Socio-economic constraints on smallholder coffee production in the Papua New Guinea highlands: the case of labour

G.N. Curry[1], G. Koczberski[1], S.M. Inu[2], M. Hamago[3], E. Kiup[3], J. Aranka[3], J. Bekio[3], B. Apis[3] and P. Togonave[3]

ABSTRACT

Coffee is the primary source of household income in many highlands communities. However, smallholder production and incomes are well below potential levels and this situation has not changed greatly since the mid-1980s. Smallholders face multiple and interacting constraints on improving their coffee production with labour shortages being one of the most significant barriers to improving production and quality. Labour supply constraints are, in part, an outcome of the competing demands on the time and labour of smallholder families as they pursue a wide range of subsistence, social, church and cultural activities. They also arise from the underutilisation of family labour due to intra- and inter-household conflicts that prevent labour from being deployed and adequately remunerated, and the limited use of labour mobilisation strategies like hired labour to address labour shortages. It is likely that labour investments in coffee have declined in some coffee growing areas with good access to markets and with a range of alternative livelihood options in which to invest labour. Some women have been shifting their labour out of coffee to the lucrative fresh food sector because they can obtain better returns on their labour as they have greater control over the income they earn. It is likely that the expansion of commercial vegetable production in locations with relatively accessible urban markets may be at the expense of coffee production.

KEYWORDS: coffee production; labour supply; production constraints; gender and labour

INTRODUCTION

Coffee growers in the highlands, like other PNG smallholder producers of export cash crops, typically follow a low input, low output system of production (see Curry et al. 2007 for a description of the low input system of production). This system is characterised by low labour inputs and a low rate of uptake of new technologies and other extension inputs. A lack of regular pruning of coffee and shade trees, a limited understanding of good husbandry practices and minimal financial reinvestment in smallholder coffee gardens result in low production (Uniquest 2013; Curry et al. 2017). Low production combined with poor post-harvest processing leads to smallholder production and incomes being well below potential levels (Driscoll et al. 2010). This situation has not changed greatly since the 1980s.

Previous research identified some of the higher-level structural constraints on smallholder coffee production. These include poor and declining market accessibility, high transport costs, limited access to credit, senile coffee stands, land tenure disputes, and law and order problems (Collett 2009, Uniquest 2013; Sengere 2016; Curry et al. 2017). Limited access to regular extension advice

[1]Curtin University, Perth, Western Australia. Email: G.Curry@exchange.curtin.edu.au
[2]MDF, Port Moresby, Papua New Guinea.
[3]CIC, P O Box 470, Ukarumpa 444, Eastern Highlands Province, Papua New Guinea

and training due to under-resourced extension services is also a considerable constraint as it restricts the flow of new technologies and information to assist smallholders increase production and quality (Fleming and Antony 1993; CIC 2008; Batt and Murray-Prior 2009; Uniquest 2013; Hamago 2019). Poor quality processing means farmers receive Grade Y1 prices for their parchment which is a discounted price of approximately one-quarter on Grade X parchment. Other factors such as limited supply chain linkages among value chain actors, poor institutional governance and, more recently, competition from commercial vegetable production for land and labour in villages close to urban centres such as Goroka and Mt Hagen, have constrained coffee production and the expansion of coffee holdings (Murray-Prior et al. 2008; Batt and Murray-Prior 2009; Collett 2009; Uniquest 2013; Inu 2015; Sengere 2016; Curry et al. 2017; Curry et al. 2019). A World Bank-funded PPAP project in EHP and WHP is addressing some of these constraints, such as market accessibility, coffee rehabilitation and credit.

While there has been much conjecture about the causes of the stagnation and decline of smallholder coffee production in the highlands, there has been little detailed empirical local level research since the village-based fieldwork of Collett (1989) and Overfield (1994). Furthermore, despite smallholder coffee producers depending largely on family labour for harvesting and farm maintenance tasks, knowledge remains limited of how household labour dynamics influence coffee production and productivity. This paper addresses this gap by exploring some of the socio-economic factors constraining production and productivity. In particular, the paper examines household labour constraints and addresses the question of why coffee smallholders experience labour shortages given that family size is quite large relative to the size of household coffee holdings. We discuss the main factors constraining the supply of labour to enable a better understanding of why household members are unable or unwilling to invest time and labour in coffee production.

