

Women's time use and implications for participation in cacao value chains: evidence from VRAEM, Peru

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ABSTRACT

Bringing inclusion into value chain development requires interventions that account for gender-based constraints and opportunities. Key determinants of women's capacity to participate are their availability and access to interventions. Twenty-four-hour recall surveys with 53 women from households engaged in a cacao expansion intervention in Peru found women with a strong interest in cacao; however, participation was thwarted by household responsibilities and exclusion from training. Findings emphasise the need to actively engage women in intervention design, and monitor and evaluate their time use, recognising the unintended consequences of increased time investments, and hence the unexpected impacts of these development interventions.

ABSTRACTO

Incorporando la inclusión en el desarrollo de la cadena de valor requiere intervenciones que tengan en cuenta las limitaciones y oportunidades basadas en el género. Los determinantes claves de la capacidad de las mujeres para participar son su disponibilidad y acceso a las intervenciones. Veinticuatro horas de encuestas de recuerdo con 53 mujeres de hogares que participan en la intervención de expansión de cacao en Perú encontraron a mujeres con un gran interés en el cacao; sin embargo, la participación fue prevenida por las responsabilidades domésticas del hogar y la exclusión de las capacitaciones. Los hallazgos enfatizan la necesidad de involucrar activamente a las mujeres en el diseño de intervención, y monitorear y evaluar su uso del tiempo, reconociendo las consecuencias no deseadas del aumento de las inversiones de tiempo y, por lo tanto, los efectos inesperados de estas intervenciones desarrolladas.

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Introduction

Strengthening the capacity of smallholders in developing countries to participate in lucrative agricultural value chains remains a development priority (Humphrey and Navas-Alemán 2010; Stoian et al. 2012; Devaux et al. 2016). Interventions in value chains generally aim to improve access by smallholders and small and medium enterprises to information, inputs, and services. Emphasis is placed on strengthening the capacity of resource-poor chain actors to meet the demands of downstream buyers, and on developing more equitable business relationships between actors along the nodes of a chain, with expectations that beneficial outcomes accrue to smallholders but also to their business partners. Development agencies and businesses engaged in the development of

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agricultural value chains have increasingly labelled their interventions as “inclusive”. To date, discussions on inclusion in value chains has emphasised the poverty aspect; ensuring that programming includes and substantially benefits large numbers of poor people, often smallholders (Harper, Belt, and Roy 2015). However, it is increasingly recognised that inequalities also occur within a given node of a chain, based on gender, age, ethnicity, and other factors of social differentiation (Coles and Mitchell 2011). Failure to address these inequalities is problematic from a gender and a broader equality perspective, and may effectively undermine the potential of value chain programming to advance economic and social progress (Bamber and Staritz 2016).

In Peru, development agencies and the private sector have invested heavily to expand and intensify smallholder cacao (*Theobroma cacao L.*) production, in response to relatively favourable market conditions and the need to promote alternative income-generating options to discourage the production of illicit crops (Bean and Nolte 2014). Between 2001 and 2013 cacao production throughout Peru increased from 23,600 MT to 71,800 MT and has been prioritised for development interventions by the government (MINAGRI 2015). The growth of the cacao sector has translated into important new income opportunities for resource-poor households. However, there has been limited discussion on the role of women in cacao production and the potential constraints to their deeper engagement. Women can play a critical role in smallholder-based value chains and have made significant contributions to crop production (Quisumbing et al. 2015). When given needed support to farm cash crops, women’s participation can help improve product quality and increase productivity (Chan 2015). Including women in these value chains also can lead to broader social and economic development goals. For example, women’s expenditures of income from these activities have been shown to improve household food security and children’s education, as women prioritise these areas (World Bank 2007).

In the context of Peru’s expanding cacao sector, the determinants of female time allocation can provide important insights into their capacity to contribute to cacao production and the constraints that exist for women to participate. Although a few Peru-based studies have focused on women’s time allocation in market and non-market work, research has yet to focus on women’s ability to participate in cacao production relative to their time use (Ilahi 2000, 2001; Berrocal Montoya 2010; Emenius 2012). This study explores women’s time use, and identifies barriers to women increasing their participation in cacao production in the Valleys of the Rivers Apurimac, Ene, and Mantaro (VRAEM).

The following section provides an overview of recent discussions on gender and market participation and gender relations in Peru. Next, we look at debates surrounding the lack of time use data, as well as time poverty and introduce the framework for time use assessment used in this study. We then explain the data collection methods and present our findings. The article concludes with a discussion of the implications of the findings for the assessment of women’s time use, including recommendations to inform better design and implementation of future development interventions.

Gender and market participation

Advancing gender equality in cacao value chains is particularly important given women’s growing participation in commercial agricultural work throughout Latin America (Katz 2003; Deere 2005). Although women are increasingly responsible for this market-oriented agricultural work, they face a multitude of obstacles and have needs that differ from their male counterparts. Gender roles in rural Latin America are based on social norms, where certain productive tasks are considered men’s work, and others women’s work (Forstner 2013; Greene and Robles 2013; Wiig 2013). Women are traditionally regarded as mothers and wives and not as decision-makers or landowners, and typically are involved in activities that complement their care work (Reyes 2002).

