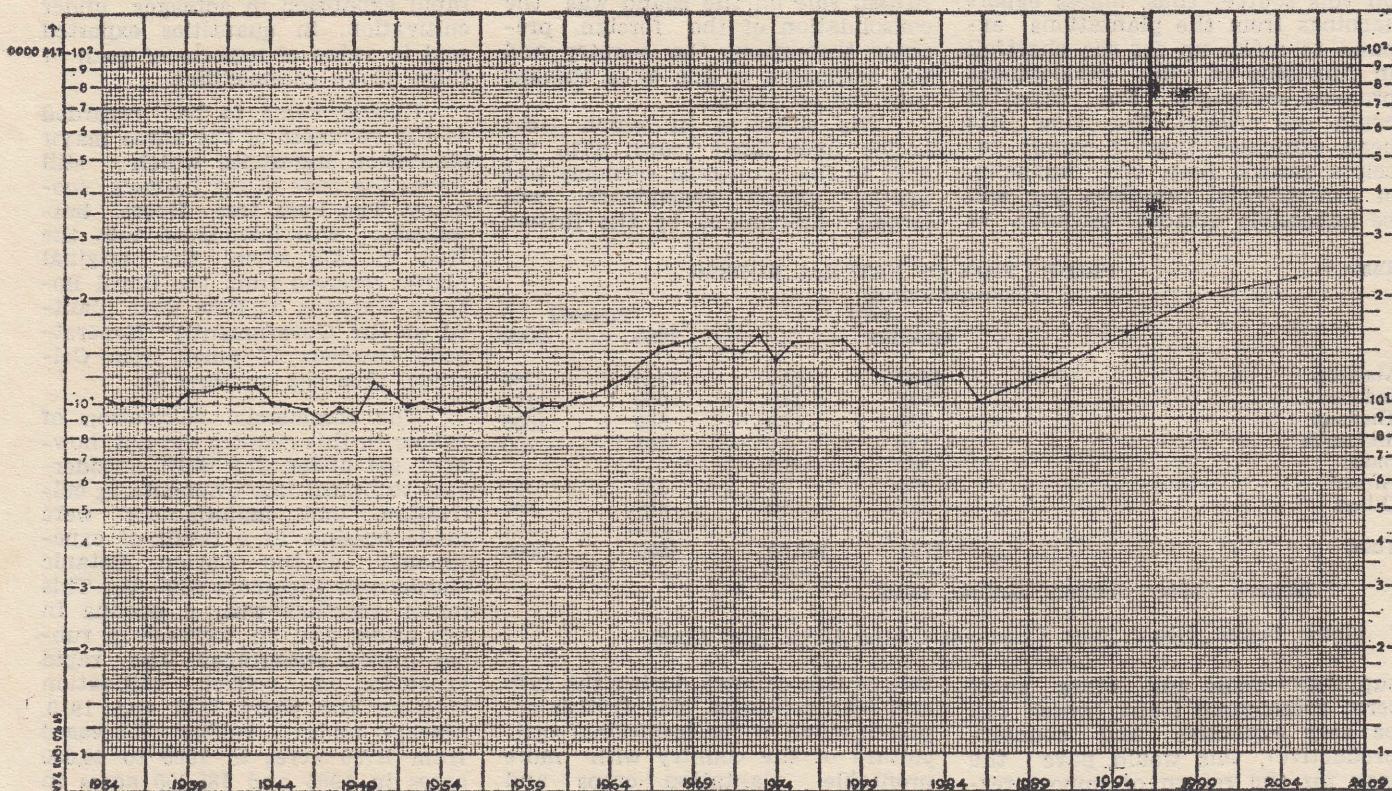
- 24 The United Nations Organization marked its thirty-fifth anniversary.

- 27 The Swiss Government has made an outright grant of Rs. 24 million (1.8 million Swiss Francs) for the State Pharmaceutical Corporation's sterile products manufacturing plant to be built at an estimated cost of Rs. 63 million at Ratmalana, according to a press announcement.

- 28 China and the US signed a major trade agreement providing for the annual sale of 6 million to 9 million tonnes of US wheat during the four years from 1981. The agreement was one of the largest agreements by the US, states a Reuter report from Beijing.

Colombo Dockyard Ltd. won a worldwide tender for the second time, called by Sri Lanka Navy for the construction of five high speed, all steel, petrol boats, with the most competitive tender of Rs. 4.8 million.

- 30 The government decided to remove the import duty of 100 per cent now being imposed on imported teas in order to promote establishment of an industry for tea blending, packeting and tea-bagging for the export market.



# The Rubber Industry in Sri Lanka:

## Bleak 80's outlook

## Bright 90's prospects

### RUBBER PRODUCTION: PAST AND FUTURE

A graphic representation of past and future rubber production trends in Sri Lanka covering the 75 years from 1934-2009. The chart (in semi-logarithmic scale) illustrates clearly how although there are some fluctuations appearing between 1934 and 1961, the overall trend in the long term shows a fairly constant level of production. The period from 1962 to 1970, however, shows a steady increase in production and then a constant level upto 1978. Estimated production from 1979 indicates a steady decrease upto 1985 and then a steep increase from 1986 onwards.

Sri Lanka's rubber production is expected to reach its lowest levels in 24 years by 1986 when the country's total output is estimated to drop to 100,952 tonnes from a peak of 160,000 tonnes in 1970 and about 153,000 tonnes in 1979. While the main rubber producing countries will be increasing their production in the years ahead, and reaping the benefits of an increasing trend in prices, Sri Lanka's rubber output levels are due to take a steep dip in the 1980's and are expected to pick up fully only by the mid 1990's (see tables 1 and 2). There are several reasons for this impending crisis in our industry, the most prominent of them being the years of neglect in the country's rubber replanting programme, a general lack of maintenance of estates both large and small, and an inflexibility on the part of the

authorities and the trade to take advantage of the advances in the industry and consumption patterns which has in turn resulted in an almost negative attitude in the spheres of research, marketing and production.

On the other hand, the need to maintain the highest possible levels of production and export earnings has never been more imperative than in these early years of the 1980's. With the country's import bill reaching unprecedented levels, and export earnings trailing sluggishly behind, the net result has been a record merchandise trade gap of nearly Rs. 20 billion in 1980. Prospects are that the import bill will continue to soar over the next few years, while fears have been expressed that foreign aid cannot continue to finance the country's yawning trade gap.

Heavy hopes are therefore being placed on earnings from exports — the traditional agricultural commodities, the non-traditional agricultural and industrial exports, and the foreign exchange earning service industries — and rubber is expected to play a vital role here.

In spite of the various efforts at diversification of exports, earnings from the plantation sector are expected to provide the major part of the country's foreign exchange returns in the foreseeable future. Several major development projects are being launched and at present foreign aid is providing most of the finances in the short and medium term, but this is expected to tail off. It appears that earnings from the Free Trade Zone could at most provide a safety net but it would be too risky to rely

on this source; thus, unless export earnings from the plantations expand to make up for the shortfall in financing of the development projects envisaged the situation could get critical. The view has been expressed that if export receipts cannot help, the financing of the external resources gap will be impossible without recourse to

British rule on the island was the consolidation of the foreign presence throughout the country and the deepening of the alien inroads into the economy.

The situation in which Sri Lanka finds itself today, with regard to the plantation economy and brittle export dependence, was largely determined by the British

rapid expansion in acreages under cultivation, in quantities exported and in value of exports of each of these three commodities.

Rubber came to be regarded as the youngest of the three major plantation industries which still forms the base of Sri Lanka's economy. The Para tree *Hevea brasiliensis* was introduced into the East in 1876 when the original plants received from the Royal Botanic Gardens at Kew were planted at the Government's Heneratgoda Gardens 17 miles from Colombo. (See box on page 5).

The commercial cultivation of rubber in this country did not, however, get under way until considerable technical improvements in cultivation and manufacture were made possible as a result of experiments at the Ceylon Botanic Gardens in the years 1897-99. This factor together with a decline in tea prices and an increase in rubber prices, encouraged the rapid expansion of rubber cultivation between the years 1900 and 1910. Acreage under rubber increased from 1,750 acres in 1900 to 40,000 acres in 1905 and 188,000 acres in 1910 (see table 3).

Table 1 PRODUCTION OF NATURAL RUBBER

	1979		Forecast	
	Quantity	%	1980	1990
Malaysia	1600	42.2	1750	2750
Indonesia	905	23.9	950	1175
Thailand	529	13.9	540	1000
Sri Lanka	153	4.0	165	200
India	147	3.9	—	—
Africa*	194	5.1	225	350
Others	267	7.0	415	600
Total	3795	100.00	4000	6000

Source: Rubber Statistics Bulletin, IRSG

\* Liberia, Nigeria, Ghana, Zaire, Camaroon, Central Africa, Ivory Coast.

suppliers' credit and other short term commercial loans (which can be very expensive and counter-productive), this would pave the way for the return of import restrictions and a change in the present direction of development.

Rubber has remained one of Sri Lanka's three staple export commodities throughout the eighty years of this century. Together, the three traditional—tea, rubber and coconut—have accounted for over 90 percent of the country's export earnings upto the early 1970's.

The new industrial exports and gems have, in recent years, kept increasing their share of the country's export earnings, but the three traditional export crops still contribute around 70 percent of Sri Lanka's export returns and will have to make the major contribution for many more years to come.

The alternative to this dependence on exports would be restructuring of the entire economy and the return to a self-reliant economy, in the modern context. The importance of the rubber industry in Sri Lanka's economy can be traced back to the period when the distortion of the economy first appeared. This process, started by the Portuguese in the 16th century, which diverted the directions of the country and its people away from their own needs, was sharpened and refined in the subsequent centuries by the powers that followed them, namely the Dutch and the British. A significant impact of the

rule of this country during the 19th and 20th centuries. The British replaced much of the traditional agriculture of the country with more profitable plantation crops and finally enmeshed Sri Lanka in a

Table 2. ESTIMATED RUBBER PRODUCTION 1978-2005 (tonnes)

Year	State Estates	Small/holders Private Estates	Total	
1978	42,924	112,738	155,662	actual
1980	40,383	80,000	120,383	estimated
1982	39,364	73,950	113,314	"
1985	43,273	76,840	120,113	"
1986	46,302	54,650	100,952	"
1990	58,616	61,060	119,675	"
1995	69,223	89,890	159,113	"
2000	76,587	125,660	202,247	"
2005	84,312	142,850	227,162	"

Source: C.D.C. Rubber Industry Master Plan Study

Note: The Central Bank of Ceylon, however, has forecast increases in the volume of rubber that will be produced over the coming years. In its latest annual Review of the Economy (1979) it forecasts an annual average growth rate (at current prices) of 12% up to 1984 and states "In the case of rubber the expected price and volume increases are 11 per cent and 3 per cent respectively per year." P289.

colonial plantation economy.

Coffee was first introduced but by the 1870's it was making way for the more profitable and successful tea crop. The rubber industry, together with tea and coconut, came to form the base of the country's export sector within the comparatively short period of about 3 decades, beginning with the decline of the coffee industry in the 1880's. During this period there was a

The rapid expansion of the motor car industry, particularly in the United States was, of course, the chief stimulant to rubber production. Prices for rubber remained at a lower level during the next 10 years, 1910-1920, but they were yet high enough to permit the continued expansion of the industry. By 1920 over 450,000 acres, or about two-thirds of the present rubber acreage in Sri Lanka, was under

**TABLE 3. Acreage of Rubber in Sri Lanka 1900-46**

Year	Acres
1900	1,750
1905	40,000
1910	188,000
1920	460,000
1925	495,000
1930	582,247
1935	602,412
1940	636,936
1945	655,040
1946	659,909

Source: *Report of the Rubber Commission, 1947.*

cultivation although of this total 267,000 acres were actually in bearing. The country's exportable capacity thus continued to increase until the period of the "depression" in 1930 (see table 4).

**TABLE 4. Exports of Rubber from Sri Lanka (in tons)**

Year	Tons
1900	4
1905	700
1910	1,697
1915	22,000
1920	39,500
1925	46,000
1930	76,000
1931	62,000
1932	50,000
1933	53,500
1934	79,000
1935	54,000
1936	50,000
1937	70,000
1938	51,000
1939	60,000
1940	88,000
1941	90,000
1942	115,000
1943	99,000
1944	100,000
1945	96,000
1946	100,000

Source: *Report of the Rubber Commission, 1947.*

Rubber thus became significant as an export item from Sri Lanka in the first decade of the century. As seen in table 4, it showed a sharp though irregular upswing till the end of World War I, as demand was expanding steadily and production lagged behind. The post-First World War slump and the weak demand from world markets caused a downswing, which continued in the early 1920's. This period was dominated by over production in the industry, resulting from over-investment in the years of the previous upswing. The trough was reached in 1932, when the depressed world business conditions affected this industry most severely. There was an upswing in 1933-34 due to the revival in busi-

ness conditions, but the improvement in exports was short-lived.

The serious state of recession in the world rubber industry caused the plummeting of prices while the glut in international markets kept building up. The London price per metric ton of rubber for the years 1900 to 1918 averaged £417.1 but for the period 1919 to 1939, it had slumped to £ 103.7

and during the depression year it was as low as £ 21.2. The Agency houses in the rubber producing countries were most affected and attempted to alleviate the problem of oversupply by calling for the introduction of output restriction to boost rubber prices. Two schemes were established during the inter-war period: the Stevenson Restriction scheme of 1922-1928 and the

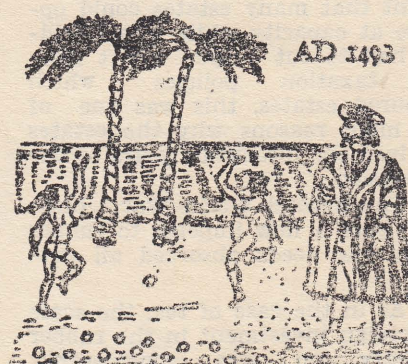
### BEGINNINGS AND GROWTH OF THE INDUSTRY

The American continent is not the only discovery attributed to Columbus. He is also believed to have been the first European to have set eyes on natural rubber. History relates that when Columbus made his second 'great' voyage to the Americas in 1493 he came across some Indians in Haiti playing a game with balls of gum. Though there did not seem to be any immediate use for the new material he reported its existence on his return home and may also have brought back some samples out of curiosity.

Over 250 years were to pass before the first tentative steps to make serious use of this peculiar substance were taken, when in the 1760's it was discovered that crude rubber from South American could be dissolved in turpentine. The natural liquid rubber, or latex, could not be transported without deterioration but in the dissolved form it could be shipped across the Atlantic to Europe, where it was used to produce rubberised fabrics, boots and other articles.

But it was not till the 1840's when Charles Goodyear and Thomas Hancock discovered the process of vulcanization that rubber was converted from a substance of comparatively little importance to one of the world's most important commercial products. Vulcanization made the modern rubber industry possible by permitting use of the substance in combination with machinery and in tyres for bicycles and later for automobiles.

Early articles made of rubber suffered from many disadvantages. The rubber rapidly deteriorated, becoming sticky when exposed to heat and light and hard and brittle when exposed to cold. It was only with the discovery and application of two complementary processes, mastication and vulcanization that the basis of the future world-wide rubber industry was truly laid.



The year 1900 may be said to mark the birth of the motor car era, and for the next 80 years the production of the petrol-driven vehicles increased year by year and with it the consumption of rubber.

The name 'rubber' was adopted in England since one of its early uses was to 'rub out' pencil marks, while the French word *caoutchouc* comes from the South American Indian word *cao* meaning 'wood' and *o-chu* a flow or weep, 'weeping wood' being a graphic description of the tapping of a rubber tree.

As soon as the potential advantage of rubber came to be appreciated it was realised that something would have to be done about cultivation of the rubber tree on a large scale. The tree grew wild in Brazil, and location and extraction were difficult-hardly conducive to regular production. After many false starts the selected tree, *Hevea Brasiliensis*, was established in Malaya and other places in the East, the original seedlings becoming the ancestors of the extensive plantations existing today. Prior to this a large number of plants were brought from Brazil to Kew Gardens (later Royal Botanical Gardens) near London and the first 100 rubber plants to be despatched Eastward came from Kew Gardens to Sri Lanka (then Ceylon) in 1876.

International Rubber Regulation Agreement of 1934-1941. There is general agreement that restriction of output was more effectively imposed by the colonial Governments upon the indigenous small holder sector than upon the large foreign estates. In Sri Lanka the average 1934 quota for estates exceeding 100 acres was 330 lbs. per planted acre, for small estates it was 265 lbs. while for holdings of less than 10 acres the quota was only 195 lbs. This quota imbalance meant that many estates could operate at capacity while small holders had to cut output. Apart from the taxation policies which favoured estates, this was one of the main reasons why the estates survived the disastrous years of the depression.

The Second World War, however, gave a new impetus to rubber when war needs absorbed all output.

As in the case of tea, the scale of foreign investment in the rubber industry too was considerable, though Sri Lankans had a larger share in the opening up of and operating rubber plantations than they did in tea. A large number of rubber companies were floated in the eight year period, 1904-1911. The island was in a position to receive large doses of foreign investment with its basic infra-structure of roads, railways, ports, market and banking services, a wage labour force and an 'efficient' government administration being established, while London in the

bered the Sterling companies, possibly because of the tax advantages in floating Rupee companies. This did not mean that there was a greater degree of local investment, available evidence from scattered sources strongly suggests that the great majority of shares in both Rupee and Sterling companies operating in this country in the early part of the century were foreign owned. There were some Rupee companies, however, that had significant, though rarely majority, local equity participation. This foreign ownership of Rupee companies was eroded only during World War II and following the period of Sri Lanka's independence from British rule. Being a rural subsistence economy, prior to the establishment of the plantations, little or no domestic capital was available. The very nature of the economy provided little or no scope for entrepreneurship. With the expansion of the money economy, however, a supply of domestic capital was becoming available for investment in export agriculture. At the same time the Ceylonese capitalist was becoming aware of the new markets, and therefore, willing to undertake risk, as the success of foreign capital exerted a kind of demonstration effect on local capital. Supply of domestic capital and enterprise became increasingly evident in the first quarter of the twentieth century, when new investment in land, especially in rubber plantations took place at a growing pace.

ment trusts which were formed specifically for this purpose. Unlike the Tea companies which were generally formed by proprietary planters, in conjunction with banks or established investment trusts, more interested in long term returns; the rubber firms were established during the rubber booms of 1905-1906 and 1909-1910, it appears, to take advantage of the public's speculative enthusiasm, and possibly it was the hope of high, short-run gains that served as the driving force.

