POST-1960S COCOA AND COPRA PRODUCTION IN BOUGAINVILLE

by Joachim Lummani

Cocoa and copra production have been an integral part of agricultural development in Bougainville, copra since the early 20th century and cocoa mainly since the 1960s.[1] The decade of civil war from late 1988 saw a significant decline in the production of these crops. Since the late 1990s, however, agricultural activities have once again been given priority. Resumption of mining, the major factor in the Bougainville economy in the 1970s and 1980s, is not currently being considered seriously because of the problematic social and environmental costs associated with it. While emphasis on perennial tree crop plantations, such as cocoa and coconuts, may be necessary for Bougainville's economic recovery, it can also be expected to cause or contribute to a range of social and other problems associated with land use.

GENERAL PARAMETERS OF COCOA AND COCONUT INDUSTRY ON BOUGAINVILLE

Cocoa and Coconut Area and Distribution

The Bougainville Province covers a total area of about 8,788 square kilometres [Griffin with Kawona 1989: 225], approximately two per cent of Papua New Guinea's total land area. An estimated 332,000 hectares are considered suitable for agricultural production [Bleeker and Freyne 1981: 8; see also NSPG 1982: Pt 1, Ch. 3, p. 6]. The 1980 census survey estimated the number of smallholder cocoa growers at 15,792 and that of coconut growers at 9,186, cultivating an estimated total area of 18,035 and 34,285 hectares respectively [NSPG 1982: Pt 1, Ch 5, pp. 1, 7; Ch. 3, p. 7; and see Table 4]. The total area under large scale plantation cultivation was then between 20,000 to 30,000 hectares, though a 1982 study for the North Solomons Provincial Government (NSPG) put the figure at 20,682 hectares (see Table 1 below). Most cocoa areas are inter-cropped with coconuts.

Cocoa and coconuts are grown across the province. Generally, cocoa has been the dominant crop in the south, around Buin, Boku and towards the Jaba River; while copra has been more important than cocoa as a source of cash income on Buka Island, along the north-east coast, and as far south as coastal Kieta. Buka Island has been a mixed cocoa and copra zone, its south given over to cocoa, while copra is grown on the smaller islands.

Before 1988, the year that the period of conflict began, Teop, Keriaka, Suir and Buka Island were the largest producers of cocoa in the north, as well as having the highest per capita income from it. Large producers in the centre were the Nasioi, Rotokas, Aita and Koromira area and in the south, it was the Buin, Nagovisi and Siwai area. Teop and Rotokas were the largest producers in terms of both large scale plantation and smallholder production. Most copra was produced in Hahon, Teop, Selau, Kunua, Keriaka and Buka Island. According to 1980 data, these areas accounted for about 50–60 per cent of provincial production, and 64 per cent of all production by village farmers.

Potential Arable Land for Agricultural Production on Bougainville

Bougainville's capacity for agricultural production is constrained by both technical and human factors. Climate, soil, vegetation, topography and rainfall variations are among the factors that determine the capability of land for agricultural production within each district, and which in turn influence land use and cropping patterns. The distribution of arable land and land actually utilised in the early 1980s is summarised in Table 1.

Table 1: Distribution of Arable Land and Land Under Cash Crops (hectares) Early 1980s

Admin District	*Total Arable(1)*	*Smallholder Cash Crops (2)*	*Plantations (3)*
Buka	68,000	19,528	3,289
Tinputz	30,500	7,563	7,030
Wakunai	45,500	3,916	3,405
Kieta	32,500	9,485	4,960
Buin	49,000	4,360	168
Boku	56,000	3,360	-
Torokina	14,000	495	-
Kunua	36,500	3,313	1,830
Total	332,000	52,020	20,682

Source: NSPG, 1982

The areas under smallholder and plantation cash-crop cultivation in 1980 were 52,020 and 20,682 hectares respectively. They represented about 15.7 per cent and 6.2 per cent respectively of the total potential arable land. The total area under cash-crop production was 72,702 hectares, approximately 22 per cent of total potential arable land. There was some evidence of an increase in the smallholder area under cash-crop cultivation, as implied by the increasing production trend until 1988/89 (see Figure 3 in the Appendix).

In 1964, five per cent (420 km^2) of the area of Bougainville was devoted to village food gardens and cash crops, with a further 1.5 per cent (126 km^2) used for non-indigenous plantations [McAlpine 1967 p. 160]. A detailed national study conducted by the Commonwealth Scientific and Research Organisation (CSIRO) in the 1980s found that 55 per cent of the provincial land mass was devoted to agricultural land use, where that was defined by the presence of anthropogenic vegetation (altered by humans), current food gardens and cash crops [McAlpine and Quigley no date. Table 1]. These authors reported that 80 per cent (7428 km^2) of the total area of 9329 km^2 was forested. A recent study by Bourke and Betitis [2003] recorded the average population density as 19 persons/km^2 in 2000, with the range from 15 persons/km^2 on Bougainville Island to 1224 persons/ km^2 in the Carteret Islands — the highest recorded population density in PNG and at a level where food was chronically scarce. Bourke and Betitis [2003: 7] estimated that 160,000 tonnes of staple food was grown in the province in 2000, of which two thirds (65 per cent) by weight was sweet potato. Other important staple foods were cassava (12%), banana (8%), coconut (6%), Chinese taro (5%), taro (2%) and yam (2%).

