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The influence of socio-economic factors in farm investment decisions and labour mobilisation in smallholder coffee production in Eastern Highlands Province, Papua New Guinea

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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 degree or diploma in any university.

Signature: 

Date: 13th July 2015

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Abstract

The thesis examines the socio-economic factors influencing household farm investment decisions and labour mobilisation of coffee smallholder farmers in Eastern Highland Province, Papua New Guinea. Through the prism of coffee production and the adoption of large-scale commercial production of pineapple and broccoli, the thesis documents and explains the reasons for the dramatic changes in land use, land tenure, labour and gender relations over the last two decades. These processes are creating vibrant village economies that defy earlier descriptions of arrested agrarian development or a 'terminal' peasantry in the highlands of PNG.

The study uses the framework of the Sustainable Livelihoods Approach (SLA) developed by Chambers and Conway (1992) to reconcile the agency of farm families with the structure of the economic, biophysical and social contexts of coffee smallholder farmers. A mixed methods approach using both quantitative and qualitative surveys, focus groups and the collection of secondary data was employed in two phases of fieldwork in the villages of Sogomi and Safanaga, Eastern Highlands Province. Qualitative data included one-on-one interviews, semi-structured interviews and focus groups on selected topics.

The research revealed that the introduction of coffee altered customary values relating to land and also influenced land use and land tenure in the two villages. Land tenure is becoming more individualistic as inheritance of land from father to son becomes more pronounced, and households function more as individual units of production by limiting their engagement with other households in coffee production. Labour exchange is limited only to immediate household needs, and exchange labour is given in expectation of cash returns or in-kind returns of mainly store foods.

The introduction of large-scale commercial cultivation of pineapple and broccoli has created new possibilities for increasing women's participation and status in the market compared with coffee production. It has also changed traditional gender roles, by increasing the participation of men along the value chain of commercial food crop production. More men are now selling pineapple and broccoli at local markets. New labour strategies are being developed as households begin to explore new market opportunities.

While seasonal labour demands are fixed for some crops (coffee and pineapple), other crops like broccoli can be planted at any time of year. This means that production of broccoli can be timed to avoid peak labour demands for coffee and pineapple with crops being ready for harvesting during high consumer demands periods (e.g. public holiday periods). These new production strategies are particularly beneficial to women for three reasons: 1) unlike the perennial crop, coffee, women can access land in their own right for production of temporary food crops; 2) they can have full control of the production and income from food crops; and 3) this economic empowerment also raises their social status within their communities.

The research has important policy implications for the coffee industry. Areas with a high degree of market accessibility are becoming heavily involved in the production of food crops and fruits for local markets, often at the expense of coffee production. If the trend of large scale commercial production of vegetables and pineapple continues in accessible coffee growing areas the implications for smallholder coffee production from an industry perspective, are not good. However, there is a strong argument for maintaining coffee – its capacity to generate income during droughts when income from drought sensitive vegetable and fruit crops fail. Climate change is therefore an important reason for maintaining coffee in accessible regions prone to drought. Thus, to address the shift away from coffee production in villages with good market access, extension policies and strategies must take account of the rapid social and economic change occurring in these areas and pursue extension strategies that will increase the returns to labour for coffee farmers and acknowledge that coffee is part of a wider integrated farming system that supports smallholder social and economic livelihoods.

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Measures

Papua New Guinea Kina (PGK) 1.00 per 0.46 AUD in August of 2015 1 PNK = 100 toea

1 Bag of green bean coffee = 60 kg

List of Abbreviation and Acronyms

ACIAR	Australian Centre for International Agricultural Research
CIC	Coffee Industry Corporation
BPNG	Bank of Papua New Guinea
DPI	Department of Primary Industry
EHP	Eastern Highlands Province
FAO	Food and Agriculture Organisation
FPDA	Fresh Produce Development Authority
ICA	International Coffee Agreement
ICO	International Coffee Organisation
IFAD	International Fund for Agricultural Development
LLG	Local Level Government
MTDS	Medium Term Development Strategy
NGO	Non-governmental Organisation
NSO	National Statistics Office
PNG	Papua New Guinea
PNGK	Papua New Guinea Kina
PSC	Premium Smallholder Coffee
QDPI	Queensland Department of Primary Industries
QEB	Quarterly Economic Bulletin
SDA	Seventh Day Adventist
SASE	Society for the Advancement of Socio-Economics
SLA	Sustainable Livelihoods Approach
SHP	Southern Highland Province
UNCTAD	United Nation Conference on Trade and Development
WIPO	World Intellectual Property Organisation
WHP	Western Highlands Province

CHAPTER ONE

INTRODUCTION

1.1 Overview

> Agriculture must mediate between nature and the human community, with ties and obligations in both directions. To farm well requires an elaborate courtesy toward all creatures, animate and inanimate. It is sympathy that most appropriately enlarges the context of human work. Contexts become wrong by being too small - too small, that is, to contain the scientist or the farmer or the farm family or the local ecosystem or the local community, and this is crucial (Wendell and Pollan, 2009, p. 96).

The above quote encapsulates the theme of this thesis: the reconciliation of farm families as agents within the economic, biophysical and social realities of coffee smallholder production. The thesis argues that, while the Papua New Guinea (PNG) Coffee Industry extension and private sector, help to maintain coffee production and smallholder coffee incomes through various industry mechanisms, effective strategies to help smallholder coffee farmers maintain consistent quality and productivity are yet to be developed. Current extension also fails to acknowledge the diversity of livelihood activities in which coffee smallholder farmers are engaged. This chapter provides a background to the thesis, including a synopsis of the economic significance of the coffee industry to PNG's national economy in terms of export revenue, rural development, rural employment and income. It also provides an overview of emerging domestic food crop markets and their possible impacts on coffee production and rural livelihoods. The chapter also states the main arguments, objectives and problems that are associated with the research, and explains the rationale of the thesis. The chapter finishes with an outline of the structure of the thesis.

There have been several recent studies undertaken in PNG in areas such as land use change (e.g. Laukau, 1994, 1997; Kalinoe and Kiris, 2010), gender relations (Brouwer *et al*., 1998; Dickson-Waiko, 2003; Kocsberski, 2007; Eves, 2012), the influence of churches on development (Hanson 2012), and the impact of mobile phone technology (Watson, 2011, 2012, 2013). However, it is not understood how

these changes are playing out at the village level or what will be their implications for policy development. This thesis aims to capture some of these changes by investigating the influence of socio-economic factors in farm investment decisions and labour mobilisation among smallholder coffee producers in Eastern Highlands Province (EHP), PNG (Figure 1.1). The study was conducted in 2013 and 2014 as part of a larger project funded by the Australian Centre for International Agricultural Research project[1] on coffee-based farming systems. This study focuses on coffee communities with good access to markets and extension services in order to understand how market accessibility and socio-economic and cultural changes interact to influence smallholder coffee production.

The thesis has three main arguments: 1) coffee smallholder farmers with relatively good market access are diversifying into large-scale commercial production of pineapple and broccoli; 2) this process of commercialisation is associated with the individualisation of production and land tenure; and 3) a high level of market access is facilitating these changes.

Coffee is one of the export cash crops that has received much attention from academic observers and policy makers. Development projects often have a narrow focus on a single crop, thereby ignoring other significant components of smallholder livelihoods. However, food production for local markets is proving to be very popular among rural communities with good access to markets because of the growing demand resulting from the country's high population growth and increasing urbanisation. However, little attention has been given to vegetable and fruit production, and little is known about commercial food and fruit production or their interaction with traditional export cash crops like coffee. This bias is particularly pronounced in the Highlands region, where the land and climate is very suitable for a wide range of crops, including coffee. Benediktsson (1998) stated that there is, clearly, a lack of understanding about the interaction between production of coffee and food crops. Since the 1990s, a thorough understanding of the diverse variety of local circumstances is viewed as being central to successful development interventions, including attention to the production and marketing of food crops. There is now growing recognition of the importance of understanding that most rural farmers who produce export crops, like coffee, in areas that have good access to markets are also heavily involved in the production of food crops and fruits for local

markets. This study shows how coffee households are managing the major socio-economic changes that are associated with the commercialisation of the production of pineapple and broccoli for the domestic markets while, at the same time, managing the challenges of land and labour. Figure 1.1 shows the main Highlands area (Provinces 1 to 7) where most of the Arabica coffee and temperate crops are grown.

Figure 1.1. Map of PNG (Source: ANU).

1.2 Brief introduction to coffee in the Highlands

Coffee was introduced to PNG some 120 years ago. It is reported to have been planted in East New Britain and Central Province in the 1800s (CIC, 2013) (Figure 1.1). It was introduced to the Highlands as a potential agricultural cash crop in 1937, with the first Arabica coffee plantings established in Aiyura (Sinclair, 1995). From there, coffee seeds were supplied to most parts of the Highlands region by the colonial administration, with the first commercial enterprise in 1947 (Steward, 1992). Initially, the coffee industry was established through colonial development efforts. European settlers with capital were drawn to the region to grow coffee during the period of high prices in the early 1950s (Armarshi *et.al.,* 1979). At that time, coffee was being promoted to boost the economic development of the Highlands. Coffee was synonymous with the capitalist style of development (Fleming and Anton,

1993), thus, capitalism was introduced into the PNG Highlands with the development of the coffee industry; commercial plantations were established and a local labour force was engaged in its development.

1.3 Economic importance of coffee

From 1970 to 2001, coffee was been the main agricultural export crop of PNG (Orrell, 2012). Smallholder households' contribution to total coffee production has been increasing since the plantation sector started declining in the 1980s (Orlegge, 2010). Coffee's contribution to the export revenue of the national economy increased from K215 million, in 1995, to K521 million, in 2010, and the following year it recorded the highest export revenue of K700 million, in 2011 (Table 1.1).

Table 1.1. Coffee exports in the last five years: 2009-2014.

Year	Exports (60kg GB[2] bags)	Value (Kina)
2009/2010	1,032,804	527,424,042
2010/2011	1,048,723	788,211,426
2011/2012	1,140,257	670,711,236
2012/2013	743,287	325,496,876
2013/2014	871,203	430,370,085

(Source: CIC, 2015)

1.4 Smallholders' contributions to national production

The smallholder coffee holding is defined by McGowan International (1989, Vol. 2, No. 2) as follows:

> A single family unit of land is utilised for the production of subsistence and cash crops, using un-costed family or shared labour. However, while the great majority of smallholder coffee gardens have less than 1000 trees on one or separate blocks, this definition also includes all those coffee plantings of up to five or more hectares which do not engage paid external management.

Today, there are more than 400,000 households in PNG engaged in coffee production (PNG National Statistic Office, 2000). The coffee industry is the largest employer in the agricultural sector. Despite the significance of the contribution of coffee smallholders to the national and rural economies, their productivity, relative to

plantation production per hectare, is much lower (Bourke and Harwood, 2009). Although a few technologies have been developed to improve productivity through extension mechanisms, the adoption rate of new technologies in the agricultural sector of PNG is very low (e.g. Omuru, 2003; Api *et al*., 2009). The low adoption rate may be because most smallholder cash crop farmers in PNG are risk averse and utilise a low labour input system of production that leads to very low productivity levels, relative to plantation levels. It is known from socio-economic research regarding other export commodity crops, such as cocoa and palm oil (see Koczberski *et al*., 2001; Koczberski and Curry, 2005; Curry *et al*., 2007; Bourke and Harwood, 2009; Curry and Koczberski, 2012), that socio-cultural factors play a crucial role in influencing smallholder productivity (see Chapters 6 and 7). However, these socio-cultural factors are poorly understood in relation to the coffee industry, despite some ongoing research funded by the Australian Centre for International Agricultural Research (ACIAR, e.g. ASEM/2008/036). The World Bank, which is one of PNG Coffee Industry Coporation's (CIC) development partners, has attributed the low level of smallholder productivity to the lack of tailored extension packages and poor market access that reduce farm-gate prices and, therefore, smallholders' incentives to invest in coffee (World Bank, 2009).

A small number of studies were undertaken among coffee farmers in Bena more than twenty years ago (e.g. Collett, 1992; Overfield, 1995). As stated above, coffee farmers in some rural areas are now moving into the production of other cash crops, like pineapple and broccoli, as new markets emerge and market access improves. These new cash crops for domestic consumption are now challenging coffee's dominant position, but they were not identified as challenges to coffee in the earlier work of Collett and Overfield. Serious land pressures due to population growth and the introduction of new crops are having an effect on farming systems in some of the major coffee growing provinces, including EHP, Simbu and Western Highlands Province (WHP) (see Kaitila, 1995; Kalinoe and Kiris, 2010), yet it is not clear how the industry can maintain the interest of coffee farmers in areas that have a high degree of access to markets.

The national government has been concerned by the lack of impact of its policy directives in the coffee sector because farmers are not exhibiting increased production. In line with its Medium Term Development Strategy (MTDS, 2005), in

2005-2010 (The Medium Term Development Strategy, 2004) the national government had been pursuing an export-driven strategy for economic growth and recovery and, hence, emphasising the importance of productivity in the agricultural sector. This has been emphasised again in its National Development Plan PNG Vision 2050 (PNG Vision 2050, 2010). There is now a strategic initiative to broaden the economy, which is currently dominated by mining and energy, by allocating more resources to agriculture, forestry, eco-tourism and manufacturing from 2010 to 2050 (PNG Vision 2050, 2010). In the light of the country's national development plan, through CIC, the coffee industry embarked on formulating the Coffee Industry Strategic Plan 2010-2018. Its authors highlighted the escalating challenges and constraints that are prevalent at the levels of both institution and farmer. Studies in the coffee industry have highlighted: poor delivery of extension services; lack of knowledge of coffee husbandry; inferior pest and disease management; deficient post-harvest processing; lack of farm investment; and inadequate infrastructure. These constraints are common to other agricultural industries, such as cocoa (Omuru *et al*., 2001; Simbiken, 2004; Curry *et al*., 2007; Api *et al.,* 2009; Orlegge, 2010).

1.5 Alternative cash crops

Vegetable and fruits crops are increasing in importance as sources of income and are competing with traditional cash crops, such as coffee, in the Highlands of PNG (Benediktsson, 1998). Furthermore, in those parts of the Highlands, such as Tambul in WHP and SHP, which are marginal for coffee (being above 2,100 m above sea level and, therefore, too cold), vegetable growing is seen as the major, if not the only, opportunity for economic development. With the growth in global population and increasing demand for food, about 87% of the world's small farms are in the Asia-Pacific region and Latin America. These are mostly small-scale family farms, which produce most of the staple foods required to meet the growing demand for food (IFAD n.d.). PNG development authorities, aid donors, NGOs and church-based organisations have sought to enable highland cultivators to adopt large-scale cultivation of food crops in order to tap into a potentially profitable domestic food market and reduce their dependence on coffee as the sole cash crop. Considerable fluctuations in coffee prices within world commodity markets have added salience to this argument.

1.6 Aims and objectives

The overall aim of this research is to provide insights into how the livelihood strategies of coffee smallholders and the socio-cultural context within which they make decisions influence their production and farm management strategies. The main objectives of this study are to:

1) identify and describe the key socio-economic factors influencing farm investment decisions among smallholder coffee growers in EHP, PNG;
2) identify and describe the key socio-economic factors affecting labour mobilisation and the production costs of smallholders;
3) consider the implications of commercial food production on land management strategies, smallholder coffee households and the coffee industry in general.

The study will investigate and document the changing socio-economic context affecting smallholder farm investment decisions regarding coffee production among coffee households in Sogomi and Safanaga Villages in Unggai-Bena District of EHP. The study focuses on smallholder farmers' investment decisions concerning land, labour and crops. The most recent detailed studies on smallholder coffee production have investigated modernisation and technical efficiency of labour and the social influences of gender roles, particularly as they relate to labour (Collett, 1992; Overfield, 1998). There are numerous other studies that have been undertaken in the Highlands, spanning over three decades. Typically, they paint a bleak picture of rural development within the Highlands. Terms such as "arrested modernisation", "terminal development" and "subsistence malaise" are common in their writings (e.g. Howlett, 1973; Gerritsen, 1981; Grossman, 1984; Overfield, 1995). However, as this thesis will show, these terms do not reflect changes observed in the last ten years within those rural communities that have a high degree of market accessibility. Increasingly, as this thesis will argue, rural communities are evolving into very dynamic economies, while pushing the boundaries of traditional lifestyles and values, which challenge earlier descriptions of a state of economic malaise or terminal development. It will be argued that areas with a reasonable degree of market access have become vibrant and dynamic local economies with people pursuing new opportunities for economic development.

This study will show that styles and patterns of development are shaped considerably by their socio-economic contexts. Thus, the realities of the local context must be taken into account rather than ignoring the complexity of the rural economy by assessing economic activity and productivity using traditional economic models based on methodological individualism. Social decisions have both social and economic consequences (Akerlof, 1997). For example, the choice of whether or not to plant a coffee garden is determined not only by short- and medium-term returns from coffee, but also by social factors such as the birth of a son and the need to ensure his future by planting perennial coffee trees on family land (Chapter 6).

1.7 Thesis rationale

Studies that have documented the production constraints on coffee households have emphasised the lack of extension service delivery, the low quality of extension advice, poor market accessibility, run down infrastructure and farmers' poor commitment to reinvest in their farms (Simbiken, 2004; Api *et al*., 2009; Mendano, 2012). However, more research is needed to understand the decision-making process of smallholders. A closer investigation of decision-making at the household level would help to advance our understanding of the economic behaviour of individual household members in relation to livelihood opportunities. Such studies may help explain why household coffee production is below its potential level and why households make particular socio-economic decisions about farm investment in land, labour and choice of crops to grow.

Another rationale for undertaking the study is its policy implications. Specifically, the research was principally designed to provide vital information needed by the PNG Coffee Industry Corporation to develop appropriate extension strategies for the industry. Secondly, at the national level, the study would be useful for formulating appropriate research and extension strategies for smallholder farmers producing other export tree crops such cocoa and palm oil.

1.8 Thesis structure

Chapter 2 provides a brief review of the literature on socio-economic studies relating to smallholder coffee households in PNG. This is followed by a brief overview of some of the relevant theoretical literature that relates to the lives of coffee

smallholders. A discussion of land and labour with reference to Collett's (1992) and Overfield's (1998) works provides an overview of rural households, drawing out their socio-cultural dimensions. The chapter highlights the limited knowledge in regard to recent socio-economic changes and identifies gaps in earlier studies, particularly in relation to the individualisation of labour and land at the household level and how these are connected to changes occurring at the village level. Finally, Chapter 2 briefly discusses alternative cash crops, crop diversification and possible impacts on coffee production. Overall, Chapter 2 will highlight how the rural coffee economy is driven by both internal and external market and non-market factors, often, in ways that defy common assumptions.

Chapter 3 presents a brief overview of the global coffee industry that is followed by a discussion of coffee production, its expansion within the main producing countries and the challenges associated with the global commodity approach towards development. It also provides an insight into the development of the PNG coffee industry and how it fits within the global coffee market. Finally, Chapter 3 highlights the role of market forces in influencing government policies regarding investment in coffee production by institutions like the International Coffee Organisation (ICO) and the World Bank.

Chapter 4 broadly describes EHP and provides an insight into the Bena district and, briefly, the villages of Sogomi and Safanaga, relative to other districts in the province. The chapter describes the physical geography of EHP and provides an overview of the province's history and the economic context of coffee development in Sogomi and Safanaga Villages. The chapter also describes the dynamics of the indigenous economy and people's attitudes towards increased monetisation of the rural economy. The historical background highlights how prevailing ideas of development shaped the introduction of coffee by the colonial administration to encourage the indigenous people to move more strongly into the cash economy.

Chapter 5 describes the methodology and explains why a multi-method approach was adopted for the study. It outlines some of the excitement and challenges of conducting field work in Bena. Chapter 6 discusses coffee production in Sogomi and Safanaga Villages, including the changing social and cultural values and the social

decisions that face households in an emerging market economy. The chapter first describes the productive assets (land and labour) of households, and then provides an analysis of households' livelihood decision-making processes, the relative importance of different livelihood options and their main areas of income and expenditure. The final part of the chapter discusses how cash moves through market and non-market exchanges in the context of the village economy. This chapter highlights the key point that indigenous social and economic relationships are adapting to new values and circumstances by which, in turn, they are affecting households' coffee productivity and efficiency.

Chapter 7 discusses how opportunities to produce alternative cash crops in Sogomi and Safanaga Villages are influencing households' investment decisions and labour mobilisation. Firstly, it discusses the role of the church in the introduction of crops like pineapple, orange, broccoli and cabbage. Then, the chapter explores how labour is allocated among these crops and coffee. Case studies are presented to illustrate the range of factors affecting farm investment decisions and how they mediate farm input into coffee and alternative cash crops.

The final chapter, Chapter 8, draws some conclusions and discusses policy implications in the light of the findings in the preceding chapters. Firstly, it provides a brief overview of the key arguments of the thesis. This is followed by a discussion of the key findings and their policy implications. The chapter concludes by suggesting the potential research directions for coffee research and for other commodity institutes in PNG. Overall, the thesis points out the inappropriateness of the current extension policy approach towards smallholder coffee households that have relatively good access to markets. It highlights the need to take into account the lifestyles of rural households when designing extension strategies for increasing productivity and incomes.

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

> The world is of course more complicated than our simple or even our more complicated models would suggest (Stiglitz, 2002, p. 472).

This chapter has several objectives. Firstly, it reviews development studies, Etzioni's (1999) concept of socio-economic framework, the notion of the moral economy and the concept of social embeddedness. Secondly, it outlines the relevance of these ideas for coffee households in Bena. Thirdly, it provides a summary of the main socio-economic studies of coffee smallholders in order to appraise the theoretical discussion and demonstrate the strengths and weaknesses of some of the theories within the context of rural development in PNG. Accordingly, to more closely represent the realities of smallholder production in PNG, an overview of the indigenous economy is provided, and its similarities and differences to the market economy are highlighted.

2.2 Development studies

Development is defined in The Chambers English Dictionary[1] as "the act or process of developing; the state of being developed; a gradual unfolding of growth; evolution advancing through successive stages to a higher, more complex, or more fully grown state". In the Dictionary of Human Geography[2] it is defined as "a process of becoming and a potential state of being". The achievement of a state of development should enable people within those societies to choose the conditions under which their histories and geographies are formed. Qerimi (2011) stated that the former definition refers to growth in economic wellbeing and the latter embraces the development of social wellbeing that is related to an increase in choices.

Development studies has a long history in social science. In recent decades, it has been subjected to increasing criticism, mainly because it is claimed that it provide a very Western, and market-dominated, perspective on development (Sahlins, 2005).

In recent years, it has been widely acknowledged that many ideas concerning development were derived from Western experience and superimposed onto non-western societies. Often, the push was towards Western-style development (see Escobar, 1994; Corbridge, 1995; Schech and Haggis, 2000; Qerimi, 2011).

It has been argued that one outcome of this discourse of development is the mental reorientation of indigenous peoples in how they perceive themselves and their relation to others in the context of development (Sahlins, 2005). Ideas deriving from such an understanding would be useful in terms of establishing alternative forms of development that accommodate and enhance socio-cultural life, as well as the economic situation of rural farming households. For example, Horan (2002, p. 205-221), writing on Tonga, has argued that project funders lack the knowledge and understanding of the hybrid economic systems that challenge macroeconomic-driven development policy in the Pacific (for similar studies, see Anderson, 2002; Peredo *et al*., 2004; Curry, 1999; and the collection of chapters in McCormark and Barclay, 2013).

2.3 Religion and development theory

Development policy and its implementation is seen, foremost, as the duty of the state. However, religious organisations have played a significant role in shaping some of the policies and contributing to their implementation since the sixteenth century. Development is a very secular concept, yet religion has played a vital role in defining theoretical concepts. Max Weber (1958) first identified the significant role that religion plays in social change. He went as far as to state that the Protestant Reformation caused a mental revolution that enabled the advent of modern capitalism. Weber described the emergence of capitalism as the development of a Protestant work ethic. The Protestant work ethic results from the interaction of the doctrine of salvation and the concept of good works. It was Luther who decisively altered the Christian concept of good work by prescribing the "fulfillment of duties in worldly affairs as the highest form which the moral activity of the individual could assume" (Weber, 1958, p. 95). Eisenstadt (1968) withdrew from the analysis of a direct causal link between Protestantism and capitalism to focus on the "transformative potential" of religion, which refers to the "capacity to legitimize, in religious or ideological terms, the development of new motivations, activities, and institutions which were not encompassed by their original impulses and views"

(Eisenstadt,1968, p. 672). Eisenstadt's main thesis is that Protestantism redefined political and social institutions and impacted on the reformulation of roles within the economic sphere. The arguments of Eisenstadt regarding transformative potential focus on the economic sphere but fail to capture cases like the following one, in Angola. In this case, from 1886 to 1961, the Protestant Church had worked in Angola to improve the conditions of indigenous communities, by developing institutions for education and health organised around religious groups or missions. This educated and empowered the indigenous population to make their own decisions, which was in opposition to the Portuguese state's development policy of colonialism (Byam, 1997). Thus religious institutions have played a significant role in secular development activities in the areas of education, health and agriculture, running programmes parallel to the state (Woodberry, 2012).

Given the various styles of development practised by major world religions, it is useful to draw on one example from PNG. In the late 1890s, the German Catholic missionaries that were working in New Guinea had to improve their physical surroundings in order to progress their spiritual mission. For example, the German Catholic mission in PNG was the first mission to enter the northern part of the island of New Guinea, where mission work had to be carried out under very harsh conditions. They established plantations, as a means to an end. The church had to raise money to support its mission work, so it had to acquire land and build infrastructure. In the process, it contributed to the development of the country (Huber, 1987). As one of the missionaries described:

> Poor, poor New Guinea! Here every foot of ground still has to be cleared, every road has to be made, every bridge built, every really worthwhile plant imported, every hen, every duck, and every other domesticated animal including the horse, has to be brought in from the outside… Every thread on our back has to be gotten from Europe or elsewhere (Wiltgen, 1969, p. 339)

In Africa, it is often difficult to untangle the Church from the agency of development. According to a 2008 World Bank report, half of the health and education services in Sub-Saharan Africa in the year 2000 were provided by faith-based organisations (World Bank, 2008; Myers, 1999; Deneulin and Rakodi, 2011). The evangelical development agency, World Vision, had an effective aid budget of

US$1.032 billion in 2002 (World Vision International, 2002). The World Bank notes that, in Benin, the Church is recognised to have a realisable, and effectively solid, network (Kliksberg, 2003). Similarly, the Church was recognised as a major player in the development of Malawi in the 1970s. It was claimed that the annual budget of the Christian Service Committee of the Churches of Malawi, a key ecumenical organisation, was 1.5 times the size of the state's entire development budget (World Faiths Development Dialogue, 2003). Even in South Africa, the Catholic Church has provided more anti-retroviral treatments for people suffering from HIV than the state (Deneulin and Rakodi, 2011; Bompani and Smith, 2013).

In agriculture, too, the Church plays an important role, not only in agricultural extension but also by influencing policy. The South African Catholic Bishops' Conference has on several occasions discussed and released policy papers and statements on the positives and negatives of biotechnology in alleviating hunger and poverty in Africa. Churches, including the Catholic Church, have always acted as development tools in East Africa, and research has shown that Christian churches have become development vehicles for new ideas and practices in contemporary Kenya. Churches have promoted new types of agricultural technology, including precursors of biotechnologies. Studies have outlined how, within the contested and political discourse around biotechnology, the churches have negotiated their own ethical and theological systems, and applied their more pragmatic works, as a proper 'secular' development organisation (Deneulin and Rakodi, 2011; Bompani and Smith, 2013).

2.4 Socioeconomic studies and the moral economy

> Socio-economics assumes that economics is embedded in society, polity and culture, and is not a self-contained system. It assumes that [sic] individual choices are shaped by values, emotions, social bonds, and judgements rather than by a precise calculation of self-interest (SASE 1990, cited in Coughlin 1991, p. 159).

The socio-economic framework is associated with Etzioni's work in the 1980s and 1990s. It is concerned with combining economic and social perspectives to provide an improved understanding of economic behaviour. The main view (see Etzioni, 1999) is that social institutions mediate economic behaviour. The institutions of concern are those that form the context for the economic behaviour; for example,

business firms, the social organisation of markets, social networks, political entities and legal institutions, and cultural norms (Coughlin, 1991). Thus, in general, the socio-economic framework rejects narrow individualism and rationality, arguing that moral commitments also cause human action, in contrast to the notion of self-interest as the sole determinant of behaviour (Tomer, 1999). Thus, the socio-economic framework is relevant to the rural livelihoods of coffee households in PNG. However, Sayer (2002, 2006, 2007) has also added to the counter arguments that markets influence our moral behaviour and people sometimes act purely out of self-interest. As Scott (1998) have argued, capitalism challenges the communitarian reasoning and cultural knowledge that are the foundations of cooperative societies and reciprocal strategies. The moral economy is a normative understanding of mutual reciprocity and embedded sociality that raises questions about the human capacity to flourish or suffer, and how to support wellbeing (Sayer, 2007). The moral economy considers labour to be part of an important relationship rooted in a web of social dependencies (Polanyi, 1944; Sayer, 2000, 2007). However, research in the Andes has suggested that social networks, and cultural and traditional practices, are on the decline in some communities as they increasingly participate in global markets and other forms of globalisation (Allen, 2002; Temple, 2003).

2.5 The concept of social embeddedness

The concept of social embeddedness is discussed here to highlight how social norms and values shape the rural economies of PNG. PNG's rural communities are governed by traditional social rules and values while simultaneously embracing the modern economy. Polanyi's (1944) concept of the socially embedded economy is quite useful for understanding socio-economic change in PNG, particularly how the social and the economic components are inseparable. Such an approach is seen in the work carried out in PNG by Curry (1999), Imbun (2000) and Koczberski and Curry (2004).

It is now widely acknowledged, especially in respect to the indigenous economies of developing countries such as PNG, that many economic practices and transactions contradict the assumption of the separability of markets and society that underlies conventional economic analysis (see, for example, Cornelisse, 1984). Polanyi (1944) argued that the economy is essentially a function of the interaction of social and

market relations. As Cornelisse (1984, 254) pointed out, although individuals' transactions at the personal level are often measured by recording their frequency and intensity, and are quantified for modelling purposes, the existence of qualitative human attributes and socio-cultural factors that influence human behaviour limits the explanatory power of such models. For instance, using a Nigerian case study, Berry (1975) argued that economists generally view socio-cultural variables (including religious and moral variables) as impediments to the free flow of market information and resources from less, to more, productive economic uses.

Markets are about more than just financial returns; they are also about social returns to the community. Walsh-Dilley (2013) reasoned that indigenous economies can create a hybrid space to sustain livelihoods and communities. Her argument is based on her study of the San Juan de Rosario rural community in Bolivia, where households were able to sustainably produce the super grain, quinoa, using traditional labour reciprocity relationships, despite market integration of the rural community, even against a backdrop of increased demand for quinoa on the global market. She used the concept of hybridity to illustrate how socio-cultural processes can be used to combine discrete structures of practice, which previously existed separately, to create new structures for the market economy **(**Walsh-Dilley, 2013). She contended that her study revealed a hybrid space, in which local people engaged in the global economy while reconciling the communitarian logic of reciprocity and moral values with external market-oriented strategies. Her work was a critique of others (e.g. Thompson, 1991; Scott, 1976), who argued that indigenous practices are weakened as indigenous societies are integrated into the global economy.

The body of literature discussed above looked at development agencies and the role they play in shaping the theoretical concept of development and its impact on current development trends. Development values held by the secular and religious institutions have influenced the behaviour of people towards the modern economy and their adaptation of alternative developmental values. There are communities that incorporate both traditional and modern values to create an alternative set of integrated values (e.g. Polanyi, 1944; Coughlin, 1991; Koczberski and Curry, 2003; Sayer, 2000, 2007; Wash-Dilley, 2013). However, others have found that, when people and communities conform to the standards of capitalism as the main

development value, the challenge to communitarian reasoning and cultural knowledge can impact on people's behaviour (e.g. Scott, 1976; Thompson, 1991; Allen, 2002; Temple, 2003; Sayer, 2007).

2.6 Overview of PNG literature on cash crop production

2.6.1 Historical context of development concept in PNG

The role of agriculture in relation to beliefs about development in PNG was especially important during the late colonial period. Increasing agricultural production was envisaged as the main form of economic growth that should take place to satisfy the increased need for output and to improve living standards, both of which were development objectives. For the Australian colonial authorities, the principal basis by which to increase the living standards of the local population was to raise agricultural output by households occupying smallholdings of land up to 3 ha. Development was to be attained by utilising household labour on smallholdings to grow crops for immediate consumption, and for both domestic and foreign markets, by raising levels of production. Exchanging cash income earned from marketed crops for goods, either made locally or manufactured through industrial processes in other countries, was intended to lift living standards, improve welfare and maintain rural communities. To achieve such an end, state coordination and supervision of households was placed at the centre of the colonial agrarian doctrine of development (MacWilliam, 2013; Wright, 2002).

Collett (1992) also mentioned that the scale of women's involvement in commodity production was small, relative both to men and to subsistence production. This was reflected in terms of area cropped, management of crops, degree of utilisation of realised (marketable) yield and income from cash cropping relative to the value of subsistence production. Moulik (1973) extended Fisk's (1971) economic analysis of cash cropping to include social and psychological factors that mediate individual responses to the incentives for production of cash crops (coffee and food crops). However, Collett's work, completed 30 years after the Moulik and Fisk studies, indicated that a new contemporary generation of cash crop growers were now in charge of household production and their motivations were very different. Expectations have grown and there is greater need for cash, both for modern items like education and health-care, and for traditional applications such as bride price and

ceremonial obligations. Thus motives and experiences in the early stages of cash crop development were not the same as they are today. Additionally, it appears that there have been further changes since Collett's study in 1992. Women may be farmers in their own right and their participation in the cash economy is not the same for all of them. Some may argue that female cash needs are basically family needs but, now, young school girls own pineapple farms and have cash needs that are totally different to those of their mothers (Chapter 7).

2.6.2 Socioeconomic changes and constraints on smallholder coffee production

Most rural communities in PNG are experiencing rapid socio-economic change, which is challenging traditional ways of managing land and labour. However, most of the literature on smallholder production ignores these challenges and tends to highlight the need to increase productivity and total production through the interventions of improved infrastructure, market-efficient technology and the management of pests and diseases (e.g. Fleming and Kanappiran, 1999; Simbiken, 2004; World Bank, 2014). As an increasing body of work has revealed, market efficiency and technology are not the only constraints on smallholder productivity (e.g. Curry, 1999; Koczberski, 2007). Smallholder farmers have competing claims on their time, ranging from tending alternative crops to meeting socio-cultural obligations (Lummani, 2007; Collett, 1992). Which goals take priority in a farmer's household is based on individual circumstances that are difficult to predict. However, as Curry (1999; see also Connell, 1997) indicates, at times, PNG farmers prioritise their social goals and obligations over cash income, depending on their individual household circumstances.

The coffee industry, for years, has tried to convince farmers to invest in resources for their coffee gardens, to raise productivity and production using different approaches, such as encouraging co-operative groups, coffee rehabilitation and freight surety[3] programmes to facilitate market access. These efforts have not achieved their intended outcome, which is to increase productivity. After examining the literature mentioned above, there are two main farming inputs about which households constantly make decisions, and which determine their productivity: land and labour.

There is little doubt that the traditional lifestyle of Papua New Guineans is changing (Kalinoe and Kiris, 2010). Most indigenous societies around the world have experienced, or are experiencing, these changes (Anderson, 1977). However, it appears that the rate of change in PNG is accelerating with the mining boom and the rapid and widespread adoption of social media through mobile phones (Suwamaru, 2014; Watson, 2011, 2012, 2013). As stated by Banks (2013) "within their lifetime, highlands communities have gone from no European contact to having a billion-dollar gold mine and LNG gas on their door step. The transformation and rate of change in that society is incredible."

PNG's rural population is under immense pressure to engage in the modern cash economy to complement, or even transform, their subsistence way of life. They need cash for household medical treatment, to educate their children and to participate in the new opportunities present in the modern economy (Kalinoe and Kiris, 2010). More rural households are engaging in cash crop production, altering traditional farming practices and the rules governing the exchange and ownership of resources, as they strive to meet their livelihood needs. The socio-economic priorities of rural households are not the same as they were ten years ago: now they want cash for phone credits, and for fuel to run their generators so that they can watch rugby on television. The coffee industry's view of rural farmers is out-of-date and, for a long time, the industry has misunderstood the modern context of farming in PNG and has associated the economic importance of labour solely with the production of coffee. Population growth and pressure on land to generate cash is pushing a lot of rural people into cash crop farming because it is the only way for them to generate an income. This is quickly changing the landscape of land ownership, land accessibility and labour mobilisation (Collett, 1992).

2.7 Land use changes and traditional land tenure

Land use patterns have changed from temporary and short-term use to longer-term use and, in some cases, to permanent and exclusive use of land (Grossman, 1984; Kalinoe and Kiris, 2010; Yala, 2010). Ownership of land has become more individualistic and less clan-orientated (Grossman, 1984). The Western concept of land ownership is radically different from that understood by traditional landowners in PNG. In the Western sense, ownership of land implies exclusive enjoyment of all the real economic rights, privileges and pleasures associated with ownership (Young,

1988). From that perspective, many arguments have been put forward to identify and predict future developments in PNG in regard to land tenure, and to develop the necessary judicial apparatus that defines the complexity of land tenure systems in PNG (Howlett, 1973, 1980; Gerritsen, 1981; Stewart, 1992; Laukau, 1994, 1997, 1995; Dixon, 2007; Lund, 2004; Altman *et al*., 2005; Bradfield, 2005; Fingleton, 2005; Weiner and Glaskin, 2007)

Collett (1992) claimed that the nature of land tenure in the Highlands of PNG is a constraint on agrarian transition. Collett further stated that land tenure is a barrier to capital and is the most commonly cited reason for blockage of the transition to capitalist production within the agricultural sector (see Section 2.7.2). Villagers at the time of Collett's study were beginning to understand the nature of perennial crops and their possible impact on land use: that is, land would be removed from the pool of communal land for long periods (Fitzpatrick, 1980; Kalinoe and Kiris, 2010). Collett (1992) also maintained that cash cropping interacted with customary land tenure to change the way in which land tenure operated. Under the traditional tenure pattern based on shifting cultivation, labour - not land - was the critical factor of production. However, as Chapter 6 reveals, land is becoming a critical aspect of cash crop production. Chapter 6 illustrates the dilemma that many smallholder households face when making land use decisions.

