The rise of rice: How changing livelihoods influence the diets of oil palm smallholders in Hoskins, West New Britain Province, Papua New Guinea

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A thesis submitted in partial fulfilment of the requirements for the degree of Bachelor of Arts (Honours) in the Faculty of Humanities majoring in Geography

Curtin University

October 2019

Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other qualification in any university.

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Date: 25/10/2019

Abstract

Dietary change in the Global South has increased food security, but has also contributed to new vulnerabilities. In Hoskins, West New Britain Province (WNBP), Papua New Guinea (PNG), oil palm smallholder's diets are changing to incorporate higher proportions of rice and other store bought foods. This thesis aims to identify the drivers of rice consumption to give an insight into how people's changing livelihoods influence diet and how these dietary changes affect food security. The differences in drivers of dietary change between smallholders who live on the Land Settlement Scheme (LSS) and Village Oil Palm (VOP) growers will also be discussed. Interviews to collect qualitative and quantitative data were undertaken in Kapore, Kavui, Mosa, Rikau, Kololo and Valoka villages with 31 smallholders; 16 people from the LSS blocks and 15 VOP growers. From the analysis of the findings, changing generational and cultural preferences, declining land access, access to money and labour pressures were found to have influenced rice consumption among oil palm growers in Hoskins. A shortage of land for food gardening was a main driver of consumption on the LSS blocks. While VOP growers experienced some soil infertility, they tended to eat rice because it was easy to cook and they enjoyed the taste. Rice was found to enhance food security as people ate it when they did not have enough garden foods to eat. However, a combination of low oil palm prices and land shortages could increase vulnerabilities to food insecurity. This research is significant because it provides policymakers, not-for-profits and oil palm companies with a better understanding of the livelihood pressures that impact oil palm smallholders which could be used to develop policies and initiatives to improve the standards of living at Hoskins and help mitigate future food security risks. As PNG is characterised by uneven development and this study was undertaken in a relatively well-off area of PNG, it shows how other regions in the country could develop.

Acknowledgments

This thesis would not exist if not for the following people who generously offered their time, expertise, food and support. Firstly, thank you to the Department of Foreign Affairs and Trade for providing me with a New Colombo Plan scholarship so I could travel to PNG. I had an incredible time and cannot stress how much of an important educational experience it was. I'd also like to thank Esley Peter and Alois Ndrewou who generously gave their time to teach *Tok Pisin* me and explain the real PNG to me before I left Australia. Thanks also to Jennifer McKellar and Stephanie Harris for organising *Tok Pisin* classes and always being willing to give me advice from their own experiences.

Thanks so much to all the smallholders who kindly donated their time to speak to me, everyone's friendliness and openness was incredible. An enormous thank you is owed to my research assistant Dickson Urabe for the enthusiasm he brought to my data collection. Dickson was always prepared to transcribe another interview, ask another question or explain something I didn't understand and I can't thank him enough. I am also indebted to all those at the Oil Palm Research Association (OPRA) for hosting me, going above and beyond to help me complete my research and for helping me to understand a little about life in PNG: Steven Nake, Merolyn Koia, Linus Pileng, Emmanuel Germis, Jessica Bira, Philip Makai and Leonard Hura. To my PNG roommates, Raquel, Nell, Bobo, Aloma and Maggie, thank you for beach trips, *Tok Pisin* lessons and surviving a volcanic eruption. Thanks to everyone in PNG for truly giving me the experience of a lifetime!

I really appreciate the hours my super supervisors Tim Sharp and George Curry spent helping me travel to PNG on top of all the advice and research help they offered. Thanks for always answering my panicked emails, providing exceptional academic guidance and helping me to organise the logistics of travelling to PNG by myself. Thanks also to Gina Koczberski for checking up on me while I was in PNG.

And finally, a big thank you to Jos and Claudia for their sharp editing skills, and Grant, Lachie, Connor and Michaela for all the support they offered throughout the year.

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Abbreviations

Australian Centre for International Agricultural Research	**ACIAR**
Land Settlement Scheme	**LSS**
Oil Palm Research Association	**OPRA**
Papua New Guinea	**PNG**
Village Oil Palm	**VOP**
West New Britain Province	**WBNP**

Chapter One: Introduction

This thesis will use rice to explore transformations of social life in Hoskins, West New Britain Province (WNBP), Papua New Guinea (PNG). It will draw on previous works which have used a food to unpack why shifts in diet in the Pacific are occurring and how they are influenced by wider societal change (Errington & Gewertz, 2008; Errington, Gewertz, & Fujikura, 2013; Jourdan, 2010). In this thesis, rice will be used as the medium to investigate broader drivers of dietary change. The study of rice will be used to describe how livelihood strategies, modernisation, access to land and labour drive dietary change and the implications for food security.

The diets of oil palm growers in WNBP are evolving (Koczberski, Curry, & Bue, 2012b; Koczberski et al., 2019). Smallholders in the area grow oil palm and maintain food gardens for household consumption. Staple food crops include banana, Chinese taro, cassava, sweet potato and yams. People also grew other foods like green leaf vegetables, beans, capsicum, tomato, Chinese cabbage and pak choi (Koczberski et al., 2012b). However, since the introduction of oil palm in the late 1960s, store foods, including rice, tinned fish, tinned meat, flour and noodles, have become part of the local diet. In 2000, 77% of all meals contained food entirely from food gardens and by 2010, only 43% of meals consisted entirely of garden foods (Koczberski et al., 2012b). A recent ACIAR-funded study led by Koczberski et al. (2019), *Strengthening livelihoods for food security amongst cocoa and oil palm farming communities in Papua New Guinea,* found rice consumption in Hoskins to be higher than in other oil palm and coffee cash cropping areas. It reported 30-40% of a sample of smallholders in Milne Bay, Autonomous Region of Bougainville and East New Britain Province and 50% of smallholders from WNBP ate rice the evening before the survey. This thesis will explain why people in Hoskins are consuming more rice and investigate the implications for food security.

The adoption of store foods and whether they increase or decrease food security in the Pacific, has been extensively debated in the field (Allen, 2001; Allen, 2015b; Bourke, 2001; Inape & Humphrey, 2001; Manning, 2001). The Food and Agriculture Organisation defines food security as "a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO,

2010, p. 8). Food security in PNG is generally considered to be good as people are able to grow their own foods and purchase additional store foods to improve their diets (Allen, 2001; Bourke, 2001; Heywood & Hide, 1994; Koczberski et al., 2019). However, other researchers have questioned whether people are becoming dependent on these foods and thus increasing their vulnerability to fluctuations in world prices (Grant, 1988; Inape & Humphrey, 2001; Manning, 2001). This thesis will examine how high levels of rice consumption influence food security.

Food security within a community differs between different groups and households, in part because of how they construct their livelihoods. Thus their reasons for dietary change may also be different. At Hoskins, there are two types of oil palm growers: Land Settlement Scheme (LSS) growers and Village Oil Palm (VOP) smallholders. As will be further explained in Chapter Two, LSS blocks were established in the late 1960s when the Australian Administration recruited volunteers from across PNG to move to the area and grow oil palm. VOP growers are the customary land owners in the area who began growing oil palm in the 1980s. I will compare the drivers of rice consumption between these groups.

This research is significant because it helps to understand how changes in people's livelihoods influence dietary change which can be used to formulate food policy. It also uses rice to gain insight into the changing livelihoods of the area which may help to inform other areas of policy including land tenure. The research is conducted in a relatively wealthy area of PNG, so it may inform what could happen in other regions as they develop. The information presented in this thesis will be of great interest to oil palm companies, as people's livelihoods and food security influence how people engage with cash cropping. If livelihoods are under pressure, it can influence people's production and perhaps decrease company profits. This thesis will provide understanding to inform the development of private policy and approaches to smallholders.

The study

In this thesis, I explore the social, environmental and economic factors driving increased rice consumption in WNBP and use rice to investigate how livelihood contexts shape diet and food security. I will use qualitative data to explain the high levels of rice consumption and will compare the livelihood strategies of people living on the LSS

blocks and VOP smallholders. I explore the reasons for rice consumption structured around four themes: changing food preferences, access to land, access to cash and labour. My research question is: What are the factors influencing oil palm smallholders' high rice consumption in Hoskins, WNBP, PNG? The research objectives are to:

1. Identify the factors that drive changes in rice consumption among oil palm smallholders in Hoskins, WNBP.
2. Investigate whether there are differences in drivers of rice consumption between people living on the LSS blocks and people living in VOP areas in Hoskins, WNBP.
3. Use rice to explore how different and changing livelihoods shape the diet and food security of oil palm smallholders in Hoskins, WNBP.

Outline of the chapters

The following chapter will provide the context to understand livelihoods in Hoskins. It will discuss uneven development in PNG, LSS and VOP land arrangements, the oil palm industry, rice consumption trends, the link between food and culture and whether buying rice leads to food security or dependency. Chapter Three will explore the literature to discuss factors influencing dietary change and drivers of rice consumption in Melanesia and the Global South more broadly. Chapter Four explains and justifies the methods used to collect data. Chapters Five to Eight present the findings and analysis focused on four themes: changing preferences, access to land, access to money and labour. In Chapter Five, changing generational and cultural preferences are explored as a driver of rice consumption. In Chapter Six, issues surrounding land such as land shortages, population increase and soil infertility and their effects on rice consumption are discussed. Chapter Seven will explain how access to cash fuels rice consumption, establishes rice as a status symbol and explains how some smallholders have stopped buying rice to manage their household budgets. Chapter Eight investigates the link between labour and rice, the ease and availability of rice and whether cooking rice means women have more time to participate in other activities. The Conclusion will give a summary of what was found, describe the implications of these findings for smallholders and private and public policymakers and offer suggestions for future research.

Chapter Two: Oil palm, rice and uneven development

Figure 1. Oil palm loose fruit in Wilelo.

This section begins with a discussion on uneven development which explains why place-based research is important in PNG. Next, an explanation of the LSS and VOP is given to distinguish between the livelihood strategies of these two groups. The link between food and culture in PNG will be highlighted to demonstrate the importance of food to PNG societies. Lastly, the influence of rice and other store-bought foods, on food security and vulnerability will be explored.

Uneven development

PNG is marked by a significant rural-urban divide and inequality between rural provinces. Most poverty is found in rural areas, where 94% of the country's poor live (Gibson & Rozelle, 2003). Poverty in PNG has been shaped by geography and inequality has been reinforced by colonial and post colonial development (Allen, Bourke, & Gibson, 2005). There are severe environmental constraints that restrict development and limit people's ability to access the markets due to poor transport and infrastructure including

steep terrain, high rainfall, rivers and swamps. (Allen et al., 2005). Education and health facilities vary depending on province and region. In 2012, schools in Gulf Province received a funding average of K155 per student, while those in WNBP were given K342 per student (Howes et al., 2014). The percentage of health clinics with good or adequate access to an ambulance is 3% in Gulf Province and 17% in WNBP (Howes et al., 2014).

Within WNBP there are clear development disparities. The introduction of oil palm has made the areas around Hoskins and Bialla some of the most developed areas in the country (Hanson, Allen, Bourke, & McCarthy, 2001). These areas have sealed roads, opportunities to earn high incomes and the people who live there can reach a service centre in less than four hours. Residents in this area can earn incomes from oil palm and supplement this by earning money from selling fresh food, harvesting cocoa, betel nut and copra or by running a public motor vehicle or trade store. In contrast, people who live in the Nakanai Mountains have limited opportunity to earn money as they live far from roads, have infertile soils and need more than a day to reach the nearest service centre (Hanson et al., 2001). Therefore, where you live shapes livelihood, income and diet.

Land settlement scheme and village oil palm

The Hoskins area became relatively wealthy after the introduction of oil palm cash cropping. In 1967, the Australian Administration established oil palm production in WNBP. Estate plantations, oil palm processing mills and smallholder a LSS was adopted (Koczberski, 2007). The Hoskins scheme involved recruiting 3,500 volunteer families from densely populated regions and giving them 6-6.5 hectares of land, four hectares of which was for oil palm farming and two hectares was for food production (Hulme, 1984; Koczberski, Curry, & Anjen, 2012a). The scheme comprises of nine subdivisions of 130-320 blocks each (Bue, 2014). Male household heads were given 99-year state leases. The scheme was adopted to promote agricultural and economic development by encouraging people to contribute to the cash economy and export their products.

Several years after the LSS was developed, Benjamin (1977) suggested if smallholders began planting oil palm on gardening land, fallow periods would be reduced and food garden production would decrease. Given the increasing populations on the block, smallholders had to plant more oil palm to earn money to support their growing

families (Koczberski et al., 2012a). In 1975, an average of seven people lived on each block (Benjamin, 1977). By 1990, blocks had a population density of 8.6 people. Family size continued to increase and in 2000 an average of 13.3 people lived on a block at Hoskins, and in 2010, the population density reached an average of 15 people per block (Koczberski & Curry, 2005; Bue, 2014). Koczberski et al. (2012a) reported that all six hectare blocks had been fully planted with oil palm to provide income to support the growing population. Thus, the land originally set aside for growing food is now occupied with oil palm, meaning people have to find somewhere else to grow garden foods or purchase fresh food from the markets or buy store-bought foods, such as rice.

After the LSS blocks had been established at Hoskins, in the 1980s the government introduced the VOP scheme to encourage customary land owners to grow oil palm. As with the LSS, growers were given assistance loans by the Papua New Guinea Development Bank to purchase seedlings (Bue, 2014). Over the years, more customary land owners signed up to the scheme and there are now 4,744 VOP and 2,373 LSS smallholder blocks (S. Nake, personal communication, July 22, 2019). There is also a third group of oil palm smallholders who acquired their land through buying customary land from local land owners. These blocks are called Customary Rights Purchases. There are 1,186 CRP growers at Hoskins (S. Nake, personal communication, July 22, 2019), mainly second and third generation LSS growers who need more land to meet the needs of their growing families (Bue, 2014). Smallholders contribute around 30% of total palm oil production and the rest is cultivated on NBPOL's plantations (Bito & Pettit, 2016). Smallholders harvest their palms and leave their fresh fruit bunches and loose fruit on the roadside once a fortnight to be collected by company trucks and processed at one of the company mills into Crude Palm Oil (Bito & Pettit, 2016). Therefore, LSS and VOP growers pursue different livelihood strategies and may eat rice for different reasons.

