Coffee, child labour, and education: Examining a triple social–ecological trade-off in an Afromontane forest landscape

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ABSTRACT

In biodiversity rich agriculture–forest moasic landscapes in south-western Ethiopia, the production of coffee and food crops, including guarding them from forest-dwelling mammals, requires a high input of labour, which is supplied partly by children. Through field observations and interviews with smallholders, we studied the extent of children's participation in coffee production and food crop guarding, its impact on school attendance and implications for sustainable development. The findings revealed that the extent of children's participation in such work is correlated with the level of household's income and residential location, i.e. near versus far from forests or in coffee versus non-coffee areas. Child labour and school absenteeism linked to coffee production and crop guarding are widespread problems. Some of the measures taken to mitigate the problem of school absenteeism were coercive and posed threats to poor households. The paper concludes that child work in coffee production and crop protection is at the cost of school attendance for many children, which represents a critical social justice issue and a trade-off with the economic and environmental values of the forest. Reducing poverty would likely mitigate the problem of child labour and school absenteeism and promote synergistic development in the region.

1. Introduction

Despite aspirations and continued efforts, harmonising development and biodiversity conservation remains a global challenge (Díaz et al., 2018; Fischer et al., 2017; Sayer et al., 2013; UN, 2015). In low income countries, a key aspect of this challenge is the conflict between human welfare and biodiversity conservation, which has negative consequences for local livelihoods and children's rights (Green et al., 2018; Mackenzie et al., 2015).

South-western Ethiopia contains a major part of the country's remaining forests, which form part of the Eastern Afromontane biodiversity hotspot, one of the world's 35 globally important regions for biodiversity conservation (Mittermeier et al., 2011). In addition to sheltering rich biodiversity, the forest is a well-known centre of origin and diversity of Arabica coffee (*Coffea arabica*) (Meyer, 1965). Its smallholder shade-grown coffee production (Gole, 2015) is key to the national economy as a leading export commodity and the primary

source of income for over 15 million people (Gray et al., 2013). Smallholder coffee production uses forest trees for shade and therefore has also a preserving effect on forest cover (Ango, 2016; Hylander et al., 2013). Hence, multiple valuable social–ecological benefits appear to exist, whereby the coffee economy supports both local human wellbeing and the national economy, in addition to facilitating conservation of a globally important biodiversity hotspot.

However, forest cover preservation in the southwest Ethiopia also means maintaining richer wildlife fauna. Coffee production and the need to protect food crops from forest-dwelling mammals—an integral part of a diversified smallholder production system—require that farm families make substantial labour investments, often including child labour. Hence, the rather unique and seemingly successful social–ecological combination of smallholder coffee production and forest conservation generates a two-fold demand for child labour, i.e. in the smallholder coffee production and to defend the farming system against the wildlife that are thriving due to forest cover preservation.

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Studies on the human–wildlife interaction near protected areas have documented school absenteeism and reduced educational achievement among children, especially boys, in nearby villages due to their participation in crop guarding (Haule et al., 2002; Mackenzie et al., 2015; Mackenzie and Ahabyona, 2012). Commercial farming elsewhere, e.g. of coffee and tobacco, has also increased the number of children that relatively poor families withdraw from schools (Kruger, 2007) and has negatively affected children's health (Ibrahim et al., 2018; Ramos, 2018).

In this study, we examined the extent of children's participation in both coffee production[1]—mainly coffee berry picking—and food crop guarding. Specifically, we analysed how child work differs across the agriculture–forest mosaic landscape, between poor and wealthy households, and between boys and girls, and the extent to which this work affects children's education through school absenteeism. We discuss the implications for social–ecological dynamics and sustainable development in the agriculture-forest moasic landscapes of south-western Ethiopia.

2. Child work, labour and schooling in Africa and Ethiopia

Child labour is a pervasive development and human rights issue in low income countries (Emerson and Souza, 2003; ILO, 2017; Jensen et al., 2012). In Africa one in five children is involved in child labour (ILO, 2017). Ethiopia has over 37 million children aged 5–17, of whom c. 31 million (82 %) live in rural areas; and 28 % of rural children, over 8 million, are in child labour (CSA, 2018).[2] Generally, an overwhelming majority of the rural children in the country are engaged in agricultural work; and nearly all of them are unpaid family workers.

There is a rich body of literature on the causes and consequences of child labour, especially in agriculture, a sector that involves a disproportionately high number of children, 108 million, or 71 % of the total children engaged in child labour worldwide (ILO, 2017). Studies from Ethiopia and elsewhere in Africa have attributed the extensive use of child labour to poverty (Grootaert and Kanbur, 1995; Morrow et al., 2017; Webbink et al., 2015), market imperfections, and lack of access to education (Fors, 2012). Child labour may undermine children's schooling, health, and psychological wellbeing (Fors, 2012; Ramos, 2018). In this region, child labour seriously weakens educational achievement through lowering the rate of school enrolment (Putnick and Bornstein, 2015), taking time and attention away from education and increasing the number of grade repetitions and drop-outs (Beegle et al., 2009; CSA, 2018; Lee et al., 2021; Woldehanna and Gebremedhin, 2015). By negatively affecting education, child labour can undermine children's personal development, with implications for human capital and the quality of later life such as the types of work and level of income available to them (Becker, 1993); a generational child labour cycle may also be perpetuated (Emerson and Souza, 2003).

As a key to human development and human capital formation, education is important for achieving a range of Sustainable Development Goals (SDGs), including food security, poverty elimination, biodiversity conservation, and adaptation to and mitigation of climate change (Vladimirova and Le Blanc, 2016). As for population and health, education (including of girls and women) plays important roles in reducing fertility rates by delaying marriage and birth, reducing child mortality, increasing awareness and adoption of family planning, and creating job opportunities that are difficult to combine with child bearing and care

(Colleran and Snopkowski, 2018). Thus, by weakening human development, child labour can have far-reaching implications for human welfare, national development, and biodiversity conservation.

On the other hand, a growing body of studies have identified pitfalls in the dominant, negative view of child labour (excluding the worst forms (ILO, 1999) and child work more broadly, and have stressed the importance of understanding socio-cultural contexts and recognizing certain demonstrated economic and psychological benefits of child work, in contrast to the dominant 'modern' conceptions of a 'work-free' childhood (Abebe, 2016; Libório and Ungar, 2010). In many rural areas in Africa including Ethiopia, children commonly engage in household chores and family agriculture, and age-appropriate child work may be a valuable, informal and practise-based means of inter-generational knowledge transmission (Admassie, 2003; Bourdillon, 2006). Further, children who work to supplement family income may also mobilise resources that enable them to start and remain in school (Hilson, 2010); combining schooling and work may not in all situations lead to a decline in children's education (Mussa et al., 2019).

These debates about the ideal of a work-free childhood versus the socio-cultural importance of child work and its relation to schooling, highlight the need for studies on child labour and children's rights, with a focus on specific socio-cultural, political economy and environmental contexts for better understanding and policy outcomes (Abebe, 2016; Bourdillon, 2006). Our study contributes to these debates by examining the extent of child labour mobilisation for coffee production and food crop guarding in a biodiverse agriculture-forest moasic landscape. To our knowledge, no other study has conducted such a comparative analysis to uncover the educational consequences of maintaining forest cover and producing coffee. The analysis highlights some of the underlying realities that shape and reinforce children's participation in coffee production and crop guarding. It also shows that such work is at the cost of school attendance for many children, and argues that this represents a critical justice issue and trade-off between educational, economic and environmental values in the context of Ethiopia's Afro-montane forests.

3. Conceptual framework

International conventions define child work and child labour (ILO, 1973, 1999; UNCRC, 1989) and have been ratified by most states including Ethiopia. UNCRC (1989) considers that any child, defined as a person under the age of 18, has the right 'to be protected from economic exploitation and from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical, mental, spiritual, moral or social development'. Children's participation in any such work is considered to be child labour, and thus a violation of the rights of the child. As per international labour standards (ILO, 1999), Ethiopia considers children aged 5–17 who are engaged in hazardous work to be child labourers. Children aged 5–13 who are engaged in other economic activities (excluding 'unpaid family workers' and 'self-employed') and not attending school are also considered to be child labourers (CSA, 2018: 61). However, based on the (ILO, 1973) norm, Ethiopia allows children aged 12 and 13 years to engage in 'light work', which is considered not to harm children's health, development, and schooling (CSA, 2018).

This research draws on a political ecology perspective to highlight (in)justice in child work in shade-grown coffee production and crop guarding (Svarstad and Benjaminsen, 2020). This perspective can help to explain how the costs and harms—in the form of child labour and school absenteeism—of crop guarding and the production of tree cover preservation-friendly coffee in forest coffee ecosystems are distributed within the local community, intra-family, and across the landscape. In addition to unpacking local realities, it can also help to disentangle distant drivers, such as conservation policy and coffee markets, and the power relations that shape and reinforce children's participation in coffee production and crop guarding.