In the context of rural Peru, limited research exists on the gendered aspects of the cacao value chain. However, studies found barriers to women’s participation included access to and control of

resources such as education and training, opportunity for land ownership, and time constraints due to household responsibilities and family care (Twin 2013; Root Capital 2014; Gumucio et al. 2016). Another study of cacao producing-households found that Peruvian women were more likely to prepare food to sell in street markets and engage in childcare, domestic duties and the care of small animals (Emenius 2012). Men's status, however, is often linked to generating income through cacao production or other off-farm work. This same study found men were more likely to be employed in cacao farms than women, as gender bias perceived men to be harder workers and less constrained by household duties. Research on women in coffee production found a few cases in Peru (about 10%), where women reported that there was an equal gender division of labour, on the farm and in the home (Twin 2013). This was the result of gender sensitisation programmes implemented by producer organisations over a period of up to 15 years. The study highlighted these cases as exceptions rather than the rule. With most of their activities concentrated in the home, women face social and cultural norms, which limit their participation in and returns from cacao value chains.

As a result of these different roles, women frequently experience more financial constraints and are more likely to remain in poverty (Meinzen-Dick et al. 2011). There is broad consensus that poverty is a multidimensional concept, encompassing a range of quality-of-life measures, including equity, security, economic inclusion, and freedom of choice (Sen 2006). Thus, gender equity in the ownership of and control over assets at the household and individual levels is necessary to achieve global poverty reduction (Haddad, Hoddinott, and Alderman 1997; Meinzen-Dick et al. 2011). With the term "productive assets" frequently used in the context of resources individuals and families own or have access to such as land, income, and training, a growing body of evidence emphasises the importance of women's time as an asset associated with development outcomes and as a way to draw insights from research to inform poverty reduction strategies (Blackden and Wodon 2006). It is becoming increasingly evident that poverty is experienced differently by men and by women, further supporting the necessity for gender and time use analysis of poverty (Bardasi and Wodon 2010).

Given the competing claims on women's time to domestic and market activities, it is important to recognise how market-oriented agricultural projects impact women's time, as women are frequently confronted with a *double burden*, a well-established concept also known as the *Second Shift* that refers to the second part of a working mother's day in which she comes home from a job outside of the home to her job in the home (Hochschild and Manchung 1989). Typically, project activities are in addition to women's reproductive activities, such as maintaining the household and caring for children, often increasing women's time burdens (Ilahi 2000). This unequal distribution of time highlights a critical dimension of poverty: time poverty. Time is a scarce and valuable resource and how it is allocated can have implications on women's ability to participate and benefit from agricultural development, as well as present trade-offs in time allocation that may have negative impacts on family welfare and security (IFPRI 2014). Important questions remain about how to reduce the workload of demanding unpaid care tasks so women can have the opportunity, if they desire, to participate in market-oriented activities outside the home, without facing a double work burden or jeopardising household well-being. A shift towards acknowledging women's time burden and supporting them in their existing roles by development organisations is necessary to ensure women are given the right to meet their full potential and benefit from economic activity.

Examining time use shows what people do on a daily basis, providing information on how time is allocated to work outside and within the household. Time allocation recognises the market economy contributions of men and women to development, as well as, the existence of the household economy which often is largely invisible and excluded in economic data (Blackden and Wodon 2006) (Figure 1). It is important to understand how differences in time distribution influence participation in market-oriented activities such as cacao production and the potential time impacts of development programming which may unintentionally increase women's workload, having diverse implications for women and household well-being (Quisumbing et al. 2015).

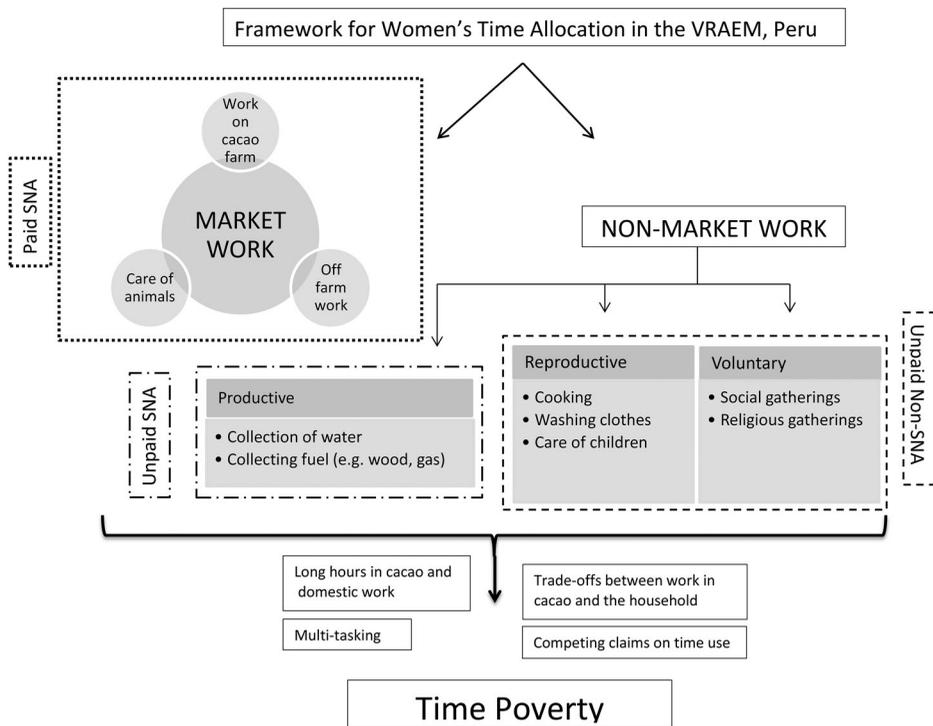


Figure 1. Time use assessment framework of women's time allocation in the VRAEM, Peru.