The link between food and culture

In PNG, food has cultural value and is used in ceremonial exchanges and customary events to strengthen and maintain kinship networks. Different foods are valued by different cultural groups. For example, people in East New Britain Province and WNBP use taro as a gift to reinforce social connections (Bue, 2014; Lowe, 2001), while people in Milne Bay believe yams to be significant (Lepowsky, 1985). More recently, modern, store-bought foods have been incorporated into gift exchanges as they have been

ascribed cultural meaning (Gregory, 1980; Strathern, 1976). Gregory (1980) noted the difference in payment used between brideprice, an exchange from the groom's family to the wife's. In 1904, a brideprice transfer consisted of shells, pigs and dogs teeth, while in 1975 it included money, rice, sugar and bananas (Gregory, 1980). At festivals, some people slaughter pigs while others cook rice and fish bought from trade stores (Strathern, 1976). Festivals and ceremonial exchanges have not changed, but the items of exchange have.

Trends in rice consumption in PNG and between provinces

Rice was introduced to PNG in the mid 1800s. Young men who worked on plantations and others who came into contact with missionaries and colonists were introduced to the new food (Bourke, 2009; Kahn, 1998; Minnegal & Dwyer, 2017; Sexton, 1988). Rice grew in popularity as people engaged with the cash economy and were able to purchase it from trade stores (Dundon, 2004). As can be seen from Figure 2, PNG rice import data dating back to the 1960s shows an increase in rice consumption per capita until the 1990s, when rice consumption reached a plateau. PNG experienced drought in 1997 and many people resorted to eating rice when they could not grow foods in their gardens (Whitecross & Franklin, 2001) which explains the spike in consumption. However, in the same year, the PNG kina fell rapidly, increasing the price of imported foods (McGregor & Bourke, 2009). Trukai, the major rice company in PNG, decided to keep prices low so people would have food to eat. Once the drought subsided, Trukai steadily increased the price of rice to recoup the money they lost (Whitecross & Franklin, 2001). From 1997 to 2005, the price of rice increased from about K0.90 per kilo to K2.75 in Madang and Port Moresby (McGregor & Bourke, 2009). As Figure 2 shows, this led to low levels of rice consumption in the early-mid 2000s. The world food price crisis in 2008, thought to be caused by an increase in demand for agricultural products to make biofuels (FAO, 2009), could explain the decrease in per capita rice consumption seen on the graph below. Oil palm prices also increased sharply during this time (FAO, 2009), possibly sheltering some oil palm smallholders from the high price of rice. Since 2010, rice consumption in PNG has been increasing.

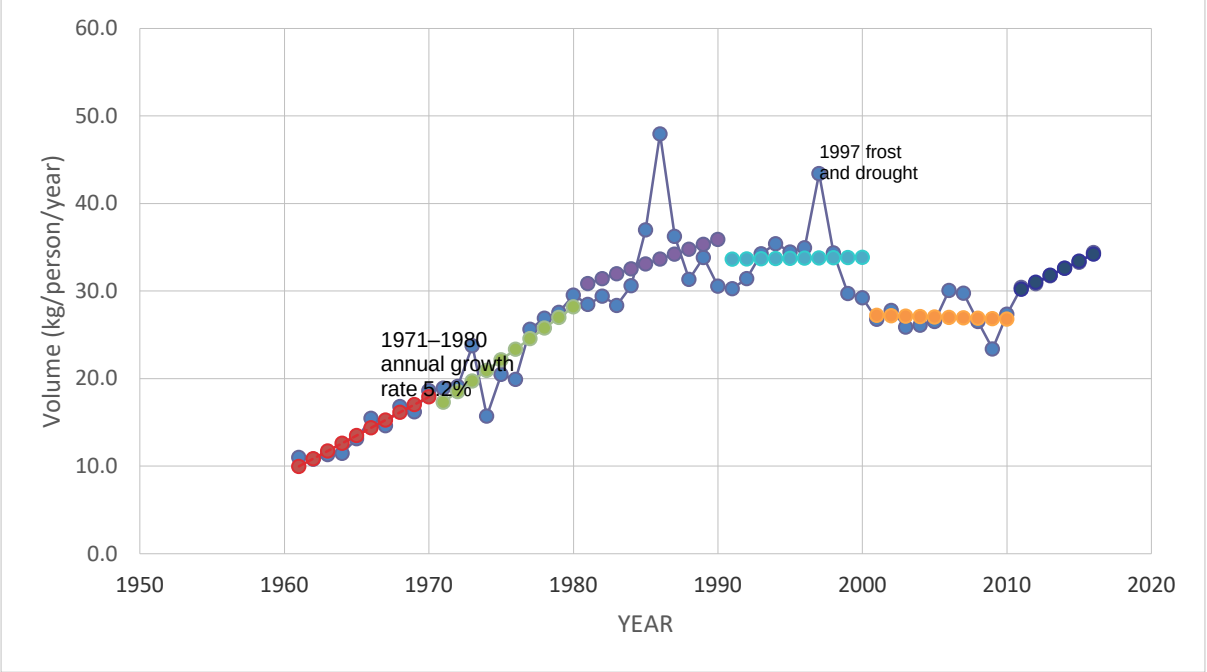

Figure 2. PNG per capita consumption of rice 1961-2016. From R. M. Bourke (unpublished) adapted from "Rice demand in Papua New Guinea", by J. Gibson, 2001, *Pacific Economic Bulletin, 16*(2), p. 97. Copyright 2001 by Asia Pacific Press.

Due to the uneven development of PNG, rice consumption differs between provinces. The most significant differences in rice consumption are evident when comparing rural and urban regions (Bourke, 2019), but differences also occur between rural provinces. In WNBP, Koczberski et al. (2019) found over 50% of the meals consumed the previous night contained rice. When the same question was asked in Milne Bay, only 30% of households said they had eaten rice for dinner the night before while about 40% of people in Oro Province, East New Britain Province and the Autonomous Region of Bougainville said they had eaten rice for dinner. Another dietary survey found people in the Autonomous Region of Bougainville ate more grains[1] than those in the provinces of West Sepik, East Sepik and Madang (Schmidt, Gilbert, Holtemeyer, Rosenbach, & Benson). Livelihood strategies could also influence the amount of rice a household consumes. However, Figure 3 shows LSS, CRP and VOP smallholders consumed a similar amount of rice the night before this survey. While groups of people with different livelihoods are consuming the same amount of rice, this thesis will explore if different reasons are driving them to eat rice.

[1] In this study, "grains" predominantly referred to rice (Schmidt et al., 2019)

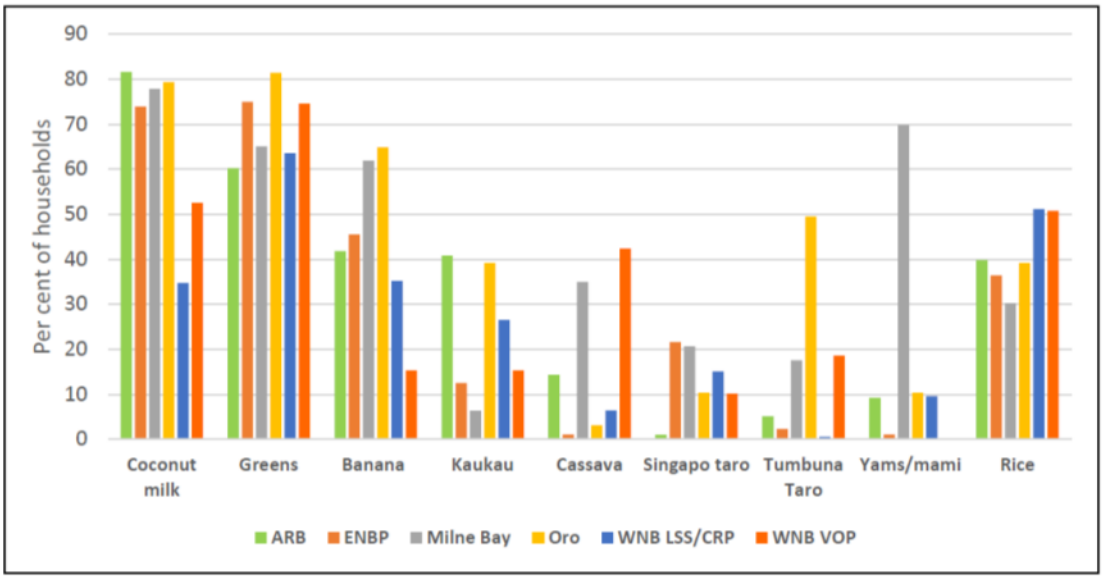

Figure 3. Proportion of households' foods consumed in the previous night's meal. From "Strengthening livelihoods for food security amongst cocoa and oil palm farming communities in Papua New Guinea," by G. Koczberski et al., 2019, *ACIAR*, p. 48. Copyright 2019 by ACIAR.

Food security or food dependency?

There is debate in the literature whether people in the Pacific are becoming "dependent" on store-bought foods, or if these purchases are increasing food security (Allen, 2001; Allen, 2015b; Bourke, 2001; Inape & Humphrey, 2001; Manning, 2001). Diets comprising of high quantities of imported food could be an issue if the kina is devalued, oil palm prices fall, the price of rice increased or the supply of rice was disrupted (Manning, 2001). Rice imports have been disrupted twice: when the government reduced imports in 1979-80; and in the Bougainville Civil War in 1994; and both times, people responded by planting more sweet potato (Bourke, 2001). Bourke (2001) said there was confusion about food security and self-sufficiency. The self-sufficiency position is popular because of national pride. The national pride argument rests on a belief that relying on other countries for food makes you inferior (Manning, 2001). Allen (2015b) wrote about how some researchers have perpetuated the "Pacific Island food insecurity narrative" by writing about how an increased reliance on imported food and an income from one cash crop has increased the vulnerability of the Pacific Islands to economic and environmental shocks and eroded the resilient traditional food system. His paper stresses that although this is true of some Pacific

Island nations, it cannot be widely applied to all as some areas, such as the island of Malo in Vanuatu, do not fit this description.

Some researchers assert access to imported foods has improved food security as people are able to buy food when locally grown food is scarce (Allen, 2001; Bourke, 2001). The ability to purchase food provides people with a safety net between seasons or if there is bad weather (Allen, 2001). Despite land shortages and rising populations, smallholders in PNG continue to grow enough food, consume nutritious food and sell extra garden foods at the market (Koczberski, Curry, & Bue, 2018a). Most recently, Koczberski et al. (2019) found food security among oil palm smallholders in Hoskins and nearby Bialla, was reasonably good and people generally had access to land to grow their own foods and were also able to purchase store foods. The study found people were able to use the money they received from oil palm and the markets to supplement their subsistence diet with store foods rich in protein and energy to make their diet more nutritious (Koczberski et al., 2019). It is therefore necessary to investigate whether the high levels of rice consumption levels in Hoskins are contributing to food security or creating food dependency.

Chapter Three: Literature review

Figure 4. Rice at Papindo Supermarket in Kimbe, WNBP.

This chapter explores the literature focused on dietary change and food security. First, drivers of dietary change in the global south and Melanesia will be explored. Secondly, the drivers of rice consumption in Melanesia will be discussed in relation to availability, convenience, labour, access to cash, status, taste and access to land.

Drivers of dietary change in the Global South

Dietary change in the Global South is attributed to rising incomes, status, taste, availability and convenience. Access to money and rising incomes has been shown to be linked to dietary changes in Africa (Delgrado & Miller, 1985), Asia (Pingali, 2007) and the Pacific (Jourdan, 2010). The westernisation of Asian diets was due to income growth with the argument that as people earn more money, they will pay more for convenience (Pingali, 2007). A similar phenomenon was seen in Sri Lanka where rising incomes contributed to the popularity of bread (Senauer, Sahn, & Alderman, 1986), and in Africa where plantain, a popular food, was consumed more when people received higher

incomes (Dury, Bricas, Tchango-Tchango, Temple, & Bikoi, 2002). When women's time is valued in the workplace and at home, people's diets incorporate more foods that are faster and easier to cook (Senaeur et al., 1986). Research on dietary change in the Himalayas has shown that the shift from subsistence foods to store-bought foods has reduced women's housework (Iyer & Wright, 2016). Eating store-bought foods such as rice reduces the physical labour of walking on potentially steep and rough paths to reach the garden (Raynor, 2013). Cooking convenient foods instead of "traditional" foods can also free-up time to participate in income-generating activities and other household work (Errington et al., 2013; Kennedy & Reardon, 1994; Regmi & Dyck, 2001). The incorporation of store bought foods in people's diets also reduces seasonal food insecurity and hunger as they are available all year round (Allen 2015b; Iyer & Wright, 2016). Dietary change in the Global South is due to a complex combination of drivers. My research will investigate whether these drivers are encouraging rice consumption in Hoskins.

Drivers of dietary change in Melanesia

Diets in Melanesia have been constantly evolving due to colonisation, the introduction of the cash economy and convenience foods and the need to grow hardy subsistence foods. Each wave of colonisers brought new crops and foods to the country (Pollock, 2017). About 300 years ago, sweet potato was introduced to PNG from the Americas and root vegetables, including cassava, Irish potato and Chinese taro, arrived about 160 years later (Bourke et al., 2009). In the past 50 years, Melanesian diets have changed significantly as people have engaged in cash cropping and entered the world economy (Bourke, 2019). Owen (1999) reviewed the dietary change literature and found the key drivers for choosing foods for daily meals were cost, availability, storability and convenience. Drivers influencing food choices for special meals included cost, availability, cultural and kinship factors. Errington and Gewertz (2008) investigated why people in PNG liked to eat lamb flaps, a fatty cut of meat popular in the Pacific, and found they were well-liked because they were a cheap and available source of meat. Instant noodles were found to be popular because they were cheap, allowed Papua New Guineans to feel like they were part of the globalised modern world and they were good for multinational corporations like Nestle to sell as they are cheap and can reach "bottom of the pyramid" consumers (Errington, Fujikura, & Gewertz, 2012). In a study in rural Solomon Islands, more than 80% of respondents said they bought instant noodles

because they liked the flavouring (Pitman, 2016). In PNG, tea, sugar, tinned fish, rice and flour became popular with young people and those employed because they were seen as a symbol of independence and added variety to the local diet (Dundon, 2004). These foods are now considered to be prestigious and healthy by most of the community in Gogodala villages in Western Province. In Melanesia, drivers of dietary change include cost, availability, taste, status and health benefits. I will use this information to inform my own search to identify the drivers of rice consumption.