METHODS

From 2010 to 2012 household surveys over 23 weeks were conducted in Bena, Asaro, Baira and Marawaka in Eastern Highlands Province (see Curry et al. 2017: 14-23 for a detailed description of methods). The data for this paper were drawn from:

- Baseline household socio-economic surveys
- Interviews with households
- Village focus group meetings
- Labour allocation surveys
- An assessment of farmer technical knowledge and technical needs

The baseline socio-economic surveys were carried out with both the male and female household heads present. Information collected from 332 households included: household demographics; size and age of coffee holdings; agronomic and farm management practices; household labour demands; production costs; perceptions of social, physical and market constraints on coffee production; uptake and quality of extension; land access; production for subsistence and local markets; and coffee income and other cash income activities. Time spent with a family to complete the household and coffee garden surveys provided the opportunity for informal interviews to take place. Discussions ranged across a broad spectrum of topics which added depth to the data collected in formal surveys.

In the second round of fieldtrips, subsets (~30 households per site) of the initial households were selected for more intensive data collection. Household selection was based on household size, age of household heads, number and size of coffee holdings, type of land tenure, and coffee garden maintenance and nutrient management strategies. Over a period of 7-10 days farmers were visited every second day to carry out labour allocation surveys to assess household labour allocation, gender division of labour, livelihood activities, labour remuneration, access to and control over household labour and other constraints on labour. The labour allocation

surveys were repeated at Asaro and Bena in 2012 to assess differences in household economic livelihood activities and labour demands between the seasonal coffee flush and off-season.

Focus group meetings with men and women were also held at all sites to seek information on social values relating to labour and agricultural production, changes in farming systems and nutrient management practices.

RESULTS AND DISCUSSION

Labour in coffee production

Smallholder households rely heavily on family labour for harvesting and coffee maintenance. At all sites the immediate family was the primary source of labour for coffee production with limited use of hired labour or labour from the extended family (Figure 1). Within households there was

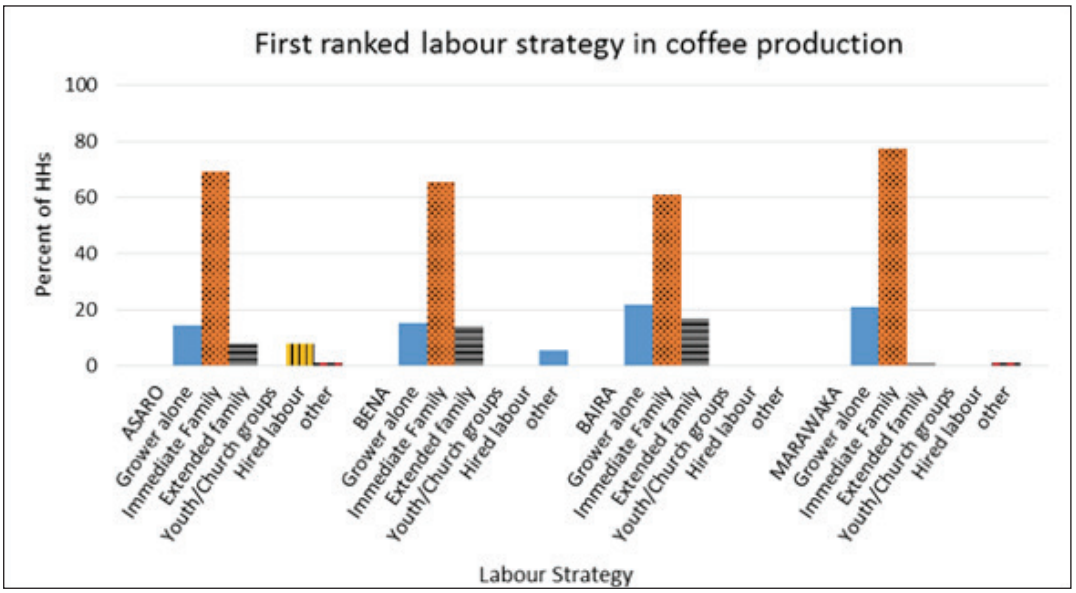

Figure 1: The first ranked labour strategy in coffee production as a percentage of households.