Some of these foreign owned companies which invested in rubber took to the production of other crops, particularly tea as a means of improving profitably, while some of the Tea companies diverted to rubber with the prospect of big profits at the time of rising prices during the late 1920s.

Unlike the tea industry, which was an offshot of the Indian industry, and through a long period of trial and error came to be placed on a firm footing in this country by the late 1880s the rubber industry was in a different position. When Ceylon's first rubber companies were being established in 1904, the plantation rubber industry of the world was still in its infancy; there were not even any settled techniques of cultivation. The fear of over-production and the possibility of the invention of synthetic rubber, combined with the volatile nature of rubber prices, rendered the industry highly speculative in its early years. Moreover, those companies which were working previously uncultivated land and planting rubber for the first time, had to wait six to eight years for the trees to reach the production stage. As time went on, however, the danger from over-production came to be discounted.

Also, due to the weak demand for tea in the early years of this century British planters had begun to see in rubber a more profitable product; rubber was thus planted extensively, although not to the same extent as tea. Coconut was the other main crop to be grown on a plantation basis; but as it was also originally a peasant crop and this industry was largely in local hands the enclave situation was not as pronounced as in the case of tea and rubber.

With this introduction of the classical plantation economy at the end of the 19th century and early years of the 20th century the country's economy suffered a clas-

Table 5. SRI LANKA RUPEE AND STERLING COMPANIES ENGAGED IN RUBBER PRODUCTION ACREAGE AND CAPITAL, 1920

	Rupee companies	Sterling companies
Number of Companies a/	127	28
Total acreage	73,604	69,940
Total issued capital (b)	5,741,998	5,246,641 b/
Acreage per company	580	2,948
Issued capital per company (-)	45,000	194,320

Source: Derived from Handbook of Rupee Companies, 1920 and Ferguson's Directory, 1920.

- a/ In addition to the companies listed, there were 8 tea-cum-rubber companies (1 rupee company of 1,919 acres and 7 Sterling companies with 20,314 total acres.) Data are not available on the acreages and capital proportions devoted by these companies to rubber  
 b/ Data available for only 27 companies. Data for 24 companies based on authorized capital.  
 c/ Converted from Rs. to £ at fixed conversion of 1 £ - Rs. 10.

early twentieth century was well organised for promoting investment in colonial plantation enterprises. The fact that capital was effectively mobilized in London is reflected in the larger scale of Sterling as against Rupee Companies both in average acreage and issued capital. (See table 5).

However, despite their smaller size the Rupee companies outnumbered

Yet it was the Sterling companies that had the major impact on the increasing investment drive at the time, and rapid growth of rubber production and exports. These Sterling rubber companies came into existence much later than the tea companies and also under different circumstances. These companies were typically promoted by ad hoc syndicates or by invest-



sical dualistic split. The enclave or 'modern' sector had its main interaction with the external world and very little interaction with the traditional economy, within which a large part of the population lived. Just as the interaction with the outside world was exclusively with the enclave sector, the interaction of the government was likewise almost exclusively with this sector.

The estate sector produced enormous surpluses. Once the initial capital was injected, handsome dividends were available. The plantation sector's growth provided high level dividends for foreign shareholders and a high level of consumption for both expatriates and allied local groups of persons within the enclave. It did not significantly increase the production of local goods and services, nor were surpluses invested outside the enclave. The ability of the so-called modern or enclave sector to initiate economic development for the country as a whole was therefore minimal.

With the establishment of rubber as a plantation crop the dependence of the economy on three primary agricultural export commodities was complete. Agriculture in the colonies was generally viewed as primitive and backward and this reinforced the rationale of the colonizers for neglecting it. They thus diversified production to one or two cash crops often to the exclusion of staple foods. Rather than helping the peasants, colonialism's public works programmes only reinforced export crop production. Plantations usurped most of the good land, either making much of the rural population landless or pushing them onto marginal soils. The introduction of the plantations meant the divorce of agriculture from nourishment, as the notion of food value was lost to the over-riding claim of "market value" in international trade.

A process was begun in earnest which stifled and distorted traditional agriculture in order to extract wealth in the form of export oriented cash crops; the agriculturally productive population had to move away from growing their subsistence crops which were allowed to fall into neglect, and for large numbers of this population land-tenure became most insecure (a security that is now recognised as the first prerequisite of agricultural progress). A new 'dynamic' commercial sector emerged at the expense of the tra-

ditional sector which came to be regarded as 'backward'. The history of underdevelopment has shown that the economic decline of the 'backward' sector was the direct product of the formation of this other 'commercial' sector, tied in to the international economy.

Rubber acreage, production and exports, as we observed, moved up

rapidly in the first 20 years of the century, and over the next 20 years fluctuated downwards and then recovered slightly. The final phase of the expansion of the plantation export sector appeared to reach its close with the coming to maturity of the rubber industry. Despite various restrictions in the 1920's and 1930's, both acreages and out-

### RUBBER'S CONTRIBUTION TO REVENUE

Rubber contributed as much as Rs. 1,239 million in a total of Rs. 4,168 million recovered by Government as export duties in 1979; while from a total estimated Rs. 3,855 million in 1980 rubber duties were expected to contribute Rs. 2,070 million or more than 50 percent of total export duties. For 1981, however, the Minister of Finance proposed a reduction in the export duty on rubber by 15 percent per kilo, by adjusting the sliding scale of duties on rubber.

This sliding scale of export duties for rubber was introduced in 1961, based on the average price of RSS Grade I in the London market. The basis of setting this price continued unaltered for 11

November 1977 with the new Government's first Budget the existing sliding scale of export duty was brought into operation. The following table summarises the export duty over the last decade, and shows it as a percentage of annual rubber exports.

An estimate by the Rubber Master Plan Study team showed that the export duty alone accounted for almost 50 percent of total export earnings from rubber in 1978. The other major component of cost was wages, which accounted for around 24 percent of total export earnings.

Meanwhile, the total taxes levied by the Government on the rubber industry in 1978 amounted

### RUBBER EXPORT DUTY 1970-79

Year	Rubber Exports Tonnes	Export Value Rs. mn.	Export Duty Rs. mn.	Export Duty as % of export value
1970	160,651	439.7	53.8	12.2
1971	129,353	306.8	10.2	3.3
1972	129,604	265.1	10.0	3.8
1973	160,759	591.5	141.5	23.9
1974	127,553	738.5	284.3	38.5
1975	160,877	653.6	139.6	21.4
1976	136,933	889.6	197.4	22.2
1977	134,530	930.6	260.6	28.9
1978	138,045	2,020.5	1,001.0	49.5
1979	128,208	2,491.4	1,239.0	49.7

years when as a result of persistent representations from the trade there was a revision in July 1972 and once again in April 1973. At the end of November 1976 a flat rate was introduced over and above the sliding scale. In July of that year a revised duty structure came into operation with a fixed duty rate of Rs. 6/65 per kg. which was to be added to the converting sliding scale. From mid

to Rs. 996.5 million. In return for this sum Government expenditure on specific subsidies to the industry amounted to about Rs. 98 million, according to the Study team, as shown in the table below. These estimates therefore indicate that the net returns to Government arising from the export duty was almost 90 percent or about Rs. 900 million from a total of almost Rs. 1,000 million.

### RETURN TO RUBBER INDUSTRY FROM SUBSIDIES

Fertiliser subsidy at 50% of cost price	38,612,986
Fuel (subsidised rate Rs. 5.30 per economic rate Rs. 9.66 per gallon)	3,468,442
Transport (assuming 18.2% total costs are fuel which is subsidised at the above rate)	841,217
Electricity (assuming economic cost is three times the financial cost)	12,175,834
Rice ration subsidy (to 172,000 smallholders per 1 ha and 68,400 workers at Rs. 178.57 per person)	42,928,228
<b>Total</b>	<b>98,026,697</b>

put exported continued to rise until the 1930's after which there was a marked slowing down in the rate of growth. The years of depression between 1929 and 1933 affected both investors in large estates (mainly foreigners) and also the local "rubber barons", though the colonial government did all within its power to soften the impact.

Incomes of small income producers too were seriously affected; their standard of living was lowered considerably, as rubber prices fell by nearly 75 percent over the four years 1929-33, while import prices, especially those of consumer goods and prices of locally produced consumer goods were only halved. Smallholders thus found their cash incomes shrunk and their obligations heavy. They did not obtain much relief officially but were able to add to their incomes (or reduce their expenditures) by turning to increased peasant cultivation, and in this area they continued to produce at a relatively high level throughout the slump. Investors in large estates were, however, left with little or no income from this source as no dividends could be declared. Estates which were closed down were generally liquidated and investors lost a considerable portion of their capital. These estates were bought up by Ceylonese and more investment in rubber shifted into Ceylonese hands during this period.

After 1939 rubber prices picked up and even the Sterling companies showed a higher yield per acre than during the 1934-38 period. Until 1942 the output of rubber had been regulated by international agreement. With the Japanese occupation of the other main rubber producing countries in 1942, Ceylon became the main rubber supplier for the Allied war effort. The restriction machinery was abandoned and producers were exhorted to maximise their output and to slaughter-tap 20 percent of their planted acreage in return for a government offer of £45 per acre 'to meet replanting costs'.

Thus, during World War II rubber output expanded in the short run to cope with the enormous demand generated, following the acute shortage of this strategic raw material for the Allied. Trees were 'slaughter tapped' and every effort was made to extract the maximum possible output from the existing plantations. The scarcity created by the War also resulted in increas-

ing efforts to develop the synthetic rubber industry in the Western Hemisphere. The artificial boom conditions of the war period ended with the cessation of hostilities, and soon thereafter world supply and demand reached 'normal' proportions.

As far as the local industry was concerned, it was left poorer after its enormous effort to cope with the war demand. Replanting had been neglected and trees had been 'slaughter tapped'. The result was a generally low yield. Meanwhile, output from the once Japanese occupied countries was entering the normal channels of trade and tending to depress prices. The Korean War created a strong demand for rubber in 1950 and 1951. With the resumption of normal conditions thereafter, it was once again evident that total productive capacity in the industry (both natural and synthetic rubber) was greater than demand. As the synthetic rubber industries were in the consumer countries, over-investment in the whole industry reacted most strongly on natural rubber exports.

Replanting of estates was a problem that had reached serious proportions after the war. Slaughter tapping and reduced replanting were now telling on yield levels. Competition from synthetic rubber made replanting costs appear prohibitively high. Earlier, in 1947, a Rubber Commission which reported on the industry had showed that more than one-fourth of the Island's rubber lands was 'uneconomical' because of the age of trees and natural factors such as unsuitability of soil and insufficiency of rain. As at 1950 only about 8 percent of Sri Lanka's total rubber acreage had been replanted since 1934. The replanting problem was regarded as a serious one, particularly with the emerging competition from synthetic rubber. It was decided that an immediate and extensive replanting programme, using high yielding clones as a means of reducing estate costs and increasing the competitiveness of natural rubber, was imperative. The Korean war boom helped to increase prices to unprecedented levels and these fortunate circumstances provided estates with the opportunity to replant. With the end of the Korean war boom the authorities continued to promote replanting through a public subsidy scheme. This resulted in replanted acreage

more than doubling, between 1950 and 1955, and showing the same growth once again between 1955-1956. In the 1960's, however, the rate of replanting fell steeply mainly due to the downward trend in prices and the sterling rubber companies were reluctant to invest with the growing uncertainties in the public policy environment at that time.

The Government showed great concern over the adverse effects on the rubber industry as a result of the abrupt end of the Korean boom. Towards the end of 1952 a very significant step it took to assist the industry was to negotiate a trade agreement with the People's Republic of China and was thus able to divert to China nearly one-third of Sri Lanka's rubber exports, at prices considerably higher than those obtaining in the open market. A five year trade agreement in 1952 was entered into between the two countries under which Sri Lanka was able to annually supply 50,000 tons of sheet rubber to China in return for 270,000 tons of rice. A second five year agreement was signed in 1957, under which no premium of world prices were paid to Sri Lanka but China agreed to contribute Rs. 15 million annually for a period of five years as part of a subsidy to the rubber replanting programme. This contributed much towards maintaining the initial thrust of the replanting scheme. The third five year agreement from 1963-1967 included an annual contribution of Rs. 10 million for the same purpose of replanting. The sixth Five Year Agreement is now in force. Over recent years China has progressively received reduced quantities of rubber (see table 18). In 1976 China's purchase amounted to 74,488 tonnes and this had come down to 30,000 tonnes by 1980. In 1981 China will receive 20,000 tonnes. This agreement was of major significance to Sri Lanka's rubber industry for two reasons: it assured the country of a stable price for rubber and at a time when prices were depressed; and it also helped to maintain the replanting programme which then covered the largest acreage (at the time the Chinese contribution to the programme came in).

The instability of the 'export economy' was beginning to be felt ever since the 1920's. The slowing down in the physical expansion of the export sector in the later period upto World War II is well

illustrated in the following table.

As seen from the figures below, the acreage under tea and coconuts did not expand substantially after 1906. Total acreages under rubber, however, continued to increase until the nineteen thirties, according to acreage estimates provided in the Annual Blue Books. It is evident from this data that in comparison with the last three decades of the nineteenth and the first two decades of the twentieth century, the period which followed was one of relative stagnation.

the background to public finance during recent decades. Another factor which made the economic background to this period even more unfavourable was the depreciation of physical capital in the export sector. The decline in the fertility of land which had been under cultivation for a long period of time became a familiar feature in agricultural production. In Sri Lanka the problem of diminishing fertility has been intensified by the fact of soil erosion which was a consequence of the planting of coffee, tea

existence tend to be of the same age; (a situation Sri Lanka is expected to face most acutely in the mid 1980's). Consequently trees age together, and the decline in productivity which inevitably results with the passage of time is widespread throughout the industry. This state of affairs implies, first, that there will tend to be a rapid falling off of total output in these industries following a period of stability, and second that the necessity for replacement will call for heavy capital investment within a short period, corresponding to the "lumped" investment in the initial phase. Moreover, since a number of years are required before rubber trees come into bearing, there will have to be a period of waiting before output revives. This situation which now seems so obvious, was strongly argued out by Gamini Corea in his doctoral dissertation as far back as 1952 but unfortunately over the 1960's and 70's the urgent need to maintain a consistent programme for the industry was lost sight of and never received the priority it deserved.

Table 6. ANNUAL AVERAGE OF ACREAGE AND QUANTITIES EXPORTED OF PRINCIPAL EXPORT PRODUCTS

Year	Tea		Rubber		Coconut Products Acreage (000)
	Acreage (000)	Quantity (lbs. million)	Acreage (000)	Quantity (lbs. million)	
1901-05	436	154	13	—	386
1906-10	513	181	128	1	975
1911-15	462	196	202	26	993
1916-20	503	195	285	73	951
1921-25	422	186	400	93	832
1926-30	453	235	513	147	970
1931-35	497	229	587	138	1,100
1936-40	555	229	604	145	—
1941-45	550	255	617	225	—

Source: Annual Blue Books, "The Instability of an Export Economy" Gamini Corea p. 75.

Two of the three major export industries of the country experienced a marked slowing down in the rate of growth as early as the beginning of the present century, whilst the rubber industry continued its expansion somewhat rapidly until the nineteen thirties and thereafter slowed down.

Available evidence does not at the same time indicate that there was any marked expansion in the non-export sectors of the economy to a degree sufficient to compensate for the decline in the rate of growth of the export sector.

The fact that the economy of Ceylon had ceased to grow latterly is a fundamental feature of

and rubber.

Another form of capital depreciation whose short term consequences were perhaps even greater has been found in the limited life span of these tree crops. A coconut or a rubber tree cannot indefinitely be maintained at constant productive capacity; once productivity falls off it has to be replaced altogether. One consequence of rapid expansion within a short period of time, as against gradual investment over a longer period, is a tendency towards an uneven distribution in the age composition of trees. In other words, at any given moment of time, a greater proportion of the trees in

As observed earlier, it was also after the mid 1930's that changes evidently occurred in ownership patterns of the country's rubber holdings. A summary of major shifts in the composition of Sri Lanka's rubber industry from the pre-war to the post-war period and through 1969 is provided in table 7. The column totals of this table show that the industry had reached maturity in terms of acreage by 1943. Secondly, it is apparent that considerable structural change occurred between the pre-war (1934) and post-war (1959) situations but that little change took place over the decade following 1959. The compositional shift between 1934 and 1959, most of which took place following independence, consisted

Table 7. SRI LANKA RUBBER HOLDINGS AND ACREAGES, BY OWNERSHIP CATEGORY 1934, 1959 AND 1969

	1934		1959		1969	
	acreage	%	acreage	%	acreage	%
Company estates						
Sterling companies	145,000	23	88,458	13	80,335	12
Rupee companies	100,000	16	88,590	13	89,350	13
Total	245,000	39	177,048	26	169,665	25
Individually-owned estates						
Non-Sri Lanka individuals	76,000	12	16,156		15,772	2
Sri Lanka individuals	160,000	26	283,906	42	279,891	42
Total	236,000	38	300,062	45	295,663	44
Smallholdings (less than 10 acres)	140,000	23	191,068	29	208,617	31
Total	621,000	100	668,178	100	673,965	100

Source: Ceylon, Report of the Rubber Controller, various issues

of several elements. The most important of these was the decline in company estates from 39 to 26 percent of total rubber acreage, with the compensating increase being shared by smallholdings and individually-owned estates. Some three-quarters of the company estate decline of 13 percent was accounted for by Sterling companies, with Rupee companies contributing the remaining quarter. The other compositional change consisted of a major shift of ownership of privately owned estates from non-Sri Lankan to Sri Lankan individuals. The net effect of these compositional changes was an increase in smallholdings to 31 percent and a rise in Sri Lankan-owned estates to two-fifths of total rubber acreage by 1969. Assuming that smallholdings and Sri Lankan-owned estates accounted for the domestic share of ownership and control of Sri Lanka's rubber industry, the role of foreign interests can be said to have declined from over half of the industry in 1934 to about one-quarter by 1969, with practically all of this change occurring after independence in 1948.

A very significant fact that emerges from the above table 7 is that the Sterling Company planted area fell from 145,000 acres in 1934 to 80,000 acres in 1969, representing 12 percent of total land area under rubber. However, the Agency Houses managed to continue their strong relationship with the remaining sterling companies and with the rupee companies. In 1970, they handled an estimated 27 percent of national production, (according to the Agency Houses Commission report) which measured from the yardstick that sterling companies together accounted for 25 per cent of total Sri Lankan rubber acreage, was a comparatively large share.