Notes: Framework based on the System of National Accounts (SNA 2009), the international framework that measures and defines work. Paid SNA work refers to market production (income-generating activities) and non-market subsistence production. Unpaid non-SNA work refers to reproductive and volunteer activities. Adapted from Blackden and Wodon (2006).

Methodology

Study site

Research focused on smallholder households in the VRAEM (Figure 2) who engaged in a three-year cacao intensification project supported by an international NGO and an international cacao buyer. The VRAEM, located along the eastern slopes of the southern Peruvian Andes, is one of the largest areas for coca leaf (*Erythroxylum coca*) production in Peru (Beriaín 2014). It is also well-positioned to develop a vibrant and globally competitive cacao industry as relatively high and stable prices over recent years and the emergence of disease-resistant cacao varieties have contributed to a dramatic rise in production. The south is hilly and well suited for coca cultivation, while the north is flat, with healthier soil that is better suited for growing cacao. Of the estimated 18,333 hectares (2015) of coca planted in the VRAEM, only 6% of the product is sold legally and registered with the National Coca Company (ENACO), the rest is cultivated for drug trafficking (UNODC 2016).

The cacao project was implemented by a local NGO in the VRAEM that was established by the cacao buyer, who played a strong role in defining the NGO's strategic and operational directions. Smallholder households who were already selling their cacao beans to the international buyer were asked if they were interested in participating and self-selected into the project. The project focused on providing technical assistance to expand cacao area and improve trees that were already planted. It also provided inputs such as small motorised equipment and some farmers had assistance in getting organic fertiliser from the agricultural ministry. Furthermore, training provided consisted of business development and assistance in starting a cooperative as well as gender equality training with farmers.



Figure 2. Study areas in Peru. Map data provided by Google Maps.

Notes: A: Río Tambo; B: San Martín de Pangoa; C: Canayre; D: Pichari; E: Kimbiri; F: Echarate.

Data collection

This study was preapproved by the Social, Behavioral, and Education Research Institutional Review Board at Colorado State University (Protocol # 16-6719HH). Data used for this analysis were collected as one part of a three-part study to examine the outcomes (e.g. access to markets, increased production, and gender roles) for cacao-producing households in response to their participation in the project. The larger study was conducted in 2016 during the peak cacao harvest season (July through September). A hundred and twenty households participated in the cacao project. Sixty households were selected for the larger study from a list provided by the implementing NGO (Table 1). The households were selected using a stratified sampling method corresponding to geographic distribution. The households were divided into two lists, from the north and south of the VRAEM. Every second household was systematically chosen from the two lists to be part of the sample. From these selected households, we asked to speak with the female household head. Every other household on the list was selected to ensure women were proportionately represented (the same percentage in the sample as in the population). However, 53 women were interviewed for the time use analysis as six households did not have a female household head, and one woman who was head of the household was unavailable. The first eight interviews were pilot tests and thus were

Table 1. Geographic location of sampled households.

District	Communities	Number of households (n = 53)	Percentage (n = 53)
Río Tambo	Selva de oro, Los Angeles, Fe y Alegria Shapo, Valle Esmeralda	26	49
Pichari	Quisto Central, Quisto Valle, Puerto Mayo, Otari San Martin, Ccatun Rumi, Teresa, Mantaro, Agua Dulce, Villa Vista	17	32
Pangoa	La Florida	6	11
Canayre	Canayre	2	4
Kimbiri	Sampantuari	1	2
Echarate	Palmeira	1	2

Notes: Part of the stratified sample included six households with only a male and no female. These households were kept as part of the sample to represent all the types of households. In one household, the head female was travelling and unavailable for the interview.

not used in the final sample and did not include all the detailed information on women's time use. So, 45 women were included in the time use analysis while the full sample of 53 women was used for the rest of the analysis including the regressions.

A 24-hour recall interview was used to understand women's time allocation and ability to participate in cacao-related activities. Data were collected from women by a two-person research team in July 2016. Anchor points (landmark events) (Bernard 2011) were established at the beginning of each interview, centred on mealtimes, when women woke up and the time they went to sleep. These helped to mark the beginning of the recall period and stimulate visualisation of activities to minimise recall bias. A pictorial approach (Masuda 2011) was used to encourage women to reflect on their time use; major daily activities were represented with pictures representing a single activity (e.g. cooking, work in cacao). A short description of each activity in Spanish was included above each picture. Sixteen activities were presented, with daily activities selected based on preliminary interviews and observations of women's daily activities. The cards were used to not only find out what activities women participated in the prior day, but also what activities they dedicated the most time (sleep time was not included).

Data were also collected on socio-demographic characteristics. Qualitative, open-ended questions were asked to capture women's insights on their daily time use, level of participation in cacao production and potential barriers to participation, as well as perceptions of the implications of cacao-related interventions on their time use and associated trade-offs. Finally, structured questions with forced choice responses focused on women's interest in cacao production, project workload, and impact on household activities. In addition to the recall interview, five women were selected for participant observation (DeWalt and DeWalt 2002) to obtain more insight into the activities the women performed. The first author spent one day with each woman to note the type of activities performed and how much time was dedicated to each activity. The women were selected to represent a range of ages, types of households (single and double headed), socio-economic groups, and number of children. The youngest woman observed was 28 years old and the eldest was 58 years old and they had from one to six children.