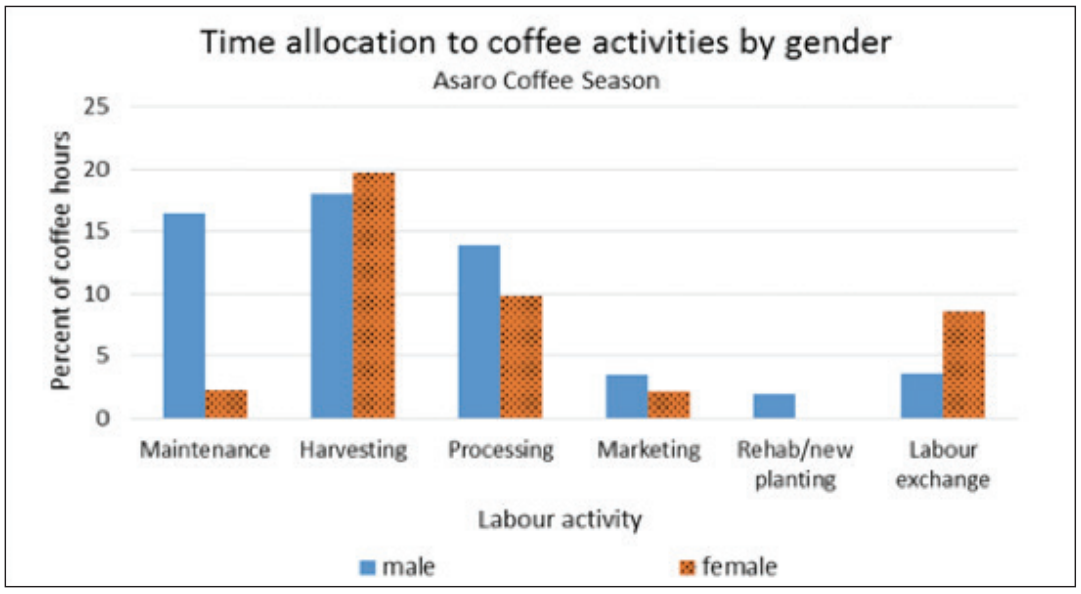

Figure 2: Time allocation to coffee activities at Asaro by gender.

a distinct gender division of labour with men largely responsible for coffee maintenance (e.g. drain maintenance, fencing and pruning) and marketing, while women made a large contribution to harvesting and post-harvest tasks (Figure 2). In addition, during the coffee season when labour demands were high, women participated in reciprocal labour exchange by providing harvesting labour to other families through social and kinship networks (Figure 2). This labour exchange by women helped mitigate labour shortages experienced by some households during the coffee harvesting season.

At all four sites, access to labour was ranked in the top four constraints on coffee production (Table 1). Labour shortages lead to under-harvesting and can be a key factor explaining low productivity. Under-harvesting, for other smallholder cash crops such as cocoa and oil palm (Koczberski et al. 2001; Curry et al. 2007), is likely to be a key factor limiting productivity. Murphy et al. (2008) reported very high yield losses in coffee production. Although the study did not identify the causes of the high yield losses, it is likely that a significant proportion of losses was due to under-harvesting.

Based on household interviews and survey data the labour supply constraints appear to be an outcome of several interrelated factors, namely:

1. absolute shortages of household and extended family labour;
2. the underutilisation of household labour (reluctance of some family members to provide labour);
3. competing demands on labour; and
4. limited use of labour mobilisation strategies like hired labour.

Each is discussed as follows:

Absolute household labour shortages

Household labour shortages can be either short- or long-term and tend to be experienced by the following types of households:

- Large coffee holdings relative to household size.
- Life cycle stage of the household. Households headed by the elderly, widows or women, with few adult offspring to assist with harvesting and maintenance can experience labour shortages. Newly married families or household heads with

Table 1: Major constraints on coffee production (per cent of households).

Asaro (%)	**Bena (%)**	**Baira (%)**	**Marawaka (%)**
Farm inputs (tools/ equipment/ chemicals (66)	Labour (49)	Market access & low prices (63)	Market access & low prices (90)
Limited knowledge & skills (30)	Family/community conflict (43)	Labour (54)	Farm inputs (tools/ equipment/ chemicals (42)
Environmental (24)	Poor fencing & animal damage (38)	Pests & diseases (29)	Labour (14)
Labour (19)	Pests & diseases (33)	Environmental (24)	
	Farm inputs (tools/ equipment/ chemicals) (20)	Family/community (15)	
	Limited knowledge & skills (17)		

a long-term illness, face similar problems when they have no adult offspring to provide labour for coffee production.
- In remote areas such as Marawaka and Baira many young people are absent, attending schools elsewhere or working away from the village.

