DEVELOPMENT OF THE PNG RUBBER INDUSTRY

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Rubber *(Hevea brasiliensis)* was first planted commercially in Papua New Guinea during the first decade of this century, and as an industry was slow to develop - in 1939 production from the estates sector amounted to only 1 300 tonnes. The estates were somewhat neglected during World War II, but after the end of the war plantings resumed and expanded to a peak of 14 300 hectares in the early '60s, with production reaching 6 000 tonnes by 1969-70.

Rubber planting by Papua New Guineans commenced at village level about 1927 and at scheme level about 1960 and, like the estate sector, was quite slow to develop, contributing only 2.5% of total rubber exports by 1971. However, production since then has risen steadily to just over 300 tonnes (1975-76), being 6% of total PNG production. From 1965 to 1970 the estates sector area increased at a rate of less than 1% per annum whilst smallholdings increased annually by 10%. Since 1970 the estate sector has in fact declined in area, the major factor being the type and age of rubber planted combined with fluctuating world prices.

A further factor has been high PNG estate manufacturing costs, brought about at least in part by old equipment, processing costs and a decreasing estate production area.

Smallholdings on the other hand have increased rapidly in number and area, there being currently an estimated 3 000 smallholders with almost 3 500 hectares of combined immature and mature rubber.

During the period from 1964 to 1974 world natural rubber production rose by some 48% from 2.35 million tonnes to 3.47 million tonnes, this being mainly caused by a 78% increase in production by Malaysia. However, during this same period, PNG production rose by only 10% from 5 041 tonnes to 5 553 tonnes, representing only 0.16% of total world production in 1974.

THE ESTATE SECTOR

This sector, until about the start of the last decade, constituted the whole of the PNG natural rubber industry. Rubber estates total over 70 in number, and are found chiefly in the Central Province (Galley Reach, Sogeri plateau and Cape Rodney areas), Gulf Province and Northern Province (Kokoda). Terrain varies from mostly flat and gently undulating coastal delta to steep rising land of 300 to 500 metres above sea level.

Tapping on estates is an entirely different proposition from that which confronts the smallholder.

The estate must employ tappers in a labour force which is contracted for the relatively short period of two years, following which each man is repatriated to his home village. This is in striking contrast with the situation in most other rubber-producing countries, where skilled workers are encouraged to live permanently on estates in central villages and are provided with all basic amenities. There has been no attempt to introduce such a system in Papua New Guinea, and as a result good training, high tapping standards and a reasonably disciplined tapping force are most difficult to achieve and rarely seriously attempted. Unlike Malaysia where the *jebong* tapping knife is universally used, Papua New Guinea estate tappers are provided with the *gouge* knife, which invariaby produces a higher rate of tree and bark damage.

There are 79 estates in the country with an average of 174 hectares; of these, 62 are in Papua. The remaining 17 in New Guinea average only 16 hectares per holding. In the total estate sector, almost 40% of holdings have less than 40 hectares, 14% have more than 400 hectares, with a similar proportion in the "middle" range of from 160 to 400 hectares.

Only about 14% of the area planted is wholly high-yielding stock (budgrafted or polyclonal seedling), a further 18% planted mainly with "improved" material, and the remaining 68% is almost entirely non-clonal stock.

This places the majority of estates at a competitive disadvantage compared with other natural rubber-producing countries.

Very little new planting or replanting is taking place, and to date no positive steps have been taken to change from the traditional sheet and crepe production techniques in an endeavour to present PNG's estate crude rubber in a more modern, competitive and internationally acceptable form (e.g. technically specified block rubbers, etc.).

THE SMALLHOLDER SECTOR

Rubber planting by smallholders first commenced with the Native Plantation Ordinance (1918), which generated rubber plantings, notably in the Northern Province, from 1927 through to the second World War. Since then planting by Papua New Guineans at scheme and village level level has multiplied rapidly, notably in the Western Province which alone boasts some 52% of the current national total of about 3 000 smallholders. Since rubber was first produced by smallholders a decade ago, production has grown by one thousand per cent to over 300 tonnes in 1974-75, and a continuing production growth rate in this sector is confidently predicted, and should almost treble by 1980.