Empirical model

The paper presents two probit and three ordinary least squared (OLS) regressions, which aim to better understand the factors that influence women's participation in cacao production and their time poverty. The probit regressions measure women's interest in cacao production and perceptions of their overall workload, while the OLS equations evaluate which factors influence women's productive and reproductive workload, time spent in cacao production and their free time. The OLS estimations allow us to verify women's perceptions of workload to match the realities of the time they spend in productive and reproductive activities and to identify which women are most time poor.

The first probit equation aims to shed light on which women would be most willing to engage in cacao production. The second examines which women would be the most time constrained to deepen their engagement in cacao expansion and intensification, with the dependent variable expressed as the respondent saying she was overworked. A variable addressing marital status was included in both regressions. In this study, marital status refers to those women who were married legally or in a common law marriage. In both regressions, the following independent variables were included: age, number of children under 15 years old, education level and wealth, which was measured using a proxy, the flooring of the house (Table 2). Housing quality including flooring type has been often been used as a proxy to measure household wealth (Khudri and Chowdhury 2013). Probit and logit models are commonly used for the estimation of this binary choice from cross sectional data. The difference between these two models is that the probit model is estimated using a normal distribution while the logit model is based on a logistic distribution. The logistic distribution has heavier tails than the normal distribution. Thus, both models provide very similar results,

unless the model estimates very small or very large coefficients (Cameron and Trivedi 2010).

$$\Pr(\text{workload or interest in cacao} = 1) = \alpha_i + \beta_1 \text{ age} + \beta_2 \text{ primary education} + \beta_3 \text{ young children} + \beta_4 \text{ flooring material} + \beta_5 \text{ marital status} \quad (1)$$

The OLS equations measure which of these demographic factors influence women's time poverty and participation in different productive and reproductive activities. The OLS equations used the same demographic dependent variables as in the probit regressions. However, the independent variables used in these regressions were total time women dedicated to reproductive activities, productive activities, cacao production and leisure time (Table 2).

$$(\text{reproductive activities, productive activities or leisure}) = \alpha_i + \beta_1 \text{ age} + \beta_2 \text{ primary education} + \beta_3 \text{ young children} + \beta_4 \text{ flooring material} + \beta_5 \text{ marital status} \quad (2)$$

Table 2. Description of variables used in the empirical models.

Variable	Description
Workload	Dummy variable taking a value of 1 if the respondent stated that she felt overworked and 0 if she did not
Interest in cacao production	Dummy variable taking a value of 1 if the respondent was interested in being more involved in cacao production and 0 if she was not interested
Age	Age in years of the respondent
Productive activities	Self-reported time in minutes spent on productive activities
Domestic activities	Self-reported time in minutes spent on domestic activities
Leisure	Self-reported time in minutes spent on leisure activities
Primary education	Dummy variable taking a value of 1 if the respondent has at least a primary education and 0 if she has not completed primary schooling
Young children	Number of children that the respondent identified as being dependents
Flooring material	Dummy variable taking a value of 1 if the floor is cement and 0 if it is dirt or clapboard
Married	Dummy variable taking a value of 1 if the respondent was married and 0 if she was not

Results

Socio-demographic data

Respondents ranged from 22 to 72 years of age, with a mean age of 43 years and a median age of 40 years. Nearly all of the respondents had a live-in partner (96%). On average, there were four children per household, with only 4% of households having no children. The women included in the study had limited formal education – 49% had no formal education or only attended a few years of primary education. Nineteen per cent of women lived in homes made of brick or cement; the others were made of clapboard and 49% lived in homes that only had dirt floors.

Women's time use in daily activities

Women on average spent 39% of their time on income-generating activities (5.5 hours) and 61% in care or domestic activities (8.7 hours) (Table 3). Cooking and childcare ranked among the most time-

Table 3. Time dedicated to economic activity and work from a survey of women in the VRAEM, Peru (minutes per day).

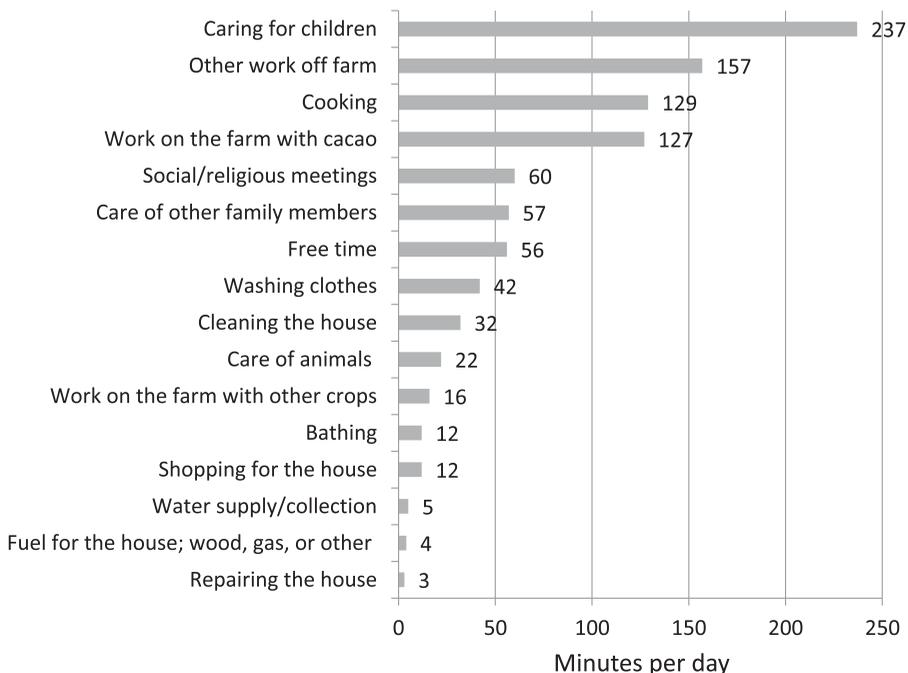
	Time
SNA* production	332
Non-SNA** production: Reproductive work (domestic and care)	523
Total work	855
% SNA in total work	38.8%
% Non-SNA in total work	61.2%

Notes: Does not include free time. SNA refers to the System of National Accounts, the international framework that measures and defines work. * = paid SNA work such as market production (income-generating activities) and non-market production. ** = unpaid non-SNA work such a reproductive (domestic and care) work and volunteer activities.