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[1] Coffee production involves, among others, clearing undergrowth, picking matured coffee berries and sun-drying coffee beans. Garden coffee production also include preparing the land, and growing and transplanting seedlings. This paper focuses on coffee berry picking since it is widely believed to be related to the problem of children school absenteeism.

[2] The child labour estimate was based on national directives and guidelines from the ministry of labour and social affairs of Ethiopia (CSA, 2018: 75).

We also note that gender intersects with family income and proximity to forests in terms of the mobilisation of different groups of children for coffee production and crop guarding, with different but mainly negative implications for education. Understanding such intersectionality is important to identify the groups that are most vulnerable to child labour risks and violations of the right education (cf. Mackenzie et al., 2015; Ogra, 2008).

4. Methods

4.1. Study area

The study was conducted in the Gera district of the Oromia region in the south-western highlands of Ethiopia (Fig. 1). The district has 29 rural *kebeles* (the lowest administrative unit), 16 of which are located in coffee forest areas (hereafter, 'coffee areas'), while the remaining 13 are situated in high altitude areas above coffee growing elevation (hereafter, 'non-coffee areas'). Coffee grows naturally at altitudes between 1000 and 2000 m above sea level (Senbeta, 2006). There are four types of coffee systems: forest coffee, semi-managed forest coffee, garden coffee, and plantation coffee (Gole, 2015). In all systems, coffee is grown under the shade of trees, but the extent of the shade decreases as one moves from forest coffee to garden and plantation coffee. In this paper, we refer to the four coffee systems as 'shade-grown coffee' and to forest coffee and semi-managed forest coffee as 'forest coffee ecosystems'. Some farmers living in non-coffee areas have customary rights to forest coffee ecosystems in coffee areas, while others access them through share-cropping (Ango, 2016).

A questionnaire survey was implemented in four *kebeles* in coffee areas (Gaminnaa Dacco, Gara Naso, Sadii Loya, and Qolla Qimbibit) and in three *kebeles* in non-coffee areas (Boge Dedo, Dusta, and Gadda Guute), taking into account their proximity to forests (Fig. 1). In each *kebele*, we identified two 1-km transects, i.e. a total of 14 transects (eight near forests and six far from forests) using Google Earth and located on the ground using a handheld global positioning system. In coffee areas, we took more transects near forests (five), compared to those located far from forests (three), since most of these *kebeles* are surrounded by forests (Fig. 1).

We situated the transects near forests along the forest edge, and the transects far from forests at a distance (more than one km) from the forest edge. Severe and frequent crop raids by wild mammals, requiring continuous crop guarding, occur in villages near forests (Naughton-Treves, 1997). Hence, the study design, i.e. near forests versus far from forests and in coffee versus non-coffee areas, aimed to capture spatial differences in how children are mobilised for coffee production and crop guarding, and the effects of such work on their schooling.

4.2. Data collection

We gathered data for the study in two different periods: pilot fieldwork from 12 to 22 August 2019 and the main fieldwork from 12 November to 19 December 2019. The pilot fieldwork covered farm households in four villages: two in Sadii Loya, and two in Dusta. We tested a semi-structured questionnaire designed to assess the extent of children's participation in shade-grown coffee production and crop guarding as well as the effects of such work on their schooling in 27 households. We did not preselect the households interviewed but rather visited each house around the transects and interviewed the self-identified heads of households we were able to find at home and who had children. Often, spouses and/or children were present and participated in these interviews.

During the main fieldwork, we interviewed 140 households, including second interviews with 19 households from the pilot study. We excluded eight households interviewed during the pilot study because the children in them were not within the 5–17 years' age group or the household heads were not available for re-interview. We selected

and interviewed ten households living along each 1-km transect in the same manner as during the pilot study. However, to qualify for the interview, the household had to include a parent or non-parent guardian of at least one child aged 5–17.

Via the survey, we collected background data on the interviewed households and sociodemographic characteristics of the children in the household aged 5–17, as well as their work participation in coffee production and crop guarding, and school-related problems. We also collected data on total annual household income, including farm and off-farm sources generated by all household members, for the 2011 Ethiopian calendar year, i.e. 11 September 2018–31 August 2019.

During the main fieldwork, we also observed the working conditions of nine households while camping and working in the forest during coffee harvest season in Gara Naso, Gura Afallo, and Gaminna Dacco *kebeles* (Fig. 1). In addition to the household heads, we interviewed two boys and two girls among the children camping with these families. To further explore the extent of child work, underlying drivers, its effects, and possible ways to address the school-related problems associated with child work, we visited non-camping forest and garden coffee sites and interviewed working boys (two), girls (three), adult men (six) and adult women (two) in Ganji Callaa and Sadii Loya. The mean age of the children we interviewed was 13.1 years (± 1.8). We also contacted ten primary schools (Fig. 1) and conducted short interviews with seven school directors, two vice-directors, and two teachers, all of whom were male. Secondary schools are less accessible physically to many children since there were only five such schools at the time of fieldwork. But each rural kebele has at least one primary school, and hence we focus on such schools to better understand the relationship between child work and schooling. We also interviewed staff at the Gera district (1) and Jimma zone (1) educational bureaus. The interviews with staff at the educational bureaus, and with school directors and teachers focused on children's school absenteeism and its relationship with coffee production and crop guarding, as well as how schools deal with school absenteeism.

The study was conducted with ethical vetting and permit from the Oromia Regional State Bureau of Health. No sensitive personal data were collected, and the household heads, children, and their guardians were permanently anonymised. We have also anonymised quotes from the interviews with school directors, teachers, educational bureau staff, and a private coffee company representative to avoid the identification of specific persons.

4.3. Data analysis

We analysed quantitative information from the survey by pooling and comparing the responses of households from villages near versus far from forests and in coffee versus non-coffee areas. We performed two types of analyses: logistic regression and Pearson's Chi-square test with Yates' continuity correction. We applied a logistic regression data analysis technique to determine the factors that influence the probability that a household will use children aged 5–17 in shade-grown coffee production or crop guarding. Since the dependent variable is binary, namely households that (do not) use at least one child in coffee production or crop guarding, ordinary least squares is not ideal. The general model for logistic regression, with a logistic distribution function, is represented as follows:

$$P_i = E(Y = 1|X_i) = \frac{1}{1 + e^{-(a+\beta X_i)}} \tag{1}$$

where P_i represents a probability, Y is our dependent variable (i.e. child work), X represents the independent variable that accounts for household characteristics, i denotes the households who used or did not use children aged 5–17 in coffee production or crop guarding, and β is the coefficient matrix to be estimated.

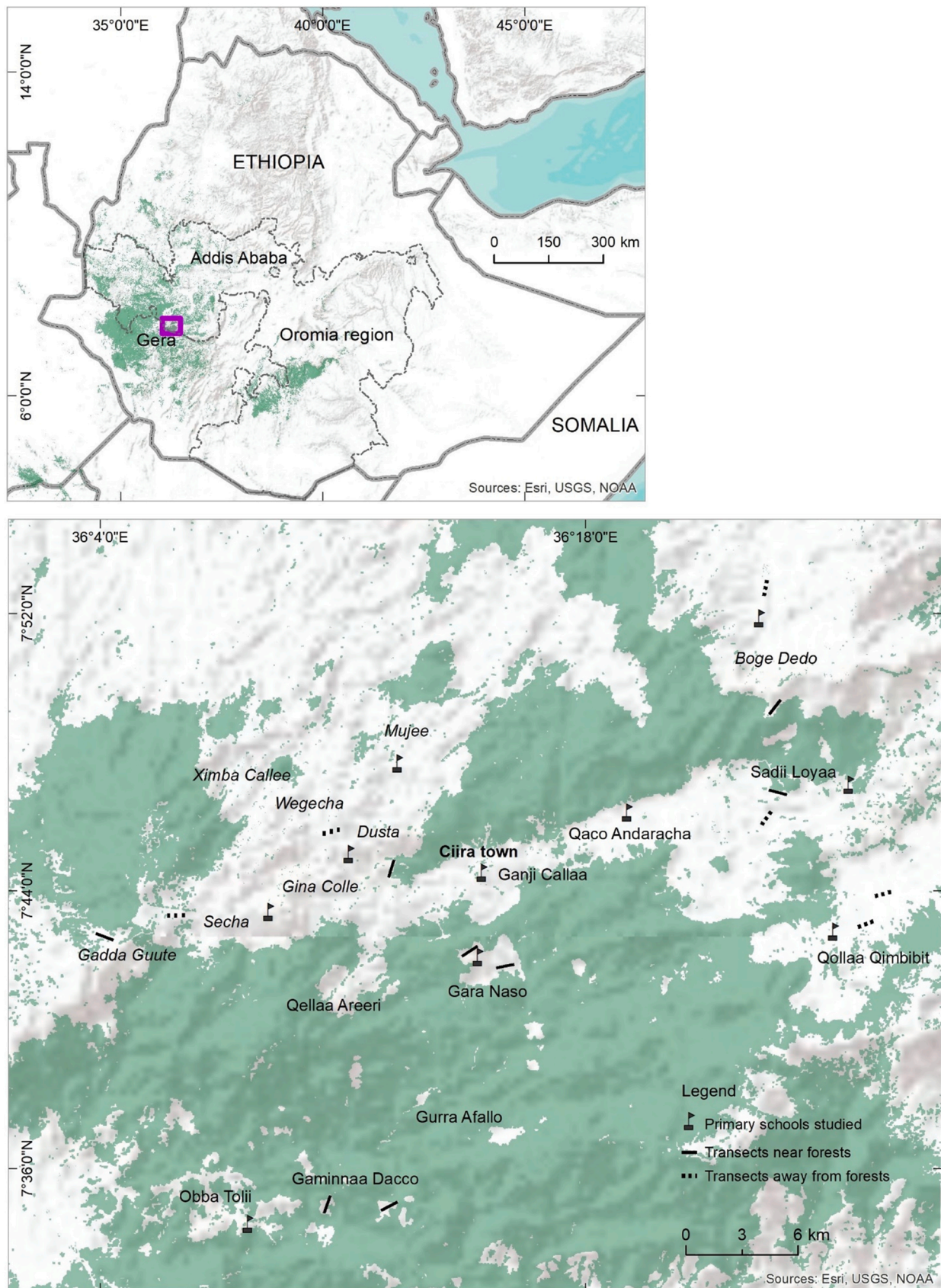Eq. (1) can be simplified and used in this study as follows:

Fig. 1. Study area and transects design. The names on the Gera (lower) map are those of the *kebeles* (*kebele* is the lowest administrative unit in Ethiopia) where the transects and/or the households interviewed are located. Italics: *Kebeles* located in non-coffee areas. The colour green on the upper map represents 2017 forest cover (source WWF), and on the Gera map, green represents forest and forest coffee ecosystems, based on a 2010 Landsat scene.

$$ln\left(\frac{P_i}{1-p_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + , \ldots , + \beta_n X_n + e_i \qquad (2)$$

Where:

1. $ln\left(\frac{P_i}{1-p_i}\right)$ is the dependent variable that shows the probability of a household using at least one child in coffee production or crop guarding with two values (0 for the household that did not use the child(ren) and 1 for the household who used the child(ren)).
2. e_i is the error term
3. X1 = A dummy variable for the location of the households concerning suitability for coffee production (coffee area = 1, non-coffee area = 0)
4. X2 = A dummy variable for the location of the households in relation to the forest edge (near forests = 1, far from forests = 0)
5. X3 = Household head's age (in years)
6. X4 = A dummy variable for the household head's gender (male =1, female = 0)
7. X5 = A dummy variable for education, if the household head is illiterate (yes = 1, no = 0)
8. X6 = Number of household members over the age of 17
9. X7 = Household's total annual income (Birr)

We selected the X-variables based on the literature (e.g. Grootaert and Kanbur, 1995; Webbink, Smits, and Jong, 2015) and our expectations. STATA SE software version 14 was used for analysing the logistic regression in Eq. (2).

We performed Pearson's Chi-square tests to evaluate whether there were differences in the number of (a) households using at least one child aged 5–17 in coffee production and/or crop guarding between households located near versus far from forests and in coffee versus non-coffee areas, as well as (b) working children, and (c) children facing school-related problems among those working schoolchildren in the interviewed households between those located near versus far from forests and in coffee versus non-coffee areas. We also tested whether there were differences between the number of boys and girls (a) working in coffee production and/or crop guarding, and (b) facing school-related problems among those working schoolchildren. We performed the Chi-square tests using R version 3.6.3.

Qualitative data from the interviews were sorted and coded to identify emerging themes. The main categories identified were reasons for child work in crop guarding and coffee production, school absenteeism, and measures taken to mitigate absenteeism. This analysis has complemented and triangulated the quantitative data on children's participation in coffee production and crop guarding, and the school-related problems they face.

4.3.1. Some socioeconomic and demographic characteristics of the households surveyed

The mean age of the household heads was 43 (± 12) years, half of them were literate, and 86 % were male-headed (Table 1). Crop and/or livestock production were important livelihood activities for all the households. Their mean annual income was 34,072 Eth Birr (1 USD = 28.9161 Eth Birr on 1 July 2019), and households in villages near forests in both coffee and non-coffee areas had a higher income.

Collectively, the households had 485 children (47 % girls) aged 5–17 (mean age was 10.5 years ± 3.6), and most (80 %) of them were going to school (Table 2). The mean number of children aged 5–17 per household was four (Table 1).

5. Results

5.1. Perceptions of child work in coffee production and crop guarding

Work to protect some food crops (e.g. teff and field beans) from damage by wild mammals and to prepare the land for the next planting season (e.g. for maize) both coincide with coffee harvest time (especially for farmers in non-coffee areas). This bottleneck situation requires the mobilisation of a high number of able-bodied adults and children for work. Most farmers who live near forests and/or have coffee farms use as many children aged c. 7 years and older as possible for both coffee production and crop guarding. Children often participate in crop guarding outside of school time on weekdays. Similarly, in coffee areas, most children pick coffee berries before or after school and during weekends, since this task does not usually involve a long commute.

However, many farmers from non-coffee areas and those from some coffee areas, e.g. Ganji Callaa, camp in the forest in other coffee area (e.g. Gara Naso, and Gurra Afallo) often with their school-aged children for up to two months to harvest coffee in November and December each year (Fig. 1). A farmer explained: 'We have camped in this coffee forest for nearly twenty days now. My 6- and 11-year-olds are in the forest collecting coffee berries with their mother right now.'[3]

Nearly all children involved in crop guarding and most children who pick coffee berries work on their family's farm. However, several children from non-coffee areas also pick coffee berries for other farmers and private companies. These children are from relatively poor families or families who have small or no forest and garden coffee, as explained in the next two quotes: My 'father suggested that I take on coffee work on some days to cover the annual cost of my clothing. My father also told this to my siblings, as soon as he felt that they were mature enough [i.e. c. 10 years old] to support themselves.'[4] A representative of a private coffee company said: 'Needy children come to us and ask for work. To help them, we allow them to work.'[5]

Interviews with farmers and children show that coffee berry picking is an important income source, especially for children above age 10, which they use to buy personal effects, mainly clothes and materials for school. A girl of 16 explained:

'I can collect 20–30 kilos of coffee berries per day. I receive two Birr per kilo of coffee I collect. This 10-year-old boy [pointing her finger at a boy in a group of eight collecting coffee berries with her for a farmer] can collect 10–15 kg of coffee berries per day. I keep all the money and will use it to buy things for myself, like clothes, and hair and body oils. I work because if I sit idle, no one will give me a penny.'[6]

While camping, families typically leave some of their members or relatives behind to take care of the home, livestock, and farm, which, in villages near forests, involves guarding crops. In such cases, children go camping to harvest coffee on shift; that is, children who go to the forest with their parents at the beginning of camping will return home after collecting coffee berries for a couple of weeks and change shifts with those who initially stayed behind. However, most of the children who camp with their parents are absent from school for the entire coffee harvest season. A school director explained: 'Children are absent for coffee berry picking in forest coffee areas in November and December. During January and February, some children go back to the coffee forest to collect coffee berries that were left on the ground for themselves.'[7] Another added: 'The numbers of boys and girls [who are] absent from school due to coffee harvest are quite similar. But along forest edges, more boys are absent from school for crop guarding, as compared to girls.'[8]

Private coffee companies and farmers recruit children for day-work

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[3] A 45-year old man from Gina Colle, interviewed at a campsite in Gurra Afallo forest, 5 December 2019.

[4] A 14-year-old boy from Mujee, interviewed while working in Ganji Callaa, 6 December 2019.

[5] Interview at Gera, 7 December 2019.

[6] A 16-year old girl from Ximba Callee, Interviewed in Ganji Callaa, 6 December 2019.

[7] School director A, 13 December 2019.

[8] School director B, 11 December 2019.

Table 1

The number of heads of households interviewed in villages along transects near and far from forests; their gender, age, and literacy status; and family size and households' major sources of livelihood.

