Coffee smallholder households and livelihoods diversity

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ABSTRACT

This paper presents an overview of the broad characteristics of coffee farming households and the main livelihoods they pursue. To date most coffee research has neglected to consider, at the household level, the interaction between coffee production and broader household livelihood strategies, and how this interaction affects the amount of time and labour smallholders invest in coffee production. The data presented are drawn from extended village fieldwork where survey and interview data were collected at the household level with almost 350 farming households. Smallholder coffee farmers pursue a range of income sources and livelihood activities that fit within a dynamic coffee farming-livelihood system that adjusts continually in response to internal household factors and broader socio-economic change. The coffee farming-livelihood system plays a critical role in shaping household decision-making. Moreover, the findings show that there is great diversity among coffee farming households. This diversity is often based on location, access to markets, land availability, age of household head, the number of household members willing to contribute labour to coffee production, and availability of alternative income sources. We conclude that being aware of these differences and the factors influencing farmer decision-making, are critical to providing extension advice and training that is appropriate to the everyday lives and challenges faced by small farmers and their families.

KEYWORDS: coffee production; smallholder characteristics; livelihood diversity; gender

INTRODUCTION

Villagers in the highlands of PNG have been growing coffee since the 1950s and coffee plays a significant role in the highlands economy. Coffee is a primary income source for many rural households and smallholders now produce over 85% of PNG's coffee exports (Sengere 2016; Sengere et al. 2019). Despite the economic importance of coffee for rural households, smallholder production has been stagnant since the 1990s and coffee quality remains poor (Batt et al. 2009; Sengere 2016, Curry et al. 2017). A range of factors has been implicated in the low production and low productivity levels of smallholders. They include institutional and infrastructure constraints; limited access to extension services; restricted supply chain linkages among value chain actors; labour shortages; and land constraints (Murray-Prior et al. 2008; Batt et al. 2009; Collett 2009; Uniquest 2013; Curry et al. 2017; Hamago 2019; Sengere et al. 2019; Curry et al. this issue).

Over the past 10-15 years, many sectoral and industry-based programs aimed at increasing smallholder production have failed or have only partly succeeded (Sengere et al. 2019). The low success rate points to the need to better understand the socio-cultural and economic context in which coffee is produced and how this shapes household decision-making related to livelihoods. Too often the literature does not adequately recognise that smallholder coffee farming occurs within a larger agricultural and socio-economic livelihood system and

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that coffee smallholders pursue a diversity of livelihood activities. There has been a tendency in the research on smallholder coffee production in PNG to examine coffee production in isolation of broader household livelihood strategies (for exceptions, see Overfield 1998; Collett 2009; Inu 2015). However, as research among cocoa and oil palm farmers has shown, recognising the diversity of economic, social and agricultural activities pursued by smallholders can help to better understand what shapes smallholder decision-making and lead to more targeted agricultural extension interventions to improve smallholder production and productivity. In this paper, we outline the broader range of income sources and livelihood activities that fit within the coffee farming-livelihood system to better understand what shapes farm management decision-making and the allocation of household labour. The paper argues that there are notable differences among coffee farming households and that a range of socio-economic factors determine the time and labour household members invest in coffee and other livelihood activities.

METHODS

The research findings presented in this article are from data gathered between 2010 and 2012 at four field sites in Eastern Highlands Province. The study sites were: Asaro, Baira, Bena and Marawaka (see Curry et al. 2017: 14-23 for a full description of methods). Asaro and Bena are within 20 km of the provincial capital of Goroka, and Baira and Marawaka are remote sites without road access. Three fieldwork trips were made to Asaro, Bena and Marawaka and two fieldtrips to Baira. Fieldwork of between four and six weeks was carried out at each site. Data collection was carried out by research team members from CIC, NARI, CSIRO and Curtin University.

The methodological approach adopted in the study was based on the tenet that coffee production is but one of a range of livelihood strategies pursued by smallholders. Thus, a broad mixed method approach was considered the most appropriate for data collection. Data collection focused at the household level because the immediate family is the primary source of labour for coffee production, and intra-household dynamics and relationships heavily influence farm management practices and decision-making.