For various reasons, labour-short households are unable or reluctant to address labour shortages through hiring labour or drawing on extended kinship networks (Figure 1). Previously, when villagers initially adopted export cash crops, labour demands were met through reciprocal exchange of labour among extended family members (Hide 1981; Collett 1992; Curry et al. 2007; Koczberski and Curry 2016; Curry et al. 2019). Traditionally, labour was mobilised for subsistence food production to meet labour-intensive tasks such as clearing new gardens. These flows of labour were embedded within extensive networks of kinship, obligations and reciprocity. These same networks of labour exchange were carried over to coffee when it was introduced. Whilst reciprocal labour exchange arrangements remain common in subsistence production, villagers, especially at the accessible sites, reported a gradual contraction of the network of relatives that could be called upon for labour-intensive tasks like coffee harvesting (Inu 2015; Curry et al. 2019). Two main interrelated factors appear to be operating. First, households are beginning to operate more independently of each other, both socially and economically, and there is now a reluctance to call on labour from the extended family for coffee production. In part, this is because most families are heavily involved in commodity crop production and other income-earning activities and villagers are aware that by seeking labour assistance from the extended family they are denying opportunities to members of their extended family to work for their own individual material gain. Thus, households are now much more dependent on their own labour and that of their immediate families for coffee production.

Second, with the commodification of labour in coffee production, more villagers, especially young adults, are reluctant to provide unpaid labour to relatives when their labour will be used largely to deliver economic benefit to the family receiving the labour. In interviews with Sogomi and Safanga villagers, many claimed that in the past relatives were once satisfied with a cooked meal at the end of a day labouring; now there is an expectation by many that when they assist relatives to work in their coffee gardens, or in other cash income activities, they should be paid cash for their labour or receive some other material reward (this is a trend also seen among oil palm households in PNG (Koczberski and Curry 2016). The demise of reciprocal labour arrangements and 'free labour' has made mobilising labour for coffee production more difficult. These long-term labour shortages can often lead to poorly maintained coffee holdings and consistently low production.

Underutilisation of available household labour

Disagreements within the family and extended family reduce the ability to draw on available family labour. Conflicts within families can result in family members working less cooperatively as they are discouraged from or resent providing labour in coffee production. Indeed, at Bena the second most important constraint on coffee production identified by farmers was family conflict (Table 1). This constraint is not confined to highlands coffee farmers. Research among smallholder cocoa and oil palm households show that households that work cooperatively and harmoniously as a family, tend to have higher production (Curry and Koczberski 2004; Curry et al. 2007).

A range of factors underlie disagreements within and among households. Among the most commonly discussed during interviews related to conflicts over the payment of coffee labour and income distribution. Women and young men complained about what they perceived as the unfair distribution of coffee income by the male head of household. Many believed that their labour input in coffee was not adequately remunerated. This 'underpayment' created few incentives for wives and adult sons to commit labour to coffee production and many were reluctant to do so (see also Overfield 1998).

In PNG, men typically control the income earned from women's labour in commodity production (Overfield 1998; Koczberski and Curry 2016; Curry et al. 2019). Studies in the 1980s showed that

women's labour input alone in coffee production did not give them secure rights to the income generated from their labour, often resulting in gendered conflicts over women's labour and remuneration (e.g. Strathern 1982; Sexton 1986; Johnson 1988; Overfield 1998). These conflicts over the payment of labour can have a negative impact on the quantity and quality of smallholder production. For example, Overfield (1998) in a study of coffee production in the Benabena District, EHP, argued that the poor returns to women's labour constrained the supply of female labour in coffee production to the extent that smallholder production and incomes were reduced significantly.

A response to perceived underpayment of labour, or payment uncertainty, has been for women to redirect their labour to activities where the returns on their labour are higher or perceived to be more secure. At Bena and Asaro, which are close to urban centres with good access to large fresh food markets such as at Goroka, Lae, Madang and Mt Hagen, women were increasingly redirecting their labour from coffee to garden food production for the expanding urban fresh food markets. As women explained, a key factor driving this shift in their labour to the fresh food sector was because they could earn better returns on their labour as they had greater control over their own labour, production decisions and the income generated from vegetable production (see Koczberski et al., this issue).

Plate 1: Growers in remote locations often need to carry their coffee long distances to markets (Photo credit: Joeri Kalwij).