Location	No. of households interviewed	Gender (%)[1]		Age (year)		Literacy level (%)		No. of household members		No. of household members aged 5–17		Major sources of livelihood (%)				Annual total income (in Eth Birr)[3]	
		Male	Female	Mean	Standard Deviation (SD)	Illiterate	Literate	Mean	SD	Mean	SD	Crop and livestock production	Crop cultivation	Crop and livestock production and trade	Other[2]	Mean	Standard. error of the mean (SE)
Coffee areas																	
Near forests	50	84.0	16.0	42.4	10.6	48.0	52.0	6.9	2.0	3.4	1.6	68.0	10.0	6.0	16.0	36,261	4814
Far from forests	30	86.7	13.3	47.1	13.7	43.3	56.7	6.5	1.9	3.1	1.4	80.0	6.7	6.7	6.7	27,877	3903
Total	80	85.0	15.0	44.2	12.0	46.3	53.7	6.7	2.0	3.3	1.5	72.5	8.8	6.3	12.5	33,117	3360
Non-coffee areas																	
Near forests	30	93.3	6.7	43.8	11.0	53.3	46.7	7.7	2.7	3.6	1.8	73.3	16.7	6.7	3.3	44,789	10,855
Far from forests	30	80.0	20.0	40.7	12.8	56.7	43.3	7.9	4.2	3.8	1.9	63.3	13.3	10.0	13.3	25,903	3263
Total	60	86.7	13.3	42.3	11.9	55.0	45.0	7.8	3.5	3.7	1.8	68.3	15.0	8.3	8.3	35,346	5752
Coffee and non-coffee areas																	
Near forests	80	87.5	12.5	42.9	10.7	50.0	50.0	7.2	2.3	3.5	1.7	70.0	12.5	6.3	11.3	39,459	5042
Far from forests	60	83.3	16.7	43.9	13.5	50.0	50.0	7.2	3.3	3.5	1.7	71.7	10.0	8.3	10.0	26,890	2525
Total	140	85.7	14.3	43.3	12.0	50.0	50.0	7.2	2.8	3.5	1.7	70.7	11.4	7.1	10.7	34,072	3113

1: Of the 120 interviewed male-headed households, 119 were married and 1 was a widower, whereas 15 of the interviewed 20 female-headed households were married, and the remaining 5 (25 %) were either widow or divorced.

2: Represents income sources from crop and/or livestock production and other income sources such as trade including crop, livestock and firewood sales, carpentry, salary from employment or daily labour, or income from honey production.

3: The mean annual income of the female-headed households was 27,453 Birr (SE = 5,360); whereas it was 13,664 Birr (SE = 4,457) for the widow or divorced female-headed households.

1 USD = 28.9161 Eth Birr on 1 July 2019.

Table 2

The number of children aged 5–17 in the households interviewed, and their gender, and schooling status in the 2018–2019 academic year.

Location	Gender (%)		Child's age		Children schooling status (%)			
	Male	Female	Mean	SD	Attending school	Left school	Never went to school	Total
Coffee areas								
Near forests ($n = 170$)	51.8	48.2	10.6	3.6	78.8	14.1	7.1	100
Far from forests ($n = 92$)	53.3	46.7	10.9	3.3	77.2	8.7	14.1	100
Total ($n = 262$)	52.3	47.7	10.7	3.5	78.2	12.2	9.5	100
Non-coffee areas								
Near forests ($n = 108$)	50.0	50.0	10.7	3.8	81.5	13.0	5.6	100
Far from forests ($n = 115$)	59.1	40.9	10.0	3.5	83.5	8.7	7.8	100
Total ($n = 223$)	54.7	45.3	10.3	3.7	82.5	10.8	6.7	100
Coffee and non-coffee areas								
Near forests ($n = 278$)	51.1	48.9	10.6	3.7	79.9	13.7	6.5	100
Far from forests ($n = 207$)	56.5	43.5	10.4	3.5	80.7	8.7	10.6	100
Total ($n = 485$)	53.4	46.6	10.5	3.6	80.2	11.5	8.2	100

n: the total number of children aged 5–17, based on which the percentages were calculated.

coffee berry picking, providing these children with a cash income in the form of a daily wage. Some children are absent from school on account of coffee berry picking without their parents' permission. Such un-sanctioned school absenteeism is at least partly motivated by children's keen interest in earning money to buy the same consumer, especially fashion items, e.g. clothes, as their peers who participate in coffee har-vesting. Interviews with parents, children, teachers, and school directors show that school absenteeism is mainly an effect of coffee berry picking and to some extent of crop guarding. This will be further explored in the quantitative analysis below.

5.2. Extent, pattern, and determinants of children's participation in shade-grown coffee production and crop guarding

5.2.1. Overall extent and pattern of child work

Nearly all the households interviewed (91 %) used at least one child in coffee production, crop guarding, or both.[9] The proportions of households using children for such work were quite similar in coffee (95 %) and non-coffee areas (87 %), as well as in villages near (95 %) and far from forests (87 %) (Fig. 2a).

Of the total number of children in the interviewed households, 79 % work in coffee production, crop guarding, or both, and more children in coffee areas (89 %) than in non-coffee areas (66 %) engaged in such work (Fig. 3a; Sup. Table A.1a, $p < 0.001$). More children in villages near forests (85 %) work than those in villages located far from forests (70 %) (Fig. 3a; Sup. Table A.1a, $p < 0.001$). Similarly, in non-coffee areas, more children living near forests (74 %) work than those living far from forests (59 %) ($p = 0.027$). In coffee areas, there was also a tendency for more children in villages near forests (92 %) to work than those in villages located far from forests (84 %) ($p = 0.075$). But, there was no statistical significant difference between the proportions of working boys and girls for pooled data, near forests, far from forests, and coffee and non-coffee areas (Sup. Table A.1a).

5.2.2. Variation and determinants of children's participation in coffee production and crop guarding

A majority of households (75 %) use children in coffee production, more so in coffee areas (94 %) than in non-coffee areas (50 %) (Fig. 2b; $p < 0.001$). More than half of the children in the interviewed households (60 %) work in coffee production, and more children in coffee areas (84 %) than in non-coffee areas (32 %) engaged in such work (Fig. 3b; Sup. Table A.1a, $p < 0.001$).

A majority of households (71 %) also use children in crop guarding, more so in villages near forests than in those located far from forests for

pooled data (Fig. 2c; $p < 0.001$), for coffee areas ($p < 0.001$) and for non-coffee areas ($p < 0.001$). More than half of the children in the interviewed households (62 %) engage in crop guarding, and more children in villages near forests engage in crop guarding than those from villages located far from forests for pooled data (Fig. 3c; Sup. Table A.1a, $p < 0.001$), in coffee areas ($p < 0.001$), and in non-coffee areas ($p < 0.001$). In addition, more children in coffee areas (71 %) than in non-coffee areas (51 %) do such work (Fig. 3c; Sup. Table A.1a, $p < 0.001$).

Moreover, among the determinants included in the logistic regres-sion model, total household income significantly influences the proba-bility of having at least one child engaged in coffee production and crop guarding: the lower the household income, the higher is the probability of farmers involving their children in such work (Table 3, $p < 0.001$).

5.3. School-related problems faced by children attending school and working

5.3.1. Overall extent and pattern of school-related problems

For pooled data, just above half (54 %) of children working in coffee production, crop guarding, or both, while also attending school, face school-related problems (Fig. 4a; Sup. Table A.1b)—mainly school absenteeism (Fig. 5a). More children in villages near forests than those located far from forests face such problems according to pooled data (Fig. 4a; Sup. Table A.1b, $p < 0.001$) and in coffee areas ($p < 0.001$).

Considering coffee work alone, just above half (52 %) of the working schoolchildren faced school-related problems (Fig. 4b). Of the children facing such problems, 34 % were absent from school for the whole coffee harvest season, and 28 % were absent one day per week (Fig. 5a, Total).

Considering crop guarding alone, more than a third (40 %) of the working schoolchildren faced school-related problems (Fig. 4c). Of the children facing school-related problems, a large proportion (40 %) was absent from school one day per week; while 24 % were absent one day per month, with observable competition between crop guarding and their schoolwork (Fig. 5b, Total). The proportion of boys and girls facing various levels of school absenteeism due to their participation in coffee production or crop guarding was quite similar (Fig. 5c and d, Total).

