UNIVERSITY OF PAPUA NEW GUINEA

DEPARTMENT OF PRIMARY INDUSTRY

HISTORY OF AGRICULTURE

DISCUSSION PAPER No. 1

Papers on primary industry commodities, part I

Cocoa	R. McKillop
Coconuts	L. Farrall
Coffee	R. McKillop
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A single volume history of agriculture in Papua New Guinea will be written during 1978, for publication by the Department of Primary Industry at the end of that year. To assist the many people engaged in writing and research on this topic, a series of discussion papers will be circulated. This is the first of the series, edited by Geoff Harris and Faith Wieland.

The discussion papers will include up-to-date research information, and opinions and interpretations, so that everyone interested in the project should know what the others are thinking. Copies of the discussion papers will be deposited in the libraries of those institutions most concerned.

The present discussion paper includes items written for the proposed fourth volume of the Encyclopaedia of Papua New Guinea. Since this volume will not now be published, the items are included here to reach the most urgent audience.

People who have contributions to this series are welcome to send them to Geoff Harris (Economics, U.P.N.G.) or to Faith Wieland (History, U.P.N.G.).

Donald Denoon

HISTORY OF AGRICULTURE

Discussion Papers (to September, 1977)

1. Papers on primary industry commodities, part I (Cocoa, Coconuts, Coffee, Rubber).
2. Papers on primary industry commodities, part II (Fishing, Livestock, Passion Fruit, Plywood, Pyrethrum, Rice, Sugar, Timber, Tobacco).
3. Papers on institutions in agriculture (Agriculture Education, Co-operatives).
4. Aspects of the rural economy (Wages, Business Development).

History of Agriculture Discussion Papers are lodged with the following libraries: University of Papua New Guinea, PNG University of Technology, Administrative College of PNG, Institute of Applied Social and Economic Research, Department of Primary Industry and the Highlands, Vudal and Popondetta Colleges.

COCOA INDUSTRY

Since 1965-6 the cocoa industry has been characterised by wild price fluctuations. The average in-store Rabaul price has fluctuated from K250 per ton in 1965 and K350 in early 1971 to K750 in 1969 and K1300 in 1974. Production especially from small holder producers, has responded to these price changes. A recent survey has shown that smallholder producers exhibit a strong price response beginning at the level of K340 per ton and becoming significant when prices rise above K450.

An International Cocoa Agreement (I.C.A.) has been made in an effort to stabilize world prices. Papua New Guinea became a joint member of I.C.A. with Australia in October 1973 and has agreed to limit exports of bulk cocoa if the indicator price drops below 71 toeas United States kilograms.

Price uncertainties, disease problems and the shortage of labour, especially on Bougainville, have limited the planting programme for cocoa envisaged in 1964. By 1970-71 the area under cocoa had reached 74,144 hectares of which 26% was in the indigenous sector. Most of the increased plantings since 1970 occurred in this sector. These plantings have been largely confined to the East New Britain and Bougainville districts which now have 53% of the plantation cocoa and 71% of indigenous cocoa plantings. Cocoa production reached 31,492 tons in 1973-4 of which at least 36% came from the indigenous sector.

A major breakthrough has been made in research into the stem disease "dieback". A joint research project between the Department of Agriculture, Stock and Fisheries (D.A.S.F.) and the University of PNG determined the cause of the disease, and high-yielding dieback resistant clones

have been developed at the Lowlands Agricultural Experiment Station, Keravat. Large numbers of cuttings have been distributed to growers who have readily adopted them in their holdings. Insect pests remain a major problem, especially in the Northern District where Pantorhytes spp. borers and capsids have laid waste large areas of cocoa. Expensive eradication campaigns have been undertaken by D.A.S.F. and the remaining settlers in the Northern District, but the only viable solution here seems to be the adoption of crops and agricultural systems which will be less susceptible to insect damage.