Drivers of rice consumption in Melanesia

In the following section, I will examine drivers of rice consumption presented in the literature including status and prestige, taste and variety, declining land availability, access to cash, food availability, convenience and labour in Melanesia. Advertising and mass media is also referenced as a driver in some literature, but it is outside the scope of this thesis due to word limits (see Foster, 1996). I am looking at Melanesia[2] instead of just PNG to widen my search for possible drivers. Although individually different, the Indigenous cultures and livelihoods in this region are closely related and similar after thousands of years of trade and interaction (Hirch & Rollason, 2019).

Status and prestige

When rice was first introduced in Melanesia, it was seen as a prestigious food which symbolised modernity and Western "success" (Bourke 2019; Grant, 1988). Kilenge people in PNG believed copra would give them money to eat like the Americans which would make them successful (Grant, 1988). In most areas of Melanesia, rice is less prestigious than it once was and has been adopted as an everyday staple, but still symbolises wealth and status (Bue, 2014; Jourdan, 2010; Petrou & Connell, 2017). In Paama in Vanuatu, providing a community meal without rice was unthinkable and it meant you had no money and you also had no family or friends to help you. Contributing rice to a community event was a sign of status and small business owners who donated rice were perceived to be successful (Petrou & Connell, 2017). Jourdan (2010) shows how the localisation or adoption of rice in the Solomon Islands has seen the food be accepted as a local staple. Other recent research in the Solomon Islands reported half of survey respondents said they viewed local food and "white people" food as equally good and just under half said they believed local food to be better (Pitman, 2016). The same

[2] Melanesia includes Papua New Guinea, West Papua, Fiji, Torres Strait Islands, Solomon Islands Vanuatu and New Caledonia (Hirsch & Rollason, 2019).

study also found 66% of interviewees said their diet was influenced by Asian foods sold at supermarkets (Pitman, 2016). Therefore, although rice does not appear to be as prestigious as it once was, in some parts of Melanesia, it still symbolises wealth and status.

Taste and variety

People in Melanesia have developed a taste for rice (Grant, 1988; Jourdan, 2010; Kahn, 1988; Sexton, 1988). As discussed previously, when rice was first introduced, it was associated with wealth, modernity and the missionaries and colonists who brought it to Melanesia (Grant, 1988; Jourdan, 2010; Kahn, 1988; Sexton, 1988). The social status of rice made it a desirable food which translated into people enjoying the taste (Jourdan, 2010). In the Solomon Islands, rice is now considered to be a local staple (Jourdan, 2010; Pitman, 2016). Rice provides an alternative to the repetitive diet of root vegetables, while still appealing to Melanesian tastes (Jourdan, 2010). The stickiness and softness of rice allowed it to fit within the local diet in the Solomon Islands as it was similar to "traditional" root crops like taro and cassava (Jourdan, 2010; Pitman, 2016). Children are said to especially enjoy rice because it is sweet, soft and white (Grant, 1988; Jourdan, 2010; Pitman, 2016). This thesis will discover whether people in Hoskins are eating more rice because they like the taste and variety it brings to their diet.

Declining land availability

Land shortages, caused by extensive cash cropping and population increases, have also caused some Melanesians to turn to rice to supplement their diet (Kahn & Sexton, 1988; Pollock, 2017). In Malo, Vanuatu, people are planting more coconuts to earn an income while family sizes are increasing, leading to a loss of land and little room to grow garden foods. People then use the income earned from cash cropping to buy imported foods like rice (Allen, 2015b). Bue (2014) discovered some oil palm smallholders on the LSS blocks in Hoskins were using rice to supplement their diet of banana and root crops. However, there is an argument that even though some oil palm smallholders on the LSS blocks are experiencing population growth and land shortages due to using nearly all their land for oil palm, most families grow enough food for their families because they are intensifying their agricultural practices and devising new innovations to grow garden foods (Koczberski et al., 2018). Therefore, after a review of the literature, it is unclear whether land shortages are driving people to eat rice.

Access to cash

Rice consumption first emerged when people entered the world economy through cash cropping (Dundon, 2004; Heywood & Hide, 1994; Saweri, 2001; Sexton, 1988). However, whether people consume more rice when their incomes rise in the present day is debatable and often depends on where studies are conducted. Bourke (2019) said rice consumption in PNG fluctuates with the economy. Bue (2014) found those LSS smallholders in WNBP with sufficient incomes were able to purchase store foods to enrich their diets. Koczberski et al. (2019) reported when oil palm prices were low, smallholders in WNBP ate store foods for only a few days after being paid and then reverted to eating garden foods. Contrary to this argument, Gibson (1995) found rice had fairly low income elasticity in rural areas in PNG meaning people did not buy more rice when they got paid more money and thus it was not classed as a luxury good. In the Solomon Islands, people were buying rice for taste and convenience, despite the increasing pressure on household budgets (Pitman, 2016). A recent household survey in the Autonomous Region of Bougainville, East Sepik, Madang and West Sepik found poor and rich households ate the same amount of rice (Schmidt, et al., 2019). While cash provides the means to buy rice, whether people eat more rice when their income rises, is still unclear.

Ensuring food availability

The availability of introduced foods, as opposed to garden foods, provided a reason for people to buy them (Kahn & Sexton, 1988). Eating rice eliminates seasonal food insecurity and hunger as they are available all year round (Allen, 2015b). In 1988, Bourke and Allen studied trade store data in rural PNG to find people bought more rice when they were short of subsistence foods. More recently in PNG, Dundon (2004) described an interview with a woman in Western Province who said the introduction of European foods such as rice was good because in the past she struggled to find enough food to feed her family. With the means to buy rice, she could now mix garden foods and store-bought foods together to make them last longer. Similarly, rice was used by people in rural areas of the Solomon Islands when their harvested food ran out, when they did not have time to go to the garden, and in bad weather (Pitman, 2016). Therefore rice is contributing to food security by "filling in the gaps". People used to plant extra food for emergencies but now they can use the cash they earn from cash cropping to buy rice (Bourke, 2019). In the 1997 droughts, people turned to rice when they could not grow

garden foods (Whitecross & Franklin, 2001). The availability of rice has been proven to be an important driver of rice consumption in other areas of PNG.

Convenience

Rice is easy and quick to cook, requiring less time spent gardening and collecting firewood (Petrou & Connell, 2017; Pitman, 2016). Villagers who are time-short can cook rice at the end of the day without having to go to the garden (Petrou & Connell, 2017). Rice also goes a long way; a small amount of rice can feed a lot of people (Jourdan, 2010). The preparation of rice is also easier when compared to garden foods. When Pitman (2016) asked about 100 people living in Marovo Lagoon in the Solomon Islands why they liked to eat rice, 50% of respondents said they preferred rice because it was easy and quick to cook. Rice only requires washing and boiling, while cooking taro involves collecting from the garden, washing, peeling the outer layer, sometimes chopping to an appropriate size and boiled, baked or fried (Pitman, 2016). People must also clear land before planting garden foods and wait for harvest while for most people, rice can be obtained easily (Pitman, 2016). Convenience is a possible driver for rice consumption in Hoskins.

Labour

Because rice is easy and fast to cook compared to garden foods (Pitman, 2016), people might be choosing to consume rice to reduce their household labour (Koczberski et al., 2019). In Eastern Highlands Province, Daulo women purchased foods to relieve themselves of household tasks and allow them to participate in the cash economy. Women could harvest and sell some of the fresh coffee cherry and immediately use the money to buy rice and tinned fish during the coffee harvesting season. This eliminated the need for women to travel to the garden and reduced lengthy food preparation times, lessening women's labour (Sexton, 1988). In some rural areas of the Solomon Islands, gardening activities have been significantly reduced due to the option of consuming rice and other store-bought foods. Some people reported only visiting their gardens twice a week allowing women the time to engage in other activities like work with the church or money-making activities (Pitman, 2016). Reducing labour is a driver of rice consumption in Eastern Highlands Province and the Solomon Islands.

Summary

The literature provides examples of drivers of dietary change in the Global South and Melanesia, highlighting how dietary change is caused by a myriad of factors. It also shows while drivers of rice consumption are similar, they differ from place to place. For example, some people eat rice because they have money to spend (Bourke, 2019), while others eat it because it is available and "fills the gaps" in their diet (Allen, 2015b). I will use these drivers to inform my own investigation into the factors influencing rice consumption at Hoskins. I will investigate whether people eat rice because it is readily available; convenient and less laborious for women to prepare; linked to declining land availability; is seen as a prestigious food; cheap; or people like the taste and variety it brings to their diet.

Chapter Four: Methods

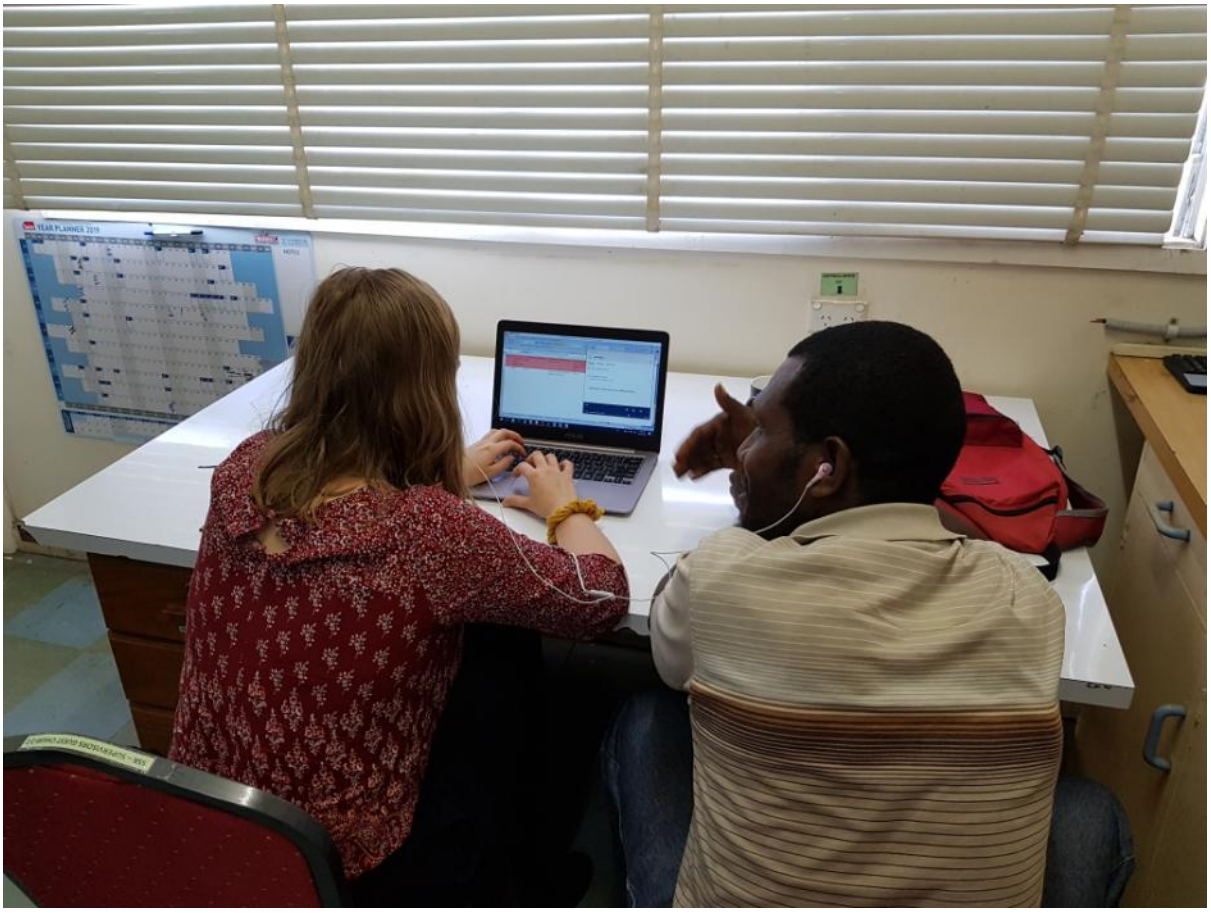

Figure 5. Transcribing interviews at OPRA, by G. Curry, 2019.

In this chapter, I will describe the study site, outline my methodology, and explain how I recruited participants, negotiated ethical issues and conducted interviews, the demographics of my sample and how I analysed the data.

The study site

Research was undertaken in WNBP, PNG. The Hoskins oil palm area was selected to be the study site as a previous ACIAR study found the smallholders in the region had higher rice consumption than other oil palm and cocoa growing areas (Koczberski et al., 2019). It is also close to the Oil Palm Research Association (OPRA) who kindly hosted me during my fieldwork. The customary landowners of the area are the Nakanai, Bebeli, Garua and Bakovi peoples and, as in most places in Papua New Guinea, they speak *Tok Pisin*, the *lingua franca* of PNG, as well as their own language. Few people speak English fluently. Due to the establishment of the LSS, which recruited people from all over the country, the area has a large population of migrants (Koczberski, Curry, & Gibson,

2001). More recently, people have moved to the area to earn an income and bought customary land from customary land owners to grow oil palm (Germis, 2019). Thus the community consists of people of different cultures with different customs, diets, languages and ideas. Migration to the province combined with a high birth rate has also led to high population densities in some areas, where there is now pressure on agricultural land and some people are short of land to grow garden foods (Curry et al., 2007; Koczberski, et al., 2001; Koczberski et al., 2012b).