At each site, both qualitative and quantitative data were gathered at the household level. The data for this paper were drawn from baseline household socio-economic surveys (n=332), interviews with members of coffee producing households and extension officers, and time allocation surveys.

The data presented below draw heavily on the results of the time allocation surveys and informal interviews with household members. Study households were visited every second day over a 7-14 day period and asked to recall all the activities and the approximate time allocated to each activity for each household member over the age of 12 from when they rose in the morning until 21.00. Activities were recorded in five, three-hour time intervals: 6.00–9.00; 9.00–12.00; 12.00–15.00; 15.00–18.00; and 18.00–21.00. Activities were allocated to the subcategories: coffee production, subsistence gardening, fresh food production for market sales, other economic activities (small business, retail enterprises, selling garden produce and waged employment), pig husbandry, domestic tasks, community activities (including church and customary activities), leisure (travelling to town, socialising, etc.), labour exchange (i.e. reciprocal labour given and received through social and kinship networks) and hunting, fishing and gathering from the forest. At Asaro and Bena, data were collected in both the coffee flush and non-flush periods. Regular visits to the study households during the time allocation surveys provided additional opportunities to discuss labour issues and coffee production.

RESULTS AND DISCUSSION

Coffee farmers and livelihoods

Whilst coffee was the dominant source of income for all study households, time allocated to coffee production was not always given priority over other daily livelihood activities. Like elsewhere in PNG, villagers in the study sites pursued a range of livelihood and agricultural practices to maintain household food security and well-being

(see also Sillitoe 2010; Minnegal and Dwyer 2017; Koczberski et al. 2018). Activities like food gardening, animal husbandry, maintaining social and kinship networks, managing small businesses like stores and PMVs, seeking medical care and undertaking childcare and domestic tasks all drew on people's time and labour and were a central part of everyday life. Indeed, in all the coffee growing villages, subsistence farming is at the core of daily activities and many women spend much more time in subsistence food production than in coffee production. Generally, it is only during the coffee flush season, or when prices are high, that smallholders divert labour from important social and economic livelihood activities to engage in coffee production. Not only does time allocated to coffee vary by site but also by gender with men typically spending more time on coffee production than women.

As Figure 1 illustrates, coffee production is one component of a larger livelihood system that includes socio-cultural and community activities, household domestic tasks, subsistence activities and pursuing other income sources in addition to coffee. All these activities are central to everyday life and each activity draws on the labour and time of family members.

The diverse activities of smallholders explain why some farmers are unwilling or unable to commit more family labour and time to coffee production. Furthermore, allocating more time and labour to coffee production often involves trade-offs in time with other activities such as customary activities or subsistence gardening, which are highly valued by both men and women. Overall, coffee farmers seek to maintain a diversity of livelihoods because together they act to:

- Strengthen household economic and social security (insurance role)
- Maintain household food security
- Strengthen social and kinship networks (build social capital for community cohesiveness), and
- Give meaning to people's lives

A key feature of the coffee farming-livelihood system is that it is highly flexible and dynamic. It is grounded in a set of social structures (largely kinship and social networks) and institutions (e.g. belief systems, societal rules and clan groupings) which influence how livelihood strategies adapt and respond to the changing socio-economic, institutional and environmental context in which they are embedded. For example, high levels