Over the past ten years the trend has been toward a concentration of cocoa production in the most advantaged producing areas with an increase in production by the indigenous sector as opposed to plantation production. In this sector growers have developed their own growing practices such as planting cocoa in old subsistence gardens, inter-planting cocoa in existing food gardens, with maintenance levels. The plantation industry, in contrast, has been subjected to increasing pressure to return alienated land to traditional owners and to rising labour costs. New land legislation (q.v.) is designed to facilitate the purchase and transfer of plantations to groups who are short of land. A number of cocoa plantations have now been taken over by village groups under this programme, but a firm policy on method of operations for such plantations has yet to be decided. The shortage of skilled managers for plantations has resulted in a decrease in productivity in this sector. At the same time the trend toward a stable mixed cropping agricultural system by village cocoa producers suggest that an alternative production system to meet the needs of Papua New Guinea is likely to be the

major issue facing the cocoa industry over the next decade.

R. McKillop.

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COCONUT INDUSTRY.

The coconut industry has not changed substantially in the 1970's. The coming of self government and independence has seen increased emphasis placed on the indigenous section of the industry. Official government policy is to encourage and help finance the sale of expatriate-owned plantations to Papua New Guineans. However, the place of the coconut industry in the overall economy has changed substantially. In some years export earnings from coffee were higher than those from coconut products, displacing the coconut industry from its historical role as the leading sector in primary industry. Moreover the completion of the Bougainville copper project brought considerable export earnings from copper ore and concentrates so that in 1972-3 the coconut industry contributed less than ten per cent of the total export income compared with 30-40 per cent in the mid sixties. However, higher prices in 1973-4 and 1974-5 considerably increased export earnings from coconut products in those years.

In the early 1970's, contrary to expectations, there was no real growth in the area under crop nor the total production of copra. There was, however, a steady increase in the proportion of the total crop produced by indigenous growers as can be seen in Table 1.

TABLE 1

Copra Production and Area Under Crop 1969-70 to 1973-4

	Area under Crop			Production		
	Indigenous	Expatriate	Total	Indigenous	Expatriate	Total
	(000 hectares)			(tonnes)		
1969-70	136	110	246	43,597	85833	129430
1970- 1	137	109	246	47,396	82083	129479
1971- 2	133	108	241	47,501	80278	127779
1972- 3	140	108	248	51,872	77384	129256
1973- 4	n.a.	103	n.a.	n.a.	72696	n.a

Source: Bureau of Statistics, Papua New Guinea

Prices for coconut products have continued to fluctuate considerably during the 1970's. In 1970, 1971, and 1972 prices fluctuated between a low of less than K110 per ton (July 1972) and a high of nearly K220 per ton. However, 1973-4 saw a steady increase in prices, reaching a peak of more than K500 in JUne 1974. The rest of 1974 and 1975 saw prices decrease until they were once again well below K200 per ton. The Government through the Copra Marketing Board has continued to administer a price stabilisation scheme.

Price fluctuations led to a considerable variation in export income from year to year (see Table 2). Britain, Australia, West Germany, and Japan continue to be the major purchasers.

TABLE 2

Export Income from Coconut products (K'000)

	Copra	Copra Oil	Copra Oil Pellets	Desiccated	Total
1970-1	14,207	7805	893	1204	24109
1971-2	9392	5880	588	1065	16925
1972-3	8083	4982	950	1191	15206
1973-4	23,672	13,761	1012	498	38943
1974-5 *	28,270	13,747	1332	-	43349

* 11 months only.

Source: Bureau of Statistics, Papua New Guinea

Present Government policies continue to support research and extension work in the coconut industry in order to increase both rural income and export income. There is increased emphasis on the use of coconut products at the village level in accord with government policies to develop appropriate technologies for rural areas. In this case, however, the emphasis will be on coconut products other than copra itself.

So far the 1970's have not seen any significent increase in the amount of processing of copra in Papua New Guinea. The production of desiccated coconut ceased in 1973-4 and although the opening of a soap factory in Lae in early 1976 may mark a step in the other direction the coconut industry is still basically a primary industry.