In the early 1970s when the Government embarked upon a wide ranging programme of land reforms publicly owned companies were excluded in the first stage in 1972 but in 1975 they were included, by transfer to the Land Reform Commission of all land owned by these public companies. The Central Bank of Sri Lanka commenting on some of the problems facing the estate sector in the post Land Reform period stated: "Many estates that were vested in the Land Reform Commission and now managed by other agencies were in a state of neglect before the take-over. Those properties managed by agency houses were

## NEW INCENTIVES FOR RUBBER PRODUCTION AND EXPORTS

T. P. G. N. Leelaratne, Rubber Controller

Over the last few years rubber production in Sri Lanka has been fluctuating around 150,000 metric tons a year. This was mainly due to the slow rate of replanting areas under senile rubber trees, which result in limited extents of high-yielding rubber coming into bearing annually while the existing old seedling rubber areas continue to give yields at a diminishing rate. This situation was further aggravated by the poor fertilizer use for mature rubber plantations. According to the statistics available it is estimated that there is approximately 200,000 acres of old seedling rubber which must be replanted with high yielding clones during the shortest possible time.

It is with this objective in view that the Government of Sri Lanka launched a project to replant about 47,000 acres of old rubber, spread over about 27,000 smallholdings in the districts of Kalutara, Ratnapura and Kegalle over a period of 5 years. World Bank assistance for this project amounts to about US\$ 16 million and the Sri Lanka Government contribution is the rupee equivalent of about US\$ 12 million.

The Rubber Replanting Programme is financed by a special export duty (cess) levied on every kilogramme of rubber exported from Sri Lanka. This money flows into a special fund called the Rubber Replanting Subsidy Fund administered by the Rubber Controller. The Government's contribution to finance part of the Special World Bank Project will have to come from the monies lying to the credit of the fund. Therefore it has become necessary to augment this fund to finance the above programme. The Minister of Finance proposed in his Budget Speech in November 1980 to increase the present levy of the cess from -/35 cts. per kilo to -/50 cts. per kilo on every kilogramme of rubber exported from Sri Lanka. Money collected in this manner will be disbursed by the Rubber Controller in the form of grants to rubber replanters to subsidise their replanting costs at the rate of Rs. 6,500/- per acre. This subsidy generally covers about

75 percent of the costs of replanting per acre of rubber in the smallholdings sector.

Any increase in the Rubber Replanting Cess while maintaining the current sliding scales of export duties leviable under the Revenue Protection Ordinance would contribute to the further erosion of the producer margin. If this is allowed, it would operate as a disincentive to the producer. Therefore the Minister of Finance has proposed a corresponding reduction of -/15 cts. in the sliding scale of export duties to ensure that the new levy will not be a burden on the producer and the exporter. The result will be that the Treasury will suffer a loss of revenue from export duties at the rate of -/15 cts. for every kilogramme of rubber exported. This loss, the Hon. Minister now proposes to absorb in the interests of the industry.

Sri Lanka has been traditionally exporting rubber in raw form. It will be in the interests of the country if the rubber produced in the country is exported in more value added form to earn more foreign exchange. Therefore the production and export of rubber in a small processed form and as end products should be encouraged. "Camel-Back" is a semi processed rubber product manufactured in Sri Lanka recently by few manufacturers, containing 60 percent of rubber and 40 percent of carbon black. In order to encourage the export of "Camel-Back" only 50 percent of the normal duty payable on rubber will be charged on this product. All these years this product was also subject to 100 percent duty. This will be a further incentive for the production and export of Camel-Back.

"Master Batch" which enjoyed 100 percent duty rebate from 1979 will now pay 50 percent duty. Master Batch is not a rubber product as such but only a semi processed raw material made out of rubber, carbon black or silica. Therefore the 100 percent duty rebate which it enjoyed earlier has been reduced to 50 percent by the Finance Minister.

Table 8. EXPORT EARNINGS OF TEA, RUBBER &amp; COCONUT

	In Rs. Million														
	'35	'40	'45	'50	'55	'60	'65	'70	'75	'76	'77	'78	'79	'79*	'80*
1. Tea	146	209	279	752	1194	1096	1210	1120	1932	2100	3503	6401	5722	4,802	5,090
2. Rubber	38	113	218	406	336	376	304	440	654	890	931	2021	2491	2,129	2,056
3. Coconut	36	23	69	281	258	238	334	295	504	502	496	1271	1699	1,390	1,017
(a) Coconut Kernel Products	(30)	(20)	(66)	(252)	(228)	(184)	(278)	(240)	(406)	(390)	(335)	(972)	(1298)		
(b) Other Coconut products	(6)	(3)	(3)	(29)	(30)	(54)	(59)	(55)	(98)	(112)	(161)	(299)	(401)		
4. Other Domestic Exports	10	14	25	55	84	65	68	140	833	1309	1685	3482	5316	4,380	5,965
5. Total Domestic Exports	230	359	591	1494	1872	1775	1916	1995	3923	4801	6615	13175	15228	12,701	14,128
6. Re-exports	22	26	71	69	68	57	33	38	10	14	23	31	45	40	56
7. Total Value of Exports (Rs.mn.)	253	387	666	1563	1940	1832	1949	2033	3933	4815	6638	13206	15273	12,741	14,184
8. Total Value of Exports (SDR) mn.									(466)	(495)	(659)	(674)	(759)	(635)	(666)

Source: Customs, Sri Lanka; Dept. of Commerce  
Coconut Marketing Department.

in a much better condition than those that belonged to proprietary planters. However, it has been difficult to determine the exact number of years of neglect, but the condition of many of them seems to have deteriorated in the wake of land reform. Many of those who have been newly placed in charge of these estates have very little experience in planting although they have displayed considerable enthusiasm for their jobs. Equipment, spare parts for factories and lack of transport facilities are serious impediments to increasing production on most estates. There is little evidence that timely action has been taken to supply these inputs".

However, the deterioration in the rubber growing industry, does not establish the fact that the expropriation of the foreign owned

estates was misguided. However one adverse repercussion was the serious deterioration in management standards and general efficiency levels on these estates.

Over the 1960's and 1970's the rubber industry on the whole was showing signs of decline. The rubber replanting programme was far behind schedule, estates both large and small suffered from a lack of proper maintenance, together with periods of price instability and general uncertainty facing producers. In the 1960's largely favourable prices may have discouraged uprooting of the older trees though there is every possibility that the land reform measures of 1972 and 1975, and particularly the period of uncertainty which accompanied them, discouraged investment in long-term production capability. In more recent years the rapidly increasing

costs of production have compelled growers, both big and small, to produce all they could. They could not therefore afford to spare any part of their existing lands for replanting — a short term policy forced upon them, but which will badly effect the industry in the long run. The need to resuscitate the industry had become quite apparent.

The government realised the urgent need for a systematic development and rehabilitation of the rubber industry in 1978 and, as in the case of tea, it commissioned a team of foreign consultants to study the organisation and performance of the industry and formulate proposals to improve its effectiveness. This study was undertaken by the Commonwealth Development Corporation (CDC) and financed by the British Government. The CDC team submitted a

Table 9. THE TOTAL AREA UNDER RUBBER IN CEYLON ON 31ST DECEMBER 1979, AS REGISTERED UNDER THE RUBBER CONTROL ACT, CLASSIFIED ACCORDING TO REVENUE DISTRICTS

District	Estates (100 acres)		Estates (10 to 100 acres)		Small Holdings (Under 10 Acres)		Total			
	No. of holdings	Acreage	No. of holdings	Acreage	No. of holdings	Acreage	No. of holdings	Acreage		
Colombo	...	...	33	14,087	656	14,456	25,791	38,376	26,480	66,910
Kalutara	...	...	133	53,840	1,102	24,202	50,226	48,061	51,461	126,103
Galle	...	...	66	27,501	887	20,362	19,652	25,330	20,605	73,193
Matara	...	...	28	6,194	770	12,975	4,765	8,946	5,563	28,115
Hambantota	...	...	—	—	07	150	22	78	29	228
Ratnapura	...	...	130	41,399	1,355	32,928	14,297	28,431	15,782	102,758
Kegalle	...	...	214	70,976	1,183	26,843	26,489	46,398	27,886	144,217
Kurunegala	...	...	29	10,124	201	5,059	1,118	3,318	1,318	17,501
Chilaw (Puttalam)	...	...	—	—	2	32	15	45	17	77
Kandy	...	...	74	16,577	415	11,155	8,587	14,610	9,076	42,342
Matale	...	...	61	18,175	258	7,874	4,215	3,933	4,534	29,982
Nuwara Eliya	...	...	01	361	5	258	21	37	27	656
Badulla/Moneragala	...	...	48	16,007	89	31,180	111	262	248	19,449
Total	...	...	817	275,232	6,930	159,474	155,309	216,825	163,056	651,531

Source: Rubber Control Department

report entitled "Rubber Industry Master Plan Study" in the course of which they confirmed the bright outlook for natural rubber and possibilities of a high economic rate of return in replanting, but drew attention to various technical shortcomings in the industry such as over-tapping, inadequate fertiliser

cerned. Unlike tea, about 75 percent of the acreage under rubber are on estates of less than 100 acres with 33 percent in small holdings of under 10 acres (see tables 9 and 10). In this situation rubber should have been more responsive to the various incentives offered but the expected increases

4.3 percent of the world total. In 1977 this share has further declined to 4.1 percent. Unlike in the case of other rubber producing countries, whose proportion of production has increased steadily over the last 10 years, Sri Lanka's production has fluctuated, and in fact being dropping.

Table 10 ACTUAL AREA UNDER RUBBER IN SRI LANKA AS AT 31ST DEC. 1979  
CLASSIFIED ACCORDING TO REVENUE DISTRICTS

District	Over 100 Acres	10-100 Acres	Small Holdings	Total
Colombo	17,761	17,545	28,264	63,570
Kalutara	57,020	25,368	42,839	125,227
Galle	26,060	11,938	17,529	55,527
Matara	7,078	8,126	7,266	22,470
Hambantota	—	128	96	224
Ratnapura	42,926	29,116	24,705	96,747
Kegalle	62,954	23,161	42,852	128,967
Kurunegala	9,173	3,795	1,915	14,883
Puttalam	—	96	32	128
Kandy	8,044	4,808	3,355	16,207
Matale	12,911	4,917	2,008	19,836
Nuwara Eliya	—	141	42	183
Badulla/Moneragala	14,326	1,209	435	15,970
	258,253	130,348	191,338	559,939

Source: Rubber Control Department

application, insufficient work on plant nutrition and disease control, and also various organisational deficiencies which have been largely responsible for the low productivity levels of the industry.

Rubber has not played as important a role as tea in Sri Lanka's economy but yet it has made an important contribution throughout this century and is of vital significance in the life of the three major rubber plantation districts of Kegalle, Kalutara and Ratnapura. It now accounts for about 15 percent of the country's export earnings (as against 35 percent from tea, See table 8), about 11 percent of government revenue (as against 15 percent from tea) providing more than 50 percent of export duties in 1980 (as illustrated in the box on page 7) and provides employment both directly and indirectly to about 500,000 persons engaged in the 155,000 small holdings, 7,000 small estates and 800 large estates and also employed in various stages of processing upto final export. A deterioration in the conditions of the rubber industry can therefore have an adverse effect in several areas of the economy. The benefits to be derived from a sustained increase in rubber output and general improvement in the rubber sector have thus been appreciated by all con-

cerned. This is most clearly seen in the replanting programme which is a basic need for sustenance and improvement of the industry.

Production of rubber in Sri Lanka between 1955-57 averaged around 97,000 tons which was 5 percent of world production. By the period 1966-68 production had increased to an average of 141,000 tons which was 5-6 percent of the world's total. By 1972-74, however, production increased only marginally to 142,000 tons which was then

#### Rubber Replanting Programme

The drop in the country's production is the effect, on the one hand, of the slow progress in replanting, after an initial spurt, and on the other hand the fact that a very significant acreage of rubber was generally beyond the stage of economic exploitation.

Thus, one of the major factors affecting the progress of the industry has been the severe shortfall in the targets of the rubber replanting scheme. By 1978 the

Table 11. Replanted and Old Rubber Acreage as at December 1978  
(Districtwise)

District	Area replanted	Old Rubber Acreage
Colombo	42,367	21,128
Kalutara	84,930	40,124
Galle	33,489	21,995
Matara	11,881	10,559
Hambantota	35	189
Ratnapura	55,079	41,588
Kegalle	101,094	27,658
Kurunegala	7,658	7,209
Puttalam	—	128
Kandy	3,741	12,448
Matale	3,565	16,258
Nuwara Eliya	171	12
Badulla/Moneragala	2,646	13,305
	346,656	212,601

Source: Rubber Control Department

total old rubber overdue for replanting had been estimated at a backlog of about 213,000 acres (see table 11), while the total extent brought under high yielding rubber in the 27 years between 1953-79 was 380,090 acres (see table 12).

The rubber replanting scheme got off to a very good start during the decade 1953-1963 (see table 12). In these first ten years nearly 178,000 acres were replanted, averaging around 18,700 acres per annum. In the years 1956 and 1957 about 24,000 acres were replanted, almost twice the replanting target for those years. But, as official records reveal, replanting has been below targets in all subsequent years and averaged only around 7,100 acres per year in the five years from 1973-1978. The records show that of the 346,656 acres replanted since 1953, about 227,900 acres are in bearing and about 55,000 acres are under seven years old. Despite the fact that the Government has set a target of an annual replanting rate of 15,000 acres and a national need for achieving about 25,000 acres a year the rate of rubber planting in the two years 1977 and 1978 had averaged only about 8,000 acres a year.

The Rubber Master Plan Study estimated that of the privately owned and managed rubber lands 102,000 acres were beyond a state of economic exploitation. Another factor was that the rate of bark consumption, one of the most important factors governing the life of rubber trees, was in advance of the standard and this has reduced the life of the trees from around 30-33 years to about 27-28 years. The Master Plan Study team found that small holdings which were tapped daily had a shorter life span than trees on small and medium estates which were tapped on alternate days. Also, tapping standards in early and midlife of the trees are generally good but exploitation in the late stage is unskilled and wasteful of resources. In 1978 there had been many cases of double cut tapping in midlife and a change of tapping from alternate days to daily tapping, which were being done in order to benefit from the increase in price of rubber. In the long term, however, this was bound to result in a decrease of yields, over the life of the trees. Thus, the moderate increase in production in 1978 reflected an increase in in-

tesity of tapping and not a underlying improvement in the state of the industry. Future production was therefore expected to decline and, with the recommended replanting programme, may not surpass current levels before 1995. The Study team emphasised that there was an urgent need to curb the present tendency to over-exploit medium age rubber and to introduce planned exploitation for maximising yields in later life.

time. There is thus a need both to catch up on this backlog, and to restore replanting rates to the required levels on a continuing basis.

Under this scheme the government contributes to the grower's replanting costs and recovers the money through a cess on exports. Despite the increases in the replanting payment over the years the rate of replanting has fallen

Table 12. ACREAGE IN SRI LANKA PLANTED (NEWLY PLANTED & REPLANTED) UNDER HIGH YIELDING RUBBER 1953-1979

	Newly planted High Yielding Rubber (Acres)	Replanted High Yielding Rubber (Acres)	Total High Yielding Rubber (Acres)
1953	861	5,800	6,661
1954	1,529	18,457	19,986
1955	1,240	20,907	22,147
1956	429	24,585	25,014
1957	2,793	24,229	27,022
1958	2,310	20,638	22,948
1959	2,009	18,532	20,541
1960	1,893	17,893	19,786
1961	1,413	18,685	20,098
1962	684	17,954	18,638
1963	662	15,912	16,574
1964	423	13,552	13,975
1965	644	12,501	13,145
1966	387	11,582	11,969
1967	137	10,086	10,223
1968	586	12,735	13,321
1969	311	12,034	12,395
1970	277	10,239	10,516
1971	588	8,477	8,065
1972	444	8,742	9,186
1973	460	7,276	7,736
1974	85	7,076	7,161
1975	382	7,980	8,362
1976	139	6,299	6,438
1977	83	6,463	6,546
1978	935	7,968	8,903
1979	1,439	10,295	11,734
Total	23,143	356,947	380,090

Source: Rubber Control Department

For an actual area under rubber (as estimated officially) of approximately 560,000 acres, a crop cycle of 33 years implies 3 percent annual replacement, amounting to about 15,000 acres. Assuming that the more rapid consumption of bark, characteristic of small holder tapping, results in a cycle of only 27 years; over 20,000 acres would need to be replanted annually. At the end of 1979 about 356,947 acres had been replanted leaving a backlog of 271,441 acres of overage rubber, taking the theoretical 33 years as the turnover time.

Furthermore, the second replanting cycle of the acreage replanted since 1953 will begin in 1980, taking 27 years as the turnover

below the minimum replacement rate. This trend if continued, will contribute to an even greater accumulation of unproductive tapped out rubber in the 1980s.

The efficient replanting subsidy scheme started in the 1950's was allowed to fall back and various reasons have been adduced; such as uncertainties caused by land reforms, low producer prices, and insufficient promotion of replanting by the authorities responsible for this scheme.

One of the major criticisms of this scheme is that the additional replanting subsidies provided were "too little and too late" to have a significant impact on the rate of

replanting. The first increase was in 1978, from Rs. 2,000 to Rs. 3,000 per acre, and again in November 1979 there was another increase to Rs. 4,000 per acre. When it was realised that this too was not sufficient two further increases were made taking it up to Rs. 6,500 per acre. Doubts, however, were expressed as to whether even these increments were high enough to take the rate of replanting to the target level. Particularly for the smallholders, the problem is that of the long gestation periods when they suffer a considerable loss of income. The subsidies should be effective enough to compensate them fully in such instances. It was precisely for this reason that the Malaysian Government showed a firm commitment to that country's replanting programme by increasing its subsidy rates by over 100 percent in four years, from M\$ 1,000 per acre in 1976 to \$ 1,200 in 1978 and \$ 2,200 in its latest 1980/81 budget proposals.

There were also drawbacks in the functioning of the planting material and fertilizer distribution systems. The Master Plan Study found that they suffered from the twin problems of limited supplies and a poorly organised distribution network. One factor that could have helped to improve output from the existing acreage was a heavier and more timely application of fertilizer. The Finance Minister put the entire problem in proper perspective in his 1980 Budget Speech where he said it was essential that Sri Lanka fully exploited its second largest export industry "by concentrating on a more regular and increased replanting programme and optimum use of fertilizer. Despite a sharp increase in the issue of fertilizer for rubber from 12,440 metric tons in 1977 to 21,000 metric tons in 1978, a threefold increase is necessary if fertilizer in adequate quantities is to be applied to rubber lands."

