



Department of Pacific Affairs

Trapped: Smallholder Coffee Producers in the Papua New Guinea Highlands

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Introduction

Soon after becoming Papua New Guinea's latest Prime Minister, James Marape fittingly drew particular attention to the condition of the majority of the country's population who live in rural areas. He said:

Eighty per cent of this country [is] still locked in the enclaves of rural entrapment. Those of us in cities are enjoying and yet they are stuck up there. They deserve to be lifted. (Whiting and Graue 30/5/2019)

His depiction of life for the smaller proportion of the country's population that lives in urban areas as being 'enjoyable' ignores the impoverished conditions faced by many city and town residents. Further, the reference to 'lifted' suggests a recognition of the need to raise living standards as an objective of government action but without any suggestion on how this might occur when previous governments have had other priorities. Nor was there an explanation for the 'rural entrapment' or a statement of how any state policy that pushed substantial numbers into towns and cities to remove the 'rural' component might lead to urban impoverishment instead.¹

This Discussion Paper cannot examine how most of the rural population of PNG has become locked in impoverished conditions, even as the United Nations Development Programme's (UNDP) Human Development Index rates the country as one of low human development, 155th out of 176 (UNDP 2018:310). Nor can it consider in detail differences in degrees of poverty across rural areas (Allen 2009). Instead, this paper uses a particular region of the country, the central Highlands,² and coffee-growing households in that region, to illustrate how since

independence in 1975, entrapment has intensified for a substantial proportion of the country's people. About 400,000 smallholder households, or about 80 per cent, of Highlands' households produce about 85 per cent of the national output and depend upon coffee for all or part of their cash income (CIC 2017; Curry, Koczberski and Inu 2019). These smallholders probably constitute around one-quarter of the country's total population of over eight million.³ ('Probably' is employed, as PNG population figures are not always reliable.)

With little, if any, real increase in prices for a crop that forms the most important component of household incomes — and with only minimal provision of state efforts to raise productivity and quality — households continue to be told that they are primarily responsible for securing any improvements in conditions. As arabica producers in PNG become more dependent on their export crop, major changes in international production and consumption are against them.

The crop, which had been encouraged by the late colonial administration as a means of securing village life, prior to the ascendancy of a process which was anticipated to produce urbanisation, industrialisation and landless proletarianisation (MacWilliam 2013, 2018, 2019), has become instead the most important instrument of entrapment. The promise of 'the money that grows on trees' (Brookfield 1968) led to the continuity of relatively undifferentiated family labour processes, with little division of labour and thus only minor productivity increases, producing a crop subject to the vagaries of international markets.

Papua New Guinea producers as 'price-takers'

As very little coffee produced in PNG is consumed in the country, it is international conditions that are

an important determinant of livelihoods for coffee-producing households in the country. Despite a consistent drive to increase output in PNG, this has occurred at a slower rate than has occurred internationally. At independence in 1975, PNG produced about 650,000 (60 kg) bags, or under one per cent of global output of 80 million bags. Subsequently, world coffee production for 2018–19 was estimated to be about 175 million (60 kg) bags, with PNG's maximum reaching just over one million bags in the late 1990s and again on several occasions in the next decades (CIC 22/3/2017). That is, world production has more than doubled, while PNG's output has increased by approximately one and a half times (Sengere 2016:92; USDA 2019; OECD 2007).⁴

Even as PNG's output has increased since independence, almost all of the country's exports are still in the form of green bean: only small amounts are either sold overseas or consumed domestically as roast and ground coffee. The effect is that prices received by smallholders, with relatively slight variations due to the abilities of trading companies and processors to grasp shares of these prices, are largely determined by international trends for particular varieties of this form of coffee. (There are continuing disputes, not examined here, about the extent to which traders and processors 'distort' these trends and undercut the prices paid to growers. See Batt and Murray-Prior 2007).

In terms of coffee exports, PNG continues to be what is termed a 'price-taker'. Further, most of PNG's coffee goes to those sections of the market where downward pressure on prices has been most substantial over the last 40 years, as explained below. With only occasional peaks, international prices for PNG's main coffee exports have remained stagnant in nominal terms since independence (Sengere 2016:92, Figure 4.3). Regardless of this price trend, as the smallholding proportion of total output has increased, from around 70 per cent at independence to about 85 per cent currently, there has been a continuous call to increase production and improve quality (see below).

Part 1: Global coffee: Persistent surpluses, changing sources and the rise of robusta

Surpluses

The production and marketing of coffee is affected by important local, national and international determinations. Soil fertility, attention to pruning,

shade management, application and non-application of chemical fertilisers, quantity and timing of rainfall as well as strength of winds, and sunshine: each and all affect the health of trees and thus yields, with climate change recognised as a major determinant. The global production of coffee is also subject to local political upheavals, including civil wars. As a result, output can vary considerably in the short to medium term. However, for the condition of smallholders in PNG and elsewhere, it is the long-term trends that are most important and will be emphasised here. The persistence of surplus production over consumption, the importance of the rise of new sources, especially Vietnam and Indonesia, and the increased output of lower quality and priced coffee, particularly robusta, are the most important of these trends (see below).

The importance of coffee exports for national revenues and company profits has resulted in a continuous threat of production exceeding consumption on world markets (Economist Intelligence Unit 1987). Further:

Since 1964, world coffee production has grown at a rate of 1.4% per year, increasing from 3.1 to 6.3 million tonnes. With a lower growth rate than Robusta (0.9% as compared to 2.7%), Arabica's share has fallen from 4/5 to 2/3 of total coffee production over the last 40 years ... Arabica is far more sensitive to climatic conditions and therefore subject to greater fluctuations in its production from year to year. (OECD 2007)

By 2019, while the year-on-year variability in production continued, in part due to the biennial bearing pattern prevalent for arabica trees, robusta's ascendancy became even more apparent (USDA 2019). Occasionally, major weather shocks and civil wars have broken the long-term trend of production exceeding consumption. These exceptional events, as well as climate change, have often led to new plantings and subsequent production increases, with supply once again exceeding demand as governments urge continuous increases in production. Because green bean can under optimal conditions be stored for periods without losing quality, the relationship between production and consumption has also been affected by the capacity of various state agencies to withhold stocks. In periods of low prices, warehouses are filled until coffee is subsequently released on to markets at propitious times when prices rise: the annual

relationship between total production and consumption is continuously mediated by the level of global stocks (USDA 2019).

Total global production has also been affected by the emergence of major new producing countries, where robusta is the principal form of coffee grown. Robusta production has become more important in countries, including Brazil, where arabica's previous predominance is now under challenge (see USDA 2019, and below). Over the last 30 years, Vietnam and Indonesia have risen into second and fourth places in total output (Zhang 2016; Indonesia Investments 2019). Both countries have become more important for robusta production and play an important part in that crop moving toward parity with arabica output (OECD 2007). Since 1988, with funding and other assistance from the UNDP and the World Bank, China too has embarked upon a major expansion of coffee growing, although with arabica the principal variety planted in Yunnan Province with an average altitude of 2000 metres (Heinze 28/9/2016). Robusta is a higher yielding, more disease resistant species of coffee tree capable of being grown at lower altitudes than arabica.