Planting has always been practised using conventional methods of forest clearing, planting and, later, tapping. Processing at village level is almost entirely through the medium of shared hand-operated equipment which results in a high proportion of good quality sheet-grade rubber (86% ribbed smoked sheet grades from all smallholdings in 1974).

Terrain varies from flat and undulating to occasionally hilly, and soil nutrient status is of a sufficiently high level to enable

smallholders to avoid the costly practice of fertilizer application. The PNG smallholdings are also remarkable in that there is an almost complete freedom from the normal major diseases suffered habitually by the rubber tree in all other major producing countries.

Smallholders, encouraged and assisted by the Government through its Department of Primary Industry, have planted wholly high-yielding polyclonal stock raised from imported (Malaysian) and locally produced seed, thus enabling the smallholder to derive a potentially greater return per unit of area than his estate counterpart. Plantings from 1976-77 will switch progressively over to the use of material budded in nurseries using the most modern techniques of propagation, and based upon carefully selected clones suited to the special conditions which commonly prevail in PNG smallholdings.

Such planting has taken place both at village level and upon formalized resettlement schemes. These schemes, principally in the Central, Gulf and East Sepik Provinces, generally cater for a centralized rubber process, with individual smallholder block latex collection by vehicle. Currently scheme plantings represent only about 23% of the total national smallholder area of almost 3 500 hectares; however, redevelopment plans currently being implemented to rejuvenate the less successful of these schemes should result in an increase of well over 1 000 hectares of budded rubber planting in these areas.

Excellent incomes can be earned by smallholders from holdings such as this at Cape Rodney.

Smallholders may obtain loans from the Papua New Guinea Development Bank, once the trees have matured to the point of being ready for tapping, to assist them in purchasing essential equipment and

building materials. Currently, for an average one-hectare holding, and upon the basis of a six-holding share-factory, an individua loan is set at about 350 Kina at 8% interest per annum.

Due to the relative isolation of the majority of (village) smallholders, particularly those in the Western Province, very little change in processing method is foreseen in the short term, as at present the simpler methods of processing fit well the geographical and communications constraints.

The success obtained so far with smallholder rubber plantings gives strong support for the view held in a number of other countries that *Hevea* -growing and cropping is almost ideally suited to the average way of life of most smallholders. It reinforces the PNG Government's development policy, which aims principally to promote development at village level, combined with low level technology and village-based management. Rubber for smallholders has proved an ideal vehicle for such development policies.

Green budding technique now used in Papua New Guinea.

MARKETING

PNG rubber marketing for the past 20 years has been performed by the Papua New Guinea Rubber Pool (PNGRP) based in Australia. The Pool uses a buying price in PNG based upon Singapore Rubber Exchange prices and Australia, under a trade agreement, takes the whole PNG output.

Both estate and smallholder sectors benefit from a price umbrella, which provides for a subsidy during times of low world market prices (this subsidy, averaged over the past four years, has been 2.4 toea per kilogram). Estates usually market output individually or through agents to the PNGRP, which then disposes of it to an Australian buyer. Smallholders, however, market through the Department of Primary Industry organization (and hence through the PNGRP), thus being spared the "middleman" problem so common in other natural rubber producing countries. This marketing facility for the smallholders, which amounts to another form of government subsidy, has meant that on average the PNG grower is receiving some 65 to 75% of PNGRP prices, compared with, for example, Nigerian rubber farmers who often receive as little as 25% of market prices.

FUTURE PROSPECTS

The measures being taken by the ANRPC member countries, led by the three major South-east Asian producers (Indonesia, Malaysia and Thailand), through stockpiling, replanting and restricted exploitation systems, should result in higher and more stable prices on world markets, with a steadily increasing demand for natural rubber, provided it is presented in a modern form acceptable to the buyer, i.e., technically specified.

The outlook for the PNG producer can be comparatively optimistic provided a solution is found to the currently most pressing problem-complete change-over from traditional conventional crude rubber process to speciality or block rubbers (BR).