Table 4. Total number of women who performed each activity.

Activity	Number of women (<i>n</i> = 45)	Percentage (<i>n</i> = 45)
Cooking	45	100
Bathing (self-care)	43	96
Cleaning the house	38	84
Care of animals	37	82
Work on the farm with cacao	28	62
Washing clothes	26	58
Shopping for the house	25	56
Free time	25	56
Caring for children	24	53
Other work off farm	15	33
Attended social/religious meetings	12	27
Care of other family members	11	25
Collection of water	8	18
Work on farm with other crops	7	16
Collecting fuel for house; wood, gas, other	7	16
Repairing the house	1	2

consuming of women's reproductive activities. Twenty-two per cent of women spent all of their day watching children while simultaneously doing domestic work. All women reported cooking as a major activity, and the majority also noted they cleaned the house (84%), washed clothes (58%), and cared for children (53%). Women also tended to be involved in productive activities, with 82% engaged in caring for animals, 62% working in cacao plantations, and 33% in off-farm work (Table 4). The average total time in a woman's day was 971 minutes, with women spending on average 237 minutes on childcare, 157 minutes performing work off the farm, 129 minutes cooking, and 127 minutes working in cacao production. Less than an hour was allocated to free time, as it only accounted for 5.8% of women's total time. Women averaged 16+ hour workdays, waking at 5 am and going to bed around 10 pm (Figure 3).

**Figure 3.** Daily time spent on various activities from a survey of women in the VRAEM, Peru.

Notes: *n* = 45. Average total time use during the day is 971 min or 16.2 h. Numbers are reported as the mean; time does not include sleep.

A Pearson's correlation coefficient between the amount of time spent in reproductive activities and time spent in productive activities revealed a moderate, negative correlation between the two variables, $r(45) = -.32, p < .05$. Increases in women's time in reproductive activities were correlated with a decrease in women's time in productive activities. The probit regression on women's perceptions of being overworked revealed that for each additional child a participant was on average 16% more likely to feel overworked, a woman who had obtained at least a primary education was on average 36% more likely to claim that she had too much work than women who did not have at least a primary education, and women who were unmarried were 32% more likely to claim to be overworked than married women. A woman's age and her household wealth did not prove to significantly be determinants of women's workload (Table 5). The OLS regressions that measured the time women actually spent on domestic and productive activities also concluded that women who had young children were overworked as these women on average were estimated to spend over two and a half hours more per child per day on domestic work. However, these regressions revealed that relatively wealthier women, those in homes with cement floors, spent more time on productive activities; nearly four hours more, 230 minutes per day than less wealthy women. These wealthier women also took more leisure time than less wealthy women. On average these wealthier women had 42 minutes more of free time per day than less wealthy women (Table 6).

Table 5. Coefficients and average marginal effects on women's workload and interest in participating in cacao production.

Variable	Workload		Interest in cacao production	
	Coefficients	Average marginal effects	Coefficients	Average marginal effects
Age	0.3354 (0.0230)	0.0128 (0.0088)	-0.0090 (0.0273)	-0.0018 (0.0054)
Primary education	0.9338* (0.5191)	0.3562* (0.1986)	0.6659 (0.6936)	0.1302 (0.1328)
Young children	0.4215** (0.1726)	0.1608** (0.0658)	0.2930 (0.1867)	0.0573 (0.0360)
Flooring material	-0.6355 (0.4617)	-0.2424 (0.1758)	-0.2160 (0.5330)	-0.0422 (0.1039)
Marital status	-0.8321** (0.4179)	-0.3174** (0.1603)	-0.3956 (0.5406)	-0.07645 (0.1053)
Constant	-2.460** (1.2361)	-	0.7153 (1.5508)	-
Log likelihood	-29.4513	-	-18.7316	-
χ^2 (5)	12.27**	-	7.52	-
Observations	53	53	53	53

Notes: * $p < 10\%$. ** $p < 5\%$.

Table 6. Coefficients of demographic characteristics for OLS regression of time in minutes spent on different livelihood activities.

Variable	Productive activities	Domestic activities	Leisure
Age	1.279 (3.320)	-7.565 (7.117)	-1.527 (0.9743)
Primary education	108.6 (79.39)	-16.69 (170.2)	-20.22 (23.30)
Young children	-39.52 (23.99)	156.7** (51.42)	-2.475 (7.040)
Flooring material	231.9*** (69.49)	1.814 (149.0)	42.77** (20.39)
Marital status	-84.00 (64.08)	-32.91 (137.4)	6.202 (18.81)
Constant	286.06 (64.08)	560.3 (376.7)	119.32** (51.57)
F (5, 39)	5.34***	2.46**	1.37
R-squared	0.2394	0.4065	0.1490
Observations	45	45	45

Notes: ** $p < 5\%$. *** $p < 1\%$.