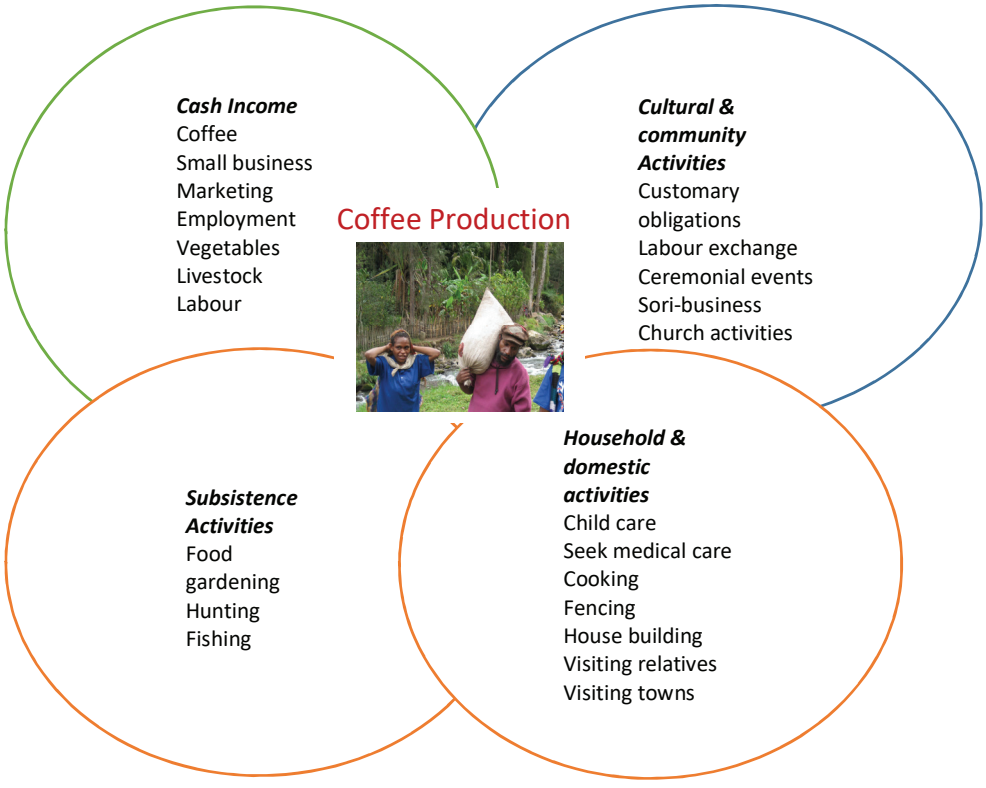

Figure 1: Smallholder coffee livelihood-farming system.

of market access at Asaro and Bena have enabled villagers to take advantage of new income opportunities, like large-scale vegetable production. In these villages vegetable and fruit production are expanding and competing with coffee for dominance in income generation as more land and labour are devoted to these new income sources. In contrast, at remote Baira where poor market access means income opportunities apart from coffee are very limited, many households are allocating more land and labour to coffee in response to improved access to extension training arising from new partnerships with the private sector.

Changes in the livelihood activities of coffee smallholders in response to new conditions are similarly found among cocoa and oil palm growers in PNG (Koczberski et al. 2012; Bue 2013; Curry et al. 2015; Koczberski et al. 2018). This flexibility is an element of a sustainable agricultural system (Brookfield 2001). Shifts in livelihood activities can be due to a range of changing circumstances occurring within the household and in response to wider external factors impinging on the household. Some of these include:

- Access to resources
- Land pressures and land disputes
- Fluctuating coffee prices and the relative prices of other marketable crops
- New income earning opportunities
- Changes in market access
- General socio-economic change (including changing values, e.g., modernisation)
- Environmental stressors and shocks (e.g. droughts and pest and disease outbreaks)
- Changing household dynamics (e.g. illness, death and family conflict)

All these factors can influence the various livelihood activities of coffee farmers and determine the allocation of land, labour and other resources to coffee production.

The capacity to adjust allocations of land, labour and other resources within the coffee farming-livelihood system is a factor determining household resilience and livelihood security. Research in PNG and elsewhere has shown that this capacity to adjust the balance of resources amongst various livelihoods enables households to better manage risk in the context of changing conditions (e.g. Brookfield 2001; Lauer 2016; Koczberski et al. 2018). Thus, the flexibility of the coffee farming-livelihood system plays a critical role in maintaining household well-being and livelihood security. This capacity is particularly important now as Coffee Berry Borer spreads throughout the highlands coffee growing regions.