The need for increases in production have been emphasised in several quarters. The situation was aptly summed up by Dr. B. C. Sekhar, Controller Rubber Research and Development, Malaysia, when he stated, "if at all natural rubber loses out to synthetics and other substitutes, it will not be due to competition from synthetics but because natural rubber production has not expanded fast enough".

Table 13 RUBBER ACREAGE, PRODUCTION AND EXPORT IN SRI LANKA 1940-1979

	Cultivated Acreage	Acreage Under Tapping	Production	Export	Average yield of tapped land
	(In Thousands of Acres)		(Millions of Kgs.)	(Kgs. per acre)	
1940	634	—	109	90	—
1951-54 (Average)	657	612	100	97	163
1955-59 (Average)	663	552	99	94	170
1960	668	522	99	105	190
1161	670	504	98	90	194
1962	567	528	104	102	197
1963	568	525	105	95	200
1964	568	546	112	115	204
1965	569	466	118	121	253
1966	569	476	131	135	275
1967	569	488	143	132	293
1968	569	488	149	149	305
1969	568	494	151	143	306
1970	568	496	159	161	321
1971	568	475	141	129	297
1972	567	470	140	130	298
1973	564	491	155	161	316
1974	563	475	132	128	278
1975	562	482	149	161	309
1976	561	475	152	137	320
1977	560	466	146	136	313
1978	559	456	156	138	342
1979	559	—	153	128	331

Source: Central Bank and Rubber Control Department

As observed in the Master Plan Study too, the need was urgent to curb the present tendency to over exploit medium age rubber and to introduce planned exploitation for maximising yields in later life. Fears are expressed that the continued high prices of rubber may lead to longer exploitation of high level reserves, at yield per tapper below normal economic levels. It has been pointed out that though this may not have a major effect on overall production it could slow down the recommended replanting programme, thus affecting future production. Official estimates indicate a national average of over 700 lbs per acre of tapped rubber. However, this is estimated to range from about 300 lb/acre for smallholders below 10 acres to approaching 1,000 lb/acre for the public sector estates. (See table 13). This compares poorly with Malaysian output where average yields are over 800 kgs per acre (see table 14) and in that country's FELDA

schemes are around 1,200-2,400 lbs. per acre. The steady rise in rubber production of Sri Lanka from about 1960 to an all time high of 159,158 tons in 1970 is largely due to the increased yields obtained from the relatively large areas replanted with high-yielding material between 1953 and 1963. But the present rubber yield remains low, particularly when we consider the potential of the clones and yields that can be expected under modern methods of cultivation. This situation is partly explained by the lower replanting rates.

Moreover, experiments of the Rubber Research Institute with stimulants have not been encouraging, though in the longer term with appropriate fertilizer applications and tapping systems the use of stimulants could give improvements to the industry. Long term experiments with yield stimulants in Sri Lanka have indicated that, for prolonged stimulation, it would be best to aim at yield increases

Table 14

RUBBER YIELD PER HECTARE

Country	Year	Area (Hectare)	Production (M.T.)	Yield (Kg.)
Malaysia	1977	2,003,800	1,613,193	806
Indonesia	1977	2,327,500	835,000	359
Sri Lanka	1975	227,633	148,751	653
Thailand	1974	1,404,160	379,489	270
India	1978	235,910	132,991	564

Source: IRSG, Rubber Statistical Bulletin, April 1980.

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in the order of 20 to 30 percent per year with Ethrel stimulations. It has been recommended that Sri Lanka's immediate targets for the industry should be to re-plant all the senile rubber with recently developed, high yielding clones as soon as possible. This would be the most positive way of increasing production in the coming years in order to benefit from the high prices forecast for natural rubber in the future.

It has also been found out that immature replantings are of good standard in early years, but many suffer neglect in the later years of maturity when there is no incentive or control through subsidy inspections and payment. New plantings which were cultivated before introduction of the subsidy have been generally poor though, from the time the subsidies were introduced in 1953, standards have much improved. In Sri Lanka the time to full maturity is about two years longer than in Malaysia and Indonesia. This is assessed to be due to poor planting material, incomplete application of the recommended fertiliser schedule, and soils and weather conditions in some areas.

#### Organisational Drawbacks

Although the Rubber Controller's Department has encouraged replanting and, more recently, new planting by the supply of planting material and the establishment of an early inspection system, it appears that tedious application procedures have negated to some extent the impact of the scheme. The Master Plan Study thus commented: "In view of the patent inability of the methods and organisation to cope with the existing work load and the requirement for substantially increased replanting rates up to and exceeding those achieved in the early years (8,700 ha) of the replanting scheme a revision of the systems, of the Rubber Control Office was an urgent necessity". The operation of the replanting subsidy scheme has thus been criticised for its cumbersome and slow administrative procedure, and the failure to provide necessary inputs and other services. Added to this is the considerable overlapping of functions, both regulatory and executive, in the institutions servicing the rubber industry. Several Ministries are directly concerned with the rubber industry. The Ministry of Plantation Industries was responsible for various aspects of cultivation; while the

Ministry of Trade both regulates and participates in rubber trading, including primary trading through the Purchasing Depots of the Commodity Purchase Department; and the Ministry of Industries and Scientific Affairs promotes rubber products manufacture. Other agencies include the Rubber Control Department whose functions are essentially regulatory; the Rubber Research Institute which provides research and extension services; the two plantation Corporations SPC and JEDB which operate the public sector estates and are directly under the purview of the President, and the SRMC which is expected to implement the processing development programme of the Government. The Master Plan Study team thus recommended certain broad changes in the institutional framework of the servicing organisation which will coordinate all these functions; and the establishment of: (i) a compact planning and monitoring unit within the Ministry of Plantation Industries; (ii) a Rubber Industry Development Authority to undertake long-term planning of rubber growing, processing and marketing and implementation of agreed plans in the small-holder and private estates sector and coordinate those in the State sector.

The current system of registration of new plantings and existing acreage appears to suffer from several defects. According to the Master Plan Report the problems of the current system for registration will suffer from one central problem which at the present time threatens the effectiveness of the Rubber Control Department, and will have serious deleterious effects upon the viability of the rubber industry. This is the accretion of a vast, uncontrolled and poorly maintained collection of records. It is reported that there are some 255,000 files on individual land within the registration system and that these records are duplicated in 843 registers. The study team was of the view that in such a situation, it appears that no reliance could be placed on the data provided by the Rubber Controller's Department. This system has naturally led to a large discrepancy in reported acres of rubber as shown by the Census data of 1962 and 1972.

#### Inter Cropping

A fundamental problem in raising production, as we observed, has been the failure to maintain a sys-

tematic and consistent replanting programme. One of the major disincentives in this regard has been the loss of income when rubber trees are still not matured. It discourages rubber growers from replanting and this is particularly so in the case of smallholders. Sri Lanka's Rubber Research Institute (RRISL) has been working on various programmes to encourage inter-cropping in the newly replanted areas to help growers to make up for loss of income when their rubber is not in yield. The Institute has shown that various crops could be intercropped successfully in both the wet and dry areas, and that inter-cropping would give an attractive income during the immature period of the rubber plant.

Initially the Department of Rubber Control forbade any form of intercropping under replanted rubber, although some smallholders did plant annual root crops such as sweet potato, yams and manioc. In 1973 the Department withdrew this restriction and interplanting of food crops was allowed under young rubber for the first three years; and it was after this that intercropping experiments gained in importance. RRISL experiments have since shown that coffee, cocoa, banana, passion fruit, pineapple, chillies, vegetables, highland paddy, soya bean and cowpea can be successfully interplanted with rubber, planted at a spacing of 30 x 8 ft. on flat land. Of these, banana, cocoa, coffee, passion fruit and pineapple have been found particularly suitable as they do not require over-all tillage but only weeding round each plant and hence have less erosion risk and can be planted on somewhat steeper slopes. Further, in the dry areas both cocoa and coffee can remain as permanent intercrops.

#### Returns to Investment

Another important consideration is the current profitability of new investment in rubber. The trade was of the view that good rubber land was appreciating in value, particularly with the bright future prospects for rubber and the attractive replanting and other incentives being offered. The Master Plan Study team making Comparative Economic Studies of Rubber, Tea and Coconuts concluded that "since lowland tea and coconuts are major established economic crops which could be grown as alternatives to rubber, comparative analyses were undertaken to

assess which would be expected to give the best return for planned investment assuming average management of an estate operation. Returns to investment were prepared in respect of replanting one hectare

of each crop. At the price levels assumed the economic rates of return of rubber (30.9%) and tea (8.6%) were broadly comparable but the indigenous tall coconuts (8.8%) appeared to be a poor investment. Re-

planting with hybrid, coconuts, not proven in Sri Lanka to any extent, would at 27.5 percent match rubber and tea. When the internal financial rates of return (assuming producer costs and prices) are com-

## Prospects for the manufacture of rubber goods in Sri Lanka

A. de Vaas Gunawardena

Of Sri Lanka's total rubber production of about 150,000 tons only about 6000 tons or 5 per cent is utilised locally for manufacture of rubber goods. Manufacture of rubber products is carried out on a wide scale. The production equipment in general use in the rubber manufacturing sector is far behind European standards; product standards, generally are far below accepted export quality standards.

The government is actively encouraging foreign investment in the industrial sector and generous incentives are offered. Export Processing Zones are being established to facilitate this development. Exports of rubber products from Sri Lanka has averaged around Rs. 2.0 million annually and there are prospects for increasing this. The rubber products market internationally is a highly quality conscious sector. There is every reason to believe, that Sri Lanka can develop and significantly expand its manufactured rubber goods sector to a level at which it is a supplier to World Markets generally, making use of its resources in raw material, labour and power; though there are in-built constraints to this, as discussed elsewhere in this note.

In the context of the present governments package of measures for investment by rubber goods manufacturing companies and the market prospects for these products, significant interest could be generated from foreign companies in this direction. The major areas of investment possibility is seen in Latex dipped goods, Latex thread and domestic products and cycle tyres. As the availability of Centrifuged Latex is very limited at present, investment in the production of Centrifuged Latex is seen as feasible. In the fields of stationery products with the exception of rubber bands, toys and sports products, interest may be developed at a later stage, as the economic advantages at present appears less clear cut.

### Local Consumption

Local demand for rubber averages around 6,000 tons or about 5 per cent of production annually, with about 75 per cent of this being used in the manufacture of new tyres and tyre re-threading. This means that only about 1,500 to 2,000 tons of rubber is used for conversion into general rubber products. The amount of rubber used in the form of latex is very small and has averaged around 500-600 tons annually.

The range of products other than tyres using rubber are cycle tyres and tubes, foam rubber products, rubber fibre products, rubber toys including balloons and a range of miscellaneous products such as erasers, rubber bands, rubber mats, rubber bushes, hoses etc. The whole range of products accounts for not more than 25 percent of local consumption.

In 1978, however, a noticeable increase in the use of latex is seen. The availability of latex for the manufacture of latex based rubber products has also been very limited; only three centrifuges are working in the island, and there is hardly any pre-vulcanized latex available commercially. This is one of the main constraints in the development of the rubber products industry. Local consumption of rubber from 1974-1978 is given in the following table.

### Organisation and Structure

The private rubber goods manufacturing industry is an industry of extremes. There are three fairly large companies employing over 500 people and over

120 companies employing less than 50 people. The only manufacturing company in the public sector is the Ceylon Tyre Corporation which employs about 2,000 people and produces tyres and tubes. Almost all the companies in the private sector have a wide range of products, the only specialisation seen is in the tyre re-treading and latex based product fields.

Of about a total of nearly 150 companies the breakdown in terms of products and product specialisation is:

Tyre & Tube manufacture	1
Tyre retreading only	14
Latex based products only	22
General rubber goods (including retreading & latex products)	108
	145

Of the total of 145 industries 115 units manufacture products from dry rubber while 28 industries are latex based. Two industries manufacture both dry and latex based products. It is to be noted that out of this total of 145 industries, 138 are small scale or cottage level industries.

The major private companies carry out the manufacture of rubber products as part of diversified organisations involving, for example, automobile agencies leading to tyre production. In the context of exporting rubber products, the potential is limited to the very small number of larger companies. Even these companies had to face an environment of restriction and control which resulted in investment suffering for many years.

Local Consumption of Rubber (Metric Tonnes)

Year	Dry Rubber	Latex	Total
1974	5,630	611	6,241
1975	5,685	908	6,593
1976	6,350	917	7,267
1977	5,915	851	6,766
1978	7,624	1,448	9,072

pared, rubber (15.8%) is greatly superior to tea (5.1%) and tall coconuts (6.1%) but would be matched by hybrid coconuts (20.7%). It is concluded from this that too high a level of export taxes is a posi-

tive disincentive to replanting investment. Investment in rubber rehabilitation at prices currently forecast appears to be a sound proposition".

Producer margins have also been

on the increase in recent years (see table 15) but much of this increase could have been neutralised by the growing rate of inflation. Apart from the problem of replanting and productivity and the insti-

The production equipment in general use by rubber product manufacturing firms therefore is some 20 years behind European standards and consists mainly of second hand equipment from developed countries or equipment fabricated through local ingenuity but with little appreciation of technology.

#### Market Aspects

The domestic market for rubber goods in Sri Lanka was a classic example of a captive sellers market with no competition. The market was heavily protected in that imports were not allowed if the product could be made locally. The producers were not competing for the customers preference and the customer did not appear to complain.

In this situation the quality and design of most of the goods offered by Sri Lanka were and are with minor exceptions suitable for a nondiscriminating local market. The explanation appears to be at least in part in the high degree of protection that was afforded to domestic firms, which has had the effect of allowing manufacturers to produce and sell goods of even the poorest quality in the domestic market. It is unfortunate that the approach to the domestic market seems to have been carried over to export markets.

Another striking aspect is the total lack of specialisation in most of the major firms. Even the largest firms produce a bewildering variety of non-complementary products. The net result being that no product has received the attention it needs to keep pace with modern developments. It appears that of the older existing companies virtually no firm in the industry can boast that it manufactures a range of items that could compete on equal terms with products sold in the international market. Entry into exports will require process control to be strictly adhered to, in order to ensure a regular and guaranteed product quality. An International Trade Centre (ITC) expert in 1973 commented on the Sri Lanka rubber products industry in

the following terms: "that there is virtually no firm in the Ceylonese rubber industry that is properly geared to exporting".

#### Product Quality

The quality and other aspects that require improvement in regard to product ranges are briefly dealt with here.

##### — Automobile Tyres and Tubes:-

The present range of tyres offered from Sri Lanka is not suitable for any sophisticated market. Sri Lanka tyres are old fashioned when compared with the move towards radical ply tyres.

##### — Bicycle Tyres and Tubes:-

The quality appears to be acceptable, but if exporting is seriously considered production should cover a complete range of tyres and tubes. The tyres manufactured by two leading firms appear to be of reasonable quality but have a dull finish and the patterns are not sharp.

##### — Pharmaceutical Rubber Goods:-

The local products are of very poor quality and of an obsolete design and type. The surgical gloves are badly manufactured in that there are drip marks on the surfaces, indicating bad flow properties and in addition, the thickness is not consistent. The baby teats and soothers too suffer from similar drawbacks and are sticky, uneven, rough and discoloured. They should be translucent and colour should be regular throughout and the finish smooth.

##### — Rubber Sandals:-

The market is highly competitive, and sandals needs re-designing with different colours. The shoes produced by most firms are not upto the required standards in design and production.

##### — Foam Rubber:-

Foam rubber mattresses produced are of acceptable quality, but face competition from Dunlopillo. However, the covering material must be of good quality.

— Rubber Sheeting:- Rubber sheeting produced is of good quality but this product appears to be outdated as more use is made of plastic sheeting.

— Rubber Toys:- Rubber balls produced are too heavy, do not bounce easily and colouring is unattractive. The balloons to be competitive must be comparable to manufactures of other international producers.

— Rubber Hose:- One of the biggest manufacturers and exporters exports 600,000 to 700,000 feet per year. This type of hose is not braided and has a limited market.

— Moulded Rubber Goods:- One leading firm produces a wide range of products i.e. automotive components, cycle parts and items for domestic use. For competition in export markets, specially automotive parts require oil resistance and for this synthetic rubber is required. Also the foreign automobile manufacturers specify very high quality standards, and this would require equipment such as injection moulding equipment.

A general comment that could be made in regard to manufacturers for export is that marketing as a concept has not been fully understood and has not been generally applied. Packaging materials and standards adopted are of a very low nature and there appears to be no background or experience of the requirements of a sophisticated market in respect of product presentation.

#### Exports of Rubber Products

Exports of manufactured rubber products from Sri Lanka in 1978 totalled about Rs. 2.9 million. The bulk comprised of un-hardened vulcanised rubber articles totalling 206 tons at a value of Rs. 2.7 million. The main importing countries are the EEC. It is to be noticed that there has been no substantial increase in the export earnings from rubber products over the period 1974-1979.

tutional framework, the other major areas in need of attention are research, marketing and the specific problems associated with the smallholder.

#### Rubber Research

Future market conditions for natural rubber producers appear quite promising. In this context particularly, the strengthening of the rubber research programme and its supporting service institutions in this country are an urgent necessity. The development of the rubber industry calls for a constant and sustained promotional effort, since maintenance of production requires that rubber trees be replanted every 26-33 years on a planned annual replanting programme. In Sri Lanka research possibilities have always existed for production of improved planting material suited to our particular ecological conditions through improving propagation methods and better husbandry techniques. The Master Plan Study team indicated that in Sri Lanka the research and development effort was not sufficient to support a substantial increase in production. It appeared that while in other major rubber producing countries key advances in production had been almost entirely a result of substantial investment in research by the industries and Governments of those countries, in Sri Lanka it was not so. The government has now realised it and the Minister of Plantation Industries has made a positive commitment in this regard. The scientists at Sri Lanka's Rubber Research Institute, the oldest such research institute in Asia, have done their best possible with the meagre resources made available. When the Minister visited the Institute's headquarters recently he was told of the problems arising from the lack of resources and he showed concern over this situation.

Another major constraint on the progress of rubber research in Sri Lanka according to the Master Plan Study, has been the unsatisfactory siting of the RRI's main research station at Darton Field Estate, Agalawatte. It has been found that the land here was topographically unsuited for sites for laboratory buildings, and housing was very restricted by the steep terrain, the location was uneconomical for access to the main rubber plantation areas, while local supporting services were poor especially for education. The Study team has gone to the extent of suggesting that heavy additional expenses at this

site would be "shortsighted policy" and a more appropriate long term policy would be to build a station on a more suitable Government owned rubber estate, while retaining the Darton Field site as a sub-station.

