

Gender differences in time-poverty among rural households in Southwest Nigeria

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Abstract

This study seeks to assess gender inequality in and correlates of time poverty among 360 rural households in Southwest, Nigeria. A person is deemed to be time poor if (s)he works more than 10.5 hours per day, the internationally accepted threshold. Using the time allocation domain of the Abbreviated Women's Empowerment in Agriculture Index, the study found that on the average, rural women and men spent about 10.3 hours and 8 hours, respectively, on work activities on a daily basis. Work activities for women were found to be diverse, spreading across reproductive and productive domains largely farming, own business e. g. trading, cooking and domestic work, while for men, work activities centred on productive economic activities, dominated by farming. Using a Probit regression model, the study found experience in agriculture and adoption of television to reduce the likelihood of time poverty among rural men. Surprisingly, participation in empowerment projects was found to increase the likelihood of time poverty among rural women. In conclusion, empowerment programmes should be expanded to address the non-material aspects of human well-being. Hence, the study recommends a gender-sensitive approach to intervention programmes in agriculture and adoption of a broader definition of empowerment which not only focus on expanding access to markets and increasing income but enhances control over time. This is more important for women who are already under the double burden of paid and unpaid domestic work.

Keywords: agriculture, dual adult households, rural smallholders, women empowerment, work-related activities

1 Introduction

Gender disparities persist in all areas of life and more importantly in developing countries. Very critical is the gap that exists between men and women especially in the rural communities of Nigeria. Hence, closing the gender gap is a key strategy for boosting agricultural productivity, achieving food security, and reducing hunger and poverty (FAO, 2011).

Poverty is regarded as a multidimensional concept that cuts across different areas of life and livelihoods of rural dwellers including income, education, food, access to water and sanitation, health, among others (Alkire & Foster, 2009; Scoones, 1998). Several studies (Blackden & Wodon, 2006; Alkire & Foster, 2011; Alkire, 2018) have re-affirmed

the non-inclusiveness of traditional poverty measures such as income and other monetary indicators in measuring well-being. Hence, it becomes imperative for studies on poverty to focus on non-income variables (Alkire, 2018). One of such is the time approach to measuring poverty. Time poverty is defined as a state of deprivation where people do not have enough time for rest due to high demanding work time (Bardasi & Wodon, 2006). Time use issues have strong gender dimensions in Africa. For African women, they work long hours on domestic chores and are involved in the collection of water and wood aside from their participation in the farm and market activities (Bardasi & Wodon, 2009). This has significant implications on women's overall potential and actual contribution to society. Studies have established that the time women spend looking after their families, working in home gardens and businesses, and producing

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food for their households greatly inhibits their ability to expand production for the market (Ellis *et al.*, 2007; World Bank, 2009). According to feminist economists, focus on income and assets as the only means for women's empowerment can water-down the significance of challenges that women face (Bain *et al.*, 2018). This is because the wellbeing of women is a function of not only income or consumption but also revolves around their capacity to make choices which include capacity to allocate their time (Bardasi & Wodon, 2006).

In the same manner, Grassi *et al.*, (2015) reported that data on rural women and men's time use is not available for systematic assessment, nor is it given due attention. There is therefore the call for time-use surveys to be designed to capture individuals' work intensity and the trade-offs they face (Blackden & Wodon, 2006). As a result, standardized, sex-disaggregated data on time use needs to be collected and analysed to inform policy-making and project/programme design.

This paper uses gender lens to assess time use and time poverty among men and women in rural households of Southwest Nigeria. The time domain of the survey-based index, the Abbreviated Women's Empowerment in Agriculture Index (A-WEAI) is used to assess time poverty (Malapit *et al.*, 2015). This allows us to examine the gender dimension and determinants of time poverty among rural smallholders. Specifically, this study addresses the following objectives:

1. Examine the gender differences in daily work and non-work activities;
2. Assess the gender differences in time poverty; and
3. Assess the differences in determinants of time poverty among rural men and women.