The introduction of coffee has intensified competition for land in the Highlands (Overfield, 1998) and an increased population has exacerbated this competition. Land management is becoming more important as the population grows and new demands are placed on land (See Kalinoe and Kiris, 2010[4] for a more detailed discussion on some of the main issues surrounding changes in land use).

2.7.1 Land access and inheritance of land rights

Since the introduction of coffee, access to land is becoming a serious matter as it now deviates from traditional principles of land tenure. As stated by Hide (1981), inheritance of land did occur in pre-contact societies, but its relevance has been intensified in more recent times because of commodity production. Patrilineal principles of land tenure operate in the Highlands and, when coffee was introduced, the crop and its income became associated with men because it was grown on a

man's land and was planted by men. Land access has been limited to only the immediate family, and coffee as a perennial crop has been used to sustain the hereditary land tenure system (Howlett, 1973; Fitzpatrick, 1980). However, there is past evidence of redistribution of land within the clan other than through direct patrilineal inheritance of land rights or by virtue of membership of a land-holding group. For example, Hide (1981) found that 29% of the area planted with coffee, in his sample in the Western Highlands and Simbu provinces, had been planted on land not inherited from the grower's father. Furthermore, several studies in the Highlands have shown the manipulation of land by *bigmen*[5] to claim exclusive rights to large parcels of customary land for the production of coffee (see Fingleton 1985; Fitzpatrick, 1980; Crocombe, 1971; Shand and Straatmans, 1974). However, as will be further discussed in Chapter 6, the manipulation of customary land by *bigmen* is no longer widespread.

2.7.2 Land commoditisation by smallholder farmers

Rowley (1965) claims that, prior to European contact, there was no concept of individual land ownership or land being seen as a commodity. Land was sacred and it was taboo to obtain it in the same manner as exchanging gifts, such as pigs and shells (Kaitilla, 1992; Schwimmer, 1973). Within the corporate social groups, the clans, sub-clans or families enjoyed short-term individual proprietary rights to particular pieces of land within the tribal territory (Young, 1988; Hutchins, 1980). According to Du Toit (1975), Akuna people of the Arona Valley in EHP had three classifications of their customary land: (1) land around the village, (2) fallow gardens; and (3) the true bush. Private ownership was applied only to land surrounding villages. The claimed land was fenced and referred to by the family name of the owners (Du Toit, 1975; Schwimmer, 1973; Hogbin, 1978; Josephides, 1985; Zorn, 1992). The other two categories of land were referred to by clan names. The ownership of gardening land area was not permanent and another clan member could take it over if gardens were no longer fenced or were abandoned. However, property "rights over trees in abandoned gardens remained with previous owners" (Du Toit, 1975, p. 92). It is clear from Du Toit's description that traditional land-use practices supported and encouraged the individualisation of land tenure among clan members as long as they continued to use it. This means that each family had the right to use the land belonging to its clan, and these rights lasted while they actively maintained the area.

Now, fundamental changes in the system of ownership of customary land are occurring. It is argued that commoditisation of land started in the Highlands in the 1950s, when land was appropriated for plantation scale production of coffee (Stewart, 1992). With the decline of the coffee plantation sector in recent years, land that was once alienated for the development of plantations has been taken back by local customary land owners. Typically, the land with coffee crops is subdivided among customary landowners who then decide what to do with the land. Some of them continue with producing coffee, others replant it with other crops or rent the coffee blocks to other people in order to earn the rental fees. For example, Kaitilla (1995) and MacWilliams (1988) cited cases of the sale of customary land to other non-clan members and pointed out that such sales are commodity transactions. However, as Collett (1992) reported around the same time, such transactions were not generally common practice in the Highlands, especially when compared with the current practice of traditional landowners pressing persistently for monetary compensation in return for granting use rights to their land. As pressure increases to 'rent' land and as subsistence dependence is reduced by a shift toward a market (cash) economy, the survey and registration of customary lands could eventually lead to the individualization of land, under private individual ownership. These trends are explored further in Chapter 6.

Capitalism brings its own market relations in production and distribution which, typically, operate beyond village or community structures. The introduction of coffee to the Highlands intensified the competition for land, partly because it was another land-based activity competing with food production. However, as Grossman (1984) stated, this change did not increase women's access to land. Similarly, Collett (1992) pointed out that women have very limited access to land to generate cash income to meet their cash needs. However, this study has established otherwise, as investigated in Chapters 6 and 7.

2.8 Labour

The term 'labour', in a market economy, is defined as the use of skills to produce goods and services in exchange for cash. Most of the labour in rural PNG is used to produce food for home-consumption, indigenous exchange and, now, increasingly,

market production. Labour did not have a cash attachment in PNG until the mid-nineteenth century. Traditionally, the production of goods and services was a process built on social and kinship relationships. In this reality, people maintained their relationships by fulfilling social obligations or by adhering to culturally prescribed principles, such as reciprocity and gift exchange (Lummani, 2007). These principles were part of the dynamic reality of smallholder life, which, in one way or another, influenced their choices because their economic activities were culturally-embedded (LiPuma, 1999, 192-213).

However, labour began to be commoditised when coffee was introduced into the Highlands, (see Chapters 6 and 7). Shand and Straatmans (1974) found no constraints relating to availability of family labour for cash crop production. This is not surprising, given the small size of coffee holdings during that period, compared with recent studies that show the expansion of coffee and its associated labour constraints (Collett, 1992).

2.8.1 Family labour

Family labour plays a significant role in smallholder coffee production (Hide 1981; Sexton, 1986; Collett, 1992; Overfield, 1998). Collett (1992) stated that families with large coffee holdings[6] experience competition for labour, especially during the peak harvesting period when family labour is also involved in food production. Many smallholder coffee gardens are not fully harvested and smallholder coffee production would increase if a full harvest could be completed. Theories explaining this failure have encompassed low prices and poor returns for labour, competing household activities (food production and wage labour) and labour constraints (Collett, 1992; Lummani, 2007). However, as will be discussed in Chapters 6 and 7, there is evidence that households are becoming more individual units of production, which is limiting their resources drawn from outside their households.

2.8.2 Gender roles in labour

The introduction of cash crops such as coffee has resulted in a shift in the roles of men and women in rural PNG. Sexton (1986) put forward the view that two major occurrences that substantially influenced the gender division of labour in the Highlands were the penetration of market relations and the spread of coffee among

rural villages. Collett's (1992) study found that women in households with large coffee gardens maintained the same level of labour time in food production as they did before coffee was introduced. However, men began to spend less time in food production and more on coffee production. Collett also commented that, for households with small coffee holdings, both males and females spent about the same amount of time in food production and coffee production. However, he also argued that women tended to work principally on food production, regardless of the size of family holdings of coffee. This suggests that the adoption of commodity production in the Highlands, and the consequent changes in traditional structures, has not only been an important factor heightening social differentiation but also gender inequalities (see, also, Overfield, 1998). Collett's (1992) earlier research suggests that labour constraints were, as would be expected, most critical in households owning large coffee holdings, and that gender-based inequalities in labour allocation varied with relative reliance on subsistence production. Collett (1992) did not mention household labour for food crop production for marketing purposes, although it was around this period when some farmers began planting relatively large areas of pineapple for marketing (Chapter 7).

The traditional patriarchal culture of the Highlands exacerbates gender inequalities (Overfield, 1998). For women, access to land is through marriage and, in return, they provide food for household requirements, provide labour (often unpaid) on 'male' coffee plantings, and complete a large range of household tasks. It is, perhaps, their access to the most basic productive asset, land, which is crucial in determining the position of women; a factor that has been noted in many other studies, particularly in Africa (e.g. Mackenzie 1990; 1993), and is particularly the case in PNG Highlands society. Overfield (1995) stated that allocation mechanisms reflect the nature of society and the duality of its social relations, whereby men control resources of economic value, such as coffee, but the mechanisms also are critically dictated by the system of patriarchy itself, which equates to land ownership by men. The first important point is that the system of patriarchy is all-pervasive; it is the only phenomenon that can adequately explain the much longer working hours of women. However, this does not tell the whole story; much of PNG rural society has changed since the population embraced market relations. Overfield (1998) reported that rural women in coffee-producing areas received lower returns for their labour and had

greater overall work burdens than men. Women had greater responsibility for both subsistence production and coffee production. Coffee production, particularly at harvest time, was influenced by women's reluctance to give their labour because they were not remunerated adequately. Households faced a female labour constraint but, at the same time, there was male underemployment, apparently, even during the peak coffee harvesting periods. Overfield's research does not fully explain why underemployed males failed to respond to such a significant price increase despite their control of coffee incomes. This will be further explored in Chapter 6.

2.9 Hired labour

Collett (1992) found that there was no clear relationship between the use of hired labour and the size of coffee holdings. Other factors that influenced the hiring of labour included family size, the availability of wage labour, the availability of unpaid or reciprocal labour, garden yields, coffee prices, wage rates and the availability of other income sources. Anderson (1977) reported that 33% of his smallholder sample used hired labour, which is higher than the 25% reported in Collett's study. Anderson's (1977) survey in the late 1970s found that even those coffee growers with small coffee gardens hired (33%) seasonal labour and that the practice of hiring labour was inversely related to family size. Collett's survey of 60 households in Bena District in 1998, at a time of very low coffee prices, found that 25% of households hired labour, mainly for coffee harvesting. Collett's study suggested that smallholders were less likely to employ labour in the late 1990s than in the time of Anderson's survey. This may have been due to the increasing cost of labour relative to the value of coffee, which deterred smallholders from hiring labour. Overfield neglected to discuss the hiring of labour during the coffee flush[7]. More recently, Inu (2007c) in a sample of 500 smallholders in the three major coffee growing provinces found that 38% of households hired labour for post-harvest processing.

Collett (1992) considered that labour constraints during the coffee flush period were a major factor limiting coffee production and the size of smallholder coffee gardens. Based on studies in the late 1980s, smallholders were predominantly reliant on family labour for the harvest. This was at a time of very low coffee prices. Owners of large coffee gardens did not always have the labour for a full harvest. Collett suggested that the hiring of labour must be related to coffee prices. Presumably there

is greater reliance on unpaid family labour when prices are low. As a result of low prices and limited labour, not all coffee will be harvested. This would reflect both a poor return for labour in times of low prices, as well as the shortage of family labour to harvest large gardens. Previously, people who provided labour in the villages were migrants from other villages or were settlers working in nearby plantations. However, evidence suggests that extended family members who previously provided labour under reciprocal labour arrangements became hired labour. It is quite possible that this reflects the commoditisation of labour in rural villages that were engaged more strongly in the market economy. This idea will be explored further in Chapters 6 and 7.

2.10 Existing gaps in the literature

This study points out some of the changes that have been happening in regard to the livelihoods of coffee farmers in Sogomi and Safanaga, in the Ungai Bena District, over the past two decades. The research from this study will build on the studies carried out by Collett (1992) and Overfield (1998) to assess changes through time in Bena, and the Highlands of PNG more generally. Since Collett's and Overfield's studies, no detailed village-based research has been undertaken into coffee smallholder livelihoods. However, as indicated in this chapter, PNG has experienced considerable economic and social change over the past 20 to 30 years. Thus, this thesis aims to fill the gap in our knowledge of how coffee smallholders are operating within the contemporary context, where large-scale commercial food production is common, land pressures are intense and socio-cultural values and gender roles are changing rapidly. Coffee smallholder farmers with good access to markets are diversifying into large-scale commercial production of pineapple and broccoli. The study also examines changing socio-cultural values which were not reported in previous studies by Collett (1992) and Overfield (1995) and other recent studies on developmental changes at the village level (e.g. Lakau, 1997; Kalinoe and Kiris, 2010; Brouwer *et al*., 1998; Eves, 2012; Hanson, 2012; Watson, 2011).

Collett (1992) reported that women in Bena worked small food crop gardens, mainly for household consumption. His study made no reference to large-scale commercial production of food crops. Collett also reported that labour, not land, was the critical factor of production. However, at the time of his data collection (1988/1989) farm

practices, based on shifting cultivation, were already changing to a more permanent form of agriculture, with land becoming a critical factor of production as population pressures and land shortages began to emerge. These factors will be investigated further in Chapters 6 and 7. His study mentioned individualisation of land tenure, which will be explored in detail (Chapter 6) to show how critical changes in land use are associated with changes in land tenure. Overfield's (1995) study of gender relations in coffee production did not discuss how changing social relations were affecting labour decisions. He mentioned that the allocation mechanism, which reflects the duality of social relations and resources, operates in response to market prices and that the opportunities these express are critically dictated by the system of patriarchy. This thesis will explore changes in gender roles, male and female attitudes, and practices in the diversification of cash crops beyond the traditional concept of coffee as a male crop. The thesis also will explore women's bargaining position in relation to the increasingly commercial production of pineapple and broccoli compared with the weak bargaining power that Overfield reported for women in terms of labour allocation in regard to coffee.

2.11 Conclusion

This chapter has reviewed some of the key literature on Etzoni's socio-economic framework and has assessed its relevance to the changes occurring at the village level in rural PNG. The perspective adopted in this study is that the economy is embedded in society, polity and culture, and is not a self-contained system. Several theories have been discussed, to shed light on the socio-economic realities of coffee farmers, such as social embeddedness and the moral economy, which acknowledge that both social and economic factors are closely interwoven in the situation of PNG coffee farmers.

The next chapter discusses the global coffee economy and PNG's position within it. The chapter shows that, while coffee is driven by a well-developed and complicated marketing system, the strategies applied by smallholders in producing countries like PNG are mostly semi-subsistence oriented and are aligned to supporting household cash needs and livelihoods.

CHAPTER THREE

THE WORLD COFFEE ECONOMY

3.1 Introduction

This chapter provides an overview of global coffee production and its impact on the producing countries. Firstly, the chapter provides an historical account of the spread and development of coffee globally. This is followed by a brief discussion of the position of the PNG coffee industry among other agricultural commodities and its importance to the national economy of PNG.

Coffee is the second most valuable commodity exported by developing countries. Coffee supports the economies of more than fifty producing countries and garners an average of $55 billion in global sales (Talbot, 1997; ICO, n.d.; FAO, 2015; UNCTAD, 2015). While coffee consumption is maintaining its popularity, most of the producing countries are struggling to maintain smallholder coffee productivity. Smallholder farmers are affected by the perilous nature of the world coffee market and respond to price changes according to their particular circumstances, which may vary across the producing countries. Diverse farming systems and socio-economic factors also pose major challenges to farmers when attempting to improve their production, as noted by Giovannucci *et al*., (2002):

> Over the past year, as the stories of deprivation, farm abandonment, and even death among desperate coffee producers affect everyone in the coffee industry, there is an increasing need to understand what is happening (p.1).

Worldwide, about 20 to 25 million households, mostly smallholder farmers in developing nations, produce and sell coffee (Lewin *et al*., 2007). Some of these countries are facing considerable difficulties because of the dramatic decline in the price of coffee in real terms. Since 1970, the average annual coffee price decline has been by 3% for Arabica coffee and 5% for Robusta. Although coffee income is usually a vehicle by which to reduce rural poverty, when coffee prices decline it can produce negative results. For example, in Nicaragua, some rural households whose only income source was coffee were severely affected when the price of coffee declined between 1998 and 2000: poverty rates increased by more than 2% among

those farmers who remained in the coffee sector. In contrast, during the same period, poverty rates among rural households as a whole declined by more than 6%. A similar picture emerges for primary school enrolment rates, which fell by 5% for households that stayed in the coffee sector but increased by 10% among all rural households in Nicaragua (Lewin *et al.,* 2007). Nicaragua was not an isolated case: such are some of the realities of coffee farmers around the world. The instability of commodity markets such as coffee poses risks to those whose livelihoods depend on it. The PNG coffee industry shares some of the concerns of other developing countries regarding the need to raise smallholder productivity, given its importance as a source of export revenue, rural employment and income for reducing poverty. Similar to many developing countries, PNG also faces challenges relating to the sustainability of coffee productivity, improvement of tree stock, provision of rural infrastructure and creation of economic incentives for growers to plant more coffee (ICO n.d.).

3.2 The origins of coffee

From its humble beginnings in Africa, coffee cultivation travelled east and west, eventually forming a belt around the world. Coffee growing and drinking originated in the Ethiopian province of Kaffa. The coffee was brought from Sudan to Yemen through the trading port of Mocha. Coffee was known to be cultivated in Yemen in the fifteenth century. The Arabs fell in love with coffee and imposed a ban on the export of fertile coffee beans to prevent other countries growing it. However, the Dutch were determined to have the much-loved drink and brought a coffee plant back to the Netherlands.

The first coffee house was opened in Mecca and then quickly spread throughout the Arab world. The coffee houses were social hubs at that time, where gossip was exchanged, chess was played and music was enjoyed over a cup of coffee. Soon, coffee houses became comfortable places to discuss political agendas and were later suppressed by the state authorities in some parts of the Arab world. By the late 1600s, the Dutch were growing coffee at Malabar in India and, later, established coffee holdings in Indonesia. Soon the Dutch colonies were supplying coffee to Europe and the first coffee was brought to the Venetian region in 1615, about the same period when hot chocolate and tea were first introduced to Europe, and the first

reference to coffee in North America was noted in 1668. In 1683, the first coffee house was opened in Venice. Between 1718 and the 1720s, coffee reached the shores of Surinam, French Guyana and Brazil (see in ICO, n.d.; Ukers, n.d.).

3.3 The global coffee economy

The introduction of coffee farming into Africa, Latin America and South East Asia followed colonialism (Figure 3.1). The colonial authorities enforced capitalism through the establishment of coffee estates and plantations and, with an abundant supply of local labour, the coffee industries in the colonies flourished. The impact of coffee on the major coffee-producing countries cannot be denied. As the largest global coffee producer, coffee in the Brazilian economy was much stronger than that of even gold (The Brazil Business: Brazil Coffee Industry, 2012). In Vietnam, coffee is second only to rice production, with an estimated 1.13 million tonnes of coffee exported in 2012 (Reuters, 2012). In Colombia, coffee drives the nation's development; it was instrumental in fostering much of the country's industrial development and many of its important current industries were funded by coffee earnings (World Bank Report No. 24600; Colombian Coffee Growers Federation 2013). Coffee has undeniably played an important part in the economic growth of Indonesia, the fourth largest coffee producer. Similarly, coffee is an important agricultural crop for countries in Africa, including Ethiopia, Ghana, Kenya, Tanzania and Uganda. These countries have similar environmental and economic conditions to PNG. In most of these African countries, coffee is produced by smallholder farmers, and it generates more than 50% of their foreign exchange revenue.

3.3.1 Main producing countries

In 2010, it was estimated that 26 million people in 52 countries were employed in the coffee sector, with 97% of total global production being from the exporting members of the International Coffee Organization[1] (ICO). The main producing countries in the last five years were Brazil, Vietnam, Indonesia, Colombia and Ethiopia. Table 3.1 provides a brief description of the five major coffee-producing countries. The production rates of these countries have a significant impact on global coffee markets and coffee prices. Therefore, it is important to understand what some of these countries are doing in terms of coffee research and development. Having a wider understanding of the production decisions of the major producing countries will

assist PNG authorities to make informed decisions that guide policy locally and to address possible market risks that will affect local coffee farmers.

3.3.2 Coffee demand and consumption

World coffee consumption has increased at an average annual growth rate of 1.9% over the last 50 years, from 57.9 million bags in 1964 to 142 million bags in 2012. This annual growth rate has accelerated since 1990, to 2.1%, and to 2.4% in 2000. Traditional importing markets, such as Japan, the European Union and the USA, have historically accounted for the majority of global coffee demand. However, in recent years, demand in coffee-producing countries and emerging markets has expanded significantly, providing much of the impetus behind recent demand growth. Global coffee consumption has displayed noticeable regional differences.

Emerging markets are developing in countries which, traditionally, were not noted for coffee-drinking, in Asia, Eastern Europe and the former Soviet Union. This represents a 2.3% average annual growth rate in global coffee consumption since 2011 (Figure 3.2). Most of the emerging markets primarily consume the inexpensive, soluble[2] coffees, though tastes are evolving towards improved quality and novel characteristics, such as pre-mixed cappuccino. Soluble coffee products are an important key to developing these traditionally tea-drinking markets because most consumers are unfamiliar with coffee-brewing methods and the associated paraphernalia. Coffee consumption in North America and Japan is growing slowly. Northern European consumption, particularly in Germany, is stagnant, but in southern Europe there are some increases. It seems that in southern Europe, the differentiated product market is growing the fastest. The differentiated product market requires that producers distinguish their products by origin, processes or exceptional characteristics, such as superior taste or minimal defects. These can be traded through more lucrative avenues than the typical industrial grades that flow in the undifferentiated commodity channels and include: Geographic Indications of Origin (appellations); gourmet and specialty; organic; Fair Trade; eco-friendly; shade grown; and/or other certified coffees (Lewin *et al*., 2007). The popularity of coffee, and its addictive nature, means that demand can grow rapidly when it is introduced to new markets. The consumption demand creates the pressure to expand current production and to sustain the supply chain. However, it is the farmers who are drawn

into this demanding world of coffee and must cope with sustaining the resources of the coffee economy while also dealing with internal pressures from their respective authorities.

Table 3.1. The top five coffee bean exporting countries in 2012.

Country	**2012 Production in Bags (60 kg)**	**Production decisions**
1. Brazil	28,333,000	Brazil became the world's largest producer in 1830, and it exported some 600,000 bags. It produced a bumper crop in 1998/1999 of about 38 million bags with an estimated 4.4 billion trees in production. Most of the coffee is planted in highly productive areas of the Cerrado region (Talbot, 1997; Giovannucci *et al*., 2002).
2. Vietnam	25,475,000	Coffee was introduced to Vietnam in 1857 by the French. The height of coffee production occurred in the early twentieth century as small-scale production shifted towards plantations. The dramatic increase of 1,400% in a decade (1990-2000) appeared to have surprised the industry. While Vietnam's meteoric rise to the position of the world's second largest producer, with 14.7 million bags in the 2000/2001 year, makes it the main contributor to over-production, it is by no means the only one when compared with Brazil. For example, Brazil has added more to the global supply over the last five years than Vietnam. In 25 years, the total coffee area in Vietnam reached 500,000 ha, mainly under Robusta coffee, with annual production of over 700,000 tonnes (Nhan, 2001; Giovannucci *et al*., 2002; Minh, 2015).
3. Indonesia	10,614,000	Indonesia was the first country outside of Arabia and Ethiopia where coffee was widely cultivated. By the mid-1870s the Dutch East Indies company expanded Arabica coffee growing in Sumatra, Bali, Sulawesi and Timor. In Sulawesi, the coffee was first planted in 1850. In the highlands of North Sumatra, coffee was first grown near Lake Toba, in 1888, followed by Gayo Highland (Aceh) near Lake Laut Tawar, in 1924. Today, more than 90% of Indonesia's coffee is grown by smallholders on farms averaging 1 ha or less. Much of the production is organic, and there are 46 certified companies exporting certified coffee of 47,000 tonnes per year (Wahyudi and Jati, 2011; Indonesia Investment, n.d.).

4. Colombia	7,170,000	Colombia, where coffee had been introduced by the Jesuits as early as 1723, is the world's fourth largest producer of coffee and by far the largest single producer of washed Arabica coffee. Since serious commercial production began there in the 1870s, it has slowly developed a sterling reputation for consistency and good business practices. Coffee has shaped Colombia's fortunes for many decades. Its value at one point reached 80% of Colombia's total export value. As a result of its plant renovation programme that seeks to increase productivity and plant health in coffee, production has exceeded 10.3 million bags over the past twelve months. In 2013, 35% of exports were sold in higher value segments, while more than 164,000 coffee growers are tied to a sustainability protocol, such as 4C, UTZ, Rainforest Alliance, Fair Trade (Flo) or C.A.F.E. Practices. It was projected that 50% of coffee exports by the Colombian Coffee Growers Federation in 2013 would be for specialty markets whereas, in 2006, that proportion stood at only 19% (World Bank Report No. 24600; Colombian Coffee Growers Federation, 2013).
5. Ethiopia	4,700,000	Coffee production in Ethiopia is a longstanding tradition. Ethiopia is the birthplace of Arabica coffee and it produces mostly that variety. Ethiopia itself accounts for around 3% of the global coffee market. Coffee is important to the economy of Ethiopia; around 60% of foreign income comes from coffee, with an estimated 15 million of the population relying on some aspect of coffee production for their livelihoods. In 2006, coffee exports brought in $350 million, equivalent to 34% of that year's total exports. Ethiopia is the largest producer of coffee in Sub-Saharan Africa and is the fifth largest coffee producer in the world, contributing about 7-10% of total world coffee production. Coffee has economic and environmental, as well as social, significance to the country (WIPO, n.d.).

3.3.3. Market prices for coffee

Price levels during the regulated market period from 1965 to 1989 were relatively high, since both upward and downward trends were corrected through the application of export quotas. This system of export quotas was in effect from 1963 to 1972. The market then was unregulated, until 1980, because exporting and importing countries failed to agree on a renewal of the quota system. The international coffee agreement (ICA) was once again in effect until 1989 (Talbot, 1997; ICO n.d.). The free market period that began in 1990 had two sub-periods of markedly low price levels: 1989 to 1993 and 1999 to 2004. The latter period was the longest period of low prices ever recorded, known as the coffee crisis, with severe negative consequences on the coffee economies of exporting countries. Prices recovered strongly after 2004, reaching a 34-year high in mid-2011. However, there has subsequently been a severe

deterioration in prices while costs of coffee production, particularly fertilizers and labour, continue to rise (Talbot, 1997; ICO, n.d.).

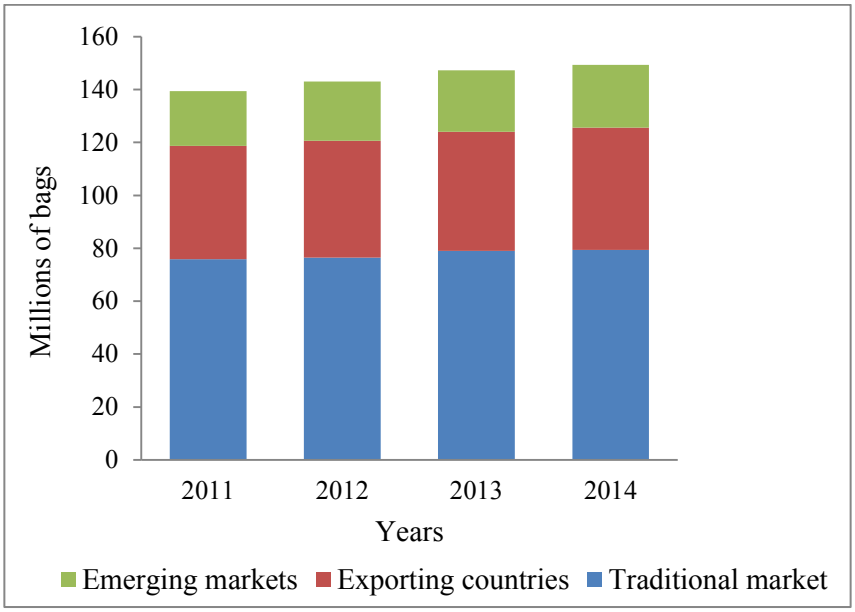


Figure 3.1. Growth in global coffee markets in the last four years.

3.4 Overview of PNG commercial agriculture and coffee production

The driving force behind commercial agriculture in PNG has always been its export crops. At present, more than 90% of the value of agricultural exports comes from four crops: coffee, cocoa, palm oil, and coconuts (copra). Table 3.2 shows the production of different commodities from 2009 to 2013. Other export commodities include cardamom, chillies and pyrethrum. There is considerable potential for the expansion and development of other crops for export, including the export of fresh fruit and vegetables, as well as processed products.

Table 3.2. PNG agricultural exports classified by tonnage.

Commodity	2009	2010	2011	2012	2013
Palm Oil	428,400	453,300	559,100	483,000	487,200
Coffee	62,200	55,900	73,500	55,500	48,500
Cocoa	48,100	27,100	40,900	34,500	25,100
Copra Oil	44,800	44,800	45,200	22,100	13,500
Copra	15,200	16,400	43,700	32,000	15,800
Rubber	5,400	4,600	4,200	4,600	3,400
Tea	5,600	4,600	4,000	3,800	2,900

(Source: Bank of PNG Quarterly Economic Bulletin December 2009, 2010, 2011, 2012, 2013)

The PNG agricultural sector accounts for approximately 25% of the nation's GDP. Beyond PNG's urban areas, agriculture remains the principal economic activity and provides the main livelihood for most of the rural population. Indeed, 85% of the population rely directly on land for farming to provide their basic needs, mostly in the form of subsistence agriculture. The rapid modernisation of agriculture, particularly the farming of export cash crops, has transformed many rural communities and facilitated the adoption of modern lifestyles. There are approximately 600 plantations in PNG that produce coffee, copra, rubber, tea and palm oil. With its fertile soils and favourable climate, the highlands of PNG are ideal for cultivating a wide variety of cash crops. Production of cash crops was previously centred upon plantations but significant production now comes from the smallholder sector.

During the 1970s, there was rapid growth in the cash economy, largely in response to the development of primary export industries. During the 1980s this growth continued at a steady pace, reflecting increased competition and some lower commodity prices. The agricultural sector was largely static in the early 1990s and has declined over the last few decades. A significant factor in this reversal was the 1997 drought caused by the El Nino weather pattern. The drought wreaked havoc on PNG's coffee, cocoa and coconut production, which are the mainstays of the agricultural economy and a major source of export earnings. Coffee production was slashed in half in 1997 and, with the low world prices that followed in 1999, productivity has not yet fully recovered. Other reasons for the decline in the sector can be traced to the localisation of coffee plantations, the politicisation of the state agricultural development boards, land tenure disputes among the local and competing landowner groups, poor infrastructure and poor market access.

Rural dwellers form the largest group in agricultural activity, with subsistence farming being the main activity. Food for household consumption is only part of the total production in subsistence farming: other activities include sourcing housing materials, ceremonial goods, fuel and animal feed. At present, most of PNG's small-scale agricultural production is consumed by the domestic market. The main goods produced include a wide variety of fruits and vegetables, meat and eggs, tobacco and spices. The continued development of small-scale commercial agriculture is crucial

to any expansion of employment. Twenty percent of the wage-earning households are in the non-village rural sector (Benediktsson, 1998)

3.5 The PNG coffee industry

There are approximately 64,000 hectares of coffee trees across 18 of PNG's 22 provinces, mostly managed by smallholders. It is estimated that 2.5 million Papua New Guineans rely on coffee as their main source of income. The Coffee Industry Corporation provides statutory oversight of the industry, as well as research and grower support. It is also empowered to buy and sell coffee. PNG produces roughly one million bags of coffee green beans annually (with annual world production currently about 125 million bags) (Business Advantage, 2014). PNG produces both Arabica and Robusta coffee with Arabica coffee production accounting for 95% of total production. Arabica coffee is grown inland, at high altitudes. Robusta is grown in the lowlands, mostly in the Sepik region of the country, with new growth areas in the provinces of Milne Bay and East New Britain. The two main forms of coffee exported from PNG are 'green bean' and 'roasted and ground', the latter accounting for only 1% of coffee exports. There are 14 registered exporters, of which 12 actively export coffee green bean and five export roasted coffee. The export companies are classified into five main categories according to the nature of the export business they perform:

1) *Specialist exporter*

   These companies are middlemen. They buy green bean from processors and sell to roasters overseas. Although their task is essentially to find a buyer and a seller, most exporters also are involved in processing and, therefore, adding value. The four specialist companies represent 36% of the exporters (CIC, 2013).

2) *Partly integrated exporters*

   The largest of these companies, such as Sigri and Highlands Arabica, are primarily involved in the export stage but have some processing facilities and also own, or have a share in, some plantations. The other companies are, to varying degrees, involved in processing and plantations (CIC, 2013).

3) Plantation-based exporters

These companies are plantation-based operations that are integrated right through to the point of export. While they are small in terms of the total volumes of coffee exported (7% of the total exports), they export around one third of the plantation crops (CIC, 2013).

4) Roast and ground Exporters

Roast exporters are still a very small part of the total PNG coffee trade, representing around 10 tonnes out of total exports of around 67,000 tonnes (CIC, 2013).

3.5.1 PNG coffee grades

Exported coffee beans are graded in descending quality as AA, A, X, PSC and Y grades. The first three grades are for quality plantation coffee, while the last two are smallholder coffee grades, with the top smallholder grade labelled 'Premium Smallholder Coffee' (PSC). However, recently, the country has introduced other export grades of coffee: those of certified organic and Fair Trade. Although the quantity is currently small, it is expected that, in the near future, export of these coffees will increase rapidly.

3.6 Domestic coffee production and export performance 2000-2013

Between 2000 and 2004, exports averaged 63,000 tonnes per annum. In 2005, due to the favourable international prices for coffee and the year being an 'on-year' in coffee growth, exports again increased to 72,000 tonnes but fell to 50,900 tonnes in 2006. The decline in export volume was due to an 'off-year' of production and was further compounded by the rehabilitation of some coffee tree stocks in the industry. In 2007, production exports returned to previous levels of 54,600 tonnes and increased to 67,000 tonnes in 2008.

In 2009, there was a decline of 7.2% in the export volume, to 62,200 tonnes. The decline was caused by further replanting activities in most plantations in the major coffee producing areas under the industry's rehabilitation programme. Additionally, the average export price of coffee was 4.7% lower, down from K7,764 to K7,400 per tonne, due to lower international prices and a decline in global demand. In 2010,

there was a further decline to 55,900 tonnes, mainly attributable, once again, to replanting activities (in most plantations in the major coffee producing areas) under the industry's rehabilitation programme, and the unfavourable dry weather conditions caused by the drought. In 2011, there was an increase of 31.5% from the 2010 figure, with a total export volume of 73,500 tonnes. The increase was due to favourable weather conditions and higher international prices, with the average export price being K12,618 per tonne. Revenue also increased by 35.4% from 2010. This was due to high global demand and the relatively low supply from Indonesia, the third largest coffee producer.

There was a 24.5% decline in production in 2012 to 55,500 tonnes at an average export price of K8622 per tonne, which was 32% less than the 2011 price. The decline in price was caused by the supply response to lower international prices. This low price was, once again, caused by higher production in Brazil and Honduras. In 2013, there was a further decline and the volume exported fell to 48,500 tonnes which was 12.6% less than 2012. The decline was due to a supply response to lower international prices and lower productivity from an ageing tree stock. The average price of K6,942 was due to favourable weather and high production in Brazil and other South American countries. Table 3.3 shows the coffee export volumes and earnings for PNG. The production figures show the volatility of export commodities.

Table 3.3. PNG coffee export volume and earnings from 2004 to 2013.

Year	Tonnes	Price (Kina/Tonne)	Total Earnings (PNG Kina)
2004	63,000	4,505	283,815,000
2005	72,100	6,533	471,029,300
2006	52,300	6,444	337,021,200
2007	54,600	7,480	408,408,000
2008	67,000	7,764	520,188,000
2009	62,000	7,400	458,800,000
2010	55,900	9,320	520,988,000
2011	73,500	12,618	927,423,000
2012	55,500	8,622	478,521,000
2013	48,500	6,942	336,687,000

(Source: Quarterly Economic Bulletin 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013)

3.6.1 Smallholder coffee cultivation

Marketing of coffee by smallholders is determined by the availability and cost of transport, as well as immediate household needs. Growers can sell their coffee as cherry, parchment or green beans. Cherries are either sold to buyers in the village or to factories and processors who have wet mills. Many smallholder producers who live in villages close to urban centres sell their cherries to factories or processors. This is especially common in provinces like Western Highlands. Parchment beans are sold by 95% of smallholder producers, particularly from the remotest parts of the country. Less than 1% of smallholders produce green bean. For very remote villages, the storage durability of coffee beans is their salvation. Thus, coffee is an attractive crop in remote villages where access to markets is variable or difficult. Farmers can store their coffee beans for up to three months, as per the standard quality time set by the PNG coffee industry. Some remote farmers store coffee for up to six months, depending on the availability and cost of transport. It is likely that coffee stored for longer periods would experience a drop in quality.

The main costs of smallholder production are labour and transport. However, it is meaningless to work out labour costs at the market rate or minimum wage rate because that type of labour accounts for less than 1% of total input costs. However, valuation of the cost can be based on the opportunity cost of labour or the return to the nearest economic activity, which would be food production for the smallholder. Overfield (1994, 1998) estimated this to be K2 per day. The estimated total production cost for smallholders, from farm to export, is estimated to be around K1,071 to K1,435 per tonne, which is 57% less than the cost for plantations (Bourke and Harwood 2009). Labour inputs are the largest cost element (55%), with grower costs accounting for 67% of the total. The lower smallholder costs of production, particularly the direct cash costs, should have a positive impact on their long-term sustainability (Bourke and Harwood 2009).