Time allocation

The diverse range of livelihood activities listed in Figure 1 is reflected in the patterns of labour allocation recorded for the study households during the non-coffee season. As expected, there were some differences between the sites, and especially between the remote sites (Baira and Marawaka) and the accessible sites (Asaro and Bena) in the time allocated to activities such as coffee and subsistence production, market gardening, and leisure (Figures 2 and 3). These differences can be explained largely by market accessibility. For example, it was not unexpected that at the accessible sites more time was spent on market gardening than on coffee. Better access to markets and employment opportunities provided households at Asaro and Bena with a wider range of income opportunities compared with Marawaka where only a very small proportion of total time was allocated to market gardening and other cash income activities during the non-coffee season. Due to poor market accessibility, smallholders in remote sites were unable to take advantage of the rising demand for pineapples and European vegetables in PNG's larger urban centres. It is also likely that Asaro and Bena villagers' greater access to cash during the non-coffee season explains why they spent less time in subsistence production compared with the more remote sites of Asaro and Marawaka.

The greater proportion of time spent on leisure at remote sites is more difficult to explain. At Baira, a third of leisure time was spent gambling: more time was spent on gambling than any other activity including subsistence gardening and coffee work. Interview data suggested that the need for cash for gambling was a motivating factor driving coffee production in that community. Finally, community and cultural activities were an important component of village life (Figures 2 and 3), and at Bena 14% of total time was devoted to these activities.

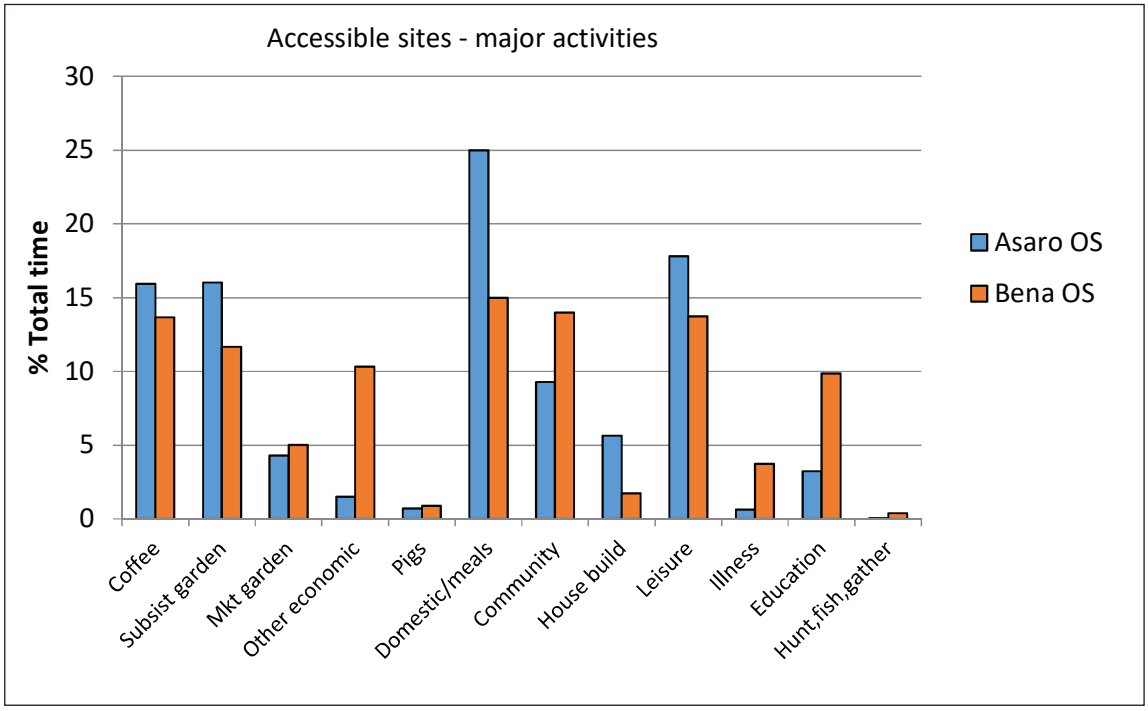

Figure 2: Major livelihood activities at Asaro and Bena during the non-coffee season.

