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Market update: Sixty years of change in Papua New Guinea's fresh food marketplaces

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Abstract

Open-air marketplaces are vital to food security, livelihoods, and the national economy in Papua New Guinea (PNG). Over the past 60 years, rapid growth of urban populations, changes in global commodity prices, and the decline in value of the PNG currency have stimulated demand for domestic fresh food. Selling fresh food in marketplaces has also become an attractive way to earn money for rural producers, whose returns on labour on their export crops have declined, and for urban residents struggling to make a living. This in turn has led to significant changes in PNG's marketplaces: spatial and temporal changes, changes in what is bought and sold, changes in who is selling, and changes in how food is transacted. In this paper, we bring together research on PNG's marketplaces from between 1961 and 2022 to document these changes and their causes, alongside important continuities, and to examine the implications and substantial gaps in our knowledge.

KEYWORDS
food security, gender, livelihoods, marketplaces, Papua New Guinea

1 | INTRODUCTION

Open-air marketplaces are vital to food security, livelihoods, and the national economy in Papua New Guinea (PNG). Despite this, marketplaces are too frequently undervalued by economists and government policymakers. The significance of open-air marketplaces will continue to increase with climate change, disruptions to global commodity networks such as those caused by pandemics and conflict, the growth of PNG's population, and changes in the relative prices of export crops and imported food. Understanding the history of PNG's marketplaces, how they function, and their likely future trajectory, we argue, is an essential starting point for policy and planning related to marketplaces, food security, and urban and rural development.

In the 1950s and 1960s, the Australian colonial government encouraged the development of urban fresh food marketplaces. Initially, the main purpose of these marketplaces was to supply fresh food to the mainly white urban population while eliminating the health risks associated with door-to-door food sales, and to provide the colonial government with a way to distribute new non-indigenous crop varieties (Benediktsson, 1998, p. 167; Jackson, 1976, p. 175). In time, these marketplaces became vital sources of food for growing urban populations. The move to daily markets in the early 1970s reflected both the increasing commercialisation of consumption and the colonial government's encouragement of the production of surpluses beyond household requirements (MacWilliam, 2013, pp. 217–218). But government and development interest in marketplaces waned after this initial period, and since then far greater attention has been directed at export cash crop production, while the contribution of domestic fresh food production has been routinely overlooked and undervalued (Brookfield, 1969b, pp. 15–16; Bourke, 1986b, p. 60; Dickerson-Putman, 1988).[1]

The undervaluing of domestic fresh food marketing emerged, in part, with a shift in the gendering of marketplaces. As men, who were initially active in marketplaces, shifted their attention to smallholder export cash crop production, marketplace vending became increasingly imagined as women's work and as less worthy of development attention than export cash crops (Dickerson-Putman, 1988; Underhill-Sem et al., 2014). Since the late 2000s, however, as a strong focus on women's empowerment emerged within international development in the Pacific, there was a renewed interest in marketplaces precisely because they were primarily women's domain (UN Women, 2012; Underhill-Sem et al., 2014). A range of development interventions, funded by overseas aid and PNG government authorities, have sought to improve marketplace infrastructure and support women's income generation. Marketplaces have also been used as a vehicle to address broader development issues including women's safety in public spaces and, recently, responses to COVID-19 (Parker, 2022; UN Women, 2012).

While many marketplaces have been physically transformed since the mid 2000s, many of the redevelopments have failed to recognise the trajectory of change or have simply been outpaced by it. For example, Mount Hagen's redeveloped marketplace, which opened in late 2006, was ill-prepared for the reselling and wholesaling activity that now occupies much of the bench space and chokes the main entrance (see also Chang et al., 2014). Many of the developments have also occurred without sufficient contributions from local people, without understanding of the social dynamics of these spaces, and without recognition of the impacts of such redevelopments on market users (Craig & Porter, 2017; HELP Resources, 2019; Underhill-Sem et al., 2014).

[1]The limited attention fresh food did receive focused on the formalised trade supplying the private sector rather than open-air marketplaces (Benediktsson, 1998, p. 167).

Marketplaces, and the informal economy[2] more broadly, have received increased support from the national government since the enacting of the *Informal Sector Development and Control Act 2004* and the recognition, in the National Informal Economy Policy (2011–2015), of the informal economy as a 'full and legitimate partner of the formal economy' (DfCD & INA, 2011, p. ix). This sentiment was echoed in PNG Prime Minister James Marape's recent foreword to the *National Audit of the Informal Economy* (see Stanley, 2019). This high-level support is, however, often not reflected on the ground. Marketplace vendors are generally neglected and, at times, harassed by authorities and some young men. Despite the numerous marketplace redevelopments since the mid 2000s, the undervaluing of local fresh food continues, and investments relative to the social and economic significance of marketplaces are small.

In a recent review of the informal economy in PNG, Kopel (2017, pp. 6–7) noted that providing fresh food marketplaces is one of the most important priorities for the development of microenterprises. She also argued for the need to move beyond a 'narrow focus' on improving marketplaces and to take 'a holistic approach to improve the entire marketing system'. This paper is intended as a contribution to such a broader approach.

In this paper, we discuss significant and ongoing changes in trading practices in PNG's marketplaces, as well as changes in spatial and temporal organisation, changes in what is being traded, and changes in who is doing the trading.[3] We emphasise aspects of change, both because these aspects are underdescribed and because the practices and market characteristics we describe are growing in prominence and will have significant implications for food security and livelihoods. There are, however, significant continuities in PNG's marketplaces, as well as significant differences between marketplaces in different parts of the country. There also remains a strong Melanesian character to PNG's marketplaces, and Papua New Guinean ideas about social personhood, place, and exchange influence the changes we describe (Busse & Sharp, 2019; Sharp & Busse, 2019, p. 194).

There are two main causes of the changes occurring in PNG's marketplaces. First, there is increased demand for fresh food. This is caused by the growth of urban populations and the increased affordability of local fresh food relative to imported food. Second, there is the search for money both by an expanding urban population, for whom there are growing costs of living and shrinking formal employment opportunities, and by rural people, for whom export cash crops have become less remunerative. We return to a fuller discussion of these causes later in the paper.

We also identify important implications of those changes for PNG development as well as areas where more research is needed. The implications include greater investment in infrastructure that supports the different market participants, particularly women, and attention to the impacts of increasing numbers of market intermediaries on livelihoods, prices, and urban food security. More research is needed to better understand consumer behaviour, market intermediaries, market catchment areas, price formation, the effects of the ongoing COVID-19 pandemic, and small urban and rural marketplaces. We return to these points at the end of this paper.

In describing changes in PNG's marketplaces, we draw both on the literature and on our own extensive fieldwork experience in PNG's marketplaces over many years. Mike Bourke (1986b, 1986a) intensively surveyed marketplaces in the Eastern Highlands in the late 1970s and early 1980s. Between 2010 and 2019, he surveyed numerous rural and urban fresh food marketplaces in the vicinity of established and proposed resource projects in Hela, Southern Highlands, Western, Gulf, and Morobe provinces. In addition to research in the Daru market in the 1990s, Mark

[2]See Conroy (2020) for a discussion of the historical development of the informal economy in PNG.
[3]We have discussed these and other changes in PNG's marketplaces elsewhere (see Busse & Sharp, 2019; Sharp, 2021; Sharp & Busse, 2019).

Busse (2014, 2019) made a detailed ethnographic study of the Goroka marketplace between 2010 and 2015 as part of a project on urban food security.[4] Tim Sharp worked extensively in marketplaces in his multisited study of betel nut trading, with 13 months of fieldwork (2006–2010) in 13 provinces (Sharp, 2013, 2016, 2019). In 2015, he undertook marketplace surveys with colleagues from PNG Oil Palm Research Association and the PNG Cocoa & Coconut Institute in West New Britain and East New Britain as part of a wider study of food security (ASEM/2012/072) funded by the Australian Centre for International Agricultural Research (ACIAR) (see Sharp et al., 2022). And, from 2017 to 2019, he conducted in-depth interviews with more than 50 market vendors and wholesale traders in East New Britain, West New Britain, Eastern Highlands, Western Highlands, and Port Moresby as part of an ACIAR-funded study of women's entrepreneurship in the agricultural sector (ASEM/2014/054). Each of us also has made casual observations of marketplaces over many years and, collectively, across most of PNG.

The paper draws on marketplace research extending from 1961 to 2022. The number and quality of studies in PNG are spatially and temporally uneven and this constrains our ability to trace change in the country's marketplaces (see Busse & Sharp, 2019, fn. 7). There are reasonable data over time for markets on the Gazelle Peninsula and in Goroka, Port Moresby, and to a lesser extent, Mount Hagen and Kimbe (see Figure 1). But elsewhere marketplace studies are few. From the 1960s to the 1980s, there was considerable research on PNG's marketplaces. Research on marketplaces has since been more limited and, with only a few exceptions, less detailed. This research, nevertheless, provides snapshots of particular marketplaces at particular times. In this paper, we draw these snapshots together to assemble a picture of significant changes in PNG's

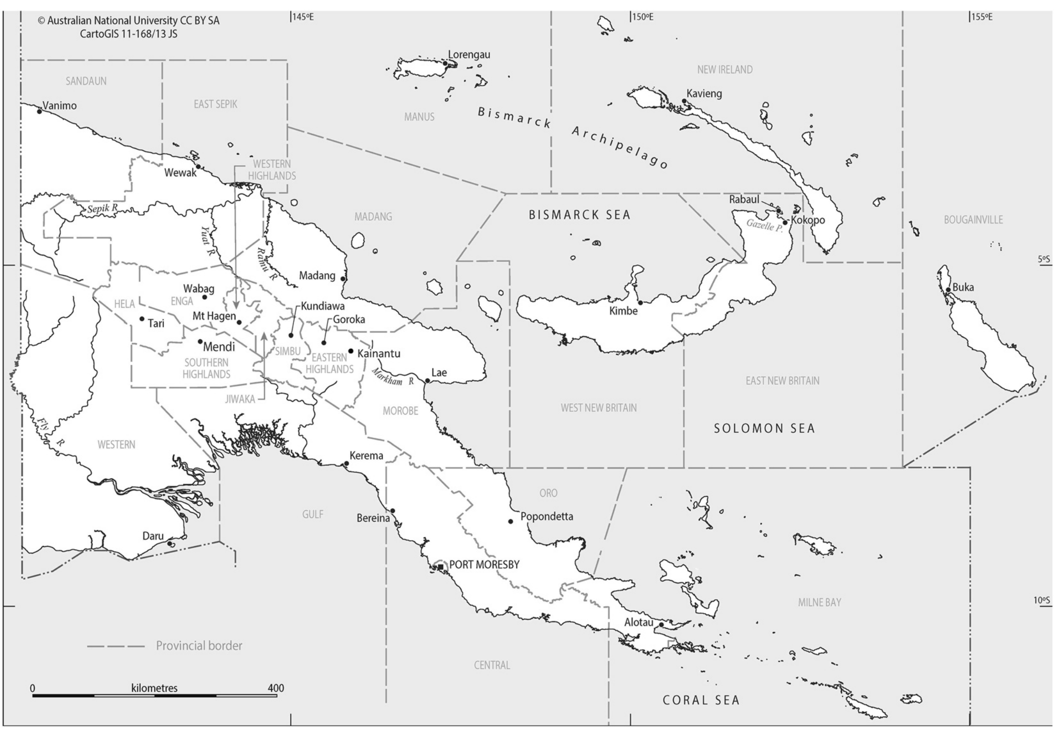

FIGURE 1 Provinces and major towns in Papua New Guinea.