Table 3.4 shows a slight increase in smallholder production from the 1970s to the 1990s. However, the last three studies in Table 3.5 by Kufinale (1995) showed stagnation in plantation production and it was assumed by Bourke and Harwood (2009) that smallholder production would have the same outcome. Although there was expansion in the smallholder coffee area, it was not accompanied by the increase

in yields per hectare that might be anticipated with new plantings (Overfield, 1994). From 2006 to 2014, production averaged 951,000 bags annually (CIC, 2013). This average represents a modest decline from a ten-year average of 1,076,000. However, in 2011, production hit a record of 1.1 million bags (CIC, 2000, 2010, 2011). This record production was in response to the prevailing all-time high prices that enabled coffee from inaccessible areas to be brought to market because remote farmers could cover the high transport costs of air freight.

3.6.2 Market opportunities and future trends for PNG Coffee

Given the current standing of the conventional[3] coffee market and the potential to raise the quality of smallholder coffee from Y grade to at least PSC grade, there are opportunities for PNG smallholders to be competitive in differentiated[4] marketing. The main area for expansion of the PNG coffee industry is in differentiated marketing, and this provides an opportunity to improve PNG's competitiveness, as well as to improve income for its smallholders. This product differentiation is a growing global trend, and it provides a policy focus on quality rather than expansion of volume production. According to World Bank market experts, PNG is most likely to improve its position in higher value markets well beyond the current 5% of coffee exports that are differentiated (Giovannucci and Hunt, 2009).

Table 3.4. Average yields of smallholder Arabica Coffee through time (kg/GB/ha).

Survey year	**Average yield (kg/GB[5]/ha)**	**Location**	**Source**
Smallholder			
1973	750	6 Provinces	Munnull and Densley (c.1978)
1976	910	13 villages, EHP, Simbu and WHP	Anderson (1977)
1982	880	14 provinces	Hassall and Associates (1982)
1982	1,170	EHP, Simbu, WHP and Enga	Hassall and Associates (1982)
1987-1990	990	14 village plots, over three years, Kainantu area	Harding (1988)
1992-1993	1,090	Benabena District	Overfield (1994)

(Source: Bourke and Harwood, 2009, p. 311).

Table 3.5. Average yields of plantation Arabica Coffee through time (kg/GB/ha).

Survey year	Average yield (kg/GB/ha)	Location	Source
Plantation			
1975	1,680	6 provinces	Munnull and Densley (c.1978)
1982	1,580	49 plantations, EHP and WHP	QDPI (1987)
1983	2,340	50 plantations, EHP and WHP	QDPI (1987)
1989	1,550	12 plantations, EHP and WHP	Irog (1992)
1990	1,100	13 plantations, EHP and WHP	Irog (1992)
1992	1,050	20 plantations, EHP, WHP and Morobe	Kufinale (1995)
1993	1,400	20 plantations, EHP, WHP and Morobe	Kufinale (1995)
1994	1,400	20 plantations, EHP, WHP and Morobe	Kufinale (1995)
1995	1,180	16 plantations, EHP, WHP and Morobe	

(Source: Bourke and Harwood, 2009, p. 311).

Another prospective area of the coffee business where trade could be increased in scale is the manufacturing or roasting sector of the industry. While domestic sales and consumption are limited, the potential of international sales has not yet been fully tested. There is also an opportunity for partnerships in the plantation sector in PNG. The plantation sector had declined in the past because of a combination of low international prices and poor management, among other reasons. Currently, the Coffee Industry Corporation (CIC) is focused on revitalising this sector, which had previously propelled the country to the international coffee trade stage as a quality producer of superior plantation coffees. CIC is encouraging innovative business strategies in this sector that may be fostered through joint-venture partnerships that will commence with rehabilitation and financing.

3.7 Conclusion

The spread of coffee out of Africa involved Muslim traders, European explorers, Jesuit priests and entrepreneurs seeking personal gain. Coffee spread east and the west through the tropics, with its greatest productive capacity being between the Tropics of Capricorn and Cancer. Coffee contributes to economic and social development and impacts on the livelihoods of millions of people around the world.

The addictive nature of coffee led to millions of consumers and millions of producers, making it one of the few renewable commodities that is merchandised on a global scale and exported by developing countries. Although coffee came from Africa, it has become the most cultivated crop in South America, with an estimated four billion trees in Brazil alone, making its annual production weigh heavily on the global coffee market. Coffee became a vehicle of progress in many developing countries but its volatile price on global markets has negatively affected the economic security of some of the poorest communities whose livelihoods depend largely on the coffee trade.

On a global scale PNG's coffee industry is small. It ranks 13th among the 39 Arabica producing countries and exports only a small amount of Robusta coffee. Coffee is undoubtedly one of PNG's most important cash crops, primarily because it is dominated by smallholders and involves a third[6] of the population. A significant part of the total labour force[7] in PNG is involved in its production, processing and sale. Although, the PNG coffee industry faces many challenges in revitalising the industry, there are still opportunities that can be explored, such as the expanding speciality markets.

The next chapter provides the historical development of coffee and other crops in EHP. The chapter will look at some of the political and economic developments of the province that have shaped the behaviour, attitudes and socio-cultural practices of the people. It also shows how cash crops have been absorbed into people's livelihoods as the demands of the cash economy have increased through time.

CHAPTER FOUR

COFFEE: EASTERN HIGHLANDS AND BENA BENA

4.1 Introduction

This chapter provides an overview of the geographical and historical development of EHP, including its economy and the socio-cultural factors that influence the behaviour of coffee smallholders. The purpose of this brief overview is to show how cash crops have been adopted as an integral part of the livelihoods of rural communities, as the demands of the cash economy have increased through time. This chapter is divided into two parts: the first part gives an insight into provincial developments since the area was first explored by Europeans in the early 1930s; the second part examines the development of Ungai-Bena district and provides an overview of changing agricultural practices and livelihoods in the Sogomi and Safanaga villages.

4.2 The geography and history of Eastern Highlands Province

EHP is one of seven highland provinces in PNG. This province shares common administrative boundaries with Madang, Morobe, Gulf and Simbu Provinces. The provincial capital is Goroka, which is at an altitude of 1,400 metres above sea level (masl). The town is surrounded by clusters of villages of round huts, built low on the ground, among a landscape of rolling hills of *kunai (Imperata*) grassland in a valley that is walled by distant mountains. The province can be entered from Morobe Province in the south-east, via the national highway through Kassam Pass, and from Simbu Province in the north-west, through the Daulo Pass.

The climate of EHP is described as perpetual spring, with uniform temperatures of 23 to 27 degrees (Celsius) throughout the year (Eastern Highland 2008; World Weather, 2015). It has an annual rainfall of 1,800-2,800 mm, with the eastern part of the province usually experiencing moderate to long dry seasons. The wet season is from December to early April. At lower altitudes (1,500 metres or less), especially towards the areas that border the coastal provinces, there is very high rainfall and humidity, and lowland rainforest is found. The province is made up of rugged mountain terrain and wide valleys. Grasslands dominate the valleys and this is a

result of continuous burning and excessive use of the land for subsistence gardening (Hanson *et al.* 2001). Secondary forests and shrub regrowth dominate what were previously primary forest locations in most of the populated valleys of Bena and Asaro.

The province's highest peaks are Mt Tabletop in Obura Wonenara District and Mt Michael in Unggai-Bena District. Mt Michael is situated 3,750 metres above sea level while Mt Tabletop is at 3,686 metres. At higher altitudes, as in the Bismarck and Kratke ranges, the vegetation type is mountain rainforest dominated by beech forest and pandanus species. At much higher altitudes of over 3,000 metres, alpine grassland and moss forest are common vegetation types. The range of vegetation is very diverse, and heterogeneous in species composition, and is home to a wide range of fauna (Uyassi, 2004; Hanson *et al.,* 2001).

EHP has a rich and varied history formed by gold miners, Christian missionaries, a diverse collection of tribal groups and languages, and new introduced crops such as English potato, cabbage, broccoli and coffee. The highlands of PNG were one of the last frontiers to be explored by the western world. Some of the first encounters were filmed[1] and may be the first visual record of first contact between indigenous populations and the modern world (Connelly and Anderson, 1983).

The first Europeans to enter EHP were German Lutheran missionaries. In 1919 and 1920, the Lutheran missionary expedition entered the province through the Kratke range from Morobe Province. The missionaries were limited in their evangelism outreach due to the hostility of many different tribes in the area. Most of the tribes operated within defined areas and were reluctant to move beyond their traditional boundaries, which made it difficult for the missionaries to have a wider reach. In 1930, Micheal Leahy and Mick Dwyer arrived in upper Ramu after crossing the ranges into Bena and the Asaro Valley. An airstrip was built in Bena in 1932, to facilitate gold exploration in Bena. The presence of other European explorers facilitated the rapid spread of mission stations throughout EHP (Uyassi, 2004).

Michael and Danny Leahy (brothers) soon realised there were no gold deposits and moved west, passing through Goroka (Connolly and Anderson, 1987; Ashton, 1978; Willis, 1969). Goroka was one of the patrol posts. Administrators moved between

Kainantu and Bena, and Goroka and Asaro. In 1938, an airstrip was constructed at Goroka and a few administrative offices were created, such as the police station and the courts. However, the real development of Goroka into what it looks like today took place as part of an Allied Force Military strategy during World War II. An air field was built in 1943 for the American Fifth Air Squadron. The air field was built in seven days by a few different clans who owned the land, with additional labour recruited from Simbu. When the war ended in 1945, Goroka had its status upgraded from patrol post to post-war administration centre for the highlands region.

4.3 Political history of Eastern Highlands Province

Eastern Highlands was a subdivision of the Highland region prior to 1975. When PNG became independent in 1975, the subdivisions of the Eastern Highlands became the Eastern Highlands Province. The main governing legislation is the Organic Law on Provincial Governments and Local Level Governments (1995) and the Local Level Governments Administration Act (1997). The Minister of Provincial and Local Government Affairs has statutory responsibility over all matters relating to local government. The province is governed by a governor who is a member of the National Executive Council. The provincial administration consists of a provincial administrator and district administrators. EHP is divided into eight districts; each district is divided into local level government councils (LLG), each with its own ward council. The ward council is made up of villages (Uyassi, 2004).

There is evidence from this current study to show that the villagers have two sets of laws to guide their everyday lives. The western-style law, which is written and structured accordingly, is channelled through the national and provincial political structures and institutions mentioned above. The expected behaviour within these rules is taught in civil institutions like schools and churches. The colonial administration laid the foundations for these regulations from the 1930s until independence in 1975 and, today, village magistrates, police leaders and ward councillors are some of the people responsible for the general rule of law at village level (Uyassi, 2004).

The other set of rules are traditional values and codes of behaviour that are not written down, but which are passed down through the traditional political structures (tribal structure) of the villages. Most of these traditional values are passed on by village elders. Like many other Melanesian societies, tribal structures provide the core values and governance of village societies. Belonging to a tribe[2] forms part of one's identity and value system, and plays a significant role in influencing one's individual behaviour and the overall societal systems. These systems are guided by unwritten customary laws, traditions and practices that are learned, primarily, by example and through the oral teachings of tribal elders (men and women). In most EHP villages, social values and expectations are taught in *hausman*[3] or *hausmeri*[4] in the village. In *hausman*, males are taught the rituals associated with marriage, warfare and death. In *hausmeri*, females (upon reaching puberty) are taught how to behave as a woman, a wife and a mother within their household and society at large. They are taught the skills that will sustain them and their society (Whiteman, 1974; Narakobi, 1983; Uyassi, 2004; Poke, 2009).

The dilemma for most of the rural population is that the application of these two different sets of rules sometimes causes conflict. Such realities create new trends in behavioural patterns that have implications for both the modern, western governing system and the traditional values and way of life. The village leaders and ward council play an important role in negotiating through this state of affairs to achieve beneficial outcomes in both modern and traditional governance.

4.4 Population

EHP had an annual population growth rate of 2.6% from 2000 to 2011 and, in 2011, it had a total population of 579,825. EHP is the second most highly populated province in PNG (PNG National Statistics, 2015). Goroka is the smallest district, in terms of land area, but has the second highest district population (103,396) in EHP. The increase in population is also due to migration from other provinces because of its central location to both the lowland and highland provinces.

4.5 Agriculture in Eastern Highlands Province

4.5.1 Food production

Root crops, such as sweet potato (*Ipomea batatas*), taro *(Colocasia esculenta*[5] and *Xanthosoma sagittifolium*[6]), banana (*plantains*) and sugarcane (*Saccharum officinarum*), are traditionally planted in household gardens. Food crops are typically planted in a shifting cultivation system for about three years then fallowed for several years afterwards. However, in some areas, population pressures and land shortages mean that cropping periods are lengthening and fallow periods are shortening to the extent that the agricultural system is increasingly becoming more like a permanent agricultural system.

As in other parts of the highlands, the staple food crop in EHP is sweet potato. Every household in the village has a sweet potato garden. The crop is intensively planted in the northern valleys, moderately in the centre and less intensively in the south (Hanson e*t al.,* 2001). Usually, sweet potato is rotated with nitrogen-fixing crops like peanuts and winged beans. This practice is common in northern parts of the province, like Asaro, Goroka and Bena, where fallow periods are short - often less than a year. In the central area of the province, in the districts of Hanganofi and Kainantu, fallow periods are longer on average - often more than a year (due to reduced population pressures). However, in these districts, gardens near homes tend to be more intensively cultivated, with shorter fallow periods than gardens further away from the home. This is because of their close proximity to the house, meaning there is less distance to travel and easy access on rainy days. Further to the south, a variety of crops is grown due to the wide altitudinal range from 1,200 to 1,600 masl. Sweet potato is less intensively cultivated in the south because they are able to grow many other crops such as taro, yams and different varieties of banana.

EHP is also one of the four highland provinces that have at least half of their land areas utilised for agricultural activities. This land is used fairly intensively (Bourke and Harwood, 2009). Food crops are typically cultivated in mixed gardens. For example, cabbage, banana and taro are intercropped with cassava, and sometimes cassava is planted around the perimeters of gardens as a fence. Also, cabbages and bananas can be found planted next to, or within, coffee gardens. There is also

intensive cultivation of introduced varieties of sweet potato and vegetables like broccoli, carrots and peanuts.

4.5.2 Animal husbandry

Pig production is an important household activity. Pigs were central to many cultural events in the past and still are. Today, few households continue to maintain a large stock of pigs, except perhaps in some remote regions of the province. There have been introductions of other livestock, such as goats (Boyd, 1984; Whiteman, 1984; Strathern, 1987). Goats were introduced in the early 1960s by the Department of Primary Industry (DPI), and they have become very popular in villages where people belong to the Seventh Day Adventist Church (SDA) and are forbidden to consume pigs as part of their religious beliefs. Other reasons why villagers are increasingly looking after goats are:

1) There is demand for goats for socio-cultural events among communities that do not consume pork for religious reasons.
2) Goats cause less damage to food and coffee gardens than pigs. Pigs often cause conflicts in the villages due to the damage they cause to neighbouring gardens.

4.5.3 Traditional practices which influence the modern village economy

The importance of demonstrating group strength through warfare has declined while the capacity to accumulate wealth and maintain an exchange relationship has become more valued (Feil, 1987). In the Eastern Highlands of PNG, wealth accumulation was traditionally achieved through:

1) acquisition of land through successful tribal raids; and
2) men maintaining several wives who helped to raise large herds of pigs for exchange (Boyd, 1984; Whiteman, 1984). Women's labour was required to grow sweet potato to feed the pigs.

Eastern Highlands society was a warring society. A successful raid that resulted in a tribe being driven off its land was a success story for the victorious tribe and it was remembered for generations as a sign of status, prosperity and wealth. *Bigmen*[7] were the leaders of social groups; they married many wives so that their wives could raise

more pigs for them and provide labour for food gardening. Leadership by *bigmen* was at the clan level, where gifts and ceremonial exchanges were tied to *bigman* status. The colonial administration attempted to suppress tribal warfare through a court system and by changing the emphasis on how status was achieved. This led to a more conducive environment for the development of a modern economy. At the micro-level, within the tribe, successful men were those who maintained large herds of pigs and attained large-scale food production, based largely on female labour. A *bigman's* success in these arenas not only supported his household but also the wider clan and, so, helped to maintain social relations among kinsmen. The role of the wives was to provide labour for their husband's political, social and economic ambitions, as well as children (sons) for the clan. Women tended food crops and pigs and, by using their productive power in those ways, they sustained the status of their husbands, which was seen as a positive thing. However, when they were not happy with their lot they showed displeasure by withdrawing their labour, which had implications for their household and community. Withdrawal of labour could also have a negative effect on the women themselves (Dickerson-Putman, 1994; Banks, 1993). Pigs were the main item of exchange between clans and can carry a lot of status. Pig feasts are organised and displayed in rows and the length of the rows determine the social status of the group (Boyd, 1984; Whiteman, 1984; Strathern, 1987; Bell, 1947).

However, contemporary EHP is greatly influenced by modernisation and development, especially by the increased demand for cash. People in rural villages who earn their income through cash crops like coffee are challenged to maximise household resources to meet household needs while maintaining some social and cultural values, which are important determinants of individual and clan status. Concepts of wealth are being redefined as traditional cultural values are questioned, with smallholder households strengthening their engagement in the cash economy. For example, it is becoming more evident that rural people in villages with better access to markets and services are starting to become more individualised in their approach to economic and social life, which is leading them to change some of their cultural values. This will be discussed in more detail in Chapters 6 and 7.

4.5.4 The development of the cash economy in EHP through coffee

The cash economy emerged in EHP, around the mid-1930s, as part of the colonial administration's quest to pacify and bring development to the warring tribes of EHP. Coffee was seen as the means for change and modernity. Coffee plantations were developed and locals were employed as labourers. Later, coffee seedlings were distributed to villages to encourage them to plant their own coffee gardens.

In 1947, Jim Leahy, one of the first European explorers to reach the highlands of PNG, planted his first six acres of Arabica near Goroka (Uyassi, 2004). During the 1950s, plantations were established in the EHP. In May 1952, the administration publically opened land in the highlands for coffee plantations and, by 1955, there were 44 plantations established in EHP and WHP. The plantations became the dominant sign of western-style development and were the beginning of the modern economy in the highlands of PNG. The plantations had begun their expansion from an initial base in EHP and Simbu and then progressed into Western Highlands (MacWilliam, 2013). However, land alienation for the purpose of European settlements was stopped by the colonial administration in the 1960s to protect the rights of the indigenous populations and to prevent land shortages occurring.

Coffee was the first commodity crop produced by Highlanders and, with the cash earned, they could purchase the *white man's*[8] goods such as rice, tinned fish, biscuits, beer and matches. Cash was also incorporated into the traditional exchange system such as payment of bride prices. The rural lives of the highlands people were transformed (Stewart, 1992). The first coffee planted by a smallholder was in Asaro, in 1952. By the early 1970s, the area under coffee was approximately 25,000 hectares, planted with approximately 26 million bushes, most of them in the three Central Highlands Provinces of PNG. Today, there are estimated to be 400,000 coffee smallholder households in PNG whose livelihoods are, in one way or another, linked to coffee. EHP alone yields 37% of the nation's total coffee production. Children are educated, bride prices are exchanged and compensation is paid, largely from coffee earnings. However, the development of a cash economy has increased the value of land and labour, which were the two main resources that every smallholder household was able to access somehow, by virtue of being a member of a clan or tribe. Today coffee households are, perhaps, more motivated by cash than

traditional values (Stewart, 1992). Village households are now driven to an extent by the cash demands imposed on them by the developmental changes occurring within the country. Traditional values are now viewed as a hindrance to households and some socio-cultural obligations are being foregone to accommodate social and economic change, such as the adoption of more individualistic ideas associated closely with cash and the market economy. These changes are discussed further in Chapters 6 and 7.

Initially, when coffee was first planted by the Europeans, labour was thought to be in abundance (MacWilliam, 2013). The demands for rural labour grew as more coffee plantations were established in the 1950s. At this time, there were 2,000 indigenous labourers working in coffee plantations and, by the 1970s, their number had grown to 11,000 full-time labourers. There was evidence of rural labour migration during that time. Howlett (1980) reported that most rural labourers were from poor, isolated areas that were disadvantaged by environmental or location factors that prevented them from earning cash income. These people migrated to the coffee plantations, where they worked for around three years as contracted labourers. This pattern of labour migration followed that of the contracted labour in the lowland coconut plantations of the 1920s, which, in turn, was followed by later migration to the oil palm plantations in West New Britain Province in the late 1960s. However, the coffee plantation sector has been in a long-term decline since the mid-1980s. Today, 85% of the national production of coffee is from smallholders (CIC, 2013). Smallholders manage their own land and labour resources for coffee production. However, as the demand for cash increases, households intensify cash crop farming, which impacts on land availability and the supply of labour. (See further discussion in Chapter 6).

4.6 Overview of the geography and history of Unggai-Bena District

The survey site for this study was in Bena, situated in the Ungai-Bena electorate of EHP and sharing its provincial boundary with Usino-Bundi in Madang Province. The Ungai-Bena District is centred on the Bena Bena Valley, with the Bismarck Range in the north and Unggai Range in the south-west. Mt Unggai, rising to 2,400m, is in the south-west and Mt Helwig, rising to 2,700 m, is in the north (Hanson *et al.,* 2001).

The Bena region was one of the first areas in the highlands to be exposed to the outside world. This happened when gold prospectors, like the Leahy brothers, went prospecting for gold in the Bena River. Bena Bena used to refer only to people living around the airstrip but, as the Colonial Administration expanded into the area, it came to include all the tribes speaking the same language in that area.

After the establishment of the patrol post in Bena Bena in 1934, the Australian Administration started implementing Western law and suppressing the strong warfare culture among the people. German Lutherans and Seventh Day Adventist missionaries advocated pacification among warring tribes and encouraged highlands women to adopt Western-style homemaker roles by performing tasks such as bread making (Gardner, 1976; Barnes, 1981; Dickerson-Putman, 1996).

By 1955-1954, more than 2,000 people from the local area were employed on coffee plantations. However, the administration found it challenging to interest Bena Bena men in becoming contract labourers. As reported in the Patrol Report Bena No. 2/1956-57, in 1956-57 only 16% of the Bena Bena male population were away at work, and most of those were filling short-term casual positions within a day's walking distance from their village. They were renowned for their tenacity in holding on to their traditional ways, much more so than many other groups in EHP (Banks, 1993).

4.6.1 Population and land pressures in Bena

The estimated rural population in the Unggai-Bena district, in 2011, was 67,123. Bourke and Harwood (2009) estimated that the highest population densities in EHP were found in the Bena Valley (this study site) with 62 persons/km^2, while the lowest population density of 13 persons/km^2 was to be found on the slopes of Mt Helwig. The Unggai Range has a population density of 52 persons/km^2. In the Bena area, customary land is not sold to outsiders. However, different patterns of land use are occurring where overwhelming demand for cash has led to the intensification of land use associated with cash cropping, particularly in this district where 80% of the population live in areas with relatively good access to markets.

4.7 Brief overview of the study sites

The villages of Sogomi and Safanaga are at an altitude of between 1,300 and 1,400 masl. It is dry from August to March, which is good for growing pineapple; a crop fast becoming a major income source in the area (and discussed further in Chapter 5). Sogomi is located in the valley, while Safanaga has spread from the valley up to the mountain slopes. Sogomi Village has more land and a larger population than Safanaga. There is much inter-marriage between the two villages. Both villages are experiencing a great deal of socio-economic change which is changing the village lifestyles of its people. To understand some of these developments and gain an insight into how they are occurring, it is necessary to discuss the historical context.

Three generations ago, due to tribal warfare, there was a shortage of male heirs in many families in Sogomi and Safanaga. Warfare was endemic, as has been documented by early anthropologists in the area (e.g. Langness, 1963, 1964, 1967; Dickerson-Putman, 1994). Interviews conducted with families in Sogomi and Safanaga, as part of the current study revealed that most male household heads had been adopted because of losses due to tribal wars. Male heads of families took in their sisters' sons and, for those who had no sister, nephews from their paternal family lineage were adopted to maintain their own family lines. These adopted sons remained with their uncles and grandfathers, got married and lived with their families, farming on their adopted family land. Today, in the absence of warfare, many of the children and grandchildren of the adopted sons are having their birthrights challenged, to the extent that they are being asked to move out or are given limited rights to continue to live and farm on the land that was once used, unfettered, by their fathers or grandfathers. Some households who are farming and accessing land through their maternal side and have planted coffee some fifteen to twenty years ago are now being pressured to hand back the land, or a portion of it, to the clan leaders.

Some households are manipulating kinship links to strategically align themselves so that they can access land from their cousins through their maternal lineage. However, the cultural agreement to have user rights access would have been made by the previous generation (between brothers and sisters) for the sister's son to be able to access the land. These agreements, as illustrated by Farmer Mark's experience (below), may not endure into the next generation, given that the contemporary

changes occurring in the villages, where demand for cash is rising rapidly, are causing more pressures on land use.

> *Farmer Mark is living on his mother's land with his cousins. For him to reside there, his mother had to pay for his rights to live and farm there. His mother made a one-off payment to her brothers, and pigs were exchanged. The payment allowed access rights to the land. It is not a payment to purchase the land. He owns land from his father's side, but Mark prefers living on his mother's land. The cultural agreement that gave him legal rights to access and use his mother's land may not be allowed to pass to his sons. As Mark explained, his children may not have the same rights as him and may not be able to inherit cash crops such as his coffee gardens. This may discourage his sons from investing their labour in improvements to their current household farm such as rehabilitating or replanting old coffee trees. (Mark, August 2013)*

There are also other factors contributing to pressures on land use, such as accessibility to markets, increased demands for food and vegetables, and pressure from agricultural industries to increase production in order to have access to other services such as extension. Farmers also are under pressure to increase production or show evidence of expansion of cash crop farmland as collateral when taking out loans with financial institutions (i.e. large land area of coffee gardens).

4.7.1 Changes from past to current farming practices in Sogomi and Safanaga

Typical household food sources are from the cultivation of sweet potato (*Impomea batatas*), banana *(Musa paradisiaca)*, taro (*Colocasia esculenta and Xanthosoma sagittifolium*), winged beans (*Psophocarpus tetragonolobus*) and sugarcane *(Saccharum officinarum)*. A wide variety of food crops that have significant cultural value have been grown. However, most of these food crops are not currently grown in large gardens, as people did twenty to thirty years ago. The introduction of new varieties of food crops, such as sweet potato, broccoli and cabbage, and cash crops (like coffee) have taken priority over traditional crops and varieties of food crops grown by the households. In addition, pigs are raised for cultural ceremonies and household consumption.

Sweet potato (*Impomea batatas*) is one of the main food crops in the villages. It is planted all year round and is one of the main energy foods. The villagers used to grow three dominant varieties, but these are all being replaced by new types that

have shorter maturation periods of 5 months rather that the 7 months of traditional varieties.

Taro (i.e. *Colocasia esculenta and Xanthosoma sagittifolium*) is rarely planted any longer due to a number of factors, such as pests and diseases, and because of poor yields due to loss of soil nutrients. However, during the focus group discussions of this study, it was mentioned that, in the past, taro was planted in separate gardens as a food source of great cultural significance and was used as *rausim hevi* or *sutim nus* (for compensation payments or in cultural ceremonies of initiations, where males have their noses pierced).

Sugarcane used to be planted in gardens on its own. Villagers do not maintain these separate gardens anymore. Today, sugarcane is planted in the same gardens as other food crops. Sugarcane was also of great cultural significance and was used for bride prices and in death ceremonies.

Banana has special cultural values, symbolising respect, and it is an important daily food source. There are several banana varieties regarded as very special and they still carry much significance in cultural events. They are used in compensation payments (*stretim hevi*) and were grown previously in separate gardens of their own. However, today, like sugarcane, they are intercropped with other crops because farmers have prioritised their farming resources of land and labour for cash crop production.

Asbin[9] are commonly known as winged beans and are mainly planted by women. In the past, every wife made sure that their household maintained a garden of winged beans. When they were ready to be harvested, the women who planted them threw winged bean flowers on the road as a sign of invitation to households around their area to join them during harvesting time. Winged bean 'parties' were held and households feasted on them. This was the cultural way of showing the productive power of females in the household. The village collectively acknowledged and praised the women who planted winged beans because they are very laborious to grow. Only a few households still cultivate winged beans today because it is such a laborious activity.

Marita is commonly called Pandanus (*Pandanus jiulianetti*) and is a very prestigious food. Culturally, it is the food deemed to be fit for in-laws. In Highland society, in-laws must be treated with great respect to maintain good social standing and harmonious relationships between the families and tribes. Pandanus is often given by the husband's family to the wife's family to show respect and to maintain the social status of the husband's family. The pressure on the man is usually great because he is expected to treat his in-laws well so as to earn their respect and gain the status of being a man.

Pigs are highly valued in Highland society and are a sign of wealth and status. Thirty to forty years ago, in Sogomi and Safanaga, most men had 1-4 pig houses, with 3-10 pigs in each. Pigs were raised on sweet potatoes, and additional gardens were cultivated purely for pig production. Pigs were used as payment of the bride price, as death gifts and for compensation as part of reconciliation following conflicts like warfare. It was a lot of work to feed them, but families and clan members in the village helped. Villagers from this study said this was possible more than thirty years ago for the following reasons:

1) Garden yields were much higher than today, so it was not necessary to make so many gardens to feed the pigs.
2) Families in the villages contributed food to feed the pigs and, later, received a piglet in return.

Today, most villagers are no longer looking after large herds of pigs because they damage food gardens, causing garden owners to seek compensation for damages to fences, drains and crops. Unlike the past, most gardens today are not fenced, due to timber shortages. The theft of pigs has become a problem. Also, some religious beliefs discourage pig consumption. All these factors have led to a reduction in the pig herds in both villages. People still use pigs for compensation payments, exchanges, bride prices and death contributions to satisfactorily meet their socio-cultural obligations, but most of these traditional cultural practices have now been incorporated into the cash economy, so the role of pigs in these exchanges has declined while that of cash has increased through time. Cash has also replaced many of the food crops that had cultural value, such as taro, sugarcane and specific varieties of banana, which are not grown in the village but can be bought with cash.

Most villagers do not practise mono-cropping of food crops for household consumption as they did in the past. Today, sweet potato is the main agricultural food crop in the study sites and in the Bena Bena Valley. Intensively cultivated sweet potato and intercropping is a common sight, as mentioned above (Hanson *at el*., 2001).

4.7.2 Cash crop farming

A diverse range of income sources is pursued by households. The main ones are coffee, pineapple and broccoli (Table 4.1). The traditional cash crop was coffee, which was introduced to Sogomi and Safangai in the late 1950s by the DPI. It was originally planted in a makeshift nursery in the neighbouring village of Magenafaro, then seedlings were distributed to the villages of Sogomi and Safanaga with a distribution of about 5-6 seedlings per household. Later, people started gathering seedlings and seeds from other places, like Aiyura, where a DPI station had an Arabica coffee nursery.

The early coffee farmers started planting coffee seedlings on new land that had not been previously cultivated, not too far from their houses. Later, some started planting coffee in old food gardens. As villagers started selling coffee and earning cash, they expanded their coffee gardens. Coffee was mainly planted by the male head of the household, usually the father, and families were expected to help with coffee harvesting, with no cash payment. However, in return for their labour, the sons expected their fathers to pay their bride prices. Today, every young man in both villages with access to land has coffee. The coffee gardens are established when the sons are young so that the land is locked up, ensuring that the sons have coffee gardens when they grow up.

Today, coffee has much competition from other crops that can be produced for sale. The main competing cash crops are pineapple, oranges, broccoli and cabbage, (discussed further in Chapter 7).

There are many non-farm income-generating activities in which most villagers are involved (Table 4.1). Among the most common is small retailing, such as running a trade store. However, more villagers own stalls, where a variety of goods are sold,

such as mobile phone credits, noodles, biscuits, processed coffee packets, sweets, cotton wool and rice. Other common income sources are seasonal wage employment and movie nights (where villagers with a generator and a television screen show movies once or twice a week and charge a fee, usually children-K1 and adults- K2). Women also are involved in the making and selling of traditional string bags (*bilums*) which may be sold from small retailing stalls. Additionally, cash enters the household through family remittance; most households have a sibling or relative who is formally employed (either inside or outside the province) and who sends money to village relatives. The flow and timing of remittances varies, with some families receiving remittances on a monthly basis while others receive a payment only once per year.

Table 4.1. Income sources for Sogomi and Safanaga.

	Percentage of Households	
Other income sources	**2010**	**2013**
Selling vegetables at local market	95	95
Bulk sale of vegetables	13	5
Buying coffee	15	10
Selling spices	13	7
Trade store	10	12
Firewood	8	7
Small retailing	36	14
Phone cards	13	7
CD movie house	10	10
Bakery	18	10
Chickens	5	2
Pigs	44	31
Goats	8	5
Waged employment	26	19
Hired labour	5	0
Family remittance	38	33

4.8 Conclusion

With its beautifully endowed geography, fertile soil and suitable climatic conditions, together with an assumed abundant labour supply, Eastern Highlands was thought to be ready for agricultural development during the colonial administration. Coffee

development was used to pacify warring tribes. EHP, like any other province in PNG, is changing rapidly as people redefine their socio-cultural values and systems. Village farmers have demonstrated such value changes by altering their land management practices from clan ownership to individual ownerships. For instance, village farmers of the same family lineage farm food crops together on the same land but, with increasing cash demands, some are growing cash crops using only their immediate family's labour.

Sogomi and Safanaga are rural villages that have good access to markets and are increasingly integrating into the wider cash economy, which is affecting their attitudes towards cultural values, land management and social relationships. New high-income opportunities are leading to the neglect of traditional cash crops like coffee, which now has to compete with other livelihood demands for labour. Social relationships of exchange that are highly valued in Melanesian society are now more tied to cash exchanges. In the next chapter, based on the fieldwork data of this study, the household economy will be discussed in relation to farm investment decisions and cash income activities, and it will be seen how these are affecting subsistence food production.

CHAPTER FIVE

METHODOLOGY

5.1 Introduction

This chapter discusses the research approach and the processes involved in the collection and analysis of the research data. There are two sections: the first part discusses the research paradigm, the study sites and their significance. The second part outlines the research methods used and the data collection process.

The research philosophy underpinning this study is constructivism. It was assumed that coffee smallholder households construct their livelihoods from their experiences and from the socio-economic and institutional contexts affecting their lives. The Sustainable Livelihoods Approach (SLA) is used as a framework because it draws on different theoretical approaches but places people at the centre of a web of inter-related influences that affect how livelihoods are constructed for themselves and their families (International Fund for Agricultural Development, IFAD, n.d.). The method of interpretivism (e.g. use of questionnaires and focus group discussions) is used to investigate the culturally-derived and historical influences that underlie the contemporary realities created by individual coffee households. This approach uncovers the deeper meanings of events and activities that affect coffee smallholders as they engage in their diverse livelihood activities (Crotty ,1998).

5.2 Site selection

Field site selection was a significant factor that could enable understanding of the societal changes, occurring at the village level, that will have future implications for the PNG coffee industry. Therefore, a purposive method was used to select the field sites. Given the proximity of Sogomi and Safanaga to Goroka, and with new markets emerging, these villages pose a major challenge to the coffee industry through their expansion of cropping for food crops to sell at urban markets (Figure 5.1). The households included in the study were all rural farmers, with 99% of them relying heavily on agricultural production for their sustenance. The remaining sample households had at least one member in formal or casual employment such as

teaching, clerical or trade jobs (e.g. a mechanic or carpenter), either within the village or in the closest town. At the time of the fieldwork, in 2014, there were 286 households in Sogomi and Safanaga villages, with a combined population of 849 residents (Table 5.1). The villagers are all self-reliant, like most rural communities in the country. However, these villages had an estimated 80% of their population who were highly market-driven, and who were seizing the opportunities provided by their proximity to the main urban markets at Goroka by exploring new livelihood options. The other 20% were 'tagging along' but not really capitalising on the new opportunities. These households tended to be headed by men from outside Sogomi and Safanga who had married local women and were living in their wives' villages. Therefore, their access to land was limited. They were allowed to farm, but mostly for household consumption, and they only took a small surplus to market. Most had small plots of pineapples but no coffee. However, not all of these households were confronted with limited access to land. Some were able to negotiate access to land that allowed them to join the majority group that was able to capitalise on these new market opportunities. This is discussed in Chapter 6.

5.2.1 Significance of the study sites

The significance of the study sites is their proximity to Goroka, which is the main urban centre in EHP. Many coffee growing areas in EHP and neighbouring provinces are like these two villages, with a high degree of market accessibility within 30 minutes or less by public motor vehicle (PMV) to a large urban market. In these areas, the PNG coffee industry is having difficulty maintaining farmers' interest in coffee production as they drift away from perennial cash crops, including coffee, to explore new income opportunities. The two villages are also sites where CIC and ACIAR are currently doing research, which afforded this study the opportunity to draw on information collected as part of the larger study while also focussing on the main concerns of this research current smaller one. The diverse livelihoods of coffee farmers is one area that has not been given significant attention by previous research within the coffee industry, but which is now becoming important given the rapid pace of change in people's knowledge, attitudes and farming practices.