Land Systems on Bougainville

CSIRO classified landscapes in Bougainville and Buka into 40 land systems (areas with similar patterns of topography, soil and vegetation) [NSPG 1982: Pt 1, Ch. 2, p. 5]. According to the CSIRO's classification, approximately 36 per cent of land in Bougainville and Buka was considered suitable for both food crop and cash-crop production, subject to local limitations in terms of differences in soil fertility, drainage, preparation costs and possibility of erosion.

DEMOGRAPHIC SITUATION ON BOUGAINVILLE

Rapid population increase on Bougainville, if not eased by some means, will constrain the extension of agricultural production and lead to increased competition over available arable land. Bougainville's average annual population growth rate is about 3–3.5 per cent per annum, above the national average of 2.3 per cent. With an increasing population, it seems likely that the communal land tenure

system, which guarantees the use of land by all members of a community, will become difficult to maintain in the long run. There is, of course, no uniformity in the intensity of land use and of its scarcity throughout the province. One cannot say with certainty that shortages of access to productive land had not already begun to occur in various places before the conflict.

Table 2: Population Estimates for Bougainville Districts, 1995

District	*Population Estimate*
Buka	28,000
Atolls	9,000
North West	16,000
North East	14,000
Central	30,000
Siwai	13,000
Telei	23,000
Bana	17,000
Total	150,000

Source: Pourhosseini 1995: 13

The population of the province was about 39,000 in 1939; 59,250 in 1967 and 129,000 in 1980 [Hirsch with Beck 1991: 165; NSPG 1982: Pt 1, Ch. 3]. The actual provincial population in 1995 was estimated as about 150,000 (see Table 2 above) but, with immigration, this would have been around 160,000 or slightly higher in 1988. The *2000 National Population Census* indicates a population of 175,160 [Papua New Guinea National Statistical Office 2002].[2]

It has not been possible to access data on internal demographic structures and their impact on access to land within each district of Bougainville from the pre-conflict years. However, Mitchell's study [1976], based on fieldwork conducted from 1969–70 and 1971–73 in the Nagovis area of Bougainville, provides some insight in this respect. Applying 1970 data on population, age and sex structure for the areas of Nagovis he was studying, Mitchell projected a rapid growth in the rural population in excess of six per cent per annum. He mentions cases of shortages of land for gardening, resulting in villagers being forced to make gardens further away from home or to depend more on imported food items [Mitchell 1976: 127]. Land pressures vary considerably both between and within each district. Nevertheless, it is clear that rapid population growth can have considerable impact on availability of land.

The 'Provincial Nutrition and Garden Survey and Associated Land Use Study' undertaken as part of a broad ranging development study, organised by NSPG in the early 1980s, indicated some of the problems likely to arise in areas where the growth of population started to push against the supply of arable land [NSPG 1982: Pt. 1, Ch. 3, p. 12]. Some of these were already evident before the conflict:

— the contraction of the per capita garden area, resulting in gardens being unable to provide sufficient food;
— the shortening of fallow periods (two to five years on average), thus adversely affecting soil fertility and yields (as had already begun in Siwai at the time of the aforementioned study);
— competition for land between food crops and cash crops;
— the clearing and cultivation of marginal and unsuitable land, likely to result in poor yields, loss of crops, soil erosion, and so on;
— a lack of access to land for some people who would then need to turn to other means of support.

The 1980 rural population estimate was 97,000, mainly involved in subsistence agriculture and cash-cropping. The North Solomons Provincial Government study predicted that this figure could double by 2000, if a 3–3.5 per cent annual growth rate applied. Since then, the rural population has possibly increased considerably, especially if in some areas the rural population grows at a higher rate than the overall increase of provincial population (as may be suggested by Mitchell, above).

A 'Village Survey', also conducted in 1981 as part of the NSPG 'Development Study', estimated the average family size as five members per household and number of food gardens per family unit as two. [NSPG 1982, Pt. 1, Ch. 3, p. 12]. A fallow period generally varies from five to 15 years, with an average of about six years. In some areas, villages have very short fallow periods. Examples cited in the study were Taokas, Tearoki–Aita, Nasioi, Suir and Bakadaa community government areas and were said to reflect local population pressures associated, *inter alia*, with intensifying land use.

Population and Land Availability, 2000

In the absence of recent studies on population and land availability on Bougainville, a general indication of the significant variation in land/population pressures between districts is provided by analysis in the 1982 NSPG study. Data on the likely relationship between the supply of, and demand for, land resulting from projected population increases between 1982 and 2000 is presented in Table 3.

Table 3: Projected Population and Land Availability by District, 2000.