[4]Busse's research in and around Goroka was funded by the University of Auckland and the New Zealand Royal Society.

open-air marketplaces over the past 60 years—changes that have important implications for social planners and development specialists.

In this paper, we focus on fresh food marketplaces and the trade networks directly associated with them.[5] We do not discuss direct selling of fresh food to supermarkets, resource extraction camps, or institutions such as schools and jails, nor do we examine fresh food sales in supermarkets (for extra-marketplace sale of fresh food, see Benediktsson [1998, 2002]; Bonney et al. (2012)). We also largely exclude discussion of betel nut trading, which Sharp (2012, 2013, 2016, 2019) has discussed in detail elsewhere. We also do not focus on betel nut because, while there are clear similarities with the trade of fresh food, the dynamics of betel nut trading and its historical development are quite distinct. Intermediary and long-distance trading of betel nut emerged much earlier than it did for fresh food. The trade networks for betel nut today are more complex and span greater distances than those for fresh food. Competitive trading practices are also more evident. At the same time, the prevalence of betel nut in many fresh food marketplaces means its story interlaces our discussion. Indeed, the rapid and indigenously driven changes in betel nut trading provide possible clues to the future trajectory of fresh food marketplaces as Papua New Guineans continue to transform marketplaces into Papua New Guinean spaces.

Understanding the complex history of change in PNG marketplaces matters because of the critical role marketplaces play in urban food security as well as in urban and rural livelihoods. The rapid increase in PNG's urban population means a growing dependence on urban marketplaces, and the growth in urban centres will be exacerbated in coming years by climate change—both in the form of climate change refugees and in the effects of climate change on food production and health in rural areas.

There is also a critical need to understand what happens in marketplaces in concrete detail so that they are safe places for the many Papua New Guinean women who buy and sell in them. The recent closure of large urban marketplaces during the COVID-19 state of emergency (see below) also highlights a potential risk in large marketplaces during pandemics and the disruption of food supply chains on which growing numbers of Papua New Guineans are becoming increasingly dependent. These issues, and others, are taken up in the rest of this paper.

2 | SIGNIFICANCE AND BROADER CONTEXTS

Marketplaces in most parts of Papua New Guinea emerged in the colonial period, particularly in connection with the growth of urban centres and smallholder cash crop production after World War II. In a limited number of locations, modern marketplaces were preceeded by, and developed from, regularised indigenous trade gatherings (see, for instance, Salisbury (1970) in relation to trading on the Gazelle Peninsula). Elsewhere, and notably in the Highlands region, despite the existence of complex and spatially expansive trade networks, marketplace trade was a novel mode of exchange (Hughes, 1977).[6] In marketplaces today, there remains a coalescence and negotiation of both exogenous and endogenous ideas of exchange and social relations (summarised

[5]In PNG's marketplaces, a wide range of indigenous and introduced fresh food is sold. This includes the major staple crops (sweet potato, banana, taro, yam, and sago), an array of vegetables, fruits, and nuts, stimulants, as well as marine produce and, in some marketplaces, livestock.

[6]There is a danger of smuggling assumptions and terminology from capitalist market societies into descriptions of what appear *prima facie* to be marketplaces. In so doing, one ignores how the people who are participating in such spaces understand what they, and others, are doing. Just because something looks like a marketplace does not mean that it works like a capitalist market or that abstract economic models are the best way to understand what is happening (Busse, 2022; Polanyi, 1957).

in Brookfield, 1969b; Busse & Sharp, 2019, pp. 129–130). Marketplaces are important social venues within the urban landscape, as well as important sites of trade.

The sale of fresh food, primarily in marketplaces, provides income for more rural households in PNG than any other activity. In the 1990s, 94 per cent of rural households earned some income from fresh food sales and 35 per cent earned some income from the sale of betel nut (Allen et al., 2009, p. 286). Taken together, fresh food provided an estimated 22 per cent of the total income from agricultural activities of rural Papua New Guineans, and betel nut provided an additional 10 per cent. Domestic marketing of fresh food has likely since increased in significance. Even in those rural areas with large amounts of export cash cropping, marketplace earnings are an important supplementary source of household income and the main source of income for most women (Curry et al., 2019; Dickerson-Putnam, 1988).[7] Indeed, as we will discuss, the significance of marketplace earnings in relation to other sources of income is likely increasing in these areas. Women are also more likely to be able to retain control over marketplace earnings, whereas export cash crop income is more frequently controlled by men (Curry et al., 2019). Marketplaces are also an increasingly vital source of income for many urban households—again, particularly for women.

Marketplace earnings are also important for household incomes due to their potential regularity. In urban households, marketplace earnings supplement wages that are insufficient to meet household needs and they support household consumption between fortnightly wages (Rooney, 2019, p. 155; Sharp et al., 2015). In rural households, marketplace earnings add to incomes from export cash cropping (Curry et al., 2019). They assist households to manage intermittent disruptions to, and fluctuations in, household incomes resulting from crop seasonality and changes in crop prices. In the Bena area of Eastern Highlands, for example, earnings from the sale of fresh food, particularly pineapple, are critical to household income during the coffee off-season (Inu, 2015; see also Dickerson-Putnam, 1988, p. 218). The sale of fresh food was also critical to supporting household incomes in East New Britain in the late 2000s when cocoa pod borer decimated production of the province's main cash crop, cocoa (Curry et al., 2015). Marketplace earnings also partially offset the declining value of cash crops relative to the costs of goods in recent years.

Rural incomes are vital. Most rural people produce most of their own food, and 83 per cent of the food energy consumed in PNG is produced in PNG (Bourke et al., 2009, p. 131). Even small incomes in rural PNG matter to food security because they improve the consumption of fats, protein, and energy-dense foods such as lamb flaps and tinned meats, which are typically short in rural diets (Allen et al., 2005; Heywood & Hide, 1992). They also support household food security during periodic shocks, such as the 1997–1998 and 2015–2016 El Niño events (Allen & Bourke, 2001; Kanua et al., 2016).

Finally, marketplaces are vital for urban food security, not only because of the incomes that urban people gain from markets, but also because open-air marketplaces are the main source of fresh food for PNG's growing urban population.

We now turn our attention to describing six areas in which PNG's marketplaces have changed over the past 60 years: the spatial extent of trade, temporal changes, what is bought and sold, who is buying and selling, how food is bought and sold, and the organisation of the market system (summarised in Table 1). We then discuss the causes of those changes and conclude with a discussion of the implications of these changes.

[7]In household surveys conducted with cash crop smallholders, fresh food marketing was the most important income source for 50.5 per cent of women in cocoa-producing households in East New Britain, 58.5 per cent of women in coffee growing households in the Eastern Highlands, and 21.5 per cent of women in oil-palm producing households in West New Britian (Curry et al., 2019, p. 241).

TABLE 1 Summary of characteristics and changes in PNG's marketplaces since the 1960s

	1960s	Since 2000
Spatial	Marketing gained popularity. Many small marketplaces established.	Further increase in the number and significance of small marketplaces in urban and rural areas.
Temporal	Markets held on set days and times. Daily trading adopted, but a strong weekly/fortnightly pattern of trading, with greater activity on certain days.	Differing levels of trading over the week/fortnight have diminished, with high levels of marketing six or seven days a week. Trading hours have expanded.
Goods	Marketplaces dominated by domestic fresh food. Imported goods nearly absent.	Marketplaces still dominated by domestic fresh food. Imported and manufactured goods increasingly common.
	Produce sold in bundles, piles, or as individual items (not by weight).	Produce still sold in bundles, piles, or as individual items (not by weight).
Traders	Gender of vendors differed considerably between locations, with proportion of women lowest in the large urban centres. Sale of certain goods is gendered.	Women are generally over 80 per cent of vendors. Women as a proportion of vendors lower where long-distance trading involved. Men's involvement appears to be increasing.
	Market earnings only part of most vendors' total household income.	Market income contributes an increasing proportion of household income in accessible areas. Markets are main source of income for most women. Many resellers dependent on market income.
Character of trading	Lack of bargaining between buyers and sellers.	Bargaining has appeared where fresh food resellers are active and very common in betel nut trade. Bargaining is uncommon in transactions with end consumers.
	Sellers did not try to force a sale. No touting.	Mild touting, including offering discounts and calling out to attract a prospective customer's attention, but relatively uncommon.
	Little overt competition between sellers.	Competition evident, although sellers frequently operate as groups to reduce competition.
	Short-term prices mostly inflexible. Some reduction of prices, though not at the behest of buyers.	Reduction in prices in the afternoons. Small amounts of extra produce are sometimes given after a transaction.
	Marketplaces are important social spaces as well as places to trade food.	Marketplaces remain important social spaces as well as places to trade food.
Organisation of trade	Absence of wholesale transactions. Virtually all marketplace vendors are rural producers.	Rise of wholesaling and reselling. Reselling most prominent in large urban centres.
	Little or no specialisation in production. Very limited rural–rural trade.	Greater specialisation in production in accessible areas, but rural–rural trade remains limited. Rural people do not depend on markets for their food.
	Most vendors from local area, although some travel up to 2 hours by vehicle.	More non-local vendors (related to reselling and long-distance trading).

3 | CHANGES IN PAPUA NEW GUINEAN MARKETPLACES

3.1 | Spatial changes

In most urban centres, the first marketplaces were established in the 1950s and 1960s[8] but rapidly expanded so that by the early 1970s marketplaces had 'sprung up alongside almost all non-rural settlements in the [Highlands] region: beside council chambers, near schools, by missions, by plantations, next to airports, along road sides, and by small wayside shops (or trade stores)' (Jackson, 1976, p. 176). This profileration of marketplaces has continued.

The growth in the number of marketplaces can be seen in the Eastern Highlands. Goroka's first marketplace was established in 1957 (Epstein, 1982, p. 19). By the early 1970s, there were at least 23 marketplaces in the Eastern Highlands (Ward et al., 1974, Fig. 4.17) and, by the early 1980s, there were 'some 57 rural and rural non-village markets ... as well as nine markets located in the urban areas' in the province (Bourke, 1986b, p. 73). There are no current data on the number of rural marketplaces, but in 2014 Eastern Highlands' main urban centre, Goroka, had at least 13 marketplaces (Barnett-Naghshineh, 2018, p. 9), ranging in size from 10 or 20 vendors to the main marketplace with about 700 vendors on a typical day (Busse, 2019, p. 209). Individual vendors and small clusters of vendors are also scattered throughout Goroka.[9]

Most of the growth of marketplaces has been in 'informal' marketplaces not administered by local councils, government, or the private sector. The government-administered urban marketplaces remain the largest marketplaces in their respective urban centres, though some of the 'informal' marketplaces are of considerable scale. In 2007, Mount Hagen's Kaiwei betel nut market had an average of 420 vendors each day, just under half of whom sold betel nut and its accompaniments (Sharp, 2012, p. 161).