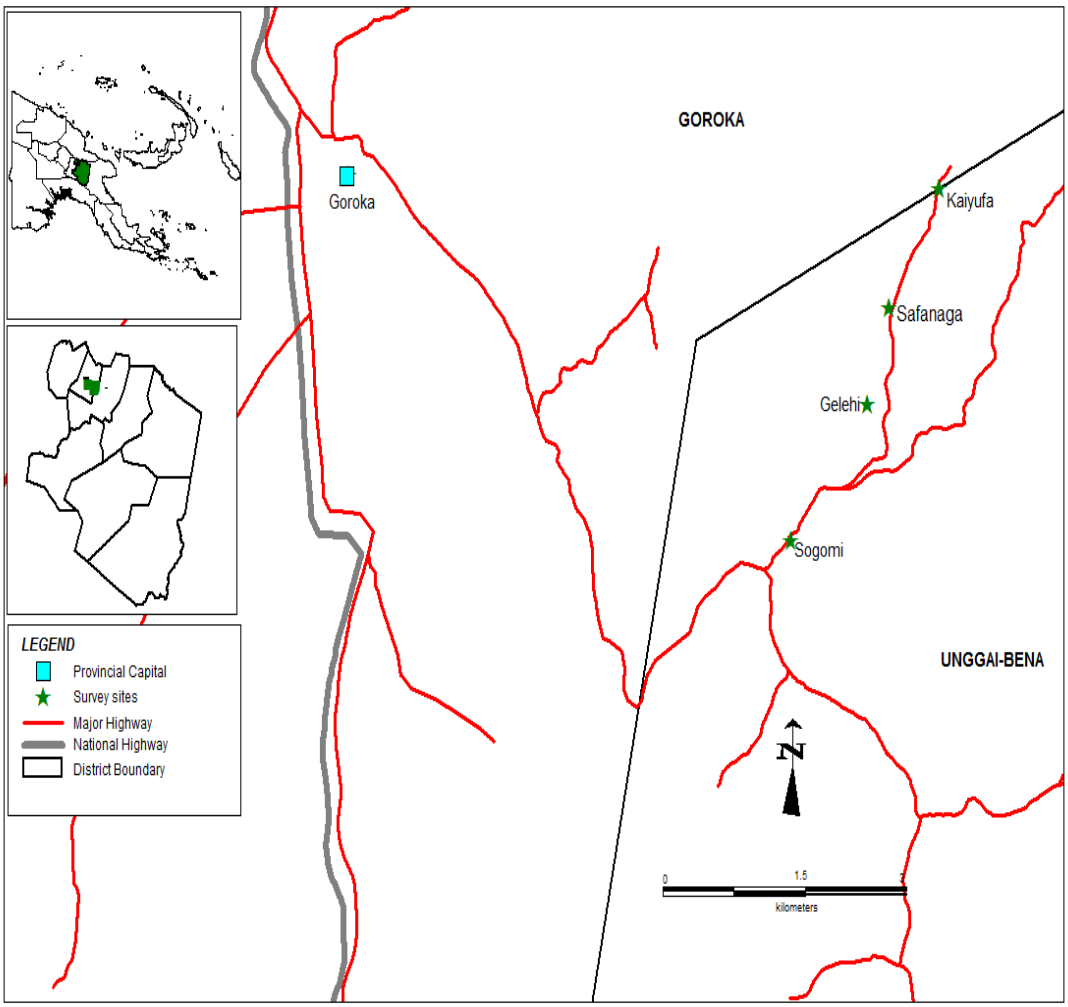


Figure 5.1. Location of Safanaga and Sogomi villages relative to Goroka (Source: CIC, 2013).

5.2.2 Population in Sogomi and Safanaga

There were 153 households in Sogomi and 53 households in Safanaga. Table 5.1 provides a breakdown of the numbers of adults and children and also shows the movement of villagers in and out of the villages during the course of the fieldwork. The figures provide an indication of the mobility of people which, of course, affects household decision-making regarding farming activities. The movement of villagers varied throughout the year. Most villagers made a lot of short trips (of 1-4 weeks duration) within EHP and also to other provinces like Madang and Morobe, which are highly accessible because of their relatively good transport infrastructure. Few village children were attending boarding schools away from the villages, while a handful of children from remote villages were boarding with some families in the two villages so that they could attend primary school. These children from remote

areas sometimes had family members visit them in Sogomi and Safanga. Their family members could stay in the village for between two and four weeks. The location of these two villages allows the villagers to be highly mobile, which has implications for household farm productivity.

Table 5.1. Village household census in 2014.

Name of village	No. of households	No. of persons(both adults and children)	Children under 16	Likely increase in population during the period of fieldwork (+)[1]	Likely decrease in population during the period of fieldwork (-)[2]	Total number of people leaving or coming into the villages during period of fieldwork (+,-)
Safanaga	53	231	132	27	-3	24
Sogomi	153	610	298	56	-7	49

My initial visit to these villages, in December 2010, was when I was involved in a coffee livelihood project funded by the Australian Centre for International Agricultural Research (ACIAR). During that initial visit, the villages were experiencing a drought. Villagers were living on stored foods like rice, noodles and wheat flour, supplemented by whatever food crops they could find from their *bus gaden* (bush gardens, i.e. gardens located near the forest at the foot the mountains, about 1-2 km away from their houses). The gardens near the house or down in the valley had failed because of the drought. Not all farmers had bush gardens, and some were buying vegetables from other farmers who did have bush gardens.

The coffee price was around K6.00-K6.30 (AU$3.00-$3.10) at that time, and some farmers had coffee in storage while using income from pineapple to purchase food for their households (December is the pineapple harvesting season). Most farmers were excited because coffee trees started flowering around that time; they were very attentive to the price, hoping it would remain high during the coffee season, which would start in April 2011 and run through to late September. It started raining on

several afternoons in December 2010, which marked the break of the drought and the beginning of the gardening season for many villagers to concentrate most of their labour and time.

During my second visit to Safanaga and Sogomi for another two weeks of fieldwork on the same project, in early June 2011, I made a few important additional observations. It was the coffee harvesting season and farmers were anticipating the price of coffee to be as high as the previous year (PNGK7/kg=AU$3.50/kg), so most farmers were putting a lot of time and effort into their coffee gardens. This demonstrated their price responsiveness. It also encouraged some villagers to set up cherry-buying spots in the village (to buy coffee cherries). However, most village farmers were not keen on the idea of village coffee-buyers because they thought it would encourage coffee cherry theft. Coffee theft was not a new thing, but the rate of theft had increased alarmingly because it was easy to steal cherries and sell them in the village. Some farmers lost much of their crop to cherry theft because of labour shortages that made it hard for households with large coffee gardens (1 ha or more) to harvest all the ripe cherries on the day of harvest.

5.2.3 Sample selection

Several different sampling criteria were used. Simple random sampling was originally used for the 100-household survey under the ACIAR/CIC livelihood project. From that initial sample, for the current study, a cluster sample of two villages was selected, and a random sample of 41 households was chosen from this group to participate in one-on-one quantitative and qualitative surveys. Focus groups also were used, in which farmers identified themselves as belonging to one of four groups, in line with the four main themes of discussion: coffee, broccoli, transport and pineapple (discussed further below). This was done using stratified[3] sampling of the 41 households. There was an average of 12 farmers in each focus group.

5.2.4 The advantages of using a village-based study approach

It is important for the researcher to have a good rapport with villagers when undertaking village-based studies. Given my previous visits to these villages prior to this study, I had already been able to build the networks and relationships that facilitated research for this study. There are a few important points to consider when doing village-based studies. These are described below.

1) *Established relationships*

My fieldwork in the villages was relatively short because I had already established a relationship with the community a few years prior to this study, as mentioned in Section 5.1.1. I had kept in touch with key members of the community, which gave me a headstart when commencing fieldwork. I maintained the relationships by mobile phone after leaving the field, and follow-up contact continued to inform my work during the data anlaysis and writing stages of my work. The longer-term visits to the communities and pre-existing relationships overcame problems that could have arisen with shorter-term visits. A villager who completed high school assisted me with most of my fieldwork and I maintained contact with him by mobile phone after I left the field. This allowed me to confirm or follow up on points that emerged from the data during analysis.

2) *Resourceful and reliable informants*

Community leaders were valuable and resourceful people to consult, and I started off my fieldwork by consulting them. The study objectives were written out and explained to them, which helped them to understand (and not misinterpret) the objectives and methods, thus reducing later problems. This also helped to avoid the formation of unrealistic expectations within the community about potential benefits of the research (Apis *et al.,* 2013).

3) *Community engagement*

Being engaged or immersed in the local community for a lengthy period allows one the opportunity to improve one's understanding of local lifestyles, the cultural values and norms, and socio-economic opportunities relating to residents' available resources. An improved understanding of the local context can enhance one's ability to interpret results (Apis *et al.,* 2014). As mentioned above, I had resided in Sogomi village prior to my study visit and had made numerous trips to both villages, spending a few weeks there in 2010, 2011 and 2012. These visits helped me to foster relationships and trust, and facilitated my acceptance as a fellow member of the community. I participated in socio-cultural activities like funeral ceremonies, sports and

church activities. My participation was a learning experience; it led to an understanding of the socio-cultural factors influencing their livelihoods, such as land accessibility for cash crops, and the role of cultural values and socio-economic demands on gender. All these added to my knowledge of the people and their livelihoods.

4) *Leaving the field site with an appreciative attitude*

One of the most important things I tried to do was to end the fieldwork with a good impression, not only for the benefit of my research study but also for any future work that might occur there. At the end of the first fieldwork period (September 2013), I used the focus group discussion as an avenue to thank participants. When a weekend focus group was scheduled, a *mumu* was prepared (food cooked in an earth oven) for participants and their families to share after the focus group discussion. The fresh vegetables were contributed by farmers, while I contributed meat and soft drinks. Participants were shown appreciation for their participation and farewells were bid. At the end of the second and final study trip (November 2014), a small get-together was organised on the final evening. I presented and discussed some of the research results that were beginning to come out of the study and this opened the discussion, and their thoughts, to what future changes were likely to occur. Once again, I thanked them before leaving, with the hope that they could understand the importance of this research to their livelihoods. It is also vital to conduct oneself in culturally appropriate ways, to show respect for people and to avoid separating oneself from the community. Such gestures strengthen village and cultural protocols and demonstrate respect for their values and way of life (Apis *et al*., 2013).

Plate 5.1. A thank you meal and farewells with participants and their families when I was leaving the village.

5.2.5 Field problems

A few issues were encountered during field work, including:

1) *Proximity to town*

Given the proximity of the village to Goroka, the surveys had to begin very early before farmers headed off. Farmers visited town regularly and tended to leave the village quite early.

2) *Unexpected events*

During my first period of fieldwork, there were two major disturbances. The first was the provincial visit of the Prime Minister and the second was the pre-celebratory event for the upcoming independence celebrations, both of which excited villagers and distracted them from their normal activities.

3) *Social pressure*

With a prolonged fieldwork period, there is a risk that team members will be drawn into negative social situations that may easily impinge on interview time or compel researchers into taking sides in village politics. One of my field assistants from the village community fell prey to the spectre of gambling.

4) *Frustrated farmers*

Some farmers were so frustrated with the lack of government service delivery that they refused to participate in the research because I was viewed as a representative of the government, being an employee of CIC (a government research institute for coffee research and extension). Later, when they came to understand the nature of the research, and my role, they joined the study.

5.3 Research methods

The study used the framework of the Sustainable Livelihoods Approach (SLA) developed by Chambers and Conway (1992). The SLA was employed because of the centrality of the household in the framework and the attention paid to local level factors as well broader macro-level factors, such as institutional aspects and world coffee prices. There is a large literature on livelihood approaches to research and this approach is being adopted by many researchers engaged in household studies within the developing world (e.g. Chambers and Conway, 1992; Bebbington, 1999; Koczberski and Curry, 2005; Rigg, 2006; Solesbury, 2003). It was important for the study to be focused at the household level because it is at this level that many of the changes occurring in the village were being driven, drawing on the different types of livelihood capital – natural, physical, social, financial and human capital

The development of this study can be traced backed to Harold Brookfield's pioneering work on the analysis of resource use behaviours at the local level (Brookfield, 1964). This led to the study of households, communities and villages as they interacted with conditions created at the local, national and international scales (Brookfield, 1964; Grossman, 1977; Deneven, 1983; Smith *et al.,* 1984; Netting,

1993). Because coffee production was the basis of studying these households and it connected them to the global economy, the literature on cultural ecology that emphasised the livelihood context of households was also drawn upon. As stressed by Zimmerer (2004), the main unit of interest is the household, which is important for understanding how global economic processes interact with local actors to determine local outcomes. Zimmerer highlights the importance of using a household level of analysis to examine interactions between people and resources in terms such as forest use, agricultural change and migration. There are, of course, other approaches to analysis. For example, some studies in Africa used a political ecology framework linking development, environment and social movements (e.g. Bebbington and Perreault, 1999) while Batterbury (2001) used a livelihood diversification approach, and Bebbington and Batterbury (2001) examined households using a rural livelihood and globalisation analysis (see further discussion in Chapter 2).

5.4 Establishing contact and consent with survey households

The households selected for study were invited to participate through the village leaders a few weeks before the team arrived in the village on 25th August 2013 (see Section 5.1.3 regarding household selection). On the first day, upon arrival, the team met with a local pastor (who was a leader in the village) and several farmers to explain the purpose of the research and to work out a daily plan with them. They provided useful information about planned activities in the village and what was expected to happen during the course of my stay.

The list of sample households chosen for the study was discussed with village leaders to obtain their views about the participants. This provided some information about each household. It enabled the leaders to inform me about important information regarding certain households. For example, I was informed about households with ill family members whom I should not disturb and, also, families who were going through mourning periods. The village leaders helped to identify households which could replace those that were not able to participate in the study in a way that avoided biased selection of households. This important step with the community village leaders allowed the study team to follow certain unwritten protocols in the village and not to undermine local leadership. If they had been offended and chosen

to withdraw their support, this would have influenced the outcome of my field study. There were other households who were not directly involved in the survey but who were invited to provide information through informal conversations and through their participation in focus groups. This allowed the study to robustly validate the information collected from the 41 households.

Participants were informed about my impending arrival a week before the start of my second fieldwork period. I started data collection by visiting individual participating households and completing follow-up surveys as most of them were aware of my visit. During this second fieldwork period, there was only one focus group discussion held; it was with elderly people in the village to discuss land use changes through time.

5.4.1 Data collection

The study used a mixed methods approach involving both quantitative and qualitative surveys and the collection of secondary data (Brannen, 2005). Surveys included one-on-one interviews, semi-structured interviews and focus groups with the selected households. The mixed method approach has been defined by Greene (Johnson *et al*., 2007) as:

> …mix method inquiry is an approach to investigate the social world that ideally involves more than one methodological tradition and thus more than one way of knowing, along with more than one kind of technique for gathering, analysing, and representing human phenomena, all for the purpose of better understanding (p.119)

5.4.2 Brief history of the development of mixed methods approach

The earliest use of mixed methods was reported in the work of cultural anthropologists and sociologists in the first half of the twentieth century (Hollingshead, 1949; Lynd/Lynd, 1929; Pearce, 2012). These studies reported transforming qualitative data into quantitative data and the fieldwork methods included participation, observation and semi-structured interviews (DuBois, 1995; Thomas and Znaniecki, 1918). Mixed methods were in use long before the term ‘mix method’ was devised, however, there were other terms like critical multiplisim, triangulation, blended research and integrative research (Webb, 1966; Cook, 1985; Thomas, 2003; Johnson and Onwuegbuzie, 2004). The mixed methods approach was

used in social sciences by researchers who thought that a qualitative or quantitative method, in isolation, was not sufficient to reach a full understanding of certain phenomena. Instead, they preferred to address their research questions from multiple methodological positions to reach a better understanding of what they were investigating.

5.4.3 Criticisms of the mixed methods approach

After World War II, there were technological advances in research tools for collecting and analysing data. Associated with this trend was a strong objective to standardise data collection techniques and, in the era of positivism, for hypothesis testing. In the thriving post-war economy of America, the government and private sectors used survey-based research for marketing purposes, using largely positivistic methods. However, from the 1960s to 1980s there was a renaissance of qualitative methods to support constructivist models and to promote an alternative to what was seen as a failure of 'positivism' to provide an understanding of the underlying motivations and values that caused people to behave in certain ways (Pearce, 2012).

The debate continued, with one group of scholars emphasising deductive reasoning to promote the use of quantitative methods while the other emphasised inductive approaches (Johnson *et al*., 2004). However, Schwandt (2000) questioned this debate about the two approaches and asked whether this division (between qualitative and quantitative inquiry) was helpful for understanding the purpose and means of human endeavour (Schwandt, 2000). As stated by Johnson *et al* (2004), this debate on the value of the two methodological paradigms has not been helpful, yet the two paradigms applied in a mixed methods approach are complementary to each other; when used together, they each help to overcome the weaknesses of the other approach.

I chose the mixed methods approach because it suited the conditions of this field research and it provided a better methodology for understanding my research questions, which are similar reasons to those behind studies that have used this approach previously (e.g. Koczberski *et al.,* 2001; Omuru *et al*., 2001; Koczberski and Curry, 2003, 2005; Apis *et al*., 2013).

5.4.4 Justification of mixed methods in this study

The usefulness of the mixed methods approach, in the context of my study, cannot be understated, for the following reasons:

1) Quantitative surveys have tended to dominate village-based research in PNG for a long time. This may be because most research related to social science in rural settings in PNG was undertaken by agricultural scientists or economists whose use of qualitative methods was not usually the norm.

2) In recent times, there has been growing recognition of the importance of socio-cultural factors in shaping agricultural production and livelihoods in PNG. Thus, a mixed methods approach enables the role of socio-cultural factors in production to be investigated.

3) Socio-economic change in PNG is very rapid and widespread, so the use of this method is critical for understanding the dynamics of the changes occurring at the household and village levels.

4) The use of a mixed methods approach in the ACIAR coffee project on farming systems (ASEM/2008/036) to understand smallholder productivity, provided an insight into how these techniques can be used to capture important information about smallholder coffee production.

5.4.5 Advantages of the mixed methods approach

The advantages of the mixed methods approach have been discussed by Sosulski and Lawrence (2008), Mertens (2014) and Brannen (1992). In summary, the main advantages identified by these authors include:

1) Mixed methods are an important tool for understanding complex social phenomena, which cannot be fully understood using a single approach.
2) The approach allows for multiple interpretations and provides a rich contextual description of the interaction of factors.
3) The data sets generated by the approach are complementary and, thereby, reinforce confidence in explanations being developed or data being interpreted.

4) The methodology identifies constraints in the research process and helps to identify practical approaches to overcome these constraints.
5) Due to the relationships built between researchers and participants, the study targets are not seen as mere objects.

However, it should be kept in mind that some disadvantages of the mixed methods approach have been identified (Johnson and Onwuegbuzie 2004; WordPress n.d.).

1) It is time consuming and expensive.
2) It is difficult to find a researcher with experience in both qualitative and quantitative research.
3) The researcher has to learn multiple methods and be able to combine them effectively.
4) It is not easy to interpret conflicting results.

However, a mixed methods design can be effective if the researcher is well-versed in both quantitative and qualitative research methods and also knows how to avoid the major challenges of the design. I chose mixed methods because I was able to use both quantitative and qualitative methods and, thus, add to the richness of the explanation of the research issues I was exploring.

5.4.6 Primary data

There were two fieldwork periods for data collection: fieldwork A and B. Fieldwork A was conducted in two phases. Phase one was formal interviews and phase two involved the focus group discussions. Interviews were carried out in Tok Pisin and, where necessary, translated into the local dialect by my village field assistant. In phase one, the smallholder coffee household survey was carried in two sections:

Part A consisted of 28 quantitative questions (Appendix 1)
Part B consisted of 2 qualitative questions (Appendix 2)

The questionnaires were designed to elicit information on coffee production, farm investment decisions, land access, labour mobilisation, types of production for local markets, and cash income. Structured questionnaires were appropriate within this context because the data were largely quantitative and included demographic data, as

well as estimated incomes and costs of production. The demographic information of the 41 households, collected in 2010 under the 100-household survey that was conducted by the ACIAR livelihood project, was updated. This first section of the current study was mainly a quantitative survey with closed questions, although there were some open-ended, qualitative questions. Questionnaires were field tested prior to the commencement of fieldwork.

The phase 2 of fieldwork A involved mostly qualitative surveys aimed at a sub-group of farmers. The questionaries were designed to suit the conditions of the field study and to elicit reliable qualitative and quantitative data from the farmers. They were followed by focus group discussions.

1) The smallholder household pineapple/vegetable survey consisted of 11 qualitative questions. These questionnaires were administered to farmers who supplemented their coffee income heavily with pineapple and broccoli. The questions were designed to gather information on general pineapple and broccoli production, and on household investment decisions about land and labour mobilisation.

2) Focus groups collected mostly qualitative data through discussions that were written in notebooks and recorded using an audio recorder. Audio recordings were recorded in Tok Pisin. Most of the focus group audio records were transcribed into English in the village during the evenings. The process of transcribing focus group data in the village was to ensure accurate translation. My village research assistant was present during transcribing to clarify any language issues that arose in the recordings. Four focus group discussions were conducted. The purpose of the focus groups was to gain a detailed understanding of the expected norms and practices of each interest group and to ascertain the degree of consensus on a given topic (Morgan and Kreuger, 1993). The other reason was to draw upon respondents' attitudes, feelings, beliefs, experiences and reactions in a way that would not have been feasible using other methods, for example, observation, one-to-one interviewing or questionnaire surveys. The farmers were grouped thus:

A. Coffee group - farmers who were heavily involved with coffee (Appendix 3).
B. Pineapple group - farmers who supplemented their coffee incomes heavily with pineapple earnings (Appendix 4).
C. Broccoli group - farmers who supplemented their coffee incomes heavily with broccoli earnings (Appendix 5).
D. Transport owners group - providers of transport services who also supplemented their coffee income with profits made from this service (Appendix 6).

Data were categorised into main themes to identify emerging patterns of knowledge, attitudes, practices and perceptions of socioeconomic factors affecting coffee, pineapple, broccoli and transport owners. Follow-up discussions in the form of informal interviews were carried out to expand on some of the information identified via the quantitative questions. These informal interviews were carried out also with individuals who were not part of the sample, to gather additional data on a broader scale. These informal or semi-structured interviews allowed more free-flowing discussions and allowed me to follow up particular lines of inquiry. By not imposing rigid guided questions, it allowed more flexibility in these informal interviews that were usually carried out in comfortable environments like local markets or one of their lucky gambling spots, sometimes over a cup of tea or a shared meal.

Fieldwork B was conducted a year after fieldwork A. It was follow up fieldwork to investigate further the identified trends and data from fieldwork A. The survey was mostly qualitative semi-structured interviews which included a focus group discussion on land tenure and land use.

5.4.7 Secondary data

The study drew on the following secondary data:

1) The ACIAR/CIC 100-household survey, as baseline information for 39 of the 41 households studied. Two households in the current sample were not part of the initial sample;
2) CIC reports;
3) Institutional websites like ICO, CIC, NSO and BPNG.

Plate 5.2. Broccoli farmers display their broccoli during the focus group discussion.

5.4.8 Data analysis

The quantitative data were analysed using Excel pivot tables, and summarised statistically in tabulated and graphical formats (Manning and Munro, 2007). Most of the qualitative data from the first fieldwork were analysed during that fieldwork and interviews were transcribed to identify trends and themes. However, not all qualitative information was strictly from the sample. Other members of the community who were keen to share their experiences and thoughts also provided information.

5.5 Limitations

The two questionnares (one set of questionnaries were for coffee and the second set covered pineapple and broccoli) were conducted simultaneously. Both of these surveys were conducted with individual households when they were available, especially in the early morning from 7 to 9 am and in the late afternoon from 5 to 7 pm. On a few occasions surveys were carried out until 10 pm, when interested farmers turned up later in the evening. Between 9 am and 5 pm, I checked interview forms and made field observations. This also allowed farmers who wished to be interviewed during the day to participate. However, adjustments were made, when necessary, to cater for unforeseen events.

The focus group discussions were held on weekends. The coffee group held their discussion from 3 to 5 pm on Saturday 31st August, while the pineapple group had their meeting on Sunday 1st September, from 4 to 6 pm. The broccoli group discussion was held from 4 to 6 pm on the weekend of 9th September. The transport owners' group held their discussion on 10th September from 4 to 6 pm. The field plan to use only afternoons on weekends for the focus groups allowed enough time for farmers to attend, which left the weekdays for one-on-one interviews. There were some limitations with focus groups when a few people who were not on the initial sample were invited to be part of the discussion, and then dominated the discussion.

5.6 Ethics

During the start of the first fieldwork period, in the morning after we arrived, a meeting was held to explain the study and obtain participants' consent. Those who were not able to make it on that morning were met later in the afternoon, or over the following few days, when the team explained the purpose of the study and obtained their consent to participate. The field study plan and the sample size were adjusted, after discussion with supervisors over the mobile phone, to allow for the practicalities of fieldwork.

5.7 Conclusion

The SLA approach was selected to allow for the complexity of Sogomi and Safanaga livelihood choices. The study sites provided both a challenge and an opportunity to use a mixed methods approach to collect data. The quantitative data provides information on the production costs of the various livelihood strategies pursued by smallholder farmers while the qualitative methods offer an insight into the social and cultural dimensions affecting livelihood decision-making. The methodology is summarised in Table 5.2.

Table 5.2. Summary of the Methodology.

Summary of the Methodology	
Overarching goals	Investigate the influence of socio-economic factors on farm investment decisions and labour mobilisation for smallholder coffee production in EHP, PNG.
Guiding theories	The Sustainable Livelihoods Approach (SLA) used for this study involved participation of people at the household level in order to understand their relationships with their resources, the constraints and opportunities that influence their farm investment decisions and the daily management aspects of their livelihoods.
Designs and major decision points	Primary data collected from a random sample of 41 households. Focus group used simple stratified sampling of four groups (n=12). Secondary data was from large ACIAR projects (n=39).
Participants and settings	Coffee households in Sogomi and Safanaga.
Data collection procedures	One-on-one interviews and focus group discussions, unstructured interviews and collection of secondary data from reports and the 'grey'[4] literature.
Data analysis	Qualitative analysis: data transcribed and coded using emerging themes and established themes based on the literature. Additional themes emerged from interviews. Comparative and unusual cases were examined for underlying social processes. Quantitative Analysis: percentages and counts, using pivot tables.

The next chapter examines coffee production in terms of land use and labour allocation in a broader context relating to household investment decision-making.

CHAPTER SIX

COFFEE AND LAND USE CHANGES IN SOGOMI AND SAFANAGA

6.1 Introduction

This chapter discusses how smallholder land and labour investment decisions in the Sogomi and Safanaga village economies have been affected by changes in peoples' farming lifestyles resulting from the introduced cash economy and wider socio-economic influences. Firstly, farming lifestyles in the two village economies are described. This is followed by a discussion of recent transformations in farming methods that can be attributed to social and economic change, and how these modifications shape the livelihoods of people and their farm investment decisions concerning land and labour. To set the scene, the chapter begins by briefly describing the economic context of village coffee production.

6.2 The economic context of smallholder coffee production

Coffee was originally introduced by the Australian colonial administration as a means of facilitating agrarian development in rural areas, especially in the high altitude areas of the emerging nation state of PNG (Wright, 2002; MacWilliam, 2013). The expansion of the industry in this pursuit has been a strong focus of the national Coffee Industry Corporation (CIC) in the years subsequent to political independence in 1975. This has facilitated market relations to work its influence on the livelihoods of the indigenous populace among whom the crop was introduced for cultivation. As reflected in the poem below, for most rural families in the highlands of PNG, coffee remains the main means of gaining access to wealth, in the form of cash and other material[1] possessions, and enjoyment of the lifestyles offered in urbanised areas. The following is a poetic reflection on the aspirations for modernity by village households, which also highlights the temptations of money.

…..Money, money, money
People say it's the root of evil
But isn't it for our survival?
Money's funny isn't it sonny?
You worked hard for it
And then you get naughty

Money causes and settles fight
Money ensures I see city lights
But does it also throw me off sight?....
(Wapar, 2014)

6.2.1 The social context of smallholder coffee production

As is the case for other smallholder-based export tree crops, the means and reasons for producing coffee (see, for example, Curry, 1999; Curry & Koczberski, 2012), are never entirely attuned to market expectations because production and farming practices remain socially embedded within the indigenous economy. This integration of production into the indigenous economy of sharing and exchange generates social benefits as well. This is because, for the thousands of coffee-growing village families, it is a means to an end in terms of meeting social and cultural demands that require cash. Nonetheless, understanding the attitudes and motives of the farmers engaged in growing coffee, in relation to changes in social relationships and access to land and labour, has not been given much research attention by the CIC. Although this aspect of coffee production has been widely debated by CIC it has been viewed more as a hindrance to agrarian development that has to be overcome (Howlett, 1973; Collett, 1992; Overfield, 1998; Sinnett, 2008; see also Chapter 2).

6.3 Land ownership and distribution

Land is the basis of livelihoods for rural communities in PNG (Kaitilla, 1995). For Sogomi and Safanaga villagers, as for other rural Papua New Guineans, access to land is considered to be a critical factor for social and economic survival. Hence, its distribution is vitally important for sustaining livelihoods. In PNG, people have little, or no, experience of survival that is detached from the land. As Lederman (1986) noted, land is the basis of social life, even though land is not equally distributed within village society. In the villages, land can be accessed through social[2] contracts such as marriage (Overfield, 1998). In Sogomi and Safanaga, villagers have farmed the land and have shared and exchanged garden produce among families in times of both celebration (feasts) and calamity. This means that every member of the clan has a relationship to every other member of the clan through the land on which they live (communal ownership of land by the clan) and the food it produces. Among clan members, there is mutual consultation, exchange and planning of food production. However, some of these traditional social relationships, based on land rights, are

changing as rural societies like Sogomi and Safanaga embrace market relations and improved access to markets (Anderson, 1977; Kalinoe and Kiris, 2010). As Katilla, (1995, p. 96) observed in his work across the highlands of PNG:

> Before the present period, traditional landowners never sought to derive monetary benefits from their lands. Traditionally, anyone could gain usufruct land-use rights to [sic] customary land through well understood and prescribed procedures. These procedures are, however, no longer sufficient. Almost everywhere land has acquired new economic value as opportunities to use and exploit the riches of the land resources have become greater. Increasingly, land is being commoditized.

6.4 Changes in land use

Currently, land availability in Safanaga and Sogomi is coming under pressure due to changes in the use and distribution of land. Land pressure is related to increasing population growth and demand for land for cash crop production. Much of the land once used to grow food to feed families and to contribute to cultural rituals is now reserved for cash cropping. As land pressures have increased, it has orchestrated changes in the farming system from shifting cultivation to more intensive permanent farming systems. Thus, there is a move away from shifting cultivation, with long fallow periods, to crop rotation with shorter fallows leading to permanent agriculture. The area of land per food garden ranges from 0.25 ha to 1 ha. The permanent cultivation of gardens also requires households to know about different type of crops and their suitability for different combinations in rotational replanting. For example, some households plant peanuts to help soil fertility, by fixing nitrogen, as part of crop rotational farming. Villagers are also planting new varieties of sweet potato that are quick to mature (e.g. Wanmun, Whagi Besta, and Marasunda), taking five months rather than the seven months or longer for traditional varieties. The knowledge and understanding of different crops and their contribution to soil fertility is becoming important to these village farmers. There were cases in the village where some households were practising permanent agriculture because they had limited access to land.

There is also intensive commercial farming of food crops, which started in Sogomi and Safanaga only in the last ten years with the introduction of crops such as broccoli, pineapple and oranges. This farming system typically uses a lot of land (see Chapter 7). Production of large commercial food gardens is a recent development in

many rural areas of PNG and this is placing more pressure on land availability and accessibility (Kalinoe and Karis, 2010).

6.4.1 Individualised land tenure

The Food and Agriculture Organization of the United Nations (FAO) defines land tenure as:

> …the relationship, whether legally or customarily defined, among people, as individuals or groups, with respect to land. (For convenience, "land" is used here to include other natural resources such as water and trees). Land tenure is an institution, i.e., rules invented by societies to regulate behaviour. Rules of tenure define how property rights to land are to be allocated within societies. They define how access is granted to rights to use, control, and transfer land, as well as associated responsibilities and restraints. In simple terms, land tenure systems determine who can use what resources for how long, and under what conditions. (FAO, 2014)

The FAO definition of land tenure may be valid for large-scale development and management of land, but it does not truly define land tenure at the micro-level of the household, especially in transitional societies like PNG. From observations and discussions among the villagers, it was clear that they understood and identified the land as becoming more economically important today and that the rules of land tenure have changed considerably over the last three generations. Land tenure is changing rapidly as land comes under individual ownership. In customary land ownership, most member of the clan had access to land for food production, hunting and gathering of timber for firewood and building houses. Now, however, land resources are being intensively exploited by villagers as the population increases and the livelihoods of rural farmers become more integrated into the cash economy. There is a shift from temporary and short-term use to long-term use. Hence, new value systems relating to land are emerging as market access improves and new cash crops become available.

There has been much debate at the national level about the issue of customary land ownership in PNG and its significance to economic development (Yala, 2010). There is also a wide range of literature associated with communal versus individual land ownership and its impact on economic development in countries like Australia, Ghana, New Zealand and Somalia. For example, in the African context, Besteman (1994) argues that government interventions in customary land tenure regimes have stemmed from findings linking customary tenure arrangements with low agricultural productivity.

In Sogomi and Safanaga, the shift in the distribution of land from clans to family lineages intensified with the introduction of coffee. There were occurrences of inheritance in PNG's pre-contact societies. However, it has become more common with the cultivation of perennial cash crops such as coffee (Hide, 1981). The process of land distribution led to restricting access to other clan members and only allowing the immediate families access to the land. In this new individualised land tenure system there is a clear inheritance pathway. Land is passed on to sons in the family, then the son and his family are allowed to use that land in any way they desire, without the consent of the broader clan. In this system, farming on another clan member's land is restricted (e.g. a nephew farming on his paternal uncle's land), unless prior permission is given. The situation is different under communal or customary ownership. Under customary land tenure, production of food and other activities relating to the use of land is a form of social bonding. For example, villagers used to form large working parties to cultivate food gardens or go hunting, and such activities strengthened social bonds. Today in Sogomi and Safanaga these practices are rare.

More than half of the households studied planted their coffee gardens themselves (Table 6.1) and 20% of farmers inherited their coffee gardens from their fathers. Table 6.1 shows that more than 60% of coffee is planted on inherited land that was once part of the clan's communal land, and this is an outcome of the process of individual families claiming exclusive rights to land for their future male heirs. Coffee planted on customary land makes up only 21% of the total number of coffee gardens (Table 6.2). Most of the coffee planted on customary land is more likely to have shared ownership, that is, the coffee holding is shared with other relatives. For example, Peter has a section of his coffee garden on customary land that is shared with other relatives. When he was initially given a portion of customary land to plant coffee, he had planted some coffee outside the allocated portion of land, on what was declared to be customary land. Therefore, other relatives who have access rights to that land also have the right to harvest the coffee trees planted on it by Peter. Peter is not able to claim it as 'private' property even though he planted the coffee. This land is now disputed by other clan members who are now asserting land ownership claims for their own individual use. Customary rights to traditional communal land were initially for subsistence farming, where land was farmed for short periods and then

left to revert to fallow. However, coffee, as a perennial tree crop, occupies the land for years and that piece of land is therefore not available for others to use.

Table 6.1. Household members who planted the coffee gardens.

Who planted the coffee trees?	**Percentage (2013)**
Planted by current farmer	60
Planted by father & inherited	20
planted on uncle's land	13
Planted by father and subsequently subdivided	4
It was inherited from father and extended by current owner	2
It is a portion of an old coffee block	1

Table 6.2 shows that land was directly inherited by 69% of households, and this is reflected in Table 6.1 showing that 20% of households owned coffee trees planted by their fathers. These data show a clear pathway of inheritance and this was stated briefly in Grossman's (1984) study about individualisation and the inheritance pathway.

Previously, warfare was a regular threat to the village and one of the ways to deter enemy attack was to have a united community. To maintain solidarity among kinsfolk, everything was shared. However, in today's cash economy, money creates a new enemy line. This adversary is addressed by individual households and not so much by communal effort. The shifting of the attitudes of villagers towards a more individualised system of landownership is also disengaging households from some of their social connections. The process of individualised land tenure is making households act as individual units of production on their own land and this is having the effect of reducing their access to labour outside the family. More households are managing their farms independently, with little labour assistance being given or received. Households now concentrate their resources on their own production and households to generate cash income, and this limits their social and cultural engagements with the wider community.

Table 6.2. Household land ownership of current coffee holdings.

Land ownership and coffee production	**Percentage (2013)**
Households who inherited private land through family lineage	69
Customary land[3]	21
Land owned by maternal uncles	7
Land owned by in-laws of the male household head	1
Other	2

There is significant evidence of changes to land management in terms of ownership, accessibility and land distribution after the introduction of coffee in the Bena area in the mid-1940s. It was clear from the discussions with the older people in the village that customary land tenure is not static and that land was once viewed as an infinite resource: now land is viewed as valuable and finite. As one older villager said:

> *Mipella lukim na ting olsem graun em i olsem mama bilong mipela em: bai no nap idai. Em bai givim mipela samting long taim mipla i stap laif inap mipela idai. Em bai gat gris olgeta taim, tasol nogat mipela i asua.* (We think of land as our mother who will never die; she will provide for us 'til we grow old and have passed on. She will always be fertile; alas how wrong we were.)
>
> (Papa Ukaia, November 2014)

People told me that, when coffee was introduced, the villagers started planting coffee on the portions of land that were once used by their grandfathers or their fathers for food gardening. Hence, initially, only land that was once used for gardening was planted with coffee. When villagers realised that coffee was earning them money, they started to identify other portions of land used by their grandfathers and quickly laid individual claims on that land to expand coffee production. This is the period when coffee started to spread like wildfire among the smallholders, in the 1950s and 1960s (MacWilliam, 2013, p. 125). In recent times, with rising population pressure, improved market access and emerging land shortages, villagers have realised the impact of coffee as a perennial crop on the land, which has led them to 'grab' land that they identified as theirs according to their gardening history. This is leading to the process of unequal land distribution and the individualisation of land tenure.