5.3.2. Spatial and gender variations in school-related problems faced by working school children

5.3.2.1. Problems faced by children working in coffee production.
Comparing near forests (55 %) versus far from forests (49 %) a nearly equal proportion of children face school-related problems due to their participation in coffee production (Fig. 4b, Total; Sup. Table A.1b). However, in coffee areas, more children near forests (60 %) than in villages far from forests (34 %) face school-related problems (Fig. 4b; Sup. Table A.1b, $p = 0.002$). It is the opposite in non-coffee areas, where

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[9] 'Child work' in coffee production or crop guarding refers to an average of 1 h/day or more for a month.
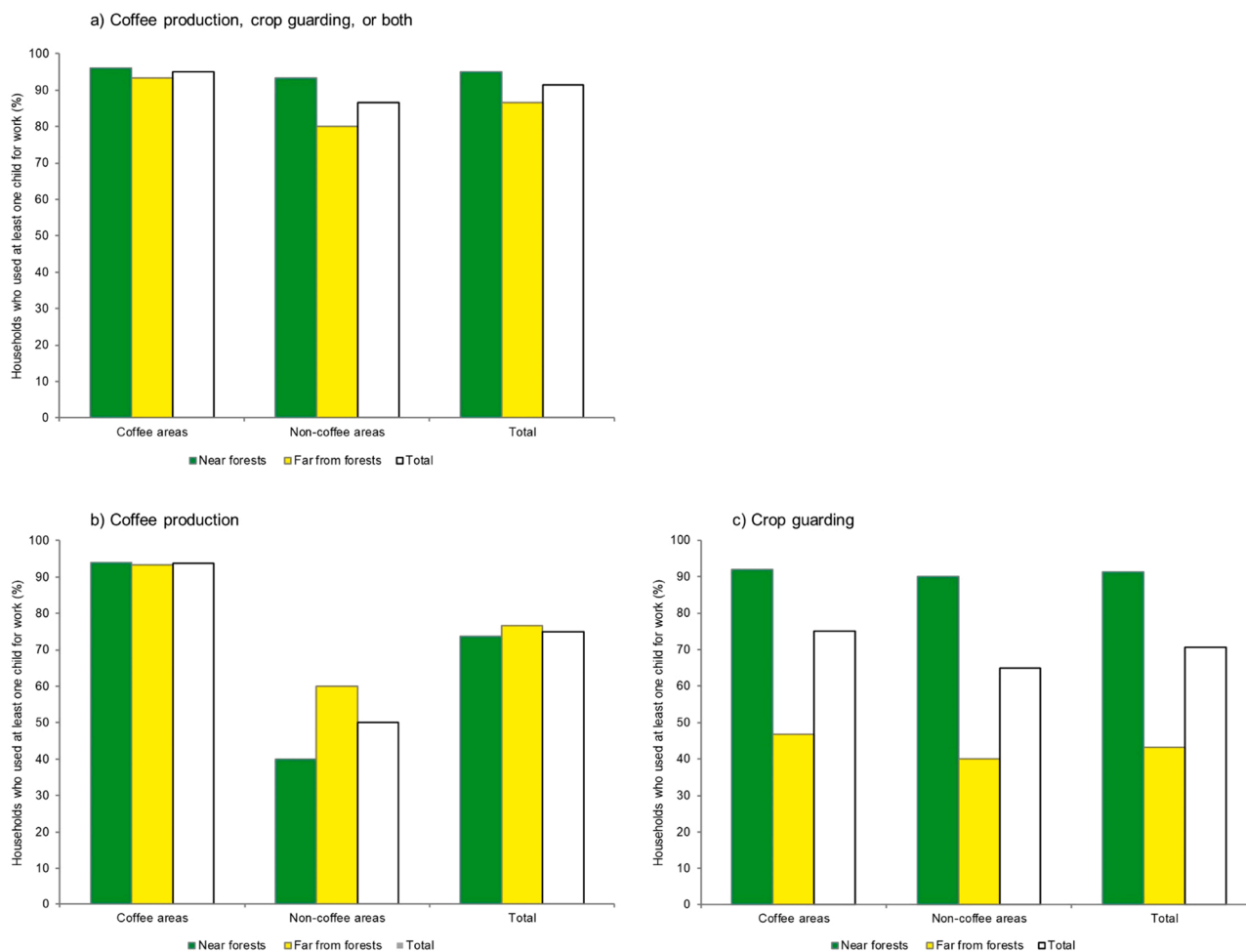
Fig. 2. Proportions of the households interviewed who used at least one of their children aged 5–17 for coffee production, crop guarding, or both in Gera, Ethiopia.

more children living in villages far from forests (74 %) than those living near forests (32 %) face such problems ($p = 0.003$). Moreover, in villages far from forests, a large proportion (47 %) of children facing school-related problems were absent from school for the entire coffee harvest season, but a large proportion (42 %) of those from villages near forests were absent only one day per week (Fig. 5a).

Comparing coffee (51 %) versus non-forest areas (57 %) revealed a nearly equal proportion of children facing school-related problems due to their participation in coffee production (Fig. 4b, Sup. Table A.1b). However, in coffee areas, a large proportion of children (39 %) were absent from school one day per week during coffee harvest season, whereas in non-coffee areas, a majority of children (64 %) were absent from school for the whole coffee harvest season (Fig. 5a).

A gender difference is that in non-coffee areas, there is a tendency for more boys than girls who work in coffee production to face school-related problems (Sup. Table A.1b, $p = 0.083$). A higher proportion of boys than girls in non-coffee areas (boys 68 % vs girls 55 %) and villages far from forests (boys 53 % vs girls 35 %) were also absent from school for the whole coffee harvest season (Fig. 5c). But, in coffee areas (girls 29 % vs boys 17 %) and villages near forests (girls 33 % vs boys 20 %) a higher proportion of girls than boys were absent from school for the whole coffee harvest season (Fig. 5c). Moreover, a higher proportion of girls than boys in non-coffee areas (girls 27 % vs boys 12 %) and villages far from forests (girls 35 % vs boys 19 %) were absent from school for two to three days per week during coffee harvest season (Fig. 5c).

5.3.2.2. Problems faced by children engaged in crop guarding. Proximity to forests is an important factor, as much more children in villages near

forests (51 %) than villages far from forests (12 %) face school-related problems due to their participation in crop guarding (Fig. 4c, Total; Sup. Table A.1b, $p < 0.001$). Similarly, more children in villages near forests than in villages far from forests in both coffee ($p = 0.001$) and non-coffee areas ($p < 0.001$) face such problems. In villages near forests, a majority of the children (51 %) were absent from school at least one day per week due to crop guarding, while in villages far from forests, as few as eight children face school-related problems due to their participation in crop guarding, five of whom were only absent from school one day per month due to this reason (Fig. 5b; Sup. Table A.1b).

Comparing coffee (40 %) versus non-forest areas (40 %) revealed a similar proportion of children facing school-related problems due to their participation in crop guarding (Fig. 4c, Sup. Table A.1b). The severity of the problem faced these children was also similar, as a large and nearly similar proportion of children forced to be absent from school at least one day per week for crop guarding both in coffee areas (51 %) and non-coffee areas (48 %) (Fig. 5b).

A gender difference is that in non-coffee areas, a higher proportion of boys (23 %) than girls (11 %) were absent from school two to three days per week due to crop guarding, whereas a higher proportion of girls (39 %) than boys (23 %) were absent from school one day per week due to this reason (Fig. 5d).

5.4. School absenteeism: Perceptions and countermeasures

The school directors and some farmers suggested that school absenteeism due to coffee harvesting had declined in the past two years because of mitigation measures by educational bureaus and schools.
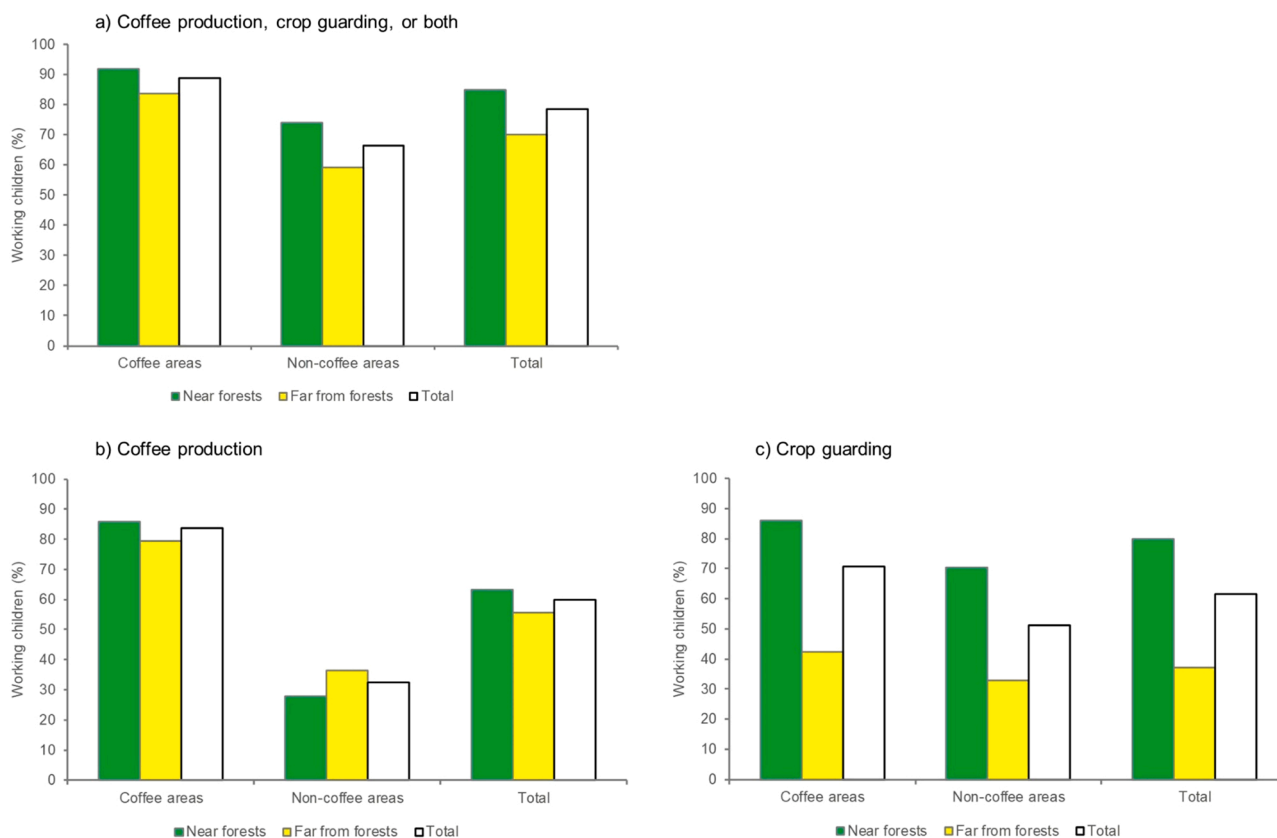
Fig. 3. Proportions of children aged 5–17 working in coffee production, crop guarding, or both in Gera, Ethiopia.