1.1 Gender roles and time poverty in rural livelihood

It has been observed that there is a distinct division of work based on gender in many societies. This division of work is influenced by the nature of tasks involved and socio-cultural and economic factors characterizing a certain society, community or historical period (Kasente *et al.*, 2002). In most societies, individuals are strongly pressured to abide by such models, not only directly by the family or the community, but also indirectly by the role models underlying the social fabric – the labour market, public policy, taxation system etc., which often act as inhibitors to social change (ILO, 2008).

Boellstorff (1995) advocates for development approaches that take into account the different roles and needs women and men have especially in developing societies. First, while

women and men perform multiple roles in the productive domain, in many societies, reproductive domain which includes tasks and activities relating to the creation and sustaining of the family and the household are primarily undertaken by women (ILO, 2008). This comprises activities such as domestic chores, caregiving and cooking while productive activities include farming, trading and other income generating activities. Men's roles in most instances are more prominent in the productive domain, while their reproductive role is merely subservient. Men's productive work, usually takes place outside the homestead, allowing them to perform their roles sequentially rather than simultaneously (ILO, 2008). This suits the weak, demure and sacrificial narrative painted of women and strict, aggressive, calculating, rational, and bold of men (Opare, 2005). Hence, women are supposed to operate in private sphere mostly at home while men's place is in the public domain. Second, efforts towards increasing agricultural productivity and the real incomes of rural women have been accompanied by the intensification of labour (EIAR, 2012). This has increased women's workload in the absence of any measures to alleviate their already extremely heavy domestic burden. Hence, very little can be achieved in terms of enhancing rural women's labour productivity without taking into consideration the limitations imposed on such work by other time-consuming household tasks (IFAD, 2016).

Bardasi & Wodon, (2006) explained that time poverty can be used to identify the poor in terms of those who do not have time to rest or enjoy leisure due to excessive workload. Studies of Bardasi & Wodon (2009); Vickery (1977) and Zacharias *et al.* (2012) confirm that income poverty and time poverty reinforce each other with attendant negative influence on the well-being of household members especially women and children. For women in agriculture, time poverty does not only constitute a burden to them but also has negative impact on the care and welfare of children and other household members (Alkire *et al.*, 2013). In addition, time poverty is exacerbated among women in agriculture because technological innovations that improve labour productivity are in most instances designed towards men's tasks. For instance, tractors and animal-driven plough are used by men leaving women to struggle with weeding and tilling using handheld tools (World Bank, 2009).

The first study recognised for the use of time poverty is Vickery (1977) who conceptualized poverty in terms of time and money inputs using the US context. The study defined a two-dimensional measure of household needs to include time requirements to achieve a minimal level of consumption at the specified poverty line. The study used the trade-off between money and time by defining households as poor

if they have less than a certain threshold which is made of the combination of the two. However, Vickery's framework's weakness is the interpretation of the household from the unitary model neglecting the intra-household differences existing in time poverty between men and women within the household. Following this, several researchers have conducted other studies to broaden the perspective on the understanding of time poverty. In Guinea, Bardasi & Wodon (2006) found the time poverty headcount of 24.2% for women compared to 9.5% of men, using a poverty line of 70.5 hours/week (10.5 hours/day). Also, Gammage (2010) found that more women (33%) compared to men (15%) experienced time poverty in Guatemala using a time poverty line of 12 hours/day. Goodin *et al.* (2008) differentiated between 'discretionary time' and 'minimum necessary time'. 'Minimum necessary time' is the amount of time needed to earn an income corresponding to the poverty line while 'discretionary time' is defined as the time left after the minimum necessary time has been spent on paid and unpaid work. This is used to distinguish between those who work long hours by necessity and those who work long hours 'by choice'.