The development of a new site for the RRI and expansion of research activities had been justified by the long term prospects for rubber as the second largest export industry in the country, and also on the basis of long-term price forecasts and its major contribution to the livelihood of large numbers of families in the smallholder and private estate sectors and in State estates employment.

The need for added emphasis

sources for: Plant breeding and selection of clones; field testing of clones on commercial plantations; plant/soil/water relationships; soil conservation; propagation from single node leaf cuttings to give self-rooting clones; propagation by tissue culture; field diagnosis and control to root diseases; nitrogen fixation by rhizobial inoculation; and record keeping.

A strengthening of the cadres of professional staff has also been recommended. A separate Advisory Services Department of the RRI for small holders and private estates has been recommended as the existing Advisory Services Department has been found to be understaffed and under-equipped to deal with about 160,000 small holders

Table 15. RUBBER COST PRICE AND PRODUCER MARGINS IN SRI LANKA  
RUPEES PER KILOGRAM 1955-79

	FOB Price All Rubber	Colombo Market Price RSS No. 1	Cost of Production	Producers Margin
Average 1956-59	3.08	2.64	—	—
1960	3.58	2.73	1.65	1.08
1961	2.89	2.23	1.61	.62
1962	2.81	2.16	1.55	.61
1963	2.67	7.05	1.63	.35
1964	2.51	1.98	1.63	.42
1965	2.50	2.01	1.61	.40
1966	2.49	1.96	1.60	.36
1967	2.13	1.74	1.57	.17
1968	2.22	1.96	1.58	.38
1969	3.03	2.29	1.57	.72
1970	2.73	2.01	1.52	.49
1971	2.38	1.74	1.62	.12
1972	2.05	1.78	1.69	.07
1973	3.68	2.59	2.18	.41
1974	5.75	2.82	2.31	.51
1975	4.06	2.88	2.44	.44
1976	6.50	4.34	2.97	1.37
1977	6.58	4.53	3.75	0.78
1978	14.64	6.92	4.84	2.08
1979	19.42	9.12	6.50	2.62

Source: Central Bank and Rubber Control Department.

on R & D also becomes evident by the fact that because of neglect in sustaining the annual rubber replanting programmes there will be a severe decline in production in the 1980's as was shown in table 2. This situation will require an accelerated replanting programme in the next few years and from the 1990's there is expected to be an upsurge in production with output expected to increase by as much as 45 percent over the next 25 years. This would require a far more serious and intensified research effort. Specific areas, where strengthening of Research and Development were necessary, have been identified. In the Biological Department, for instance, the R & D effort was found to be inadequate and the Master Plan Study team has recommended additional re-

and the private estates.

The structural changes in the plantation industry appear to have had an adverse impact on the progress of R & D in the rubber sector. The Master Plan Study team in drawing attention to this situation has indicated that the wide climatic range of rubber planting in Sri Lanka requires a corresponding range of test-sites for planting materials, methods of pest and disease control, and other agronomic practices. The Rubber Research Institute, since its founding in 1924, established a tradition of working closely with many large and well-managed estates. Experiments were planted and recorded under the supervision of the research staff, but were tapped and tended as part of the estate crop.

In the last decade of extreme

political change, in which large estates were nationalised or broken up, many long-term experiments were lost and the maintenance and recording of the remainder became much more difficult. Three Government owned estates, which had been directly managed by the Rubber Research Board and were devoted intensively to field experiments, were taken away from the research organisation. The estates were placed under the control of the new State Corporations. Two of the managements have agreed to continue any of the trials, but on the third estate, which contained important components of the research programme all recording ceased, according to the findings of the Master Plan Study team.

The long established close relationship with the plantation industry, by which the findings of the research were distributed, have also been disrupted; though progress has been made in establishing working arrangements with the two State plantation authorities, the JEDB and SLSPC. The discontinuities of management and the unsettled conditions following from the land reforms have thus caused disruption of experimental progress, with a loss of information and wastage of past efforts. The RRI staff and the present plantation managers have succeeded, however, in resuming a number of long-term trials.

There is now an urgent need to establish a more organised flow of information from research to plantation managements. A more vigorous lead by the RRI is needed with production and frequent up-dating of advisory pamphlets, prepared jointly by the Research Institute and the Advisory Services. At present, decisions on replanting and other developments are reported as being made with inadequate consultation and without sufficient understanding of the information now available for the improvement of production.

Crop nutrition has also been neglected in certain areas; with the disruptions of the past 10 years, many records of past estate applications had been lost. This situation has required more active diagnostic techniques of fertiliser requirements and active attempts are now being made by the RRI in this regard, according to the Study team. They have found, however, that a far more important constraint on plant nutrition in Sri Lanka is the absence of adequate fertiliser distribution ar-

rangements beyond a 20-mile radius from Colombo. This, together with the reluctance to invest which has prevailed over the past ten years, has resulted in a serious need to restore soil fertility over large areas of rubber, a task for which existing knowledge is sufficient for practical guidance.

The Master Plan Study which showed much concern for the role of the RRI's Rubber Chemistry and Technology Department indicates that Malaysian studies had established that there were very real prospects of prosperity for the natural rubber industry provided increased production of standardised grades of raw natural rubber could be achieved. The Study team expressed fears that the main threat to this bright future was that the natural rubber industry could be too slow in its improvement of both standardisation and overall output, so that the world industry could be forced to invest further in substitutes. It has been suggested that Sri Lanka's RRI staff, therefore, should concentrate on methods to achieve more closely standardised qualities of rubber to meet the rising demands; rather than be concerned with any aspects of promotion and diversification of the sales of rubber internationally. Sri Lanka had already established a special world position in the supply of high quality rubber, particularly crepe, and it was most important that continued research and development helped the country to retain this position.

What appears to be the RRI's greatest immediate need, however, was more qualified and competent staff. The Institution will be called upon to provide the mainspring for the industry to upgrade and standardise Sri Lanka's rubber and this would require staff fully conversant with the manufacturing properties and service qualities of various grades of raw rubber. The Director of the RRI had suggested that over the next 10 years that this Department should more than treble its specialist cadres.

Another urgent requirement is found to be more up-to-date and specialised equipment, particularly for improvement and standardisation of the country's raw rubber production. The Study team found that the RRI had most of the necessary equipment but much of it very old, for example, a 75 year-old cast iron autoclave is in regular use, their latex centrifuges have done 30 years of service, and eight of their major pieces of

equipment (including the main boiler) are more than 25 years old. Supplementation of this equipment with modern machinery, and the replacement of worn-out items, is clearly a first priority.

### Marketing

Future prospects in the world rubber market point to an increasing disparity between projected production and consumption; and as a result consumption is expected to increase at a higher rate than estimated production. This situation not only offers opportunities for producers to step up planting and to rehabilitate existing plantations; it also offers them a challenge to maximise the returns from all available sources of rubber production. The marketing function could play a vital role in this regard.

In the background of a present estimated total world production of natural rubber of 3.8 million tonnes and a synthetic rubber production of about 8 million tonnes, Sri Lanka's production is as low as 4 percent of the world's total natural rubber produced. World production increased by 44 percent in the decade 1967-77 while total consumption increased proportionately. Upto 1990 total world elastomer consumption is projected to increase by about 4.5 percent per annum. In the decade 1967-77 Sri Lanka's production remained static and its share of the increasing world production fell from 6 percent to 4 percent.

Over the years Sri Lanka has established an international reputation as a producer of high quality rubber, in conformity to the standards defined by International Standards of Quality and Packing for Natural Rubber Grades of which the Colombo Rubber Traders Association is an endorsing organisation, alongside similar organizations in all the major producing and consuming countries. Sri Lanka produced 153 million kgs. of rubber in 1979 of which about 92 percent was exported in the form of Sheet Grades (RSS) (56.99%); Latex Crepe (26.64%); Scrap Crepe (10.22%); Block Rubber (3.73%); and Sole Crepe (3.31%). Only 5.7 percent of the total production is domestically consumed reflecting the low level of industrialization. (See tables 16 and 17).

In Sri Lanka approximately 95 percent of the smallholders sell processed rubber, the remainder disposing of their production as latex. Processing is either under-

Table 16 RUBBER AREA AND PRODUCTION 1910-1979

Year	Registered Area (Acres)	Smallholdings below (10 acres)	Percentage of smallholdings below 10 acres	Production (M.T.)	Exports (M.T.)	Export as Percent of production	Foreign Exchange Earnings (Rs.'000)
1910	188001	5000	2.7	N.A.	1697		19,634
1920	460643	68295	14.8	N.A.	39500		89,961
1930	582247	120696	20.7	N.A.	76000		47,158
1940	636936	131992	20.7	107000	88000	82.2	113,111
1950	655225	171542	26.2	113500	118525	104.4	N.A.
1960	668948	192557	28.8	97276	104733	107.7	N.A.
1970	674335	209014	31.0	159158	154051	96.8	N.A.
1975	652802	214728	32.9	148751	160874	108.2	653,500
1976	651157	216116	33.2	152133	136932	90.0	889,586
1977	651157	216116	33.2	146243	134529	91.9	930,646
1978	650819	216572	33.3	155662	138045	88.7	2,02,544
1979	651531	216825	33.3	152704	128209	83.9	2,491,368

Source: Rubber Control Department

taken by themselves or by using private facilities or at Group Processing Centres. The private processing yields the poorest return to the producer due to poor processing and partly to limited bargain-

ing power when selling either to a licensed dealer or to the Department of Commodity Purchase. Most of the Ribbed Smoked Sheet (RSS) is produced by smallholders and the private sector whilst the Jana-

tha Estates Development Board (JEDB) and the Sri Lanka State Plantation Corporation (SLSPC) concentrate on producing high quality crepe, of which Sri Lanka produces 70 percent of total world

## Transnational Corporations in the Rubber Industry

### A. de Vaas Gunewardena

Natural rubber is a strongly export-oriented commodity with less than 10 per cent of production being absorbed into manufacturing processes in the producing countries. World natural rubber production is dominated by four Asian developing countries, and in turn, natural rubber is crucial to the export performance of each of these four countries: Malaysia, Indonesia, Thailand and Sri Lanka. Rarely has the proportion of foreign exchange earnings as a proportion of total export earnings, fallen below 10 per cent in any of the four countries and it has ranged at highs of 23 per cent for Thailand to 64 per cent for Malaysia. In this context transnational corporation activity in the rubber industry is of significance and interest.

The initial phase of the transnational corporation (TNC) involvement was around 1900—1920, which period saw the rise of the TNC estates. The demand for rubber, stimulated by the growth of the automobile industry and other rubber using industries in the industrialised countries, induced this involvement. The TNCs acquired land for rubber production, controlled processing and also internal and international marketing chan-

nels. The Agency Houses of the TNCs exerted a strong influence; originally acting for the foreign rubber companies as merchandise agents, they soon extended their activities to secretarial and management functions, which also involved organising of estate activities.

The rise and development of transnational corporation estates in the rubber producing countries of Asia followed a somewhat similar pattern, though there were some variations. Initially it was the small United Kingdom proprietary companies that started operating specially in Malaysia and Indonesia but due to difficulties in mobilising sufficient funds London based companies were formed during 1905—1915, the boom period to secure the necessary finance for the clearing and planting of large tracts of land.

In Sri Lanka two types of companies were formed almost simultaneously. One was the Sterling Company which was incorporated in the United Kingdom, with the shareholders being mainly United Kingdom nationals, and around the same time the Rupee Companies was formed which was similar to the proprietary companies of Malaysia and Indonesia and was owned by United Kingdom nationals. Thailand, entering the industry

at a much later date, has avoided this trend.

By the inter-war years the merchant houses which were active in the transformation of proprietary concerns into public London based Companies extended their operations to secretarial and management functions. By the 1950s the leading agency houses increased their ownership of rubber companies. The end result was that the indirect agency control was transformed to a holding company arrangement. Through this system the agency houses continued to retain their dominant position until the 1970s. The Agency Houses between them controlled four fifths of the foreign owned estates in Malaysia in 1961; while in Sri Lanka by 1970 an estimated 27 per cent of national production, and 25 per cent of the acreage was handled between the sterling and rupee companies. The Agency Houses controlled the rupee companies through interlocking directorships between plantation companies and Agency Houses.

Following the post-war period of independence in these countries the TNC estate area began to contract. The main factor contributing to this shrinkage in TNC involvement in cultivation of rubber has been the nationalisation policies and programmes of Governments of these coun-

production. It is processed either into Sole Crepe of Thick or Thin Pale Crepe, enjoys a prestigious reputation internationally, and in turn commands premium prices. Sri Lanka began the processing of block rubber only recently; the quality of which is technically specified to Sri Lankan Rubber (SLR) standards. Three factories produce block rubber to SLR specification. In 1979 the TSR produced locally was about 13,000 tonnes or 10 per cent of local production. Licenses have been granted for an additional eight block rubber factories with total capacity of 44,200 tonnes.

Internal marketing of rubber can be broadly divided into RSS, Crepe grades and Block rubber. Most of the RSS which is produced by smallholders and privately owned estates, comes under the

tries. These programmes were aimed at boosting rural incomes, foreign exchange earnings and other targeted objectives which sought to increase the benefits to those countries from their own rubber industry. The action taken in regard to TNC involvement in the rubber plantations formed a part of this broad programme.

Land which is basic to the rubber industry received intense attention from the Governments of the main producing countries in the 1970s in their efforts at redistribution of assets. Under the Land Reform Laws of 1972 and 1975 Sri Lanka embarked on a wide ranging programme of land reform which resulted in the expropriation of foreign rubber estates. A similar pattern was followed in Indonesia and foreign estate acreage was largely taken over by smallholders and the State Plantation sector. In Malaysia, however, the government programme of action of opening up large tracts of lands through the Federal Land Development Authority (FELDA) is not directly concerned with TNCs. Therefore the effects have not been as far-reaching as in Sri Lanka and Indonesia, as the FELDA programme alienates undeveloped land to the smallholder and as such does not encroach upon the TNC holdings. In Thailand, however, from the infancy of the industry foreign-

government control through an arrangement made and operated by the Department of Commodity Purchase. Commodity Purchase (DCP) is a misnomer in that the Department only deals in rubber, operating through the 50 divisional purchase depots throughout the rubber producing areas, and publishes daily purchase prices based on Singapore FOB closing prices for the previous day, less deductions for duty. Local dealers compete for available supplies with the DCP. The DCP handles only 30 per cent of its commitment to supply the Chinese commitment whilst about 70 per cent is handled by private dealers. The DCP has statutory obligations, both to compete for initial supplies and in the case of RSS 1, 2 and 3 a monopoly for ultimate shipment overseas. There is a degree of incompatibility bet-

ween these two objectives. The DCP is efficient in the provision of market intelligence but not so in its participation in physical trading. Depot coverage of the rubber growing areas does not appear adequate. There is also a need to remedy deficiencies in transport and grading capacity. The grading procedures in the field tend to result in smallholders rubber being undergraded while the DCP benefits from upgrading at the point of export. There are reported instances of the sheet remaining at the DCP depots under unsuitable storage conditions for several weeks because of transport deficiencies, resulting in quality deterioration due to extensive mould growth. Mouldy, long stored sheet causes grading delays at the central stores, which in turn, result in more

ers have been prohibited from owning rubber lands. Though the TNCs have ceased to play an important role in the cultivation of natural rubber, TNC influence has tended to remain quite strong in the processing, distribution and marketing of natural rubber. Many companies, very often with their parent companies located abroad, are responsible for the bulk of processing and marketing natural rubber. Shipping lines serving these countries are TNC dominated, and the international marketing of natural rubber is a complex process with many agents of foreign consuming countries tending to determine rubber prices. World rubber goods manufacturing is almost entirely in the hands of enterprises located outside the natural rubber producing countries. In more recent years, it is seen that the TNCs have played an increasingly diminishing role in actual cultivation of rubber but has increasingly controlled the local manufacturing of rubber goods. The recent surge in the manufacture of rubber goods in rubber producing countries is linked to Transnational Corporations in the manufacturing sector extending their interests into these countries.

Several firms with transnational connections were operating in the rubber producing coun-

tries; five well known transnationals operating in Malaysia, Indonesia and Thailand at the end of 1975 being Goodyear, Dunlop, Bridgestone, Firestone and Bata. Transnational corporations in the Malaysian rubber goods manufacturing industries started in 1936 with the entry of Bata for the manufacture of footwear. This was followed by Dunlop and Goodyear for the production of tyres. The dominance of Dunlop and Goodyear is such that these two account for virtually all of Malaysia's domestically produced automobile, truck, tractor, aircraft and earthmover tyres, and more than one third of motorcycles and bicycle tyres. With the entry of Bridgestone in 1975 to Indonesia, Goodyear and Bridgestone with the state owned Intirib produce the entire auto and truck tyre output. Tyre production in Thailand too is dominated by TNC interests which include Firestone, Bridgestone and Goodyear. Apart from the manufacturing of tyres, in other areas such as footwear, dipped goods, moulded goods and latex thread too the investment is concentrated in TNC connected firms. It is apparent that TNC involvement in the actual cultivation of rubber has been ended, only to be replaced with an equally commanding position in the rubber goods manufacturing industry.

mouldy sheet and further down grading.

Rubber like tea passes through auctions held twice weekly in Colombo and are administered by the Ceylon Chamber of Commerce. Not all rubber comes into the auctions. Sheet rubber grades 1, 2 and 3 are the monopoly of the DPC, all crepes are sold at the auctions and TSR negotiated direct between buyer and manufacturer.

The Rubber Master Plan Study identified three main areas of concern relating to rubber marketing:

(a) future of Sole Crepe in the light of a feared decline in world demand; (b) the need to upgrade quality of RSS, particularly that originating from small holders; (c) future policy with regard to producing of a higher proportion of Block rubber, to comply with specifications determined by the Rubber Research Institute.

It has been suggested that as a safeguard against the possibility of decline in demand for Latex Crepe rubber in traditional form, further study be carried out to identify the form of block rubber offering the most favourable economic advantages. More than 30 percent of total production in Malaysia is now produced in block form as Technically Specified Rubbers and similar developments were being carried out in other producing countries. There was considerable potential, therefore, for Sri Lanka to increase its volume of Block rubber once the envisaged decline in rubber production was reversed and began to surpass present levels.

There is uncertainty that a continuing favourable market will exist for between 50,000 - 55,000

tonnes of Latex Crepe. There seems to be a need for exploring production of latex grade of crumb rubber with a high technical specification which can also be produced once output of the larger estates recovers and expands beyond present levels.