These changes in sources of supply have been driven by government policies and programs, even where the sheen of private efforts, including privatisation, following so-called free market principles, gloss over the importance of state coordination and supervision. Vietnam provides an exemplary instance of governmental and other state agency roles in increasing production.

Importance of national government roles for newer producers

Against retraction from coffee growing in some countries, in others including China (see above), the most substantial increases in production have occurred where governments have emphasised the importance of coffee for national economic growth *and* to combat the possibility of disorder arising from unemployment and impoverishment. For instance, during the colonial period and prior to independence in 1945, estates/ plantations mainly grew arabica in Vietnam. After the 1975 completion of military victory over the US-led invasion forces, the government of Vietnam developed a program of reconstruction (Zhang 2016). Labelled *Doi Moi* (Hays 2014) and launched in 1986 to produce an economic rejuvenation or officially a socialist-

oriented market economy, the program sought to deal with the disorder created by prolonged warfare through expanding domestic agricultural and manufacturing production. Rice and coffee became two of the most important export crops. Some of the expansion of coffee-growing involved moving populations into highland areas, suitable for growing arabica, but a more substantial increase occurred by stimulating the output of robusta in lower altitude regions. As the World Bank (2004) noted of Vietnam:

For decades the state has been an integral part of the coffee sector's development ... Government and parastatal organizations increasingly embrace free market structures but still have a presence in the sector. *Government is the primary and most influential institution and has created nearly the entire sector's other institutions.* (emphasis added)

So successful has the program been for coffee, that:

Between 1980 and 2000, Vietnam went from producing 8,400 tons of coffee to producing 900,000 tons,⁵ averaging more than 26 percent growth per year. Half a million small-scale coffee farmers now grow beans by cultivating two to three acres of land (Zhang 2016).

By 2019–20, Vietnam was forecast to produce more than 32 million 60 kg bags, or 1.9 million tonnes, about one-fifth of global production. Of this total, the bulk exported was robusta. Less than 10 per cent of Vietnam's output is of arabica, as the total production and robusta's share continues to climb (USDA 2019).

Importance of government's reforming role for Brazilian production and consumption

With the collapse of the international efforts of producing countries to raise producer prices (see below), national governments and other state agencies, including in PNG, have been forced into country-specific measures. With some capacity to withhold stocks from export to reduce supply in order to raise prices, government agencies in the world's major coffee producing nation, Brazil, have also taken important reform steps.

One of these has been to encourage greater production of robusta from lower altitude regions of the country less susceptible to frost. As a result, when arabica production declines in a low-yielding year, robusta growers are able to gain a greater share of

national production (USDA 2019). Instead of unwashed arabicas having near-complete dominance, robusta now comprises almost one-third of Brazil's total output. When Brazil is already a major producer of unwashed arabicas⁶ that obtain lower prices on international markets, the growth in robusta output acts as a further downward pressure on global coffee markets. In Brazil, government agencies are pouring resources into research on higher-yielding coffee varieties, mechanised harvesting, improved farming practices, and encouraging diversification into other crops, including soy bean. These reforms, especially the increase in robusta production, have also been instrumental for Brazil's rise as a consumer country, which has been so substantial that it now challenges the long-term consumption leader, the United States (US).

Consumption

Coffee production and consumption has, since the 19th century, been divided to a substantial extent between countries where the crop is produced and those where most is consumed. The United States and Western Europe have been the main consuming locations, with Brazil and Ethiopia the only two countries where production as well as consumption are important. Consumption in Europe now exceeds that in the US (Caffeine Informer n.d.).

While some of the following trends in coffee's consumption commenced before 1975 (Pendergast 1999), over the last 40 years they have intensified. Although by the late 1960s overall growth had already slowed in the main consumer markets, over the last three decades there has been a greater rate of increase in other markets (OECD 2007). Competition from other beverages, including aerated waters, has also increased (Pendergast 1999). The national changes reflect how the main shifts in consumption, towards cheaper coffee from lower-grade arabica beans and robusta on the one hand, and higher-priced specialty, mainly arabica, beans, on the other, are determinant on international markets. (There are, of course, exceptions to such general statements: the highest-priced coffee is a specialty robusta from Indonesia, coffee *luwak* — Indonesia Investments 2017).

The coffee market throughout the world has increasingly split into two main components: cheaper instant and other blended ground coffee; and the extensive range of specialty roast and other coffees. The

latter include national brands, Free Trade and organic varieties (Pendergast 1999). Greater consumption in countries outside the United States, especially western and central Europe and into Russia and China, has occurred, mainly through the increased availability of instant and other soluble coffees (Ferdman 14/7/2014; Inu 2015:31). These consumption increases at particular moments led some observers to suggest a forthcoming world shortage of supply (OECD 2007:6). This prediction tends to ignore the history of coffee production and consumption in which shortages are soon followed by surpluses as a result of government and other state agency action taken in producing countries (see above). Instead, producers in different countries are forced to deal with these two main international production directions in distinct ways.

Each direction, with distinct price effects towards greater consumption of speciality coffees and increased demand for bulk coffees, places pressure on households (as the most important producers) to work longer hours, search for additional sources of income and vary labour time devoted to coffee. The shift away from international and domestic efforts to maintain prices, which accelerated from the late 1980s, has further exaggerated the uncertainties of household existence.

Increased smallholder dominance and impoverishment

The global predominance of smallholders, emphasised in MacWilliam (2018), has not simply continued but increased, particularly where governments have seen this form of production as central to other national objectives (see below). The widespread impoverishment which goes with smallholder dominance is now of international concern. The major chemical company Bayer warned (2018) of the serious effects of a reduction in coffee yields for the 25 million smallholders who produce 80 per cent of global output. The chemical giant repeated a warning made at the September 2016 meeting of the International Coffee Organization that low profits and incomes were already being experienced by growers.

Central American countries are one epicentre of the crisis. Honduras, which produces and exports at least six times as much arabica coffee as PNG and ranks about fifth in global output compared to PNG's 15th to 17th, has widespread poverty in the countryside. Out-migration and households straddling between smallholder coffee growing and wage work in the

United States are a prominent feature of ‘broken village’ (Reichman 2011) existence in that country. Guatemala, another important Central American arabica producer, is similarly affected with the country being the ‘single largest source of migrants being apprehended at the US border ... The migration problem is a coffee problem’ (Sieff 11/6/2019).