Admin District (1)	*1982 Rural Village Population* (2)	*Population forecast for 2000* (3)	*Land Required for Food crops 2000* (4)	*Land Required for Cash Crops 2000* (5)	*Total Land Available 2000* (6)	*Balance of Arable Land Available 2000* (7)
Buka	19,046	35,640	17,820	36,709	64,711	10,182
Tinputz	6,677	12,500	6,250	14,125	23,470	3,095
Wakunai	6,121	11,470	5,735	7,341	42,095	29,019
Kieta	19,680	36,840	18,420	17,683	27,540	(8,563)
Buin	15,041	28,160	14,080	8,166	48,832	26,585
Boku	18,306	34,260	17,130	6,852	56,000	32,018
Torokina	1,710	3,200	1,600	928	14,000	11,472
Kunua	5,948	11,140	5,570	6,238	34,670	22,862
Total	92,529	173,210	86,605	98,042	311,318	143,796

Source: NSPG 1982

The final column in Table 3 shows a balance of arable land still expected to be available in each district in 2000 after accounting for how much land was expected to be required for food and cash crops. This shows that in 1982 it was anticipated that by 2000 there would be a large deficit in Kieta and a small margin in Tinputz, while Boku, Buin, Wakunai and Kunua districts were expected to have a comfortable excess of land over requirements. Buka and Torokina districts were expected to have a balance of moderate dimensions.

The anticipated deficit situation in the Kieta area was expected to be a product of a number of factors in addition to the most obvious ones — the limited total arable land available and the large and growing population — including limitations imposed by agro-climatic conditions, soil fertility, and so on. Further, some areas of the Kieta district were occupied by the mine and the Arawa, Loloho and Kieta towns, while other parts were occupied by migrants from other parts of Papua New Guinea. As a result, Kieta may have been experiencing particularly intense pressures on land in 1982, and some of those pressures may well have reduced in intensity by 2000. If so, then the deficit situation anticipated in 1982 may well have become quite different by 2000. In the absence of recent land and population studies, it is not possible to know this with certainty. What this data does demonstrate, however, is the potential for serious land shortages in some areas of Bougainville, especially in situations where increasing proportions of land are devoted to cash crops.

COCOA AND COPRA PRODUCTION

From the 1960s to the 1980s, most rural Bougainvilleans became dependent upon cocoa and coconuts as the dominant source of cash income. For example, the average cash income from the two crops in 1980 was K728 per rural household, equivalent to K154 per capita, of which cocoa contributed K131 and copra K23. The provincial average income from cocoa growing households was K807 per household. These data were about eight years old when the conflict started in 1988. By now somewhat out of date, the figures do indicate the significance of cash crop income in the pre-conflict period. In the post-conflict situation, alternative sources of cash income are much reduced (with the Panguna mine not operating) the reliance on cash crop income can be expected to have increased.

Kunua, Wakunai and Tinputz, had the highest share of income from cultivators. Tinputz district was mainly a centre of production from smallholdings and plantations. Although cocoa was dominant in south Bougainville, there were virtually no plantations there. Those in Buin (see Table 6 in the Appendix) went out of production prior to the conflict. Kihill and Patupatuai plantations used to be owned by the Uniting and Catholic churches. Toburuai plantation, inter-cropped with cocoa and coconuts (not shown in Table 6 in the Appendix), was overgrown by weeds some years before 1988, enhancing opportunities for illegal harvests by local villagers.

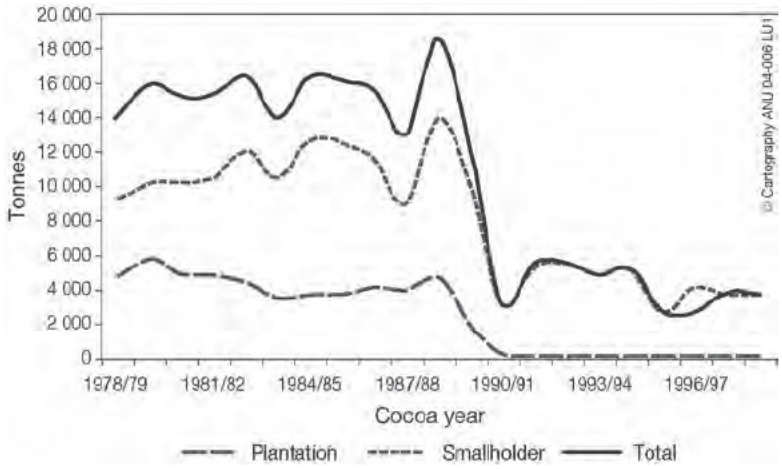
The increasing population will probably continue to depend on these crops for a long time to come, particularly if no other significant agricultural crops are adopted. Historically, the plantation sector has been associated with large-scale production for exports. But smallholders have gradually increased their contributions to the cocoa and coconut industries in Papua New Guinea. Smallholders currently contribute about two–thirds and four–fifths of cocoa and copra production in Papua New Guinea, respectively.

Cocoa

Before the conflict Bougainville accounted for about one–third of national cocoa production and smallholders accounted for well over 60 per cent of total production in the province (Table 7 in the Appendix). In the years just before the conflict, there was a steady growth in smallholder production while production by the plantation sector declined (Figure 1).

Cocoa production in Bougainville reached its highest level in 1988/89, with 18,441 tonnes, which was also the highest in the country. Output declined as the conflict intensified. Smallholder production declined by about 28 per cent and 69 per cent in 1989/90 and 1990/91 respectively, while the plantation sector fell by 58 per cent and 99 per cent in those years (Table 7 in the Appendix).