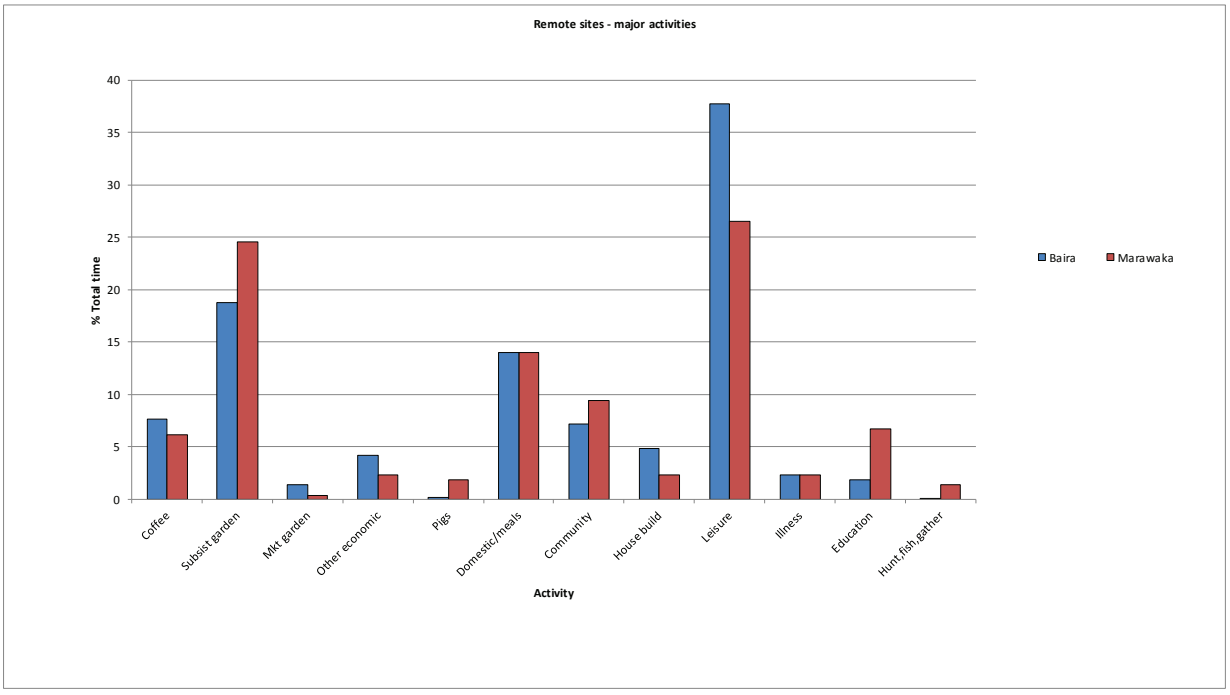

Figure 3: Major livelihood activities at Baira and Marawaka during the non-coffee season.

For logistical reasons, time allocation surveys in both the coffee and non-coffee seasons were done only at the accessible sites of Asaro and Bena. As expected, the intensity of some agricultural and economic activities varied through time, especially between the coffee flush and non-flush seasons. At Bena and Asaro, more time was allocated to subsistence and market gardening in the non-flush coffee season. The timing of community and customary activities was not tied to the seasonal coffee flush when more cash was circulating, which was reportedly the case following coffee's introduction to PNG (e.g. Sexton 1986; Brison 1999; Benediktsson 2002). While there was no increase in customary activities during the coffee season at Bena, the increase at Asaro was associated with attendance and assistance with funerals, which of course are not seasonal.