The number of small marketplaces along major highways has also grown. Along the Highlands Highway in the Eastern Highlands, the number and size of roadside markets have grown significantly since the 1980s, and even markedly since the mid 2000s. This is due in part to people migrating to live closer to roads to access health and education services and economic opportunities in town, as well as the economic opportunities provided by road traffic (Allen et al., 2005). Where there is human settlement along a road, there are invariably small markets oriented towards passing travellers (Anderson, 2008; Beer & Church, 2019; Sharp et al., 2022).

Small marketplaces along minor rural feeder roads have also grown in number. These marketplaces often have only a few vendors and are oriented towards local consumers. Fresh food is sold as well as store goods and immediate consumables such as 'scones', rice balls, betel nut, cigarettes, and cups of tea. Small housefront stalls have also increasingly appeared in rural areas and occupy a middle ground between fresh food markets and rural trade stores. The 2018 *National Audit of the Informal Economy* also emphasised the prevalence of vending at sites other than the designated urban marketplaces (Stanley, 2019).

Trade away from the main urban marketplaces increased in the early period of the COVID-19 pandemic. In response to the pandemic, the PNG government declared a state of emergency in late

[8]Some marketplaces were established earlier in coastal areas—for example, the 'formalised' Rabaul market dates from the late 1920s, and Koki Market in Port Moresby dates from the early 1950s. Indigenous trading previously occured at both these sites (Epstein, 1982, p. 14; McCullough, 1971, p. 135). Marketplace-like trade occured at a limited number of lowland locations in precolonial PNG (Brookfield, 1969b, pp. 4–10).

[9]The growing number of marketplaces is also evident in Wewak District, East Sepik, where in 2019 there were at least 37 marketplaces operating (HELP Resources, 2019).

March 2020, which was extended until mid June. Among other measures, open-air marketplaces in the larger urban centres were closed (although not most smaller marketplaces outside the urban areas), road travel was closed at provincial borders, and the sale of betel nut was banned. The greatest impact of the government-imposed measures was on sales of fresh food, animal products, and betel nut in urban marketplaces. This had a significant impact on the cash income of many rural villagers as well as on some intermediate traders and resellers. There were marked increases in the price of many types of fresh food in some larger urban centres. Some sellers and buyers found innovative ways to avoid the closures, one of which was to sell in either newly established or existing marketplaces outside town boundaries (Bourke, 2020, pp. 144–149; Kopel, 2020).[10]

The state of emergency was lifted in mid June 2020. Open-air marketplaces reopened between April and June 2020, often with restrictions on the number of sellers allowed in a marketplace. By late 2020, most open-air marketplaces were operating again and the short-term increases in prices were reversed. It is not known whether the newly established informal roadside marketplaces have continued after the cessation of restrictions.

Marketplaces provide an important source of income for rural people, but potential market earnings differ greatly between different locations. This is evident in the fresh food prices in six marketplaces in Western Province in 2013 and 2014 (Bourke & Kanua, 2022). Four of the markets—Kiunga, Rumginae, Ningerum, and Sisimakam—are on the Kiunga–Tabubil Highway. Two—Kuda (near Debepare) and Nomad—are in remote locations with no close road or river access to urban centres. Prices in the four accessible marketplaces were broadly similar. Prices in the village market near Debepare were much lower than in the four marketplaces with road access, and prices at Nomad were even lower. Given that the sale of fresh food is the main source of cash income for most female villagers in Western Province, these data suggest that sellers have significantly lower cash income in the more remote locations. This is consistent with surveys in other rural locations in PNG that show that the large differences in rural people's income from all sources are related to access to transport infrastructure and hence to urban and market centres.

More research is needed to understand rural and smaller urban marketplaces. More investment in infrastructure in these increasingly important places of trade is also needed.

3.2 | Temporal changes

There have also been significant changes in the temporal pattern of marketing. When first established in the 1950s and 1960s, most of the urban marketplaces operated only one or two days each week. Marketplaces soon shifted to daily trading, but market attendance throughout the week was very uneven, with marketplaces generally having one or two days each week with much higher attendance than others.[11] This is strongly evident in Epstein's records from the Rabaul market in 1968, where the number of sellers and market turnover were much higher on Saturdays than on other days (see Figure 2). Similar patterns were observed in Koki (Port Moresby) and Mount Hagen in the early 1970s (Jackson & Kolta, 1974, p. 13; McCullough, 1971, p. 141), and in Kainantu in the early 1980s (Bourke, 1986b, p. 65). Over time,

[10]The volume of fresh food transported by road and sea from the Highlands to Port Moresby decreased by 90 per cent in three months. This resulted in increased prices for market foods, which had the greatest impact on the urban poor.
[11]The strength of Christianity in the country means many marketplaces do not operate on Sundays, though an increasing number do. Sunday markets are typically much smaller than those on other days (see Figure 2). Some markets, such as that at Poinini (near Kimbe), known locally as 'Sunday Market', are only significant on Sundays when the main town marketplace is closed.

the variation in attendance between the different market days has diminished. Fridays and/or Saturdays still attract higher attendance at most marketplaces and vendors often report that they receive higher profits on these days, but they are not of a different order of magnitude as they once were. This is evident at the Kokopo market—now the largest market on the Gazelle Peninsula (see Figure 2).[12] Although the Saturday market attracts fewer sellers than it did in the 1960s—declining from about 2,400 vendors in 1968 to 1,714 vendors today—the weekdays have grown significantly, from about 220 vendors each day in 1968 to 1,360 vendors in 2015.[13] Reduced variation in attendance is now evident in all major urban marketplaces (see HELP Resources, 2019, p. 77; JICA, 2008, pp. 2–7, 2013, pp. 2–6, 2017, pp. 2–15; Sharp, 2012, p. 164) though most rural markets at government and mission stations continue to operate only on one or two days each week (for a recent account of a two-day-a-week rural station market, see Minnegal & Dwyer [2017, pp. 106–111]).

The influence of the fortnightly public sector pay day on market activity has also diminished. In the 1970s and 1980s, there was a marked fortnightly pulse through marketplaces in terms of vendor attendance and the value of fresh food bought and sold (Bourke, 1986b, p. 65; McCullough, 1971, p. 141). The East New Britain Provincial Market Authority (ENBPMA) vendor ticket data for Kokopo are the only available recent quantitative data on this. The data show that the market continues to be larger on the Friday and Saturday of the public sector pay week, but only marginally (Table 2). Casual observations in other marketplaces support a diminished fortnightly pulse, though this pattern is strongly influenced by each market's local economy. On the whole, PNG's economy is increasingly diversified and the government sector no longer dominates the way it once did.

With increasing numbers of small 'informal' marketplaces, trading hours have also increased. Small 'corner' marketplaces are often busiest in the late afternoon and they continue after the main town markets have closed for the day. All-night markets and small canteens operate along the Highlands Highway and the major roads through Madang and Morobe provinces, catering to truck drivers, betel nut traders, and other night-time travellers. Housefront stalls also often operate well into the evening (see HELP Resources, 2019, p. 8; Rooney, 2019).

The changes in the temporal pattern of marketing reflect the growing importance of fresh food marketing both for people's livelihoods and for the PNG economy. The now daily significance of marketplaces and the expansion of trading hours make it viable for marketplace vending to become a vendor's main occupation and so for reselling to emerge—a subject to which we will return. We now turn to discussion of what is bought and sold in marketplaces.

3.3 | Goods: What is bought and sold in marketplaces

In the 1950s and 1960s, vendors in urban marketplaces mainly sold 'native staple foods, fresh fruits and vegetables, limited quantities of fish, meat, and cooked foods, [and] native stimulants' (Brookfield, 1969b, p. 1; see also Epstein, 1982; Belshaw, 1952). A small number of vendors also sold local handicrafts and artefacts (including brooms, baskets, string bags, mats, *tapa* cloth, lime

[12]The East New Britain Provincial Market Authority made the 2015 data available. Its markets are very well administered and the authors have strong confidence in the integrity of the data. Kokopo replaced Rabaul as the provincial capital and the province's economic hub after the Rabaul volcanic eruption in 1994. In 1968, Rabaul market was the region's largest. Today, Kokopo has the largest market.

[13]Data for 1968 are from Epstein's January survey period. In 2015, the figures are for a 12-month period, November 2014 to October 2015.

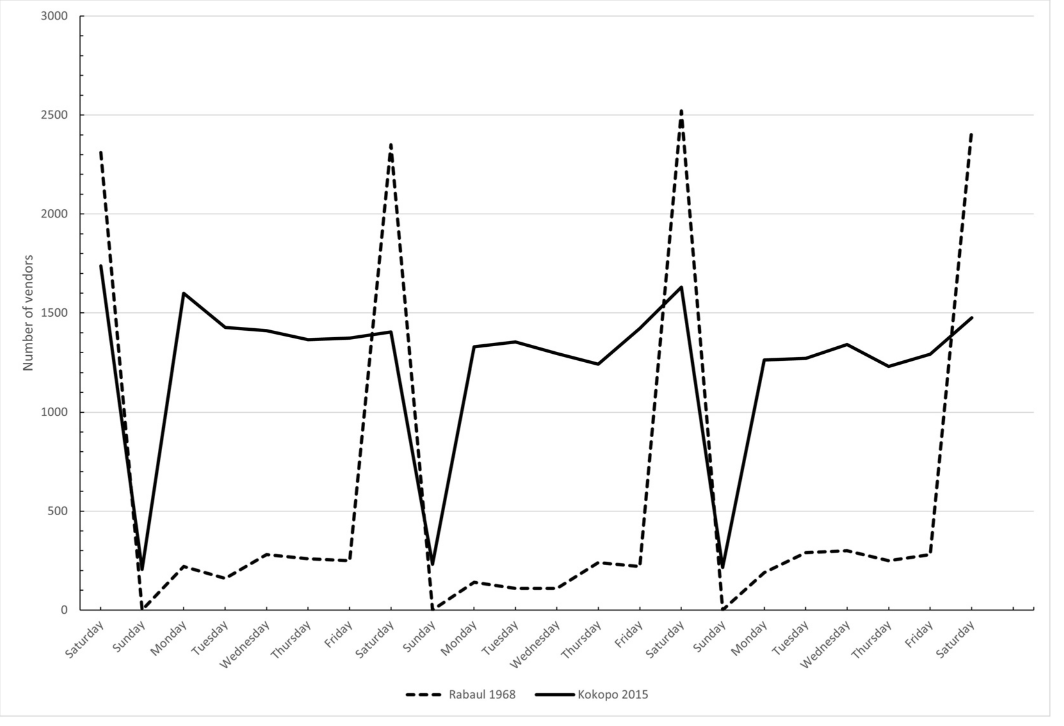

FIGURE 2 Number of vendors at Rabaul market in 1968 and Kokopo market in 2015. *Sources*: Rabaul 1968 data from Epstein (1982, p. 175) for 6–27 January 1968. Kokopo 2015 data are from the East New Britain Provincial Market Authority (ENBPMA) ticket data, showing vendor spaces occupied for 10–31 January 2015.[14]

TABLE 2 Average number of vendor spaces occupied on the public sector pay week and the 'off' week, Kokopo market (1 November 2014 – 31 October 2015)

	Public sector pay week	Off week
Friday	1455	1411
Saturday	1727	1701

Data source: ENBPMA.

pots, ropes, beads, shells, feathers, fossils, ochre, and stone axes) (Belshaw, 1952; Dakeyne, 1969; Epstein, 1982; Salisbury, 1970; Harold Gallasch, Pers. comm., August 2022). Imported and commercially manufactured items were absent from marketplaces in the 1960s (Brookfield, 1969a, p. 142; Epstein, 1982, pp. 85, 98). However, bread made from imported flour was sold in Popondetta and Kerema markets by the early 1960s, as were 'ready-made dresses and skirts' at Popondetta and clothing made from imported cloth in Rabaul by 1967 (Dakeyne, 1969, p. 31; Hogbin, 1969, p. 38; H. Gallasch, Pers. comm.).