Due to the introduction of cash cropping and the regular income it provides, the area is relatively wealthy compared with the rest of the country (Hanson et al., 2001). To supplement oil palm income, people also earn money by selling fresh food, copra, coconut and betel nut, have small businesses including public motor vehicles or trade stores and participate in wage employment at businesses or plantations (Koczberski et al., 2001). People at Hoskins live close to the urban centre of Kimbe and there are good roads that service the area.

At the time of the data collection, oil palm prices were low at $168.67 in June and $163.14 in July, following six months of depressed prices. Data were collected at two LSS sites, Kapore and Kavui, and in four VOP areas, Mosa, Rikau, Kololo and Valoka. Both Kapore and Kavui were among the first LSS subdivisions to be established and are suffering from a shortage of gardening land. Mosa and Rikau are inland villages while Kololo and Valoka are situated on the coast. Figure 6 shows the Hoskins oil palm area.

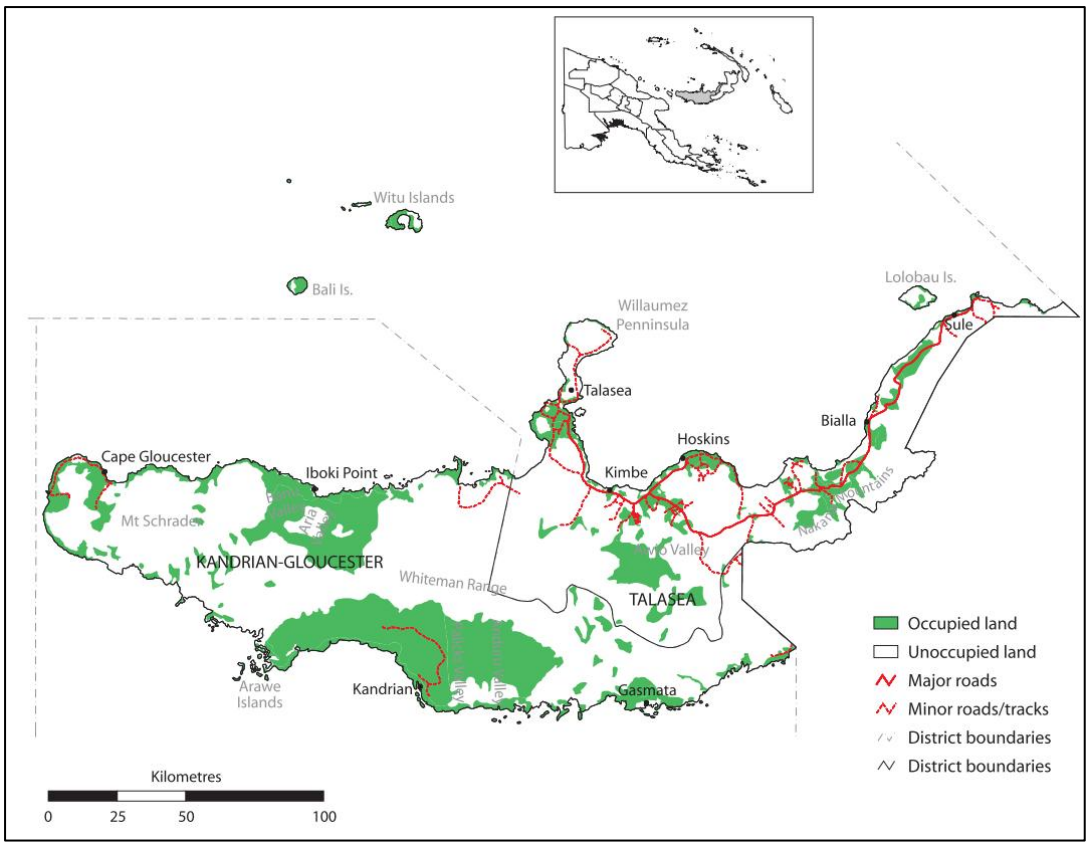

Figure 6. Map of occupied land in WNBP. "From Papua New Guinea Rural Development Handbook," by L. Hanson, B. Allen, R. Bourke and T. McCarthy, 2001. Copyright 2001by The Australian National University.

Methodology

The methodology I chose to use was realism because I am aiming to understand the underlying factors driving rice consumption by collecting and collating data from different sources. Researchers who use realism want to find out what causes change, what makes things happen and what allows things to change (Kitchin & Tate, 2000). A realism approach allows the researcher to use quantitative and qualitative data to explore the complexity of an issue.

Participant recruitment

Participant selection was dictated by safety, convenience and logistics. I did not have my own transport so I conducted interviews when I was out in the field with the OPRA socio-economic team. The methods I used to select participants were criterion sampling and convenience sampling. My project required criterion sampling, selecting cases that meet certain criteria (Stratford & Bradshaw, 2016), because oil palm smallholders were my target group. Interviews were household-based. Anyone from the household could

answer the first set of questions about rice, but the second part regarding labour had to be answered by the person who did the most cooking in the household. I also used convenience sampling as I interviewed the oil palm smallholders who I had access to while the socio-economic team were conducting their own surveys (Stratford & Bradshaw, 2016). I interviewed LSS households and VOP households so I would be able to compare the livelihood strategies of these two groups[3]. While this method of participant selection can provide the lowest level of dependability, safety and logistical concerns meant another sampling method was not possible (Stratford & Bradshaw, 2016).

Ethical issues

As I was conducting cross-cultural research in a foreign country, there were many ethical issues I had to consider including consent, mental and physical harm and power imbalances. My research assistant, Dickson Urabe, helped to ensure informed consent was received. Dickson gave a description of the study in *Tok Pisin* or in the local *Tok Ples* and said that we would be asking questions about rice consumption. People had the opportunity to say yes or no. Participants were then asked if it was acceptable for their answers to be audio recorded. Again, people were given the opportunity to decline to be interviewed. Only one smallholder household refused to participate because they said they did not feel comfortable being interviewed.

Research should not expose the researcher or the participants to mental or physical harm (Dowling, 2016). While in social science there is limited risk of physically harming a participant, mental harm can be a concern. As my research question involved asking people about food and rice consumption, mental harm should not be an issue. However, the environment was potentially harmful to me as the researcher. There was a risk of volcanic eruptions, earthquakes, violence, heavy rains, mosquito-borne diseases and car accidents due to poorly maintained roads. I took steps to minimise these risks. Nearby Mount Ulawun erupted while I was conducting my fieldwork, resulting in heavy dust falling at the research station and causing the internet to briefly drop out. The risk of inhaling potentially harmful dust was minimised by staying inside and wearing a protective mask if I did have to go outside.

[3] I did not interview any Customary Rights Purchase growers because of the time constraints faced in producing an honours thesis.

I also had to be mindful of the power imbalance between myself and the participants. To lessen the power imbalance, I worked with my research assistant Dickson to ensure people felt comfortable before being interviewed and were encouraged to ask questions. As this was a potentially exploitative relationship, given the power imbalance and the colonial history between Papua New Guinea and Australia, I listened to feedback from participants to fine tune my survey, worked alongside local researchers and practised critical reflexivity (Dowling, 2016; Howitt & Stevens, 2016). I also aimed to practice post-colonial research by rejecting colonial research and producing work that would contribute to the welfare of the people I interviewed and allow them to voice knowledge, perspectives, concerns and desires (Howitt & Stevens, 2016). I would have liked to incorporate participatory-based approaches but the time constraints of my honours year made it difficult. Instead, I tried to be friendly and open with the people I interviewed and provide a space for their concerns to be heard. I will also share my research and ensure it reaches the oil palm community in WNBP so the exercise can be of some use (Conway, Allen, & Bourke, 2001; Howitt & Stevens, 2016).

Conducting interviews

Data for this thesis was collected over six weeks in June and July 2019. I chose to conduct personal interviews as they allow for a detailed exploration of experiences, feelings and opinions (Kitchin & Tate, 2000). I asked people the same structured open-ended questions in the same order so I could compare responses in my analysis. It also ensured all participants responded to all questions (Kitchin & Tate, 2000). To make sure my interview questions were relevant, appropriate, and easy to understand, I asked my colleagues at OPRA and my supervisors to read them. These people formed my interpretive community to ensure rigour (Stratford & Bradshaw, 2016). Once they had given their thoughts and changes had been made, I tested my interview questions in the field. If any questions were not properly understood or did not seem to be relevant, I modified the questions or removed them. For example, I removed a question about whether rice was prestigious because the word “prestigious” did not translate well into *Tok Pisin* and people were confused. I also found people answered this question in other parts of the survey (see Appendices A and B for my interview questions).

I also conducted three key informant interviews. For these interviews I used an informal conversational interview approach based on topic questions. I raised some broad topics

for discussion, letting the conversation flow. I chose this method because I wanted the interviewees to talk about any issue they felt was relevant to my project (Kitchin & Tate, 2000). I conducted key informant interviews with an ex-customs official, a village chief and an Oil Palm Industry Corporation extension officer who worked with LSS smallholders. In addition to the interviews I conducted, I also made my own observations while in town and when visiting people's blocks. I discussed the data I was collecting and trends I was noticing with the OPRA socio-economic team.

As a student who had not previously visited Papua New Guinea conducting fieldwork was a challenge. My research assistant Dickson was able to help me navigate the language and cultural barriers. He helped translate my interview questions into *Tok Pisin* so I would be able to ask the participants the questions myself. I also participated in *Tok Pisin* lessons before I left so I had a basic understanding of the language. All interviews were conducted in *Tok Pisin*, except when the participant was comfortable speaking English. Once the interview was completed, Dickson translated the interview and I transcribed the responses into an Excel spreadsheet. Dickson also clarified people's answers as we typed them up.

Interviews were conducted when the rest of the OPRA socioeconomic team were completing their surveys so we had little control over the times we could interview participants. However, it quickly became apparent that people went to town on the Thursday and Friday of oil palm payment fortnights and would not be available for interviews on their blocks. Interviews ranged anywhere from 15 to 50 minutes, depending on whether the questions were properly understood and how much people chose to elaborate.

Sample demographics

In total, 16 interviews were conducted on the LSS blocks. In one household, the person who did most of the cooking was not home, so only the first half of the survey pertaining to rice consumption was completed. A further 15 interviews were completed in VOP areas. The rice consumption component of the interview was conducted with 15 men and 16 women (see Table 1). The second half of the interview was answered by the person who did the most cooking who, in this case, all happened to be women.

Table 1

Sample demographics

Rice consumption survey				**Person who does the most cooking**
Code	Livelihood strategy	Village	Gender	Gender
101	LSS	Kapore	F	F
102	LSS	Kapore	F	F
103	LSS	Kapore	F	F
104	LSS	Kapore	M	F
105	LSS	Kapore	F	F
106	LSS	Kapore	F	F
107	LSS	Kapore	F	F
108	LSS	Kapore	M	F
109	LSS	Kapore	M	F
110	LSS	Kapore	F	F
111	LSS	Kavui	F	F
112	LSS	Kavui	M	F
113	LSS	Kavui	M	F
114	LSS	Kavui	M	F
115	LSS	Kavui	M	F
116	LSS	Kavui	M	N/A
117	VOP	Mosa	F	F
118	VOP	Mosa	F	F
119	VOP	Mosa	F	F
120	VOP	Rikau	M	F
121	VOP	Rikau	M	F
122	VOP	Rikau	F	F
123	VOP	Kololo	M	F
124	VOP	Kololo	M	F
125	VOP	Kololo	F	F

126	VOP	Valoka	M	F
127	VOP	Valoka	F	F
128	VOP	Valoka	M	F
129	VOP	Valoka	M	F
130	VOP	Valoka	F	F
131	VOP	Kololo	F	F

Analysis

Content analysis was performed to identify terms or phrases that appeared in my spreadsheet and counting how many times they occur and when. This allowed me to determine the frequency of some of the answers given (Cope, 2016). In vivo descriptive codes, which are codes that come directly from phrases used by interviewees, were used to find patterns in longer, qualitative answers. Cope (2016) wrote using in vivo codes are a good way to start coding in projects that are exploratory, like this thesis. The process of coding my data highlighted what drivers of rice consumption were mentioned by the smallholders I interviewed. This allowed me to establish four main themes to organise my discussion of drivers around: changing cultural and generational preferences, access to land, cash income and labour. I based my next four analytical chapters around these broad drivers.

Chapter Five: Changing generational and cultural preferences

My last born child always wants to eat rice; she never wants to eat garden foods. When she tells me to cook rice, I must cook rice. If not, she might destroy our things. – VOP smallholder from Mosa

Figure 7. Bags of rice and garden foods at a Kastom event at Gavaiva, WNBP.

As multiple factors are at play, it is difficult to ascertain precisely why oil palm smallholders in WNBP are eating more rice than smallholders in different provinces. However, the qualitative data I collected highlighted some key themes which could be contributing to the high levels of rice consumption in the area. The following four chapters will discuss the drivers of rice consumption that were found to be most significant to the people at Hoskins.

Popular reasons for eating rice included taste and variety. Stark generational differences were also clear with children preferring rice and older adults enjoying garden foods. Changing food preferences were also evident in what people brought to customary events, with rice being one of the most common foods people brought. This chapter will explore these changing preferences as a factor influencing rice consumption in WNBP.

Taste

As previously discussed, taste preferences are formed through culture, power and history. A third of participants said they liked rice because of the taste. A respondent from Rikau simply said, "We like rice. Rice morning, rice lunch, rice evening. That's why we see that the demand for rice is very high". Other studies have found similar conclusions. Iyer and Wright (2016) found one of the key factors driving dietary change in the Himalayas was taste preference, and noted the social importance of people being able to buy the foods they prefer to eat. People in Malo, Vanuatu also nominated the taste of rice as the reason they increased their consumption (Allen, 2001). While taste is a legitimate reason for liking a food, it is developed over time and shaped by social perceptions of food (Errington & Gewertz, 2008; Jourdan, 2010). Rice was originally seen as a prestigious food because it was associated with modernity and European wealth (Bourke, 2019; Grant 1988). This could have contributed to people developing a taste for rice. A VOP smallholder from Rikau said:

> Another reason is because the children have grown up in a time of money. They want to eat like you people [white people] eat. When they taste rice it's better than sweet potato or other garden foods.