Low prices and the conditions of smallholders have been at the centre of so-far minor efforts by major producing countries to raise prices. Meeting in advance of a World Coffee Producers Forum held in July 2019 to discuss the ongoing price crisis, representatives of Brazil and Colombia, first and third respectively in global production totals, emphasised the long-term consequences for not only producing countries but also consumers. Farmers in these countries are ‘abandoning coffee farms, switching to illicit crops such as coca, leaving the countryside for larger cities or other countries altogether’ (Brown 24/6/2019). No substantial measures have been implemented to deal with the international crisis.

The decline of international efforts to deal with surpluses

At PNG’s independence in 1975, the international coffee market was supervised and coordinated under the International Coffee Agreement (ICA), first negotiated in 1962 (ICO n.d.). Under this agreement, and a subsequent 1968 follow-up, there were established:

provisions for the application of a quota system whereby supplies of coffee in excess of consumer requirements were withheld from the market. Under other provisions, production and diversification policies were initiated to limit supplies of coffee and promotion activities instituted to increase consumption (ICO n.d.).

These efforts generally worked to advantage producers (Bates 1997:16–19). Subsequently, there were criticisms that the ICO was a cartel formed by the major producer and consumer countries (Bates 1997; cf. MacWilliam forthcoming), and, as such, an oligopolistic barrier to the operation of ‘the free market’. However, during the 1960s and early 1970s, the ICA was lauded as bringing stability to the coffee market, and also assisting governments, including in PNG, to extend commercialisation by (re)attaching unemployed or under-utilised labour to smallholdings (MacWilliam 2018, 2019; cf. Stewart 1992). The high

prices of the mid-1970s following severe frosts in Brazil assisted to strengthen critics of any efforts to affect markets. The system of fixed quotas and price support levels faced greater criticism and political opposition, particularly in the United States. From 1976, when the 1968 ICA was renegotiated, provisions were introduced which permitted the suspension of quotas when prices rose above an indicator level, and their reintroduction when prices fell. Prescribing conditions for stock holding and trying to keep trade regulated between member countries through a system of quota stamps indicated how the entry of new producers and consumers was threatening the future of any regulatory agreement (ICO n.d.).

The growing use of what became known as ‘tourist coffee’ — transiting through ports in non-member countries and then on to member country markets — exposed further cracks in an agreement that sought to give preference to ICO members and limit trade in ‘surplus’, or above quota, coffee. The existence of such surpluses expressed what was happening in world coffee production and consumption, as new substantial producers and consumers — particularly of lower-grade coffees — began to affect international prices (see above). Through the 1980s a series of on-again off-again suspensions and implementations of the 1983 agreement showed up the underlying weaknesses in an ICA which sought to underpin prices for producers, most of whom were smallholders.

By 1994, a conclusion was reached among ICO members that a new ICA could only be negotiated satisfactorily if it did not attempt to regulate prices. Under the 1994 and subsequent ICAs, the ICO became little more than a forum for discussing the condition of the world coffee economy, providing transparency on movements in production and consumption, and supplying some concessional financing for projects relating to and including:

quality improvement, pest control and improvement of marketing structures. Studies were carried out in areas such as coffee price determination and volatility, organic coffee, and the formation of a global research network on coffee (ICO n.d.).

A promotion fund was utilised to encourage increased consumption, particularly in ‘new’ markets, to sponsor concerts and festivals as well as for briefing journalists. In effect, the ICO abrogated

responsibility for the long-term declining real prices that were affecting the living standards of smallholders worldwide.⁷ When combined with a similar direction becoming dominant at the national level in many countries, including PNG, coffee producers ceased to receive previously important forms of support. This will now be shown for the case of PNG.

Part 2: PNG coffee production since independence

Individual grower responsibility and minor official reforms in PNG

Over the last 40 years, more and more of PNG's total coffee production continues to go to those sections of the market where downward pressure on prices has been most substantial, as explained above. Even as there have been efforts to increase production directed at specialty consumption (Sengere, Curry and Koczberski 2019), there has also been 'a decline in the average quality and price of Papua New Guinean coffee' (Batt and Murray-Prior 2007). With only occasional peaks, international prices for PNG's main coffee exports have remained stagnant, even in nominal terms, since independence (Sengere 2016:92, Figure 4.3). Regardless of this price trend, as the smallholding proportion of total output has increased, from around 70 to 85 per cent, there has been a continuous call to increase production and improve quality (see below).

The impact of income from the crop for the living standards of Highlands' households in the four main coffee-growing provinces has only become greater over that period. However, while the crop's importance has persisted for the region and the people who live in it, there has been a substantial change in its significance for national export revenues. Since the early 1970s, agricultural exports, including coffee, have become less important as contributors to export revenues (Elek 1992; MacWilliam 1996:65; Batten 2013). The start of copper and gold production at Panguna mine has been followed by increased output of minerals, gas and oil, from a series of other mines. By 2017, coffee exports comprised less than two per cent of the national total, compared with petroleum gas (28 per cent), gold (24 per cent), copper ore (8 per cent) and wood (6 per cent). Of the agricultural exports, palm oil at five per cent of the total is more important for national export revenues than coffee (OEC 2017). Concurrent with this reduced importance for national revenues, there

has been a major decline in government efforts to raise productivity and improve living conditions for coffee-producing smallholders. The decline has occurred in distinct phases, as will now be demonstrated.

The first post-independence changes: Further expansion, price stabilisation and state reform

In PNG, the end of the mid-1970s exceptional price boom drove an effort to reinvigorate and expand coffee growing. With finance provided by international institutions, including the World Bank, and conveyed through the local National Development Bank, a rapid expansion occurred. A prominent feature of the new plantings were the 20- and 5-hectare projects, subsequently dubbed 'blocks' and hence giving rise to the term 'block coffee', situated primarily in the Eastern and Western Highlands provinces (Hulme 1983; MacWilliam 1986; Stewart 1992:176–203; Sinclair 1995:363–83). These blocks are now run as mini-plantations by commercial concerns rather than smallholders with management companies. Their establishment was in part an attempt to counter the decline in plantation production, which followed the drive to transfer largeholding ownership from expatriates to Indigenes under the Plantation Redistribution Scheme (Walter 1981). The projects aimed to consolidate landholdings in a form that resulted in improved productivity through an increased division of labour. Rather than the household labour processes involving relatively undifferentiated labour, the projects required a combination of (frequently expensive) management and labour, the latter often engaged on what were termed 'sweat equity' conditions. This form of labour consisted mainly of deferred payment for work done on the promise of profits to landholders/workers once an initial loan was partly or completely repaid. As both plantation production and quality of smallholder coffee declined, the intent was to fill the gap by a form of centralised production that replaced the former and consolidated myriad smallholdings into a form of production that would result in increased productivity and higher quality green bean. However, many of these projects failed, with perhaps the most notable success being where the project continued as a producer of organic coffee in the Eastern Highlands (Sinclair 1995; see below).