Bread and clothing are not mentioned in Epstein's (1982) 1967 study of the Goroka and Mount Hagen marketplaces, but started to appear in the Highlands from the early 1970s. 'Scones' made

[14] Some vendors, particularly resellers (who represent about 10 per cent of fresh food vendors), occupy more than a single vending space.

from imported flour were being sold at the Goroka marketplace by 1970 (Shannon, 1973), at Koge marketplaces in Simbu by 1972 (Hide, 1975), and at Kainantu by 1978. Clothing (either imported or made locally from imported cloth) was being sold at Koge marketplace by 1972 (Hide, 1975), in the Mount Hagen and Goroka marketplaces by 1973 (Jackson & Kolta, 1974, pp. 17–20), and at Kainantu by 1978 (Bourke, 1986b).

The practice of offering imported goods and cooked food has continued to expand. The diversity of imported goods on sale has expanded considerably and now includes items such as stock cubes, soft drinks, lollies, single-use plastic bags, rice, salt, oil, tinned fish, candles, cigarettes, cigarette lighters, soap, second-hand clothes, and mobile phone credit. Less common are items such as thongs, sunglasses, pirated DVDs, medicines, and torches. Foods produced from store goods such as cooked sausages, lamb flaps, rice and flour balls, and icypoles are also common (see Figure 3).

Handicrafts—including string bags, woven baskets, shell money, and locally produced blouses and screen printing—are also sold in some marketplaces.

The prominence of imported goods varies from marketplace to marketplace. At Kimbe's main market, store goods are now prominent. A one-day spot survey in 2015 recorded that 25 per cent of vendors were selling imported or store goods. This included a large second-hand clothing section. Cooked food—mostly made from imported ingredients—was also being sold by 8 per cent of vendors (Sharp et al., 2022). Imported goods are not permitted to be sold in some government-controlled marketplaces, such as in Wewak's recently redeveloped main market (HELP Resources, 2019) and the main markets in Alotau and Lae (Kopel & Iwong, 2021, p. 9). The practice remains a point of contention in the Goroka marketplace as fresh food sellers complain about the space—often the prominent space—taken by people reselling store goods (Busse, 2019). At Kokopo in 2015, very little other than fresh food, cooked food, handicrafts and betel nut were sold. In Alotau, a separate marketplace has been established for the vending of non–fresh food items (Kopel & Iwong, 2021, p. 16).

The sale of betel nut is also not permitted in many government-run marketplaces, especially in the Highlands and in the large urban centres. Where permitted, it is sometimes sold alongside fresh food, but elsewhere it is sold in a separate section of the marketplace.

A large variety of foods are sold in open-air marketplaces in PNG. During Busse's research in the Goroka marketplace from 2010 to 2015, he counted as many as 48 different types of fruits and vege-

FIGURE 3 'Store goods' sold alongside fresh food in the Goroka main market (temporary location), 2019. *Photo*: Tim Sharp.

tables for sale on a single day.[15] These included indigenous produce such as leafy greens, bananas, coconuts, sugar cane, sweet potato, and taro, as well as introduced crops such as pineapples, broccoli, cabbages, potatoes, and corn. A more critical distinction for vendors is that between perishable and non-perishable produce. The significance of this lies in what happens at the end of the day. Perishable items must be sold at reduced prices, taken home to be eaten, or given to friends and relatives. Non-perishable items, on the other hand, can be stored and brought back the next day. This is another way in which marketplaces in PNG, where most market food is perishable, differ from peasant marketplaces in many other parts of the world, where durable grains and pulses are widely traded.

This last point suggests that attention should be given to marketplace infrastructure that will allow the overnight storage of perishable produce. This will reduce the need for vendors to reduce prices or give away perishable items, and will increase the availability of such items in PNG's marketplaces.

3.4 | Traders: Who buys and sells in marketplaces

3.4.1 | Intermediaries and specialisation

In the 1960s, PNG marketplaces were dominated by producer-sellers (Brookfield, 1969b, p. 1)—people who sold fruits and vegetables that they grew themselves, or with the help of their immediate family or relatives, directly to the end consumer. This simple social organisation of Pacific marketplaces differed markedly from the more complex market structures in Africa, Asia, and Latin America (Brookfield, 1969b; Epstein, 1982). Producer-sellers continued to predominate into the 1980s and 1990s. Bourke (1986b, p. 61) noted the absence of wholesale trade in PNG fresh food marketplaces in the early 1980s, although he noted the start of wholesale trade in betel nut. In the early 1990s, long-distance sweet potato trading remained the preserve of producer-sellers, although marketplace resellers had emerged in the major cities (Benediktsson, 2002).

This has changed both with betel nut and with fresh produce. In the case of betel nut, the traders who transport it from the coast to the Highlands are part of a large and sophisticated trading network, and people selling betel nut in the Highlands marketplaces are resellers rather than producers (Sharp, 2013, 2019, 2021). Intermediary traders were slower to emerge in the trade of fresh food, the networks remain less complex, and resellers make up a smaller proportion of vendors. Intermediaries have only started to become prominent in the country's fresh food marketplaces since the start of the 2000s, and their prominence has grown apace since then.[16] The historical rise of intermediaries in PNG's marketplaces is discussed in more detail in Sharp (2021).

There are now growing numbers of both market intermediaries who transport fresh produce from rural producers to urban markets—often combining produce from multiple producers—and smaller-scale resellers who buy and onsell within a town, either in the same marketplace (Table 3)[17] or in urban corner markets. The prominence of market intermediaries varies considerably from marketplace to marketplace. In Goroka market in 2011–2012, 85 per cent of the 174 market vendors whom Busse and University of Goroka postgraduate students interviewed had grown what they were selling themselves or with the help of close relatives. Only 7 per cent of the

[15]At Rabaul's market, Epstein (1961, p. 50) counted 'about fifty different kinds of produce, not including their different varieties'.

[16]Reselling was already common on the Gazelle Peninsula by the mid 1990s, with the practice undertaken by a few people from the early 1960s (Lowe, 2006, pp. xiii, 129–130, 165–168, 213).

[17]Table 3 captures only vendors occupying a vending space in the market. It does not include large-scale wholesalers who may supply the marketplaces.

TABLE 3 Percentage of vendors in various marketplaces selling 5–7 days a week and reselling

	Vendors selling 5–7 days a week (per cent)		Vendors who are resellers (per cent)
Marketplace	**DAL, 1988[a]**	**Post-2008 surveys**	**Post-2008 surveys**
Lae	20	52[j] (6–7 days)	59[j] (fresh food)
Madang	10	Not available	Not available
Port Moresby	9 (Koki)	60[i] (selected markets)	55[b] (selected markets) 51[c]
Rabaul/Kokopo (post 2008)	3	15[d] 12[e] (fresh food)	10[e] (fresh food)
Mount Hagen	0	Not available	est. 80[f]
Alotau	0	21[g]	Not available
Kimbe	Not available	32[e] (fresh food)	14[e] (fresh food)
Goroka	Not available	15[h]	7[h]

Sources: Survey years in square brackets: a) DAL (1990–1992) [1988]; b) FPDA (2009) [2008]; c) Wang (2014) [c. 2013]; d) Scales (2010) [unpublished data on Kokopo market, 2009]; e) Sharp et al. (2022) [unpublished data from ACIAR-funded project ASEM/2012/072, 2015]; f) Chang et al. (2013) [2012]; g) JICA (2017, Appendices, p. 96) [2016]; h) Busse (2019) [2014]; i) Kopel, Hukula, Kutan, and Iwong (2017) [2016]; j) Gena (2021) [2020].

people were selling food purchased from someone else. At the same time, about half the vendors in Port Moresby marketplaces were resellers and in Mount Hagen the figure was estimated to be as high as 80 per cent of vendors (Chang et al., 2014). Previous market studies frequently did not record whether or not a vendor was reselling. The incidence of full-time selling (5–7 days a week) is, however, a reasonable indicator of the prevalence of resellers now and in the past (see Table 3), although producers do occasionally sell their produce in a marketplace over an extended period. Although some resellers live in rural areas, many are urban residents, so the rise of reselling also signals a decline in the direct participation of rural people in marketplaces (Sharp, 2021).

At the same time that intermediaries have started to play a larger role in PNG's fresh food trade, the scale at which individual traders operate has also increased. Benediktsson (2002, p. 196) noted that sweet potato producers in the early 1990s tried to take '20 bags or more to Port Moresby' and discussed loads of up to 52 bags (p. 72). In 2018, large producers from Western Highlands Province, interviewed by Sharp, who produce at scale by renting land and supplement their production by purchasing produce to onsell, were trading 100–200 bags in each load to Port Moresby (see also Chang et al., 2016).

Vendors are also increasingly producing for the market. While the majority of vendors in the Goroka marketplace in 2011 and 2012 were producer-sellers, most (83 per cent) had planted, at least in part, with the idea of selling. About half those people had planted solely with the idea of selling. The other half had planted both for consumption and for sale. Similarly, among oil-palm smallholders in West New Britain, a survey of gardens showed that 19 per cent included food intended both for marketing and for household consumption, while 29 per cent were cultivated exclusively for marketing (Curry et al., 2012, p. 174). This contrasts with Epstein's (1982, pp. 53, 126–127, 140, 146) and Brookfield's (1969a, p. 153) observations from the 1960s that much of the fresh produce being sold in PNG's marketplaces was unintended surplus of produce planted primarily for household consumption rather than produced specifically to sell, although this varied considerably between marketplaces and by gender.

In Goroka, the vendors had quite specific reasons for planting and selling food. Most commonly (71 per cent), vendors were selling to make money to buy store goods such as cooking oil, soap, and tinned food. Selling to pay their children's school fees (30 per cent) and to contribute to community activities such as bridewealth, compensation payments, or church contributions (32 per cent) were also commonly mentioned.[18]

Bourke (1986b) noted that in the 1960s earnings from marketplace sales were only part of most vendors' total income. To some degree, that is still the case, although the rise of market intermediaries and reselling means that more people are dependent on fresh food marketplaces for their total income and the increased prevalence of full-time marketplace vending is a good indication of this. In Kopel et al.'s (2017b, p. 14) survey of market vendors in Port Moresby, 40 per cent of vendors reported having no other source of income.