Participant observation revealed women frequently carried out activities simultaneously. All five women observed were multi-tasking in reproductive activities (cooking, cleaning the house, and taking care of children) and to varying degrees in cacao. One single woman with one primary school-aged child and another separated woman (no children living at home) spent around eight hours in cacao fields engaged in harvesting and post-harvest activities. Both these women had received secondary levels of education and had additional hired labour to assist in cacao production. However, another woman who had three primary school-aged children, spent less time in cacao production. She spent all day taking care of her children. She stated that childcare was a barrier to her participation in cacao, and she was often tired from taking care of the children and did not want to work in cacao production. Finally, the eldest woman observed (58 years old) spent most of her time performing household activities and tending to chickens. She was in and out of the cacao farm helping for about 30 minutes at a time and then returned to look after her household and prepare food. One of the women who dedicated much of her time to cacao production stated she liked working in cacao better than coca, as cacao production was more secure, both financially and personally. She added, *“There are some people who say women can only do certain things in cacao, but I feel women can do all the same things as men.”*

Interest in cacao production

Eighty-five per cent of women responded they were interested or very interested in their engagement in cacao production, while 16% had little or very little interest (Figure 4). Women who showed interest were on average better educated, younger (41 years of age compared to 48 years), and had fewer children (3 compared to 5) than the women who showed little or no interest. However, the probit analysis revealed that none of these differences were strong enough to predict a women’s likelihood to be interested in cacao production (Table 5). Women reported several reasons for their interest in cacao production. The majority (61%) stated it is a primary source of household income, providing money to pay for children’s education, household food, and meeting their children’s needs. Other responses were that work in cacao production was less demanding than work in coca production (7%) and 11% liked working in cacao. Women who reported a low level of interest in cacao gave the following reasons: advanced age (6%), lack of time due to childcare (2%), and some women simply do not like working in cacao production (2%). Women who reported other activities of

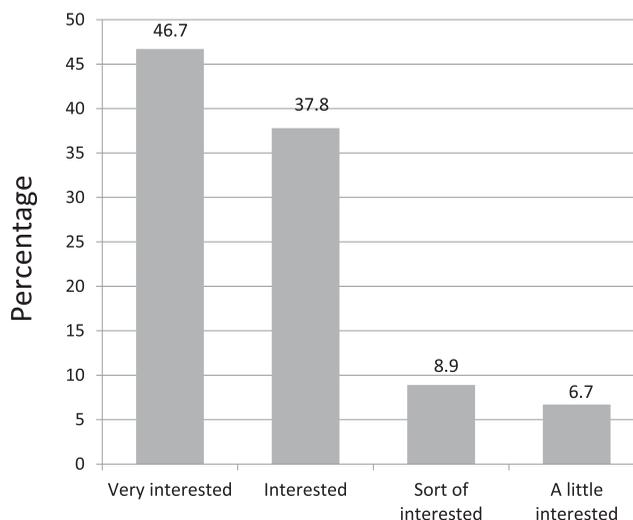


Figure 4. Level of interest in cacao production from a survey of women in the VRAEM, Peru.

Notes: $n = 45$. Over 80% of women were either very interested or interested in cacao production.

interest rather than cacao stated they were more interested in running a microenterprise or tending to small animals.

Participation in cacao production

Women indicated how much their time dedicated to cacao production had increased in the last three years, the timeframe of the intervention. Fifty-one per cent said they dedicated a little more time to cacao-related activities, while 16% reported they had spent a lot more time. These women attributed the change to encouragement by the local NGO to spend more time working in their cacao fields to enhance productivity and quality. Women had the highest participation in activities related to harvesting (91%), pruning (60%), post-harvest activities (42%), and weeding (27%) (Figure 5). Activities such as planting and selling had lower levels of women's participation. The women indicated they were active in pruning, harvesting, fermentation (drying), and weeding, while participation in planting, fertilising, and selling remained the same or was less than it was three years ago.

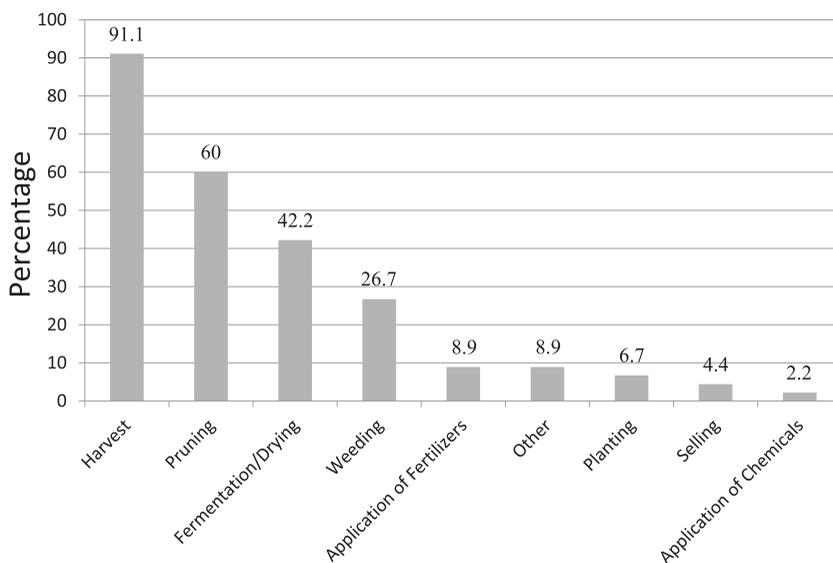


Figure 5. Participation in cacao activities from a survey of women in the VRAEM, Peru.