Although prices declined sharply in the early 1980s, a brief peak in the mid-decade was followed by the

beginning of a slump that lasted until 1993. At that point prices were in nominal (that is, not inflation-adjusted) terms only slightly above where they had been *before* the mid-1970s price boom (OECD 2007:6, Figure 5). To an extent, the effects of the slump were mitigated for consumers using coffee incomes to purchase imported goods because of the official 'hard kina' strategy that maintained the PNG currency's exchange rate vis-a-vis other currencies (Chand and Yala 2009; see below).⁸ Coincident with these price fluctuations a number of major changes occurred in the PNG coffee industry.

As important as the hard kina strategy was for households, so too were domestic attempts at price stabilisation. As the rate of unemployment increased rapidly for the country as a whole, successive governments became concerned to keep populations in the countryside. Maintaining the household compulsion to labour remained critical for government policies (MacWilliam 1996:41–48). Continued occupation of smallholdings, where households engaged in self-provisioning as well as produced for local and overseas markets, became even more critical for governments. That households had become major consumers of purchased goods underlined the importance of bolstering coffee prices. Supporting stabilisation funds for coffee, cocoa and copra in particular became a form of 'working for the dole' (MacWilliam 1996), paying growers to produce crops whose international prices could not meet household consumption needs. Government revenue raised from the export of mineral and other resources was used to bolster the stabilisation funds when they were not able to rely upon levies imposed on growers.

In the case of coffee, a Coffee Industry Fund (CIF) had been established in 1968 as part of efforts to stabilise prices at a critical moment in the country's transition to independence (MacWilliam 2018, 2019). The dramatic boost in prices which followed the 1975 frost in Brazil created an opportunity for the Coffee Marketing Board (CMB, later CIB) to increase the fund's importance for price stabilisation. The CIB lifted its existing levy on growers. The move to establish a comprehensive stabilisation fund was further encouraged by the possibility that PNG would be associated with the European Economic Community and have access to STABEX (Système de Stabilisation des Recettes d'Exportation) funds being established under the Lome Convention. The price rise made it

easier for the levy to be raised and funds to accumulate and then be disbursed when prices fell. While the moves from levy to subsidy and reverse continued through the 1980s, they did so against an unfavourable trend in prices: households depended less upon price increases to lift incomes than upon greater volumes of coffee produced.

The greater volumes came mainly not from increased productivity on existing holdings but by a major expansion of the area planted to bushes: plantings became more widespread without becoming large-scale in terms of the methods of production. Smallholders extended their plantings on to new areas without substantial changes to labour processes by maintaining household divisions of labour. As largeholdings declined in importance, the area planted to smallholder coffee increased from approximately 40,000 hectares at the beginning of the 1980s to an estimated 65,000 to 70,000 hectares by 1989 (Fleming and Antony 1993:24). Using production figures and average yields from the early 2000s, it was estimated that by 2006 the planted acreage had increased further. There were 70,000–85,000 hectares of smallholder coffee compared to 12,000–15,000 hectares of plantation and block coffee (Allen, Bourke and McGregor 2009:309). This expansion accelerated the trend begun in the 1960s of the main smallholder production centre moving westwards, away from Eastern Highlands Province into Western Highlands Province (MacWilliam 1985) and what is now Jiwaka Province. However, along with the increased production, an initial estimation of a long-term improvement in prices was proving wildly optimistic. From the mid-1990s, the end of price support from stabilisation funds would make household existence even more precarious (see below).

Competition and the race to the bottom in processing and marketing during the 1980s and early 1990s

Two specific circumstances which occurred in this decade also affected smallholder production. The first was the April 1986 discovery of coffee leaf rust in Western Highlands and the subsequent efforts to limit the effects of the disease. The second was dilution of the importance of the major exporting firms by granting more licences to new firms, some with limited experience and ability to scrutinise the

quality of the coffee purchased by their agents for processing and export. Both the outbreak and the fight against leaf rust, as well as the granting of more export licences, have been previously extensively covered and details do not need to be repeated here (Shaw et al. 1986; Coffee Industry Association 1986; MacWilliam 1990, 1993; Stewart 1992; Sinclair 1995). While the national government's resources committed to combat the rust outbreak were substantial, including for the reformation of the research and extension roles within the Coffee Industry Board/ Coffee Industry Corporation (CIB/CIC), the longer-term consequences for state supervision of smallholder coffee were less significant. Occurring as it did during the period when smallholders were expanding plantings, as noted above, the concentrated focus upon leaf rust and survival of the coffee industry probably only had a marginal effect on the overall decline in quality.

The decline was more influenced by the second factor, the battle over licences granted to export coffee, which also took place in this period. Smallholder coffee was and still is sold by growers as either unprocessed cherry or first phase processed parchment, washed and dried to varying standards. Parchment coffee comprises about 95 per cent of smallholder sales (Inu 2015:39). This coffee is sold to roadside buyers, usually engaged by exporting firms, some of which also operate the most substantial processing factories, or by smallholders directly to factories. There is a continuous tussle between growers and buyers over prices paid, in which a range of means are employed to increase or decrease the amounts received by the former. Scales used by buyers which falsify weights and smallholders adding water to bagged beans are just two of the 'tricks' used.

Prices fell again after the mid-1980s spike, disorder increased with more coffee stolen and armed holdups proliferating. Plantation firms were forced to increase expenditure on security measures (MacWilliam 1993; Sinclair 1995). Firms have been forced to continue their attempts to reduce theft into the next century (Imbun 2014:31) and the CIC has become involved in efforts to increase policing (see below). The tussle over returns to growers intensified and was made even more central to exports as these localised conflicts were expressed in the competition between established exporters and other firms trying to break into the market, ending in damage to PNG's reputation as a coffee exporter. As MacWilliam (1993:483, 484, Table 1) notes:

In the eight years prior to the establishment of the CIC (in October 1991), the proportion of coffee exports by the four major firms had been reduced from nearly 90% to under 70%. The number of licences allocated by the CIB to green bean exporters had increased from eight in 1982/83 to 13 in 1990/91.

For the older, more established exporters who also owned processing factories, with long-established international connections and reputations to uphold, scrutinising the quality of coffee purchased from smallholders was critical. As Sinclair (1995:391) notes, citing Craig McConaghy, one-time executive officer of the Coffee Industry Association (CIA), and later employee of the long-established major exporter ANGCO regarding the de-regulation of export licences:

with lots and lots of new people coming in, exporting was thought to be a licence to print money. You got people who rented an office, a fax, a phone, a desk and went into exporting. They didn't have the professionalism to carry on a professional exporting operation. Almost all of them eventually went broke.

For McConaghy and others involved in exporting, professionalism included maintaining the international reputation of PNG coffee, which affected prices obtained. For new firms, gaining a greater share of export volumes from older exporters was an important means of trying to mitigate the effects of declining international prices and their margins. Quality controls were often less important, partly because the new firms did not have processing facilities operating at the same standards as more established exporters.