This smallholder perpetuates the idea that eating rice will give you a different lifestyle. However, the association between rice and "white people" can also be seen as a deterrent. A respondent from Mosa said, "Rice is the food of white people so I don't like it too much". In this case, it seems that the social meaning of the food determines whether someone likes the food or not, in addition to the taste of the food itself. Therefore, some smallholders in Hoskins are choosing to eat rice because they appreciate the taste which has been informed by the social context.

Variety

Another third of participants mentioned they ate rice for the variety or they liked to alternate eating garden foods and rice. A VOP smallholder from Valoka said she chose to eat rice because, "When we eat garden foods for 3-4 days, we get bored so we change our diet and eat rice". Another VOP smallholder from Rikau said they liked rice because "it has a new taste". Rice is another food people can easily incorporate into the rather bland diet of root vegetables and greens (Jourdan, 2010). Kahn and Sexton (1988) had similar findings and wrote that the introduction of new foods to Papua New Guinea has

offered people more variety to their diets. Variety is a driver of rice consumption at Hoskins.

Young taste buds

This section will discuss the differing preferences of children and older adults. Twenty-six out of 31 respondents said their children preferred rice and the remaining five said their children liked to eat both rice and garden foods. The notion of being "taught" what to eat frequently arose during interviews. Over half of respondents who said their children preferred rice said it was because they were "taught to eat rice" or they "grew up with rice", like the older adults were "taught" to eat garden foods (see Box 1). For example, an LSS smallholder said, "The children are born with rice and we taught them how to eat rice. When we give them sweet potato, they will not eat it. They only want rice". In the Solomon Islands, Jourdan (2010) found a similar phenomenon where mothers complained because their children only wanted to eat rice and tuna. Children liked the whiteness, softness and stickiness of rice (Jourdan, 2010). Grant (1988) conducted research with the Kilenge people in PNG and said while the village elders want to eat taro-coconut pudding, their grandchildren want to eat rice. Kilenge children had grown up eating rice and they no longer chose to eat garden foods. Children disliked the taste and texture of some garden foods (Grant, 1988). The respondent mentioned how her child did not like eating sweet potato. This was a common response; just under half of respondents said their children preferred rice because they did not want to eat garden foods and another ten respondents said it was because their children liked the taste of rice. Those who said their children liked to eat both rice and garden foods suggested it was because eating both together gave them more energy that is how they were taught to eat. Grant (1988) also made note that children are taught that cash cropping is the future, instead of subsistence. The younger generation's change in dietary preferences brings into question the future of subsistence gardening in Hoskins. In the Solomon Islands, a majority of people thought the Marovo people today had lost knowledge of wild foods, gardening practices and food preparation methods (Pitman, 2016). With the increased consumption of convenient store-bought foods, and the apparent dislike for garden foods, it is plausible the younger generations will take less of an interest in gardening.

Another reason is my children. They say, 'we grew up on rice so we want to eat rice'. They find it more convenient. After two days of eating sweet potato and taro, you will get sick of it. After the third day of homegrown food, they say "we want rice". One of the kids will say, "I don't want to eat today because there is no rice". So we are forced to go and buy it. – LSS smallholder from Kavui

Because they [the children] get tired of eating garden foods, it never tastes good to them. Some are born with or they are brought up with rice because of white man. When they are small, they started to eat rice and when we wanted to give them garden foods they refused. – LSS smallholder from Valoka

When you talk about the children of now, we are already sick of traditional food so rice has become our common food, every week or every month. I think one reason is because when they grow up from a baby to a child, we start feeding them rice so that delicacy is already in the system. When you try to give them two times a week the local food, they normally refuse or sometimes they tell you, 'I won't go to school because there is no rice'. We have to meet their demands and give them rice to substitute the food they want to carry to school. – key informant from Gavaiva

The children eat a lot. When they grow up, they eat a lot of rice. When I want to cook rice, they told me to cook lots. If I cook three cups they tell me to add another two cups to the pot because they said three cups would not be enough for them. I don't know, they must be growing up with bigger stomachs which must be why they want to eat more rice. – LSS smallholder from Kavui

Box 1. Interview responses from LSS and VOP smallholders about their children liking rice.

In contrast to the preferences of children, when asked whether elderly people in the household preferred rice or garden foods, only three said rice, 15 said garden foods and six said both. Seven households did not answer this question as they did not live with elderly people. Elderly people were said to be concerned with the health aspects of garden foods. People suggested garden foods made them live longer, stronger and gave them more energy. For example, someone from Kapore said:

> Garden foods give them more energy. The older people want to eat only garden foods because it makes them live longer and gives them more energy to work in the garden. Rice makes them weak, garden food makes them strong.

Dundon (2004) wrote people in Western Province, PNG thought eating store foods was linked to a loss of strength and gave people soft, weak bodies which were incapable of hard work. Iyer and Wright (2016) wrote people in the Himalayas said they were

stronger in the past and there were fewer diseases whereas now people got sick more often and were perceived to be weaker. Others said they liked to eat garden foods because it was the food they were brought up on. Eating the food their mothers cooked them gives people a sense of belonging and identity (Searles, 2002). Grant (1988) suggested some older Kilenge people felt deprived and hungry if they did not eat taro. One smallholder from Kapore said, "Older people have broken teeth so they eat rice". The two other people who said the elderly people in their household preferred rice also suggested it was because they had no teeth and needed to eat rice as their gums could not chew the tough garden foods. This is consistent with findings from a study conducted in Vanuatu, where interviewees said the same thing of their elderly relatives (Petrou & Connell, 2017). While older adults said they generally preferred garden foods as they made their bodies strong, a few liked to eat rice because it was soft for their gums.

Cultural change

Store foods have been incorporated into *kastom* events in PNG (Dundon, 2004; Gregory, 1980; Kahn, 1988; Minnegal & Dwyer, 2017; Strathern, 1976). Traditionally, people brought garden foods to *kastom* but the data show people are bringing more store-bought foods with clear differences between the LSS and VOP smallholders. People were asked the top four foods they bring to *kastom*. As can be seen from Figure 8, 96% said they brought rice, 74% said taro, 64% said banana and 61% brought pig. Interestingly, the LSS and VOP smallholders provided different answers. All LSS respondents said they brought rice, and almost all listed banana and pig. In contrast, all respondents on the VOP blocks said taro was important, and nearly everyone said they would bring rice and cassava. Cassava is the staple food in the Hoskins area (Bue, 2014) which accounts for why more VOP households brought it to customary events than LSS growers. Taro is also culturally important to the people who live in the area, explaining why all VOP blocks mentioned bringing taro (Bue, 2014). A smallholder from Mosa said:

> We use it in *kastom* because it is our staple food and also it has a story. In the time of our ancestors, until now, they use only taro in the *kastom*. It is the main food for all the *kastom*s, not *singapo*, cassava and the others.

Banana was commonly listed on the LSS blocks, possibly because bananas grow very easily and do not require extremely fertile soil (Koczberski et al., 2019). Thus they can

be grown on the LSS blocks where a shortage of land is a problem. The most popular food across the two groups was rice, with almost everyone reporting they would bring rice to a customary event. The inclusion of a foreign food, rice, into the customary event shows how cultures are always adapting and changing to ascribe meanings to different objects, or in this case, foods (Grant 1988; Jourdan, 2010; Searles, 2002).

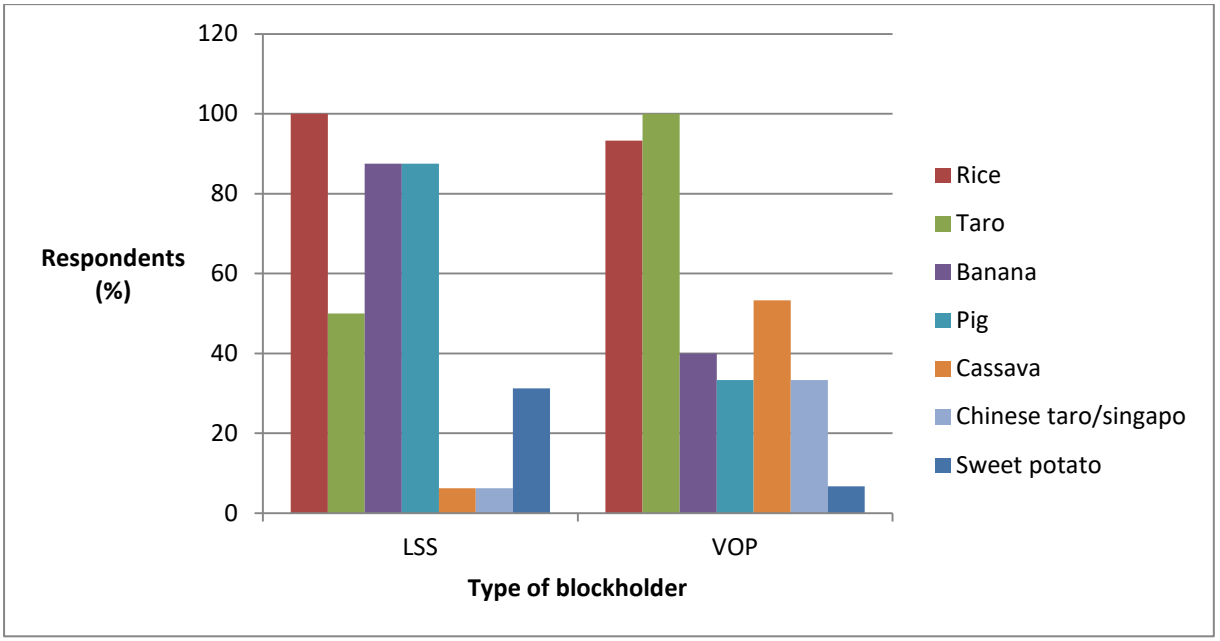

Figure 8. Food items LSS and VOP smallholders bring to *kastom* events, 2019.

Nearly everyone, bar one interviewee, said rice was important to their culture now. An interviewee from Kapore said, "Before we didn't have any store foods. In the past, our ancestors only knew about garden foods. We relied on pigs, bananas, *singapo*. The new generations rely completely on store foods". While such a strong rejection of garden foods was not representative of the sample size, the excerpt demonstrates how customary events are changing and people are incorporating more store bought foods. Grant (1988) said new foods were incorporated into the ceremonies of the Kilenge people to symbolise wealth. A similar phenomenon was observed in Vanuatu, where providing a community meal without rice was unthinkable; it meant you had no money and no family members to help you (Petrou & Connell, 2017). Being able to contribute rice was a sign of status. For example, small business owners who were able to donate rice to an event were seen as successful (Petrou & Connell, 2017). People in Hoskins described how bringing rice to an event would help a person gain the respect of the community. A smallholder from Kapore said, "When we buy a lot of store foods and

bring them to the *kastom*, we get a lot of respect". Rice has been "localised" and ascribed a meaning within the community, representing money and wealth (Jourdan, 2010). Therefore, a driver of rice consumption could be the status acquired from buying it for others.

Summary

This chapter explored taste, variety, the preferences of children and elderly adults and how rice is used in *kastom* events. Taste was found to be a driver of rice consumption. However, taste is more complex than the chemical make-up of a food, and is instead influenced by social attitudes. It was found that some smallholders liked to eat rice because of its association with money, modernity and "white people" while others disliked the taste of rice for the very same reasons. People also chose to eat rice because of the variety it added to their diet. Many smallholders said they ate rice because their children liked to eat it. However, while most adults said they ate rice, they preferred garden foods. The rise in popularity of rice among younger generations could suggest subsistence gardening will become a less important livelihood activity as it has in parts of rural Solomon Islands (Pitman, 2016). Rice was found to be a popular item at *kastom* events for both LSS and VOP smallholders. If a person did not bring rice to a *kastom* event, they would be perceived as "unfit" to host while bringing large quantities of rice to a *kastom* event would earn respect. Therefore, people are choosing to eat rice because of its taste, the variety it adds to the diet, the status earned from bringing it to customary events and the popularity of rice with children are drivers of rice consumption at Hoskins.

Chapter Six: Access to land

"When we are tired of being hungry, we buy rice." – LSS smallholder from Kapore

Figure 9. Food garden in Kololo, WNBP.

A shortage of garden land has left people on the LSS blocks with limited means of growing garden foods to feed their families. Respondents living on VOP blocks and on the LSS blocks complained of soil infertility, making it harder to grow the same amount of produce. This chapter will discuss land shortages, population increase and soil infertility and how they drive people to consume more rice.

Shortage of land

Koczberski et al. (2019) reported that smallholders in WNBP were keen to discuss land pressures and population increase. As can be seen from Box 2, I found a similar trend when conducting my interviews on the LSS blocks at Hoskins. When I asked respondents whether they had enough land to grow garden foods, all VOP households said they did, while 80% of LSS households said they did not. Just under two-thirds of LSS smallholders said they ate rice because they had insufficient land to grow garden foods. One smallholder from Kavui said, "I eat rice because there is no land to make a

garden. That's why I spend more money on rice". This smallholder explicitly states how a shortage of land drives them to buy rice. Another smallholder from Kapore said:

> Because there are not enough garden foods, that's why we eat a lot of rice. We depend entirely on rice. If garden foods are ready, we eat them. But nowadays there is not enough land for us to plant garden foods so that's why we eat a lot of rice.

The families living on these LSS blocks are using the cash income earned from oil palm to buy rice. The availability of rice, which has been discussed in the literature as a driver of consumption (Allen, 2015b; Bourke, 2019; Dundon, 2004), means people can purchase it when they do not have enough land to grow other foods. Particularly for LSS smallholders, buying rice is a livelihood strategy implemented by smallholders to deal with the challenge of land shortages.