Table 3

Factors influencing the households interviewed to use at least one child aged 5–17 in shade-grown coffee production and crop guarding.

Variables	Coffee production	Crop guarding
Location of the village in relation to ecological suitability for coffee production	3.229 *** (0.621)	0.136 (0.501)
Location of the household in relation to the forest edge	0.443 (0.803)	3.353*** (0.594)
Household's age	0.260 (0.149)	0.115 (0.124)
Household head's gender	-1.159 (0.944)	0.351 (0.724)
Household head's literacy status	-0.037 (0.581)	0.131 (0.496)
Number of family members over the age of 17	0.096 (0.072)	0.029 (0.029)
Household's total annual income	-0.001 *** (0.000)	-0.001*** (0.000)
Observations	140	140
Log likelihood	-56.137 ***	-52.535 ***

Robust standard errors in parentheses

$* p < 0.10, ** p < 0.05, *** p < 0.01$

Schools set up committees comprising mainly teachers and *kebele* administration to encourage parents to send children to school and impose monetary penalties for child absence from school. A school director explained:

'Discussions we have had with the local community [about the value of education and school absenteeism], [our practice of] only teaching in the morning hours to give children an opportunity to work in the afternoon, and [efforts we have made] to bring parents who allow children to be absent from school to the [attention of the] *kebele* administration have reduced absenteeism over the past two years, to some extent.'[10]

Schools in non-coffee areas have also recently started using local militias to prevent children from going to coffee areas during harvest, so far with mixed results, as demonstrated by the following three quotes. A school director argued: 'The use of the militia and having parents pay monetary penalties for children who are absent from school to pick coffee berries seem to somehow be working well since last year. As soon as local farmers and children hear that some parents paid monetary penalties, parents start sending their children back to school.'[11] A boy of 14 confirmed: 'The teachers said, if someone sees a school child working in the forest and reports them, they will kick that student out of school. I do not want this to happen to me. I like school education.'[12] At the same time, a school director found the measures to be partly ineffective: 'We attempted to prevent children from going …for coffee berry picking by using the local militia. But that effort failed to bear fruit, since the militia is composed of local farmers who found it difficult to prevent the children of relatives and acquaintances from going coffee berry picking.'[13] Another reason why local militias were only partly effective was that children avoid them by using alternate routes or travelling at night.

As a measure against absenteeism, schools informed parents and children about a recent Oromia Bureau of Education examination directive for Grades 1–12. According to this directive, students will not be allowed to take the final examination if they have been absent from school for more than a certain number of days, for example 15 days per semester in Grades 1–4 (Oromia Bureau of Education, n.d.). Students are required to attend class for a minimum number of days in the academic year, for example 172 days for Grades 1–4. School directors agreed that implementing these rules had reduced school absenteeism related to coffee harvesting, while some expressed that full implementation may

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[10] School director A, 13 December 2019.

[11] School director C, 14 December 2019.

[12] A 14-year-old boy from Mujee, interviewed while working in Ganji Callaa 6 December 2019.

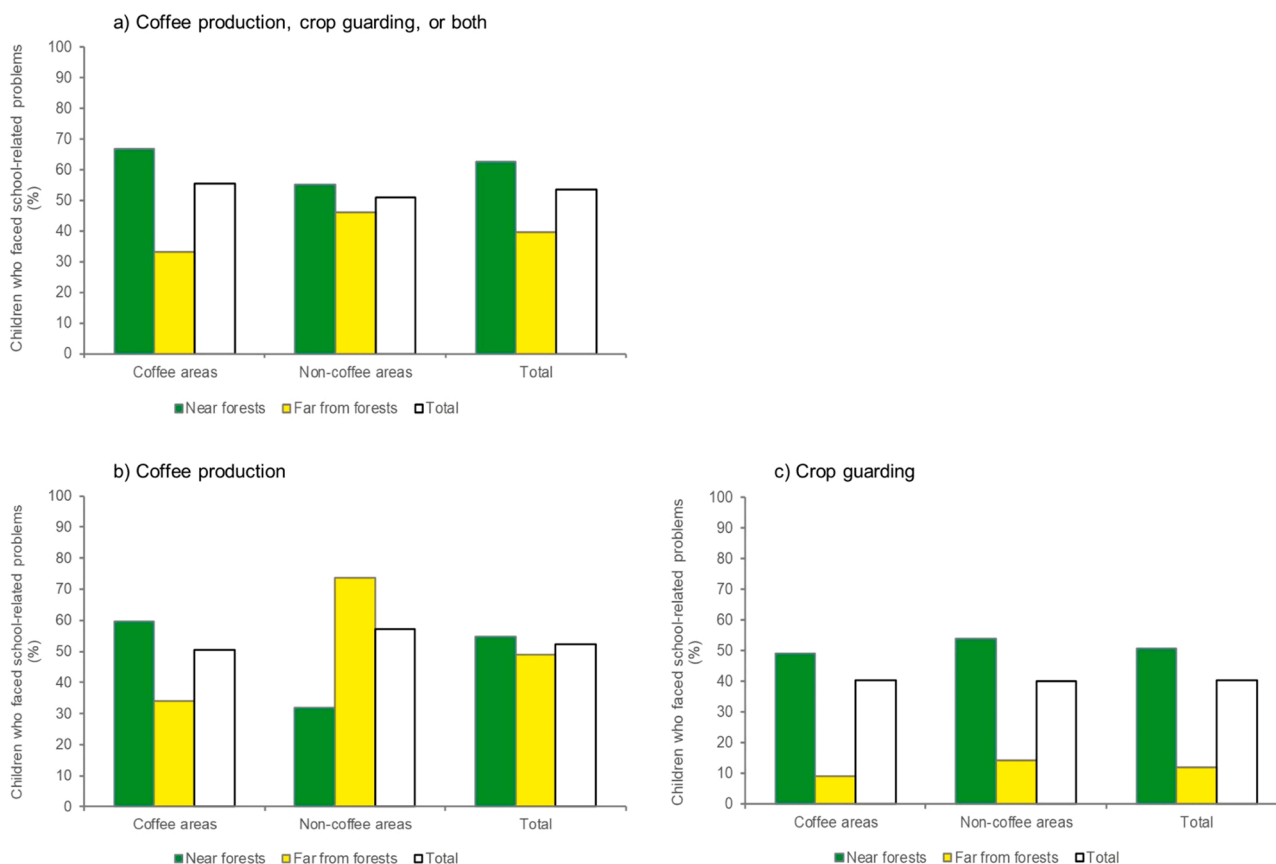[13] School director B, 11 December 2019.

Fig. 4. Proportions of children facing school-related problems among those aged 5–17 working in coffee production, crop guarding, or both, while also attending school in Gera, Ethiopia.

have unexpected consequences for some children. For instance, children who are not eligible to take their final examinations could be forced to drop out of school, as might those whose parents cannot pay the monetary penalties for their absenteeism. Furthermore, some families, especially those who are less motivated to keep their children in school, may use such measures as an excuse to stop sending their children to school at all. In this regard, children from relatively poor families are more vulnerable because they engage more in coffee berry picking and at least some have parents who needed encouragement from the *kebele* administration and teachers to send their children to school in the first place.