Figure 1: Bougainville cocoa production 1978/79–1998/99 plantations versus smallholders



Source: (Cocoa Board of Papua New Guinea 1999)

There was intensive cocoa planting in most parts of Bougainville from the 1960s to the 1980s [Figure 3 in the Appendix; Mitchell 1976: 81; Hirsch with Beck 1991: 165]. There were, however, often factors involved in the increase of production during the period, one being an improved road transport system.

It has not been possible to obtain data indicating the extent to which increased production might have been a result of yield increases in established areas as a result of Bougainvillean smallholders adopting better yielding varieties and applying fertilisers. However, comparison of the data from 1980 with 1999 in the *Report of the Cocoa and Coconut Baseline Survey, Bougainville Province* (the *1999 Baseline Survey*) indicates increased production was probably a result of additional land being planted with cocoa. The number of hectares planted by each grower increased significantly between 1980 and 1990 — 166.7 per cent overall — from 1.14 hectares per grower in 1980 to about 3.04 hectares per grower in 1999 [Cocoa and Copra Extension Agency of Papua New Guinea 1999: 10–13].

It may be that increasing family size has created pressure for increased planting. A survey undertaken in 2000 on smallholder cocoa and coconut growers in East New Britain, a province which, to some extent, shares socio-economic characteristics with Bougainville, found that 67 per cent of those who got into farming in the previous decade were prompted to do so mainly by population increase and changing lifestyles, while smallholder farmers also planted more

cocoa and coconut trees [Omuru et al. 2000]. The *1999 Baseline Survey* indicated that about 60 per cent of smallholder farmers had plans to expand their cocoa blocks. In 2000 smallholder producers were busy planting seedlings distributed by the Cocoa and Coconut Extension Agency, based at Kubu (Hutjena) on Buka Island. About three million seedlings had been distributed in that year, with more to come [Louis Kurika, Coconut and Cocoa Research Institute officer, Buka, personal communication, 2000]. The increasing production was mainly restricted to smallholders because almost all plantations were non-operational.

If increased planting of smallholder cocoa continues it is bound to contribute to existing land pressures associated with growing population pressures, especially in already densely populated rural areas. Farmers in sparsely populated areas are likely to make new clearings for agricultural purposes, while those from densely populated areas of the province, such as south Bougainville, are likely to make more intense use of available land.[3] In areas where some land is still available, people are more likely to meet their cash demands by increasing the number of hectares planted (causing additional land clearance) rather than attempting to raise the yield per hectare, for example through the use of fertilisers (something that smallholder farmers have seldom resorted to in Papua New Guinea — for example, a 2000 study found that out of a sample of 100 farmers surveyed, only eight per cent used some form of fertiliser while only 10 per cent used herbicide/weedicide) [Omuru et al. 2000].

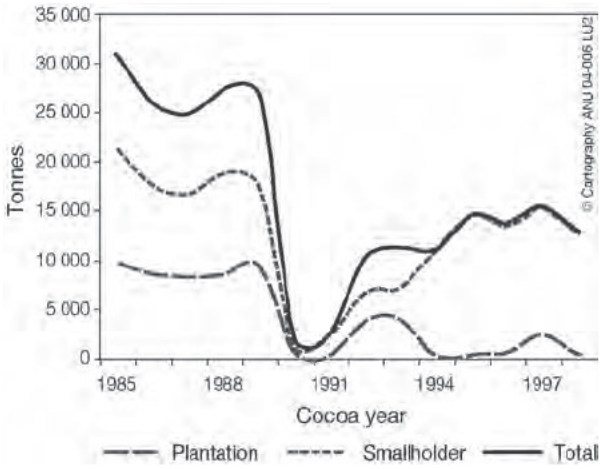
In 2000 the Bougainville Administration was proposing that plantations in the province should be sold to local people, preferably the original landowners. This is an idea which is not without difficulties. Similar situations in other areas of Papua New Guinea led to competing groups claiming to be the original landowners. There is also no guarantee that sale of plantation land to original landowners will result in the land being used for further agricultural development. If the proposal is implemented, original landowners are unlikely to accept people from other parts of Bougainville or Papua New Guinea as a whole, at least in part because not so long ago many experienced social problems associated with the influx of plantation migrants from elsewhere.

Copra

Data from the Copra Marketing Board (CMB) does not enable the disaggregation of production by districts. Copra production by sector shows a relatively larger proportion coming from the smallholder sector (see Figure 2).

The fall in copra prices in 1988/89 (see Figure 5 in the Appendix) was a factor in the decline in production otherwise due to the conflict. Copra production rapidly increased as farmers sought to meet basic requirements.

Figure 2: Bougainville copra production 1985–1998 smallholders versus plantations



Source: Copra Marketing Board of Papua New Guinea 1999

Unlike cocoa trees, coconut palms do not require regular maintenance to keep them producing. While a total of about 19.9 million cocoa trees were destroyed during the conflict as well as by the 1996 and 1997 drought in Papua New Guinea, only 866,822 coconut palms were destroyed. The coconut industry is at present an immediate provider of cash for smallholder farmers while many also undertake new plantings. As a result, smallholder copra production continues to rise (see Figure 2).