Notes: $n=45$. Harvesting, pruning, and fermentation (drying) are activities with the highest participation.

Barriers to participation in cacao production

The women identified various barriers to increase their participation in cacao production. Thirty-three per cent stated training and obtaining knowledge about cultivating cacao was a barrier to their participation, while 20% cited household activities as a barrier. Thirteen per cent of women perceived no barriers to their participation (Table 7). Some women had received a basic level of training in cacao production but indicated interest in deepening their knowledge, as illustrated by the following explanations:

"I need more training and technical support mostly to control diseases and to improve my ability to take care of cacao." (Interviewee #5, Pichari District, 13 July 2016)

"I would like to be trained and learn how to raise cacao, composting and other activities." (Interviewee #3, Pichari District, 12 July 2016)

"I don't understand the production of cacao ... my husband knows more."

(Interviewee #30, Rio Tambo District, 19 July 2016)

Table 7. Perceived barriers to participation in cacao production.

Barrier	Percentage (n = 45)
Training and management	33
Household activities	20
No barriers	13
Other off farm work	11
Age	9
Needing more land	2

Other women discussed wanting to attend training or partake in cacao production, however household activities made it challenging:

"I miss training and technical assistance because I have to take care of the kids." (Interviewee #27, Echarate District, 18 July 2016)

"Because of activities in the house, sometimes I neglect my time in the cacao farm."

(Interviewee #33, Rio Tambo District, 19 July 2016)

"Because of the many things I have to do in the house; I go to the farm tired."

(Interviewee #48, Pangoa District, 22 July 2016)

"I have many activities in the house; I have to cook and the farm is far."

(Interviewee #17, Rio Tambo District, 16 July 2016)

Perceived project impacts on household time use

Half of the women surveyed felt there is not enough time in the day to complete all necessary tasks. Approximately 33% believed the cacao project had increased their work burden. With an increase in the training on cacao plantation management, women were expected to spend more time on activities such as pruning and weeding, while 38% had mixed perceptions of the project workload on their time use. Women reported the activities most impacted were time for house cleaning (22%) and washing clothes (29%), which can have implications on the overall household well-being. One woman explained, *"Because I have to go to the farm I don't have enough time ... I need help in the house."* Another woman responded, *"I am missing time, I am working a lot in harvesting and pruning of cacao."* Other women feel their main obligation is providing care activities, watching over the family, limiting their availability to work on the farm. For instance, one respondent stated: *"I can't change duties with my husband, but sometimes he helps me."* Yet, another woman stated: *"I can't visit my cacao farm because I have to take care of the house."*

Discussion

For women in the VRAEM, time use was a barrier to their participation in cacao production, as a significant amount of time is needed to be devoted to the care economy. In general, many women faced a double burden to varying degrees, working to earn money and also being responsible for significant amounts of unpaid domestic labour, resulting in women experiencing time poverty. Although in some cases actual workload did not align with perceptions of workload, it is important to note that perceptions are extremely significant and in part impact a woman's decision to choose to participate in work outside of the home. Researchers have argued that perceptions of workload affect psychological well-being (Hobson and Beach 2000; Jacobs and Dodd 2003), influencing a woman's ability to take on additional responsibilities, and therefore should be prioritised over objective workload. Perceptions of time poverty were particularly significant for women with young children, those who were more educated, unmarried women, and less wealthy women. Women's actual time use revealed

wealthier women do have more free time. Women who perceived they spent a significant amount of time on childcare, actually dedicated 2.5 more hours of time per day to this reproductive activity. Although women with greater education perceived more time poverty, in reality, results did not show women with more education to be time-poorer. Similarly, a study in Brazil demonstrated that women are likely to be less time-poor as they attain more education (Ribeiro and Marinho 2012). Since women are still expected to perform all the unpaid care activities in addition to their work outside the home, more educated women would be more likely to perceive a double burden (Folbre 2018). Women with higher levels of education, who have the ability to read and write, and wealthier women, often have more opportunities for employment (e.g. starting their own small business). Unmarried women, who perform both productive and domestic activities, and the extra burden of caring for young children have less time and ability to make unconstrained choices. Women who are married may feel less overworked as they have a husband who often will perform a majority or part of the productive activities and some who even help with domestic activities, lessening the overall workload (Akanle, Adesina, and Ogbimi 2016).

The women who worked in cacao production noted it was the main source of household income and their time dedicated to cacao had intensified with the implementation of the project. In many cases, this increased labour requirement added to an already burdened workload, resulting in a reduction of women's ability to make unconstrained choices in regards to their time allocation. In turn, this situation created competing claims on women's labour time between meeting household tasks and agricultural work necessary for cacao production. The activities most impacted were time for cleaning the house and washing clothes, which likely had negative implications on household members. It is important to note that for the majority of women in the study, leisure time was very limited and when demand on women's time was high, it was leisure and social activities that tended to be sacrificed.

Women were engaged in various aspects of cacao production, such as pruning, harvesting, weeding, and fermentation. However, few indicated participation in the selling and planting of cacao, which were mainly male-dominated activities (Barrientos 2013). Often, men had primary control over financial assets and took decisions on market access, with women cacao farmers having limited access to earnings from cacao. Barriers to participation still exist, with women stating lack of access to technical assistance in growing cacao and household activities as primary constraints, which parallel findings from other studies (Greene and Robles 2013; Blare and Useche 2014; Marston 2016). While extension services provided via the project were essential for disseminating information on cacao cultivation and management techniques, these services could be designed to reach women who are constrained by lack of time and who have limited mobility. Perhaps, organising women's workshops on cacao training in communities could help address the issue of mobility, although it may not address the issue of lack of time. It is evident that there are varying degrees of time poverty among the women, and adapting the existing project to reflect this reality is key for development outcomes, especially those affected by time constraints.