There is a shortage of land. The government gave us only six to eight ha of land. I have a 7.9 ha of land in this block and where do I plant other crops? In this section we are lucky that we have a reserve land that is up there (points up hill) where we grow a garden. There is gardening going on up there but it is reserve land that is available so we make gardens out there. In most of these blocks you cannot find any land available to plant any other crop. –LSS smallholder from Kavui

Garden foods are better than rice but we ran out of land so that's why we go for rice now. There is no other place for making a new garden, only the same piece of land so we dropped garden foods so we stick to rice only. –LSS smallholder from Kapore

We have no land to plant garden foods. When we plant it under the oil palm, they never produce as many foods. They can only give us three or two cassava and sweet potato. Sometimes it can be three or four. The ground is not fertile anymore. – LSS smallholder from Kapore

I think that they must drop the price of rice because nowadays we rely on store goods not on garden foods. Because we have no more place to make a garden. All the land is occupied by the company. – LSS smallholder from Kavui

Box 2. Interview responses from LSS smallholders about land shortages.

Population increase

Over the past 40 years, the population on the blocks at Hoskins has doubled (Koczberski et al., 2019). As mentioned in Chapter Four, Kapore, where I conducted interviews, is one of the oldest land settlement schemes where land shortages are most prevalent. I

also interviewed smallholders in Kavui, which was established shortly after. Fourteen respondents said rice consumption had increased over the past ten years because of land issues and population increase. As mentioned in Chapter Two, in 1975 Benjamin (1977) said an average of seven people lived on each block and by 2010, it was about 15 (Bue, 2014). A smallholder from Kavui said:

> When we live on this three hectare [block, that] is not enough for all of us. In the past, when there was no children, there was plenty of garden foods. We had plenty of land. Nowadays, we are so confused how we can solve this problem. If the children grow up, the population increases, it will be a big problem. We depend strongly on oil palm block.

Some of the smallholders I spoke to were very worried about their family's futures on the oil palm blocks. A similar situation occurred in Malo, Vanuatu where the population increased and smallholders planted more coconuts to earn money, leaving little room for garden foods (Allen, 2015b). In response, the community began growing high yielding crops, intensified subsistence production, found new land on east Malo and used the money they earned to buy rice (Allen, 2015b). People in Hoskins are now using rice as a livelihood strategy to feed their growing families. An LSS smallholder from Kapore said, "It's because in 2017, we had a population increase in the household so that's why we eat lots of rice". However, this can only be a temporary solution because as populations grow, people will need more money to buy more rice but they can only earn so much on a six hectare block. Thus eating rice has become a temporary solution to feeding increasing populations on the LSS blocks.

Soil infertility

People living on both the VOP and LSS blocks mentioned soil infertility as a barrier to producing garden foods. A VOP smallholder from Valoka said, "In the time of our ancestors, the soil was very fertile. Nowadays, we continuously plant crops and it affects our land. When we want to plant some other garden foods, it doesn't produce properly". Smallholders described how they could plant garden foods but they would not yield well. Many compared the poor soil in their gardens to the fertile soil of their ancestors. This problem was affecting the VOP smallholders because as more people began planting oil palm, the land immediately surrounding the villages became occupied with oil palm leaving less fertile soil for food gardens (Grant, 1988). Food production in PNG

uses shifting cultivation systems where soil fertility is preserved using long fallow periods when naturally occurring plants grow in the area (Allen, 2015a). With less available land, people have no choice but to shorten the fallow periods, reducing the fertility of the land and causing their crop yields to decline (Allen, 2015a). The VOP smallholder went on to say:

> Sometimes when we go to harvest garden foods, they never produce much. There is only little for us to go and get until it finishes and then we go hungry and we start to look for money to buy rice.

This smallholder highlights the effect soil fertility has on their diet. Without healthy soils to grow garden foods, this smallholder reported having to look for money to buy rice. It also demonstrated how rice is used to "fill in the gaps" and provide a cheap, alternative meal when other foods are not available (see also Allen, 2015b; Bourke, 2019; Dundon, 2004).

Summary

Access to land is important for oil palm smallholders at Hoskins because they are subsistence farmers. However, due to population increases and their static six hectare blocks, many smallholders on the LSS blocks have been experiencing land shortages, reducing their ability to grow garden foods to feed their households. Thus families are turning to rice to ensure everyone can be fed. Smallholders on the VOP blocks suffer less from this issue as they are living on large holdings of customary land. However, it has been noted that VOP gardens are being made further and further away from people's homes to make way for the planting of more oil palm. Soil infertility is an issue affecting LSS and VOP growers. People complained their vegetables did not produce as much as they used to, leaving them looking for other foods to eat. Rice was a good solution as it is fairly cheap and a little can feed many people. Land shortages, population increase and soil infertility are important factors driving people to eat rice.

Chapter Seven: Access to cash

We have got five working people. When they have their fortnightly pay they buy rice. When we get fortnightly pay from oil palm, we buy rice. When we get money from the market, we buy rice. Everybody is buying rice. – LSS smallholder from Kapore

Figure 10. 10 kg bags of Roots Rice at Papindo Supermarket in Kimbe, WNBP.

The introduction of cash cropping and the opportunity to participate in the cash economy is often touted as the reason why people eat more rice (Bourke, 2019; Dundon, 2004; Heywood & Hide, 1994; Saweri, 2001; Sexton, 1988). Growing oil palm meant people had access to a regular income and were able to buy items previously unattainable, including rice. One oil palm smallholder from Valoka said now was a "time of money" as opposed to previously when people lived a subsistence lifestyle. This chapter will discuss price fluctuations, fortnightly oil palm pay day, how rice remains a status symbol and the tenuous link between land, money and food security.

Money

Smallholders had different ideas about the relationship between money and rice. As can be seen from Box 3, some believed buying rice was a waste of money, while others bought it with the little money they had. Fourteen smallholders suggested they ate rice when they had money to buy it. An interviewee from Kapore told me, "When I have money I buy rice, protein [meat], sugar, coffee and all these things". One respondent from Kapore said it depended on the price of rice, "It depends on money. When we have money, we buy plenty of rice for the children to eat. The price of the rice increases but it depends on the money". Others, like this smallholder from Kavui, reported it was bad that garden food consumption had decreased over the past 10 years because "the price of the oil palm dropped and the price of the rice goes up so we have not enough money to buy rice". Therefore, people's ability to earn money, the price of rice and the price of oil palm were said to influence people's decision to buy rice. Other researchers have noted similar findings in the Hoskins area (Bue, 2014; Koczberski et al., 2001; Koczberski, et al., 2019). Although rice is a staple which is eaten frequently by people living in Hoskins, people are heavily dependent on their income to buy it. A smallholder from Kapore resorted to using other income sources when his family did not have enough money to buy rice:

> I struggle to find money to buy rice. If I have money, I buy rice. If I don't, we have nothing. If the company delays our pick up [oil palm fruit], we will just sit and we will have nothing. We will not eat rice. In that case, I look for other sources of income like selling at the market. After I went to the market and then I go to the store and I buy rice like 10 kg for the children to eat.

While most smallholders said they bought rice when they had money, others searched for money to ensure they could buy rice.

We waste a lot of money. When we have little money we can use it to buy rice. – VOP smallholder from Mosa

Sometimes it costs too much money. The only source of income is oil palm. If there is no money, we will eat garden foods. – VOP smallholder from Rikau

In the past, our ancestors see garden foods as one of the important things in the kastom. But now, especially with oil palm, it boosts the standard of living. We earn a lot of money and we buy a lot of rice. But now we still haven't forgotten about garden foods. – VOP smallholder from Valoka

I like rice and garden foods. Because if when we have money available we can buy rice for the house. If we don't have, we eat garden foods. – VOP smallholder from Kololo

Box 3. Interview responses from LSS and VOP smallholders about rice and money.

A third of people said the time they ate the most rice was when they got their fortnightly oil palm pay. An LSS smallholder from Kavui said:

> We have no other source of income so we wait for the fortnightly oil palm payments to buy rice. When the fortnight comes, we buy rice, we eat all the rice and then we wait for another oil palm fortnight to buy another bag of rice.

Many respondents mentioned this pattern of eating rice after pay day and returning to garden foods once the bag was empty. A key informant from Gavaiva village said, "When it is the oil palm pay day, every household here they come with 20 kg or 10 kg rice to fill their house. It's a fact in the Hoskins area". Just fewer than 75% of respondents said they bought a 10 kg bag of rice a fortnight, 16% bought a 20 kg bag and 9% reported buying a 5 kg bag of rice. While I was in WNBP, I visited Kimbe on "fortnight Fridays" to find long lines at the ATMs, many of which had run out of cash, and large crowds of people shopping and socialising. Similar fortnightly retail activity occurs in urban centres in PNG when government workers receive their pay (McGregor & Bourke, 2009). Koczberski et al., (2019) found when oil palm prices were low, people ate store foods for the first few days after being paid. As stated previously, I conducted surveys in June and July of 2019 when the oil palm price was below the 2019 average and well below prices seen in 2018. Thus my data corroborates the pattern recognised by Koczberski et al. (2019) that some smallholders buy rice after pay day and then revert

to garden foods, at least when oil palm prices are low. Rice is a staple food eaten often but it is mainly purchased when people receive their fortnightly oil palm payments.

Prestige

As discussed in Chapter Three and Chapter Five, rice can be used as a symbol of status and wealth (Bourke 2019; Grant, 1988; Petrou & Connell, 2017). In WNBP, rice used to be prestigious but has now become an everyday staple (Koczberski et al., 2019). People previously ate rice to show people they had money and they could afford the luxuries of a "Western" diet (Grant, 1988). While rice has become a food consumed by most people on most days in this region of the country, it still holds some social value and represents money. One smallholder described how bringing rice to customary celebrations, which traditionally only included garden foods, earned respect:

> When we buy a lot of store foods and bring them to the *kastom*, we get a lot of respect. If there is plenty of store foods, the *kastom* has value because there are more store foods than garden foods. When they use only garden foods, the *kastom* has no value. In a *kastom* with lots of lamb flaps and rice and beer, people will see that the person has lots of money. That means he budgeted for the *kastom*.

Although the general consumption of rice is no longer prestigious, people earn respect in the community when they buy rice for customary events. People gain respect for having the money to purchase rice and other store goods (Kahn & Sexton, 1988). This dietary change represents broader societal change from a subsistence lifestyle to a more modern or western lifestyle revolving around money. A similar phenomena was seen in Vanuatu where providing a community meal without rice was unthinkable because it meant people would think you had no money and you also had no family or friends to help you (Petrou & Connell, 2017). A smallholder from Rikau said, "If you don't buy rice, people will say you are rubbish or 'you are poor, you have no money'. You are not fit to make *kastom*". This quote shows the extent rice has been "localised" and prescribed local cultural meaning (Jourdan, 2010). Now, not having money to purchase rice means you are not good enough to participate in a traditional event. Therefore, while the everyday consumption of rice is not seen as prestigious in Hoskins, the ability to provide rice for others earns respect. The status of rice as a symbol of money is a driver of rice consumption.

Budgeting

Many smallholders complained about the cost of rice. Of the 17 respondents who said rice consumption had increased over the past 10 years, 13 said it was bad and two said it was both good and bad. Cost was the most popular reason as to why the increase in rice consumption was considered to be bad, cited by 10 smallholders. As one LSS smallholder from Kavui simply put it, "It isn't good because we spend a lot of money". While people enjoy eating rice and buy it when they have the money to, people said they disliked spending the money on food, especially when subsistence food was free. A smallholder from Rikau said the increase in garden foods in the last 10 years was good because "We make more gardens and we get free food from the garden". This sentiment was echoed in Pitman (2016). Some smallholders said they were budgeting and restricting their rice consumption to pay for other expenses like school fees. All three respondents who said rice consumption had decreased over the past 10 years came from VOP blocks and cited financial reasons for their decline in rice consumption. A smallholder from Valoka explained how they had altered their rice consumption to budget and pay for school fees:

> In the past, when our kids were still small, we spent more money on rice until they went to school and now we don't spend a lot of money on rice. Now we spend more money on school fees. The rice consumption in the family has decreased.

This smallholder is actively choosing to refrain from eating rice to save money.

However, this is in contrast to how an LSS smallholder described how they have no choice but to spend their money on rice because they have no land to grow garden foods and thus cannot alter their food spending. A smallholder from Kapore told me:

> All the money is spent on food, so we don't have enough to pay for school fees and also not enough money to pay for transport for the children to go to school. That's why we have no money and also we have no land to make a garden.

A combination of a shortage of land to grow foods, an increasing population and a small income leaves some families struggling to send their children to school and feed the family. Barriers to education on LSS blocks are high, with 50% of surveyed families in Bialla, Hoskins and Popendetta reporting difficulties sending at least one of their

children to school (Ryan, Koczberski, Curry, & Germis, 2017). A shortage of land can force people to spend the little money they have on rice instead of educational expenses, reinforcing the cycle of poverty. Some cannot choose to limit their rice consumption to save money because of land shortages.

Summary

The data shows people ate rice when they had the money to buy it and if people did not have the money, they would try earning some to purchase rice. Smallholders usually bought large bags of rice, between 5 kg and 20 kg, after they received their fortnightly oil palm payment. Although the everyday consumption of rice is no longer prestigious, having the money to buy large amounts of rice for *kastom* events still earns respect in the community. Some households who were struggling to control their finances reduced their rice consumption so they could invest their limited income in other ways. However, some households often have little choice but to use what money they have to buy rice to feed their families. This shows how interrelated and complex the drivers of rice consumption are. Access to cash provides the means to buy rice and is a key driver of rice consumption. Smallholders buy rice when they have the money, will earn money specifically to buy rice and use the food to show their wealth.

Chapter Eight: Rice and women's labour

"*Rice cooks quickly, it doesn't take much time. When the rice has finished cooking, I do other housework like washing plates, or prepare [for] market or sweep.*" – LSS smallholder from Kapore

Figure 11. Women selling betel nut at markets in Bialla, WNBP.

In WNBP, women are responsible for most of the cooking in the household. Cooking garden foods involves tending to the garden, harvesting, carrying them, often long distances, back to the house, collecting firewood, washing them, peeling them and putting them on the fire for a long time. Therefore, rice offers a quick alternative because, as nearly everyone I interviewed told me, "rice is easy to cook". This chapter will investigate gender roles in oil palm smallholder households in Hoskins, the link between women's identity and cooking, women's large workloads, why rice is easier to cook and whether cooking rice means women have more time to participate in other activities.