The competition between exporters reached one peak when a new firm trying to establish itself as a major exporter bypassed the established procedure for obtaining an export quota through the CIB (MacWilliam 1993; Sinclair 1995:406–9). In 1987, as the battle to contain leaf rust continued, Panga Coffee sought approval to export what amounted to 80 per cent of the total PNG crop. Unsurprisingly, the CIB refused this request: Panga subsequently applied direct to the ICO for permission to export 100 tonnes of PNG coffee to West Germany. Again, unsurprisingly, the ICO refused Panga's request and also took punitive action against PNG coffee exporting as a whole. The ICO cancelled ongoing negotiations with the CIB over

increasing PNG's export quota, which would have added a further 300 tonnes above the 1988 quota. A prolonged saga ensued. Panga subsequently collapsed with a major debt owed to the CIB/CIC (MacWilliam 1993; Sinclair 1995). But reputational damage remained and the efforts to assert quality priorities for smallholder coffee took a prolonged hit.

Part 3: Three decades of extended capture

Over the next three decades, concerns have been regularly expressed about the future of coffee production in PNG. Apart from urging continual increases in output, including by extending production into areas where little coffee growing previously occurred, most attention was paid to declining quality. However, given the number of households that grew coffee over a substantial area, the efforts by governments and other state agencies to reverse trends have been generally minor. They have been made even less significant by the continuing post-independence decline in agricultural extension services (cf. Imbun 2014:29), which extended to many parts of the country beyond coffee-growing areas. Individualising responsibility by passing it on to household growers, with little if any price support, and quasi-privatising the principal agency, the CIC, acted against both regularised output and quality improvements. While the CIC, with support from the World Bank and PNG government, has recently played a role in the fight against an outbreak of the potentially devastating coffee berry borer, it also constructed a policing role to combat stealing of coffee and cash used by traders (CIC 2018a). The CIC, as well as the national government and the World Bank have been active in trying to upgrade major highways and what have been recently termed 'commodity roads' (CIC 25/6/2019). There are also continuing attempts to form cooperatives and other organisations fostering grower collaboration (Imbun 2014:30–34). Coupling growers with processors to improve bean quality has been a favoured direction for a relatively small number of household producers (Sengere, Curry and Koczberski 2019). Efforts to raise the prices received by smallholders are largely confined to improving the demand for PNG coffee in what is termed 'differentiated marketing' or 'niche markets' while acknowledging that further increasing the volume of coffee produced in the lower Y-grades is unlikely to halt the longer-term decline (Inu 2015:40).

In May 2019, an announcement was made that a new Australian-funded program called Grow PNG would soon be instituted to help move PNG's coffee farmers up the value chain. Under the program: 'In 2019, 3000 coffee farmers will be trained in good agricultural practices' (James 29/5/2019). The initial focus of the program is to develop coffee production in the Markham Valley in Morobe Province, a location distant from the main coffee growing areas and the bulk of the around 400,000 households dependent upon coffee prices for incomes (ibid.).

Labour and land

Contrary to claims that customary land tenure did not facilitate production increases (Lea and Curtin 2011), in the case of coffee the reverse occurred. As shown by MacWilliam (2018), and above, from the 1940s until the present, household output from smallholdings underwent a spectacular increase from no coffee grown to around 85 per cent of over one million bags in peak years. From the 1960s, when smallholder production first exceeded that from large holdings, plantations, mostly on leased land, have become less important in production volumes while retaining a significance in their output of higher-grade coffee. A major contributor to the decline in plantations and blocks has been shortages of labour, when adjoining households have worked their own holdings to produce coffee and other food crops for local marketing (see below).

So successful has been the expansion of smallholder production that there are now probably major shortages of land suitable and available (location, altitude, soil types, rainfall as well as ownership tussles) for further increases in the area available for coffee growing. While assessing the availability of suitable land is always fraught with conjecture, several salient points need to be borne in mind. Firstly, as noted by Sinclair (1995) and MacWilliam (2018), many early plantings by European settlers were made on land not suited to arabica coffee growing. Vacant areas do not necessarily imply land of the necessary fertility, rainfall and so forth for a crop that is not drought, frost or hot sun tolerant. Arabica trees, unlike robusta, do not grow well at hotter, more humid, lower altitudes. Nor are arabica trees frost tolerant. (The growing of vegetables offers more flexibility, in particular at higher altitudes beyond those where coffee can be grown, or in drier areas suitable for some root crops but not arabica coffee.)⁹

Secondly, land shortages limit the possibility for increasing the area under smallholder plantings and continue to be associated with fighting, including in areas close to the best transport routes and thus markets. Intergenerational tensions also affect the availability of land for increasing acreages planted to coffee. By the 1970s, it was already apparent that the first generation of household coffee planters were confining the prospects of future generations. Subsequently, not only did the land shortages lead to increasing sales of land, but also subdivision of land within families, so that occupation intensified individualisation of land usage (Inu 2015:83–84). The concentrations of affines on smallholdings might have been expected to result in more productive use of land and availability of labour at critical times. Instead declining soil fertility and disputes over the optimum use of land, including whether to plant permanent or short-term crops, have *probably* led to major reductions in productivity (yield per hectare) on coffee-growing smallholdings.¹⁰ When combined with price fluctuations on a static or even declining long-term trend, and the increasing importance of currency for calculating labour provided even by affines (Inu 2015:94–99), the commitment of households to coffee production volumes and quality has fluctuated considerably.¹¹

The state, privatisation, deregulation and the CIC

As noted above, with an end of international efforts to regulate international prices through an ICA in the 1990s, the role of some national governments, including Brazil and Vietnam, has become of importance in boosting international coffee production and export. PNG is not one such nation-state: instead some changes, as in the near-collapse of agricultural extension services, have tended to place more and more importance on the labour expended by individual smallholders. Other changes, as in the quasi-privatisation of the main regulatory state agency the CIC, have had a perverse effect.

When constructed in the early 1960s, the CMB was primarily intended to regulate the domestic marketing of coffee and represent Australia–PNG in international forums to secure preferable shares of the global market. One of its early moves regarding the former was to weaken the connections between household producers and settler plantation buyers and processors, in the interests of obtaining higher prices for

smallholder sellers. Licences to buy smallholder coffee were not granted to many expatriate estates, and the ‘partnership’ ideology propagated by settler leaders was rebuffed by the colonial administration (cf. Sengere, Curry and Koczberski 2019). When a small number of private firms already dominated domestic buying, and production was increasingly dominated by smallholders, the CMB advertised prices paid to growers, checked quality standards, and issued export licences but did not market coffee internationally. Two firms dominated, ANGCO and Coffee International Limited, even as the number of firms which exported fluctuated between 8 and 27 (MacWilliam 1993:4, Table 1).