Further research is needed on the rise of market intermediaries in PNG. Related to this is the need for research on market catchment areas, as well as further research on price formation. The last topic is critical for ensuring urban food security. We will return to this at the end of this paper.

3.4.2 | Gender composition of vendors

The gender composition of vendors in the country's marketplaces has also changed over time (see Figure 4). In the 1960s, a significant number of vendors in the large urban centres and in the Highlands[19] were men, although on the Gazelle Peninsula nearly all vendors were women (Epstein, 1982, p. 152; Hide, n.d.). Over time, the proportion of women vendors increased. In the Highlands towns of Mount Hagen and Goroka, women quickly came to dominate vending as men eschewed the marketplace in favour of higher earnings from growing coffee (Jackson & Kolta, 1974; Sexton, 1988; Strathern, 1979). In the large urban centres of Port Moresby and Lae, women as a proportion of vendors likely increased as the urban gender splits became more even and the towns became less masculine (see Spark [2020, p. 6] on women in towns; cf. Underhill-Sem et al. [2014]). In Port Moresby, although women vendors outnumbered men by the early 1980s, a substantial proportion of vendors were men, and today men represent a higher proportion of vendors than they do in other urban marketplaces. In the Highlands, as coffee growing has become less lucrative and selling fresh food has become more attractive, the proportion of male vendors selling in the Goroka marketplace appears to be increasing, although women still make up approximately 90 per cent of the vendors (Barnett-Naghshineh, 2019; Busse, 2019).[20] The 2009/10 Household Income and Expenditure Survey and the 2018 *National Audit of the Informal Economy* also indicate growing male involvement in the informal economy more broadly (Gibson, 2013; Stanley, 2019).

Women now generally make up at least 80 per cent of vendors in the main urban markets. Nevertheless, in parts of the rural Highlands with good access to urban markets, fresh food has grown in importance for men's incomes, although it is often sold in the marketplaces on their behalf by their wives, sisters, and mothers.

[18]Vendors could identify more than one purpose for selling.

[19]Brookfield (1969b, p. 15) reported that in the Highlands in the 1960s, despite the introduction of coffee to Chimbu Province in 1954, produce marketing was still the main source of income.

[20]Hogbin (1969, p. 44) noted that in 1963 'approximately equal numbers of men and women sold produce at Kerema'. At Kerema market in 2022, Owen Hughes and Matthew Kanua (Pers. comm.) estimated that about 70 per cent of sellers of fresh food were women.

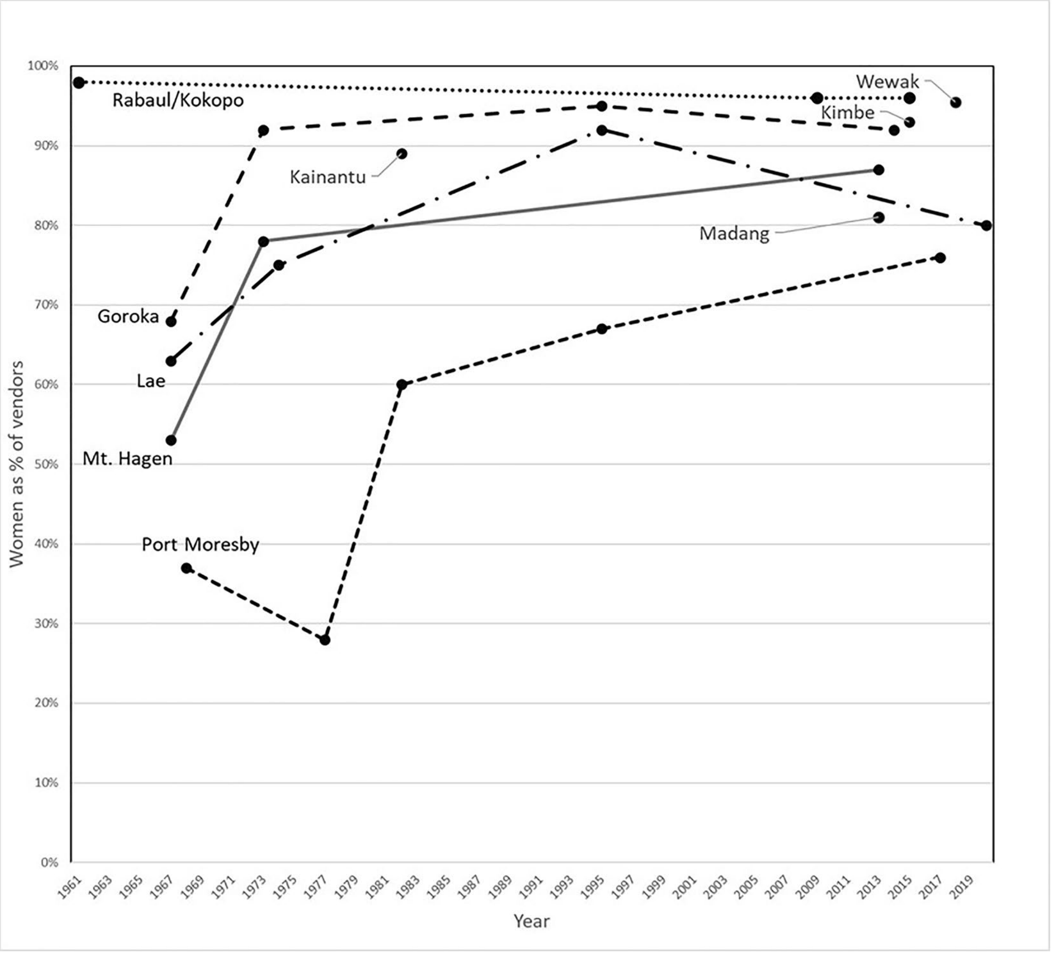

FIGURE 4 Proportion of marketplace vendors who are women at the main marketplaces in selected PNG towns, 1961–2020. *Sources*: For Goroka, see Epstein (1982, p. 152); Jackson (1976, p. 179); Benediktsson (2002, p. 141); Busse (2014); Barnett-Naghshineh (2019). For Kainantu, see Bourke (1986b) (fresh food section only—46 per cent of vendors were women in the betel nut/scone section). For Mount Hagen, see Epstein (1982, p. 121) (average plotted, 50 per cent in March 1967 and 57 per cent in July 1967); Jackson (1976, p. 179); Chang et al. (2014, p. 7) (10 key crops). For Rabaul (in 1961) and Kokopo (in 2009, 2015), see Epstein (1961, p. 49); Scales (2010); Sharp et al. (2022) (fresh food and betel nut only, unpublished figures). For Kimbe, see Sharp et al. (2022) (fresh food and betel nut only, unpublished figures). For Lae, see Epstein (1982, p. 152) (average plotted, 66 per cent in August 1967 and 60 per cent in December 1967); McKay and Smith (1974, p. 146) (average calculated: coconuts, 81 per cent; betel nut, 63 per cent; banana, 80 per cent; taro, 78 per cent; sweet potato, 74 per cent); Gena (2021, p. 6) (fresh food); Benediktsson (2002, p. 196) (sweet potato). For Madang, see JICA (2013). For Port Moresby, see Epstein (1982, p. 152) (Koki: average plotted, 34 per cent in May 1968 and 40 per cent in January/February 1969); Flores and Harris (1982, p. 151); Walsh (1986, p. 170); Benediktsson (2002, p. 196) (sweet potato); Kopel, Hukula, Kutan, and Iwong (2017). For Wewak, see HELP Resources (2019, p. 77).[21]

[21]Women have also been the most numerous vendors in rural markets. In 1972–1973, 89 per cent of vendors at the rural Koge market (Simbu) were women (Hide, 1975). In 1981–1982, women were 83 per cent of vendors at Ukarumpa and 87 per cent of vendors at Aiyura in Eastern Highlands (Bourke & Nema, 1985). In five small rural markets surveyed in Western Province in 2013 by Bourke and Kanua (2022), all vendors were women. In a one-day survey at Kaivakavu market (Gulf) in June 2022, all 220 sellers were women (Owen Hughes and Matthew Kanua, Pers. comm., 2022).

Men's participation in marketplaces often focuses on particular commodities—generally crops conceptualised as masculine, of higher value, or introduced rather than indigenous (Barnett-Naghshineh, 2019; Bourke, 1986b; Dakeyne, 1969, p. 30; Hogbin, 1969; Jackson, 1976; McKay & Smith, 1974). In 2015, in Kokopo and Kimbe markets, men were more likely to trade betel nut than they were to trade fresh food. In Kimbe, men were also more likely to be selling store goods than fresh food.

Although not captured in Figure 4, men's participation in marketplaces is greater the larger, more complex, and more lucrative is the enterprise. Sexton (1988, p. 128), for example, noted that among Daulo people in Eastern Highlands Province, selling vegetables at local markets was considered to be women's work and demeaning for men, but large-scale production for distant markets was considered an appropriate business for men. For sweet potato sellers, Benediktsson (2002, pp. 197–198) showed that the proportion of men as sellers increased with the distance from the point of production (and therefore the scale of trading). This is in part because men want the excitement of travel for themselves, but also because they are concerned about the safety of their wives, sisters, and daughters while travelling and overnighting in town (see Chang & Be'Soer, 2011). A similar gradient of male involvement is also evident for betel nut trading, with the large-scale, long-distance, and more remunerative wholesale trading role dominated by men, while the small-scale marketplace-based wholesaling is dominated by women (Sharp, 2021, p. 540). In Kimbe and Kokopo in 2015, men were also more likely to be involved in reselling (though this was also associated with the commodity traded—mostly betel nut and store goods).

Given the shifting gender composition of PNG's marketplaces and the fact that women often occupy less lucrative roles, development attention should focus on supporting women, including through training,[22] to overcome those challenges that currently constrain their participation at larger scales and their ability to grow their enterprises.

3.4.3 | Consumers

Information on the consumers in PNG marketplaces is limited. We know very little about what they want to buy, how they make decisions about what to buy, and how what they buy is related to other food that they and their households eat. The establishment of formalised marketplaces by the colonial authorities was, in large part, to provide fresh food for expatriates (Brookfield, 1969b, p. 13). But by the late 1960s, 80 per cent to 85 per cent of customers at the Rabaul market were indigenous Papua New Guineans (Salisbury, 1970, p. 207), and indigenous Papua New Guineans were responsible for an estimated 70 per cent of the value of the total market turnover in the Goroka market (Epstein, 1982, pp. 39, 52). Today, almost all customers in PNG's open-air marketplaces are urban or rural Papua New Guineans.

Omot (2010) has provided detailed information about the factors that influenced which varieties of sweet potatoes shoppers in the Lae market wanted to buy, finding that price was less important than quality (taste and physical condition), ease of cooking, and how filling a sweet potato variety was (pp. 127–128, 164).

[22]In market surveys in the Goroka market, Busse found that 22 per cent of men selling in the market had some business training, but this was so for only 12 per cent of women.