Competing demands on labour

At all the study sites, coffee production was one of many livelihood activities smallholder households pursued (Koczberski et al. this issue). The competing demands on labour largely reflect the livelihood and socio-cultural priorities of smallholder coffee households. Smallholders commit a large amount of labour and time to subsistence production, community activities, and leisure such as socialising with relatives. These activities are so highly valued that few smallholders are willing to reduce these activities to commit more time and labour to coffee production. It is for this reason, together with a reluctance or inability to mobilise labour beyond the household, that very little labour is committed to coffee maintenance. Poor management levels of smallholder coffee gardens have been noted consistently in studies since the 1980s (e.g. Harding 1988; Collett 1989; Overfield 1994).

Limited use of labour mobilisation strategies

Despite smallholders recognising that lack of access to labour was a major constraint on coffee production (Table 1), few households regularly employed hired labour to overcome labour shortages (Figure 1). Only a few Asaro households used hired labour regularly during the coffee season for harvesting, but at the other sites the use of hired labour was not common. At the remote site of Baira, although hired labour was not employed for coffee harvesting, 24% of households regularly paid individuals or church/youth groups to carry their coffee to market (Plate 1).

Many households reported that they did not use hired labour because of the cost and effort. Hired labour is becoming expensive as increasingly labourers not only want to be paid cash for their work, but be given a cooked meal at the end of the day which includes store foods such as lamb flaps or rice and tinned fish. Previously a cooked meal of garden foods was accepted by labourers which reduced the cost of hiring labour.

Labour mobilisation strategies such as the use of hired labour are not

commonly used to address labour shortages in cash crop production in PNG (Koczberski & Curry 2004). They remain the exception, partly because labour invested in crop production builds ownership claims to crops, and this is a difficult area to address through extension. Moreover, payment uncertainty for labour can be a major disincentive to hired labourers.

CONCLUSIONS AND RECOMMENDATIONS

The backdrop to declining smallholder productivity and coffee quality is a marked deterioration in road infrastructure, reduced extension capacity and the demise of the plantation sector which had previously provided centralised processing and many other services to their surrounding growers (Sengere 2016). These factors, together with poor knowledge of coffee husbandry and processing, have resulted in lower quality parchment from the smallholder sector and therefore discounted prices for farmers.

Labour shortages are a major concern in both accessible and remote coffee growing areas. This is despite what might be viewed as relatively small levels of production per household or adult equivalent. Labour shortages were not just absolute – though that is certainly a factor for some households. Rather there were, what could be called 'functional' labour shortages, that is, there is labour available but socio-economic factors prevent the deployment of that labour in coffee. This is especially true for women's labour for a range of reasons, including perceived inequities in the distribution of coffee income and perceptions of better or more predictable returns to labour invested in other livelihood pursuits such as fresh food production and marketing. Payment certainty is therefore a significant factor in improving the supply of labour in coffee production.

Another important factor constraining the labour supply for coffee is lifestyle or 'way of life'. The everyday 'way of life' for most village smallholders leaves little time for coffee production as they are involved in a suite of activities including leisure pursuits, church and community activities all of which are highly valued by smallholder communities. This partly explains why smallholders are reluctant to move from a low input, low output system of production to a high input, high output, modern system of production requiring greater inputs of labour and cash investments in coffee. The difficulty for those seeking to increase coffee production and productivity through higher labour inputs or through expensive inputs like inorganic fertiliser, is that this 'way of life' is highly valued and remains an important path to status and prestige in rural PNG society. It also provides a moral framework for community standards of acceptable behaviour (Curry et al. 2017). This makes it highly resistant to change.

Our research suggests that one way to improve smallholder productivity and coffee quality is to develop strategies to improve labour efficiency and to encourage smallholder practices that are more likely to guarantee a fair rate of remuneration of coffee labour, especially women's labour. Improvements in labour efficiency make coffee more viable in remote areas where transport costs are very high, where processing standards are poor and where parchment quality is adversely affected by long-term storage.

One potential strategy to improve labour efficiency is for farmer groups to use mini demucilagers (mini wet mills). They can improve the viability of coffee livelihoods in both remote and accessible coffee growing areas. Growers can achieve Premium Smallholder Coffee (PSC) levels of quality easily and it is not unreasonable to suggest they could achieve even higher grades of coffee like X and A grades, commanding price premiums of 30-40%. Also, the labour efficiencies and improved quality of parchment would increase returns to labour in accessible sites thereby reducing the opportunity cost of labour in coffee relative to other livelihood pursuits. Coffee would therefore become a more attractive livelihood pursuit in accessible locations.

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