The RSS produced by small holders, however, is expected to enjoy a stable market but if maximum prices are to be achieved attention would have to be focussed on improving quality. In the meantime sufficient quantities of low grade RSS and scrap rubber will have to be made available to the crumb rubber factories, if they are to continue operating as viable units. There appears to be a conflict of interests in this situation and thus in considering a future market strategy a certain inbuilt flexibility for producing blocked crepe and crumb rubber and also taking advantage of periodic shifts in consumption will have to be provided for.

The need to export rubber in more value added form has been discussed for several years but no serious steps have been taken in this direction. The offer of a 50 percent reduction in the export duty on "Camel-back" (a semi-processed rubber product manufactured locally) in the recent Budget Speech could help to boost the proportion of processed rubber exported. (see box on new incentives for production and exports). The importing countries utilize Sri Lanka's raw rubber for manufacturing various rubber products, but this has not been possible so far on a considerable scale, within

this country. Although the technology is known it is not possible to move into sophisticated processing techniques and enter the available foreign markets without joint marketing arrangements with firms having links with users. This is why there are only a handful of full-scale rubber companies in existence. The US has a dozen, Japan two, Britain one; and the developing world — none.

#### Rubber Processing

Processing before export is considered by many policy makers in developing countries to be one way of increasing their export earnings from commodities, a means of diversifying production and of promoting industrialization in their countries. The potential, no doubt, is vast for additional earnings to developing nations through the processing of their commodities before export. Rubber for example almost doubles its gross earnings over the second stage of processing (see table at top of page 23).

According to UNCTAD figures, 90 per cent of developing nations' exports of coffee, rubber, manganese and tobacco are in raw form and only one-third of the commodity groups have a share of semi-processed and processed forms exceeding 50 per cent. The share of the developing world's exports of processed and semi-processed commodities is increasing but, except for a few product groups, at a slow pace. Attractive as processing may seem, Third World countries have been discovering that it is not as sure a route to more export earnings as may have first

Table 17.

#### MARKETING OF SRI LANKA RUBBER (metric tons)

	1977	Change over '76	1978	Change over '77	1979	Change over '78
<b>Exports</b>						
Smoked Sheet	...	...	...	...	...	...
Latex Crepe	...	...	...	...	...	...
Scrap Crepe	...	...	...	...	...	...
Sole Crepe	...	...	...	...	...	...
TSR	...	...	...	...	...	...
Total exports	134,530	-2%	138,045	+3%	128,209	-7%
Percentage	(92.0)		(88.7)		(84)	
<b>Local Consumption</b>						
Dry Rubber	...	...	...	...	...	...
Latex	...	...	...	...	...	...
Total Consumption	6,766	-7%	9,072	+34%	10,617	+17%
Percentage	(4.6)		(5.8)		(7)	
Total Production	146,243	-4%	155,662	+6%	152,704	-2%

Figures in brackets represent percentage of total exports for the year.

Source: John Keels Rubber Statistics 1979 and Ceylon Chamber of Commerce Annual Report.



**ESTIMATED ADDITIONAL EARNINGS TO DEVELOPING COUNTRIES  
THROUGH LOCAL PROCESSING OF COMMODITIES**

Commodity	additional gross earnings (millions of dollars)	
	at first processing stage	at second processing stage
<b>Natural Rubber</b>		
1. Sheets, plates, tubes		
2. Rubber tyres ...	1,300	2,000
<b>Copper</b>		
1. Refined copper		
2. Rods, wires, tubes sheets ...	230	970
<b>Bauxite</b>		
1. Aluminium ingot		
2. Semi-manufactures ...	4,400	5,800
<b>Cotton</b>		
1. Grey cotton yarn		
2. Finished fabrics ...	1,300	2,600
<b>Non-Coniferous wood</b>		
1. Plywood, sheets, etc. ...	3,400	

Source: UNCTAD Secretariat, *The Processing Before Exports of Primary Commodities*, Geneva 1979.

appeared. Nor has it turned out to be a sure road to development.

There are several reasons for this situation. In a product such as rubber goods there are less than 10 'big' manufacturers spread across the world today. Any new producer hoping to break into international markets would have to compete with these giant manufacturers-to match them in their sophisticated technology, their R and D, their financial strength and their market power, which is a formidable task. So great is their influence that barriers both tariff

and non-tariff are being incessantly applied in the markets of the industrialized North against processed commodities from the developing countries. Developing nations have increasingly tried various means to circumvent the rising protectionism of the industrialized countries such as embarking on joint ventures, based in the developing countries, with the transnational firms. In Sri Lanka too, the Tyre Corporation, the only public sector venture in rubber goods manufacture, has entered into a 5 year technical collaboration ag-

reement with M/s. B. F. Goodrich and Company (signed on 25.07.79) with the hope of reaching internationally accepted standards and entering foreign markets if possible. Several studies of rubber goods manufacture in Sri Lanka have indicated that a basic drawback in our local rubber products was the very poor quality and design of most goods when compared with the products of firms having transnational connections. (See boxes on Manufacture of Rubber Goods and on Trans National Corporations in the Rubber Industry).

Third World planners have become increasingly aware, however, that in return for the financing needed for high cost processing plants and for the required technology, they are paying a steep price in increased dependence on the industrialized world. But if they are to industrialise in areas such as rubber there seems to be no alternative.

**Smallholders**

About 70 percent of all rubber growing land all over the world belong to smallholders, and Sri Lanka is no exception. The smaller private sector estates and small holdings account for at least 75 percent of the land under rubber in this country, and for about 65 percent of total production. There is little need therefore to emphasise the vital importance in framing policies specifically geared to meet the needs of the small holder. As

**Table 18. EXPORTS OF SRI LANKA'S RUBBER BY DESTINATIONS**  
(in metric tons)

Country	1976			1977			1978				1979			
	Sheet	Crepe	Total	Sheet	Crepe	Total	Sheet	Crepe	Block	Total	Sheet	Crepe	Block	Total
China ...	65,194	9,294	74,488 (55.3)	61,026	3,010	64,036 (47.6)	62,148	366	13	62,527 (45.3)	44,393	255		44,648 (34.8)
German Democratic Republic ...	-	377	1,082 (.8)	-	885	885 (.7)	-	734	20	754 (.6)	-	310		310 (.2)
Federal Republic of Germany ...	4,175	4,667	8,842 (6.6)	5,620	4,696	10,951 (8.1)	2,400	7,008	1,316	10,724 (7.8)	2,325	4,122	4,791	11,238 (8.8)
Italy ...	760	8,685	9,444 (7.0)	1,255	6,961	8,841 (6.6)	180	6,883	1,613	8,676 (6.3)	90	7,603		7,693 (6.0)
Pakistan ...	2,659	2,739	5,398 (4.0)	1,458	3,620	5,078 (3.8)	3,602	4,348	97	8,047 (5.8)	3,697	3,611	206	7,514 (5.9)
Poland ...	60	3,972	4,032 (3.0)	1,149	6,229	7,378 (5.5)	3,828	7,175	20	11,023 (8.0)	4,609	6,377		10,986 (8.6)
U.S.A. ...	3,705	4,039	7,744 (5.8)	6	4,652	4,778 (3.6)	-	4,823	471	5,294 (3.8)	596	4,173	940	5,709 (4.5)
U.S.S.R. ...	-	10,798	10,798 (8.0)	-	7,831	783 (5.8)	650	6,275	6	6,931 (5.0)	5,490	10,019	200	15,709 (12.3)
Others ...	1,337	12,290	12,823 (9.5)	6,538	17,769	24,752 (15.4)	4,626	17,843	1,600	24,069 (17.0)	1,411	16,024	6,967	24,402 (19.0)
<b>Total ...</b>	<b>77,890</b>	<b>56,861</b>	<b>134,751</b>	<b>77,052</b>	<b>55,653</b>	<b>134,530</b>	<b>77,434</b>	<b>55,455</b>	<b>5,156</b>	<b>138,045</b>	<b>62,611</b>	<b>52,494</b>	<b>13,104</b>	<b>128,902</b>

Figures in brackets represent percentage of total exports for the year.

Source: *John Keels Rubber Statistics 1979 and Ceylon Chamber of Commerce Annual Report.*

the Director of the Rubber Research Institute has pointed out (see box on smallholders) the problems of the rubber smallholder, like that of most agricultural smallholders, is basically one of lack of finance and the other resources available to the bigger producer. The end result is that his yields per unit planted are generally only half that of the larger estates; his agronomic and management practices are poor; he lacks the necessary inputs such as planting material, fertilizer implements and extension services; the size of his holding is uneconomic; he cannot afford to replant and modernise,

and he is unable to produce high quality sheet rubber.

In the case of RSS it is the buyer who determines the grade and the smallholder has little power to influence this. It is widely believed that both dealers and depot managers tend to downgrade smallholders' RSS, the former to raise their profit margins and the latter to minimise the consequences to themselves of any error of grading. A sample survey has shown that 86 percent of smallholders sell their sheet to the Licensed Dealer in preference to the depots. However, the smallholder rubber is not of a very high quality due to

various deficiencies and technical defects and for all those reasons much of their rubber is graded as RSS 3 and 4. Some of the smallholders dispose of their rubber even to unregistered dealers and other middlemen due to various circumstances. However, it was estimated that in 1978 about 85 percent of the RSS and almost 100 percent of the scrap produced by smallholders was sold to private dealers licensed by the Rubber Controller. Much of the balance RSS was bought by the Commodity Purchase Department through its 50 depots distributed across the rubber growing regions; but these depots have

## Concern for Rubber Smallholders

Dr. O. S. Peiris, Director Rubber Research Institute

Anybody interested in the natural rubber industry is immediately aware of the importance of the Smallholder to the industry, because about 70 per cent of all rubber growing land all over the world now belongs to Smallholders. (Table 1), and in some countries like Thailand, practically all rubber land belongs to small growers.

The Association of Natural Rubber Producing Countries (ANRPC) from its very inception, took a keen interest in this category of producers: and since 1975 it has organized seminars in various producing countries to discuss the problems of smallholders and formulate measures to assist them overcome such problems. (The fourth such seminar was inaugurated on July 17, 1980 in Sri Lanka).

The main problems of the rubber smallholders are that although they own upwards of 70 per cent of the total 7 million hectares of land where rubber is grown in the world now, their yield per unit area is only about half that of large estates.

This is caused by several social, economic, marketing, institutional and other factors, not the least of them being the very location of small-holdings, which are often in remote areas, where road and transport facilities are limited if not lacking altogether.

The main problems facing the smallholder are: (a) the uneconomic size of the holdings (often less than 1 acre in extent), (b) lack of capital to effect improvements and (c) poor agronomic and management

practices, which may be often linked to his financial limitations that preclude him adopting better methods of husbandry.

The increase in the total production of Natural Rubber (NR) in the world is very important now, in view of the high prices and limited availability of crude oil, which should therefore be conserved as far as possible for the supply of energy. NR

that there will be substantial shortfalls in the production of NR against demand in the years to come; and we will not be in a position to satisfy demand by several million tonnes in the immediate future.

Of course, any increase in production, must clearly bring the rubber smallholder into the picture, as he owns a majority of the rubber land: and it is on his holdings that a significant impact can be made in increasing yield, because certain technologies for increased production

AREA PLANTED WITH RUBBER IN DIFFERENT COUNTRIES (Hectares)

Country	Year	Total Area Planted	Small Holdings	% in Small Holdings
Malaysia	1977	2,003,800	1,360,000	67.9
Indonesia	1977	2,327,500	1,862,035	80.0
Sri Lanka	1975	227,633	121,997	53.6
Thailand	1974	1,404,160	1,333,952	95.0
India	1978	235,910	175,536	74.0
Vietnam	1965	100,000	75,297	75.0

Source: IRSG Rubber Statistical Bulletin, April 1980

on the other hand is a renewable resource, it is a non-polluting industry and it provides a livelihood for millions of people, particularly in the less developed countries.

Recent forecasts for the demand for NR are extremely encouraging. The demand for NR in 1980, 1985 and 1990 has been forecast as 5.2 million, 6.7 million and 8 million tonnes, respectively. The importance of an immediate attempt to increase production is all the more significant in view of a study carried out by the ANRPC, based on agro-economic norms of NR, which has shown that the future supply of NR would be only 4.2 million, 5 million and 5.8 million tonnes in the years 1980, 1985 and 1990, respectively.

Therefore, the chances are

already available, which the small-holder does not use because of various constraints.

The problems of smallholders stem primarily from their very small sizes and their wide scatter. These preclude them from obtaining the necessary inputs like planting material, fertilizers and implements on the one hand, and contact with extension personnel on the other. The small size of the holding results in poor manufacturing methods and limited incomes so that the finances necessary for fertilizers and other agrochemicals are lacking.

A smallholder may often lead a day-to-day existence by selling his day's produce to the nearest buyer, who very often exploits him. This prevents him from bargaining or keeping his

a major disadvantage as against the private buyer who extends ready cash to their suppliers. Of approximately 110,000 tons of RSS produced by the smallholders/private sector in 1978 as much as 98 percent was estimated to have been processed in small units, privately owned, capable of handling upto 250 kg. of crop per day. The balance 2 percent of RSS production was processed in the Group Processing Centres operated by the RRI.

For most smallholders rubber is not the only crop they produce. For many of them, however, rubber has become an important and re-

produce to be sold on a day that prices are most favourable to him.

Finally, the most important factor to increasing yields-replanting with new disease resistant, high-yielding clones is often beyond the smallholder's reach as the loss of income during the replanted immature phase is more than he can bear. This retards his ability to take advantage of Government subsidies for replanting and modernizing.

One important innovation all countries should try out is the possibility of consolidating smallholdings in some way to form viable units. Land settlement schemes and analyses of incomes, accrued under different price conditions, have shown in various countries that 7 to 10 acres would be the minimum economic size of a smallholding. Units smaller than this should at least be grouped together and managed by the equivalent of a superintendent of a large estate. Consolidated plantations have been managed successfully in both Malaysia and Indonesia, and their experience in this subject would be valuable to other countries.

All ANRPC countries have accepted the fact that replanting with high-yielding clones is the essential basic step to increasing production of NR. Apart from the factors already discussed one important matter that militates against re-planting of small holdings is the loss of income during the immature period of the newly-planted rubber.

Unfortunately, rubber has this real drawback, that it takes 5-6 years to get any income from replanted areas. This over-

gular source of cash income, (approximately 60-80 percent of total family income) particularly for those very small growers with less than 2 acres. Their total income appears to be around or slightly above the national poverty threshold defined as Rs. 3,600 per family per year. In the case of low yielding over-age rubber, incomes would be lower, and for smallholders having below 2 acres are estimated to be below the poverty line. A sample survey carried out among smallholders has shown that family labour was employed by a majority of holdings with below 2 acres rubber, while those in the 2 to 10 acre

rides any benefits accruing from the subsidy paid by the Government for replanting. There are two techniques which can be used to reduce the impact of this: the value of the rubber wood and the possibilities of intercropping.

It has been pointed out that another drawback of the small size of holdings is the inability of the individual smallholder to produce high quality sheet rubber and sell his produce at the optimum price, because of the subsistence nature of his whole enterprise.

Sri Lanka in its State Rubber Manufacturing Corporation block rubber factory at Mawanel-la and in over 100 Group Processing Centres (GPC) scattered throughout the rubber-growing the rubber-growing areas, has shown that the highest grades of block rubber and smoked sheet can be produced from smallholders' rubber.

Malaysia has proved this on a massive scale, and the Malaysian Rubber Development Corporation (MARDEC) operates several rubber factories, all working on a completely commercial basis, and all making handsome profits and turning out the highest quality Standard Malaysian Rubber (SMR) from smallholders' latex.

Sri Lanka now has sufficient expertise to operate central block rubber factories, GPCs and collecting centres on a commercially viable basis and this programme must be consolidated and expanded to cater to small holders wherever possible.

Where the scheme of GPCs has still not made an impact it is necessary to start Group Marketing Schemes, where smallholders' rubber is collected in central

range appear to use family and hired labour in roughly equal proportions.

The effect on production from the backlog of replanting is expected to be most marked in the smallholder and private estates sector. In this sector output is expected to come down from 112,738 tonnes in 1979 to 64,652 tonnes in 1986 and not to recover to the 1978 level until about 1998. If the replanting programme continues as scheduled a peak of 148,852 tonnes will be reached by this sector in the 2008.

Income from rubber, as we have seen, is an important source

locations with the immediate payment of a high percentage of the value of the produce, which is later sold at the optimum market conditions and the final settlement made to the smallholder on that basis. This is extremely important, as it is an open secret now that the smallholder is being exploited by various "middlemen".

The long-term strategy in the development of rubber smallholdings should be to evolve a modernised group of farmers who are economically viable and are in a position to resist or absorb price fluctuations.

They should also be in a position to adopt the most modern agronomic, management and crop husbandry techniques, get maximum returns for their labour — they must get away from the idea that family labour is free and learn to put a price on their effort.

There should also be adequate opportunities for the unemployed and underemployed to obtain alternative employment in other sectors of the economy. Otherwise, there will be a definite drift to the cities of the younger generation, and plantation agriculture will be no more.

Therefore, all governments must make a definite attempt to provide adequate and rewarding employment, sufficient entertainment facilities and other amenities of life in the villages. This itself will generate employment and help in the development of villages as 75 per cent of our population still live in them. (From a paper presented in connection with the ANRPC seminar held in Colombo in July this year.)

of earning to these smallholders and with the replanting programme and anticipated drop in their production in the 1980's this sector is bound to be badly affected. The authorities have thus been cautioned that in encouraging replanting by this sector it is very necessary to take account of the loss in income by them during the immature phase on their plantations. The smallholder rubber areas occur mainly in the Southwest quarter of the region, though it extends somewhat West and Northwest. The area is bounded by Kurunegala and Matara districts in the North and Moneragala and Hambantota districts in the East. The Master Plan Study team has reported that in all these regions there is scope for extending the boundaries to the 'dry zone'. It appears that adverse experience in initial planting outside these established areas was the main factor in confining rubber holdings to the existing boundaries. The Study team has suggested that with the use of polybag planting material and appropriate techniques it should be feasible to extend the present planting boundaries to several kilometers, thus increasing the plantable area by several thousand acres. (The Ministry of Plantation Industries has accepted the recommendation of planting rubber in the dry zone areas and as a first step intends bringing 100 acres under cultivation in the Mahaveli Region. The Minister told Parliament early in December that the country now had hardly any land available for opening up in new rubber, in the traditional rubber areas. He wanted to open up on an experimental basis 100 acres of rubber under irrigation in the Dry Zone — in the Mahaveli area. He would shortly discuss this matter with the Minister in charge of the Mahaveli Development and pick the site for it).