Having reviewed what is known about the people who buy and sell in PNG marketplaces, we now turn to *how* things are bought and sold and the changing organisation of the market system, before concluding with a discussion of the causes of change in PNG's marketplaces, the implications of the changes we have documented, and areas needing futher research.

3.5 | Trading: How things are bought and sold

In the 1960s, some kinds of produce were sold as individual items while others were sold in piles or bundles. Fruits and vegetables were not sold by weight (Brookfield, 1969b, p. 18; Epstein, 1982, p. 12). This remains the case today.

Brookfield (1969b, p. 4) also noted that social relations were the framework for all forms of economic activity in PNG and this, too, remains largely the case today. In early marketplaces, vendors from the same village or community often sat together in 'village' groups (cf. Dakeyne, 1969, p. 30; Epstein, 1982, p. 18). This is, to some degree, still the case. But whether or not vendors are from the same community, they create social relationships with other vendors around them, often leaving a neighbouring vendor to look after their produce while they run an errand or go to see someone else in the marketplace. These social relations remain relevant to how trading takes place in PNG marketplaces and, in particular, to the relative absence of overt competition (Busse, 2019; Busse & Sharp, 2019; Sharp, 2019; Sharp & Busse, 2019).

The increased prominence of reselling in PNG's marketplaces has led to changes in the character of trading. Early observers of PNG marketplaces remarked on the absence of bargaining and other forms of competitive trading (Brookfield, 1969b, pp. 9–10, 18–19; Hogbin, 1969, p. 44),[23] and this remains a feature in some marketplaces today. But in those marketplaces where resellers are prominent and people are dependent on trading to make a living, more competitive trading practices have emerged. Haggling and competition are prevalent in betel nut markets (Sharp, 2019). In this paper, we restrict our attention to fresh food marketplaces, but the character of negotiations surrounding betel nut is broadly indicative of the character of intermediary transactions in fresh food markets, although fresh food negotiations are typically more subdued.

It is important to note at the outset that competition is not a feature of all marketplace transactions, nor of all marketplaces. The small mission station marketplace described by Schram (2016), and the small marketplaces in remote Western Province described by Minnegal and Dwyer (2017, pp. 106–108) and by Bourke and Kanua (2022), are not markedly different from similar marketplaces of the 1970s and 1980s in terms of how people buy and sell. Further, in marketplaces where more explicit competition is evident, it is often restricted to certain contexts. At Kokopo and Kerevat (East New Britain), for example, resellers rush and vie with one another to secure produce to sell and haggle over the price, but haggling is generally not a feature of the transactions when these resellers onsell to the end consumers. And in Goroka, there is little overt competition in the fresh food marketplace, but there is competition in the separate betel nut marketplace. The growth of competition in PNG's marketplaces is a profound development, but it is far from all-encompassing, and further research is needed to understand its impact on market participation, prices, and the functioning of trade networks.

[23]See Sharp (2019, pp. 185–187) for a summary of the characteristics of early PNG marketplaces.

There are three contexts in which competition occurs: competition between sellers and buyers, competition among buyers to secure produce, and competition among sellers to attract buyers. We will deal with each of these contexts in turn.

Bargaining is common in large urban marketplaces in the early morning when producers and resellers arrive. Transactions generally occur on the periphery of the marketplace or in a wholesaling area, rather than in the retail vending space. Prices are negotiated between individual producers and individual resellers rather than through auctions with multiple buyers, although sometimes resellers work together to make large purchases. Negotiations can be intense, but are often subdued, with resellers seeking to reach an agreement with producers rather than trying to force a price. In marketplaces where resellers dominate much of the vending space, as in Mount Hagen's main marketplace and many of the marketplaces in Port Moresby, producers' limited access to vending space constrains their ability to negotiate. By contrast, at the Kokopo marketplace, space is available to producers if they wish to sell in the marketplace themselves rather than in bulk. Here is how one Kokopo marketplace reseller described the negotiations between producers and resellers when they arrive at the marketplace—in this case, over a bag of capsicums:

> If the farmers request K25, I check over the produce. I am looking for produce that isn't good, or whether it will have crap in it, or small ones—we check for that. If we see small ones, we tell the farmers … 'The capsicum are not big. They are small and green! Now will you cut K5 and price it at K20?' We ask the farmers. The farmers will remain strong, and say it is a big plastic bag and the price is K25. 'But the capsicum are not ripe, only slightly ripe and green, the customers do not like this,' we tell the farmers. And the farmers say that it is all right for us to buy for K20.

At the same time as resellers negotiate with producers in the large urban marketplaces, there is sometimes considerable competition between the different resellers to secure the best produce to resell. When producers arrive in the marketplaces, particularly in an undersupplied market, resellers clamour to reserve produce. They reach into the arriving trucks, sometimes before they fully come to a halt, calling out to other resellers that a certain bag or basket is theirs, generally touching the bag and holding on to it, or marking the bags with betel nut spittle to show it is reserved. Sometimes the bags of produce are removed from the truck. When supply in the market is particularly low and competition heightened, resellers may climb aboard the vehicles. A female reseller at Kerevat market commented: 'We race amongst ourselves. If I am strong, I get the produce; if I am not strong, another will get it … If I have already reserved the produce and another comes and holds it, there are disagreements.'

At the Kokopo market, resellers climbing on to the vehicles had become such a problem that in 2017 there were announcements over the market's public address system instructing the resellers to allow producers to carry their produce into the marketplace rather than thronging around vehicles and negotiating in the parking lot (see Busse & Sharp, 2019, p. 143).

Resellers also compete to attract customers; establishing regular customers is an important strategy. Resellers are not the lethargic and disinterested vendors described by Epstein (1982, p. 188) of 1960s Rabaul, but neither are they highly vocal or cajoling. The marketplaces can be remarkably quiet given the number of people present. Vendors, mostly resellers, occasionally call out to prospective customers, but this is typically drumming up conversation that they hope will lead to a sale, rather than extolling the qualities of their produce or advertising a reduced price. One reseller at Kokopo described how she attracted customers:

> We have our own customers. When they come and buy food, and they buy like K10 worth, we give them some extra, two or three extra, and make them happy so that when they next come back [to the market], they will buy again … We speak nicely to them—'Morning sister, where are you from?' we ask, and speak to them nicely. You make them your friends, *wantoks*. That is how you attract customers.[24]

Resellers can be quite possessive of people whom they perceive to be *their* customers, and disputes arise if a vendor is seen to be poaching another's customer.

Competition between vendors is also reflected in tensions over space in marketplaces. With the rise of resellers who trade on a full-time basis and who depend on the trade for their living, vendors compete for the best vending spaces, and it is common for vendors to informally secure market spaces on a permanent basis. In some marketplaces, this has squeezed producers to the margins of the markets (Chang et al., 2013; HELP Resources, 2019, p. 18; Kopel, Hukula, & Iwong, 2017, p. 17; Paul et al., 2015).

While some early observers of marketplaces commented on sellers' reluctance to reduce their prices and their preference to take unsold produce home rather than receive what they deemed an unfair price, later observations showed vendors did indeed cut their prices, although the extent of this varied both seasonally and between sellers (von Fleckenstein, 1976). Today, vendors routinely discuss price in relation to supply and demand and adjust their prices through the course of the day in response to market conditions. This is particularly true for those reselling and involved in large-scale trading. It is less true for producer-sellers. One trader from Mount Hagen, who regularly took upwards of 100 bags of sweet potato and potato to Port Moresby, spoke rhetorically of her frustration, but also acceptance, of receiving a reduced price: 'What am I to do? Are we going to boil it and eat it all?'

In many markets, a minority of transactions involve the competitive type discussed here, and resellers remain a small proportion of vendors, but as the proportion of resellers in marketplaces changes, so, too, does the character of the transactions. These changes have been subject to moral critique (Busse, 2019; Busse & Sharp, 2019; Sharp, 2021). While food produced for the market is increasingly commoditised and certain transactions have taken on a competitive tenor, people have also sought to transact in ways that resist reducing the transaction to the idealised alienable commodity transfer (Busse, 2019; Pickles, 2019, p. 108; Sharp, 2016).

3.6 | Organisation of the market system

Historically, fresh food marketing networks have been very simple in structure, with most food sold by producer-sellers to end consumers. Intermediaries have only recently become a significant presence. In other words, rural marketplaces did not function as feeder markets for larger urban markets. In the early 1970s, for example, there was no evidence of feeder markets to the Lae market (McKay & Smith, 1974). Although roadside markets have grown in number and intermediaries have become more significant, roadside and periodic markets in rural areas have not taken on a significant role

[24]On giving 'extra', see Sharp (2016); Busse (2019); Busse and Sharp (2019).

as feeder markets to the large urban markets and are instead primarily oriented towards serving the local population and passing traffic. Umi market in the Markham Valley, which is an important feeder market for peanuts to the Highlands, is one of a few exceptions to this generalisation. The largest fresh food markets in the Highlands, in Mount Hagen and Goroka, demonstrate a critical difference. In Mount Hagen, fresh produce is supplied directly by producers, though once the produce gets to the market, much of it rapidly shifts into the hands of intermediaries. In Goroka, on the other hand, the fresh produce being sold in the marketplace is, to a large extent, sold by producers.

Produce being wholesaled out of the Highlands is mostly sourced from where it was grown rather than through town marketplaces. Mount Hagen's main marketplace is a bulking point for produce headed to the lowland urban centres of Port Moresby, Lae, and Madang. It is also a bulking point for produce heading to Enga, Southern Highlands, Hela, and Western provinces (Kanua & Bourke, 2017). The Goroka market has only a very minor role in bulking for long-distance trading. Lae is an important end market and its port is an important waypoint in the trade of Highlands produce to Port Moresby, but the marketplace itself seems not to have emerged as a bulking or aggregating marketplace of significance. The large urban markets do, however, play important roles as places where produce is broken into smaller lots for resale, either within the same urban market or in urban corner markets.

In terms of the distance over which produce is traded, market surveys in the 1960s and 1970s at Koki (Port Moresby) (Department of the Administrator, 1965; McCullough, 1971), Lae (McKay & Smith, 1974), Mount Hagen, and Goroka (Epstein, 1982; Jackson & Kolta, 1974) show produce was supplied from wide but localised catchments. Long-distance marketing (lowlands to Highlands, Highlands to lowlands) was emerging by the mid 1970s (Bourke, 1986b, 1986a; Walsh, 1986) and was well under way by the early 1990s (Benediktsson, 2002). This is now well established and has grown in volume. Port Moresby, Lae, and Madang markets receive substantial volumes of produce from long distances, being moved from the Highlands to Lae and Madang by road, and from Lae to Port Moresby by ship. The rise in the scale of trading is evidenced by the movement of sweet potato (PNG's most important staple crop, and the crop for which the most comparative data exist). Between 1990 and 1999, an average of 1,600 tonnes of sweet potato per annum was shipped from Lae to Port Moresby (Bang & Kanua, 2001, p. 671; see also Benediktsson, 2002, p. 189). A decade later, in 2010, and following the devaluation of the kina, an estimated 4,200 tonnes of sweet potato was shipped to Port Moresby (Chang et al., 2016). A similar volume of sweet potato from the Highlands was also being sold in Lae at the time (Chang et al., 2016). The volume shipped to Port Moresby has continued to grow, with estimates in 2017, 2018, and 2019 of 16,000 tonnes, 11,000 tonnes, and 14,000 tonnes, respectively (FPDA, 2018; Kanua & Bourke, 2017; Ovah, 2019). Some Highlands produce is traded to coastal markets including Kimbe and Kokopo–Rabaul but in smaller volumes. Smaller, but still substantial, volumes of fresh food—notably, coconuts and peanuts—flow from the lowlands to the Highlands.