6. Discussion and conclusion

Child labour is a pervasive development and human rights issue in many rural settings in low income countries (Emerson and Souza, 2003; Jensen et al., 2012; Putnick and Bornstein, 2015). Using quantitative and qualitative data, we analysed the extent of child labour and its implications for school education in a rural setting by studying children's participation in shade-grown coffee production and food crop guarding in Ethiopia's Afromontane forest region. Our findings show that the majority of the households (91 %) use at least one child for coffee production and/or crop guarding (Fig. 2a), and a large number of children who are both attending school and working in coffee production (52 %) or crop guarding (40 %) and both (54 %) were often forced to absent from school to engage in such work (Figs. 4 and 5). We found that total annual income and location near versus far from forests or in coffee versus non-coffee areas influence the probability of using children for coffee production and crop guarding (Table 3), and the extent of school absenteeism (Figs. 4 and 5; Section 5.1). Below, we discuss our findings and their implications for children's rights, as well as for

broader rural development and conservation issues in the Ethiopian Afromontane forest region and similar contexts.

6.1. Child labour in shade-grown coffee production and crop guarding

Our results show that most households interviewed use at least one child for coffee production and/or crop guarding (Fig. 2); and that poverty increases children's involvement in such work (Table 3). A rich body of literature on child work in rural areas in Africa and Ethiopia has reported similar findings (Jensen and Nielsen, 1997; Morrow et al., 2017). Our finding that more households in coffee areas than in non-coffee areas use children for coffee production was expected and is related to ownership of forest and/or garden coffee land, the nature of coffee harvesting and coffee's importance to the local economy. Most households in coffee areas own forest and/or garden coffee land (Ango, 2016), and coffee harvesting relies on manual labour, creating a need to mobilise available labour to ensure a proper harvest of the important cash crop (cf. Abebe, 2007). Having coffee as part of the livelihood portfolio makes households in the south-western highlands relatively better off in terms of food security (Manlosa et al., 2019), as it enables many households to buy food during periods when own stores of food are low or depleted, contributing to spreading food consumption more evenly through the year (Kuma et al., 2018). For the same economic reason, many farmers from non-coffee areas with neither forest nor garden coffee land, work as labourers for farmers and private companies in coffee areas. This labour is mainly by adults who are paid higher wages—often based on the amount of coffee berries picked—than children, which partly explains why more households in coffee areas than in non-coffee areas use children in coffee production. A related explanation for this difference is that when children from non-coffee areas are unaccompanied by adults or other peers, it is difficult for them to travel far
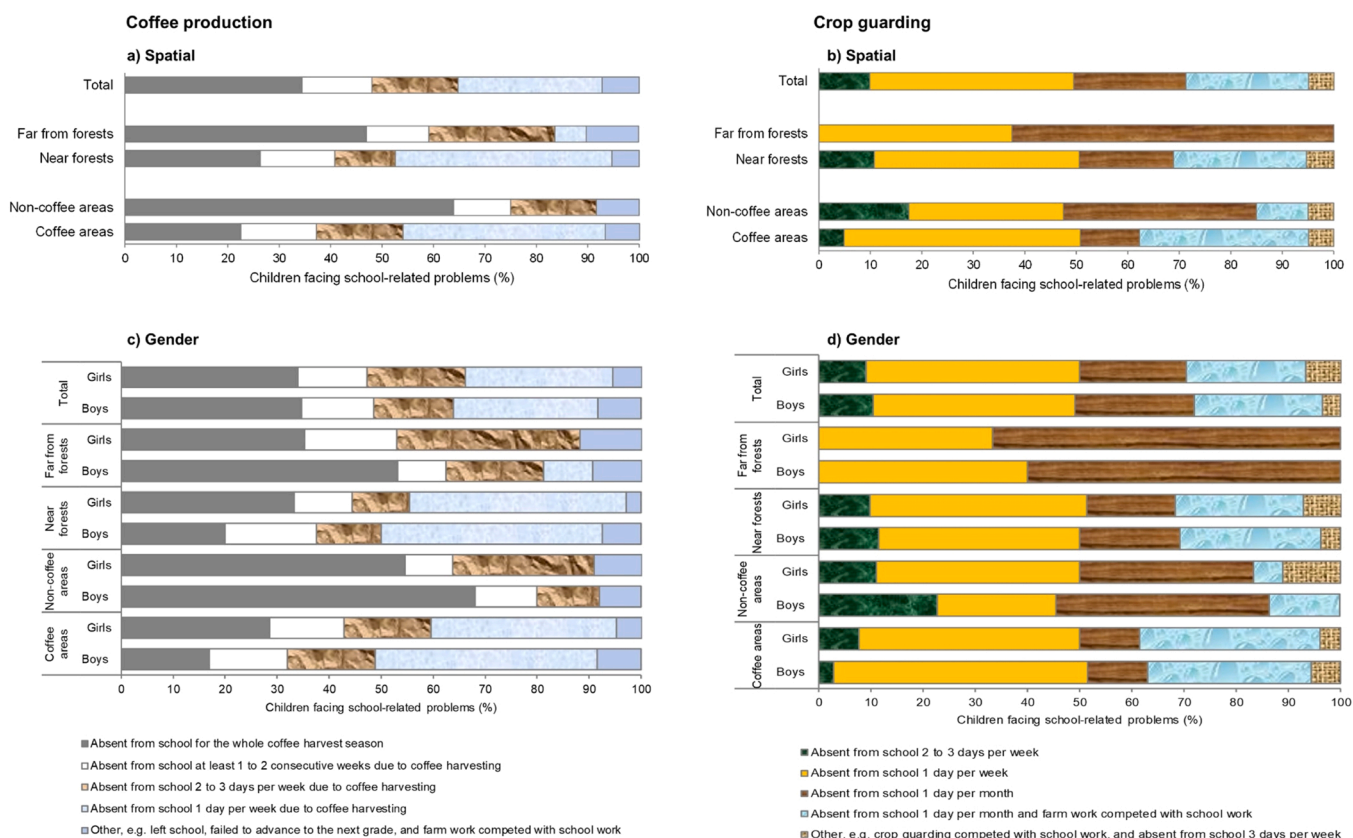
Fig. 5. Types and patterns of school-related problems facing children aged 5–17 working in coffee production (a and c) and crop guarding (b and d) while also attending school in Gera, Ethiopia.

to work in coffee areas.

Our finding that there is no significant difference in the number of boys and girls engaged in coffee production both in coffee and non-coffee areas (Sup. Table A.1a) was unexpected, provided a general understanding that in Ethiopia (Abebe, 2007; CSA, 2018; Mussa et al., 2019) and elsewhere in Africa, e.g. Ghana (cf. Wolf et al., 2016) a majority of boys participate in work outside home often to earn money unlike girls who engage more in household chores. This lack of gender difference in coffee production is also explained by coffee's economic importance, not only for parents, but also for children, as well as by families' overlapping demands for labour in coffee production, crop guarding, and agricultural work (Section 5.1), and their financial inability to mobilise other (higher paid) labour. In fact, 'of all agricultural work, children's participation in coffee berry picking is the highest'[14] because of the need for labour and the ability to attract children with immediate cash income (Section 5.1).

Our finding that more households located near forests than those in villages far from forests use children for crop guarding (Fig. 2c) was expected because of the severity of mammal crop raids and the concomitantly high crop guarding labour demand in villages near forests, both of which have been well documented in Ethiopia (Ango, 2016; Dorresteijn et al., 2017; Lemessa et al., 2013) and elsewhere (Hill, 2000; Mackenzie et al., 2015; Naughton-Treves, 1997).

In line with previous studies (e.g. Mackenzie et al., 2015), our qualitative findings suggest that more boys than girls engage in crop guarding. However, our quantitative analysis results show no difference in the number of boys and girls engaged in crop guarding (Sup. Table A.1a), which might be related to our aggregated data collection

design, using a lower work hour threshold, i.e. an average of 1 h or more guarding/day for a month, to determine whether a child was engaged in crop guarding. Based on our observations, boys engage in crop guarding for longer hours per day than girls. In Gera as elsewhere (Mackenzie et al., 2015), night-time crop guarding is done entirely by boys and their fathers or other adult male household members.

6.2. Child labour and school absenteeism

We find that many of the schoolchildren who involved in coffee production and/or crop guarding face problems in their education, mainly school absenteeism (Figs. 4 and 5). The findings confirm previous studies highlighting the negative effects of agricultural work on children's education (Admassie, 2003; Haule et al., 2002; Jensen and Nielsen, 1997; Kruger, 2007; Mackenzie et al., 2015). For instance, in Tanzania, children participating in crop guarding in villages near protected areas are forced to miss schools (Haule et al., 2002), and in Uganda, their educational achievement is reduced (Mackenzie and Ahabyona, 2012), especially for boys (Mackenzie et al., 2015). Our findings show that coffee work and crop guarding pose a serious challenge to the school attendance of many children in villages near forests and those living in non-coffee areas (due to both coffee work and crop guarding), as well as in villages far from forest (due to mainly coffee work) (Fig. 5). Accordingly, we show that: (i) children's school absenteeism due to coffee production ranges from disappearance from school for a whole coffee harvest season to join camps in the forest (applicable to a majority of children from non-coffee areas) to absence one day per week (for those in coffee areas) (Fig. 5a); (ii) a tendency in non-coffee areas for more boys than girls to face school-related problems due to their involvement in coffee work (Sup. Table A.1b); (iii) more boys than girls in non-coffee areas and villages far from forests; and more girls than boys in coffee areas and villages near forests are absent from school the

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[14] Interviews with 50- and 65-year-old male farmers, 25 November 2019, Sadii Loya.

whole coffee harvest season for coffee berry picking (Fig. 5c); (iv) more children in villages near forests who are involved in crop guarding face school-related problems and are frequently absent from school (Fig. 5b); and (v) more boys than girls are absent from school two to three days per week in non-coffee areas (Fig. 5d).