Land individualisation trends have been identified in coffee households in PNG in previous studies (e.g. Howlett, 1980; Grossman, 1984; Collett, 1992), and it is now becoming a widespread practice among coffee households in Sogomi and Safanaga. Previously, land was distributed for coffee planting by following the historical patterns of food gardening by fathers and grandfathers, as mentioned above. In time, coffee production generated a clear process of new land distribution practices that encouraged land individualisation (see Figures 6.a and 6.b). These land distribution patterns, which started after coffee was introduced, have been strengthened by growing population pressures on the land and the introduction of other cash crops like broccoli, pineapple and oranges (see Chapter 7). Many of the older villagers said that, when they were young, they participated in land conflicts and warfare between tribes. However, today, there are more land conflicts within clans and families as land pressures build and as clan groups become more fragmented. This statement was supported by the village magistrate, who has been a magistrate in the Bena area for over 12 years. He said that land conflict cases have increased in recent years from one case per month, 12 years ago, to an average of four cases per month in his Local Level Council area. During my fieldwork, the magistrate attended six land conflict cases (in October alone) in the lower Bena area that comes under his jurisdiction. I also witnessed a land conflict negotiation and a land dispute over land compensation occurring between families during my field work in 2014. This conflict escalated into a tribal fight with the neighbouring village of Sagiufa.

(a)

Legend

* Philip's household

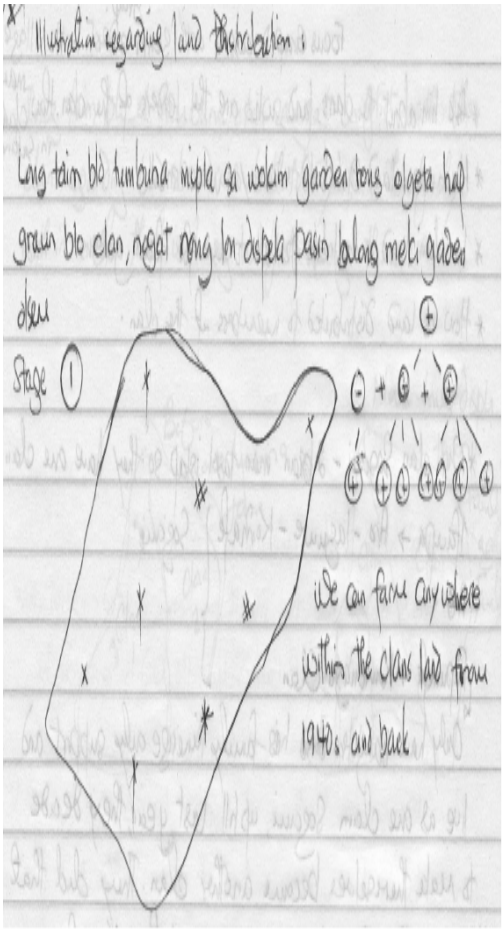
Kura's household

x Yadi's household

_____ Boundaries created after coffee was introduced dividing up once open access land for food gardens to individual land.

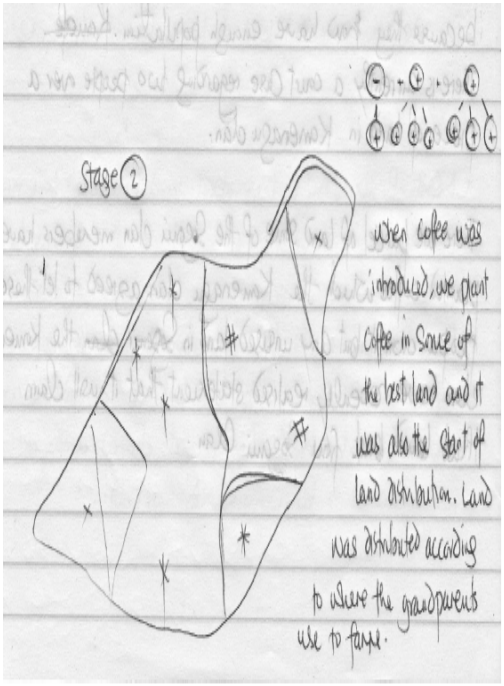
The circles show a family tree and area of land they can access. The symbols represent individual males in a households and areas they make food gardens.

__ __ __ Subdivision of land by individual households, as individual units of production.



b)

(c)



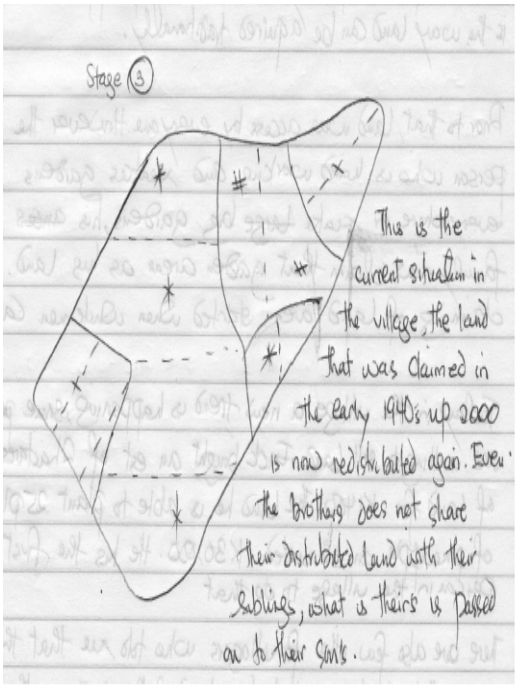


Figure 6.1 a, b, c. Changes in land use.

Figure 6.1 (a, b, c)[4] was drawn by one of the older participants in a focus group to explain the changes he and others had seen over the last few decades regarding land access and distribution. Figure 6.1a, is an illustration of the clan's land before coffee was introduced in the years prior to the 1940s. It shows stage one of the land access and distribution process in Sogomi and Safanaga villages before coffee was introduced in the mid-1940s. Land for gardening was openly accessed by any member of the clan who was able to work the land. The symbols '*, #, X' show movement of individual household gardens: households could move around the clan's land to garden. There were no restrictions as to where they could garden, or in the size of land area that each person or household could cultivate. In the 1940s, it was a shifting cultivation agricultural system. As such, after harvesting, the garden area was left to fallow for several years, and another garden area was cleared in a new, forested area. There were no restrictions on access to clan land by clan members before the introduction of coffee. As explained by Papa Ukaia:

> *Long taim bilong tumbuna mipela I save wokim gaden lo olgeta hap graun bilong clan, nogat rong lo dispela pasin bilong wokim gaden'.* During the days of our ancestors [and up until the 1940s], we could make food gardens wherever we wanted on our clan's land, and there were no restrictions on that practice (Papa Ukaia, October 2014)

Figure 6.1 (b) shows stage two of the process of changing land ownership patterns that emerged in the late 1950s when there was widespread adoption of coffee by villagers (Bourke 2009; MacWilliam 2013). In this period, villagers identified and claimed areas where their grandparents had once planted food gardens. This started new patterns of land distribution and more individualised land tenure patterns started to emerge in the villages. As one of the old villagers in a focus group discussion recalled:

> When coffee was introduced some of us planted coffee on some of our most fertile food garden areas. We did not realise that the coffee tree will be standing there for a long time, and it will cause problems. (Papa Ukaia, October 2014)

Figure 6.1 (c) shows stage three in the process of land tenure changes. This diagram shows the present situation of land accessibility and distribution that changed around the 1970s through to the 1990s when other cash crops, such as pineapple, oranges and broccoli, were introduced. There is now great pressure to restrict accessibility and land redistribution. The land area that was distributed to a family in the 1940s as illustrated in Figure 6.1 (b) has since been further subdivided, due to population growth and the increase in the cultivation of vegetables for household income.

The current pressure on land may lead to a further trend whereby land is increasingly bought and sold in the village (see below). Some families with a large parcel of land within the clan are already starting to sell and rent sections of their land, as in Sogomi (see Section 6.3.2).

This data also confirms research undertaken by Wilson and Evan (1975) in 12 villages in EHP, which found that average coffee holdings were only 0.15 ha. This may reflect the changes illustrated in Figure 6.1 (b) where farmers were subdividing land amongst their sons for coffee production. Figure 6.1 (c) may also reflect this trend, as indicated by the only slightly larger average coffee holdings of 0.26 ha recorded by Collett (1988) in Bena Bena. That is, current population pressures are causing sub-division of coffee holdings in Safanaga and Sogomi.

6.4.2 Land commoditisation

Land commoditisation may be the new way of acquiring land or temporary ownership of land in the village today. Land commoditisation initially started with the process of land alienation (Crocombe, 1971; McWilliams, 2013). It began in the 1900s and continues today with improved access to markets and a shift away from traditional principles of land ownership, as discussed above. For example, land can now be bought and sold among villagers in areas like Asaro and, very recently, in Sogomi. Some communities along the Okuk Highway have even sold customary land to outsiders. As discussed in Chapter 4, the selling of land has been recently reported in other parts of PNG where export commodity tree crops are grown. The first case recorded in Sogomi Village of land being sold to another villager was in 2013. One of the farmers I was working with bought an estimated 1.2 ha of land for K1,900 (AU$800). The farmer who bought the land is the largest and most successful pineapple producer in the village. He also owns a large land area of his own but he

bought the additional land to extend his pineapple farm, and deliberately chose the land area near the road (Plate 6.4). The land transaction was organised through village land mediators. This land purchase means that the farmer is now the 'owner' of the land; he can formally register it with Department of Lands as part of his total land area. This is a new trend occurring in the village, as a way of accessing land outside traditional practices, and it 'individualises' the land to single households. A few other farmers I interviewed had expressed interest in buying land in the future. This trend in Sogomi and Safanaga is possibly the future way of accessing land, especially for commercial production in the area. This process is occurring in other parts of the highlands, as observed by Kaitilla:

> With the introduction of the cash economy in recent times, land has acquired monetary value, which was hitherto unknown. A new form of social exchange system is increasingly manifested as traditional landowners persistently press for monetary compensation for usufruct rights of their land (Kaitilla 1995, p. 95).

There is an increasing practice among villagers in Sogomi and Safanaga to look after a family member's land while the family member is away in a distant urban centre for an extended period. The people 'minding' the land now claim monetary compensation for doing so. This practice of claiming monetary compensation for looking after a relative's land is a recent development by villagers. In interviews, people claimed that this was not observed 20 years ago. Monetary payments also are given to the trustee, even if the land is being used by the trustee to grow food crops for sale and to enjoy those economic benefits from the land. For example, Colin claimed monetary compensation for looking after his brother-in-law's coffee garden, despite regularly harvesting and selling the coffee for his own household's benefit during the absence of his brother-in-law. Upon his return to the village, the brother in-law was expected to pay Colin before returning to his coffee garden to do farm work. The payment was in the form of coffee beans that Colin had harvested the season prior to releasing the coffee back to his brother-in-law. The coffee beans that Colin harvested were sold to a buyer in town.

Another emerging practice is the renting of unused land to an "outsider"[5]. This was done by only one of the farmers interviewed in Safanaga. It may not be a common practice now, but it is possible that villagers with large areas of land will rent some

land temporarily to an outsider, or even to other villagers, in the future. Rental of unused land was observed during my fieldwork in other villages in Asaro District, where access to markets was good and households rented land to grow food crops to sell at local markets. The person who pays rent can pay PNG K250 for 0.25 ha of land to farm cabbages or broccoli for sale at the local markets for one planting cycle. The planting cycle ranges from 6 to 12 months, depending on the type of vegetables being planted. For example, in Asaro, the most commercialised food crops are broccoli, cabbages and carrots. Broccoli and cabbage mature in three months, and carrots in four months, while sweet potato, which is the staple crop, also matures in four months. While the practice of renting land is not yet occurring in Bena, it is possible it might happen in the future, given the current land pressures in the villages. If renting of land were to increase then it could lead to a reduction of land for sale among villagers, which might result in a new form of land management in the village. This might have the effect of making land access easier, at least for temporary food crops.

6.4.3 Unequal distribution of land

The concept of communal clan land appears to only work when large-scale development occurs. For example, individual clan members come together, collectively, to map out land belonging to their clan for development. However, at the micro-level there is an unequal distribution of land, resulting from changing values, increasing cash demands and improved market accessibility. Some families have limited land area and are intensively using it for cash crop production, as shown in Figure 6.1 (c). About half of the households studied had a land area of less than 4 ha. Case 6.1 (below) is an example of a household which manages its livelihoods with limited land access and availability.

Box 6.1. Peter's farm.

Peter and his household have less than 2 ha of land. Peter's access to land is limited because he was an adopted son. He has two sons and two daughters. The eldest daughter has married and lives with her husband, elsewhere. His other children were in school at the time of fieldwork. The second daughter was in Grade 10 while the two sons were in Grades 8 and 9. The household's 2 ha of land has 0.4 ha of coffee and another 0.02 ha under permanent orange and pineapple production. The remaining land is under rotational cultivation of pineapple that is for sale and food crops for household consumption, such as sweet potatoes, corn, beans, onions and leafy vegetables. Surplus vegetables also are taken to the market. His household also raises pigs and goats. Peter was the first person in the village, in 2002, to plant pineapples for large-scale commercial production. Despite his limited access to land, his household earned a reasonable income compared with some other households with a larger area of land. Annual income from coffee is under PNG K3,000 (AU$1,500); pineapple and orange is just under PNG K10,000 (AU$5,000). In 2007, Peter bought a second-hand Mazda ute to help with the transportation of pineapples to the market. He was only able to use that car for a year before abandoning it due to mechanical problems; it was difficult for him to source parts within the country. In 2013, he bought a second-hand 15-seater bus costing K30,000 (AU$15,000). His household is now running a pineapple farm, coffee farm and PMV business. He managed to acquire all these from his less than 2 ha of land and also raised money for his children's education. He said he is willing to buy land if some villagers are selling it, and he believes it will happen soon.

Plate 6.1. Intercropping and rotational farming.

Plate 6.2. A common sight of polyculture of cash crops for households with limited land.

6.5 Labour in the village

6.5.1 Immediate family labour

Generally, there is an assumption by researchers and development workers that household farms in many rural villages operate with a surplus of available family labour and can easily draw on social networks for additional labour. However, family members are the main source of labour, and households do experience labour shortages in peak periods, such as during coffee harvesting or when land is prepared for new pineapple gardens (see Chapter 7). The data from this study shows that there is a constant turnover of family labour, which is a challenge for maintaining consistency in household productivity (Table 6.3). For example, there was a 16% reduction in the use of family labour between 2010 and 2013 (Table 6.3). Although it was not a long period for comparison, it shows the high movement of labour at that

time. This decline can be explained by children moving away from the family to attend schools or to be married.

A couple of cases will illustrate the dilemma of labour shortages faced by households. A farmer in Safanaga, Maki, has three children and they were living at home while attending primary school in 2010. In 2013, the eldest daughter completed senior primary and then married, leaving her younger siblings (aged 9 and 7) with her parents. The mother expressed her plight and said that her older daughter had helped the parents a lot with household chores, including coffee and food garden work. The other two children were too young and did not help much. This left the parents to work alone most of the time. They were reluctant to ask extended family members to help because they knew it was difficult for them to assist, given their own workloads. The second example is from Peter (see page 92). Peter has two daughters and two sons. At the start of my visit to Sogomi, in 2010, Peter's children were all in school, with the eldest daughter in high school. In 2011, his eldest daughter married and left home and, in the same year, the second daughter became a school boarder, leaving only the sons with their parents. In 2012, the third child left home to be a school boarder with his sister, leaving only the youngest son with the parents. These two brief examples show how the ageing of family members can affect labour availability. Household labour supply can shift quickly from good access to poor access in a very short period, leading households to constantly alter their livelihood decision-making.

Table 6.3. Household labour sources for coffee.

Labour sources per household	**2010 (%) (n=39)[6]**	**2013 (%) (n=41)**
Grower who works alone	15	36
Immediate family labour engaged	50	34
Extended family labour engaged	26	20
Youth labour engaged as hired labour	5	6
Other hired labour	4	4

6.5.2 Exchange and reciprocal labour from extended family and relatives

Labour from the extended family played an important role in coffee production. Extended family labour also decreased by 6% from 2010 to 2013. Again, it may be a short period to compare such changes, but the trend is that more households are having difficulties mobilising extended family labour as households disengage from social networks to become more engaged in the cash economy. Any farming activity in which the household is engaged to generate cash is seen by the extended family as private, meaning the extended family does not want to become involved. The common statement used in the village is 'the household is working for their bread and butter' and so, increasingly, extended families tend not to help. However, there are some farming activities of the household that are undertaken for traditional and social purposes that are not seen as private, such as when a household is engaged in making a food garden for a bride price payment, or picking coffee that will be sold and the income used for compensation or death gift payments. In these situations, extended families and others in the village are willing to assist, without being asked to provide labour, and their assistance is gratefully received. It is a different case when farming to generate cash income because, most of the time, villagers are not willing to provide their labour to their extended family on a regular basis when it requires them to forego their own cash earning opportunities. However, there are cases of large producers of cash crops being able to attract extended family labour. In such situations, extended families will provide their labour to their most successful family member because he has cash and other material wealth, for example, a car. What they receive in return is access to some of his material goods. For example, they can transport their goods to market using his car. During the period of this study, I observed a farmer named Tau going through such a transformation of being able to attract labour because he was earning a good income from producing and selling large volumes of pineapple. Another reason for the extended family to provide labour to a larger producer of cash crops is because they want to be associated with his success and also to provide support for him, which brings them status and protection because of his success.

Exchange labour is still practised today but it is only carried out regularly by a few households in Sogomi and Safanaga. Today, most exchange and reciprocal labour is accompanied with feasting, which can be expensive for the person drawing on it.

Foods for feasting are mainly store foods like rice and lamb flaps. So, with the purchase of store foods to feed workers and gifts of cash to meet workers' immediate or future needs, reciprocal labour can be expensive. Table 6.3 shows labour used in coffee production for 2010 and 2013, and reveals that most labour for coffee comes from the immediate family. When household labour is not available, male youth sometimes fill the gap, but it does not often happen (see Section 6.4.3).

There are a few ways that a coffee household can pay extended family members who provide labour during coffee work, especially for harvesting. Table 6.4 shows some of the ways in which extended family labourers are paid. Providing cooked food and reciprocal assistance was practised by 55% of households who provided their labour. Only 10% of households paid cash. A cash payment does not mean the same as a payment for hired labour. Most people receive cash payments because they have immediate cash needs, such as a desire to travel to major towns (Lae or Mt Hagen) or the need to buy small household items. However, this does not mean that cash plays a lesser role in accessing extended family labour: 30% of households receiving this type of labour, paid cash, provided food and reciprocated labour assistance. Five percent of households assisted with labour because they thought they would need the cash later and could call for it when the need arose. With changing attitudes, this trend is likely to increase.

6.5.3 Hired labour

The availability of hired labour in the village is very sporadic. Households with large coffee gardens compete for any available group labour. It is competitive in a situation where households are competing to recruit organised labour groups because larger groups get more work done. Most organised group labour sets a fixed labour rate, and most farmers agree to the rate because they are in competition with other households for labour during the coffee harvesting season. Although the labour groups decide their own rate, it is still always below the national minimum rural wage rate. Most farmers also believe it is generally cheaper when they engage group labour compared to hiring individuals to ease their household labour demands. Although only 3% of coffee households hire labour, it is still difficult to find labour, as mentioned above.

Hired labour in rural communities has a weak bargaining position because it can be substituted with family labour at any time. That is, the labour wage rate can be low because some tasks are carried out by hired labourers only to reduce the workload of family labour and, as soon as the hired labourers' activity is completed or the need is reduced, family labour is once again engaged. For example, if a coffee garden is overgrown with weeds, a few people may be hired to slash the weeds in a day but they may not remove the slashed weeds from the garden.

Table 6.4. Labour payments made to the extended family who assisted with coffee work.

Type of payment to the extended family who provided labour	**Percentage (n=41)**
Provide only cooked food and reciprocal work	55
Provide cash, cooked food and reciprocal work	30
Provide only cash or cooked food	10
Provide cash later to assist households when they have need	5

The family will then do the task of clearing out the slashed weeds or digging out the roots of the weeds. The hired labourer cannot really bargain the pay rate because part of the work is done by the family; they are only engaged to make the workload lighter for the family. For example, Jim hired ten people to pick his coffee cherries for five hours and he paid the group K100. The 2014 rural labour wage rate is K3.20[7] per hour, but these village pickers were paid only K2 per hour. While such labour arrangements are principally an advantage to the farmer, if the labourers can meet their fund raising objectives, they are generally satisfied with the arrangement, even though such labour arrangements do not comply with minimum rural wage requirements.

Sometimes individuals are engaged in pairs. For example, a couple of male youth, usually looking for fast cash to buy beer, will provide their labour for a day's work. The day's work payment is usually equivalent to the price of a two litre container of locally produced spirit called *leva lave*[8] (costing K30), and the farmer is willing to pay K30 to the individuals to slash weeds in a coffee block or do maintenance of drains. A couple of women may also help to do weeding or planting for a day for

K20; their rate may be lower because they would mainly be weeding in coffee gardens which is considered light work. These coffee gardens are regularly maintained, so weeding tasks do not require heavy slashing. Some women also do easy tasks for quick cash to meet some immediate need such as to buy laundry soap, cooking oil, or yarn to complete a *bilum* for a gift.

Large labour groups only become available when there is need for cash for a specific purpose for the group. For example, a church group or village youth group may earn income to cover camp or registration fees and transport associated with an event. The remaining funds are used for personal needs. Most of these groups tend to form to coincide with peak labour demand periods, such as village coffee harvesting during the flush period. Church leaders also consider issues such as village cash flows when they plan their calendars early in the year and announce the events to their congregations. For example, if there is a camp in September, the church will start planning early in the year to organise work groups for the coffee season in June and July. Such situations clearly show that there are times when households face labour constraints, particularly in peak seasons, like coffee harvesting, and for the ploughing of pineapple gardens.

During focus group discussions on coffee labour, a few farmers expressed their concern and disappointment at how difficult it is for households to access hired labour in the village during the peak harvesting season. One woman also mentioned the conflict within households when their husbands want the household to follow the strict quality requirements to produce quality coffee. She said, “It is a lot of work for us to follow every step required when we have our food gardens to look after. Therefore, families are forced to hire labour and, if we are lucky, we engage them because the labour groups are not always available.” Another farmer, named Moses, shared the same difficulties of finding labourers, causing him to look for labour outside of the village (Case 6.2).

Even though only 3% of households hired labour regularly, the results show that there are also changes in the way farmers are managing to pay for labour. In 2010 households gave cooked food sometimes; however, in 2013, no hired labourers worked for food - it was all cash. This is a short period to compare changes but,

when talking to villagers, it was agreed that there have been significant changes in their attitudes to cash and the social exchange of labour.

Box 6.2. Moses and his labour struggles.

Farmer Moses said, "In recent times in our community, the villagers have changed their attitudes about helping each other. The villagers usually say 'em moni bilong ol yet so larim ol yet pikim kofi' (It is their money so let them pick their coffee). This is a common saying in our community. I am married to a woman from another province, and I have a big problem with labour when it comes to harvesting, as my in-laws cannot assist. I spend a lot of money on pickers. If the groups are available, I make it a priority to engage them but, most times, these groups are not available. The labour groups are available only to raise funds for some church activities or sporting activities. When there are no such activities, then there are no group labourers available. There is only one group of permanent pickers; they are the labourers at 'Sioke Plantation' and some villagers, like Gomez, have engaged them a few times. I had to bring in some settlers from Gumini, in Simbu Province, who live in an informal settlement (Piswara) in Goroka town to pick my coffee at one stage. This arrangement was done through a friend. I did that because I started to get embarrassed by the poor response from villagers when asking them to assist in harvesting, even when I offered to pay them. For those pickers who work for me, I provide cooked food, apart from cash payments, and other things like cigarettes or I supplied tobacco and betel-nut[9] so they are happy to work.

6.6 Coffee production

Smallholder coffee farmers in Sogomi and Safanaga villages use a low input farming system which results in low productivity. In this low input system, farmers do not apply inorganic fertiliser, as is normally practised by plantations. As observed during my fieldwork, most farmers use litter from weeds and leaves to mulch their coffee gardens, and coffee gardens near the house get a regular dose of domestic food scraps such as sweet potato peelings and coffee pulp. Smallholders do irregular weeding and pruning and most smallholder coffee is planted under moderate to heavy shade. The tree species commonly used for shading is *casuarina oligodon* which provides nitrogen (Harding, 1988, 1991; Bourke, 1997).

A total of 37 out of the 41 households surveyed produced an estimated average of 916 kg of parchment coffee in the first eight months of 2013. However, not all the coffee gardens were harvested and coffee garden size varied between households. There are many factors why some households decided not to harvest coffee in some of their gardens. For example, some gardens were distant from the house or were overgrown with weeds and too bushy to harvest without first having to clean up the

area. Another factor is that the price of coffee is not attractive enough, compared with the potential income to be earned from other crops like pineapple. Until about ten years ago, before pineapple and broccoli farming became popular, coffee was the main cash crop in Sogomi and Safanaga. Farmers started to establish pineapple as a cash crop and a few village households also established other vegetable crops like cabbage and broccoli. Most farmers got into pineapple after they realised the local demand for pineapple had increased and prices were good (discussed further in Chapter 7).

6.6.1 Coffee Income

Table 6.5 shows the coffee incomes of 37 households that sold coffee in the first eight months of 2013 (see also Appendix 6). Some households also stored coffee for future needs and there were three households that were not included in the table below because they could not recall the amount of coffee they had sold. The lowest income shown in the table was earned by a young single male. He was not able to harvest his coffee because he was doing his apprenticeship training as a mechanic in town. He left his coffee to his mother and sister to harvest and sell. There were also another four households whose incomes were less than K200 (AU$100). These four households have other sources of income. For example, Tau earned only K167 in eight months from his coffee. However, his monthly income from pineapple was around K500-K800 (depending on the season). Farmer Mary earned only K101 from coffee, and her major income source was broccoli, which earned her a monthly income of K300. In Leo's case, he earned only K165 from coffee because he had a casual job in town. He recently married a second wife, and that caused his first wife to take over the management of the coffee without sharing the earnings with her husband and co-wife.[10] Domestic conflict caused the husband to let his first wife control the income from the coffee while he and his second wife relied on income from his casual job.

Two households stored most of their coffee that year. These two households had no coffee of their own, and they were households headed by females who had separated from their husbands. The coffee stored was given to them in exchange for the labour they provided to their families. These females were vegetable farmers who planted broccoli and cabbage, earning K300 per month. Table 6.5 also shows nine

households which had earned more than K1,000 in the last eight months from their coffee, and half of these nine households were large coffee producers who had large coffee holdings, while the other half did not. However, these households with less than 2,000 trees were able to earn income of more than K1,000 either by buying coffee beans from other farmers or by fully harvesting most of their cherries from their trees. Peter said that,

> *when pineapple was introduced, most people dumped coffee for pineapple cultivation. My coffee of 0.4 hectare gives me an income of less than K3,000 in a year, while my small pineapple plot of less than 0.2 hectare gives me more than K10,000. I make more money from pineapple in a year than from coffee. That is why most people have abandoned coffee, but I strongly go against people removing coffee, because coffee is our IBD (interest bearing deposit - more like insurance). One of the good things about coffee is that the coffee season takes us through and then hands us over to the pineapple season: we have an income flow throughout the year.*

Despite the good income earned from pineapple and vegetable production, some farmers were keeping coffee trees as a form of insurance for when drought or other natural disasters happen, which can easily affect fruit and vegetable gardens but have less impact on coffee production. Sogomi and Safanaga are located in one of the drought-prone areas of EHP and are more prone to drought than other districts in the province (see Chapter 4, Table 4.2). Farmers here are well aware of the natural conditions they face and coffee, being a hardy plant, usually survives droughts when other cash crop opportunities are destroyed.

Table 6.5. Summary of household coffee income.

Coffee sales from January to August 2013	**Percentage (%)**	**Summary**
Income from K100 to K500	56	These farmers with income less then K1000 heavily supplement their household income from the sales of pineapple and broccoli. Most of these household have small coffee gardens.
Income range from K501 to K1000	20	
Income more than K2000	12	The farmers with income above K1000 are farmers with big coffee gardens. There were only 3 households in Sogomi and Safanga with more than 1 hectare of coffee.
Income range from K1001 to K1500	6	
Income range from K1501 to K2000	6	

6.7 Coffee production and the social situation of the villagers

Villagers have many reasons to cultivate cash crops that have no reference to profit-making. Four cases were identified that explain some non-monetary motives in cash crop farming in Sogomi and Safanaga. One of the most significant aspects of coffee production is to meet socio-cultural obligations. With very strong socio-cultural obligations, villagers set the timing of the payment of bride prices and death compensation around the time coffee will be ready to harvest and sell. Most of the time, the crop production has been budgeted a year or months in advance, without considering the market price or environmental factors that will affect yields. As one farmer said, "We used to plan everything around the coffee season. We call it '*six mun* (six month)' plan: *baim meri* (bride price), *bel kol bung* (compensation) and many other cultural events where households will take part are planned around this time." The second case is the expansion of coffee gardens to lock up land, and the third case is coffee production as a form of insurance. Each of these is discussed further below.

6.7.1. Coffee for socio-cultural status

The cultural system of the village is one that values social and exchange relationships, and people gain status within these exchange networks. Food and pigs are exchanged for feasting, among other things. When someone contributes a lot of food and pigs for village events, that person commands respect and status that can also be used for his personal household's benefit. Since social and exchange relationships are based on ostentatious displays of wealth, cash crop production can be used as evidence of wealth with which to impress others (Grossman, 1984). The introduction of coffee has had an impact on subsistence food production for feasting and exchange and has altered the traditional concept of producing garden food for gifts and exchange. Cash earned from coffee has substituted a lot of these traditional food crops, as discussed in Chapter 4. However, cash is also now a prerequisite for raising one's socio-cultural status in the community. Table 6.6 shows the purposes why households sell their coffee, with socio-cultural expenses ranked as the second most important expense. Table 6.7 shows that males have a strong motive for using cash income for socio-cultural purposes because it gives them status.

Table 6.6. Household ranking the purpose for selling coffee.

Purpose of coffee sales	**Percentage (n=41)**
School expenses	7
Household needs	51
Health	4
Social/cultural obligations	21
Investing in income activities	7
Corporate expenses	2
Savings	1
Other (e,g, they sold because the coffee was ready)	6

From the survey, the main priorities for the proceeds of coffee sales were household needs (51%) and socio-cultural expenses (21%). Fifty five percent of the sales were approved by husband and wife, and 35% by the husband alone (Table 6.7).

Table 6.7. Members of households who approve coffee sales.

Who approves the sales?	**Percentage (n=41)**
Husband and wife	55
Husband	35
Wife	5
Mother and children	5

Most household expenses are approved by both husband and wife while cultural expenses are mainly decided by the husband alone. This reveals the attitudes of males towards their cultural values and the cash earned from coffee. Their socio-cultural status is as important today as it was in the past. Most of the decisions about how the money will be spent are made before coffee is sold, which is an indication that most coffee sales are planned for a particular purpose, as mentioned above. In some cases, the spending of coffee proceeds is planned six to twelve months prior to sales. Household expenses are also influenced by unplanned expenses, for example, for children, as shown in Table 6.8.

Children make their requests known to their parents (for clothes, toys or snacks) as they are going off to sell coffee. Although such expenses can be seen as minor, they can greatly impact the quality of the household goods the farmer can afford. This shows that both external and internal factors influence household decisions on farm investments, and that household budgets can change on the day of sales.

Table 6.8. Children's influence on household expenses.

Children's influence on household purchases using coffee income	**Percentage (n=41)**
Sometimes	34
Never	32
Always	29
Others	5

Similarly, in other areas in the highlands and elsewhere in PNG, the village economy is a mix of the traditional economy and the modern cash economy. This integration provides a more sustainable way for a household to manage its resources that is not based purely on market factors. To discuss the mix of these economies in detail, a short case study (Case 6.3) will be used to establish the changes taking place within the indigenous exchange economy and cash farming systems. Walsh-Dilley (2013) argued that capitalism creates economic hybridity, meaning that the market economy is mixed with the indigenous economy to create an alternative form that is not entirely market-driven and also not fully influenced by the indigenous economy of social relations and exchange. Case 6.3 reflects the use of gifts in cash crop production to recruit labour.

Box 6.3. An alternative economic space.

John is an executive member of the local coffee cooperative. He promotes many good practices in coffee farm management to improve coffee quality. He is one of the farmers who engage a lot of different labour groups to harvest their coffee. Some of the groups were youth groups, church groups and church women's groups (mama groups). He said that there were different rates set by different groups, depending on their objectives. Rates range from K70 to K100, depending on how long the group is going to work (e.g. 8am-12pm; 4hrs- fixed rate). He paid a church group K50 for a day's work but, on top of that, he provided cooked food as a gesture of appreciation for their good work. He said that he looks for different groups to pick his coffee in the coffee season. "We check rates and see if they are available to do harvesting; most of these groups can be booked out during peak harvesting periods. We go to any group that is available when we need assistance: we do not go to a group with the lowest price but we choose the group according to their availability. I not only pay them cash but give them cooked food as well. This is our Melanesian way of making people happy and also I want to maintain good relationships with them because, when I ask them to help again, they will be happy to help me. This gesture will go a long way in terms of not only sourcing labour when needed but also receiving assistance in other forms such as from these people when support is needed. If the coffee pickers I engage are plantation labourers who live in the plantation settlement, we also give them uncooked food." This behaviour of cooking food goes beyond cash transactions; it is a part of an indigenous economy based on social exchange. Cash is not enough on its own; food is a way of making the transaction social and creating stronger relationships.

One of the impacts on coffee farmers engaging in both the modern and traditional economies is the fluctuations in the price of coffee. Most of the time, no matter whether the price of coffee is high (which doesn't happen often) or low, the rate for hired labour does not change. However, low coffee prices impact on farmers' capacity to recruit labour. If they are unable to buy a sufficient quantity of store foods for their hired labour, labour will be reluctant to work, and they will be more dependent on family labour. This sometimes results in under-harvesting and the neglect of coffee gardens. This makes it even more important for households to maintain good social and cultural relationships with each other by using the cultural exchange system that involves more locally grown food; however, with commoditisation of labour rapidly becoming entrenched in these communities, the recruitment of labour is becoming very challenging.

6.7.2. Coffee as land insurance and compensation

As mentioned previously, in recent years, there has been an increase in the subdivision of coffee gardens among many coffee households in order to secure land for their sons. For example, coffee gardens are developed for the male child as soon

as he is born so as to stake a claim on the land. The subdivision of land is mainly practised by families who have several adult sons who will inherit from their father. If the sons later marry and have male children, they will plan to secure land for their own sons, especially if land is in short supply. In many cases, the sons will aim to quickly either extend their coffee garden or plant a new portion of land and give it to their sons. It is a clear indication of coffee gardens not being extended simply for immediate income purposes but, strategically, to secure future claims on the land (Figure 6.1.c).

Coffee income is also used as compensation to resolve internal and external conflicts. Disputes are solved with some form of monetary payment. Having coffee gardens provides insurance for such situations. For example, Yadi said that he had to compensate his father-in-law for having a domestic argument with him, and most of his coffee sales for 2013 were saved for that purpose (Table 6.5).

6.7.3. Coffee as social safety net

Twenty years ago, households in the village would assist any household that needed it, as long as they were a member of the community. It was done because of traditional social values, the main one of which was the sharing and exchange of resources; it is a way of life that bonds members of the community. It unites disparate interest groups in the community so that they perform as one unit in times of despair and celebration. Coffee acts as collateral for households, who do not have other forms of security like small-scale businesses in trade stores or PMVs, when seeking assistance from relatives or the village community.

Today villagers will not assist a household unnecessarily, with exchange labour or other resources, if they know that the household cannot recompense them in some way. Socio-economic assistance given to relatives or other households is now seen as an investment in another household with an expected future return. If a household does not have coffee, help may not be extended to them by other village households as it is seen as a bad investment. Bad investment, in this context, means that the household may not be able to receive assistance when required because it will not be able to reciprocate in the future. A new pattern of social relations is emerging where more villagers are using cash in exchange for labour, food and other in-kind gifts for

socio-cultural activities. These new social relations make households who have no form of cash-earning activities marginalised from reciprocal labour networks.

6.7.4. Coffee as investment in education

For most villagers, coffee plays an important part as a source of income to pay the ever-increasing school costs for their children. Households make decisions on planting or expanding their coffee farm as their children progress through different levels or grades. The planting of coffee is a source of investment and pride to the family to signify that their children are advancing through education. There are also unmarried single households who use their coffee income to assist with the school fees of their nieces or nephews (Case 6.4). From the surveyed households, the second highest expense that used coffee income was school fees. Sixty-one percent said that most of their coffee income was spent on school fees or related educational expenses for their children (Table 6.6). Most farmers said that, although the government had introduced the free education policy in 2013, most schools still charged project fees. The fees are K50 for each child in primary school and more for high school students. In addition, money is needed for bus fares, stationery and clothes for the school children.

Box 6.4. Coffee and school fees.

Gideon is a young 25-year-old single male who, at this stage, has no children and lives independently. He supports his nieces and nephews who are in school, and provides accommodation for school children from very remote areas who are attending school close to his village. He provides food and accommodation for them, and they help him with his coffee work whenever they are free from their studies. In return, Gideon gives them an occasional gift of K10-20 for their stationery and other school expenses.

Rosa is a female farmer and an elementary school teacher in the village. Her situation is unique in Sogomi village but is not an isolated case in EHP. This is how she used coffee to pay her school fees for her children: She bought coffee in her husband's village in Morobe and sold it for profit because her children were doing well in school and she wanted to supplement her income to meet their school fees when they go to college. She said that her option to expand the area under coffee is limited because she is living in her village, and whatever land had been given to her by her brothers is only enough for a small coffee garden.