During the 1980s, two forces combined to demand changes in the issue of export licences. During the 1970s’ price boom the number of exporters fell from 27 in 1972–73 to 8: by 1988–89 there were still only 10, with ANGCO exporting around one-third of the national total. While the share of exports by the four main companies had fallen from 89 per cent in 1982–83 to 77 per cent in 1988–89, this continued concentration of exporters (when prices internationally were declining) attracted the by-then standard objections to market power acting against the prices paid to smallholding producers.

The second force was the increasing importance of nationalism with regard to ownership and control of export licences. Even as ANGCO’s share of exports fell from 48 per cent at independence to 30 per cent in 1990–91, that the company was now completely owned by the PNG Investment Corporation and subsequently a private local firm, Pagine Transport, did not quell the nationalist complaints. This was in part because expatriates continued to manage ANGCO under an agreement with a Sydney-based firm, Comang (Sinclair 1995:435–39). One solution to the two complaints was to issue more export licences to more firms, preferably locally owned, regardless of the expertise or international connections of the exporters (see above).

The major exporters and plantation operators conducted a prolonged campaign against the CMB and the manner in which offices on the organisation’s governing body were filled, resulting in the so-called politicisation of the board (MacWilliam 1993; Sinclair 1995). The result was a quasi-privatisation in the form of the CIC, an incorporated body with grower and other commercial representation on the board, elected by various organisations. However, the CIC remains dependent upon government

funding and approval of processes by which board membership is filled. Various activities, including the construction of a police arm and rebuilding feeder roads at the behest of government authorities, validate the description of the CIC as a case of quasi-privatisation (CIC 2018a, 2018b).¹²

On the surface, the formation of the CIC seems to have met both the objections against dominance by a few firms and the need to issue more licences to indigenous firms. In 2016, there were 22 exporters, which had increased to 25 in the CIC directory of licensed exporters (CIC 2019), with two of the top six firms being 'national' (CIC 22/3/2017). However, closer inspection shows that the general characteristic of trading capital, to centralise and concentrate even faster than productive capital (Kay 1975), still reigns. With a privatised CIC, 'market power' remains as a force acting against smallholders in quantity and quality considerations.

In 2016, the top six firms handled nearly four-fifths of the total exported, with the other 16 firms handling the remainder. Three firms connected to international coffee traders exported more than half of the total. Of at least equal significance for the process of concentration is how this has occurred in market segmentation. In terms of exporter market share by grade, one firm remained dominant in A/AA-grades (34 per cent), another shipped the most X/AX-grades (39 per cent) while a third exported the most Y1-grade (31 per cent) and Y3-grade (34 per cent) coffee. A fourth firm exported the most PSC-grade (36 per cent). A fifth firm only exported robusta coffee in 2015 and had done so for five previous years (CIC 22/3/2017). What this concentration down to a few exporting firms — both in terms of total market shares and for particular grades — has done for the price competition (so critical for the reformers of the overarching coffee agency) remains unexamined, at least publicly.

Tussling with trends — specialisation and collaboration

In May 2019, at a coffee conference held in Port Moresby, a specialist in the international coffee trade gave some advice to the PNG industry (James 29/5/2019). He began by acknowledging that the price of 'commodity coffee', meaning the bulk of the world's produce, is at its lowest level since 2005. At 90 cents US per pound (or 0.45 kilograms)¹³ this coffee, which comprises about 80 per cent of the world market, is

now priced well below the cost of production. Instead of concentrating on lifting production volumes of commodity coffee, the specialist urged PNG producers to aim at the higher-priced differentiated sector and specialty coffees (see also Inu 2015:40). In order to deal with lower prices, producers should emphasise production of specialty coffees through 'relentless devotion to best practices' (James 29/5/2019). This segment of the market is the fastest growing, although still a minor proportion of the total volume of coffee traded internationally, and in which there are supply shortages instead of the surpluses prevailing for commodity coffee.

The specialist was effectively advising PNG to follow a trend already under way internationally for what is also a very small proportion of local production (see below). As the CIC (22/3/2017) noted:

Despite the general decline in production, the exports of verified and certified coffees (4C, TK, UTZ and RFA certified), Organic, Fairtrade and Fairtrade Organic coffees grew steadily by 22% on average in the last 5 years. *Exports of certified coffees constitutes 5% of the annual exports.* Exports of Organic, Fairtrade Organic and Fairtrade coffees in 2016 totalled 3,482 tonnes, an increase of 24% compared to previous year. In 2016, exports of 4C, UTZ, RFA and TK compliant coffees grew significantly by 61%, or more than half the previous period. The growth in exports of certified coffee attributed to the increase in number of licensed or certified coffee farmers, consequently earning increased returns to farmers who are participating in certification programs. (emphasis added)

The extent to which measures for improving quality focus upon concentrated production, increased coordination and scrutiny, as well as longer working hours for a relatively small number of coffee growers, can be seen in two instances. The first, promoted at the same Port Moresby conference, described the new Australian aid program titled Grow PNG noted above, with the intention of helping to move 'PNG's coffee farmers up the value chain' (James 29/5/2019). How or why a relatively small number of smallholders in this part of the country would behave differently to the much larger number of households already growing coffee in the central Highlands was something the program announcement did not specify.

A better idea of what is required to produce higher quality organic coffee can be ascertained from the case of the conversion of an originally ANGCO-operated block project in the Kainantu district of the Eastern Highlands, or more precisely the Purosa area of the Okapa sub-district (Sinclair 1995:444–46). In the early 1990s, several moves were made by different firms to obtain organic certification for block production, notably in new areas. Having extended its activities into largeholding production in order to counter the decline in the availability of plantation grades, ANGCO first moved into an area near the newly constructed Yonki dam and then subsequently into Purosa. Since no fertilisers or pesticides had been employed in the latter area, it was an obvious location to obtain and commence organic production. Local smallholders were joined in a collaborative arrangement, with ANGCO the majority shareholder, in a venture which planted coffee on several substantial areas of leasehold land.

In order to secure production standards and amounts, ANGCO also provided management and processing, as well as facilitated transportation from an area which is isolated and only accessible by substandard roads or by air. That is, unlike for the bulk of smallholder production and initial processing utilising family labour processes to produce parchment coffee, an industrial labour process combined with machinery, including aeroplanes that avoided potholed roads and thieves, was used by ANGCO to surmount the deficiencies of much household production in the rest of the Highlands. When ANGCO ceased operations in the early 2000s, Coffee Connections took over management of the Purosa–Okapa venture and extended its reach into smallholder production elsewhere in the Eastern Highlands, including proximate to Goroka. Coffee Connections further strengthened its international accreditation through the Fair Trade organisation. Coffee Connections also benefited by operating in conjunction with US firm Vournas Coffee, which advertises itself as the largest importer of organic Fairtrade PNG coffee into the US (Vournas Coffee 6/6/2017). *In 2017, organic exports constituted less than one per cent of the PNG total* (Coffee Connections 2017).