Most livelihood activities, including coffee, have a distinct gender division of labour (Figure 4). Whilst women contribute labour to coffee production, most of their labour is allocated to harvesting during the coffee flush season. In contrast, alongside coffee harvesting, men do most of the coffee garden maintenance work and coffee processing. Domestic tasks, such

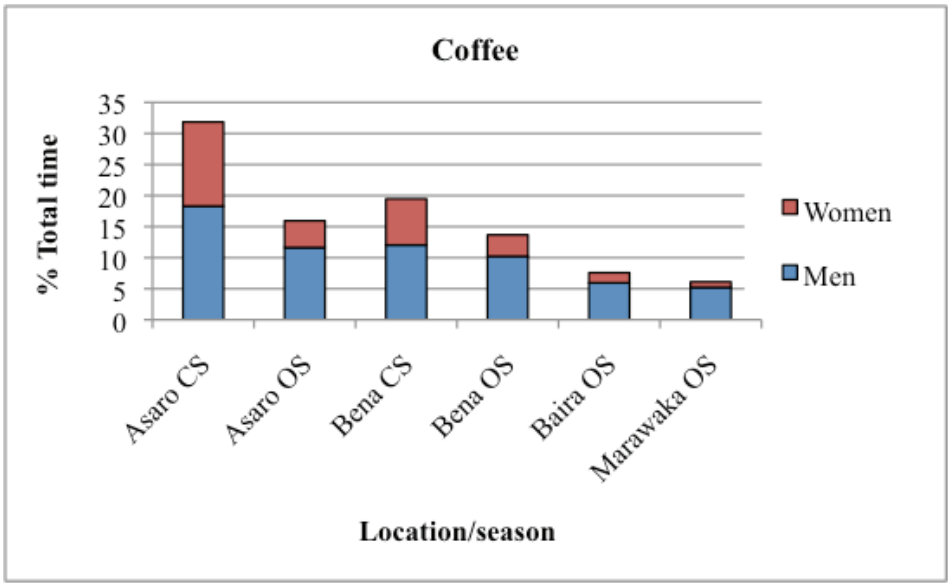

Figure 4: Time allocation to coffee by gender and season (CS = coffee season; OS = off-season for coffee).

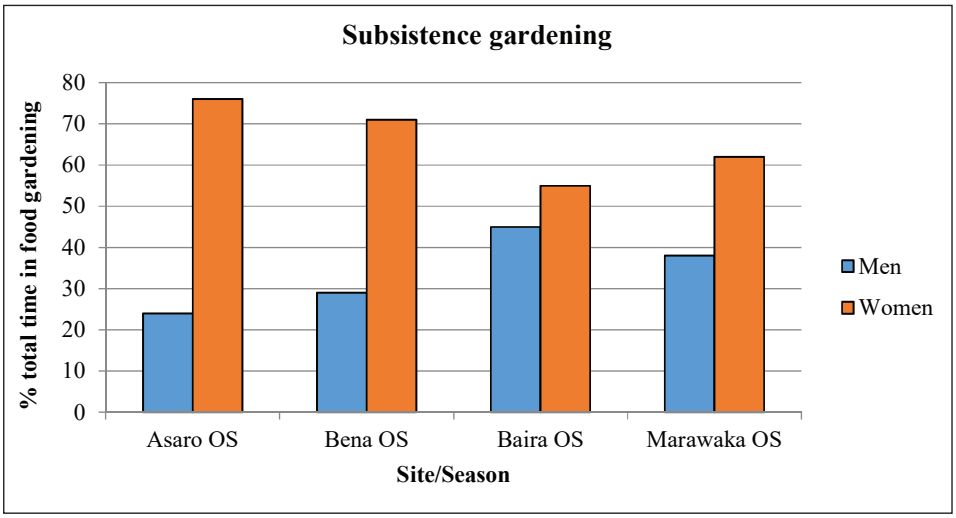

Figure 5: The proportions of total food gardening time undertaken by men and women (CS = coffee season; OS = off-season for coffee).

as collecting firewood and water, cooking and washing pots, which take up a considerable proportion of time (Figures 2 and 3), are predominantly the responsibility of women. Notably, women also spend much more time than men in food gardening (Figure 5), and women dominate the production and sale of garden foods at local markets. This gendered division of labour in food production for local markets and coffee production reflect in part a combination of pre-existing local cultural gender norms and ideologies, land tenure principles and the way in which the process of engagement in the market economy has shaped men's control over export cash crop production and income (see, for example, Strathern 1972; Benediktsson 2002; Curry et al. 2019).