Extension services could play a vital role and the Master Plan Study team recommended that the RRI services should be mobilised through a small holder Advisory Department to raise the standard of replanting and new planting among smallholders. Apart from early stages of replanting and running of Group Processing Centres the Study team found that very little general extension work was carried out in the smallholdings; also advice in tapping is minimal. It thus recommended that the smallholder Advisory Services De-

partment (ASD) should be reorganised and enlarged to enable it to take over fully the subsidy inspections from the Rubber Controller, undertake visits to holdings, increase extension work on tapping, take over nursery and planting material responsibility from the Rubber Controller's Department and to operate a training school for ASD staff.

Meanwhile, the RRI has also proposed a scheme for large estates to assist smallholders with the supply of fertiliser and planting materials, processing of latex and in general a closer integration of smallholders with estates. It states "this scheme should be given the highest priority in implementation. This will improve the living stand-

country, unlike in the case of major producer countries like Thailand (see box) where positive gains are forecast in the years ahead.

It is clear that these problems all have to be analysed and solutions sought if the main task ahead — which is to accelerate the replanting effort, expand the area under rubber wherever possible and improve levels of productivity in all spheres of the industry — is to be achieved. At the international level, through the recent agreement under the UNCTAD's Integrated Programme for Commodities and according to all supply forecasts, producer nations can be assured of more stable prices; but price stabilization alone will not help to solve the major problems

### PRODUCTION PLANNING IN THE NATURAL RUBBER INDUSTRY OF THAILAND TO YEAR 2000

Slearmarp Wasuwat — Rubber Division, Department of Agriculture, Thailand.

A major objective of Thailand in the Natural Rubber Industry is to increase its production to meet the world's demand. Three programmes are being implemented:—

1. Acceleration of Rubber Replanting: To increase the rate of replantations to 3.3% of total planting area, about 50,000 hectares of old rubber plantation have been, and will be replanted annually until replanting is complete.
2. Rubber Smallholdings Yield Improvement: High-level tapping and stimulation of the old plantation for the five years preceding replantation is underway. After the termination of the five-year project, it is expected that about 15,000 hectares of old plantation will be thus treated annually.
3. Increasing of New Plantation in New Explored Area: Trials on the establishment of rubber plantation in various regions of Thailand have been already undertaken. Some areas gave reasonably promising results.

At present, there are three more projects under preparation to increase natural rubber production in Thailand. Together with the achievement of the three programmes mentioned, by 1990 Thailand will be able to produce 1.4 million tons of natural rubber. If the trend of world demand is rising, it is possible that by the year 2000 about 2.2 million tons of natural rubber can be supplied from Thailand.

ards in the villages of Sri Lanka, and lead to the proper economic utilization of the limited land resources of this country".

#### Conclusion

Numerous other problem areas exist, particularly organizational deficiencies, which have been largely responsible for the low productivity levels of the rubber industry and its bleak future in the next few years. The comparatively high level of taxation and low level of subsidies that existed earlier are also said to be factors that have acted as disincentives for expansion of rubber acreage and output. Production planning has received scant attention in this

of the natural rubber producing countries. There is much to be done in expanding rubber production by these countries if future demand is to be met. This situation only underlines the need to adopt a dynamic rubber production programme. But as observed earlier, the development of the smallholder is of crucial significance in such a plan. In this regard there is a wide range of possibilities extending from the adoption of technical innovation and provision of adequate incentives to economic consolidation of holdings and strengthening extension work and the institutional setup to serve this sector.

## FEATURES

# Some Problems Connected with the Cultivation of other Food Crops

G. Jayanath

The need for the country to move towards self sufficiency in its food requirements has for many reasons been an over-riding goal of successive administrations, and a rapid expansion in subsidiary food crop production an essential part of this strategy. A considerable part of our food imports, for instance, has comprised wheat and wheat flour and it is argued that the one way this trend could be reversed was to increase production and consumption of substitutes which are included under the category of 'subsidiary' food crops. On the contrary when wheat flour is more freely available in the market the tendency has been for people to move away from the substitutes such as locally grown roots, tubers and cereals. In this paper G. Jayanath, of the People's Bank, Research Department, discusses how this has happened and what measures have been taken to attempt to reverse the trend. His conclusion is clearly that production could be expanded only if producers find it attractive enough to do so, but there comes a stage when consumers interests can collide. The greatest challenge before the authorities he concludes, is to avoid this clash of local producer and consumer interests and still push forward towards self sufficiency in at least some of the more essential subsidiary food items.

At a time when all efforts are being made for the country to achieve self-sufficiency in rice, there appears to have been a downward trend in the production of 'other' food crops over the last few years. Particularly after 1976, the production of 'other' food crops has registered a continuous declining trend. It may be observed that in the meantime the production of rice during this same period has recorded a rapid increase with a new crop record for each year after 1976.

Though rice forms the staple diet of the people of Sri Lanka, food items such as millets or coarse grains and maize, gram and other pulses, and yams like sweet potato and manioc have assumed an important place in the diet of every household in the country from ancient times. It was only after foreign rule came to be established that people in this country too developed a tendency and the habit of consuming food made of wheat flour. Before the advent of the foreigners a rural subsistence economy ensured self sufficiency in food. The transition to a modern export economy led to a change in the entire economic structure and the new plantation system of cash crops like tea and rubber, made deep inroads into the existing village economy resulting in a neglect of the existing subsistence agriculture. The economy of the village gradually became less and less adopted to supplying even the everyday needs of the community.

Even at present, the livelihood

in the rural sector is based mainly on agriculture with paddy and 'other' food crops taking the first and second place respectively; while the dietary habits of the rural people have not undergone any major changes as such. In recent times much attention has been focussed on the production of 'other' food crops as a substitute for rice and wheat flour. Another factor contributing to this emphasis has been the realisation that larger quantities of pulses, cereals and seeds like gingelly and soya have a high nutritional value and are essential for a balanced diet. Further, there has also been much inducement and encouragement to grow chillies, red onions and potatoes which upto the 1960's constituted nearly 90 percent of the total value of imports of the 'other'

foodstuffs sector. The Socio-Economic Survey of the Department of Census and Statistics showed that in 1974 a major portion of our diet consisted of cereals. It also showed that the deficiency in pulses, fish and meat, milk and milk products, vegetables and fruit consumption was striking. The daily, per person, availability of food supply (in grams) together with the minimum amounts recommended by the MRI were as follows:

**TABLE 1.**  
Daily per capita availability of food supply in grams  
Food balance sheet (Census and Statistics)

Availability in 1974	Recommended Allowances
Items	Grams
Rice	271.8
Wheat	89.3
Total including others	369.0
Coconut Kernel	85.6
Fats and oils	7.0
Yams	127.6
Sugar	18.0
Total	607.2
Pulses	2.0
Meats	3.3
Fish	17.7
Milk & Milk Products	30.6
Eggs	4.0
Total	57.6
Vegetables	97.2
Fruits	28.4
Total	125.6

Import statistics given below demonstrate that imports of chillies, red onions, and potatoes had been increasing upto the early 1970's and were reduced drastically thereafter; but once again were stepped up from 1978.

\*The "Other Food Crops" referred to here, also more commonly termed "Subsidiary Food Crops", generally comprise those crops that provide foodstuffs other than rice, sugar, fish products and livestock products. They have been an essential part of the diet of our people and over the past two decades have taken up nearly one-third of the value of the country's annual food import bill. Many of these crops can be grown extensively in this country and have been part of the traditional cultivation in chenas and home-gardens, and the national development programmes over the years have all envisaged a move towards self-sufficiency in regard to most of these crops through both intensified cultivation and import substitution.

These 'other' or 'subsidiary' food crops, we refer to, can be listed under four broad categories.

- Potatoes, sweet potatoes, manioc, other yams or roots and tubers.
- Red onions, Bombay onions, chillies and other condiments.
- Ground nuts, green gram, black gram, seeds like gingelly and soya bean, and other pulses.
- Maize, sorghum, miner, thanahal and other coarse grains.

TABLE 2. IMPORTS OF CHILLIES, ONIONS AND POTATOES—QUANTITY AND VALUE—1958-1979

Year	QUANTITY ('000 cwt.s.)				VALUE (Rs. '000)			
	Chillies	Onions	Potatoes	Total	Chillies	Onions	Potatoes	Total
1958	285	12	865	1,162	21,773	214	16,629	38,616
1959	316	46	271	633	24,619	575	6,357	31,552
1960	345	203	1,115	1,003	36,537	3,285	19,169	58,991
1961	206	212	1,189	1,606	20,411	2,861	20,497	43,769
1962	380	166	1,058	1,604	36,342	2,516	22,233	61,091
1963	343	153	1,368	1,864	37,864	1,797	26,076	65,737
1964	425	111	1,471	2,007	46,471	2,822	25,462	74,754
1965	278	130	1,074	1,483	30,009	2,535	17,908	50,452
1966	358	104	1,220	1,682	42,550	1,620	24,053	68,223
1967	296	38	362	690	29,332	755	6,696	36,783
1968	352	989	10	1,350	34,156	16,217	360	50,733
1969	245	1,273	Nil	1,510	25,520	23,556	Nil	49,075
1970	263	1,296	4	1,563	30,000	29,109	178	59,286
1971	326	45	63	444	39,700	752	3,835	44,287
1972	389	20	117	526	24,439	338	7,596	32,373
1973	4	—	25	29	500	—	1,763	2,263
1974	—	—	197	197	—	—	5,547	5,541
1975	—	—	12	12	—	—	1,134	1,134
1976	—	—	17	17	—	—	2,143	2,144
1977	20	—	3	22	13,800	—	606	14,645
1978	118	357	78	553	78,800	45,229	9,256	133,406
1979	166	254	163	584	101,722	36,950	27,840	166,285

Source: Ministry of Agriculture

Since importation of such food items had adverse effects on our foreign exchange earnings, measures were taken to restrict such imports and also to encourage local production. In the Five Year Agricultural Development Plan (1966-1970) much importance was given to the production of 'other' food crops. It was thus planned to reach the levels of self-sufficiency in food items like red onions, chillies and potatoes and with this objective in mind it was decided to provide irrigation facilities to about 40,000 acres of new land as shown below.

TABLE 3. Sources of Irrigation to serve new lands

I	Lift Irrigation	Acres
(a)	Surface sources	15,000
(b)	Under ground water	5,000
<b>II. Gravity Irrigation under tank schemes</b>		
(a)	Major tank schemes	15,000
(b)	Minor tank schemes	5,000
		40,000

Source: Agricultural Development Proposal (1966-1977)

Although these targets set in the Plan were not fully reached, it was quite evident that considerable progress had been made during the period 1965-70. The extent under production increased (15%) by 49,065 acres during this period. Again, in the Five Year Plan (1972-76) much emphasis was placed on local production and numerous programmes were drawn up to extend

the acreage under 'other' food crops as well, as seen in the table below.

Under this plan it was expected to provide irrigation facilities to a total area of 68,000 acres, for cultivating 'other' food crops. During

the period 1970-76, the extent cultivated with 'other' food crops had increased substantially i.e. 472,461 acres or 120.7 percent. What is important here is that the production increases during this period had brought the country closer to

TABLE 4. SELECTED SUBSIDIARY FOOD CROPS—PRODUCTION SUPPLY AND DEMAND (cwt.s) 1970-76

Crops	Production in 1970	Projected Demand 1976	Supply Estimated 1976
1. Dried Chillies	125,000	670,000	600,000
2. Red Onions	716,000	2,400,000	2,400,000
3. Pulses	50,700	1,824,000	265,000
4. Maize	409,000	800,000	660,000
5. Sorghum	1,000	340,000	23,000
6. Soya Beans	—	—	63,000
7. Ground Nuts	132,000	—	266,000
	1,433,000	6,234,000	4,277,000

Source: The Five Year Plan 1972-1976

TABLE 5. ACREAGE UNDER CULTIVATION

	1965	1970	1976
Kurakkan	64,635	52,078	97,630
Maize	29,408	50,736	94,992
Chillies	48,603	58,996	134,873
Red Onions	14,559	16,660	23,892
Potato	1,662	8,188	7,693
Manioc	130,498	147,046	373,575
Sweet Potato	34,418	39,150	112,548
	323,777	372,842	845,303

Source: Economic Review—February 1978

ECONOMIC REVIEW, DECEMBER 1980

the goal of self-sufficiency. The significant progress achieved in the 'other' food crops sector during the period 1970-76 was largely a result of factors such as the ban on imports and the consequent high prices obtained by farmers. An examination of production figures relating to 'other' food crops for

TABLE 6. PRODUCTION OF 'OTHER' FOOD CROPS Cwts. (000) 1972-79

	1972	1973	1974	1975	1976	1977	1978	1979
1. Maize ... ..	261.2	268.4	469.4	680.4	611.5	825.5	692.8	512.3
2. Sorghum ... ..	0.6	22.2	61.7	120.0	32.6	39.4	10.7	1.6
3. Kurakkan ... ..	540.6	472.5	385.0	404.6	306.9	447.2	287.5	211.7
4. Meneri ... ..	N.A.	6.7	N.A.	9.7	46.5	21.2	10.2	2.0
5. Thanahal ... ..	N.A.	N.A.	9.7	3.4	3.9	2.6	4.1	.7
Course Grains ... ..	802.4	769.8	924.8	1,218.1	971.4	1,335.9	1,005.3	728.3
6. Green Gram ... ..	24.6	58.2	116.0	116.7	91.0	153.6	165.3	190.5
7. Black Gram ... ..	N.A.	N.A.	12.8	20.5	46.5	230.4	154.9	119.0
8. Cowpea ... ..	22.8	12.5	39.7	148.8	234.2	415.8	443.1	369.4
9. Soya Bean ... ..	0.7	4.5	19.6	22.6	14.5	21.8	56.5	26.2
10. Ground Nuts ... ..	107.7	181.7	144.8	149.7	119.8	129.1	147.1	106.3
11. Dhal ... ..	6.2	33.3	153.8	44.8	6.0	.3	2.6	1.0
Pulses ... ..	162.0	290.2	486.7	503.1	512.0	951.0	969.5	812.4
12. Manioc ... ..	N.A.	N.A.	167.0	15,093.1	13,440.3	10,774.2	9,773.6	7,158.1
13. Sweet Potatoes ... ..	1,106.7	N.A.	N.A.	2,835.9	2,539.4	1,910.6	1,608.2	835.4
14. Potatoes ... ..	922.0	780	538	750	762.0	752.0	588.0	1032.5
Roots & Tubers ... ..	2,028.7	880	705	18,679	16,741.0	13,436.8	11,969.8	9026.0
15. Chillies ... ..	238.0	382.4	361.8	321.2	715.4	613.4	554.2	430.1
16. Red Onions ... ..	1,223.0	1,242.9	1,396.8	1,423.1	1,541.4	1,306.5	1,417.6	1230.5
17. Bombay Onions ... ..	36.1	26.5	21.6	26.2	24.6	37.9	70.0	19.5
Condiments ... ..	1,497.1	1,651.8	1,780.2	1,770.5	2,281.4	1,957.8	2,041.8	1680.1
Total ... ..	4,490.2	3,49.8	3,896.7	22,170.7	20,505.8	17,681.5	15,986.4	12,246.80

Source: Ministry of Agriculture

TABLE 7. TOTAL CULTIVATED AREA UNDER 'OTHER' FOOD CROPS (ACRES) 1972-79

	1972	1973	1974	1975	1976	1977	1978	1979
1. Maize ... ..	40,142	59,928	95,128	98,970	75,092	96,720	70,718	58,333
2. Sorghum ... ..	196	2,982	5,405	9,283	2,446	3,431	1,353	236
3. Kurakkan ... ..	52,894	94,701	94,571	66,289	49,019	63,245	43,665	26,770
4. Meneri ... ..	N.A.	2,436	N.A.	2,501	2,647	2,724	1,361	407
5. Thanahal ... ..	—	N.A.	1,425	1,050	702	428	200	120
Course Grains ... ..	93,323	160,047	196,529	178,093	129,906	160,548	117,237	85,866
6. Green Gram ... ..	7,053	12,966	26,417	22,866	20,667	30,509	30,132	30,124
7. Black Gram ... ..	—	—	3,439	5,026	12,579	24,279	31,760	21,591
8. Cowpea ... ..	2,376	3,310	7,395	21,578	47,516	74,516	63,116	74,791
9. Soya Bean ... ..	211	387	3,232	2,818	1,780	2,502	4,770	3,016
10. Ground Nut ... ..	11,950	15,379	19,078	19,209	16,615	16,012	26,457	12,484
11. Dhal ... ..	63	502	3,274	665	169	07	102	170
Pulses ... ..	21,653	32,544	62,835	94,978	99,326	157,846	155,337	142,176
12. Manioc ... ..	N.A.	N.A.	225,642	195,696	171,515	134,804	98,494	82,864
13. Sweet Potatoes ... ..	35,918	N.A.	N.A.	52,492	37,010	31,698	21,787	15,780
14. Potatoes ... ..	7,809	7,011	5,728	6,307	6,914	7,997	6,509	10,404
Roots & Tubers ... ..	43,727	7,011	231,370	254,495	215,439	175,499	126,790	109,048
15. Chillies ... ..	59,779	90,903	102,672	81,640	107,088	108,908	83,517	49,750
16. Red Onions ... ..	14,253	17,288	15,956	15,635	19,135	20,171	15,511	14,533
17. Bombay Onions ... ..	617	440	447	349	433	603	557	330
Condiments ... ..	74,649	108,631	119,075	97,624	120,056	129,682	99,585	64,613
Total ... ..	233,261	308,233	609,809	625,190	571,327	622,575	498,949	401,703

Source: Ministry of Agriculture

TABLE 8. OTHER CROPS—YIELD PER ACRE (CWTS) 1972-79

Course Grains	1972	1973	1974	1975	1976	1977	1978	1979
1. Maize ... ..	6.51	4.48	4.93	6.87	8.12	9.09	9.80	8.78
2. Sorghum ... ..	3.06	7.44	11.42	12.93	13.33	11.48	7.91	6.78
3. Kurakkan ... ..	0.01	4.99	4.07	6.10	6.26	7.07	6.59	7.91
4. Meneri ... ..	N.A.	2.75	N.A.	3.88	6.23	7.78	7.49	4.91
Pulses								
6. Green Gram ... ..	3.49	4.49	4.39	5.10	4.40	5.03	5.49	6.32
7. Balck Gram ... ..	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	3.51
8. Cowpea ... ..	9.60	3.78	5.37	6.90	4.93	5.58	6.51	4.94
9. Soya Bean ... ..	3.32	11.63	6.06	8.02	8.15	8.71	11.84	8.69
10. Ground Nuts ... ..	9.01	11.81	7.59	7.79	7.21	8.06	7.19	8.51
11. Dhal ... ..	98.41	66.53	46.98	67.37	35.50	42.86	25.49	N.A.
Roots and Tubers								
12. Manioc ... ..	N.A.	N.A.	74	77.13	78.36	79.92	99.23	86.94
13. Sweet Potatoes ... ..	30.81	N.A.	N.A.	54.03	68.61	60.28	73.81	52.38
Condiments								
14. Chillies ... ..	3.98	4.21	3.52	3.93	6.68	5.63	6.64	8.65
15. Red Onions ... ..	85.81	71.90	87.54	91.02	80.55	64.77	59.11	84.76
16. Bombay Onions ... ..	58.51	60.23	48.32	75.07	56.81	y2.85	62.02	59.09

Source: Ministry of Agriculture

the period 1970-79 shows a step rise upto 1977, but a sharp drop in 1978. In the year 1972 the total area under 'other' food crops stood at 233,261 acres. In 1977, it shot up to 622,575 acres. But during the year 1979, it dropped to 401,703 acres (19.5%). An examination of the figures on production clearly reveals a similar downward trend. In 1972, production was 224,510 tons. In 1977 production went up to 884,075 tons, but as in the case of acreage in 1979, in production too there was a drop to 612,340 tons (23.4%).