Lyndsay Farrall

COFFEE INDUSTRY. The coffee industry in Papua New Guinea has generally followed a pattern of boom and gloom which has made analysis of basic trends difficult. Following the initial development of the industry by expatriate planations in the 1950's the crop was enthusiastically extended to small holder village plantings throughout the Highlands areas. A rapid increase in production resulted and by 1967 Coffee had become Papua New Guinea's major export crop. In addition the industry has become predominantly indigenous, and the 35166 ha of village coffee plantings accounting for over 70% of national production.

On the surface the coffee industry has been hampered by an uncertain world market. Because of a general over production coffee extension programmes were withdrawn in 1965. The situation was changed in April 1973 when the International Coffee Agreement was modified which allowed Papua New Guinea to expand coffee plantings. A programme to plant 3000 ha of coffee in areas with few or no economic alternatives was launched late in 1973. With a general improvement in world commodity prices in 1974 good prices were received for coffee during the early part of that year reaching 95t per kilogram for Y grade in otore Highlands. The improvement was short lived and by 1975 record low prices were received bottoming at 61t per kilogram for Y grade in March-April.

Marketing problems were compounded by government attempts to restructure coffee buying within Papua New Guinea. In 1974 legislation was enacted to restrict roadside buying of coffee to indigenous buyers. In addition the government attempted to ban the selling of coffee cherry. Widespread unrest with these changes subsequently resulted in the lifting of the cherry ban and the granting of a number of exceptions to expatriate coffee buyers.

However, marketing problems are an inadequate explanation for the general feeling of despair prevalent in the coffee industry. Highland leaders have expressed concern at the state of the industry: field reports have emphasised a high prevalence of abandoned coffee

plots, declining maintenance and the absence of new plantings, and social unrest has reached crisis levels in many Highland areas. Although it is probably too early yet to confirm these observations with official figures the rate of increase in coffee production has declined in recent years and the estimated production for 1974-75 is actually 1000 - 1500 tonnes down on the previous year. The 1973 sample survey of small-holder coffee producers has also shown that only 5% of the total coffee plantings are immature trees.

Intensive studies of coffee producing areas suggest that the problems facing coffee are derived from the basic structure of the industry. Simply put, the number of coffee trees owned by most growers is insufficient to produce enough income to satisfy the rapidly rising expectations of the people. The 1973 survey showed that the average grower had only 374 trees and that 80% of growers had less than 0.2 ha of coffee. With good management practices the average plot might earn K75 per year but the maintenance of most village gardens is such that the average grower can expect only K10 - K15 from his coffee. To the vast majority of Highlanders the opportunity to increase coffee plantings and hence cash returns, is limited by the shortage of land. This problem is aggravated by a rapid rate of population increase in coffee growing areas.

Coffee, however, has not been established on an equitable basis. Traditional cultural values, expatriate planters and the agricultural extension service have combined to encourage the establishment of large coffee plantings, by "big men". In the Goroka area, for example, the plantations of bisnis leaders average over 9000 trees which is some twenty times the Gorka average. Such men have a substantial income from coffee and other enterprises which may exceed K10,000 per annum. Thus coffee has brought significant wealth to the few but only a small return to the majority.

The implications of this situation are by no means firmly established but significant, if often conflicting, trends have recently emerged. On the one hand supporters of Western models of development point to the

potential for development offered by the ability of bisnis leaders to reinvest their wealth in new ventures. During the late 1960's there was a rapid rise in investment in business ventures such as trade stores, trucking ventures and cattle projects. The entrepreneurial orientations of bisnis leaders in the Highlands has led many observers, notably Finney, to develop an optimistic view of Highland societies which are predisposed toward economic development.