Gender roles

Gender roles in Papua New Guinea are very well-defined and inform the identities of men and women. As can be seen in Figure 12, women perform the majority of the

household tasks including cooking, collecting firewood and looking after the children. They are also responsible for collecting loose fruit from the oil palm after the introduction of the *Mama Lus Frut* scheme in 1997 (Koczberski, 2007). Some women said the men in their household assisted in collecting firewood and caring for the children and nearly all women said the men were responsible for harvesting the fresh fruit bunches.

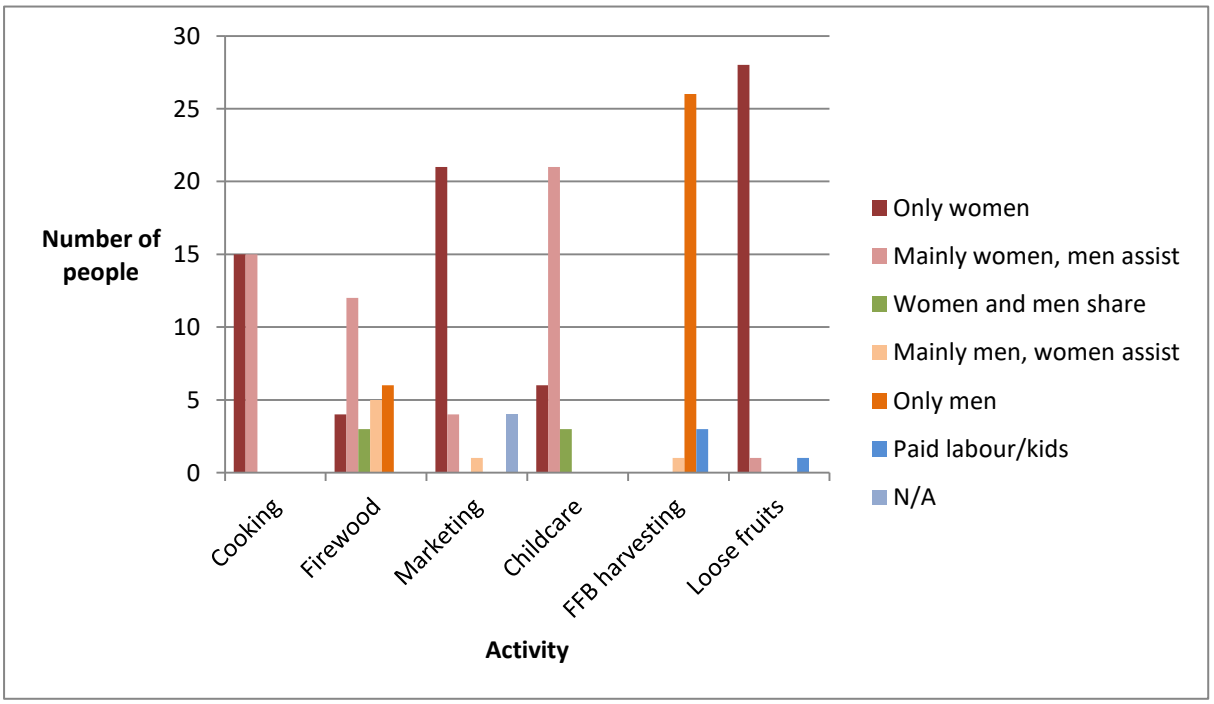

Figure 12. Participation in a selection of household tasks by gender, Hoskins, WNBP, 2019.

In PNG, women's identities are linked to domestic activities and how they look after their family and friends (Koczberski, 2002). Power and prestige is earned when a woman provides food, resources, teaches and protects (Barlow, 2004). A female smallholder from Mosa said:

> We cook rice every day, when we harvest oil palm. That's the time we eat rice. Until the bag of rice finishes, that's when we start to eat garden foods. Now, I admit that to the public. That's my cooking style.

The way the smallholder describes how she must "admit" to cooking rice to the public suggests she is ashamed. It is inferred then, that to this woman, prestige comes from cooking garden foods and not rice or other store-bought foods. Macintyre (2014) studied the situation of women working at a mine in Lihir, New Ireland Province and

found even those employed in reasonable paying jobs and working long hours, still found time for subsistence gardening. A worker is quoted saying:

> Sometimes if I get home before dark I go to the garden. Then on my day off I work all day in my garden. I give [my sister] some money to care for my two youngest children. I would feel bad if I had no garden and people would gossip. (as cited by Macintyre, 2014, p. 98)

The fact Adela said people would "gossip" if she did not have a garden, demonstrates the social expectations of women to provide a certain type of food for her family. While cooking rice is less laborious and this woman from Mosa chooses to do it, she is not proud of her choice and does not want others to know. Therefore, the shift in rice consumption is significant as it challenges women's domestic roles in the home.

Easy to cook

Rice was commonly championed as being fast and easy to cook (see Box 4), with half of respondents suggesting they ate rice for this reason. Two-thirds of people who did the most cooking in the household and completed the second half of the survey mentioned they cooked rice because it was easy and did not take long to cook. One respondent from Kololo said, "Rice is easy. You put it on the fire, wait for a couple of minutes, it boils and finishes". Thus the convenience of cooking rice was seen as an advantage. Petrou and Connell (2017) who studied food remittances in Vanuatu found people who were busy liked how it was easy to cook some rice at the end of a busy day. The ease of cooking store foods, as opposed to garden foods, also made rice more appealing (Petrou & Connell, 2017). I found the same phenomenon was present in Hoskins. A smallholder from Kavui said:

> Cooking garden foods is a long process; we peel it, wash it, put it into the pot, milk the coconut into the pot and then put it on the fire. Not like rice, rice we just put it in the pot and put it on the fire.

As this smallholder said, cooking garden foods involves many steps. Iyer and Wright (2016), who conducted research with women in the Himalayas, said purchased food also saved women hours of labour from cultivation, processing and preparation tasks. The easy and fast nature of cooking rice is a driving factor of rice consumption in Hoskins.

Because it is easy to cook and rice is available at any time. Garden foods, it takes us a long time to look for them. We just go harvest palm and we buy rice and that's easier. So we cook rice every day, nearly every day. – LSS smallholder from Kapore

The first thing about rice is that it is easy to cook and it is a food that is available so we don't have to look for other things. – LSS smallholder from Kavui

It's more healthy and it's easy to cook when the children wake up for school. When the children go to school you cannot cook cassava because cassava will take you more than one and a half hours while it's still boiling on the saucepan, the children are ready to go to school so you have to prepare rice for them before they go to school. – key informant from Gavaiva

It helps me and gives me more time to do other work. When I want to do my work, I have to cook rice quickly and go and do my other work. – VOP smallholder from Mosa

Rice is easy to cook. You put it in the saucepan and onto the fire. It is up to the fire to do everything until the rice is cooked and then I can go do other work. I can sweep the house, wash the plates, have a bath and then come back. – VOP smallholder from Valoka

Box 4. Interview responses from LSS and VOP smallholders about how rice is easy to cook.

Available

Availability was also a driver of rice consumption, with 10% of respondents reporting they ate rice for this reason. A VOP smallholder from Kololo said:

> If I am the only one doing all the garden work and I feel tired and I cannot take garden foods to the house, I cook rice. I must buy one 10 kg to help me to cook in the kitchen.

Therefore, rice was being used because it was easier to obtain than garden foods and it was available if someone did not have time or energy to cook more labour intensive foods. It was also available to fill in the gaps when garden foods were scarce. One interviewee from Valoka said, "We eat rice when there is little garden food in the house". Their garden was not producing enough food, so they decided to eat rice because it was readily available. This reason for rice consumption has been previously mentioned in the literature (Allen, 2015b; Bourke 2019; Dundon, 2004). The availability of rice is contrary to the hard work required to find and collect firewood and produce garden foods. Another respondent from Valoka said they spent seven to eight hours collecting

firewood and tending to the garden, “At 9 o'clock I go to the garden and work and collect firewood until 2 or 3 o'clock and then I go back to the house”. Gardens are being grown further away from villages as the more conveniently located land is used for oil palm or deemed infertile (Bue, 2014; Grant, 1988; Koczberski et al., 2019). Even in 1988, Grant wrote how subsistence farming took longer each year as more land became infertile and gardens were established further away from villages. Some women in Hoskins described the long walk of up to five hours to reach their gardens. Koczberski et al. (2012a) also found people in Hoskins were travelling long distances to reach their gardens; 40% of LSS smallholders interviewed had gardens off-block. In the Solomon Islands, the Marovo people were only visiting their gardens an average of twice a week (Pitman, 2016). With the increase in rice consumption at Hoskins, a similar pattern could be occurring. Therefore, unlike garden foods and firewood, rice is easily available which is driving the consumption of rice in Hoskins.

Reduces work

All 30 respondents said cooking rice allowed them to spend more time doing other things. Two-thirds of participants said this was because rice was easy or fast to cook. Other reasons included because rice created less dishes and less firewood is required to cook it. Women listed the activities they had more time for when they cooked rice compared with garden foods. Popular activities included gardening (16.5%), collecting water (12.3%), washing the dishes (12.3%) and doing laundry (10.3%). When categorised further, 41.2% were housework chores, 38.1% involved collecting firewood, water or garden foods and 16.5% were income-generating activities. Most of the activities were household chores. During interviews, women repeatedly told me how rice was easier to cook, reduced their labour and allowed them to pursue other activities. A respondent from Kapore said, “Rice is fast to cook and I serve it to the people in the house and then I will have more time to do other things like laundry and gardening, look for greens on the block for lunch.” This response is reflective of a majority of interviewees where cooking rice allowed more time for other household chores. Seneuer et al. (1986) said as countries develop, a woman’s time becomes more valuable as she has the capacity to work and earn money. However, the interviews I conducted found people used the time saved from cooking rice to pursue other household chores. Thus people may be buying rice to lessen their total household workloads.

However, people also could be buying rice because it reduces their work altogether. Some smallholders mentioned how people were growing "lazy" so they did not tend to their gardens. One respondent from Rikau said, "Money influences people now so lots of people now are lazy and won't make gardens". Instead of growing garden foods, this smallholder said others were using the money from cash cropping to buy food from the store. Another smallholder from Valoka called themselves "lazy": "We have reserve land but [we don't have a garden] because we are lazy". People consider themselves and others to be "lazy" because they are not participating in the activities of their ancestors. Pitman (2016) found a similar trend in interviews with the Marovo people in the Solomon Islands. People said they were "lazy" because they did less gardening than their parents. The Pulapese did not use the time they saved by eating imported foods to participate in money-making activities but instead spent their time socialising (Flinn, 1988). Koczberski et al. (2001) note that socialising is important in maintaining kinship networks in PNG. In Mota Lava, Vanuatu, people said they had less back-up reserves of garden foods because they were "lazy" (Warrick, 2009). While these people are probably not lazy, they perceive themselves and others to be because they are not participating in subsistence farming to the same extent as their older family members did. In some areas of PNG, people believe garden foods make people strong and healthy, while store-bought foods make you weak and adverse to hard work (Dundon, 2004). While these people are probably not lazy, they are nevertheless choosing not to pursue subsistence farming because there is an easier option: rice.

Summary

The availability and easy to cook nature of rice makes it a popular food choice. However, some women's identities and status are linked to food production so choosing to cook rice made women feel ashamed. While rice was found to reduce workloads, women said they mainly used the time they saved to pursue other housework activities, instead of money-making ventures. Some women chose to eat rice because they had limited time while others chose to eat rice because it allowed them more time to do other things. Cooking rice also reduced the hard work required to produce and cook garden foods. Some smallholders called themselves and others "lazy" as they chose not to participate in subsistence activities and instead ate foods from the store like rice. People buy rice because it is readily available and easy to cook and thus it reduces women's heavy workloads.

Chapter Nine: Conclusion

This thesis set out to identify factors driving rice consumption among oil palm smallholders in WNBP, identify any differences between the rice consumption in LSS and VOP households and use the study of rice to find out how changes in livelihoods have influenced dietary changes among oil palm growers in Hoskins. The conclusion will answer these objectives, outline the implications of these findings and provide suggestions for further research.

In Chapter Five, I discussed how changing food preferences were driving rice consumption. People said they ate rice because they enjoyed the taste. Taste is subjective and was originally developed because of the social prestige of rice. The variety that rice added to diets was also an important driver of consumption. There was a clear generational divide between older people and the children in both LSS and VOP families. Interviewees said their children wanted to eat rice while their parents and grandparents preferred to eat garden foods or both foods together. Older people said garden foods gave them strength and strong bodies. One of the reasons many interviewees said they ate rice was because their children wanted to eat it. With the advent of a new generation "brought up on rice", it begs the question of whether people will continue to reduce their dependence on garden foods. The declining importance in subsistence food gardening, an important cultural activity, would signify a large livelihood shift, and may also leave people more vulnerable to fluctuating global markets for rice and oil palm.

Chapter Five also discussed a change in the foods people brought to customary events. Rice was the most popular food for people on the LSS blocks to bring to *kastom* and second to taro on the VOP blocks. As Jourdan (2010) noted in the Solomon Islands, rice has been localised and become part of cultural activities. Therefore, this thesis provides further examples of how *kastom* events are changing to incorporate store-bought foods to a greater extent.

Chapter Six focused on how issues surrounding land access were driving rice consumption. Land shortages and population growth on the LSS blocks meant people had limited land to grow garden foods so instead ate rice. This is a significant issue and the problem will only get worse as population density continues to rise and more

generations build houses and rely on income from a single block. Oil palm incomes have generally been able to support increased rice consumption but this may change in the future and threaten food security if block populations continue to rise or oil palm prices continue to fall. Younger family members need assistance to develop non-agrarian rural incomes.

Soil infertility was another issue addressed by both people living on LSS and VOP blocks. Residents on the VOP blocks complained that their vegetable yields were lower than in the past. People ate rice to plug the gaps when their gardens were not producing enough food. The issue of soil infertility means people in the future may be restricted as to what they can grow in the available soil. If the problem worsens, it may cause rice consumption to increase further.