At the same time that long-distance trading of certain commodities in certain locations has grown, the rising cost of transport to market has likely led to some contraction of supply catchments, though there are limited data to support this. Most vendors at the Kokopo market in 2009 lived within 18 kilometres of the market, with participation rapidly dropping off beyond that distance (Scales, 2010, pp. 25–27), though more distant producers could have attended but not sold their produce themselves.

4 | CAUSES OF CHANGE

There are two main causes of the changes taking place in PNG's marketplaces.[25] The first is the increased demand for fresh food and the overall growth of fresh food marketing. This, in turn, is caused by the growth of urban populations and the increased affordability of local fresh food relative to imports, which is primarily driven by the devaluation of the PNG kina. The second is the search for money by an expanding urban population for whom there are growing costs of living and shrinking formal employment opportunities, and by rural people for whom export cash crops have become less remunerative.

When Epstein (1961, 1982) and Brookfield (1969b) sketched the characteristics of Melanesian marketplaces, PNG's urban centres were small colonial towns (see Connell, 1997, p. 189). In 1971, four years before independence, the two largest urban centres, Port Moresby and Lae, had populations of only 76,507 and 38,707, respectively. Since then, PNG's urban population has expanded considerably (see Figure 5). In the 10 largest urban centres, where changes in marketplaces have been most pronounced, the combined populations almost doubled, from 272,436 in 1980 to 500,165 in 2000, reaching 674,749 in 2011 and, in 2022, projected to exceed 920,000.[26] In sum, there are now many more people living in towns—people who must buy the food they consume.

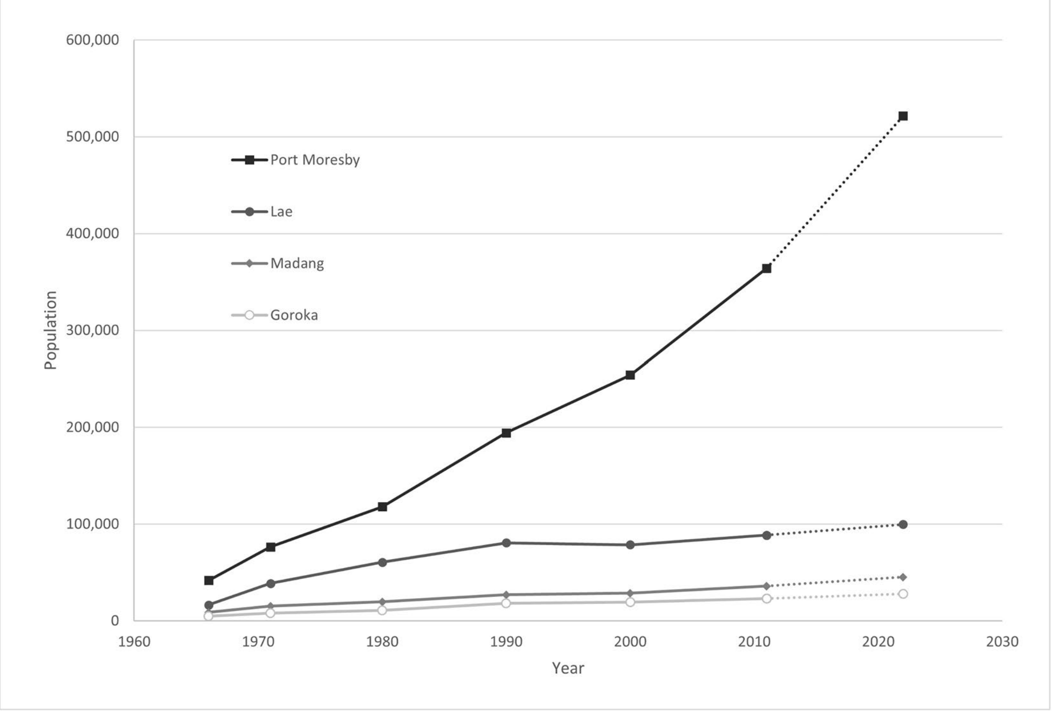

FIGURE 5 Population growth and projections for selected urban centres in PNG, 1966–2022. Census years were 1966, 1971, 1980, 1990, 2000, and 2011. Populations projected from 2011 to 2022 were generated using 2000–2011 growth rates for each urban centre. *Sources*: Koczberski et al. (2001); PNG NSO (2015).

[25]See Sharp (2021) for a detailed discussion of the drivers of the emergence of intermediary trading.

[26]Urban populations are likely to exceed more recent census figures as they overflow urban census boundaries and informal settlements are likely underenumerated (see Bourke & Allen, 2021).

Despite large increases in both PNG's urban population and PNG's national population over the past 50 years, the proportion of food energy produced and consumed in PNG has remained constant at about 80 per cent between 1976 and 2006 (see Table 4), and there is no indication that this proportion has changed since 2006. This suggests an increased absolute demand for locally produced food and for fresh food marketing.

Since the late 1990s, the devaluation of the PNG kina has also stimulated demand for domestically produced fresh food as the costs of imported foods have risen. This is evident in the changes in the relative prices of imported rice and domestically produced sweet potato. Through the 1980s and 1990s in Port Moresby, 1 kilogram of rice cost about the same as 1 kilogram of sweet potato. After the devaluation of the kina and a spike in global rice prices in the late 2000s, the price of rice rose to the point where, between 2009 and 2011, a person in Port Moresby could buy more than 3 kg of sweet potato for the price of 1 kg of rice (see Figure 6) (McGregor & Bourke, 2009, pp. 280, 545; Mellor, 2010; Sharp, 2021). Outside the capital, where sweet potato prices are much lower, the differences are even greater. Between 2009 and 2011, a person in Madang or Lae would, on average, have been able to buy more than 6 kg of sweet potato for the price of 1 kg of rice. The reduced affordability of rice led to a slight decline in per capita rice imports. Urban rice consumption also declined slightly from an average of 66 kg per person per year in 1996, immediately before the floating of the kina, to 59.2 kg in 2009–2010 (Gibson, 2001, p. 41; Schmidt et al., 2021). Larger urban populations, together with improved relative affordability of domestic fresh food, have resulted in an observed increase in fresh food marketing in PNG (although there are no quantitative data on the volume of domestically marketed fresh food). As the scale of fresh food trading has increased, this has encouraged intermediary involvement and led to increasingly complex marketing networks.

The changes in PNG's marketplaces have also been stimulated by the search for money by both urban and rural people. As noted above, PNG's urban population has grown substantially, particularly in the largest urban centres. While the urban population has increased, formal employment opportunities have not kept pace. Over time, the proportion of urban residents with formal employment has declined and this has stimulated a search for other sources of income. This is evident in comparing the 1996 and 2009–2010 PNG household surveys (see Gibson, 2013). In Port Moresby, the proportion of working-age people engaged in the urban informal sector almost doubled between 1996 and 2010. While 4.6 per cent of working-age men and 14 per cent of working-age women earned money in the informal sector in 1996, in 2010, those figures had increased to 10.2 per cent and 22.9 per cent, respectively (Gibson, 2013, p. 9). Port Moresby's population more than doubled during this period, meaning that the size of the urban informal sector increased considerably. Not all those engaged in the informal sector are in marketplaces,

TABLE 4 Proportion of food energy consumed that is produced in PNG

Year	Proportion (%)	Source	Notes
1976	77	Shaw (1985, p. 33)	Prepared for food policy paper by the National Planning Office in 1978.
1996	80	Gibson (2001, p. 42)	Consumption surveys found that people in rural areas obtain 85 per cent of their food energy from PNG sources; in urban areas, it was 50 per cent.
2006	83	Bourke et al. (2009, p. 131)	Estimates were that 83 per cent of food energy and 76 per cent of food protein consumed by people were produced in PNG.

but marketplace trading (in urban marketplaces including small corner markets and housefront stalls) is certainly the most prominent informal economic activity.

Changes in the wider economy have also stimulated changes in rural livelihoods. At the same time as the kina was declining in value and imports were becoming increasingly expensive, in the Highlands—a key source area for traded domestic produce—low coffee prices through the early 2000s encouraged rural producers living close to towns to refocus their attention on fresh food production for the domestic market. Over the past two decades, many stands of coffee trees have been either neglected or pulled out so that more time, labour, and land could be dedicated to market gardening. This is part of the larger story of the gradual decline in the volume of the country's coffee production since the late 1990s (see Curry et al., 2017; Sengere et al., 2019). Coffee prices improved from 2005 to 2012, but the cost of imports continued to rise and the shift to fresh food marketplaces had already gathered momentum (also see Mellor, 2010).

The relative returns from fresh food and coffee production could potentially shift the gender dynamics in marketplaces. The high potential earnings from coffee production at times during

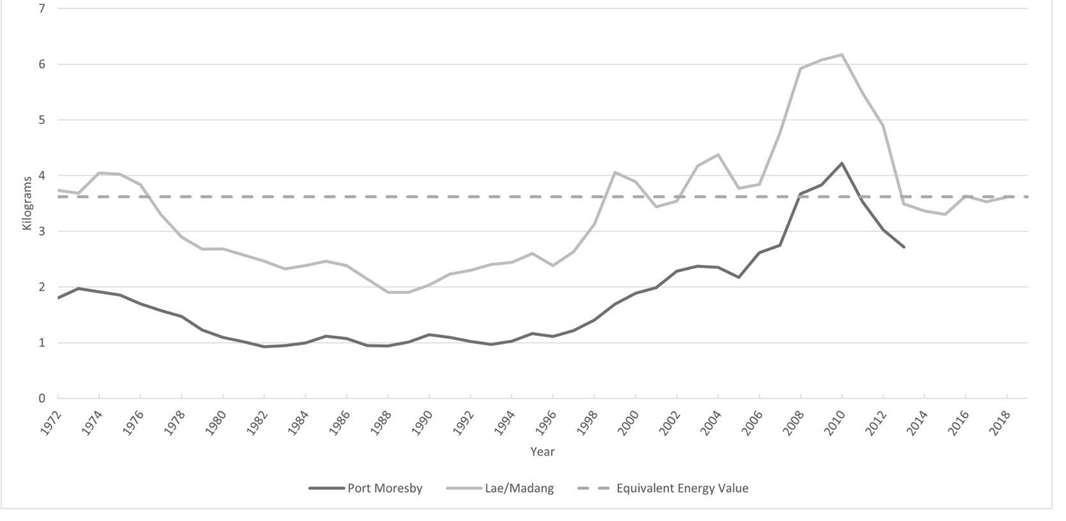

FIGURE 6 Number of kilograms of sweet potato that could be purchased for the price of 1 kg of rice in Port Moresby, Lae, and Madang, 1972–2018. The Equivalent Energy Value line shows the amount of sweet potato with the same energy value as 1 kg of rice (3.62 kg of sweet potato has the same energy [kilojoule] value as 1 kg of rice) (Bradbury & Holloway, 1988, pp. 30, 54). When consumers can purchase more than 3.62 kg of sweet potato for the same price as 1 kg of rice, sweet potato becomes the cheaper source of food energy. *Sources*: National Statistical Office Consumer Price Index Basket of Goods; Fresh Produce Development Agency market price data.[27]