On the other hand a number of observers, among them Howlett, Brookfield, Gerritsen and Standish, have pointed to the rapidly increasing inequalities in Highland societies as the basic contributing factor to social unrest and economic stagnation. Two divergent trends have been described. In many parts of the Eastern Highlands for instance, the emergence of a rural elite has become apparent as wealthy bisnis leaders find areas of interest with others of their own kind at the expense of group loyalties. Powerful interest groups with restricted membership have emerged which have taken policy stands directly opposed to the interests of the majority of village people. Two of the issues which have divided the community into distinct interest groups have been the attempts to ban the sale of coffee cherry and claims for land tenure conversion. This latter trend involved the enclosure of increasing areas of land for cash cropping and grazing ventures by bisnis leaders and eventually the claim to convert tenure from clan to individual title. The effect is social unrest within the group. In other areas, notably the Chimbu District, bisnis leaders have been able to divert social and political unrest within their communities toward outside groups by reasserting group identity and reinforcing old loyalties. The result has been widespread outbreaks of tribal fighting and violence. The insecurity further hinders coffee productions.

In summary then, the wealth which coffee has brought to the Highlands people has brought mixed results. It has brought the infrastructure and material goods of a modern economy to many village people: it has allowed a few growers to attain wealth and power. it has brought disillusionment to many; and, while a landless class has not yet emerged, the inequalities of income have created a sense of relative poverty within some communities. There is still some

expansion of the industry into new areas, notably the Southern Highlands. Here a different development strategy has been adopted, in which coffee plantings are encouraged under a clan-owned "plantation" system. Also several Highland groups have recently taken over the running of former expatriate owned planations. However, there are few indications that the coffee industry will overcome the fundamental problems which have emerged and move on to a more productive stage of development.

E.McKillop

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RUBBER INDUSTRY. Two trends are clear in the recent history of the industry in Papua New Guinea. First, between 1964 and 1974 world natural rubber production rose by some 48% from 2.35 million tonnes to 3.47 million tonnes, caused mainly by a 78% increase in production by Malaysia. However, during the same period, Papua New Guinea production rose by only 10%, from 5,041 tonnes to 5,553 tonnes, and representing only 0.16% of total world production in 1974.

Second, rubber planting by Papua New Guineans on smallholdings was slow to develop, contributing only 2.5% of total rubber exports by 1971. However, production since then has risen steadily to 314 tonnes (1974-75), being 6% of total Papua New Guinea production. From 1965 to 1970 the area of estates increased at a rate of less than 1% per annum while smallholdings increased annually by 40%. Since 1970 the estate sector has declined in area. Smallholdings on the other hand have increased rapidly in number and area: there are now about 2,800-3,000 smallholders growing some ,3500 hectares of rubber.

THE ESTATES SECTOR

The estates employ tappers for only two years, after which each man is repatriated to his home village. In most other rubber-producing countries, skilled workers are encouraged to live permanently on estates. There has been no attempt to introduce such a system in Papua New Guinea, and as a result, high tapping standards are difficult to achieve. Unlike Malaysia where the jebong tapping knife is universally used, Papua New Guinea estate tappers are provided with the gouge knife, which invariably produces a higher rate of tree and bark damage.

There are seventy-nine estates in the country with an average of 174 hectares. Sixty-two of these are in Papua. Almost 40% of estates have less than 40 hectares, 14% have more than 400 fhectares, 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 clonal stock (budgrafted or polyclonal seedling). A further 18% is planted mainly with "improved" material, and the remain-

ing 68% is almost entirely non-clonal stock. The majority of estates are therefore at a competitive disadvantage compared with other countries. Very little new planting or replanting is taking place, and no positive steps have been taken to change from traditional sheet and crepe production techniques in an endeavour to present estate crude rubber in a more modern, competitive form.

THE SMALLHOLDER SECTOR

Planting by Papua New Guineans has multiplied rapidly since 1960, particularly in the Western Province which boasts some 58% of the current national total of about 2,800 smallholders. Production has grown to over 300 tonnes in 1974-1975, and a continuing production growth rate of about 15% per annum is confidently predicted.