6.8 Issues of wealth and status in Sogomi and Safanaga

The current lifestyle of wealth accumulation was influenced by the colonial administration that changed the way of achieving leadership status (Feil, 1987). Sogomi and Safanaga villages were traditionally warring villages and, even now, there are warring tribes only a few kilometres away from these villages. The introduction of coffee as a cash crop was rapidly taken up and, gradually, villagers replaced traditional wealth items with cash. Coffee became a way to achieve *bigman* status in the village. Coffee income was used, not only to purchase material goods for one's household, but also was channelled through the social structures of exchange in which generosity is highly valued (Grossman, 1984). The coffee tree gives the opportunity for a villager to please their tribesmen by acquiring wealth and status through cash earned from coffee production. Even families that have limited access to land can also attain status in the village through developing and managing cash income from coffee to accumulate cash and material possessions, then channel them to the wider society through social activities. Therefore, cash crops provide the opportunity for most villagers to acquire wealth and status which once was only possible for the strongest and fiercest.

6.9 Gender and coffee production

There is the argument that women do much work and get paid less for their contribution than their male counterparts (Collett, 1992; Overfield, 1998). However, this argument is too general for specific farming activities. In coffee production the seasonality of the crop influences the type of gender-related activity that is performed. This influences labour decisions. For instance, during non-flush periods, agronomic work focuses on pruning shade trees and maintaining drains, which are hard physical tasks that require a lot of input from men (Table 6.9). However, during harvesting season, every available family member contributes to the work. Although women usually work the same hours as their husbands while picking coffee, in addition to cooking for household members who are harvesting, they are unlikely to be compensated well from the coffee income. Table 6.9 shows the main coffee activities in which household members were engaged in the 2010 and 2013 coffee seasons. In 2013, the data were collected in the last week of August and the first week of September, towards the end of the coffee harvesting period. During this season, coffee is harvested once a week or fortnightly and, as long as the coffee

beans are still being harvested, the post-harvesting activities, such as pulping, fermentation, washing and drying of beans continue to be undertaken (Table 6.9). The results in Table 6.9 show that household heads (husbands and wives) seem to be doing a lot more work than their eldest children. Most of the children over 18 years of age are either at school or doing casual jobs in town. The coffee flush period ends in July and, from August to September, households reduce their inputs to harvesting and post-harvest labour, which means that labour is moved from coffee to other livelihood activities.

Female labour is generally required for all livelihood activities. Results from a much broader survey of the ACIAR Livelihood Project (carried out in Sogomi and Safanaga in 2010 and 2011) showed that, during the off-coffee season, women's gardening time as a percentage of total labour time increased to 11% from 6% in the coffee season. This indicates that women desired to be compensated well and, therefore, they increased their labour allocation in areas that they felt would be fruitful, such as gardens for marketing during the off-coffee season. It is clear from the results that women not only spent most of their time in food gardens but also used the opportunity of the reduced labour demands in coffee during the off-coffee season to focus their labour where they could earn good returns. Overfield's (2000) study observed similar gender differences but he did not mention women's labour in food gardens as a major income source.

Table 6.9. Coffee work performed by household members- August, 2013.

Months	**October-November 2010 (n=30)**				**August-September 2013 (n=39)**			
Coffee work done by household	Male Head %	Female Head %	Son %	Daughter %	Male Head %	Female Head %	Son %	Daughter %
Harvesting	4	9	13	25	29	38	2	5
Pulping	4	3	0	0	24	18	5	0
Washing pulp	4	3	0	0	20	20	2	2
Drying coffee parchment	4	3	0	0	24	24	0	0

Selling parchment coffee	4	3	0	25	7	4	12	2
Weeding coffee gardens	29	58	50	25	29	18	0	2
Spraying insecticide	9	0	13	25	29	7	0	0
Applying organic fertiliser	0	0	13	0	0	0	0	0
Applying inorganic fertiliser	0	0	0	0	0	0	0	0
Pruning coffee trees	15	15	13	0	41	7	0	0
Pruning shade trees	2	3	0	0	0	0	0	0
Maintaining drains	5	0	0	0	0	0	2	0
Fencing	13	0	0	0	10	1	0	0
Clearing new garden area	4	0	0	0	2	1	0	0
Planting new garden	5	3	0	0	2	1	0	0

Women in Sogomi and Safanaga do not have the same level of user rights and incentives as men to labour for coffee production. They may have such privileges in the production of food and fruit crops, but that does not equate to the same power and influence of coffee that is strongly associated with the traditional politics of patrilineal land ownership (see detailed discussion in Chapter 7).

6.10 Gender difference and power relations in coffee production

The data indicate that more than 80% of husbands manage most coffee gardens (Table 6.10). However, when detailed analysis is done using focus group data to define the claims of husbands, the result reveals a mixture of both husband and wife managing coffee gardens, and, in some cases, wives taking full responsibility for the coffee garden. In the patrilineal societies of the highlands, only the men inherit and

own land. This culture influences men's attitudes and perceptions regarding the management of coffee gardens. The ideology underpinning this view is that the coffee trees are planted on the man's land, so he can claim management of production and distribution of income. The coffee tree can also be seen as a permanent possession, unlike crops such as pineapple that are viewed as temporary crops. Tree crops like coffee, with their long crop life, signify permanency, ownership and inheritance, while crops like pineapple, with a short crop life, symbolise temporary ownership that can be associated with impermanent female power. Thus, the land is used for a short period and there is no challenge to male authority in land tenure. Interestingly, the coffee garden is shared by the household while the women in that household can have exclusive ownership of pineapple gardens (as discussed in Chapter 7). In 2013, there was an increase in other household members managing coffee gardens. One reason for this was because of the husband leaving the family. There also were a few cases of men having additional wives and managing conflicts between wives by allowing one or more of them to manage a coffee garden, effectively ceding control of a coffee garden to a wife. This reduced their dependency on their husbands to bring food to the table and reduced potential marital conflicts and disagreements. The polygamous lifestyle can sometimes enhance women's status by enabling them to negotiate greater control over resources like coffee gardens.

Table 6.10. Household member who claimed management control of coffee holdings.

Household members who manage the coffee holdings	**Percentage (n=41)**
Male head of family	95
Single male head	1
First wife	1
Wife and children	1
Both husband and wife	1
Other relative	1

6.11 Conclusion

The households in Sogomi and Safanaga are striving to find a balance to accommodate the demands of the traditional and market economies. They are moving from subsistence farming of shifting cultivation to a more modern farming system of permanent agriculture. Villagers are moving away from the traditional principles of land ownership and land use as they evaluate their new aspirations and cash needs. A new pattern of land distribution is emerging that began when cash crops such as coffee were first introduced to the villages. Coffee introduced the cash economy and that changed the farming system and patterns of traditional behaviour and values. The study has also shown that in Sogomi and Safanaga labour accessibility is no longer established by implicit contracts between family members, as it used to be. It is now a combination of social and cash contracts.

Traditional land ownership and management have been modified to accommodate the socio-economic changes occurring in the villages. Coffee farming changes the distribution patterns of land accessibility and it has created an unequal distribution of resources. Coffee planting and expansion also has been used to secure land, to meet school fees and as a safety net for the household. Coffee farming changes the behaviour of villagers to mobilise and access labour. Reciprocal labour is limited only to the social responsibilities of households as villagers have monetised their labour. Hired labour is very sporadic, and payment for hired labour is not usually determined by market forces. The individualised land tenure system and commoditisation of both land and relationships are increasing with population pressure and cash crop development. Will this process of land individualisation and commoditisation allow for gender equality in land ownership, such as the purchase of land by females in the future? Coffee was introduced with a lot of promises to improve the livelihoods and quality of life for rural villagers. Undoubtedly some have benefited, but there have also been some burdens associated with these changes. In the next chapter, I consider how these changes are impacting on the status and role of women in vegetable production.

Plate 6.3. Papa Ukaia explaining his drawing on land distribution before and after coffee was introduced (see Figure 6.1).

Plate 6.4. Part of the land Tau bought next to the main village road.

CHAPTER SEVEN

NEW CASH CROPS: PINEAPPLE, ORANGES AND VEGETABLES

7.1 Introduction

This chapter discusses the development of new cash crops and how this has affected the allocation of household labour, access to land and land use patterns within Sogomi and Safanaga village economies. The concerned alternative cash crops are, pineapple[1] oranges[2] broccoli[3] and cabbage. The first part of the chapter discusses the introduction and expansion of pineapples and oranges as cash crops, and outlines the impact of the protestant churches on fruit and vegetable production in the two study sites. This is followed by an analysis of trends in the production of pineapple and oranges. This provides the context for discussion of the impact of the expanded cultivation of these two crops in relation to labour, time and land use changes in the two villages. The second part of the chapter examines the production of broccoli and cabbages, and the changing position of coffee as the dominant cash crop, in certain parts of the Highlands, with the arrival of alternative cash crops. A historical background to the two crops is given to provide a perspective on the two village economies and how the production of these crops, over time, has impacted upon household labour, time and land use patterns within the two villages. Also, in relation to this, an overview of the changing role of marketing of the concerned crops is provided.

7.2 Overview

In general, the cultivation of new food crops has been encouraged by improvements in infrastructure, better access to markets and increased cash demands by village households. The rise in the demand for food crops is resulting, in part, from a fast-growing national population which is about 7 million (NSO, 2015). Food demand also is being driven by national economic growth reflected in a growing middle class of indigenous Papua New Guineans within urban areas and an inflow of expatriates associated with national impact projects, especially in the extractive industries (Birch *et al*., 2009). The emerging middle class is demanding more temperate climate vegetables, such as broccoli, beans and onions, while the extractive industries have a

high demand for a wider variety of fruits and vegetables to feed employees. This provides an opportunity for smallholder farmers to expand their incomes by broadening the range and supply of higher-quality vegetables that they grow (Birch *et al*., 2009; World Statistic, 2014; Pacific Island Business, 2014).

The values system of exchange and reciprocal labour obligations, which is part of most rural societies, is changing dramatically as fruit and vegetables are increasingly cultivated on a large-scale for cash income. When villagers produce fruit and vegetables for cultural ceremonies, they receive much labour assistance from relatives. However, when preparing and making large gardens for commercial purposes (gardens for income), households are not able to access the same level of assistance. Villagers, in recent years, have begun to associate pineapple and orange production with cash earnings so it is difficult to mobilise labour through traditional mechanisms to make and tend these gardens. The use of reciprocal labour arrangements is gradually being replaced by a system of labour mobilisation using cash and food as payment. As discussed earlier (Chapter 2), there is evidence from other studies that shows a decline in social networks and cultural practices as communities increase their participation in the wider market (e.g. Scott, 1976; Thompson, 1991; Allen, 2002; Temple, 2003).

7.3 Introduction of pineapple and oranges to Sogomi and Safanaga

Pineapples and oranges were introduced to PNG after 1870. These two fruits are widely grown in most environments in the lowlands, at intermediate altitudes and in the lower highland valleys. Pineapples are grown by more than 50% of the rural population, and are grown in a wide altitude range of 400-1800 masl. Oranges are grown by 12% of the rural population (Bourke and Harwood, 2009). Table 7.1 shows that pineapples and oranges are among the top ten most commonly grown fruits in PNG. Both are grown in the highland and lowland areas.

Table 7.1. Numbers and percentages of PNG population growing different types of fruit.

Fruits	**Rural Population**	**Percentage**
Pawpaw	2,642,804	63
Marita Pandanus	2,465,476	59
Pineapple	2,197,921	52
Mango	1,962,731	47
Watermelon	1,090,010	26
Ton *(Pometia pinata)*	1,046,111	25
Malay apple	985,150	23
Guava	723,650	17
Orange	503,488	12
Passionfruit	327,880	8

(Source: Bourke and Harwood 2009)

Christian missionaries of the New Life Christian Church (NLC) and the Baptist Church were among the first people to introduce crops like pineapple and broccoli into Sogomi and Safanaga in the early 1960s. As stated by Bompani and Smith (2014, 19) in reference to Comaroff and Comaroff (1991): "missionaries provided the basic sites for local perceptions of modernity". The introduction of what were thought of as western crops, like pineapple and broccoli, were part of the global modernisation project. Most of the introduced food crops and fruits, initially, were farmed in the missionaries' gardens. The crops grown by the missionaries were sold at Goroka market by female members of the congregation. The income earned was returned to the missionaries. A Sogomi villager named Seka Kotis, who is now in her sixties, recalled selling for the missionaries in the 1970s. She was one of the ladies who had marketed cabbages, peanuts, pineapples and bananas for the missionaries. She said that the money earned from selling these crops was very good, and the money was given to the missionaries.

Although the missionaries introduced many new food crops, rarely were these crops incorporated into the subsistance food gardens of the local villagers. Most village people who attended church practised subsistence gardening, but they did not know how to cultivate some of the newly introduced crops. In the early 1970s, most of the new skills required for nurturing these recent crops were taught formally in schools rather than at the village level. It was the educational programmes of the churches that taught girls, of all age levels various vocational skills in nursing, cooking, home

care, animal husbandry, gardening of introduced vegetables, sewing, and so forth, that equipped the girls for their adult lives. Aitsi (2013) and Guiso *et al.* (2003) stated that Christian religions are more positively associated with attitudes that are conducive to economic growth.

The NLC missionaries quit Sogomi in the 1980s, leaving behind only the Bible and local believers to carry on the faith. Villagers carried on with the traditional subsistence farming of their own customary crops for years after the missionaries left. They earned most of their income from coffee up until the late 1990s and early 2000s. The commercial farming of introduced food crops started with a local pastor named Albert Ukaia, who used commercial agriculture to develop and sustain his Christian mission work in the village (see Case 7.1). Twenty years after the missionaries had departed the village, local people started cultivating some of the introduced crops such as pineapple, broccoli and cabbage. It was not until the early 2000s, when villagers took up large-scale commercial farming of food crops, that the local agriculture system was transformed. The villagers had been growing fruits and vegetables, but not on the commercial scale seen today.

Pastor Albert's recollection of cash crop development at Sogomi is supported by the data I collected, showing an increase in pineapple farming from 2001 to 2013 (Figure 7.1). The church encouraged households in the wider village community to diversify into pineapple and oranges as alternative cash crops. The community observed what was happening among the NLC church members and decided to aggressively adopt these other cash crops.

Box 7.1. Local leadership.

Pastor Albert was born in Sogomi Village in 1969. His mother was from Sogomi and his father from outside the local area. His father died when he was a young boy and he was adopted by one of his uncles. He completed all his primary school in Bena but went to attend Goroka High School from 1985 to 1988. He later went to Bible College in the Western Highlands and in early 1999, went to do his first practical with a local church in Central Province. He returned home and went back to study and graduated with a Diploma in 2006. Pastor Albert said that, when he started in 1997 as a young pastor with NLC, one of the main problems he observed in the village was the high level of poverty. At that time, individual Sunday offerings were less than K5.00, people had no soap for bathing and they bought little store food. It was not a good experience for him as a young pastor. Around 2002 and 2003, he encouraged his congregation to produce coffee and food crops for marketing. He also encouraged those who had neglected their coffee to start rehabilitating their coffee farms. He said, "I was doing marketing of food crops back then and realised the potential income, and I had to plant coffee as well before I told the congregation to follow [my example]."

Some of the youth in the church followed him closely and applied the concept of cash crop production. Several young church members started to plant their coffee gardens in 2003/2004. Other villagers joined later. As he recalled: "I planted and tried as many crops as I could to lead my church members to do the same. I encouraged them to plant a range of crops. I also tried to set an example by raising livestock. Pig production used to be the traditional livestock activity but many villagers had given up raising pigs in recent years. I raised pigs, goats, planted coffee and experimented with a few new crops like pineapples and oranges, ginger, onions, cucumbers, corn, peanuts, potatoes and cabbages for commercial production."

He tried to lead by example and hoped to see change happen: first it was with the church congregation and, later, the community. Church members who had gone into food crop production for income rather than purely for subsistence production became successful. The pastor said, "My point was for the church members to get into cash cropping for themselves; I wanted church members to earn cash through crops and improve their lives and the community they lived in. Through this, I could increase the church offerings and further aspirations for better church buildings". The pastor continues to be a strong advocate for youth in agriculture. He said that, when the NLC first entered this area, they were only concerned with the spiritual well-being of the people, but materially people were poor. He said that, if the church had an outreach programme in agriculture incorporated together with the gospel of Jesus Christ, people would have been better able to improve their livelihoods. He also regrets that most farmers in Sogomi have concentrated mostly on subsistence agriculture. "It is only since 2001 that we (including other denominations) have realised the importance of cash cropping and the development of church missions. This was an unfortunate and valuable time that was lost".
(Pastor Albert, August 2013)

Figure 7.1 shows a drop in pineapple production from 2011 to 2013 that is due to the normal production cycle. The households that had been planting pineapple since 2008 had begun replanting their pineapples in 2012 and some households allowed their pineapple farms to fallow before replanting them. This production pattern may become a familiar pattern in the future, whereby individual farms experience a temporary drop in production after 3 to 4 years of production, due to replanting.

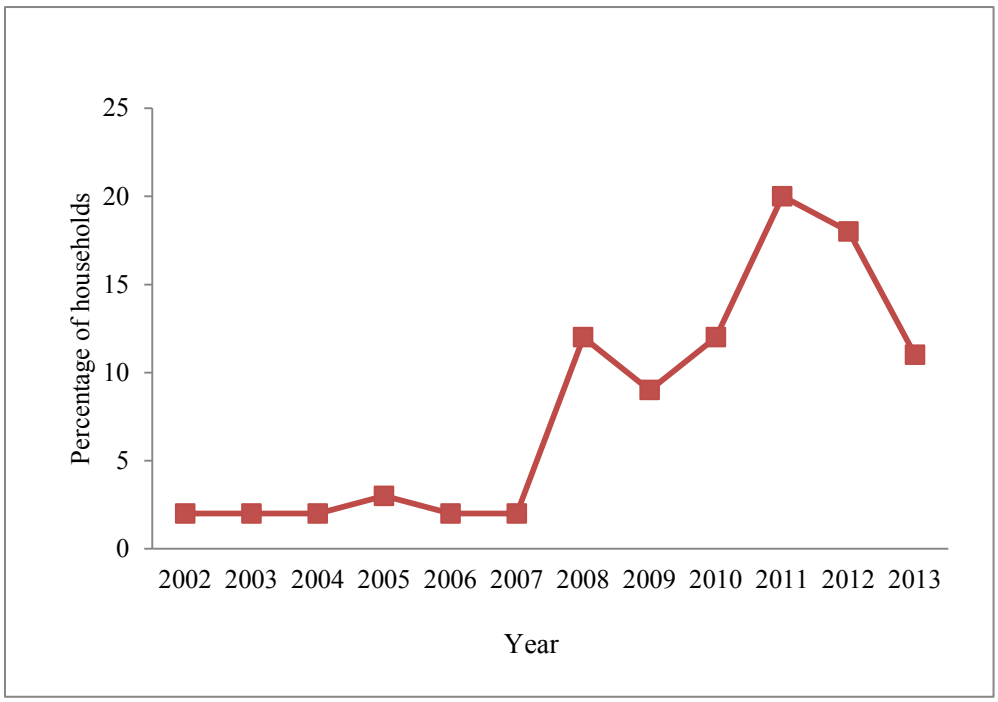


Figure 7.1. Percentage of households involved in the commercial production of pineapple in Sogomi and Safanaga from 2002 to 2013.

Table 7.2 and Figure 7.2 provide a summary of the major events that happened during the commercial cultivation of pineapples and oranges. There were a few villagers who were instrumental in facilitating their introduction and who explored new opportunities for the village. Pineapple suckers were collected from rubbish heaps in Goroka market to start a large pineapple garden, while the introduction of oranges started with a woman who braved the two-hour road trip to bring mandarins from Yonki to Goroka (Table 7.2 and Figure 7.2). According to Pastor Albert, pineapples and oranges have enabled his church members to have more money to contribute to church projects and improve their living standards (28/08/14). Other farmers I interviewed agreed with the sentiment shared by Pastor Albert.

Table 7.2. History of pineapple and orange farming in Sogomi and Safanaga, 1970–2014.

Year	Pineapple	Orange
1970s	Pineapples were grown by the early missionaries of the New Life Church (NLC) in Sogomi. These pineapples were of different varieties and were not the source of the main plants cultivated today. However, it was also reported that some of those found here in the gardens (a tiny proportion) are of the same varieties planted by the missionaries.	The oldest citrus trees found in the Sogomi area were introduced to Kopona Village by a school girl named Elaiso Monopahe, who was attending primary school in Goroka. The DPI officials visited the school that Elaiso attended and delivered citrus seedlings to the children. Elaiso Monopahe brought the seedlings to her mother, who planted the citrus trees for her daughter in the 1970s.
1980s	No villagers were selling pineapples at Goroka Market after the missionaries left in the early 1980s. Some villagers were planting a few pineapples for home consumption, but not for sale.	The second oldest orange tree in the village was planted by Kotis Monopahe in the 1980s, and that tree is still there. It is likely that Kotis's tree comes from Elaiso's mother. Kotis sold oranges in the 1980s. She was the only one from the village to do so.
1990 to 1991	Around 1991/1992, Sefa Monopae of Sogomi Village visited Goroka and collected seven pineapple plants that were dumped at a rubbish heap at Goroka Market. He gave the pineapple heads to his mother, Gesgo, who planted them in her garden at Sogomi Village. Thus began the first wave of pineapple production.	In the early 1990s, a local villager at Sogomi, named Mukaleso Moses, was living and working at Yonki with the PNG national electricity supplier. His wife marketed mandarin oranges from Yonki at Goroka Market and eventually other women from Sogomi went to Yonki doing 'Wholesale Marketing' of mandarins because they were sweeter than the local oranges and they sold well. Mukaleso also brought seeds/cuttings from Yonki to the Sogomi Village and her husband started a nursery. Her son, Rodney, recalled how his mother paid his school fees from the income earned by selling mandarins and his parents expanded their mandarin orchards because it was very profitable.
1994/1995	By 1994/95, Gesgo had rapidly multiplied the pineapples in her garden from the initial seven pineapple plants to 150 plants. Gesgo and one of her sisters-in-law were the first villagers in Sogomi to sell pineapples because they lived close to the roadside.	More women from Sogomi joined Mukaleso in the mandarin trade from Yonki to Goroka Market.
1995 -2000	Gesgo increased the planting to three gardens, with a total of 400-600 plants. Gesgo's adopted son and his household started selling pineapples at Goroka Market. No other farmers in Sogomi were selling pineapple because most people did not realise the potential income that pineapples could generate. In 1998 Gesgo was still the only one in Sogomi and Safanaga selling pineapple. In 1999 and 2000, Pastor Ansley Semeti brought back information about planting pineapple (and orange) and	The women from Sogomi Village stopped sourcing mandarin from Yonki and, instead, started purchasing oranges from Bobiyufa. The Sogomi villagers started going to Bobiyufa because it is less than one hour from Sogomi, compared to the two-hour road trip to Yonki. There is an orchard of Belly Button[4] oranges in Makia Coffee Estate, near Goroka. It was not known who introduced the citrus from Makia to Sogomi. The dates of planting in Bobiyufa were not known, but the increase in sales of oranges occurred between 1996 and 1997. By the late 1990s, the interest of

	told others, including Pastor Albert.	villagers in growing oranges increased. Demand for navel oranges also increased and some people in Sogomi started cultivating them. However, there was no record of who were cultivating navel oranges at this time in Sogomi Village. Around 1999 to 2000, a villager chopped down the orange trees that Elaiso's mother had planted in the 1980s, to build a house, and there are houses on the spot today. In the same year Pastor Ansley visited DPI and brought back information on growing oranges (and pineapple).
2001-2005	About ten years after Mrs Gespo began selling pineapples; Pastor Albert Ukaiah started planting pineapples. Thus, by 2001 and 2002, the second wave of pineapple growers began. It was the beginning of a large scale commercial cultivation of pineapple. In 2001, he collected as many pineapple heads as he could at the Goroka Market rubbish dump. Between 2002 and 2005, Pastor Albert expanded and developed new pineapple gardens. He saved most of the income earned from pineapple sales. By mid-2005, people from other villages began selling pineapples at Goroka Market, including Sagifa villagers, and soon villagers from Sogomi, Safanaga and Kokinaga began planting pineapples. The sale of pineapples by males at Goroka Town Market began with Pastor Albert himself, Mr Manifa Johannes and Mr Tiki Sinifi Monopahe. They were the pioneers of pineapple marketing in the Sogomi area. In 2005, the third wave of pineapple growers commenced. These were people like Erick Moses, Marlins Monopae and a few others. Erick Moses started planting pineapples in 2005, with more than 200 pineapple plants. Today he has more than 25,000 pineapple plants, making him the largest producer in the area and earning an estimated annual income of K30,000 (AU$15,000).	In 2001, two men started planting orange seedlings in Sogomi Village that were purchased from Goroka Market for K5.00 each. One of them was Mr Linken Siape, from the lower part of Sogomi Village, called Kopona. In 2005, Pastor Albert saw the high demand for oranges in Lae Market. Sellers, there, sold large quantities of oranges. He returned to Goroka and bought ten orange seedlings at K8.00/tree from a DPI officer. They were planted at Sogomi Village, in the upper area of Sogomi called Gelehi, in his garden. Later, sometime the same year, Pastor Albert exchanged a goat worth K600 (AU$300), with Mr Kombok, for about 200 budded root stocks of orange seedlings.
2006-2010	Pastor Albert introduced a new selling strategy. When he saw that pineapples began flooding Goroka Market, he introduced "Street sale with ready sliced pineapples" for 20t per slice in Goroka Town streets. He said he started doing this because he wanted to be ahead of others in the business. In 2009, Pastor Albert	Pastor Albert distributed citrus seedlings to his relatives in Gelehi. By 2008, he had distributed 47 seedlings, with an average of 12 per family member. Many other people were aware of the value of oranges and also began planting them. Villagers collected budded clones from the same sources in town as Pastor Albert; others planted citrus using seeds. It is now well

	started intercropping pineapples with peanut, corn and onion. In the same year, Pastor Albert purchased a second-hand vehicle (Ford JV) from a missionary, worth K8,000. It was the first car bought from pineapple income in the Sogomi and Safanaga villages. In 2010, more villagers started to plant pineapples. By this stage nearly everyone in the village had pineapples in their gardens. Pineapples were bringing in a large amount of cash to the village. This is evident with some villagers buying vehicles and planning to build modern, permanent houses. Other people from EHP seen at Goroka, marketing pineapple, were from the villages of Makia, Kaiyufa, Kokinaga, Safanaga and Kamex. In 2012, Pastor Albert purchased a second vehicle (worth K37,000) using pineapple income.	understood in the village that oranges are an important cash crop.

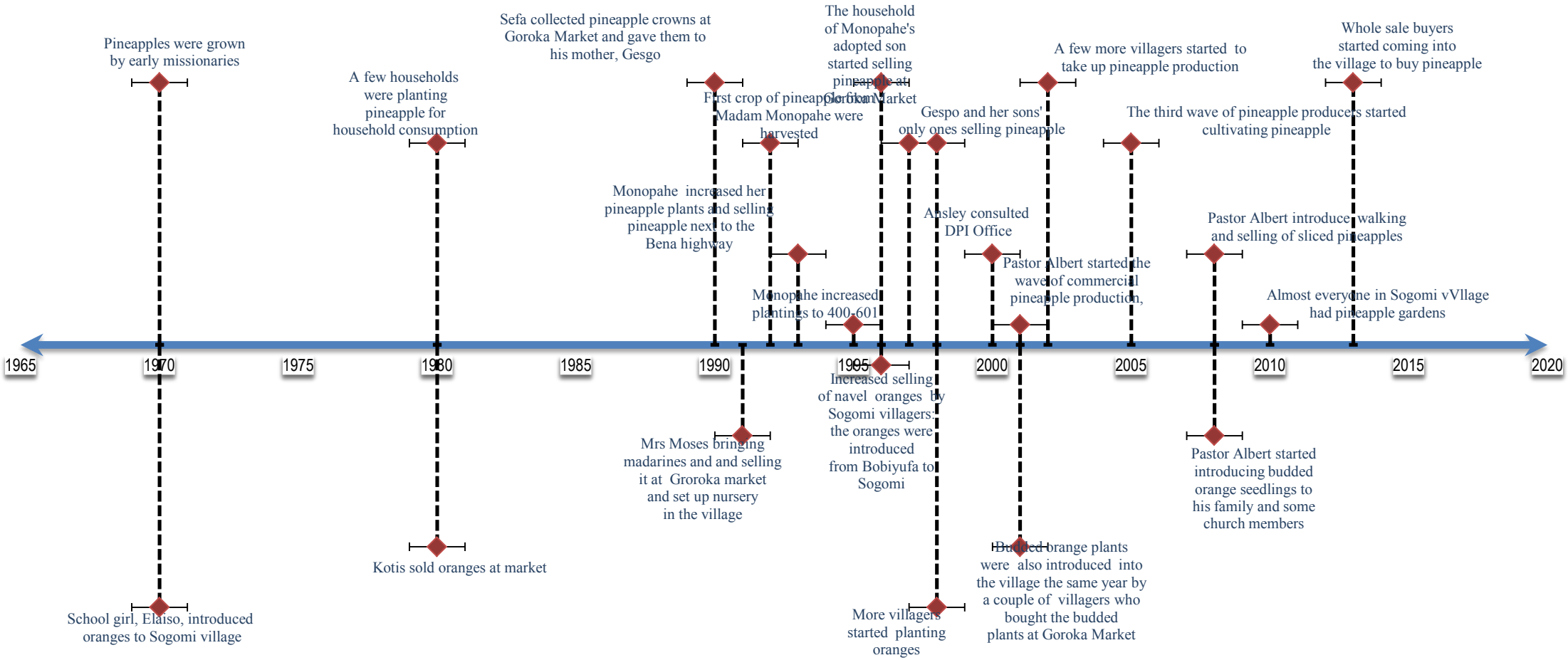


Figure 7.2. Timeline showing significant dates in the development of commercial production of pineapple and oranges.

7.4 Impact of churches on fruit and vegetable production from 2011 to 2014

The Christian churches have played a significant role in the development of modern farming of introduced cash crops in the villages of Sogomi and Safanaga. The NLC, Baptist, SDA, Four Square and Lutheran churches have all strongly encouraged their local congregations to become engaged in the cash economy through cash crop production and livestock production. The literature has shown that early Christian missionaries who arrived in PNG were not only motivated to convert the inhabitants of PNG to Christianity but were also involved in setting up schools and health clinics, and managing plantations. There is evidence of church-run coconut plantations in the island region of PNG and in the northern coastal part of the mainland of New Guinea in the 1950s (Wiltgen, 1969; Huber, 1987). However, in Sogomi and Safanaga villages, little was done by the early waves of Christian missionaries (Protestants) to teach people how to generate money from agriculture in order to send their children to school or to pay for health services.

7.4.1 Churches using cash crop farming to fund church projects

Although the early missionaries had not done much to encourage agriculture, the local church pastors had used agriculture to sustain and develop their church activities. In 2013, the Maganose NLC Church planted a large pineapple garden which had the potential to raise K40,000. The pineapple farm is, by far, the largest farm project of any church in the village. The land for the pineapple garden was 'donated' by Tau and an estimated 20 church members provided labour. Land preparation for the pineapple plots was a half day's work on Tuesdays and Thursdays for the first four months (clearing land, ploughing and planting). The planting of the first crop of 10,000 pineapple plants was completed in September 2013. After ploughing and planting, church members weeded and maintained the garden until the pineapple plants started bearing fruit (Plates 7.1 and 7.2). This activity continued in 2014. The purpose of the farm was to raise funds for a modern church building and to purchase musical instruments. The church was able to organise its congregation for such a large agricultural project because of its well-planned church programmes that integrated agriculture into them, the strong church leadership and group cohesion. The households which were part of this church

project had organised their labour for their own household livelihood activities as well as the church project.

Plate 7.1. Church members ploughing land for pineapple plots in August 2013.

Plate 7.2. Church pineapple project in November 2014: a total of 42 plots with 250 plants on each plot.

7.4.2 The influence of the church on the expansion of pineapple production in the village

Churches in the community have greatly influenced the production of pineapples in the village. This influence has been achieved largely through developing group cohesion and a shared sense of purpose. Developing large scale (K100,000) cash crop projects for any church can be challenging. For Maganose Church, their strong group cohesion for the development of cash crops started with individual households, and was built up in a number of steps.

Firstly, the church took the approach of getting its older church members into cash crop farming to improve their well-being and also to have enough cash to support the church through church tithes and offerings. Most of the church members took up pineapple and orange production as an alternative to coffee and were able to sustain their incomes throughout the year.

Secondly, the church programme was aimed at youth to encourage peace in the community. Tribal warfare is common in the Bena District. As Dickerson-Putman (1986) stated in her study, Bena people refer to the time before the Colonial Administration period as fighting time and it still flares up every now and again (Langness 1963; Dickerson-Putman, 1986, 1996, 1974; MacWilliam, 2013). Young men were encouraged to develop cash crops as a way to keep them busy and to create a sense of responsibility in the community. The church pastors were able to involve youth in cash crop farming by providing the leadership and support that encouraged them to invest in, and develop, their own farms, both to earn cash incomes and to add value to their communities. By doing so, it was thought that village youth would avoid conflicts that would affect their farms. The church youths at NLC were able to set an example for other youth in the community to do the same. The cash crop project was very successful among the youth and led them to develop other strategies to sustain and develop the project further. For example, they have individually made cash contributions among themselves towards their own bride price savings. Youth have become very productive and successful in managing their wealth. The change among the youth who took up alternative cash crop farming is visible through the accumulation of material goods. Most of the youth only got involved in cash crop production less than ten years ago. For

example, one youth has bought a car, and another has completed his technical college education and is now a trained mechanic with a formal job; he still maintains his farm project and sells his pineapples on Saturdays at Goroka Market. A few other young men have been buying modern building materials to build permanent houses in the village. All of these individual experiences have given the youth a new positive identity of making a valuable contribution to the welfare and reputation of themselves and the broader community. The church has strategically influenced individual households and, along with all these individual experiences, they were able to work together to develop a large agriculture project for the church.

The benefits have spread into other areas of villagers' lives. For example, villagers have formed a committee to coordinate village clean-ups and improve living conditions. The community has also abolished gambling, public alcohol consumption in the village and dumping of rubbish in the Gelehi area. These activities have attracted the interest of NGOs in the village. There is much evidence in the literature to show that religious beliefs can affect a wide range of behaviours and attitudes, including economic attitudes (Innaccone, 1998; Guiso *e.al.,* 2003; Noland, 2005, see Chapter Two).

7.5 Village labour for pineapple production

Pineapple farming is labour-intensive during the period of land preparation and weeding. If the pineapple is planted in a new area, forest must be cleared. Land cleared from forested area requires a significant amount of labour to dig out tree roots and to plough[5] the soil for planting. It is not as labour-intensive if the pineapple is established on fallowed garden plots. The soil in a fallowed garden area is loose in comparison with soil that has never been farmed before, which tends to be very compact and full of organic matter. Most farmers in the study were farming pineapple on fallowed or pre-used land, and a few were clearing secondary forested area for planting.

There are three sources of labour used in pineapple production: immediate family; extended family or relatives; and hired labour. The study data showed that 45% of households had one pineapple garden and 39% had two pineapple gardens (Figure

7.3). The average pineapple garden is 0.25 ha with internal plot sizes of 6 metres by 30 metres. Figure 7.3 shows the proportion of households with different numbers of pineapple gardens, compared with other cash crops.

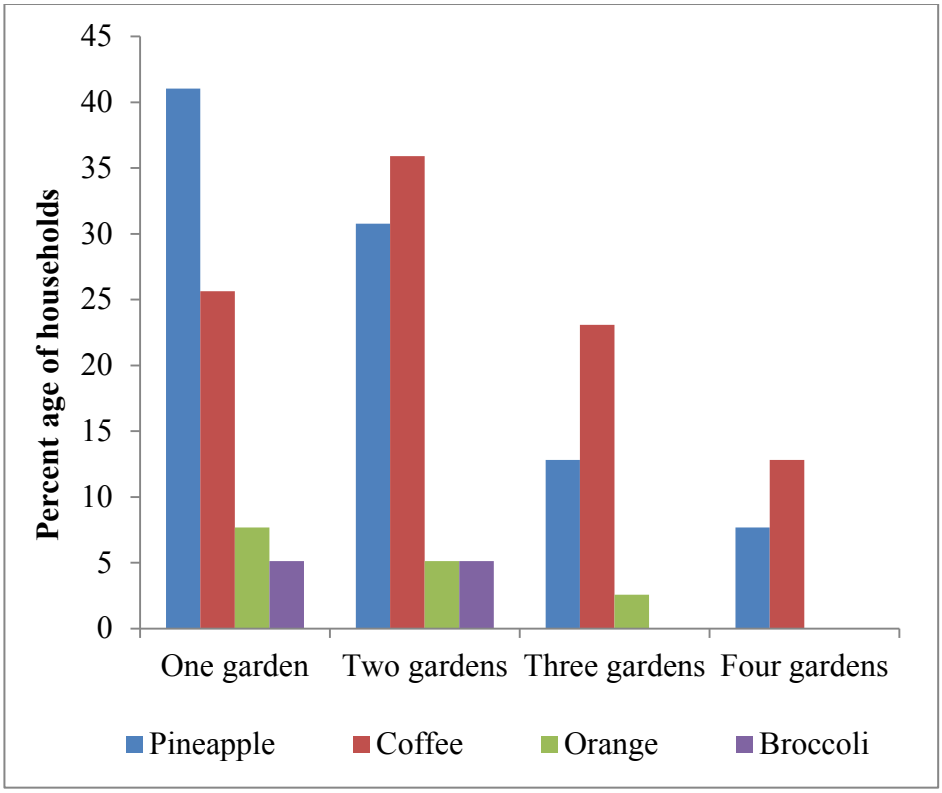


Figure 7.3. Percentage of households and the number of different cash crop gardens owned.