Instead of the emphasis upon individual responsibility to improve yields and quality being urged for the majority of growers by the CIC, in this instance, there is an attempt to re-impose industrial methods of production on a relatively small number of growers to

replace the earlier largeholding form which has become of minor importance. Smallholders are consolidated in terms of land and labour: ANGCO's Purosa organic operations began by consolidating seven leases totalling 907 hectares (Sinclair 1995:444). Smallholders from the area whose land had been consolidated were employed as wage labourers to clear land, plant coffee, build wet and dry factories, and construct a trade store (Sinclair 1995:444–45). ANGCO supplied a tractor, and a helicopter was used to bring in cash to pay wages and for coffee sold. In short, organic farming involved directly industrialising production and supplanting smallholder agriculture, however much local householders were shareholders in the venture. That Purosa–Okapa production was insufficient to meet international demand, and Coffee Connections had to extend its operations to other areas in search of organic coffee, repeated the process by which processors and traders had operated in the 1960s and 1970s phase of coffee's expansion.

Labels such as 'organic' and 'Fair Trade' coffee provided a cover for another, newer, form by which households were subject to capital. The question remains: could other proposals that have emerged over the last 20 years for changing the terms of household existence — and to mitigate the effects of reliance upon coffee production for incomes — provide better routes out of the malaise? One such route with a long pedigree and recent re-emphasis is for households to diversify production. The route involves transforming previous production for immediate consumption, self-provisioning or so-called subsistence production, into forms of commercialised production. As with coffee, this change also maintains household attachment to land under conditions where living standards are subject to the vagaries of market prices (see below).

The consequences of diversification

One welcomed direction of change has been some diversification of crops grown, either for export (for example, cardamom) or for local consumption. Such measures would supposedly give smallholders alternative sources of income, which would lift living standards and ameliorate the price effects of coffee, either in its rapid fluctuations or longer-term trends. Because women tend to dominate both production and selling of foods into local markets, diversification also benefits hitherto disadvantaged female members of

households. Gender equality and female empowerment is therefore advanced.

While there has been an important increase in incomes for some households and probably also women's incomes out of just such diversification, this direction is itself subject to trends obvious in coffee. The bulk of households are no less trapped on smallholdings if they produce coffee *and/or* locally marketed vegetables, fruit and any other goods.

While the stagnation in prices has in part been met by increasing acreages under the crop to produce greater volumes of mainly parchment coffee (see above), another major change has been occurring in the Highlands. As pointed out recently by MacWilliam (2018), an important dimension of late colonial development plans was to stimulate increased self-provisioning by smallholders, as well as production for local and international markets (MacWilliam 2013). Since independence, there has not only been the increase in coffee produced for exports as described above, but also a major growth of various forms of local markets where mainly household-grown crops of vegetables and fruit are sold. Some of the produce is for local consumption. Other goods are transported to distant markets within PNG over land and sea (Benediktsson 1998, 2002). Some foods, including betel nut and mangoes grown at lower altitudes, are conveyed into Highland markets (Sharp 2012, 2019).

The range of forms growth has taken are an effect of the continuing attachment of smallholders to land, with household labour processes critical for producing coffee, other crops and livestock. That is, as much as the increases have involved extension of the land area under use and employment of a growing population, most of the change in producing food crops has occurred without industrialisation of agriculture. Capitalisation has proceeded primarily through the production and consumption of commercialised commodities without the separation of households from land. (There are of course instances of industrial food production, including sugar, poultry and beef, but these are not predominant.) While growing of pineapples, broccoli, oranges and other produce has become widespread where soil and other conditions are favourable, it has not become large scale. One consequence of the dominance of the smallholder form of production is that it has led to the prevalence of particular marketing forms, where grower-sellers are in the majority and often able to claim their primacy

in what has been termed 'the morality of markets' (Oceania 2019).

As with coffee, international and national conditions continue to affect Highland household production of these crops, including through what is termed responsiveness to 'price or market messages'. A case in point is the effect on sweet potato production of the mid-1990s devaluation of the national currency. The change occurred as a result of the abandonment of the hard kina strategy which had been employed after independence. Once abandoned, making the kina more directly subject to international currency markets, the price of the falling PNG currency was rapidly transmitted into household production and consumption. When there were substantial increases in prices for imported consumer goods, including rice, an increase in demand for domestically produced sweet potato encouraged greater production and consumption of the food crop. Sweet potato has long been a major staple central to self-provisioning as well as local markets in much of the country. As Michael Bourke and Bryant Allen also note (2009:7), the 2008 global financial crisis which brought 'rapid increases in the price of rice and other imported foods', led to a greater consumption of sweet potato. This and other forms of diversification that appeared to lessen the dependence upon coffee, nevertheless, made households (producing for immediate consumption, self-provisioning as well as for sale in local markets) more subject to the price of the kina, as an internationally traded currency and thus a measure of relative global prices.

While smallholders have increasingly become marketers of their own produce (Busse and Sharp 2019:126) or that of affines, their living conditions are also subject to the vagaries of local markets whether or not the sellers are men, or now predominantly women. Attempts by producer-sellers to impose uniformity in prices (Busse 2019) may work to impose a particular solidarity but at the end of the day, quite literally, over-production leads to lowering of prices, giving away of unsold produce or sellers taking perishable supplies back to homes for domestic use. Rather than attend major established markets in urban and other population centres, where competition is more intense and costs of selling higher, other growers sell by the roadside close to homes.

George Curry, Gina Koczberski and Susan Inu, in providing a description of smallholder diversification

also show its limits as a strategy to lift household living standards more generally. Employing research conducted in both cocoa and coffee growing areas, they argue that:

the recent emergence of large-scale profit-driven fresh food production in the highlands, which is providing new opportunities for women (and men) to earn potentially high incomes, is beginning to experience the same pressures of labour shortages and labour commodification that has characterised export crops. We argue that the moral frameworks governing food production are coming to resemble those governing export crops and hence are becoming more market-based with a consequent contraction in the extent of the social and kinship networks from which labour can be drawn. Thus, labour for large-scale commercially focused food gardening is becoming excised from networks of reciprocal exchange and is now increasingly dependent on household and hired labour (2019:247).

That is, even in the instances where smallholder income for a limited number of households is increased by concentrating upon production for a local market, including in Goroka, one of the largest urban centres in the Highlands, there is no route out. Households that initially focused upon coffee growing to provide incomes are subject to the same forces. Given the continuing attachment of households to land, the availability of labour remains a major barrier to industrial, large-scale production of food crops, as it has been since the introduction of coffee to the Highlands (Sinclair 1995; Collett 1992; Inu 2015:95; MacWilliam 2018). Without that form of industrialisation, hiring more labour and attaching it to other means of production, even these entrepreneurial households are still smallholders, albeit with higher incomes. Diversification may stimulate differentiation among households and provide an escape route for the few, some of whom become capitalists engaging in multiplex enterprises (growing coffee and vegetables, trading, transportation) (Finney 1973). However, it is not an alternative road beyond coffee production out of rural entrapment for the many.