1.2 Conceptual Framework

The conceptual framework for this study comprises the relationship between the different factors that can influence time poverty among rural men and women smallholders in Southwest Nigeria. These include socio-demographic characteristics such as marital status, household size, education, income, experience in farming and religion. Others include access to extension, participation in empowerment projects, adoption of radio, adoption of mobile phone, non-participation in other income generating activities, use of family labour and use of hired labour. Socio-demographic characteristics such as marital status and household size can influence the time allocation to work and leisure activities (Adeyeye *et al.*, 2019). In many instances, married people especially women are saddled with additional domestic and reproductive roles which will reduce the time allocation to leisure and social activities. Household size is also important especially in terms of age distribution. Households that comprise mainly of young children or the elderly will require more activities in terms of domestic work and care for children and the elderly (Neal and Hammer, 2017). Factors like experience in farming and income can greatly influence the amount of time spent working on agricultural activities; hence, time poverty. With long years of experience, farmers would have learnt the technical know-how that can reduce the burden of time spent on farming activity. A farmer with high income status can afford to engage hired labour and improved technologies thus reducing the time he/she spends on

work activities. Participation in empowerment projects can influence time poverty in different dimensions. They can help in building the capacities of smallholders therefore improving their productivity. They can also improve access to timely information about market or other improved services thereby ensuring efficiency in the way smallholders conduct their tasks.

Time poverty is measured using the 'Time Domain' of the A-WEAI (Malapit *et al.*, 2015). This measures time allocation to primary productive and domestic tasks as well as leisure and social activities. This measurement was derived from a detailed 24-hour time allocation module in which respondents were asked to recall the time spent on primary activities in the 24 hours prior to the interview, starting at 4:00 a.m. on the day before the interview. Work-related tasks included all productive and reproductive activities undertaken by rural smallholders on a daily basis. They include wage and salary employment, own business work, farming, construction, shopping/getting service, fishing, weaving/sewing, textile care, cooking, domestic work, caring for children/adults/elderly, commuting, and traveling. (Malapit *et al.*, 2015).

2 Materials and methods

2.1 Data and sampling

The study used data collected from primary decision-makers in both dual adult and female adult only rural households in three states of Southwest Nigeria (Ogun, Osun and Oyo). The population of this study consisted of smallholders who participated in the cassava value chain: production, processing and marketing. This was derived from the database of cassava smallholders from All Farmers' Association of Nigeria (AFAN) and the Agricultural Development Programme (ADP) in the states. These two sources were cross-referenced, harmonized and stratified.

Multi-stage sampling procedure was used to select 360 households with primary male and female decision-makers. First, three states were purposively selected for the study. These have a large population of smallholders involved in the cassava value chain in South West region of Nigeria (FMARD, 2012). Second, Probability Proportional to Size (PPS) technique was used to select 10% of the Local Government Areas (LGAs) in each of the three states: Ogun, Osun and Oyo States which have 18, 30 and 33 LGAs respectively. This implies that two LGAs were selected from Ogun State and three each from Oyo and Osun States respectively, making a total of eight. The eight LGAs were purposively selected based on the conditions that they are

Table 1: Definition of variables.

Variable name	Definition of variables	Variable type
Time poverty	Whether respondent is time poor (spend more than 10.5 hours daily on work activities) (Yes = 0; No = 1)	Dummy
Marital status	Marital status of respondents (Single = 1; Married = 2; Separated = 3; Divorced = 4; Widowed = 5)	Nominal
Religion	Religion of respondents (Christianity = 1; Islam = 2)	Nominal
Household size	Total number of members in an household (Number)	Integer
Education	Highest educational qualification (No formal = 1; Quranic = 2; Adult education = 3; Primary = 4; Secondary = 5; Tertiary = 6)	Ordinal
Income	Average annual? income from agricultural activities (Naira)	Continuous
Experience	Experience in agriculture (years)	Continuous
Extension	Access to extension services (Yes = 1; No = 0)	Dummy
Empowerment project	Participation in empowerment projects (Yes = 1; No = 0)	Dummy
Radio	Adoption of radio for agricultural activities (Yes = 1; No = 0)	Dummy
Television	Adoption of television for agricultural activities (Yes = 1; No = 0)	Dummy
Mobile Phone	Adoption of mobile phone for agricultural activities (Yes = 1; No = 0)	Dummy
Other income generating activities (IGAs)	Participation in other income generating activities (Yes = 1; No = 0)	Dummy
Family labour	Use of family labour in agricultural activities (Yes = 1; No = 0)	Dummy
Hired labour	Use of hired labour in agricultural activities (Yes = 1; No = 0)	Dummy