Changes in Land Area under Smallholder Production

The area per grower for both smallholder cocoa and coconut growers in Bougainville has increased from 1980, as demonstrated by the data presented in Tables 4 and 5. The total area under smallholder cultivation for cocoa has increased while that of coconuts has slightly decreased (see also Table 7).

Table 4: Number of Cocoa and Coconut Growers, Distribution of Arable Land, and Area Per Household, 1980

Cash Crop	*Household*	*Area (ha)*	*Area Per Household (ha)*
Cocoa	15,792	18,035	1.14
Coconut	9,186	34,285	3.73
Total	24,978	52,320	

Source: NSPG 1982

The *1999 Baseline Survey* compiled by the Papua New Guinea Cocoa and Coconut Extension Agency revealed the following estimates:

Table 5: Number of Cocoa and Coconut Growers, Distribution of Arable Land and Area Per Household, 1999

Cash Crop	*Households*	*Area (ha)*	*Area Per Household*
Cocoa	15,715	47,774	3.04
Coconut	8,151	32,382	3.97
Total	23,866	80,156	

Source: Cocoa and Coconut Extension Agency of Papua New Guinea 1999

The total area under smallholder cocoa cultivation has increased by about 164.9 per cent since 1980, while the number of smallholder cocoa growers saw a slight fall of 0.49 per cent. The 1982/83 'North Solomons Provincial Crop Survey' cited in the *1999 Baseline Survey* estimated 1.43 hectares per grower. This is much lower than the rate of 3.04 hectares per household for cocoa estimated for 1999. The increase in area per farmer for cocoa, and the relatively fewer number of farmers in 1999 compared to 1980, implies not just increased areas of land being used per farmer but also increased competition for available fertile land for agricultural production.

For coconut growing, the 5.6 per cent reduction in the area under smallholder cultivation combined with the 11.27 per cent reduction in the number of growers resulted in the marginal increase of 6.4 per cent in area per grower. By contrast, the area per grower for cocoa increased by 166.7 per cent between 1980 and 1988.

As the 1982 NSPG study pointed out: 'unless small farmers are trained in good husbandry and adopt new technology in the form of improved varieties of planting materials, they will continue to clear large areas of land'. Mitchell made several suggestions directed at reducing the pressure on farmers to allocate more land to cocoa trees: (i) that rural farmers should be shown how to make their existing stands more productive by supplying them with chemical fertilisers and insecticides; (ii) that a program of intensive rural-based agricultural assistance be designed, which focuses on maintenance, rejuvenation, improved harvesting and processing techniques; and (iii) that realistic efforts be made to reduce the rapid rate of population growth. In the light of Bougainville's complex land tenure systems and types of communal ownership, such suggestions seem worthwhile. Perhaps an examination of land tenure customs and associated issues that are likely to create social problems should also be given priority.

Population growth may slow down, sooner or later. Nevertheless, in the meantime, it can be expected that there will be continuing pressure for increased

tree crop plantings to meet increasing cash requirements while at the same time maintaining traditional food gardens. Such trends will only intensify competition over land and associated social problems. In south Bougainville, which has the second largest population, people openly speak about reclaiming land that has been sold to people from other parts of Papua New Guinea (personal observation).

Generally, two options are available for satisfying the rising demand for consumer goods as the rural population becomes increasingly involved in modern economic activities: (i) get paid employment or (ii) turn to cash-cropping activities. In the absence of economic activities that create wage employment most people are likely to turn to cash-cropping activities. The continuance of large-scale land clearances can be expected to usher in further long-term problems.

Many and varying circumstances contributed to the emergence of the conflict in Bougainville. Population pressure on land use was one of these. In Bougainville transactions involving customary land were less common than, for example, in East New Britain[4]. That land was being alienated in Bougainville from customary terms of tenure, as well as being immobilised from habitual, cyclical methods of production, possibly contributed to a build-up of potentially disruptive social energy. Another contributing factor may have been that the conflict also coincided with a period of falling world cocoa and copra prices in mid-1988 (Figures 4 and 5 in the Appendix to this chapter).

SOME IMPLICATIONS OF PERENNIAL TREE-CROP PLANTINGS

Perennial tree-crop plantings, particularly cocoa, in the form of permanent establishments, affected many traditional aspects of lives of Bougainvilleans. As with mining activities, nothing in the experience of the majority had prepared them to assess the trade-off between the economic gains to be derived by planting cocoa trees and the disruption to their social interactions that allocating land to such purposes could cause. Aspects of traditional culture, such as power relations, land-use patterns, access to land, attitudes and behavior, were significantly affected by cocoa planting on communally owned land.