7.5.1 Family and exchange labour in pineapple production

Similar to coffee production, the immediate family is the main source of labour for pineapple farming in most households. It is difficult to access labour from the extended family to assist in pineapple work, as shown in Table 7.3. Only 30% of households received labour assistance from relatives outside the immediate family. Labour assistance is not given freely or reciprocated equally. Often food, especially store food, and cash are given to relatives who provide labour. Reciprocal labour exchange is not always balanced between households and that can also affect future offers of labour assistance. Overall, households reported receiving more labour than they give (Table 7.3). This suggests that labour is not equally reciprocated and it may depend upon the type of payment made (Table 7.4). However, it could be that households tended to under-report receiving payments for the labour they gave and also the amount of labour they gave, but tended to remember better their own

payments made for labour assistance provided to them by their extended families. Labour exchange tends to be focused more on perennial crops, while most of the literature on extended family labour in relation to smallholders' cash crop production in the highland areas relates to coffee production, rather than fruits and vegetables (e.g. Shand and Straatmans, 1974; LiPuma ,1999; Collett, 1992; Overfield, 1998).

Table 7.3. Labour assistance given to and received from extended family.

Labour assistance (n=41)	**Percentage of households**
Households that received labour assistance from the extended family	30
Households that provided labour to extended family	21

Few households today assist other households without expecting cash, store food or in-kind gifts. These changes in expectations regarding labour can make it difficult for households to mobilise the labour of the extended family, both for pineapple and coffee production (see Chapter 6). Ten percent of households said that they would help other households with future cash needs. These cash needs are not daily household needs, such as for regular consumption expenses, but rather are assistance to meet cultural obligations such as payment of compensation and bride prices or purchase of funeral gifts, which form the social side of market transactions (Polanyi 1944; Cornelisse 1984). These households' reciprocal labour arrangements are not based purely on market relations but are tempered by their social relations; they are a form of insurance or safety net and enable people to meet their traditional obligations and, so, maintain good social relationships among members of the extended family group and beyond (see also Curry, 1999; Imbun, 2000; Koczberski and Curry, 2004).

There are four main reasons to explain the behaviour surrounding extended family labour. Most households have their own pineapples gardens to take care of (Figure 7.3 and Table 7.5). Firstly, it is clear that households have created a livelihood that has economic benefits but which also conflicts with social relationships: the households are challenged to manage not only their pineapple gardens but also their

coffee gardens, while also struggling to maintain exchange relationships. For example, a household could be requested by the father-in-law of the male household head to help with labour during the peak pineapple season (the havesting and selling period). Unfortunately, the requested household may not be able to assist the father- in-law with labour because they also have pineapple to harvest. They would have planned their own labour to raise a particular amount of income, perhaps to cover school fees and could not spare any additional time. However, this would create conflict with the father-in-law of the household because he would expect his son in-law to value their social relationship by releasing his wife to help her own father (as respect to in-laws is highly valued).

Table 7.4. Type of labour payment received by households and relatives who provide labour.

Type of payment	**Payment given to relatives who provided labour (%)**	**Payment received from households to whom labour was given (%)**
Food	24	15
Reciprocal labour	11	9
Future cash assistance	10	4
Cash	4	1

As households are drawn more into the market economy, their attitudes towards social relationships are changing, and this is reflected in how they mobilise their labour through the use of extended family relationships. Thus, most households do not have the time to allocate labour to relatives' pineapple gardens. Households must make decisions about how much time to allocate to their different gardens, which depends upon the availability of labour within their own households and the labour demands for different gardens at particular times, as well as labour necessary for other household chores, resulting in conflicting priorities (Collett, 1992; Lummani, 2007). One third of households had less than 1,000 pineapple plants, while the rest (67%) had more than 1,000 pineapple plants (Table 7.5). Pineapple gardens tend to be owned by individual household members, whereas coffee gardens are owned by households and not individually (see below). Therefore, there tends to be more pineapple gardens per household than coffee gardens, and this is

particularly common for families with large land parcels. This important finding is discussed in section 7.4.1.

Table 7.5. Percentage of households and the number of pineapple plants owned.

Number of pineapple plants	Percentage of households
1-999	33
1,000-5,000	57
5,001-10,000	7
10,001-20,000	2

7.5.2 Extended family labour and payment for labour

Extended family is important within the social relationships and exchange culture of Sogomi and Safanaga. Extended families provide social bonds and security. One of the roles fulfilled by extended family is provision of their labour. In Sogomi and Safanaga, this role within its cultural context is changing; it is not as highly valued as it was fifteen to twenty years ago because villagers are going through huge socio-economic changes. As shown in Table 7.3, households both received extended family labour assistance and reciprocated it. Thirty percent of households said that the extended family helped with pineapple production, mainly the three main tasks of clearing, weeding and ploughing of land in preparation for planting (see Figure 7.4 for the proportional breakdown of the tasks). Villagers who provided labour did so in exchange for food. While food has been traditionally given as a gift for labour assistance, today the expectations are different. Today, food is expected as payment for labour and, in more recent years, store foods such as rice, tinned fish or lamb flaps (Table 7.4) have replaced traditional food crops and local protein such as bandicoots and pig meat. People now will give labour only if they know that the farmer is cooking rice and other store foods. For example, one farmer said, “We usually ask ten people or more to help. To feed them, we spend more than K50 because the price of food is high” (meaning rice and lamb flaps). As pointed out above, the practice of cooking food for labourers is not new, however, the motivation has changed and, today, most villagers who provide labour require a form of payment. As another farmer mentioned:

> They will not help if they know we are not cooking, and if we are cooking we have to mention it so they are aware and will turn up to work (Gideon, September 2013).

The main task performed by extended family and reciprocated by households is weeding (Figure 7.4). Major weeding is undertaken at least three times a year. Weeding is a very unpleasant task and is difficult because of the physiology of the pineapple plant. When weeding, it is easy to prick one's skin on pineapple leaves, and this can cause skin inflammation and discomfort. During weeding, most people get sores and cuts, and discomfort continues for days after performing the task. The unpleasant nature of weeding makes it difficult for farmers to engage hired labour for the task. As one pineapple farmer, Tom, said, "The most demanding pineapple work is weeding and moving the pineapples to the roadside." He said that he hardly ever used hired labour to do weeding because of its difficulty. It is usually the immediate family, and sometimes relatives, who do most of the weeding.

Owners are also very careful about deciding who can weed their gardens for fear of workers damaging the fragile pineapple shoots. Pineapple is a delicate plant, especially its shoots; it does not take much to damage a pineapple plant and, when it is damaged, it takes a long time for the plant to recover. Furthermore, the farmer chooses some relatives to weed pineapple gardens because they are careful, and good workers are reluctant to weed because of the unpleasant nature of the task. As one of the farmers explained:

> Some of us do not want people to do our weeding because, from past experience, some workers will not be careful and dump weeds on the pineapples. The labourers will think about money, and they will try to complete the job quickly without care, and pineapple plants will be damaged (Tom, September 2013).

Villagers' attitudes towards cash crop farming are more market-focused now, compared with ten years ago. It is becoming more difficult to recruit labour; villagers admitted that every farming activity is seen as a household's 'bread and butter' or personal issue. Many people who are not part of that household are not willing to assist (Figure 7.4). As Tom commented, the change in attitude is not good; "We are supposed to help each other." His wife expressed an opposite view and said, "The change in attitude is good; it shows that others have to work hard to

make their money." Some other farmers believed that, if more people planted pineapple, it would be good because they would not steal from others if they had their own source of income.

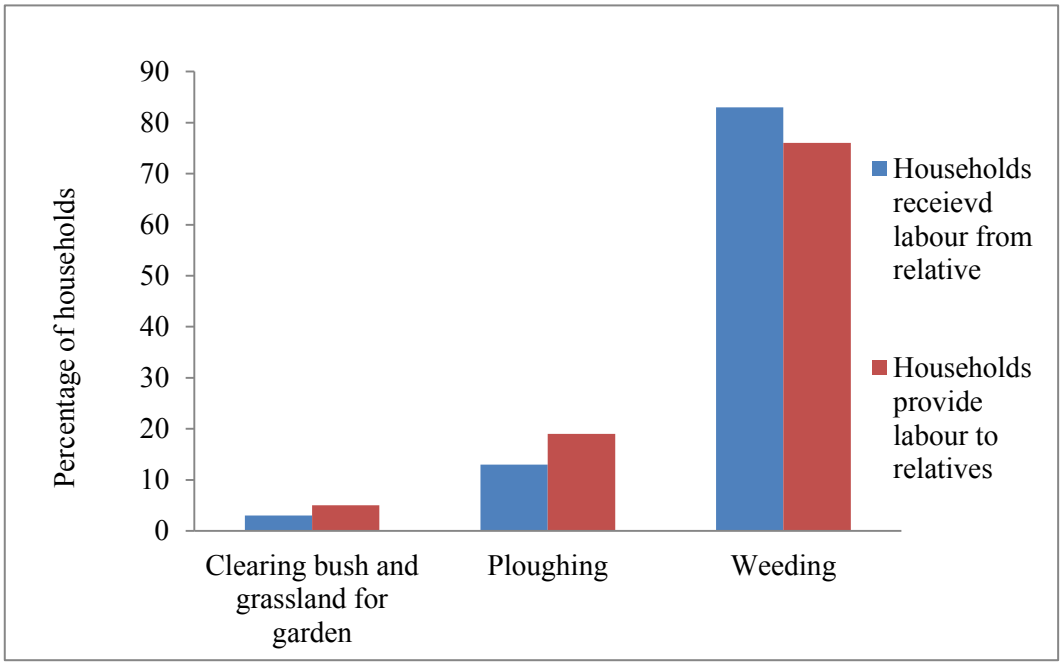


Figure 7.4. Percentage break down of pineapple work by task.

7.5.3 Hired labour, churches and youth groups

The hiring of labour is not a new practice in Sogomi and Safanaga. However, few households use hired labour in pineapple and orange production. Only five households hired labour for ploughing. Labour is only engaged during the initial stage of land preparation, while other tasks are taken care of by household members.

One of the main influences on labour mobilisation is church-organised programmes and activities, a situation that is similar to how most hired labour is organised for coffee work (see Chapter 6). There are no formal hired labour groups in the villages and, therefore, it can be difficult at times to access labour from outside the immediate family. Most group labour is organised among church congregations or church youth groups when cash is needed for specific purposes. The funds are raised and shared among those who performed the tasks. Interestingly, some farmers who reside in the Gelehi area of Sogomi Village now try to hire labour from only within their area. A few of the households interviewed said that they

wanted to help their immediate community, and to keep the money within the households residing in the area so that everyone can improve their living standards. Also, they realised that not everyone in the area has access to sufficient resources like land to plant large gardens of cash crops. Therefore, using group labour from the local area is another way to help reduce inequalities between households who have a lot of land and those who do not. Mobilisation of hired labour in pineapple and orange production also occurrs within the church's sphere, and the labour from church members is mostly engaged in clearing and ploughing of land in preparation for planting. Sometimes, sports groups provide their labour in raising funds for their social activities, such as a function at the end of their sport season.

7.6 Accessing land for pineapple and orange production

Pineapple, which is planted on the same land that is used for subsistence food crops, is now the main source of cash income in both villages (Table 6.1). Villagers with limited land are restricting access to their neighbours and other relatives by preventing them from planting food crops on their land (Figures 6.1 to 6.3). This restriction not only applies to land that would be used for cash income generation, such as pineapple and coffee production, but it is also being applied to food crops for household consumption. Families with limited land area are even restricting their siblings from farming on their land. For example, Pastor Albert said that he once prepared a sweet potato garden on his brother's land, which was part of the land their father distributed and gave to his brother. However, after he planted, his brother uprooted the sweet potato. This was his brother's way of asserting his exclusive rights to the land. Pastor Albert never attempted to access his brother's land again. On reflection, he said that he would do the same if his brothers prepared gardens on his portion of land. This behaviour is not an isolated case, and it is an indication that villagers realise that land is valuable to their livelihoods and it cannot be shared outside of the immediate household. In other words, as discussed in Chapter 6, land tenure is becoming more exclusive as its value for pineapple and coffee production is being increasingly recognised.

Pineapples and oranges are popular not only because of their high cash income potential but also because these fruits are not permanent cash crops like coffee. Pineapple plants can be removed after three to four years, and the land made

available for another purpose. Villagers can also 'borrow' land for pineapple production, although this is rare. Borrowed land tends to be owned by villagers who are working and living in urban areas. A family will 'borrow' a parcel of land to plant pineapple if permission is granted by the owner. Pineapple cultivation provides an alternative to coffee as an income opportunity for households with limited access to land and who do not want to lock up their land permanently to a perennial cash crop like coffee. Also, most households practise crop rotation in pineapple gardens but this is not possible with coffee. Therefore, pineapple production is more viable for households with limited land. Oranges are seen in the same way as pineapple, however, since it is a tree crop, there is the possibility of it being used like coffee, in the future, to lock up land.

7.6.1 Gender, pineapple production and income

The culture of land management for pineapple farming, in relation to gender, is different to coffee. It is difficult for women to access land for coffee because it is a long-term cash crop. However, women can cultivate pineapples as a cash crop, independently of their husbands, because it is like subsistence gardening; the land access is short-term and it is part of the same framework of access rights that governs access to land for food crops. This user right implies that the land can be easily accessed by any member of the family to plant pineapples, regardless of gender. Unlike coffee, where household decisions on coffee production are mainly dictated by the male head of the family, a household's decision to invest in pineapple production is often initiated or agreed upon by individual members of the household. This allows for more equality in decision–making, including across gender and generational lines. For example, daughters are able to farm and own pineapple gardens, as long as there is enough land available. Traditionally, daughters have not been permitted to establish their own coffee gardens or inherit land. In the past, if they were single and living with their parents, they would provide their labour for family food gardens, although they were often allowed to establish their own sweet potato gardens. In recent years, daughters still living with their parents have established their own pineapple gardens and they make all decisions regarding labour and income independently from their parents, particularly their fathers.

Rules of access to land for pineapple cultivation are more flexible than for coffee. This is one explanation for the major changes in today's farming practices in the villages where, traditionally, women planted sweet potato gardens for household consumption, with any surplus marketed locally for cash. In Collett's (1992) study, women purposely extended food gardens with the intention of selling the surplus, without telling their husbands. Today, women plant their own individual plots of pineapples for cash income and are able to retain that income. Disadvantaged and marginalised women, such as widows and divorcees who live with their brothers, are also able to access land to plant pineapple for sale and maintain control over management decisions and the resultant income. This would not occur if the women wanted land to plant coffee. As stated above (see Figure 7.2), in the current study, women cultivating pineapples in the villages had their own individual pineapple gardens. There are three main factors explaining why it is easier for women to access land for pineapple production than for coffee production.

1) Pineapple was initially planted as a food crop for family consumption and, therefore, like food gardens, it was in the domain of women. Large-scale commercial cultivation of pineapple started recently and it is still largely seen as a female crop. Coffee has long been strongly associated with male status and land ownership, with men having greater control over the distribution of coffee income.

2) Pineapples have a shorter cultivation period than coffee. As explained above, pineapple plants are removed after the third or fourth year and a new crop can be planted on the same piece of land. It does not lock up land for generations, as coffee does.

3) Women can vary production of pineapple by expanding or reducing the area under cultivation in response to household cash needs and in response to changing market opportunities.

Although marketing of vegetables and fruits, including pineapple, is usually carried out by women, men are increasingly engaging in the sale of pineapples. This was unheard of ten years ago. Selling food crops at local markets was not traditionally

practised by Highland men. Men from Sogomi Village were among the first men to sell pineapples at Goroka Market between 2002 and 2005 and this marked the commercial sale of pineapples in large volumes (Table 7.2). Today a lot of men from all pineapple growing areas in EHP sell pineapples at the market. When observing male pineapple sellers at the market, they talk and charm customers to buy pineapples by joking a lot with their customers and bonding quickly with them. These customers develop a social bond with particular sellers and, over time, the sellers have regular customers. The regular customers bring their friends around, introducing them to the seller and, so, the customer base expands. Although some women also use this technique, most of them are passive sellers and sit on the ground by their pineapples waiting for customers to come to them. By contrast, the men are more aggressive sellers and will attempt to engage potential customers in conversation to make a sale (see the example of Case 7.2). The main difference between males and females at the market is the quick response by men to create a social space for the customers and sellers to interact. Females take a lot longer to create that space, although that is changing and some women are becoming more aggressive in their marketing styles as well. Farmers must compete to sell because they are producing large volumes. Time is of the essence and they must offload as much volume as possible at the market. The large supply of pineapples has led to the development of new marketing strategies such as sliced pineapples. As more men enter the market, selling pineapple with new and aggressive techniques, females are also adapting by either doing the same or asking their male partners to sell for them. Husbands and wives are sometimes now partners in the market. Although they may have individual produce, they will assist each other with marketing. Interestingly, the Gelehi farmers in Sogomi also tend to help each other out at the market. If one of their farmers has many bags of pineapple to sell, other Gelehi farmers tend to assist him or her if they happen to have sold all of their pineapples earlier in the day.

The sale technique of moving around to different spots at the market to sell sliced pineapples was created by a Sogomi farmer, Albert. When interviewed, he said (Case 7.2) that he noticed there were many pineapples on sale at the market, so he decided to try selling slices of pineapple away from the main market area (Pastor Albert, September 2013). Today, at almost all the main markets around EHP, both

men and women sell sliced pineapple. The sliced pineapple sale technique has some advantages over the sale of whole pineapples. When marketing sliced pineapple, it sells out quickly because it is cheaper for a customer to buy a slice than a whole pineapple. It also attracts customers who would not have bought a whole pineapple, giving them a choice. Sliced pineapple makes it convenient for those customers who want a quick bite to eat. Therefore, farmers are able to sell quickly and complete the marketing task, to go home early and to attend to other activities.

Box 7.2. The changing rules of pineapple marketing.

Farmer James said that he did not like women to market his pineapples. He prefers to sell them himself. He said, "Women do not talk and charm customers over to buy: they just sit there and stare at people. When I go and sell, I do much talking and greeting to potential customers; I joke with them and win them over, and they buy my pineapples. I even employ a few boys from the village to sell my pineapples because they will do the sales the way I usually do. They walk around with sliced pineapple and sell it to customers at bus stops and elsewhere outside of the market area. When we do that we sell a lot in a day. The boys usually help me do sales when it's peak pineapple season and there is a lot of pineapple at the market." (James, August 2013)

7.7 Cash income from pineapples

Planting arrangements for pineapple and orange farming in Sogomi and Safanaga villages are different to traditional subsistence farming. Pineapples and orange trees are farmed as monocultures in straight, neat rows with even spacing (Plate 7.3). Income from pineapple and oranges can be predicted or calculated quite well because farmers know how many pineapple plants and orange trees they own. Intercropping is practised by a few farmers, where pineapples are intercropped with peanut and corn during the first year of pineapple cultivation. Peanuts and corn are harvested regularly, while pineapples are left to mature and produce for the next three to four years.

Pineapples start fruiting a year after planting but it is another year before the pineapples are ready to harvest. In 2013, pineapple prices during the peak season from October to March ranged from K2 to K5 per pineapple. In the off-season, from February to May/June, the price range was K7 to K10.00. Each pineapple plot has a lifespan of four years (harvest rounds) with an average price per pineapple of K3.50. Thus, an estimated gross income per standard plot (6m x 30m) of 288 plants over a four year period is K4,032, with an estimated total production cost of K252

and, therefore, a net profit of approximately K3,780. For a hectare of 16,000 plants selling at an average price of K3.50, an estimated gross income per year is K3,512. However, this does not include the farmer's time and wages for selling the pineapple.

The average labour cost per group for producing pineapple is K50.00 per day, which is higher than for broccoli because pineapple tasks, such as ploughing and weeding, are considered to be hard work. Pineapple is mainly grown in the hot and drier parts of the valley, where the soil is dry and hard to plough. As outlined above, weeding is a very uncomfortable task compared with weeding most other cash crops. Also, more money is spent on food to feed the labour force for pineapple production, compared with broccoli.

Table 7.6. Estimated annual cost for pineapple production per standard plot of 6 x 30 m.

Production cost	**Total average cost**	**Cost per pineapple (Kina)**	**Cost per standard plot (Kina)**	**Gross Income per standard plot (average price K3.50/ pineapple)**	**Net Income per standard plot (average price K3.50/ pineapple)**
Labour hire costs	K50.00 per day	K0.04 per pineapple	K10.00		
Food for labourers	K50.00 per day	K0.04 per pineapple	K10.00		
Personal transport costs (bus fare to market)	K4.00 per trip (return)	K0.01 per pineapple	K2.88		
Transport costs for goods (5 bags)	K4.00 per bag	K0.07 per pineapple	K20.00		
Market fees (5 bags)	K4.00 per bag	K0.07 per pineapple	K20.00		
Total		K0.24 per pineapple	K62.88	K1,008.00	K945.12

Plate 7.3. Commercial pineapple farming in Sogomi Village.

7.8 Farming of vegetables: broccoli and cabbages as alternative cash crops

Some households in Safanaga and Kaiyufa[6] have specialised in growing broccoli and cabbages on a large scale. Female household heads mainly direct the production of these crops. The Baptist Church in Safanaga is an influential driver of the production of broccoli and cabbages, and several church members cultivate these crops to raise funds for various church projects. The church has concentrated on these two vegetables because there is good demand for the crops, and they grow well in the cooler conditions of Safanaga Village. The environmental conditions are excellent for the production of many temperate vegetables like broccoli and cabbages. However, unlike Sogomi, growing conditions are not very suitable for pineapple and oranges. Several women who were members of the Baptist Church started growing broccoli and cabbages after seeing the good income earned by the church.

The women cultivating broccoli and cabbages in Safanaga are currently attracting much curiosity from other villagers. During fieldwork in 2014, I noticed a few

households in Kiyufa village planting large plots of broccoli. Later I learned that they began to follow the existing broccoli farmers and started to cultivate broccoli but they had no detailed knowledge of their cultivation methods and no thought was given to the timing of planting different plots, or to the post-harvest issues of mass planting such as storage and labour requirements for marketing. This highlights that, in recent times, more farmers are cultivating broccoli but lack the knowledge and experience to understand the issues of labour demands during different crop seasons, compared with the greater experience of the existing broccoli farmers. The following is one example of a family that started growing broccoli in 2012 when the husband and wife realised the potential income that could be earned from these crops.

> *Pinto is 27-years-old. He and his wife started planting broccoli and cabbages in 2012. He said that he had no knowledge or skills to farm broccoli and cabbage, but he was determined to farm these vegetables because he had heard that the income from sales was good. The crops matured fast and more than one round of planting was achieved that year. To learn how to cultivate broccoli, Pinto spent K10.00 ($5.00) on cigarettes and betel-nut and gave them to a farmer who knew how to farm these crops. The farmer taught him how to cultivate the crops, and Pinto and his wife successfully started producing broccoli (Pinto, August 2013).*

Broccoli and cabbages are planted in rectangular plots in neat rows, 8-10 m in length, with a spacing of 2.5 m between them. Each plot can hold 50 to 60 plants and each household has an average 0.25 ha (four plots) of broccoli gardens (Plates 7.4 to 7.6). There are three to four planting rounds in a year, depending on labour availability and commitments of farmers to other cash crops. It takes three months for the broccoli to mature, which is an advantage to the farmers that produce it. When considering broccoli and cabbage production, farmers will take into account labour supply and post-harvest requirements, because there are no storage facilities and, therefore, the crop must be sold on the same day it is harvested. Thus farmers will spend one to two weeks harvesting and selling broccoli from their plots each day (Plates 7.4 and 7.5).

7.9 Labour and types of work

Some broccoli farmers usually plant two to three plots of broccoli in each planting round. Each plot of broccoli is planted three to four days after each other. When the plot is ready to be harvested, other plots are being prepared to start the next planting round. This planting technique is practised to stagger flowering of the broccoli plant. When the first planting round is four weeks old, farmers start planting another plot of broccoli. Labour mobilisation and accessibility of labour for broccoli production is organised around two main factors:

1) the seasonality of coffee and pineapple, and
2) the high demand periods for broccoli and cabbage.

7.9.1. Seasonality of coffee and pineapple

Labour demand is high during the coffee harvesting period in June and July but, due to low consumer demand because those months fall outside the main celebratory period, labour demand for broccoli and cabbage is low (Figure 7.5). There is still demand, but the prices tend to be lower. Thus, in June and July, households concentrate their labour on coffee production. During the coffee season, most vegetable farmers do only light weeding on their second crop of vegetables that were planted in May. After July, the vegetable farmers reduce their labour in the coffee gardens and begin to plant their third or final crop of broccoli and cabbages, which are harvested in December and January (Table 7.8).

Broccoli planting is organised around the coffee and pineapple seasons because both are fixed. Farmers have more control over the vegetable production cycle, and they can organise and create a vegetable production cycle around the coffee season. Broccoli and cabbages can be grown all year round, so farmers have more flexibility in developing horticulture cycles for these crops. Ploughing for broccoli is the main activity for which outside labour is engaged, and it is paid for in cash or in-kind. However, if there are many seedlings to transplant, the farmer may ask others to help but they will not be paid in cash. The farmer will only provide cooked food for the workers. This is because transplanting seedlings is considered to be much lighter work than ploughing and, therefore, does not need to be remunerated with cash.

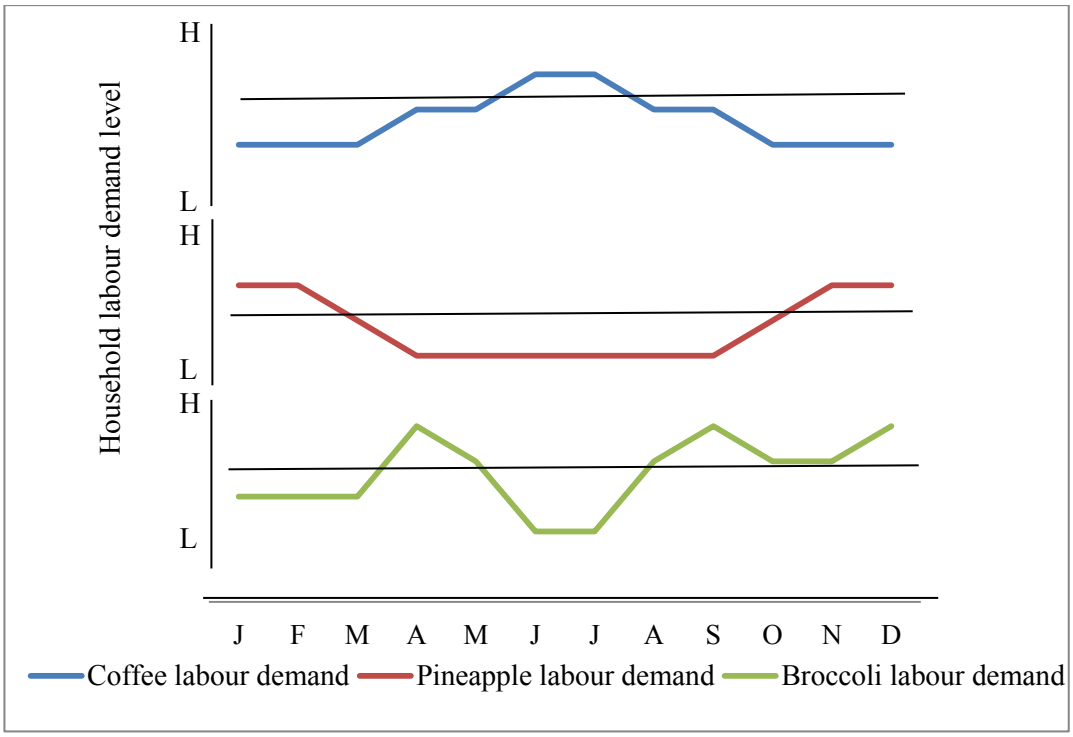


Figure 7.5. Labour demand periods for production of different cash crops.

7.9.2 Broccoli production and the pineapple season

The main periods of labour demand for pineapple are during harvesting and marketing, from October to March, when pineapples are harvested and marketed within a few hours of being picked. As shown by market surveys undertaken by Bourke *et.al.* (2004) the peak period is January and February, when most pineapples are sold at markets. Some of the households which have both pineapple and vegetable plots have labour problems in the December period because the labour demands are high for pineapple at the same time that market demands are high for broccoli and cabbages. For the vegetable producers the market demand is high in December and January, making it more attractive for broccoli farmers in terms of being able to maintain a good ceiling price during that period. Thus, households that cultivate both pineapple and broccoli are faced with the challenge of managing labour and crop sales during this period. The greatest challenge for pineapple and broccoli farmers is during times of high supply of pineapple because of the lower prices. For broccoli, during times of high consumer demand, the price is still negotiable, giving the broccoli producer some degree of control over the price compared to pineapple. This sometimes means that a farmer makes a decision to produce fewer broccolis in order to have enough labour to manage the high

volume of pineapples. Households have also developed ways to manage labour demands and marketing of produce by doing the following:

1) *Men's greater involvement in the marketing by value-adding to women's marketing strategy.*
   Male household members will sell pineapple slices by walking around in the market area, while the women sit in one spot selling broccoli, cabbage and whole pineapples. When the men have sold a batch of sliced pineapple, they will obtain some more whole fruit from their wives in the market, then peel and slice them for more sales (see section 7.4.1 for full discussion).

2) *Reduce the amount of broccoli planted during the third or fourth planting round in September if it is apparent that the pineapple yield is going to be large.* If the pineapple yield is going to be high in December and, therefore, will require more labour for harvesting and marketing, farmers will reduce the amount of broccoli they plant in August and September that would be ready in December. Therefore, more labour will be available for pineapple harvesting and marketing. (Figures 7.5). By controlling vegetable crop production, farmers have developed a labour strategy suited to their households to accommodate peak labour demands for coffee and pineapple while generating the best returns.

3) *Sell to restaurants and hotels as a last option to manage household labour constraints and offload produce during peak production periods.* To address labour supply constraints and to earn the best return, farmers will take their produce to hotels and restaurants, which usually weigh the produce and pay a fixed rate per kilogram. Farmers earn less money selling their crop in bulk this way than when selling produce at the local market, item by item, but it frees up their labour from marketing.

The pineapple season is fixed, with peak labour demands from November to January (Figure 7.5). This is when pineapples are harvested and taken to market within hours of being harvested (because there are no storage facilities available to farmers). As stated above, the broccoli season is not fixed and households which

produce both pineapple and broccoli have developed their production cycle for broccoli to accommodate the labour demands for pineapple production. While accommodating the peak labour demand period for pineapples, the broccoli production cycle is timed to meet peak market demand in April, September, December and January, as shown in figure 7.5.

Table 7.7 shows the planting rounds of vegetables, which starts in January in preparation for high consumer demand during the Easter period.The second planting round is in May, before the coffee harvesting season and in preparation for the September Independence Day sales period. The third or final planting round is in September, for the sale period over the December holidays.

Table 7.7. The seasonal distribution of tasks associated with vegetable production.

Broccoli/ cabbage production	J	F	M	A	M	J	J	A	S	O	N	D
1st Crop	Plant	Weed	Weed	Harvest/ sell								Plough/ nursery
2nd Crop				Plough/ nursery	Plant	Weed	Weed	Harvest/ sell	Harvest /sell			
3rd Crop								Plough/ nursery	Plant	Weed	Weed	Harvest/ sell
4th crop	Harvest/ sell	Harvest/ sell							Plough/ nursery	Plant	Weed	Weed

7.9.3 The consumer demand periods for broccoli and cabbage

Broccoli production is timed according to the market demand periods that, by sheer luck, fall outside the coffee high labour demand period and share only one high market demand period with pineapple, in December and January. However, the peak market demand for broccoli, in April and September, has minimum competition for labour from coffee and pineapple, so this makes broccoli a crop well-suited to plug income gaps during that period and also to allow female farmers to produce as much as possible for sale.

The peak demand periods for vegetables at the local markets of Goroka, Lae and Madang are in April, September, December and January. In April and September, the main factors contributing to increased demand for vegetables are the public holidays: Easter religious celebrations involve food for feasts and PNG's Independence Day in September is one of the most celebrated events, with many cultural shows and local feasting ceremonies held around the country. The number of foreign visitors also is high in September, increasing demand on the hospitality service industries and, thus, increasing demand for fruits and vegetables. In December, there are a host of celebratory activities, such as end of school parties, graduation parties and family celebrations over Christmas and the New Year, which also increases demand for vegetables. The broccoli farmers manipulate their planting seasons, not only to avoid competition for labour from crops like coffee and pineapple, but also to supply markets when consumer demand and prices are highest.

The most labour-demanding activities for broccoli and cabbage production are ploughing of plots and transplanting. There are three to four planting rounds, and these require three to four ploughing rounds per year. There are three labour groups that households can access for ploughing and planting:

1) *Immediate and extended family.* Labour from the extended family is usually based on reciprocal labour arrangements. The household receiving labour assistance usually provides cooked store food like rice, tinned fish and lamb flaps, which are considered to be more pretigious

than garden food. The food costs around K50 to K80, which is not cheap for a village household.

2) *Church youth groups (aged 12-15 years), which may provide labour to raise funds for their church programmes, like children's camp.* These groups do not usually work for a full day; they work only as much as they are able, typically a half day, and they are paid less than groups with members over 15 years of age. Their group rate for half a day is K20 (AU$10), and female broccoli farmers usually use these groups. The tasks are not difficult for children to do, and most of the children are friends of the farmers' children. One of the main activities they do is the transplanting of broccoli from nursery to planting plots.

3) *Mixed church groups, made up of youth, women and men*. The total payment to this type of group depends on the number of members. A large group is referred to as one with 15 to 20 members, and they are paid K50. A small group of less than 15 members is paid about K30.

Most of the other broccoli farming activities, like establishing nurseries, weeding, harvesting and marketing of the crops is undertaken by the farmer and her immediate family.

Plate.7.4. Broccoli plots that are ready to produce broccoli flowers at four weeks, and also plots that have broccoli ready to harvest.

Plate 7.5. A plot of broccoli that was a week old.

Plate 7.6. Digging a drain before ploughing land to plant broccoli.

7.9.4 Production costs and income from broccoli

Production starts with a nursery of seedlings, and the main activity that involves the engagement of labour is the ploughing of land. The main costs of broccoli production are the packet of broccoli seeds, labour and transport costs. Just a packet of seeds and a bottle of pesticide (karate) are required for broccoli production for the whole year. A few farmers that were interviewed stated that they shared a packet of broccoli seeds to minimise individual costs; it is a common practice among female farmers. Each bag of broccoli costs K2 to transport to market and there is a market fee of K2 per bag as well. Women typically take a *bilum*, weighing 10-12 kg at a time, to the market. Broccoli plot sizes are generally 6 m by 22 m with about 460 broccoli plants.

Table 7.8. Estimated annual costs and income for broccoli production on a standard plot (6 m x 22 m).

Types of production cost	**Total average cost**	**Cost per broccoli (Kina)**	**Cost per plot (Kina)**	**Gross Income per plot (average selling price K3.00)**	**Net Income per plot (average selling price K3.00)**
Hired labour	K30.00 per day	0.07	30.00		
Food for labour	K40.00 per day	0.09	40.00		
Transport (bus fare)	K4.00 per return trip	0.01	4.00		
Transport cost (9 *bilum* bags per plot)	K4.00 per bilum bag	0.08	36.00		
Market fee (9 bags)	K2.00 per day	0.04	18.00		
Pesticide-karate (350ml)	K5.00 per year	0.00	0.60		
Fertilizer-NPK (4kg)	K27.00 per year	0.01	3.00		
Chicken manure (45kg)	K10.00 per year	0.00	1.10		
Seed pkt (300 g)	K120.00 per year	0.03	13.30		
Total		0.32	146.00	1,380	1,234

The labour cost for broccoli is K30 per day, which is less than the labour cost for pineapple (K50 per day) because most of the broccoli tasks are not difficult compared with those for pineapple. Broccoli is planted on much softer soil, which is easy to plough, while pineapple is planted on soil in drier areas that is generally more difficult to plough. Weeding for broccoli is easier than for pineapple. Therefore, after considering the task requirements for each crop, the farmer pays less in labour costs for broccoli production. One 350 ml bottle of pesticide, one 4 kg bag of NPK and one bag of chicken manure are used for the whole year on an estimated total of 9 to 12 plots of broccoli produced in a year.

7.10 Conclusion

The introduction and development of fruits and vegetables as alternative cash crops to coffee have impacted on how households allocate resources such as land and labour to create a stream of income throughout the year. Households have developed labour strategies after considering the environmental, economic and social factors, and they make decisions on where and when to allocate their resources. Environmental factors such as crop seasonality cannot be easily altered to suit the labour conditions of households. However, coffee and pineapple seasons fall in different months, making it manageable for households to allocate labour. Broccoli production is timed to avoid the peak labour demand periods of other crops like coffee and pineapple, and also influenced by socio-economic factors such as high market demand periods and household labour supply at different times of the year. The farming of pineapple, citrus and vegetables is not strictly governed by cultural structures and the politics of land ownership as compared with perennial cash crops like coffee. This flexibility allows a more liberal approach to gender roles in relation to access rights to resources such as land and income. These alternative cash crops have changed the traditional ways of thinking in market spaces by creating a modern approach to the selling of produce. Women have a stronger incentive to engage in food crop production than coffee production, with independent access to land and control over their own labour and the income generated. This could well be at the expense of coffee production.