rural and have a high number of cassava smallholders actively participating in the value chain activities. The third stage was the identification and purposive selection of communities and villages with high level of cassava activities in each LGA. Lastly, simple random sampling technique was used to select 360 households from the three States. This implies that on the average, 45 households were selected from each of the LGA. Of the 360 households, 19.4 percent (i. e. 70 households) was female-adult only while the remaining 290 households were dual-adult. This gave a total sample of 586 respondents comprising 360 female and 226 male (In 64 dual adult households, the male adults were not interviewed due to their non-availability). The higher ratio of female to male respondents is due to the objective of WEAI which is to produce empowerment measures for women in the agriculture sector, and for women in relation to men in their households. The sample must be holistic enough to cover females in both dual adult and female adult only households. Hence, female respondents were oversampled by approximately 20 percent to accommodate female adult only households.

The questionnaire used to elicit information in this study is the A-WEAI developed by the International Food Policy

Research Institute (IFPRI) and Oxford Poverty and Human Development Institute (OPHI), Oxford University (Alkire *et al.*, 2013). The study was undertaken between September 2016 and January 2017. The A-WEAI comprises of two sub-indices: the first assesses empowerment of women in five domains (decisions about agricultural production; access to and decision-making power about productive resources; control of use of income; leadership in the community; and time allocation). The second, the Gender Parity Index (GPI), measures the proportion of women whose achievements are at least as high as men in their households and, for women lacking parity, the relative empowerment gap with respect to the males in their households (Alkire *et al.*, 2013).

2.2 Dependent variables

This study undertakes a gender analysis of the determinants of time poverty using a Probit regression model. The model is ideal for testing hypotheses between a binary outcome variable and one or more categorical or continuous predictor variables. The interpretation is undertaken using the marginal effects which estimates margins of responses for specified values of covariates. The Probit model there-

fore suits this analysis because the dependent variable, time poverty is a dummy. Time poverty is defined as proportion of smallholders who have inadequacy in workload indicator of the A-WEAI domain. Adequacy in this context was determined using a time poverty threshold of 10.5 hours a day. A person was adjudged to be inadequate (time poor) if he/she worked for more than the threshold (10.5 hours a day) or adequate (not time poor), if otherwise. Therefore, a value 0 was assigned for a person who is time poor, and 1 if not time poor. This draws from the Lesotho Time Budget Survey (Lesotho, 2003) where respondents were asked to recall the time spent on primary and secondary activities during the previous 24 hours.

2.3 Independent variables

In estimating the model, the different factors influencing time poverty were assessed. These formed the independent variables for the analysis. These include demographic factors such as age and marital status, religion, household size, education, income from agricultural activities, experience, extension, and participation in empowerment projects, adoption of ICTs such as radio, television and mobile phone. Others are participation in other income generating activities and type of labour used in agricultural activities. The description of the variables is highlighted in Table 1.

3 Results

3.1 Socio-demographic characteristics of the respondents

The summary statistics for work activities as well as the distribution of the socio-demographic characteristics of smallholder farmers are shown in Table 2 and Table 3 respectively. The study shows that men cultivated larger farm size than women smallholders. The average farm size for male farmers was 2.8 ha while for female farmers, it was 1.9 ha. In addition, male farmers were found to be more experienced in agriculture than their female counterparts. The average farming experience for male farmers was 24 years while that of female farmers was 15 years. On the contrary, women smallholders reported a higher participation in empowerment projects (30 %) than their male counterparts (27 %). The study found out that the average annual income of men was higher than that of women. Male smallholders' average annual income was N302,327.2 (USD 840) compared to female farmers' N152,141.1 (USD 423). The results also show that women farmers used more of family members as source of farm labour while men mostly employed hired labour. Similarly, male farmers had better access to extension services than female farmers. For instance, about 18 %

of the male smallholders had access to extension regularly compared to about 12 % among women smallholders. The result also indicates that men derived the largest proportion of livelihoods from agriculture (56 %); however, women's source of income generating activities (IGA) was more diverse with focus on trading (45 %) and agriculture (36 %). In the same vein, men's rate of adoption of different technologies (radio, television, mobile phone) for agricultural activities was higher than women.