The acreage under cultivation in 1978 showed a downward trend in all the 'other' food crops except potatoes. The production of 'other' food crops other than green gram had all recorded a fall in 1979. The average yield per acre too had dropped in 1979, the notable exceptions being soya bean, green gram, chillies and red onions.

As seen in the tables the production of pulses in 1979 stood at 40,620 tons. In order to meet the country's requirements in 1981, the production would have to be brought to 116,990 tons, i.e. an increase of more than hundred percent. Total wheat flour requirements at present are met solely by imports. The objective should be to decrease wheat flour imports and consumption and at the same time increase the production and consumption of substitutes like root crops and pulses. A programme has already been implemented to produce our entire rice requirements locally. In 1979, almost 27.9 percent of our local requirements of chillies, 16.9 percent of red onions and 13.6 percent of potato were met through imports.

In addition, about 8,000 tons of cereals and pulses were being used annually as animal feed; but the local requirement for 1980 was esti-

mated to be about 60,960 tons. It has not been possible to meet this requirement. This data alone reveals that local supply of 'other' food crops is far short of the existing demand.

According to Table 2 — on Imports upto 1966—red onions, chillies and potatoes had been imported in large quantities. The import of these items were brought under restriction in 1967. Imports of potatoes were heavily reduced, though the drop in imports of onions and chillies was not significant at that time. During the period 1973-76 we were able to do away with imports of red onions and chillies though small quantities of potato were coming in. With the liberalization of trade in November 1977, it is quite evident that the situation changed drastically.

In 1979 the imports of chillies rose by 498 percent over that of 1977; imports rose from 19,600 cwts in 1977 to 117,700 cwts in 1978 and 165,900 cwts in 1979. A total quantity of 357,342 cwts of red onions was imported in 1978 as against no imports in 1977. In 1979 a further 254,429 cwts were imported. Potato imports in 1978 showed an increase of 1,709 percent over that of 1977; going up from 2,780 cwts in 1977 to 78,091 in 1978 and 163,189 in 1979.

TABLE 9. PROJECTED FOOD REQUIREMENTS FOR SRI LANKA 1981-91.  
(tons '000)

Crop	1981	1982	1991
Rice ... ..	1,487.02	1,632.73	1,773.52
Bread & Wheat Flour ... ..	485.55	535(71)	586.11
Roots ... ..	463.65	503.78	540.33
Pulses ... ..	116.99	128.54	139.88

Source: Department of Census and Statistics



The total foreign exchange expenditure involved in importing red onions, chillies and potatoes in 1978 shows an increase of 825.2 percent as compared with 1977; and a further 25 percent increase in 1979.

It is evident that there is a connection between the production of roots and tubers, cereals and pulses and the importation of wheat flour. It can be seen how the local production of these crops generally go up with the imposition of a ban or restriction on imports of wheat flour.

When wheat flour is available in larger quantities and at a cheaper rate in the local market, the tendency is for people to consume food items made of wheat flour rather than locally grown cereals.

TABLE 10. WHEAT FLOUR IMPORTS

Year	Quantity (tons)
1968	359,388
1969	388,434
1970	268,631
1971	330,462
1972	323,935
1973	365,354
1974	441,806
1975	455,218
1976	379,760
1977	523,861
1978	662,947

Source: Ministry of Food and Cooperatives

This trend is even more apparent in the production of red onions and potatoes. When imports are restricted the local production usually goes up; while imports prove a disincentive to local farmers.

An examination of figures for 1979 reveals the beginning of a reversal of the earlier trend and a drop in acreage and production. The farmers cultivating 'other' food crops appear to have found it difficult to obtain a reasonable price for their produce. Since most of these food crops are grown in remote areas, with meagre transport facilities, the middleman exploits the entire situation here and reaps a big margin of profit. Prices tend to fall in times of glut. With a view to eliminating these obstacles for the farmer, encouraging production and stabilizing the producers' prices over the entire season, and also supplying food items to the consumer at a reasonable price, the Government (implementing a recommendation made by the Food Policy Committee) introduced a floor price scheme in 1979. This scheme which is now in operation

now covers eleven 'other' food crops. The floor price has been fixed, taking into account the production price and also the local market and world market prices.

The objectives of this scheme were broadly:

1. To prevent the private trader from controlling the market.
2. To provide regular and reasonable prices to the farmer which would act as a producer incentive.
3. To keep price fluctuations in the market above this price level.
4. To give commercial status to these crops and also to bring them in line with prices in the world market.

As a result of this scheme the producer could have an idea of the price he should get for his produce. During periods of glut, particularly during harvesting seasons, this scheme can prevent the traders bringing down the price if officials are prepared to purchase at the floor price. Further, as the floor price is expected to be fixed higher than the cost of production farmers may be assured that they will not be losing by their taking to cultivation of these crops. However, shortly after the scheme was introduced on 8 items the average open market price was such that the middleman were still in a position to obtain high profits. For example, in the case of chillies, the producer got only Rs. 10/50 a lb. (production price being Rs. 10/19) while the price in the open market was around Rs. 13/- (the profit being Rs. 2/50). In the case of green gram (which was then not under the GPS) the producer got only Rs. 5/76 a lb. (cost of production being Rs. 2/66) when the

price in the open market was around Rs. 7/50 (a profit of Rs. 1/75).

The floor price scheme implemented was reviewed at the end of 1979 and prices were duly revised on some of these crops for the Yala season of 1980. Three more items, (namely, cowpea, green gram and potatoes) were also included in the scheme. There were still, however, important commodities like red onions, sweet potatoes and manioc which had not been brought under this scheme. (Onions have been included from September this year). If this scheme is to succeed it is apparent that the government departments associated with production and marketing of these items should actively intervene in the proper implementation of the scheme. At present Government agencies like the Marketing Department, CWE, Co-operatives and Paddy Marketing Board do not seem to be very effective in procuring these items. According to reports these institutions were not able to buy even 1 percent of the total production in 1978. Exact figures are not available but if these estimates are correct it reveals that nearly 99 percent of the total trade in 'other' food crops is handled by private traders.

When we try to bring local production in line with the world market prices, undoubtedly the consumer could benefit, but in time of scarcity of supply in the world market, problems may arise in increasing the local production for farmers to avail of this facility; as provision of irrigation and land preparaton usually takes time.

The income from 'other' food crops had fallen substantially in

TABLE 11. "FLOOR PRICES" ANNOUNCED FOR ELEVEN "OTHER" FOOD CROPS

Commodity	Rs. per kg.	
	Maha 1979/1980	Yala 1980
1. Soya Bean	4.40	4.95
2. Tumeric (Cured)	11.00	16.50
3. Gingelly (Dried)	4.95	6.60
4. Chillies	18.70	20.90
5. Cowpea *	4.07	4.75
6. Green Gram*	6.05	6.60
7. Maize	1.65	1.65
8. Black Gram	3.52	3.52
9. Sorghum	1.32	1.32
10. Ground Hut (unshelled)	4.95	4.95
11. Potatoes *	3.85	3.85
12. Red Onions		1.00-1.35
13. Bombay Onions **		2.25

\* Included after November, 1979

\*\* Included after Sept. 10, 1980.

1978. In 1976, according to a Ministry of Plan Implementation study, the price fetched by chillies was Rs. 1404.91 a cwt. but in 1978 it had dropped to Rs. 907.73 (a fall of 35.4%); while the price of red onions had dropped from Rs. 205.59 a cwt. in 1977 to Rs. 165.05 in 1978, indicating a fall of 19.7 percent. A bushel of cowpea which fetched Rs 115.54 in 1976, was sold at Rs. 108.63 (a 6% fall). In 1976, the price of a bushel of green gram stood at Rs. 166.14 whereas in 1978 it dropped to Rs. 147.08 (a 11.5% fall)

Income from all 'other' food crops, except potatoes and other yams had dropped in 1978. During the period 1972-77, producers obtained such good returns due to the high prices resulting from the import ban. On the other hand, with the trade liberalization in 1977 the situation changed. The cultivation of 'other' food crops requires much more labour than for paddy cultivation.

One reason why the cost of production has gone up is due to increased wages. In the case of the cultivation of 'other' food crops, particularly, there is the problem of hiring out labour. Farmers thus prefer to work as paid labourers rather than cultivate 'other' food crops at such high costs of production and comparatively low return.

Settlers in the colonisation schemes have naturally preferred to grow only rice and when unable to do so on their highland allotments they have rather left them fallow. Cultivation of these crops are more intensive in terms of water use, labour and time (as the table below partly indicates).

**TABLE 12. Average Number of man days required for cultivating an acre with different crops**

Paddy	88
Chillies	178
Green Gram	102
Ground Nuts	87
Red Onions	308
Bombay Onions	227

Source: *Agricultural Research and Training Institute (Elaheera Survey Report)*

When we analyse the yield of 'other' food crops per acre, it is evident that the yield has gradually gone up in respect of soya bean, green gram, menari and potatoes. In 1979, the yield per acre had come down in respect of all other commodities.

It is evident that the production potential as far as 'other' food crops are concerned could be high if the correct cultivation techniques, extension and research services, and motivation is provided to local farmers. A comparison with yields of other countries in the region will reveal this as seen in table 13.

**TABLE 13. AVERAGE YIELD OF SOME OTHER FOOD CROPS IN SELECTED ASIAN COUNTRIES-KG. PER HECTARE**

	Maize	Sorghum	Millet	Grain
Australia	2,661	1,627	1,081	—
Burma	471	—	267	356
China	2,863	2,333	783	1,375
India	1,600	339	508	600
Indonesia	890	—	—	890
Japan	2,600	1,104	1,667	—
Pakistan	1,260	698	429	—
Philippines	857	—	—	857
Sri Lanka	1,073	844	603	808
Thailand	1,592	1,951	—	2,487
Developing Countries	1,836	533	660	1,046
Developed Countries	4,290	1,627	1,125	1,188
U.S.A.	5,409	3,280	—	—

Source: *Regional Co-operation in the Development of coarse grains, pulses, roots and tuber crops in Asia and the Pacific 1977.*

China, Japan and Thailand stand out among the Asian countries for their high levels of production and there is no reason why Sri Lanka cannot move closer to these yields, by resorting to the extensive and intensive cultivation practices prevalent in these countries.

Under the National Environment Protection Policy, it is now strictly prohibited to clear jungles for chena cultivation. This policy, to some extent effects 'other' food crops like kurukkan and meneri.

However, this limiting factor could be overcome with provision of irrigation facilities and adoption of modern technology. 'Other' food crops could be grown on highlands which are not suitable for paddy cultivation. Introduction of 'other' food crops under an irrigated system in paddy fields in Yala season is quite feasible because these food crops do not require as much water as compared with paddy, as seen in table 14.

**TABLE 14. IRRIGATION WATER REQUIREMENTS OF SOME CROPS**

Crops	Period	Irrigation water requirement (Ac. inches)
Paddy	180 days	61.00
Red Onions	90 days	26.00
Green Gram	85 days	28.00
Ground Nuts	105 days	27.6

Source: *Agricultural Research and Training Institute (Elaheera Survey Report)*

Until 1978 farmers could obtain field crop loans from the state banks on comparatively easy terms. In fact loan repayments in the

'other' food crops sector had been fairly encouraging during the years 1971 to 1976; but together with the decline in production of these recovery of loans granted in respect of several of these crops became difficult. Thus in respect of chillies, red onions, potatoes, vegetables, Bombay onions, manioc and a few

others such crops the recovery rate of loans to these farmers dropped from 82 per cent in 1971 to 35 per cent in 1977. The Government decided that there should be a tightening in agricultural credit procedures and accordingly in 1978, the Central Bank withdrew the 75 per cent guarantee to the banks against agricultural loans. Farmers thus faced more stringent requirements in obtaining agricultural loans and there was a sharp drop in Bank credit as seen in table 15. This situation inevitably could have an impact on the position of 'other' field crops. As the table shows total credit for minor food crops fell from Rs. 0.9 million in 1978 to Rs. 16.4 million in 1979.

There are areas where conditions are not suitable for growing paddy, but where 'other' food crops could be successfully grown. Thus, large scale cultivation of 'other' food crops has been feasible so far only in particular regions of the

island where the soil is suitable, where there is a regular supply of water, and where extension facilities and marketing are provided.

Many of the 'other' food crops can be grown under rain fed conditions, but yields under such conditions have been found to be generally low and profit not attractive enough for their cultivation. On the contrary when grown under irrigated conditions these crops have given high yields and returns to the farmer. In comparatively dry areas like Jaffna and Vavuniya red onions and chillies are successfully grown under lift irrigated conditions, with water obtained from deep wells. An important point here, however, is that the dominant factor that has determined the expansion of production is the

classic example of why the farmer settlers have not found 'other' food crops production worth their while. The basic reason is that these crops have not appeared economically profitable to these settlers. A People's Bank Research Study in a hamlet of the Mahaveli H area shows that an average of only 10 percent of those farmers expected to grow 'other' food crops had done so. They cultivated rice instead. In region III of the H area an estimated 1,703 acres was expected to be cultivated with 'other' food crops but for the Yala 1980 season only 568 acres were planted with these crops.

Crops	Acreage	Production (Cwt)
Red Onions	16,800	3,000.00
Chillies	9,200	831,000
Bombay Onions	10,000	1,500,000

In addition, plans have been prepared to increase potato production in Jaffna, Badulla and Nuwara Eliya Districts as well as to produce seed potatoes locally and import large quantities of seed potato for immediate cultivation. Extensive soya bean cultivation is also to be undertaken in collaboration with International Agencies such as the UNDP, FAO, USAID and CIDA.

As the foregoing discussion has revealed such plans for expanding production would materialise only if the necessary incentives and conditions are provided to the producer, and most attractive for him has been the price incentive. This factor, however, appears to have conflicted at crucial stages with the interests of the consumer and there are even suggestions that if this sub-sector of domestic agriculture is to be vigorously promoted it may have to be even at the expense of a transient period of consumer hardship.

TABLE 15. AGRICULTURAL CREDIT 1978-1979

	(Rs. Million)							
	People's Bank		Rural Banks		Bank of Ceylon		Total	
	'78	'79	'78	'79	'78	'79	'78	'79
<b>1. Crop Cultivation</b>	<b>154.1</b>	<b>25.8</b>	<b>4.5</b>	<b>4.5</b>	<b>100.9</b>	<b>25.5</b>	<b>259.5</b>	<b>55.9</b>
1.1 Paddy ...	122.4	20.5	0.5	1.0	60.2	17.7	181.1	39.2
1.2 Minor Food Crops ...	27.8	5.3	4.0	3.6	29.1	7.5	60.9	16.4
1.3 Sugar Cane and Cotton	3.9	—	—	—	11.6	0.3	15.5	0.3

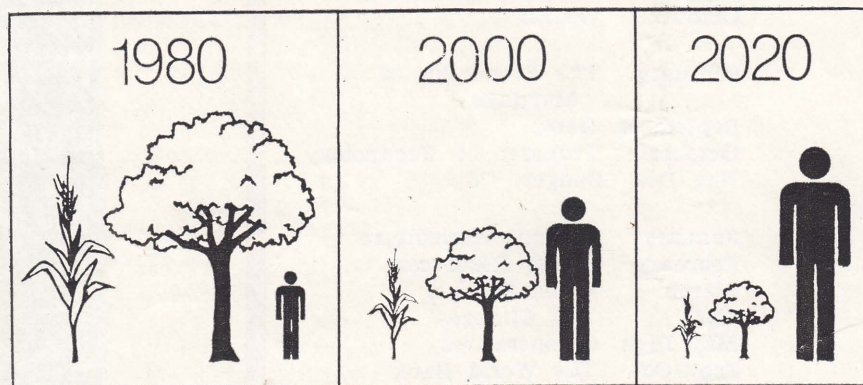
Source: Central Bank of Ceylon

profit obtained by the farmer.

In the land allotments of the Mahaveli area there is specific provision for cultivation of 'other' food crops, but here we have a

According to the Sectional Plan of the Ministry of Agriculture 1978-84 it is envisaged to expand the cultivation of subsidiary food crops as follows:

#### LIVING RESOURCES-NEED FOR A WORLD STRATEGY



A world strategy for the conservation of Earth's living resources is needed now because:

1. Living resources essential for human survival and sustainable development are increasingly being destroyed or depleted. At the same time human demand for these resources is growing fast. The problem is illustrated above. If current rates of land degradation continue, close to one third of the world's arable land (symbolized by the stalk of grain) will be

destroyed in the next 20 years. Similarly, by the end of this century (at present rates of clearance), the remaining area of unlogged productive tropical forest will be halved. During this period the world population is expected to increase by almost half—from just over 4,000 million to just under 6,000 million. The predicament caused by growing numbers of people demanding scarcer resources is exacerbated by the disproportionately high consumption rates of developed countries.

2. The action required to cure the most serious current conservation problems and to prevent still worse ones takes time: time for planning, education, training, better organization and research, and when such action is undertaken, it takes time for the biosphere to respond, reforestation, the restoration of degraded land, the recovery of depleted fisheries, and so on, are not instantaneous processes.
3. National and international capacities to conserve are ill-organized and fragmented — split up amongst sectors such as agriculture, forestry, fisheries and wildlife—with consequent duplication of effort, and gaps in coverage, competition for money and influence, and conflict; and they have little influence on the development process, with the result that development, the principal means of tackling human problems, too often adds to them by destroying or degrading the living resource base of human welfare.

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