CHAPTER EIGHT

CONCLUSIONS, RECOMENDATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

8.1 Introduction

This chapter summarises the key findings of the research in relation to the influence of socio-economic factors on farm investment decisions and labour mobilisation among smallholder coffee producers in Sogomi and Safanaga. The chapter begins with an overview of the main arguments. Then it synthesises the key findings and highlights their theoretical and policy implications. The chapter concludes with some suggestions for future research.

This thesis has shown how land use, land tenure, labour and the commercial production of pineapple and broccoli have dramatically changed smallholder coffee households in less than two decades. These rapid changes occurring in the villages of Sogomi and Safanaga are an outcome of villagers' integration into the modern cash economy. Farmers are moving away from the traditional cash crop of coffee to produce new cash crops, such as pineapple and broccoli. In the process they are creating a vibrant village economy that defies earlier assumptions of arrested agrarian development or a terminal peasantry. In this regard, the coffee industry is falling behind in its understanding of the fast pace of development and does not fully appreciate the threats to coffee production in accessible sites. Therefore, the coffee industry must refocus its research and extension approach in order to understand the diverse livelihood factors influencing the production and productivity of coffee households. The diversity of rural livelihoods reflects a broad range of environmental, economic and social factors and that must be factored into policy frameworks. The three main arguments of this thesis regarding the rapid pace of change in development and the influence of socio-economic factors on household decisions are: 1) coffee smallholder farmers with relatively good market access are diversifying into the large-scale commercial production of pineapple and broccoli; 2) this process of

commercialisation is associated with the individualisation of production and land tenure; and 3) a high level of market access is facilitating these changes.

8.2 Key findings

8.2.1 Landownership

The introduction of coffee symbolised the arrival of the modern world and PNG's engagement in it through the production of coffee as an export crop. The modern economy is profit-oriented, with emphasis on individualism and private ownership of resources such as land. The evidence in this study showed that, when coffee was introduced, it altered customary values relating to land ownership and also influenced land use in Sogomi and Safanaga. Traditional land ownership and management were streamlined to accommodate the new perennial crop of coffee and socio-economic change occurred to facilitate production.

Land was originally unrestricted to members of the clan for carrying out subsistence gardening. Villagers accessed the same areas of land which their grandparents had used for subsistence gardening, for generations. This is how land inheritance was mapped. Although there was a recognised owner, access to use the land was not restricted to the immediate family; other clan members had the right to access the land for gardening. Therefore, a communal livelihood was the way of life. However, this system of communal use of land began to change, and cash became the daily aspiration of villagers, when coffee was introduced.

Coffee, being a perennial crop, locks up land for a longer period compared with land under subsistence farming. This leads to land access becoming rigid and, with increasing population, this pressure is pushing the limits of traditional values, so land inheritance among the immediate family is becoming more pronounced. Thus, land tenure is becoming more individualistic as traditional farming systems are changing to permanent agriculture systems and village households integrate more into the market economy.

Collett (1992) stated that traditional land tenure is a constraint on the agrarian transition and land is not a critical factor in subsistence farming system. However, this

thesis shows that a transition is occurring as subsistence food production gives way to more permanent farming systems as a result of socio-economic change occurring in Sogomi and Safanga villages. These changes reflect what is happening in rural coffee households with high market access. Both Grossman (1984) and Collett (1992) stated that although the introduction of coffee intensifies land competition this change did not affect woman's access to land. However, because coffee is a perennial crop it exacerbated population pressure which led to land tenure becoming more individualistic. Under this modified tenure system, women were allowed to rent land for production of food cash crops.

8.2.2 Labour in coffee production

Coffee farming changed the rules governing the mobilisation of labour. Collett (1992) and Overfield (1998) stated that labour constraints were critical factors limiting production in households owning large coffee holdings. Collett (1992) suggested that was due to low coffee prices which made it expensive to hire labour. The results of my study show that there are number of factors critical to accessing labour in the village. Previously, labour was mobilised from the extended family to help with susbsistence gardening when there was a lot of work to be done for tasks like clearing forest or ploughing and weeding. This work was undertaken in a communal fashion. With the introduction of coffee, this changed farmers' attitudes towards labour arrangements. Then, with the introduction of large-scale production of pineapple and broccoli, the attitudes of villagers toward labour were further changed. Although traditional values are still practised and recognised, monetary value has replaced a lot of traditional values. However, most monetary transactions that are being used to subsitute for traditional values are not always commensurate with the market values of cash exchange. This creates a hybridisation of the local village economy, where market and social arrangements are mixed to create an alternate form of exchange in which resources are mobilised accordingly..

More households are functioning within the village as individual units of production because they are concentrating their labour resources within their own households' production and minimising their social engagement in the wider community. This is affecting the way these village households organise or mobilise labour to assist them.

Most labour assistance from relatives is now conditional. Labour is only given if there is an anticipated return or a reward in cash or in-kind. Reciprocal labour is limited only to the social production of households as villagers have monetised their labour for any sort of production related to earning cash income. Although most things are monetised, as mentioned above, it does not reflect the true value of cash transactions.

Two main reasons were identified for the mobilisation of hired labour in coffee production. Firstly, hired labour was engaged by a household to ease the workload of family labour at specific times, like peak harvesting periods. Secondly, those who provided hired labour did so to earn cash to meet their immediate cash needs. Hired labour is not valued solely on the supply and demand of the market for labour. Rather, hired labour is valued based on workers meeting their immediate cash demands, with little consideration of minimum wage rates. For famers employing labour, the break-even cost may be secondary to the social benefits of recruiting labour. Thus, making profits and the social returns of employing labour may both be considered equally in decision-making relating to production. As traditional values of exchange have weakened in recent times and most villagers who supply labour prefer being rewarded by cash or in-kind, most rewards are not dictated by the market, which creates a hybrid economy that seems to work well in Sogomi and Safanaga.

8.2.3 Land and labour in pineapple production

There is now large-scale commercial production of pineapples in the two study sites. This has resulted from a high degree of market accessibility, a growing domestic demand for pineapples, changes in land tenure and relations of production that facilitate commercial vegetable and fruit production. Pineapples are seen as a temporary crop, unlike coffee. This allows farmers to easily switch land use after three to four years of pineapple production. It also means that it is easier for women to access land for temporary production of pineapples than it is for coffee production. Therefore, many women have unrestricted user rights to land for the commercial production of pineapples. Thus, more flexible access to land encourages greater participation by women in cash crop production, compared with coffee. Decision-making regarding resource allocation in pineapple production is independently made by both men and women, unlike coffee production. Involvement of women in the

market economy through pineapple production demonstrates the nature of rural households that are governed by traditional socio-cultural values while being integrated into a modern market economy. These findings show how the situation has changed since Collett's (1992) study. He reported that women in Bena worked small food crop gardens, mainly for household consumption. His study made no reference to large-scale commercial production of food crops. This is a significant change to farming practices in Bena.

Labour demands in pineapple production are seasonally fixed. However, the peak labour demand period for pineapple production falls outside the coffee flush season. Therefore, households are able to engage in large-scale pineapple production without compromising coffee production. Thus, men do not need to control and re-direct females away from pineapple production to coffee. The allocation of immediate family labour to pineapple production is independently decided, unlike coffee. Therefore, there is more scope for women to make decisions regarding their labour in pineapple growing than in coffee production.

8.2.4 Land and labour in broccoli production

Land for broccoli production is used for a much shorter period than for pineapple. Broccoli is ready to harvest 12 weeks after planting and, generally, there are few problems in accessing land for such short periods. Most broccoli production is undertaken by women, unlike pineapple where both men and women are involved.

Broccoli production is a successful example of household livelihood diversification. Broccoli can be cultivated all year around and, therefore, can be produced when labour demands are low for other crops like coffee and pineapple. Women can then develop labour allocation strategies that provide a stream of income throughout the year. Labour demand for broccoli can be managed so as not to conflict with the pineapple season during festive and other peak demand periods. Households can vary the quantity and timing of production of broccoli according to anticipated yield outputs of coffee and pineapples. This gives families, particularly women, greater control over their labour.

8.2.5 Gender and coffee production

As mentioned above, female rights to independently access land are limited within coffee farming, although they are actively involved in its production. Overfield (1998) reported women in coffee producing areas receive lower returns for their labour and had a greater work burden than men. Most of the time, they provide the much needed labour for harvesting but are often not compensated adequately or fairly. Despite receiving an income, women will spend their share on household needs and rarely on their own individual needs. The perennial nature of coffee trees reinforces a male-dominated culture that sustains inequality and acts as a disincentive for women in the villages of Sogomi and Safanaga to produce coffee. However, given the high degree of accessibility to markets, women have more incentive to produce other crops for income that give them more control over their labour and income than coffee does, thereby fulfilling their desire to be compensated fairly. Men, on the other hand, use coffee as a form of social security for the inheritance of their resources. Their involvement in coffee allows them to claim and maintain ownership over land. Such practices emphasise the social factors influencing the production of coffee. However, to focus only on the economic outcomes of coffee production would provide only a partial picture of the situation.

8.3 Conceptual and philosophical approach

The Sustainable Livelihood Approach was used as the conceptual framework to understand developmental changes affecting the lives of rural coffee farmers in PNG. Previous studies undertaken with coffee households were within the discourse of rural development and reached conflicting conclusions in regards to the developmental changes occurring in rural coffee villages. This study argues that, while the PNG Coffee Industry helps to maintain coffee production and smallholder coffee incomes through various industry mechanisms, it has inadequately acknowledged the reality of smallholder coffee production in which they pursue a diverse range of livelihoods, of which coffee is but one.

A research philosophical approach of constructivism was applied in this study. As anticipated, coffee smallholder households construct their livelihoods from their

realities. They have capitalised on their high market access and developed commercial production of pineapple and broccoli. Women's labour was fairly compensated by developing labour strategies for coffee, pineapple and broccoli. These results reflect the research paradigm used to investigate the culturally-derived and historical influences to understand the contemporary realities created by individual coffee households.

8.4 Policy implications and recommendations

If the trend of large-scale commercial production of vegetables and pineapple continues in accessible coffee-growing areas, the implications for smallholder coffee production are not good if extension policies and strategies do not take account of these rapid changes. Production will decline in most of these sites as a result of land pressures reducing the area under coffee and labour shifting to more lucrative income strategies. This study makes the following recommendations:

1) The PNG Coffee Industry has inadequately acknowledged and understood that coffee farmers pursue a diverse range of livelihoods. Therefore, CIC should explore the development of new extension and research approaches based on integrated coffee farming systems.
2) The coffee industry will have to refocus its extension approach in accessible sites where, despite large investments in extension, farmers are losing interest in coffee as they perceive better returns from other crops. Extension is likely to be effective, if it seeks to improve the returns for labour through uptake of technology in rural areas. However, this will be an expensive investment for the coffee industry.

3) With increasing vulnerability to climate change (especially in Bena, where there is a prolonged dry season) coffee, which is more drought tolerant than vegetable crops, may provide a form of income and improved food security. This needs to be stressed in extension messages. Therefore, CIC will have to broaden its scope of conventional extension ideas on production to develop a

coffee resilience extension module for areas that are prone to natural disasters due to climate change.

4) There needs to be greater recognition of the fact that coffee gardens in high population areas are established in order to lock up land for the future. In these cases there can be high rates of under-harvesting. Such situations will provide an inaccurate projection of production using tree stocks. Therefore, CIC will have to develop appropriate methods to improve the accuracy of information on production.

Overall, CIC should encourage greater participation of women in coffee production by providing incentives that encourage women's groups to increase their participation by networking and partnering with other institutions, such as FPDA. For example, women may run small businesses in vegetable and fruit production and add coffee products to their businesses, gradually increasing their participation in the coffee value chain.

8.5 Limitations and future research

1) Due to time and research limitations of this study, it would be useful if similar studies were to be carried out in the three main coffee-growing provinces of Morobe, Jiwaka and Western Highlands. I would hypothesise that processes similar to those occurring at my study sites would also be taking place in accessible sites in these other provinces.

2) To maintain and sustain coffee farming in rural communities with high accessibility to markets, it is appropriate to understand the diversity of rural livelihoods and how they interact with coffee production. I suggest that studies be carried out to understand how an integrated coffee farming system would best be developed for sites with a high level of market access.

3) Evidence from this study questions the relationship between smallholder coffee productivity and area under coffee production per household. Future work is required to investigate the relationship between land area under coffee and its productivity. There may be an optimum size of smallholder coffee gardens, above which labour supply becomes a problem.

Future research on improving women's access to land in areas with a high degree of market accessibility may increase their participation in coffee production. This may include formulating policy mechanisms allowing women to rent land for agricultural projects such as vegetable farming and may incorporate the buying of coffee cherries. These women could be link to cherry processors who would buy cherry at a premium price, thereby saving much of the labour that is spent on processing cherry to parchment

NOTES

Chapter One

1. ACIAR ASEM/2008/036 project**:** Improving livelihoods of smallholder families through increased productivity of coffee-based farming systems in the highlands of Papua New Guinea http://aciar.gov.au/project/asem/2008/036.
2. Green Bean refers to the hulling of parchment beans in order to remove the dry shell and expose the green coloured bean before the beans are roasted.

Chapter Two

1. The Chambers English Dictionary, Chambers, Edinburgh, 1988, p. 386.
2. RJ Johnston, Derek Gregory and David M Smith, The Dictionary of Human Geography (3rd ed.), Blackwell, Oxford, 1994, p. 12.
3. Freight surety is a CIC extension programme for assisting very remote farmers in moving their coffee to market via air or sea. The programme covers the transport costs up-front and, later, the farmers repay 60% of the transport costs after sales.
4. This change has been a direct response to the inroads made by the cash economy, the cultivation of perennial crops and the erection of permanent houses in the village. This social and economic change has exerted considerable pressure, if not strain, on the continued viability and sustainability of the customary land tenure system.
5. *Bigman*' refers to a form of leadership in tribes where the leader achieves power and influence based on certain abilities that are valued by the tribe (http://oregonstate.edu/instruct/anth370/gloss.html).
6. Coffee garden size in terms of land area and number of trees.
7. Coffee flush refers to the peak harvesting period when most coffee cherries are ripe and ready for harvesting.

Chapter Three

1. The International Coffee Organization (ICO) is the main inter-governmental organisation for coffee, bringing together exporting and importing world governments to tackle the challenges facing the entire coffee sector through international cooperation. Its Member Governments represent 95% of world coffee production and 78% of world consumption (www.ico.org).
2. Soluble coffee refers to dehydrated coffee products, for example, the Nescafe Instant Coffee. The coffee is mixed with hot water for an instant cup of coffee, without the need to brew it.
3. In the conventional market, there are two ways of buying coffee: the cash market and the futures market. The cash market is the current market, today. It is the price you would pay for coffee today if you could receive it right away. The futures market is used to help determine the price for future deliveries. It is used to purchase a contract today that guarantees a future shipment of coffee. More importantly, however, the futures market for commodities like coffee is used to help protect against the wild variations that occur due to coffee market speculation. The quality of coffee also affects the premium or discount paid for a coffee (http://www.coffeeresearch.org/)

4. Differentiated, here, means that the coffee is distinguished from conventional or generic commodity coffee by a variety of means including particular qualities or characteristics, specific estate or geographic origins, and certifications for meeting sustainability processes.
5. Green Bean refers to coffee beans which are disengaged completely from the husk and, to a considerable extent, from the seed coat (silver skin). In general, each coffee cherry contains two coffee beans, which lie with their flat sides together and exhibit longitudinal furrows in the middle of these sides http://apps.daff.gov.au/
6. This is calculated using 400,000 farmers with an average family size of 5.1 persons, or over 2 million persons within a population of 8 million.
7. The PNG labour force was estimated to be 3.6 million in 2008.

Chapter Four

1. The encounter has been turned into a documentary series directed by Connelly and Anderson in a Highland trilogy (First Contact, 1983; Joe Leahy's Neighbour, 1988; and Black Harvest, 1992). A group that centres on kinship units and common-interest groups but cuts across kindred boundaries. The "*bigman*" institution is quite common in tribes (www.oregonstate.edu).
2. Tribe in anthropology, a notional form of human social organization based on a set of smaller groups (known as *bands*), having temporary or permanent political integration, and defined by traditions of common descent, language, culture, and ideology (http://www.britannica.com/topic/tribe-anthropology).
3. *Hausman* is a house built purposely to isolate males who reach the stage of puberty, at which time they are initiated into the tribe. They are taught how to behave in traditional society, survival skills such as how to build houses and gardens, and how to solve conflicts.
4. *Hausmeri* is a house built purposely to isolate girls when they have their first menstrual cycle, to treat them as grown adult women. It is at this stage of puberty that they are taught how to behave as a woman, a wife and a mother within their households and society at large.
5. *Colocasia esculenta* refered to as *Taro tru* in Tok Pisin
6. Chinese taro
7. A form of leadership in tribes where the leader achieves power and influence based on ability (www.oregonstate.edu).
8. White man refers to European settlers.
9. Asbin in tok pisin refers to the tuberous part of the winged bean.

Chapter Five

1. Villagers who are temporarily away, including high school boarders, but who may be back at any time.
2. Villagers who are currently in the village but will leave the village soon, including high school boarders.
3. A method of sampling that involves the division of a population into smaller groups, known as strata. In stratified random sampling, the strata are formed based

on members' shared attributes or characteristics. A random sample from each stratum is taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata are then pooled to form a random sample (http://www.investopedia.com).

4. Scholarly literature that is not formally published.

Chapter Six

1. For example, vehicles, TV sets or modern cooking devices (e.g. gas cooker).
2. Accessing land through performing cultural acts that are appreciated, hence the allocation of land to the individual through verbal agreement and cultural rites that are performed by one family for another.
3. The use of customary land in this context is about landowners agreeing to allow other families in the clan to have usufruct rights.
4. Drawing by Papa Ukaia, see Plate 6.3 in which he was photographed after drawing the diagram.
5. Someone not from the same clan.
6. Secondary data from the survey completed under the ACIAR livelihood project.
7. The Government has endorsed an increase of K3.20 per hour in minimum wages for workers throughout the country(Pacific Island Report 2011) (http://www.officeofprimeminister.com/#!june-2014/c1j7)
8. Locally brewed alcohol from a local brewing company.
   Betel nut is the seed of the fruit of the areca palm. It is also known as Areca nut. The common names, preparations and specific ingredients vary by cultural group and individuals who use it. See more at: http://www.druginfo.adf.org.au/drug-facts/betel-nut#sthash.fZQO81Uq.dpuf.
9. Betel-nut or *buai*, as it is called in Tok Pisin, has a cultural significance in coastal parts of PNG.
10. Polygamy is the practice of taking in another woman by a man who still has his first wife with him. The other woman becomes the second or third wife, depending on how many other wives the man has.

Chapter Seven

1. Pineapple is botanically known as *Ananas comosus*; it is a fruit that is native to South America. It was first discovered by Christopher Colombus on the island of Guadeloupe in 1493, even though the fruit had long grown in South America. It is believed that the Spanish introduced pineapple to Hawaii in 1527 and it then spread to Asia and the West Indies (http://www.ibuzzle.com/articles/history-of-pineapple.htm).
2. Oranges are botanically called *Citrus aurantium*. The early records show that it started to spread around the world as early as 2200 BC. Citrus fruits are believed to have first appeared in Southeast Asia around 400 BC. They spread to North Africa through human migration, and to the Roman Empire and Southern Europe by trade. The Spanish explorers brought oranges to the Americas. However, the modern development of the citrus industry started in the nineteenth century. Today, citrus fruits are traded internationally as one of the highest value fruit crops (http://websites.lib.ucr.edu/agnic/webber/Vol1/Chapter1.htm).

3. Broccoli is a result of careful breeding of cultivated leafy cole crops in the northern Mediterranean starting in about the sixth century BC. Since the Roman Empire broccoli has been considered a uniquely valuable food among Italians. Broccoli was brought to England from Antwerp in the mid-eighteenth century by Peter Scheemakers. Broccoli was first introduced to the United States by Italian immigrants, but did not become widely known there until the 1920s. (http://en.wikipedia.org/wiki/Broccoli)
4. The navel orange was propagated between 1810 and 1820 by a Portuguese who lived at Cabulla, a suburb of Bahia, Brazil (Erston 1954).
5. This refers to ally digging the soil with a shovel or digging sticks.
6. Kaiyufa is the village after Safanaga Village, about 5 km from the main Bena Road (Figure 5.1).

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LIST OF APPENDICES

Appendix 1

SMALLHOLDER HOUSEHOLD COFFEE SURVEY

Date: Interviewer: Village: LLG: Ward:

Name of Smallholder: Name of Haus Lain:

Part A. Population and Demographic Details

Immediate family members and others who are living with them in the same house and eating from the same pot.

Note all births from 1st born pikinini to last born. Include adopted children and visitors/haus lain members living with family.

Q1. Household 1: No. 1wife. Household Head

	Sex	**Age**	**Marital Status** 1. Married 2. Married & living w. parents 3. Sep/Divorced 4. Widowed 5. Single	**Highest Education Level Attained**		**Residence** 1. With this family 2. With another family in this village 3. With relatives in another village 4. Living away at school/college 5. Living in town 6. Living in another province 7. Adopted out 8. Deceased 9. Other, specify	**Notes**
				Currently attending school, college or university (Y/N)	**If yes**, note school grade, college or university. **If no**, note highest educational achievement.		
Male							

Female							
1st born	m/f						
2nd born	m/f						
3rd born	m/f						
4th born	m/f						
5th born	m/f						
6th born	m/f						
Adopted children							
	m/f						
	m/f						
Long-term visitors/ haus lain members							
	m/f						
	m/f						

Details of coffee holdings and coffee production

Q2. How many coffee gardens do you have? Complete table for each coffee garden.

Area planted (ha) /or number of coffee trees	**Name of ground where coffee garden planted**	**Distance from house:** **1. Next to house** **2. <15 min. walk** **3. >15 min walk** **4. >30 min walk** **But also from GPS**	**Was this coffee garden:** **1. Planted by you?** **2. A portion of a larger coffee garden that was planted by your father & later subdivided amongst his sons/daughters?** **3. A coffee garden planted by your father & you inherited all of it?** **4. A portion of an old coffee block or plantation?** **5. Other, Specify**	**Coffee planted on:** **1. Land owned by this HH2. Customary land of haus lain.3. Land owned by mothers' brothers** **4. In-law (wife family)** **5. Land belonging to another person in the village** **6. Purchased land** **7. Other, specify**	**Year planted / replanted**	**Who is taking care of it?** **(e.g. a son)**
1.						
2.						
3.						
4.						

Q3. What best describes the management of this household's coffee gardens? What are the typical arrangements for paying labour? What are the most common labour and payment arrangements during periods of peak labour demand like the coffee flush season?

Do you engaged labour? If you do, rank the type of labour you use from most common to least common – 1 is most common	**Most common form of payment for each labour arrangement**?
[ ] Grower himself usually works alone.	_____
[ ] The immediate family of the grower usually works together (husband, wife and unmarried children).	_____
[ ] Members of the extended family (e.g. married brothers, in-laws, etc.) help with coffee work (reciprocal labour).	_____
[ ]Youth/church groups often employed	_____
[ ] Hired labour often employed	_____
[ ] Other, please describe.	_____
	Some examples of payment arrangements (insert number above & any further details) 1. Most of the coffee money is kept by the grower himself. 2. Grower shares money with all his immediate family whether or not they helped with work in the coffee garden. 3. Grower shares money only with immediate family members who helped with the harvesting &/or processing. 4. Grower gives some cash to other HHs who helped with coffee work (reciprocal labour). 5. Grower gives cooked food only to other HHs who helped with coffee work (reciprocal labour). 6. Grower gives some cash and cooked food to other HHs who helped with coffee work (reciprocal work). 7. Grower pays cash to youth/church group on day of work. 8. Grower pays fixed wage to hired labour. 9. Other, please describe

Q4. Do relatives help with work on your coffee garden?

a) Yes. What type of coffee work do they usually help with? _____Go to Q5
b) No. Go to Q6

Q5. When relatives help with work on your coffee garden, do you (circle one or more):

a) Give them some cash?
b) Share cooked food with them following the work?
c) Later help them with work on their own coffee garden (reciprocal labour exchange – halpim wanpela, narapela)?
d) Assist them when they have some hevi in the future (e.g. baim meri, school fee, man i dai, etc)?
e) Other: _____

Q6. Do members of your family help with work on a relative's coffee garden?

a) Yes. What type of coffee work does your family usually help them with?
_____
b) No. Go to Q8.

Q7. When one of your family members helps a relative with work on their coffee gardens, does the relative (circle one or more):

a) Give your family member some cash?
b) Share cooked food with your family member following the work?
c) Later help your family with work on your coffee garden (reciprocal labour exchange)?
d) Assist your family when you have some hevi in the future (e.g. baim meri, school fee, man i dai, etc)?
e) Other: _____

Q8. Do you use hired labour in your coffee garden?

a) Regularly. What type of work tasks? _____
b) Sometimes. What type of work tasks? _____
c) Never

Coffee marketing

Q9

coffee sold in	Was there any coffee sold or stored?	K/Kg/Bag	Mkt frequency	Parchment or Cherry kg	Purpose of sale or store	If sold who approved of the seller
J						
F						
M						
A						
M						
J						
J						
A						
S						
O						
N						
D						

Q10. Do your children tell you what they need when you go off to sell coffee?

Q11. Are you a member of a coffee famer group? **Yes** complete table **No-go to the** next question.

Group	Group Name	Group Leader	Certification	
			(Y/N)	Type
PRAP Farmer Group				
Coop				
SHCGA				
Other specify				

Labour Supply and Agronomic Practices in Coffee

Q12. Did any member of you family been working in the coffee garden in the last two week? (Y/N). If yes, complete table by placing a tick in appropriate box. If No, go to Q1

Coffee Garden Activity	Male household head	Female household head	Eldest son who lives in the same HH	Eldest daughter who lives in the same HH	Non-household labourer
Harvest					
Pulping					
Washing					
Dry coffee					
Sell coffee					
Weeding					
Spraying herbicide					
Apply organic fertiliser (mulching, manure, etc)					
Apply inorganic fertiliser					
Pruning coffee					
Pruning shade					
Maintaining drains					
Fencing of coffee garden					
Clearing new coffee garden					
Planting new coffee garden					
Tending interplanted food crops					
Other, specify					

Q13. Number them 1, 2, 3 for the top three activities where the person spends most of their time working. (N/A = not applicable)
(Complete table below for different family members)

Activity	Male household head	Female household head	Eldest son (who lives in the same HH)	Eldest daughter (who lives in the same HH)
food garden				
Coffee garden				
Other. Specify				

Coffee tools and equipment

Q14. Name the type of tools you use during coffee work? Tick appropriate box

TOOLS	Yes=1; No=2;	Ownership 1. Family own 2.Lend to others 3.Borrowed 4. Other, specify	Notes
Hand pulper			
Motor pulper			
Pruning saw			
Sisis bilong katim kofi			
Bush knife			
Grass knife			
Tamiok			
Scales			
Wheelbarrow			
Knapsack sprayers			
Bucket			
Ladder			
Spade/shovel			
Motorised hand-held slasher			
Canvas for drying			
Separate house for coffee storage			
Other tools for coffee			

Household Assets and Income sources

Q15. Type of house/s (circle one or more – note from observation):

a) Permanent
b) Semi-permanent
c) Bush material_____

Q16. Does this household own any of the following items?

Item	**Yes=1 No=2 Not asked=3**	**Item**	**Yes=1 No=2 Not asked=3**	**Item**	**Yes=1 No=2 Not asked=3**	**Number**
Radio		Solar system		Pigs		
Television		Coleman lamp		Goats		
DVD player		Kerosene lamp		Sheep		
Mobile phone		Battery lamp		Muruk		
Car		Kerosene stove		Fish pond		
Truck/PMV		Bank account		Other		
Motorbike		Mattress				
Bicycle		Mosquito net				
Generator		Banis kakaruk				

Q17. Do any household members receive income from the following?

Activity	**Tick √**	Every week	Every 2 weeks	Once a month or less	**Activity**	**Tick √**	Every week	Every 2 weeks	Once a month or less
Selling fresh produce at markets					Bakery				
Selling fresh produce to bulk buyers					PMV owner				
Buying coffee					Chicken				
Vanilla					Pigs				As required
Spices (e.g. cardamon)					Goats/sheep/ cassowary (circle)				As required
Tradestore					Fish				
Fuel sales					Wage employment (full or part time)				
Firewood					Retirement pension				
Small scale retailing of store goods (e.g. beetle nut, smoke, biscuit)					Working as hired labourer				
Phone cards					Remittances				
CD Haus					Other				

Q18. If any household members are in wage employment or are hired labourers, note type of employment for each:

_____

Q19. Rank the most important sources of income over one year for the HH, father and mother (in order of importance from the largest source of income to the smallest amount of income).

Q20

Rank the importance of income sources by households from highest to lowest (ranking by voting)			
	Husband	Wife	Child 1(M/F)
Coffee			
Food crops			
Pineapple/Citrus			
Livestock			
others			

Q21. Have you ever obtained a loan from a financial institution? (Y/N). If yes, what was the loan for?

_____

Q22. What are your major categories of HH spending using income from coffee, food crops and fruits? (Rank highest-lowest by voting)?

Which source of income contributed the most to the expenses of the following (rank by voting)				
	Coffee	Food crops	Pineapple/Citrus	Livestock
Food				
Clothes				
School fees**				
Hospital				
Bride Price				
Death contribution				
House man				
House meri				
Other				

**Does free education impact on coffee production (ask in qualitative survey-try to get a sense of the impact of free education on coffee &pineapple production)

Q23. Is the decision on how the income is spent decided before or after the sale?

_____

Q24. Who decides on how the money should be spent?

a) Father – i) always ii) sometimes iii) never

b) Mother- i) always ii) sometimes iii) never

c) both parents- i) always ii) sometimes iii) never
d) father/children - i) always ii) sometimes iii) never
e) Mother/children- i) always ii) sometimes iii) never
f) Father/Mother/Children- i) always ii) sometimes – iii) never

Q25. Do your children tell you what they need when you go off to sell food crops?

a) Every time b)Sometimes c) Never d) others (specify)

_____

Q26. What are your major costs of coffee farm inputs?

What are your major costs for coffee production?	From coffee income	From Food crops income	From Pineapple/Citrus income	What time of the year are these costs highest?	Who makes decisions on this expenditure ?
a) Pesticides					
b) Transport					
c) Fertilizer					
d) Labour					
e) Other					

Q27. Any food crops produced primarily for cash income e.g. cabbage, sweet potatoes sold?

Any food crops produced primarily for cash income e.g. cabbage, sweet potatoes?	Family member who markets (papa/mama/children)	Mkt frequency	Why s/he sells	Who makes the decisions about this sale?
Jan				
Feb				
March				
April				
May				
Jun				
July				
August				
Sept				
Oct				
Nov				
Dec				

Q28. Any pineapple/citrus sold?

Any pineapple/citrus sold?	Family member who markets (papa/mama/children	Mkt frequency	Why s/he sells	Who makes the decisions about this sale?
Jan				
Feb				
March				
April				
May				
Jun				
July				
August				
Sept				
Oct				
Nov				
Dec				

	Sex	Age	Marital Status 1. Married 2. Married & living w. parents 3. Sep/Divorced 4. Widowed 5. Single	Highest Education Level Attained		Residence 1. With this family 2. With another family in this village 3. With relatives in another village 4. Living away at school/college 5. Living in town 6. Living in another province 7. Adopted out 8. Deceased 9. Other, specify	Notes
				Currently attending school, college or university (Y/N)	**If yes**, note school grade, college or university. **If no**, note highest educational achievement.		
Male							
Female							
1st born	m/f						
2nd born	m/f						
3rd born	m/f						
4th born	m/f						
5th born	m/f						
6th born	m/f						
Adopted children							
	m/f						
	m/f						
Long-term visitors/ haus lain members							
	m/f						
	m/f						

Household 2: No. 2 meri. Household Head

Appendix 2

Part B. Qualitative Questions for individual household discussion

Q1

Type of Hire Labour	Gender/Age	Type of work	Comments on how High prices affect payment levels of hired labour	Comments on how Low price affects payment level of hired labour	Individual needs	Payment in cash and Kind
Individual labour						
Village youths groups						
Church youth/women/men						
Cooperative youth/women/men						
Sports youth/women/men						
Other						

Q2

Family labour	Type of work	Comments on how High prices affects payment level of hired labour	Comments on how price affects payment level of hired labour	Individual needs of the hired labour	Food and Kind
Kinship affects payment of labour (e.g MB,SS,B,FB)					
Age-generation affects payment of labour					
Gender affects payment of labour					
Harvest rounds affect payment					

Appendix 3

Coffee group

Q1. Hire labour

a) Are there separate rates for village youths, church youths/women/men, and sports groups?

b) What type of coffee work do you engage hire labour for?

c) When it's peak season do you have problems mobilising labour? (Explore problems that might emerge)

d) How do you manage the problem of labour shortages during periods of high labour demand?

Q2. Family labour

a) Explain the meaning of cash payments to them regarding their family relations to you? (Prefer specific examples)

b) Explain how payment levels for family labour vary when prices of coffee are high and low? if its peak season do you mobilised family labour by the amount you will pay them or some other contracts?

c) Payments by cash (even cash payment is for labour or implicit payment, e.g. Eric's bride price contribution from) or by implicit contract

Appendix 4

Pineapple/Citrus groups

Hire labour

a) Are there separate rates for village youths, church youths/women/men, and sports groups?

b) What type of pineapple/Citrus work do you engage hired labour for?

c) When it's peak season do you have problems mobilising labour?

d) How do you manage the problem of labour shortages during periods of high labour demand?

Family labour

a) Explain the meaning of cash payments to them regarding their family relations to you? (Prefer specific examples)

b) Explain how payment levels for family labour vary when prices of coffee are high and low? if its peak season do you mobilised family labour by the amount you will pay them or some other contracts?

c) Payments by cash (even cash payment is for labour or implicit payment, e.g. Eric's bride price contribution from) or by implicit contract

Appendix 5

Broccoli and cabbage group.

Q1. Hire labour

a) Are there separate rates for village youths, church youths/women/men, and sports groups?

b) What type of work do you engage hire labour for?

c) When its peak coffee and pineapple season do you have problems mobilising labour for broccoli and cabbage production? (Explore problems that might emerge)

d) How do you manage the problem of labour shortages during periods of high labour demand in coffee and pineapple production?

Family labour

a) Explain the meaning of cash payments to them regarding their family relations to you? (Prefer specific examples)

b) Explain how payment levels for family labour vary when market prices of broccoli and cabbage are high and low?

c) Payments by cash (even cash payment is for labour or implicit payment, e.g. Eric's bride price contribution from) or by implicit contract

Appendix 6

Transport owners groups

1) When the coffee price is high do you increase the charges on transporting coffee give example? (get specific examples)

2) If the price is high, do you charge the same rate to farmers from your village as farmers from other villages?

3) Do you charge different rates depending on the type of kinship relations you have with your customer, e.g. in-laws?

4) If you do hire runs for people not closely related to you, does your hire rate change according to customers' relationship to you (e.g. church member, cooperative members)?

5) Do you apply price differentials to food crops and pineapple/citrus producers the same way you do for coffee farmers?

6) How much do you charge for 60 kg of coffee to Goroka?

7) How much do you charge for 60kg of cabbage to Goroka?

8) How much do you charge for 60kg of pineapple to Goroka?

9) How much do you charge for 60kg of citrus to Goroka?

10) How much do you charge for 60kg of carrots to Goroka?

11) How much do you charge for 60kg of *kumu* to Goroka?

Appendix 7

Household coffee production from January to August 2013

Farmer ID	Total coffee sold from January to August 2013 (kg)	Total coffee income from January to August 2013 (PNG Kina)	Total coffee stored (kg)	Estimated future income from stored coffee(PNG Kina)
BE-W1-388	10.00	30.00		
BE-W1-326	35.00	101.50		
BE-W1-367	52.00	156.00		
BE-W1-375	55.00	165.00		
BE-W1-377	55.00	165.00	82.50	239.25
BE-W1-371	68.75	223.44	100.00	290.00
BE-W1-321	75.00	217.50	600.00	1,740.00
BE-W1-359	82.50	243.38		
BE-W1-363	82.50	288.75		
BE-W1-316	85.00	246.00	60.00	174.00
BE-W1-329	102.00	302.60		
BE-W1-314	110.00	319.00		
BE-W1-374	110.00	319.00		
BE-W1-385	112.75	334.49		
BE-W1-319	114.00	330.00		
BE-W1-365	129.25	387.75	55.00	159.50
BE-W1-311	162.50	2,887.50	85.00	246.50
BE-W1-312	165.00	495.00	55.00	159.50
BE-W1-317	165.00	478.00	360.00	1,044.00
BE-W1-369	165.00	495.00	110.00	319.00
BE-W1-331	192.50	567.88	55.00	159.50
BE-W1-373	192.50	577.50	110.00	319.00
BE-W1-386	192.50	564.70	27.50	79.75
BE-W1-391	192.50	567.80		
BE-W1-351	275.00	797.50		

BE-W1-334	303.00	878.00	85.00	246.50
BE-W1-354	330.00	957.00		
BE-W1-356	357.50	1,054.63		
BE-W1-366	412.50	1,237.50		
BE-W1-320	600.00	1,740.00		
BE-W1-380	605.00	2,329.00		
BE-W1-376	660.00	1,958.00		
BE-W1-370	687.50	,2062.50		
BE-W1-352	1,045.00	3,082.75		
BE-W1-318	1,182.50	3,500.00		
BE-W1-398			40.00	116.00
BE-W1-399			30.00	87.00