Table 2: Summary statistics for daily work duration by sex.

	Male	Female
Observations (n)	226	360
Mean (minutes)	479	613.6
Minimum (minutes)	0	0
Maximum (minutes)	915	1050
Maximum (hours)	15.3	17.5
Std deviation (minutes)	178.4	199.0

Based on the adjudged time poverty threshold of > 10.5 hours per day, the study reveals that about 85.0 % and 51.9 % of men and women respectively were adequate in time use (Table 3). The significant difference in workload between men and women was confirmed by the time spent on work activities on a daily basis. On the average, men spent 479 minutes (about 8 hours) on work activities but women spent more time, 613.6 minutes (about 10.3 hours) (Table 4). Also, the summary statistics shows that the maximum work time for men was 915 minutes (about 15.3 hours) compared to 1050 minutes (about 17.5 hours) for women while the minimum for both was zero (Table 2). These findings imply that although on the average both male and female rural smallholders' workload were below the time poverty threshold, a higher proportion of women spent time (inadequate) on work activities than men. This is reflected in the mean of work activities for women which is closer to the threshold of time poverty than that of men. Also, the standard deviation for men was 178.4 minutes (about 3 hours) while for women, it was 199 minutes (about 3.3 hours). This implies a similar distribution of responses around the mean for both rural men and women smallholders.

The gender breakdown of daily activities is shown in Table 4. The result shows that on the average, women spent more time on reproductive activities such as cooking (8.2 %), domestic work (4.8 %) and care for children and elderly (0.6 %) than on productive activities such as trading (11.9 %). On the contrary, men spent more time on productive activities such as farming (23.1 %) and paid employment (1.8 %), in addition to leisure (2.7 %), social (4.9 %), reli-

Table 3: Distribution of socio-demographic characteristics of rural smallholders by sex.

<i>Characteristic</i>	<i>Male (n = 226)</i>	<i>Female (n = 360)</i>	<i>Total</i>
Average farm size (ha)	2.8	1.9	2.9
Average experience in agriculture (years)	24.1	15.1	18.6
Average age head of HH (years)	46.2	40.9	43.0
Average HH size (number)	8.1	7.0	7.4
<i>Type of labour used in agricultural activities (%)</i>			
Family	58.4	60.5	59.7
Exchanged	6.2	2.0	3.6
Hired	92.9	86.7	89.1
<i>Access to extension services (%)</i>			
Not at all	50.9	53.5	52.5
Rarely	31.3	34.3	33.1
Often	17.9	12.3	14.4
Participation in empowerment projects	26.7	30.4	28.9
<i>Income</i>			
Ave. income from agricultural activities (Naira)	302,327.2	152,141.1	212,160
Agriculture as only income generating activities (%)	56.0	35.8	43.6
<i>Other income generating activities (%)</i>			
Trading	8.0	45.0	30.7
Artisan	16.4	9.4	12.1
Wage work	6.2	2.2	3.8
Salaried work	6.2	2.5	3.9
Self employed	14.2	8.1	10.4
<i>Marital status (%)</i>			
Single	0.9	0.0	0.3
Married	97.4	79.4	86.7
Separated	1.3	8.6	5.8
Divorced	0.0	0.3	0.2
Widowed	0.4	11.7	7.3
<i>Highest education (%)</i>			
No formal	18.6	36.4	29.6
Quranic	3.6	0.6	1.7
Adult education	0.5	0.3	0.45
Primary	38.0	33.3	35.1
Secondary	28.1	24.9	26.1
Tertiary	11.3	4.5	7.1
<i>Communication (%)</i>			
Radio	95.1	78.1	82.3
Television	54.9	50.0	51.9
Mobile phone	38.9	35.6	36.9
Adequacy in time use (%)	85.0	51.9	64.7

gious activities (6.6 %) and commuting (1.4 %). This is further confirmed by analysing the gender differences on the proportion of time spent on ‘work’ related activities by rural

smallholders. Women spent about 43 % on work-related activities, men spent about 33 % (Table 4).