Conclusion

The Discussion Paper concludes that coffee production by smallholders provides an illustrative instance of

what has become a more general condition in rural PNG. Instead of facilitating a process which would remove the potential for 'enclaves of rural entrapment', coffee-producing households have been tied to smallholdings in conditions that provide only limited potential for improvements in living standards. Even when and where these exist, whether in dietary changes that improve health or purchase of industrial goods, it is international price fluctuations that are the major determinant of what can occur. Laying responsibility for outcomes upon individual households, as in the marketing slogan adopted by the CIC cited above, deflects serious consideration of the determinants of household existence.

The essay commenced with reference to a recent statement by PNG's Prime Minister Marape, who drew attention to how the bulk of the country's population is located in 'enclaves of rural entrapment' and the need for state action to change conditions. Missing in this analysis is how such a change might occur or the policy implications for the PNG government. Nor has there been a focus upon how the conditions arose. By using the case of coffee-producing households in the central Highlands over the period since independence, the argument is developed here that at least for these smallholders, entrapment is a function of the terms of their commercialisation.

These terms include a continuing attachment to smallholdings with limited state action to improve productivity and quality of produce. Changes in the international production and consumption of coffee have resulted in the bulk of PNG's smallholder coffee being sold into the cheaper end of the consumer market, where competition is especially intense. This intensity is a result of major efforts by governments and other state agencies, including in Brazil, Vietnam and Indonesia, to increase production of arabica and particularly robusta for instant and other bulk coffee markets. With little consumption in the country, smallholder coffee producers in PNG remain part of the global 'food bowl' so important for the industrialisation and urbanisation that is occurring in other parts of the world.

While urbanisation and industrialisation may bring higher living standards, such population movements result in another form of entrapment — as factory workers or urban unemployed. However, the point of this paper is not to promote an 'urban alternative' but to show the need for a deeper examination of rural

conditions in a region which has been central to post-independence changes. Any action by governments and other state agencies to alleviate rural conditions throughout PNG could benefit from closer study of what has occurred through the increased production by smallholders of a major export crop.

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Endnotes

1. Compare for instance the much-vaunted measures for reducing rural poverty in China as seen by an official government propaganda arm (*The Telegraph* 28/6/2018) and a biographical account of the process in Chang (2009).
2. Central Highlands refers here to the main coffee growing provinces of the Eastern and Western Highlands, Simbu and, more recently, Jiwaka. While arabica is also grown in the Southern Highlands, Morobe and Madang provinces, the central Highlands provinces listed here are the areas where over 90 per cent of the country's arabica exports originate.
3. Two and a half decades ago, Overfield (1994:2) suggested an even more substantial proportion of the population was involved in coffee growing. He stated: 'Over 90 per cent of households in the principal coffee growing areas of the Highlands cultivate ... [coffee]. These households contain approximately 35 per cent of the national population'. Whether there has been a drift away from coffee growing by households, as the comparison between 1994 and 2017–19 assessments might suggest, cannot be evaluated on presently available data.
4. All production figures for coffee output need to be treated cautiously, including because some are based upon calendar years, while others are based upon national financial years. Production also varies from year to year in all countries due to climatic and other factors. To illustrate yield variability, compare total global output in 1975 with the immediately following years after a series of very heavy frosts in Brazil's main coffee-growing regions, when production plummeted from over 60 million bags of Arabica to about 20 million bags less. Nevertheless, allowing for the wide range of factors, as will be discussed further below, PNG's increased production has lagged behind the global output trend. PNG's output has also fluctuated considerably, with one million bags being first reached in the late 1990s.
5. The measure ton is largely now only used in and by the US, or by American English writers. A tonne, the metric measure of most use internationally, is equivalent to 1.102 tons. Internationally, national output is most often measured in terms of the total number of 60-kilogram bags, converted to tonnes by the division of 60 kg bags into the metric measure tonne, or 1000 kg. Thus 16.66 bags each of 60 kg are equal to one tonne.
6. 'Unwashed' is used to describe the beans; this term derives from the beans being dried naturally, on the tree or once picked, without water being used to separate the outer flesh from the cherry. The result is a bean which is stronger flavoured than that resulting from the washed process used for Colombian and 'other mild' arabica producers, including PNG.
7. Recently, the ICO tried to re-establish its importance for world production during the international crisis by producing an inaugural Coffee Development Report. The report, titled *Growing for Prosperity*, promotes 'economic viability as the catalyst for a sustainable coffee sector' and 'presents an in-depth analysis of the root causes and impact of low coffee price levels and volatility. It contains an independent assessment of 50 possible actions to address the economic challenges and foster the long-term sustainability of the coffee sector' (Global Coffee Report 9/10/2019).
8. It is often argued that reducing the relative price of the kina vis-a-vis other currencies aids farmers' real incomes when they produce an export crop priced in US dollars. As a result, they can obtain increased incomes for purchasing goods from exports priced in US dollars, while also producing their own food through forms of self-provisioning on smallholdings. However, as the forms of household consumption change to include more imported electronic goods (mobile phones, computers, television sets and so forth) the effect of eliminating the hard kina

strategy is less predictable than this claim suggests. That is, there are terms of trade considerations to be assessed as well. In any case for this essay, the more important point is that both the hard kina strategy and ‘floating’ or even devaluing the currency result in households being ‘trapped’ on smallholdings as their existence is increasingly commercialised.

9. MacWilliam (2018) noted the 1950s advice of consultant coffee expert Yasuo Baron Goto that much of the land leased by expatriates in the Kainantu area was unsuitable for coffee growing. Indigenes had retained control over the better coffee land, making available for leases only contested and otherwise unsuitable spaces.
10. There are no substantial studies of overall smallholder productivity for the main coffee growing area and certainly none demonstrating linear trends. Instead, there are estimates based upon small samples (Collett 1992), or aggregates reached by dividing total smallholder output by estimated area of land under coffee (Allen, Bourke and McGregor 2009:309). ‘Probably’ is probably the best conclusion that can be reached, based upon the views of knowledgeable informants, and does not reflect considerable variability in smallholder agricultural practices, soil fertility, favourable weather conditions etc.
11. Imbun (2014:28–29) notes the attitudes of a group of Engan coffee growers to the labour demands of coffee, even when acknowledging the significance of income from sales. ‘[M]aintaining the plots and production on a consistent basis was not favoured as reflected in one villager’s remarks: “Why do we waste our time on a crop which pops up a good price in a blue moon? Looking after pigs is more profitable than cherry trees” (Author interview, 2010)’. While Enga is outside the more established coffee-growing areas of the central Highlands, nevertheless substantial fluctuations in total smallholder output suggest this attitude may not be confined to a small group of Engan growers.
12. CIC staff are trained and recognised formally after training as police. The CIC is also responsible for the building of roads.
13. Coffee prices are calculated and cited internationally in the US currency.

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