In non-coffee areas and far from forests, many boys follow their fathers to forest coffee areas to undertake pre-coffee harvest undergrowth clearing and to build shelters at camping sites in the forest. They also stay longer at the camp sites to make some tree thinning toward the end of coffee harvest season to improve future coffee yields. Such gender preference appears to explain why more boys than girls from non-coffee areas and villages far from forests were absent from school for the whole coffee harvest season. That harvesting coffee heightens the vulnerability of children from poorer families (Table 3), especially boys, to be withdrawn from school has also been documented in Brazil (Kruger, 2007). But, in coffee areas and near forests the labour and financial need to combine household chores with coffee berry picking appear to explain why more girls than boys were absent from the school for the whole coffee harvest season. Here many families own shade coffee in the same landscape; and there are also many private coffee companies (Ango, 2016). Hence, there is an opportunity to earn financial income by involving in coffee berry picking without a need to travel long distance that appears to motivate many girls who already bear the burden of household chores to engage also in coffee production at the expense of schooling.

Our findings show that schools and authorities recognize that child work increases the problem of school absenteeism in the region and have taken measures to reduce the problem, for example advising parents not to allow children to miss school in order to work, and using local militias to stop children from going coffee berry picking. The perception is that the measures caused a slight decline in school absenteeism for two consecutive years. However, some of these measures, for example monetary penalties for child absence and the use of local militias, are problematic because they take away an income source from poor families, including children's own opportunity to command some of that income (Section 5.1). The measures are meant to promote children's right to schooling and personal development. However, many children in poor families in Ethiopia and elsewhere are forced to work to contribute to satisfying their family's basic needs (Morrow et al., 2017; Webbink et al., 2015), so the measures taken to stop children's coffee production work and crop guarding risk making the situation worse. This is supported by our observation that the families of the children who are most vulnerable to the potential negative effects of measures against school absenteeism may choose to completely remove their children from school.

6.3. Implications for children's rights to education and for sustainable development

Our analysis shows how children's participation in coffee production and crop guarding varies by household income and residential proximity to forests or ecological suitability for coffee production (Table 3), as well as how such work is related to the serious problem of school absenteeism in many children's formal education (Figs. 4 and 5). This finding highlights the importance of addressing poverty to mitigate child labour and school absenteeism, and promote overall child welfare, while also maintaining the valuable social–ecological benefits of shade-grown coffee production, which can contribute to achieving several SDGs in agriculture-forest mosaic landscapes in Ethiopia.

Due to national and international interest in and efforts to conserve the Afromontane forests (Mittermeier et al., 2011), we expect the problem of crop raiding by forest-dwelling mammals, and the use of the forest for coffee production for the benefit of local farmers and the national economy to continue in the southwest Ethiopia (Ango, 2016). For conservation and economic reasons, there is an increasing number of proposals to establish biosphere reserves in the southwest, including

Gera (Getaneh and Gole, 2015; Jiren, 2019), and a REDD+ programme has already been initiated (OEFCCA, 2017). Furthermore, state conservation policies have undermined farmers' crop guarding strategies by banning hunting and confiscating rifles used to scare away crop-raiding forest-dwelling mammals (Ango, 2016). These conditions will most likely spur farmers to continue using children in coffee production and crop guarding in the future, with serious negative effects on school education, and children's welfare and human development, particularly for those from poorer families who cannot afford to take their children out of coffee production and crop guarding work (Table 3). Here we observed that children in households headed by widow or a woman left alone after divorce, are at higher risk because such families, were resource poor as shown by their mean annual income (Table 1, footnote). Generally for children from poorer families, the problematic link between poverty, child labour and schooling increases the risk of a generational child labour cycle (Emerson and Souza, 2003).

The UN's Agenda 2030 Sustainable Development Goals (UN, 2015) have been endorsed by Ethiopia and integrated into its second growth and transformation plan (FDRE, 2017). However, our finding that child work in coffee production and crop protection is at the cost of school education for many children highlights a critical social justice issue and trade-off between several SDGs. For many poor, rural households in south-western Ethiopia, the use of children to produce coffee and protect food crops is currently a significant factor in mitigating the immediate risks of poverty (SDG–1) and achieving food security (SDG–2). Due to the use of shade trees, coffee production contributes to conserving forest cover and thus to achieving the SDGs of combating climate change (SDG–13) and conserving biodiversity (SDG–15). However, both smallholder agricultural production and the maintenance of forest cover are partly dependent on child labour (cf. Börjeson and Ango, 2021), which, in turn, has grave consequences for schooling (SDG–4) and child welfare (SDG–3). Hence, there is a critical need to address this triple trade-off between the value realised through cash crop and food production (i.e. income and food security), forest maintenance (i.e. carbon storage and biodiversity conservation), and children's right to education as a fundamental component of personal development and national welfare. We use the notion of a triple trade-off to specifically highlight that the three value bundles we have outlined can also be related to the three basic dimensions of sustainability, i.e. economic, social, and ecological sustainability, stressing how these dimensions are entangled with the problem of child labour in our case. Given the current demand for child labour in coffee production and crop guarding in the southwest Ethiopia in the context of forest conservation, and given the relationship between child work and poverty, it will require new, concerted efforts and radical measures, to end child labour in this context by 2025, as stipulated in SDG-8 Target 7 (UN, 2015).

We contend there is a need to shift from disciplinary measures against school absenteeism to flexible arrangement that tolerate a modest level of child work as well as measures to support poor families in order to reduce their dependence on children as a source of labour. Our finding that teaching half-day contributes to a decline in school absenteeism during coffee harvest season (Section 5.4) highlights the importance of making schools more flexible, e.g. where possible by introducing a school break that coincides with coffee harvest season in order to allow children to engage in age-appropriate coffee production work to help meet their family's labour demand during the peak agricultural season; this could make it possible to reconcile limited child work with schooling (cf. Admassie, 2003). However, current efforts to solve the problem of school absenteeism, mostly through coercive measures meant to stop children from engaging in coffee harvesting (Section 5.4), are in some ways human rights violations. Research has documented that children's participation in age-appropriate work can provide them with an opportunity to reap the economic, social, and cultural benefits of working (Bourdillon, 2006). In a context of deep and persistent poverty, work can help children subsist and attend school (cf. Maconachie and Hilson, 2016).

While endorsing the human right to education for all children, coercing school participation might not be in the child's best interest in all contexts (cf. Boyden et al., 1998), as we have argued is the case in remote rural areas of Ethiopia's southwest Afromontane forest region. To remedy the problem of child labour in a way that places the right to education and children's personal development at the centre, we suggest that it would be more effective to provide external support aimed at alleviating poverty in order to reduce poorer families' dependence on child work to meet their basic needs. This could, for example, come in the form of school support (Benhassine et al., 2015) or school feeding program (Desalegn et al., 2021) or conditional cash transfers (Edmonds and Schady, 2012), and/or as compensation for crops lost due to wild mammals' crop raiding (cf. Ravenelle and Nyhus, 2017). Supporting farmers' coffee cooperatives and unions—which have been established in the region in recent years and have shown promising results towards reducing poverty (Mojo et al., 2017)— and promoting research to develop and implement labour-saving technologies for coffee harvesting and processing are other potential ways to mitigate the problem of child labour by improving local economic and social conditions. As key stakeholders, both international and national conservation organizations and authorities including the Oromia Forest and Wildlife Enterprise (Mittermeier et al., 2011; OEFCCA, 2017) that owns and manages the forest in the region should fund costs of the poverty alleviation and development programmes (cf. Balmford and Whitten, 2003; Poudyal et al., 2018). At the same time, such measures, if they successfully target smallholder coffee farmers, may also help turn the triple trade-off outlined above into a positive synergic relationship, where improved social and economic conditions also provide a base for the continued maintenance of the extent and ecological integrity of the Afromontane forests.

Conflict of interest statement

We declare that there is no conflict of interest in relation to our manuscript: Coffee, child labour, and education: Examining a triple social–ecological trade-off in an Afromontane forest landscape.

Acknowledgements

Appendix A. Supporting information

Supplementary data associated with this article (Table A.1a and b) can be found in the online version at doi:10.1016/j.ijedudev.2022.102681.

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