[27] To manage gaps in the available data, the graph combines data from two sources—the consumer price index (CPI) and, from 2004, Fresh Produce Development Agency (FPDA) market price data—and from multiple markets. Annual averages were calculated for each source, then combined to give a combined average. Lae and Madang (which have historically had similar prices) price data were combined to give an average. Where gaps occurred in the data, the price for a single source or market were used. We have excluded CPI data for Port Moresby from 2014 when the CPI was recalibrated and the data collection methods changed. Plotted as a three-year moving average. CPI data collected from PNG National Statistical Office by R.M. Bourke, T. Sharp, and Elizabeth Kopel. FPDA data was obtained from https://www.ifpri.org/project/fresh-food-price-analysis-papua-new-guinea on 25 August 2021, and from Grant Vinning and Christie Chang.

the 1970s and 1980s led men to leave the marketplace to women (Dickerson-Putman, 1998, pp . 242–243; Jackson, 1976; Overfield, 1998), but there is some evidence that men are returning to the marketplace (Barnett-Naghshineh, 2019) as the returns from fresh food become better than those from coffee. At the same time, women, finding themselves poorly remunerated for their labour in coffee, have withdrawn their labour and focused on fresh food (Curry et al., 2019; Overfield, 1998). Both trends are leading to the expansion of fresh food marketing.

Because substantial volumes of produce grown in the Highlands that are destined for sale are sent to distant markets in coastal areas, changes in the Highlands have far-reaching impacts. Beyond the Highlands, in other rural areas of PNG, commercial market gardening for the domestic market is less developed and production for market is more locally oriented but, as with the Highlands, there are clear production responses where demand exists, including the rise in betel nut production throughout the lowlands and peanut production in the Markham Valley.

Change in PNG's marketplaces has been stimulated by these larger population and economic trends, but importantly, significant social shifts have also been necessary to accept reselling and the sale of imported processed foods in marketplaces, and to make it more socially acceptable for men to again sell in marketplaces (Barnett-Naghshineh, 2019; Busse, 2019; Sharp, 2021).

Collating the extant research on marketplaces ammases a picture of considerable change, but it also reveals the substantial gaps in our knowledge about marketplaces in PNG.

5 | FURTHER RESEARCH

Research from the 1960s to the early 1980s developed a strong understanding of the structure and dynamics of marketplaces in PNG at the time. Since then, however, despite the considerable changes we document and the growing importance of marketplaces to food security and both rural and urban livelihoods, considerable gaps exist in our understanding of marketplaces throughout the country. This is likely to lead to poorer policy and development outcomes.

Research on marketplaces has in recent times taken more of a vendor focus. There has been very little research on the people who shop in open-air marketplaces—who they are, what they want, and how they make decisions about what to buy and from whom. To tackle issues of urban food security, we need far better understanding of how marketplaces (and stores) meet the food needs of urban people.

As the role of intermediaries in the country's marketplaces grows, we need detailed studies of the intermediaries to understand how they make decisions about what they buy and from whom, and where and to whom they resell. These are empirical questions and cannot be assumed or inferred from abstract economic theory (Busse, 2022). Understanding these decisions and practices is critical for understanding the effects of market intermediaries on both the price of food and urban food security.

We also need to better understand market supply catchments, the resilience of supply networks, and factors that support and undermine rural participation in marketplaces and, in turn, urban food security. Part of this is understanding how the changes in PNG's fresh food marketplaces are influencing smallholder engagement with export cash crops and production for home consumption, and exploring how to support diverse and resilient rural livelihoods, especially for women. Understanding market catchments also provides the basis for planning the infrastructure used to bring food into urban marketplaces. It is important that we understand the impact of urban growth on the rich agricultural land at the edges of towns and cities, and how this is shaping market catchments.

There is also the need to better understand price formation in open-air marketplaces. Price data need to be reliable and timely. High-quality data will encourage the central government to recognise domestic food production, distribution, and trade as vital parts of PNG's economy and critical for food security, rather than dismiss them as 'the informal economy', or simply take for granted the contribution of marketplaces to food and income security.

The impact of the shock closure both of open-air marketplaces in larger urban centres and of road access between provinces in late March 2020 in response to the COVID-19 pandemic was recorded up to mid 2020 (Bourke, 2020). The longer-term impact on the marketing of fresh food, animal products, and betel nut is not known, nor is the continuity of the increased level of roadside marketing that emerged in response to the closure of urban marketplaces. It would be instructive to record the lived experiences of producers, intermediate traders, and resellers during and after the closures as this will shed further light on price formation as well as the vital place of marketing in the lives of both rural producers and urban consumers.

Research is needed to better understand and support the connections between open-air markets and the supply of fresh produce to supermarkets, resource extraction projects, and institutions such as schools, hospitals, and jails. Creating good conditions for farmers to successfully meet direct-selling contracts will increase incomes for rural Papua New Guineans, reduce the need to import food, and reduce its associated cost.

There is also a need to understand the market system (production, transportation, producer-selling, reselling, and consumption) from the point of view of Papua New Guinean women, to understand the opportunities that marketplaces provide them as well as the constraints they encounter when selling in marketplaces, particularly as marketplaces continue to transform (see HELP Resources, 2019).

Finally, more comparable research is needed to understand the diversity of urban and rural marketplaces throughout PNG. A recent resurgence of qualitative marketplace studies has contributed important understanding of the social dynamics that shape PNG's marketplaces today. But more detailed quantitative data, attentive to social dynamics and based on how Papua New Guineans understand food and marketplaces, are needed to enhance our understanding of marketplaces and marketing systems, and to build their resilience and capacity to contribute to food and income security in PNG.

6 | CONCLUSION AND IMPLICATIONS

Over the past 60 years, significant economic, demographic, and social changes have transformed livelihoods in PNG. The rapid growth of urban populations, the decline in the value of the PNG currency and the associated increases in the price of imported food, and changes in the global prices of the commodities Papua New Guineans buy and sell have both compelled people to adapt their livelihoods in response and provided new economic opportunities. These changes have stimulated increasing demand for fresh food and the diversification of urban incomes. As returns on people's labour inputs from export tree crops have declined, the sale of fresh food in domestic marketplaces has become more attractive. People's responses to this changing economic landscape have driven change within the country's marketplaces, including increased marketplace activity (both spatially and temporally), changes in the areas from which food is brought to markets, an increase in market intermediaries, increasing competition between market participants, changing proportions of men and women vendors, and an increasing dependence on marketplace sales among some vendors for their incomes. Together, these changes demonstrate a considerable transformation of the country's marketplaces. We conclude by exploring some important implications of these changes for livelihoods, food security, and development in PNG.

One change we document has been the continued expansion of smaller urban and rural marketplaces. The main urban marketplaces remain the largest venues for the sale of fresh food, but other marketplaces (including corner markets and some quite large informal markets) have become important places for urban residents and rural people living near town to earn money, and for urban residents to buy fresh food. These markets often provide more accessible and secure places to trade than the large urban marketplaces. Most development attention (and research), however, has focused on the main urban markets. It is important to recognise the valuable contribution of smaller marketplaces, and for authorities to adopt a more supportive approach, rather than a heavy-handed regulatory approach, towards them. A more supportive and spatially distributed approach to the development of urban marketplaces would also improve the accessibility of fresh food for urban consumers and provide more people with spaces where they can make a living (see Kopel, Hukula, & Iwong, 2017, pp. 17–18).

As we have demonstrated, PNG's marketplaces have shifted from those exclusively occupied by producers to marketplaces where intermediaries play an increasingly prominent role, and in some cases dominate. Marketplaces remain a vital source of income for rural people, but they are increasingly also important places for urban residents to earn money. Landless migrants who have moved to urban or peri-urban locations are particularly prominent among marketplace resellers. The central importance of trading to these migrants is not well recognised in PNG, nor is their contribution to the national economy and urban food security. Indeed, migrants are commonly blamed for social problems in urban areas. Their role in enhancing the efficiency of food supply networks must be recognised by development planners.

But as urban resident resellers become more numerous in marketplaces, there is a need for market governance, policy, and infrastructure (including market spaces, transportation infrastructure, and appropriate overnight storage and accommodation) that provide for urban resellers and rural producers. Economic planners and development practitioners need to cultivate a market system that draws on the benefits that specialised traders can contribute, allows space for producer-selling, and assists producers to engage with intermediaries in ways that are mutually beneficial.

The proportion of women vendors in the country's marketplaces has increased over time. In recent years, however, there is evidence that men have increased their involvement, often in the more lucrative roles. Decision-makers must consider how women can best be equipped to benefit from the transformation of marketplaces and how the constraints they face in working in marketplaces can be addressed. Training, access to credit, and improved infrastructure can be critical enablers for women, but it is more important to address the underlying constraints on women's enterprise (see Spark et al., 2021). To do so, it will be critical to listen to women's voices.

The shift in focus from export tree crops to the production and marketing of domestic food also has implications for economic planning and requires further research.

The closure of many urban open-air markets during the COVID-19–induced lockdowns between April and June 2020 caused considerable hardship to urban people who depended on them as well as rural food producers and some intermediate vendors and traders (Bourke, 2020). This highlighted the importance of selling fresh food in open-air markets for the livelihood strategies of rural villagers and many urban residents. The pandemic has exposed vulnerabilities in PNG's food supply systems and national food security, but also considerable adaptive capacity and resilience.

Despite the considerable changes we document, a significant continuity is the relative lack of attention to PNG marketplaces on the part of economists and development planners—a relative lack of attention to what is both a significant part of the PNG economy and a vital contributor to urban and rural food security (Busse, 2014). While open-air marketplaces are attracting increasing development attention, it is not proportional to the importance of these marketplaces to food security and to creating resilient livelihoods.

Open-air marketplaces have provided important economic and social links between rural and urban people in PNG for more than 60 years. As the national economy changes in response to population change, global price changes, and other forces, the importance of open-air marketplaces to the PNG economy and food security will continue to increase. Open-air marketplaces thus deserve more attention from researchers, policymakers, and development planners. Understanding the recent transformation of marketplaces, and the trajectory of change, provides a critical basis for effective policy and planning, and for building resilient livelihoods and food security in PNG.

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CONFLICT OF INTEREST

No conflict of interest/competing interest is reported by the authors.

DATA AVAILABILITY STATEMENT

Most data used in the article are from published sources. Other research data are not shared.

ETHICS STATEMENT

The article draws data from numerous projects. All projects received ethics approval.

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