In this part of the chapter I have made use of arguments about patterns of land use in Nagovis developed in an illuminating article by Mitchell [1982] and also in his monograph *Land and Agriculture in Nagovisi* [1976: 118–149]. Unlike the flexibility that prevailed concerning use of land before extensive planting of cocoa began in the early 1960s, from that time individuals began to identify themselves with tracts of land on which they planted their cocoa stands. Previous patterns involving the temporary use of customary land for subsistence gardens were changed into

a pattern of permanent land use, with land tracts becoming controlled by individuals or small groups. The inequalities in landholdings among clan lineages which happened to exist at the time land was allocated to cocoa have been 'frozen' and exacerbated, with members of lineages that happened to be land-poor in the 1960s finding their situation growing worse as the population grows. This is because land on which cocoa is planted becomes frozen from movement through the normal cycle of land tracts (under which land tended to move gradually between lineages, over several generations — for example, through transfer of land as part of mortuary arrangements). In the pre-cocoa era, inequalities were irrelevant mainly because of the relative abundance of land for the main purpose for which it was then required — namely subsistence agriculture. The freezing of the normal cycle of movement of land tracts among lineages caused imbalance in land resources.

Money became the key in the new forms of cooperative activities, which included cocoa business groups and trade stores. A range of consequences flowed from increasing cocoa planting. For example, the associated restrictions on peoples' choices regarding planting food crops and undertaking other activities probably contributed to a build-up of social frustrations. Before the introduction of cocoa, individual members of households could cultivate small plots as they thought fit and with different aims.

Tracts occupied by cocoa became avenues for access to social and economic power. They provided individuals, who had been living by the more restrictive norms that were typical of traditional communities, with a new opportunity to acquire an ascendancy over others by virtue of their wealth. Minorities in clans or village communities — those with ample land available for cocoa — gained access to a 'good life' denied to the majority. While most members of a clan or village community had the means to own some material possessions, they usually were what Odera Oruka [1981] describes as 'socially insignificant personal properties'. They were not of a kind to provide social and economic power over others. Such a situation no doubt contributed to envy, distrust and ensuing social disharmony in communities used to an essentially egalitarian situation.

As a new form of wealth, money facilitated the acquisition of material possessions, which, in turn, were instrumental in changing the character of traditional communities. Money became a significant cause in the fragmentation of the social fabric from which antagonistic sub-groups emerged. New social classes began to command power, prestige and access to cargo. As Galtung [1974: 27] has pointed out, the introduction of cocoa can be seen as having stimulated and, in turn, underpinned hierarchical interaction patterns. It induced people into relationships across class, where previously most of them had taken for granted a considerable degree of social and economic equality.

The point of this chapter is to show how cash-crop activity has contributed to change in Bougainvillean society. The key change has been from a relatively egalitarian-based society towards one that is more class-based. There is some inevitability in the process, in so far as Bougainville is part of a dynamic global community. At the same time, increasing economic inequality amongst the previously egalitarian Bougainvillean people arising from various sources, including unequal access to land for cash crops, was undoubtedly a factor in the origins of the conflict. Francis Ona, the leader of the Bougainville Revolutionary Army and his early supporters were in fact seeking to restore egalitarian fairness by trying to suppress developmental change. The question arises, however, as to whether they in fact contributed to an ever-widening situation of inequality, in that after the conflict Bougainvilleans are even more dependant on cash crop income than before the conflict, when there were more diverse sources of income.

If agriculture is to be the main basis for Bougainville's economic development into the future, its people must acknowledge and deal with the trend away from communal ownership towards individual tenure as agriculture develops. Land is the first limiting factor in most tropical areas. Bougainvillean communities, like others in Melanesia, still lack general awareness of the consequences of land shortage and of the fact that land can be a negotiable possession. It ought, nevertheless, to be recognised that their traditional system of tenure and use of land may continue to operate satisfactorily, as long as land is plentiful and as long as annual and other seasonal crops are the main part of the agricultural system. Difficulties will certainly arise when demand for land increases, especially demand for land for cash crops.

APPENDIX

Table 6: Plantations in the Bougainville Province, 2000

Plantation	Kessa	Karoola	Dewa	Bunotovi	Bei	Skotolan	Laiahan	Poe	Nova
Area (ha)	7	497	228	70.9	122.2	82	137	56.07	179.3
Location	Buka	Buka	Buka	Buka	Buka	Buka	Buka	Buka	Buka

Plantation	Madehas	Watagu	Bolo	Hahaila	Halapuna	Korte	Ablaman	Haramon	Tulaen
Area (ha)	323	260	450	450	78	62.5	27.8	71.7	51.1
Location	Buka	Buka	Buka	Buka	Buka	Buka	Buka	Buka	Buka

Plantation	Pokonien	Tongolan	Nuguria	Baniu	Raua	Tinputz	Rugen	Deos	Sabah
Area (ha)	211.9	23.8	257	800	4785.6	495.6	386.8	188	365
Location	Nissan	Nissan	Fead	Teop	Teop	Teop	Teop	Teop	Teop

Plantation	Hakau	Tearouki	Teopasino	Inus	Tanwoa	Porton	Watagu	Ururu	Soroken
Area (ha)	258	202	928	860	110	100.5	97.9	119.3	940.7
Location	Teop	Teop	Teop	Teop	Puto	Puto	Puto	Puto	Puto

Plantation	Soroken	Jervau	Baniu	Kuraio	NumaNuma	Koikoi	Tenakau	Arigua	Kurwina
Area (ha)	120.6	36.27	66.3	57	1488	119	600	827	840
Location	Puto	Puto	Puto	Torokina	Numa	Numa	Numa	Numa	Numa