Addressing gender throughout the project cycle, from design and implementation to monitoring and evaluation, is critical for adaptive management that reflects the local context and integrates women's and men's experiences and aspirations. Although this study found women had a high interest in cacao production, it is important to recognise women are likely to have had a broader set of interests in terms of market-related activities. Women identified other interests such as tending to small animals (chickens and guinea pigs) and microenterprise development. Women and men who are more interested in reproductive activities could provide household and/or childcare services to those who are more invested in cacao production, developing it as a small business venture. For projects already in the implementation phase, it is important to understand the impact of any potential increased time burden by looking at what household members were doing with their time before projects began. Agricultural interventions can unintentionally reinforce existing time inequalities; therefore, understanding the time impact of projects is a critical dimension of monitoring and evaluation (Meinzen-Dick et al. 2011).

Increasing men's support for women's reproductive activities and addressing cultural norms that discourage men's participation in these activities would lessen women's workloads and balance the burden. Gender norms and attitudes are not static and can evolve over time, in particular through women's empowerment and transformation of masculinities (IFPRI 2014). Including men in women's empowerment, especially income-generating activities is critical, as failing to do so can have a range of detrimental effects, from ineffective interventions to increased gender-based violence (Kiewisch 2015). For development practitioners and people working in agricultural research this is a sensitive issue and if discussions are warranted, they need to begin at the local level and be a community-driven process. If women want to address this, receiving feedback from them on how to best approach this issue would be a good starting point. Adaptive management is required to incorporate unintended impacts and unexpected consequences of these projects. Importantly, collection and analysis of baseline gender-related data is highly recommended to monitor such impacts and if required, adapt over time (Rondinelli 1993).

While this study provides insights into women's time use, there were issues with over-reporting of time, mainly due to overlapping or simultaneous activities. Finding ways to create surveys that capture primary and concurrent activities would mitigate the problem, although may prove to be too complicated. Furthermore, some women when asked about their previous day reported an atypical day in terms of time use due to sickness or travel, affecting the overall time data. Administering the time use survey during different periods to better understand seasonal variation in workloads of women would provide additional comparative data. Furthermore, it is important to note that women self-selected to participate in the project and therefore our findings may not be generalisable to all women in the VRAEM. Finally, time and resource limitations precluded the collection of men's time use in productive and reproductive activities to confirm what gendered differences in time allocation exist and to gain insights into gender-specific tasks.

Conclusion

This study has shown time use is a constraint to women's participation in cacao production, with women experiencing varying degrees of time poverty. For women interested in the cacao project, increasing their participation is dependent upon women's ability to make effective and unconstrained choices in regards to their time use, which is often reflective of cultural norms. Addressing time allocation is, therefore, a major challenge of the cacao project and other value chain development programmes. Agricultural development projects need to better consider the household economy, the issue of time use as a key component of poverty reduction strategies and targeting women that are particularly time poor, including women with young children. When time poverty is defined more precisely through monitoring and evaluation, we begin to see when household time use becomes a constraint on other labour and the trade-offs among different tasks and activities. Prioritising women's contribution to the household in development planning would allow programmes to help minimise trade-offs women are facing, giving them increased opportunity to participate. Furthermore, incorporating women's other interests outside of cacao are important for project sustainability. Finally, gendered time analysis should not merely target women in the project households, but also include men in order to identify where opportunities exist for more male engagement and support. Drawing awareness to gender norms and communicating effectively about time poverty are important steps toward positive change, so both men and women benefit equally from agricultural development.

Experiences in the VRAEM also invite critical reflection on the basic design of interventions in value chains and their implications for gender empowerment. Value chain interventions, with their focus on a specific, often high-value crop, impose immediate restrictions for women's participation: they are far from home, require significant investment of resources and time, and require durable connections with cooperatives, NGOs, and, in some cases, buyers. The study showed that women were interested in cacao production and willing to invest their scarce time in cacao production, with limited variation based on sociodemographic characteristics. However, if women could choose alternative activities

such as small animal production (especially guinea pigs and chickens) or non-agricultural options closer to the house (microenterprise), they would likely choose to invest more of their time in these activities and less time in cacao, which is a very male-dominated activity. One option is to combine cacao support with other more productive and income-generating activities that women have shown to prefer. Interventions with a multiple-chain focus would imply a more complex project design and implementation process, but the payoff potential lies in increased and lasting benefits for the household as a whole and for women in particular.

We recommend that future research continue to understand the trade-offs women face with their time use and time demands of development programmes. This has important implications for poverty reduction and development outcomes by identifying how programmes can be more compatible with women's obligations, as time is often a gender-based constraint, taking into account the significance of the household economy and prevailing cultural norms. Many guides on gender, assets and value chain development do not have a focus on time allocation. Providing clear and easy methods to follow for the monitoring and evaluation of time use is necessary to assess if spending more time in production and market activities is a desired outcome and that increased time investments are weighed against other outcomes. Ensuring changes in time use are favoured is a critical dimension of evaluation and would allow agricultural programming to adapt accordingly and develop context-specific, gender-responsive interventions.

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