Gender and income

The gendered division of labour in coffee production and fresh food production and marketing outlined above, is reflected in the primary sources of income by gender at each site. Husbands and wives were asked to rank their three most important sources of income in declining order of importance (Table 1).

sites, although at Bena coffee income was ranked just ahead of income from garden produce.

Although marketing of fresh food produce was important at both remote and accessible sites, there were large differences in the scale of local marketing between them. For example, during fieldwork in 2010, Bena households earned 24 times the income of Marawaka households from the sale of garden produce. At Bena, vegetable, pineapple and citrus production were intensive and produced for the large urban markets of Goroka, Lae, Mt Hagen and Madang. People were earning very high incomes from pineapple production. Some farmers at the time were earning between K5,000 and K10,000 per annum from pineapple production alone (Inu 2015). Both men and women at Bena were shifting their labour from coffee to food production where they perceived the returns to labour to be higher.

The growing prominence of vegetable production as an income source at the accessible sites of Asaro and Bena suggests that labour investments in coffee, especially among women, have declined considerably in these villages as new livelihood options emerged. In contrast, because

Table 1: The three primary sources of income for men and women.

	Asaro	**Bena**	**Baira**	**Marawaka**
Women	1. Sale of garden produce (63%) 2. Coffee 3. Livestock	1. Sale of garden produce (56%) 2. Coffee 3. Livestock/ small retail	1. Coffee (98%) 2. Sale of garden produce 3. Livestock/ small retail	1. Coffee (65%) 2. Sale of garden produce 3. Livestock
Men	1. Coffee (85%) 2. Sale of garden produce 3. Livestock	1. Coffee (77%) 2. Sale of garden produce 3. Livestock	1. Coffee (100%) 2. Sale of garden produce 3. Livestock	1. Coffee (79%) 2. Livestock 3. Sale of garden produce

At the remote sites of Baira and Marawaka, women ranked coffee income as their most important income source (Table 1). At Asaro and Bena where access to roads and markets was good, women ranked sales of garden produce as their primary income source. For men, coffee income was their primary income source at all

of remoteness from markets, such opportunities were not available at Baira and Marawaka, and coffee was the only viable income for both women and men. The trends at the accessible sites of Asaro and Bena, and observed in nearby coffee growing villages, suggest that the expansion of commercial vegetable and fruit production and

the associated demands on land and women's labour may be at the expense of coffee production. This has implications for the future of smallholder coffee production in villages near urban centres, and for the design of coffee extension programs. Coffee extension will need to put a large emphasis on increasing the returns to labour, especially for women.

There are additional reasons for women investing more labour in commercial vegetable and fruit production than simply the high incomes earned. First, as women explained in interviews, the returns on their labour investments were more predictable and less likely to be challenged by their menfolk, because they planted the food crops which gave them ownership rights to the crop (see also Strathern 1984; Sexton 1986; Inu 2015; Curry et al. 2019). This gave them primary rights to the income, unlike coffee which is 'owned' by men and therefore confers on men control over the distribution of coffee income. For this reason, in households where there is an inequitable distribution of coffee income between husband and wife, and where there are good alternative income earning activities to pursue (that is, at market accessible locations), then it is possible for women to shift their labour from coffee production.

Second, the income women receive from selling garden foods is not seasonal like coffee. Market sales enable women to have access to a regular and reasonably good income throughout the year to meet their daily household needs (Inu 2015), to buy protein-rich foods (often short in local diets) and to meet their socio-cultural obligations requiring cash. Given the high cash demands and desires of contemporary life, a predictable and regular income is an important consideration for women when it comes to deciding where to allocate their labour. Finally, whilst women are generally unable to access land for coffee, they are usually able to access land on a short-term basis for commercial vegetable and fruit production. Interviews with women at Bena suggest they can more easily access land for vegetable production than coffee (which ties up land for a long time) and this is allowing them to expand the area of land devoted to commercial vegetable production.