Planters have always used conventional methods of forest clearing, planting and 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 fertilisers are usually required. The smallholdings are almost completely free from the normal major diseases of rubber trees.

Smallholders, encouraged and assisted by the Department of Agriculture, have planted wholly polyclonal stock raised from imported (Malaysian) and locally produced seed, so that the smallholder should derive a greater return than his estate counterpart. From 1975-1976 there will be more use of material budded in nurseries using the most modern techniques of propagation, and based upon carefully selected clones suited to Papua New Guinea smallholdings.

Such planting has taken place both in villages and in resettlement schemes. These schemes, principally in the Central, Gulf and East Sepik Provinces, generally cater

for a centralised rubber process, with individual smallholder block latex collection by vehicle. Scheme plantings represent only about 16% of the total national smallholder area of some 3,500 hectares; however, redevelopment plans should result in an increase of at least 1,500 hectares of budded rubber planting in these areas.

All smallholders can obtain loans from the Papua New Guinea Development Bank (qv) once the trees are ready for tapping, to assist them in purchasing essential equipment and building materials. For an average (two and a half hectare) holding, and upon the basis of a six-holding share factory, an individual loan is set at about K490.00, at 8% interest per annum.

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

The success of smallholder rubber plantings gives strong support for the view held in a number of other countries that Hevea is almost ideally suited to the way of life of most smallholders. It encourages development at village level, combined with low level technology and village based management.

MARKETING

Papua New Guinea rubber is still marketed by the Papuan Rubber Pool, based in Australia. The Pool's buying price is based upon Singapore Rubber Exchange prices, and Australia, under a trade agreement, takes the whole Papua New Guinea output.

Both estate and smallholder sectors benefit from a price umbrella, which provides for a subsidy during years of low world market prices (the average subsidy between 1971 and 1975 has been 2.4 toea per kilogram). Estates usually

sell their rubber individually or through agents to the Papuan Rubber pool. Smallholders, however, sell through the Department of Agriculture organization (and thence to the Papuan Rubber Pool), and they are spared the "middleman" problem. This marketing facility for the smallholders, which amounts to another form of government subsidy, has meant that the average Papua New Guinea grower receives some 65-75% of Papuan Rubber Pool prices, compared with, for example, Nigerian rubber farmers who often receive as little as 25% of market prices.

FUTURE PROSPECTS

The world production pattern is not likely to change appreciably in the long term. Modern clonal yields will be higher and the swing to production of Technically Specified Rubber (TSR) will continue to the detriment of the traditional ribbed smoked sheet (RSS) producer. The competitive position of natural rubber vis-a-vis synthetic rubber is likely to grow stronger, because oil shortages and price increases are more favourable to natural, than to synthetic rubber. This, combined in the short term with measures being taken by the three major, south-east Asian producers (Indonesia, Malaysia and Thailand), through stock-piling, replanting, and restricted exploitation systems, should result in better prices on world markets, with a steadily increasing demand for natural rubber, if it is presented in a modern form acceptable to the buyers. The current marketing arrangement with the Papuan Rubber Pool may not continue to function, at least in its present form. The country's crude rubber production would almost certainly then be faced with international competition, and the present RSS and crepe grades would be difficult to sell in competition with technically specified forms.

Papua New Guinea estates will have to modernise substantially, and producing tree areas must be revitalised through high-yielding clonal replacement if manufacturing costs are to be significantly lowered. The 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 achieve sufficient output to support a centralised re-process, to either speciality or block rubber. Formalised schemes must similarly achieve total planted areas which will permit the viable operation of central block rubber processing units.

Papua New Guinea's natural rubber industry is upon the threshold of a new era. Whether this new era proves beneficial to grower and country alike, will depend upon the industry's ability to modernise and keep pace with international producer and market developments.

C. E. W. Arnold.

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