Chapter Seven explored how access to money impacted rice consumption. Some people stated they bought rice when they received their fortnightly oil palm payments and when they had money. Prestige was also found to be a driver. Although the everyday consumption of rice was commonplace, people earned respect if they brought rice to customary events. Some interviewees on the VOP blocks said they had stopped buying rice to save money to pay school fees. However, people on the LSS indicated they had to use all their money to buy rice as they had very little land to grow garden foods and thus struggled to send their children to school. Others complained about the price but continued to buy rice. The implications of smallholders continuously buying rice when they are paid means if the oil palm price falls or the price of rice increases, people will find it harder to purchase rice and will need to find something else to eat or another way to make money. This could threaten food security on the LSS blocks where nearly all smallholders interviewed said they did not have enough land to grow garden foods.

In Chapter Eight, I explored the relationship between labour and cooking rice. LSS and VOP smallholders said they liked to cook rice as it was easy and cooked quickly. Although for some women, cooking rice was something they felt guilty about because their identity was linked to their ability to cook garden foods. Rice was also readily available, increasing food security when garden foods could not be produced. Cooking rice also gave women more time for other activities. However, only a small proportion of these were money-making activities. Most women said cooking rice gave them more

time to pursue other household chores. A few VOP smallholders suggested they ate rice because they were too "lazy" to produce and prepare garden foods. The availability of rice could make it easier for women to make money and participate in income-earning activities because they will have more time. If women continue to reduce their heavy workloads by cooking rice, subsistence gardens may become a less significant livelihood activity.

The drivers of rice consumption in Hoskins are multifaceted and complex. The high levels of consumption cannot be explained by one simple reason. As this thesis has shown, the consumption of rice is not merely due to taste or preference, but is instead due to a broad range of social, economic and environmental factors and has broader implications for food security. It has also highlighted the different reasons LSS and VOP households eat rice. People on the LSS blocks have poor access to land and thus eat rice to fill in the gaps. Some VOP smallholders suggested they refrained from eating rice to save money to spend on other things while people on the LSS blocks could not. Other VOP growers suggested people ate rice because they were too "lazy" to make gardens, which was not discussed by the LSS growers. However, given the small sample size, moving away from subsistence gardening out of choice could be occurring on the LSS blocks too. Individual households also had different reasons for choosing to eat rice. Some people had young children who liked rice, and others bought rice because their elderly relatives did not have teeth to chew tough garden foods.

Generally, rice consumption enhances food security as people are able to use it to "fill in the gaps" in their diets when garden foods are not available. While it is unclear if people are dependent on rice, people on the LSS blocks are more vulnerable to becoming dependent because of the land shortages and population increases they are experiencing. Therefore, a sharp rise in the price of rice or a further fall in oil palm price could be problematic for some LSS smallholders.

This thesis has given insight into how changing generational and cultural preferences, declining land access, access to money and labour pressures have influenced rice consumption among oil palm growers in Hoskins. It highlighted the land pressures on the LSS blocks by using qualitative data so the voices of the smallholders could be heard. This information should be used to help LSS smallholders further diversify their

incomes to relieve financial pressure. It also highlighted the importance of rice to food security in areas of land shortages. As PNG is characterised by uneven development and this study was undertaken in a relatively well-off area of PNG, it shows how other regions in the country could develop. It provides policymakers, not-for-profits and oil palm companies with an insight into the livelihood pressures that impact oil palm smallholders which could be used to develop policies and initiatives to improve the standard of living at Hoskins. Further research should be conducted to investigate the reasons for rice consumption on other smallholder blocks in other oil palm and cash crop areas to see what is different in Hoskins. Future studies should also consider conducting more qualitative interviews with people living on the LSS blocks to see how they are affected by land shortages in the newer LSS and Customary Rights Purchase blocks. The health impacts of eating an increased amount of rice also need to be considered.

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Appendix A: Rice consumption interview questions

Demographic questions				
Survey ID:	Name:	Date:	Age***: Hamas krismas blo yu***	Where are you from? ***Yu blong we?***

Gender ***Man o meri:***	LSS/VOP + block number	No. of households on block: ***Hamaspla hauskuk insait long blok:***
Participant main income source: ***Wonem rot tru yu i save mekim mani long em:***	Participant secondary income sources: ***Wonem narapla rot long kisim mani:***	Household main income source: ***Wanem rot hauslain i save mekim moni long em:***

No. of household members in formal employment: ***Namba blong man na meri I kisim wok insait long hauslain:***	What is your harvesting strategy? ***Wonem ol rot yu save bihainim long katim prut?***	a. Wokbung	b. Makim mun	c. Skelim hekta

When was the last fortnight you got paid? ***Wonem laspla peidei ol baim yu?***				
How much money did you receive? ***Hamas moni yu kisim?***	a. >K300	b. K300-500	c. K500-700	d. K700+

How many people live in your household? ***Hamas man, meri na pikinini i stap insait long hauslain?***			
Old/elderly ***Ol lapun or bikpla man meri inogat strong***	Active adults ***Ol stronpla yangpla man o meri***	Youth (13-18) ***Yangpela marn na meri stap long skul***	Children (0-12) **Ol liklik pikinini**

How many people live in the other households on the block? ***Hamas man, meri na pikinini i save stap long ol narapla hauskuk aninit long blok?***							
HH:	HH:	HH:	HH:	HH:	HH:	HH:	HH:

Rice consumption					
1. How many times a week do you eat rice? ***Hamas taim insait long wanpela wik yu save kaikai rice?***					
a. <1 times	b. 1-2 times	c. 3-4 times	d. 5-6 times	e. Every day	f. Never

2. How much rice did your household buy last fortnight? ***Wonem mak blong rice famili i save kisim or baim insait long last fotnite?***	1kg	5kg	10kg	20kg	>20kg

3. What brand of rice do you buy? ***Wonem kain rice yu save baim?***
3.1 Why do you buy that type and not other types? ***Wai na yu laikim displa rice?***
4. Why do you eat rice? (pick 3) ***Long wonem as yu save kaikai rice?***

a. Taste	b. Availability	c. Easy to cook	d. Money to buy	e. Variety
f. Convenience	g. Nutrition	h. Feel more full	i. No land	j. Other

5. Where do they normally buy rice? ***Long wonem hap tru ol i save baim rice?***			
a. Village trade store ***Stoa long ples***	b. Small urban store ***Liklik stoa long station or taon***	c. Large urban store ***Bikpla stoa long taun***	d. Other

6. Has rice consumption in your household increased/decreased/stayed the same over the past 10 years? ***Ten pela krismas i go pinis you tin kaikai blo rice in site lo hauslain I stap wankain, igo antap or go daun?***	a. Increased	b. Decreased	c. Stayed the same
6.1. Why do you think it has increased/decreased? ***Lon wanem as tru yu ting kaikai blo rice i go antap /go daun?***			
6.2 Do you think the increase/decrease is good or bad? ***Yu ting olsem wonem go antap or go daon em i gutpla or nogut?***		a. Good	b. Bad
6.3 Why? ***Long wonem as tru?***			
7. Has garden food consumption in your household increased/decreased/stayed the same over the past 10 years? ***Ten pela krismas i go pinis you tin kaikai blo gaden kaikai in site lo hauslain I stap wankain, igo antap or go daun?***	a. Increased	b. Decreased	c. Stayed the same
7.1. Why do you think it has increased/decreased? ***Lon wanem as tru em I go antap or go daun?***			
7.2. Do you think the increase/decrease is good or bad? ***Yu ting olsem wanem lo disla kain senis em I gutpla or nogut?***		a. Good	b. Bad
7.3 Why? ***Long wonem as tru?***			
8. Do you have enough land to grow garden foods for your household? ***Famili igat inap giraun long planim gaden kaikai blong hauslain?***		a. Yes (go to 9)	b. No (go
8.1 Why don't you have enough land to grow garden foods? ***Long wonem as tru?***			
8.2 Where do you get your food from instead? ***Sopos nogat, wanem hap yu save kisim kaikai?***			
9. What time of year do you eat the most rice? ***Women taim insait long wanpla yia yupla save kaikai planti rice?***			
10. Do you eat more rice in the wet season, dry season or all year round? ***Wanem taim em i gutpla long yupla long kaikai rice, long taim blong sun or taim blong rain or insait long olgeta day long wanpla yia?***	a. Wet	b. Dry	c. All year
10.1 Why? ***Long wonem as tru?***			

11. Do you prefer to eat rice or garden foods? ***Wanem kaikai yu save laikim tumas, rice or gaden kaikai?***	a. Rice	b. Garden foods	c. Both
11.1 Why? ***Long wonem as tru?***			
12. Do the children in your household prefer to eat rice or garden foods? ***Wanem kaikai ol pikinini save laikim tumas, rice or gaden kaikai?***	a. Rice	b. Garden foods	c. Both
12.1 Why? ***Long wonem as tru?***			
13. Do the older adults in your household prefer to eat rice or garden foods? ***Wanem kaikai ol lapun insite lo hauslain save laikim tumas, rice or gaden kaikai?***	a. Rice	b. Garden foods	c. Both
13.1 Why? ***Long wonem as tru?***			

14. Do you think rice is healthy/nutritious? ***Yu ting wanem lon rice, em i healthy, gat gutpla gris lo inap kamapim gut body blong yumi?***	a. Yes	b. No
14.1 Why? ***Long wonem as tru?***		

15. What food do you take to customary events? List most important foods first. ***Wanem ol kaikai yu save karim i go long kastom. Makim fourpla bikpla.***			
1.	2.	3.	4.
16. What food do you take when you go to church events? List most important foods first. ***Wonem kaikai yu save kaikai long ol bikpela day blong lotu. Makim fourpla bikpla.***			
1.	2.	3.	4.

17. Are garden foods important to your culture? ***Kaikai bilong gaden igat strong long taim bilong wok kastom?***	a. Yes	b. No
17.1 What makes garden foods important/not important to your culture? ***Long wonem as tru?***		
18. Has rice been important to your culture in the past? ***Yu ting rice em wanpla bikpela kaikai long wok kastom long taim blong tumbuna?***	a. Yes	b. No
18.1 Why? ***Long wonem as tru?***		
19. Is rice important to your culture now? ***Yu ting rice em wanpela bikpela kaikai long wok kastom nau long dispela taim?***	a. Yes	b. No
19.1 Why? ***Long wonem as tru?***		
34. Is there anything you want to add? ***Igat ol narapla someting long toktok moa long em?***		

Appendix B: Household labour interview questions

Demographic questions				
Survey ID	Gender:	Name:	Age:	
Household labour				
21. Who does the cooking in the house? ***Husait olgeta taim i save kukim kaikai long hauslain?***				
a. Only women ***Ol meri tasol***	b. Mainly women, men assist ***Planti taim meri, man i helpim***	c. Women and men share ***Meri na man sharim namel long tupla***	d. Mainly men, women assist ***Planti taim man, meri helpim***	e. Only men ***Man tasol***
22. Who collects the fire wood? ***Husait i save kisim planti paiawut long hauslain?***				
a. Only women ***Ol meri tasol***	b. Mainly women, men assist ***Planti taim meri, man i helpim***	c. Women and men share ***Meri na man sharim namel long tupla***	d. Mainly men, women assist ***Planti taim man, meri helpim***	e. Only men ***Man tasol***
23. Who does the marketing? ***Husait i save mekim wok blong maket olgeta time?***				
a. Only women ***Ol meri tasol***	b. Mainly women, men assist ***Planti taim meri, man i helpim***	c. Women and men share ***Meri na man sharim namel long tupla***	d. Mainly men, women assist ***Planti taim man, meri helpim***	e. Only men ***Man tasol***
24. Who does the childcare? ***Husait i save spenim bikpla taim blong lukautim ol pikinini?***				
a. Only women ***Ol meri tasol***	b. Mainly women, men assist ***Plenti taim meri, man i helpim***	c. Women and men share ***Meri na man sharim namel long tupla***	d. Mainly men, women assist ***Plenti taim man, meri helpim***	e. Only men ***Man tasol***
25. Who does the FFB harvesting? ***Lon time lo harvest husait i save katim oil prut?***				
a. Only women ***Ol meri tasol***	b. Mainly women, men assist ***Planti taim meri, man i helpim***	c. Women and men share ***Meri na man sharim namel long tupla***	d. Mainly men, women assist ***Planti taim man, meri helpim***	e. Only men ***Man tasol***
26. Who collects the loose fruits? ***Husait i save mumutim ol lus prut ?***				
a. Only women ***Ol meri tasol***	b. Mainly women, men assist ***Planti taim meri, man i helpim***	c. Women and men share ***Meri na man sharim namel long tupla***	d. Mainly men, women assist ***Planti taim man, meri helpim***	e. Only men ***Man tasol***

29. *How much time do you spend collecting firewood and gardening in a day? ***Insite lo wanpela dei, hamas hour i save kisim yu long brukim paia wut na go long gaden?***	a. <1	b. 1-2	c. 2-3	d. 3+
30. *How much time do you spend cooking food in a day? ***Insite lo wanpela dei, hamas hour i save kisim yu long kukim kaikai?***	a. <1	b. 1-2	c. 2-3	d. 3+
31. *Does cooking rice, rather than garden foods, allow you to spend more time doing other things? ***Yu tin wok ol kukim rice save givim yumi moa time lo mekim ol narapela wok?***			a. Yes	b. No

31.1 List activities. ***Raitim ol wanem wok.***	1.	2.
	3.	4.

31.2 Explain. ***Makim klia.***	a. Yes	b. No
32. *Does cooking rice, rather than garden foods, reduce the amount of household work you have to do***? Yu ting wok lo kukim rice i save katim daon ol narapla wok yu laik mekim insait long hauslain?***	a. Yes	b. No
32.1 Explain. ***Makim klia***.		
33. *Does cooking rice, rather than garden foods, mean you have more time to work/make money? ***Yu tin olsem wanem tyme yu kukim rice, bai yu gat moa taim long mekim ol wok or mekim ol wok mani e.g. redim maket etc.***	a. Yes	b. No
33.1 What work? ***Wonem ol wok?***		
34. Is there anything you want to add? ***Igat ol narapla someting long toktok moa long em?***		