Plantation	Bove	Kubwan	Bioi	Toboroi	Kekere	Koromira	Iwi	Toimanapu	Mariwi
Area (ha)	219	32.5	400	69.2	70	268	367	45.6	
Location	Kieta	Kieta	Kieta	Aropa	Aropa	Aropa	Aropa	Aropa	Buin

Plantation	Kangoi	Patupatuai	Kihill
Area (ha)	61.7	249	144
Location	Buin	Buin	Buin

Total Area (ha)	20,364

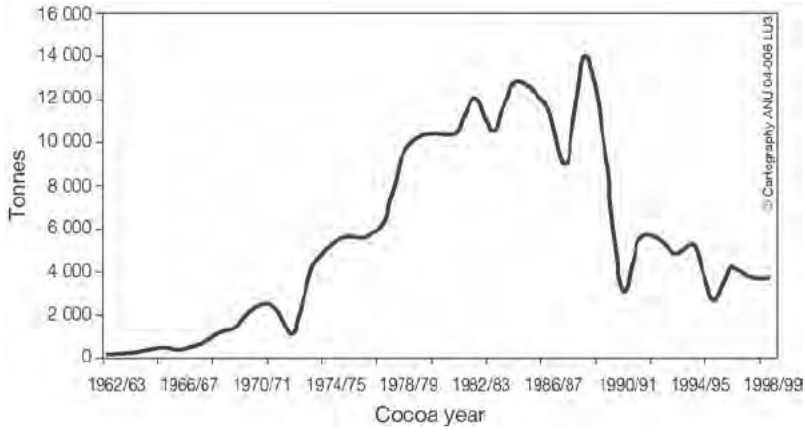
Edited source: 'Bougainville Plantations Lead Province's Economic Recovery', *Saturday Independent* (June), 2000

Table 7: Bougainville Cocoa Production by Sector: 1962/63–1998/99

Cocoa year	*Plantations*	*% change*	*Small-holders*	*% change*	*Total*	*% change Total*	*Smallholder % of Total*
1962/63	n.a.	–	94	–	–	–	–
1963/64	n.a.	–	177	88	–	–	–
1964/65	n.a.	–	307	73	–	–	–
1965/66	n.a.	–	358	17	–	–	–
1966/67	n.a.	–	313	-13	–	–	–
1967/68	n.a.	–	618	97	–	–	–
1968/69	n.a.	–	1 071	73	–	–	–
1969/70	n.a.	–	1 490	39	–	–	–
1970/71	n.a.	–	2 273	53	–	–	–
1971/72	n.a.	–	2 295	1	–	–	–
1972/73	n.a.	–	1 130	-51	–	–	–
1973/74	n.a.	–	4 063	260	–	–	–
1974/75	n.a.	–	5 115	26	–	–	–
1975/76	n.a.	–	5 510	8	–	–	–
1976/77	n.a.	–	5 546	1	–	–	–
1977/78	n.a.	–	6 297	14		–	–
1978/79	4 657	–	9 281	47	13 938	–	67
1979/80	5 690	22	10 151	9	15 841	14	64
1980/81	4 926	-13	10 221	1	15 147	-4	67
1981/82	4 812	-2	10 405	2	15 217	0	68
1982/83	4 372	-9	11 943	15	16 315	7	73
1983/84	3 463	-21	10 441	-13	13 904	-15	75
1984/85	3 667	6	12 618	21	16 285	17	77
1985/86	3 686	1	12 395	-2	16 081	-1	77
1986/87	4 108	11	11 448	-8	15 556	-3	74
1987/88	4 008	-2	8 895	-22	12 903	-17	69
1988/89	4 600	15	13 841	56	18 441	43	75
1989/90	1 923	-58	10 019	-28	11 942	-35	84
1990/91	15	-99	3 131	-69	3 146	-74	100
1991/92	21	40	5 348	71	5 369	70	100
1992/93	16	-24	5 426	1	5 442	1	100
1993/94	27	69	4 752	-12	4 779	-12	99
1994/95	23	-15	5 086	7	5 109	7	100
1995/96	32	39	2 587	-49	2 619	-49	99
1996/97	42	31	4 066	57	4 108	57	99
1997/98	7	-83	3 692	-9	3 699	-10	100
1998/99	8	14	3 641	-1	3 649	-1	100