Interrow cropping demonstrated at Gavien Rubber Scheme

The current marketing arrangement via the PNGRP may not continue to function, at least in its present form, in the longer term, and thus the country's crude rubber production would almost certainly be faced with competition on an international scale. It is quite reasonable to assume that the present RSS and crepe grades would be difficult to sell in competition with technically specified forms.

PNG estates will have to modernize to a large degree, and producing tree areas must be revitalized through high-yielding clonal replacement if manufacturing costs are to be significantly lowered.

However, recent industry investigations and resultant replanning has led to the now acknowledged need to endeavour to consume all "remote" (village) smallholder production within the country. Rubber produced from areas which will eventually support a block rubber factory (or reprocess plant) will continue to be exported; however other rubber, being produced in the more remote parts of the country (and thus less easily supervised), should be absorbed into a domestic masterbatch compounding and rubber goods industry thus obviating the need for modernization of presentation and packing as none of this rubber would need to be exported. This domestic industry is shortly to be appraised by both consultants and interested foreign investors.

It was noted in the introductory paragraph that PNG estate areas are declining in extent. This is due to a variety of factors, some of which were noted in that section. However, Papua New Guinea, like so many other developing countries, is experiencing to some degree politically rather than economically justified land rationalization policies. Thus in numerous areas there is pressure from local groups to acquire foreign-owned estate properties. In certain parts of the country, there is a genuine land shortage problem. However as virtually none of the areas in which rubber estates are to be found

Typical smallholder factory and equipment

could be classified as "areas of land shortage", acquisition by local groups will be principally upon "political" rather than "economic" grounds, resulting in declining production through an absence of incentive. Such a trend has been borne out by a number of other "Third World" countries over the past decade or so. It is thought that in a large number of cases, such previously foreign-owned properties will progressively decline in production to absolute zero output.

There is an urgent need here to very carefully investigate and assess all such properties with a view to retaining the more desirable and potentially viable of them for the overall benefit of the country in addition to the previous, customary land owners. Selected properties are seen as "national assets" to be preserved and (re)-developed and thus play an important role in the national economy. They would be categorized, and would probably fall into one of the three following groups-

Properties which should be developed as nucleus estates to support a BR factory, and with provision of land for peripheral smallholder block development.

Properties which the Government considers should be acquired from the existing owners, and which should be developed as "estates", but with local participation in the form of shares, rent or royalty payment.

Properties which, due to their proximity to existing resettlement schemes, should be replanted and subdivided into blocks for incorporation into the existing, adjacent smallholder scheme.

In the short-term then, the PNG estate sector is expected to rapidly decline in area to perhaps as little as 4 000 to 6 000 hectares. On the other hand, many properties with high potential hitherto run by foreign-owned interests could be revitalized and be retained within the national industry for the benefit of both local groups and the economy in general. The loss by the estate sector may be converted into a gain by the smallholder sector.

The present smallholder sector, on the other hand, is not faced with the same drastic change. Plantings will continue, and future material will all be of the higher-yielding budded type. Economies of scale, aimed at promoting contiguous village plantings supporting a viable shared processing unit, are of paramount importance. Area plantings must aim to reach a level whereby output might support a centralized reprocess to either speciality or block rubber. Formalized schemes must similarly achieve total planted areas which will permit the viable operation of central, block-rubber processing units.

It may be said that the PNG natural rubber industry is upon the threshold of a new era. Whether this new era proves to be beneficial to grower and country alike will depend upon the industry's ability to modernize and keep pace with international producer and market developments and trends.

This paper was presented at the Association of Natural Rubber Producing Countries' Seminar on Progress and Development of Rubber Smallholders, held at Haadyai, Thailand in October, 1976.

The PNG delegates during the opening ceremony at the fifth ANRPC Assembly, Jakarta, November, 1976.

Left to right: C.E.W. Arnold, M. Setae (Leader) and J. Aitsi (Department of Foreign Relations and Trade)

The PNG delegation at that ceremony, meeting from left to right, the Indonesian Minister for Trade, His Excellency Mr. Radius Prawiro; the ANRPC Secretary-General, Dr. Moeljono Partosoedarso, and the Assembly Chairman, Dr. Suhadi Mangkusuwando of Indonesia