Smallholder diversity

As outlined above there are large differences in the time and labour households allocated to coffee and other livelihood activities. The differences can be explained by household location, access to markets, availability of alternative income sources and the willingness of household members to contribute labour to coffee production (on the latter point, see Curry et al. this issue). Coffee farming households fall into four main categories based on their dependence on coffee, availability of family labour for coffee production, and access to markets (Table 2).

Table 2 shows that each farming type has a set of specific constraints on coffee production. For example, farmers living in remote locations generally have good access to land but very poor and costly access to markets and limited incomes to purchase tools for coffee production. These farmers have different problems and constraints on their coffee production than coffee farmers in accessible locations where markets for coffee and sources of agricultural inputs are nearby and more regular incomes are available. However, they may face land and labour shortages for coffee. These constraints on coffee production will determine and shape smallholders' farming decisions and behaviours. Being aware of the differences among farmers and the factors influencing farmer decision-making are critical for the design of extension training and programs that accommodate the everyday lives and challenges faced by farming families in different locations and family contexts.

CONCLUSION

The paper examined how various household livelihood strategies interact with coffee production and how they contribute to household well-being. This is important information for understanding what is occurring at the household level, and for developing appropriate extension interventions

Table 2: Typology of coffee growers' characteristics and constraints.

Type of coffee grower	Main characteristics and constraints on increasing coffee
Coffee growers with poor market access (Remote locations without road access)	Live in remote villagers with no or poor road access Few tools for coffee production Low income households, many without pulpers Heavy reliance on coffee as a main income as few other income sources available Poor knowledge of coffee production because of limited access to extension services Lengthy walk to coffee buyers (often > 4 hours) High cost of market access Labour shortages as many young people have migrated from village in search of work
Coffee growers close to markets (with good road access)	Good access to multiple coffee buyers Low cost market access Labour shortages because of competing demands on labour Households have access to a range of income sources. These other income sources may compete with coffee for land, labour and time Most income earned from the sale of coffee
Vegetable/coffee growers	Some coffee farmers with good and easy access to markets are reducing the area of land planted to coffee and expanding vegetable production Most income earned from the sale of vegetables and/or fruit Family labour shortages in coffee, especially because of women shifting their labour to vegetable production where they have more control over the income
Subsistence/coffee growers	Subsistence food production is the main priority of households Low labour inputs to coffee and little reinvestment of recurrent income in coffee More likely to be elderly growers Very low household incomes May have large holdings of coffee but high levels of under-harvesting

aimed at increasing smallholder production and productivity. Until recently, the current smallholder policy environment in PNG assumed coffee smallholders were all the same, all with the same needs and challenges, and disregarded important aspects of their livelihoods that interacted with coffee production. It was assumed, for example, that farmers were distracted from coffee production by customary activities, land disputes and subsistence production. This narrow focus failed to contextualise coffee production as just one component of the everyday lives of smallholders and that coffee production is embedded in a broader set of household livelihood activities that form a robust coffee farming-livelihood system.

Keeping in mind that coffee production sits within a larger smallholder livelihood system that draws on the labour and land of smallholders may help with designing extension interventions that are more compatible with this livelihood system or explain why some interventions are not adopted by smallholders. Extension interventions and training are more likely to succeed if smallholders see them as compatible with, rather than undermining, their broader household livelihood strategies. For example, some extension interventions can be viewed as strengthening or adding to smallholder livelihood strategies (e.g. technologies or management techniques that increase returns to labour), while others may be

judged by smallholders as incompatible or a risk to livelihood strategies (e.g. high interest loans to rehabilitate old coffee gardens when there are many other more pressing cash demands and obligations to meet). Therefore, efforts to encourage smallholders to increase labour and financial inputs in coffee production that require them to make major adjustments to their lifestyles and broader livelihood strategies are likely to be resisted.

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