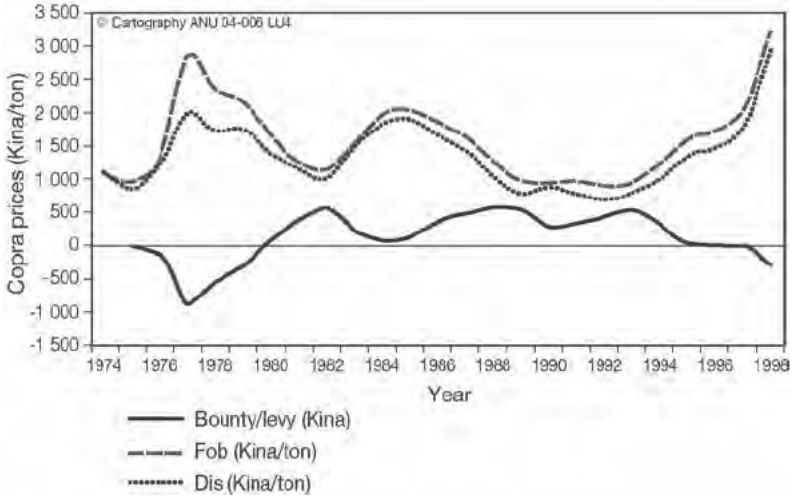
Compiled from the following sources:
(1) 1962/63–1965/66 from NSPG Development Study 1982, Vol. 2, Pt 2, Ch. 23: 11
(2) 1966/67–1977/78, NSPG Development Study 1982, Vol. 2, Pt 1, Ch. 5: 1
(3) 1978/79–1998/99 from the Cocoa Board of Papua New Guinea 1999
Note: The abbreviation n.a. stands for not available

Figure 3: Smallholder cocoa production on Bougainville: 1962/63–1998/99



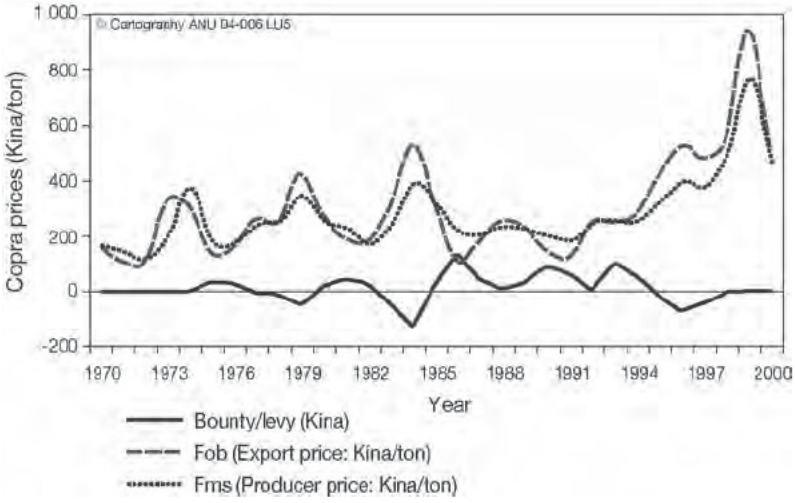
Source (s): Cocoa Board of Papua New Guinea 1999 and North Solomons Provincial Government Development Study 1982

Figure 4: Domestic and world cocoa price trends: 1974–1999



Source: Cocoa Board of Papua New Guinea 1999

Figure 5: Copra prices in Papua New Guinea 1970–2000



Source: Omuru in press

Endnotes

1. This paper draws extensively on Economic Consultants Ltd [1982] *North Solomons Provincial Government Development Study. Final Report: Background Papers* Part 1 and 2 (in text cited as NSPG which commissioned the study; cross-referenced in general bibliography). Other available studies on Bougainville have been utilised and, where possible, their accuracy has been confirmed. It has not been possible to map the more distant past with relevant statistics and other reliable information while, as a result of the conflict, statistical accuracy became impossible from late 1988.
2. Editors' note: However, it is estimated that about 5,300 people living in the 'no-go zone' in the mountains of central Bougainville (in the vicinity of Panguna) were not counted in the 2000 census exercise, in which case the total population in 2000 was a little over 180,000.
3. In Buin (south Bougainville), some villages within the vicinity of the author's home were facing land shortages prior to the conflict, mainly as a result of rapid population increases. Some families were making intense use of the same piece of land for planting food with shortened fallow periods.
4. Land, as a mobile factor of production, can serve as a neutralising agent of potentially disruptive social energy. Bougainville is said to have had the lowest out-migration rate in Papua New Guinea prior to the conflict. Those who remained outside the island were said to be mainly contract workers or students. It was quite usual for provincial education officials to encourage high school students to go back to their villages if they could not get an offer of study or work after graduation, using the expression, 'there is no place like home'. Before the conflict, it was also uncommon to find Bougainvillean squatter settlers in towns and cities away from home, nor in their own provincial centres. Such circumstances, although good, in various ways, could serve to ensure a situation where social energy could build up gradually with a potential to erupt in the absence of means for releasing such energy. In the long run, it would not be wise to continue encouraging graduating students to go home to till the land in view of a rapidly

increasing population. The occupational capacity of the provincial economy, in the long run, will also not be able to absorb the educated ones who remain in the province. According to the author's observations land in Bougainville does not change hands as frequently as, for example, in East New Britain, where there is greater opportunity for the general public to own a piece of land. There are a number of expatriates, and many non-Tolais, who have bought blocks of land, some from individual landowners, while others acquired them through government tenders. Even cocoa and coconut plantations now frequently change hands. One has to recognise the challenges that are posed to people who still live on communally-owned land but whose traditional communities have undergone changes. In times gone by, there were far fewer problems, when the population was small, as was the size of most families, there were no perennial tree-cash crop-plantings, nor other crops planted for cash, and the demand for modern material goods that cash could purchase, was non-existent.