Table 4: Average daily distribution of work and non-work activities among rural smallholders by sex.

Activity	Male			Female		
	Average time spent		Proportion*	Average time spent		Proportion*
	(min.)	(%)	(%)	(min.)	(%)	(%)
<i>Work</i>						
School (also homework)	0.5	0.1	0	1.2	0.2	0.1
Work as employee	25.9	5.4	1.8	19.1	3.1	1.3
Own business work	77.2	16.1	5.4	171	27.9	11.9
Farming/livestock	332.3	69.4	23.1	198.1	32.3	13.8
Shopping/getting service	8.2	1.7	0.6	6.4	1.0	0.4
Weaving/textile care	0	0.0	0	6.5	1.1	0.4
Cooking	4.8	1.0	0.3	118.5	19.3	8.2
Domestic work	7.8	1.6	0.5	69	11.2	4.8
Care for children/elderly	2.5	0.5	0.2	8.1	1.3	0.6
Traveling/commuting	19.8	4.1	1.4	15.7	2.6	1.1
<i>Total time spent</i>	<i>479</i>	<i>100</i>	<i>33.3</i>	<i>613.6</i>	<i>100</i>	<i>42.6</i>
<i>Non-work</i>						
Sleeping/resting	586.1	61.0	40.7	566.9	68.6	39.4
Eating/drinking	101	10.5	7	102.8	12.4	7.1
Personal care	52.4	5.5	3.6	37.6	4.5	2.6
Watching TV/Radio/Reading	38.2	4.0	2.7	20.5	2.5	1.4
Exercising	7.8	0.8	0.5	1.3	0.2	0.1
Social activities/hobbies	70.8	7.4	4.9	43.8	5.3	3
Religious activities	95.6	9.9	6.6	51.7	6.3	3.6
Others	9.1	0.9	0.6	1.8	0.2	0.1
<i>Total time spent</i>	<i>961</i>	<i>100</i>	<i>66.7</i>	<i>826.4</i>	<i>100</i>	<i>57.4</i>
<i>Total daily time on all activities</i>	<i>1440</i>		<i>100</i>	<i>1440</i>		<i>100</i>

* Proportion: Time spent as a proportion of total daily time.

3.2 Determinants of time poverty among rural smallholders

The factors influencing time poverty among male and female smallholders are presented in Table 5. The results reveal marked gender differences. For example, experience in agriculture ($p < 0.05$), adoption of television ($p < 0.05$), and dependence on agriculture as the sole source of income for livelihoods ($p < 0.01$), are the determinants of time poverty among men, while household size ($p < 0.05$), participation in empowerment projects ($p < 0.05$), adoption of mobile phone ($p < 0.05$), and dependence on agriculture ($p < 0.05$), are the correlates of time poverty among women farmers. The explanation is that a unit increase in years of experience in agriculture and adoption of television among men reduce the likelihood of time poverty by 0.6% and 20% respectively, while dependence on agriculture as the sole source of livelihood increases the probability of time poverty by 18%. Among women smallholders, a unit increase in household size, participation in empowerment projects and dependence on agriculture as the sole source of livelihoods

increase the probability of time poverty by about 2%, 15% and 13% respectively while adoption of mobile phone reduces the probability of time poverty by 18%.

4 Discussion

The results indicate a relatively younger women labour force in agriculture (average age of the female respondents was 41 compared to 46 for men). Also, male farmers were generally more educated than female smallholder farmers. For example, there were about twice as many female (36.4%) cassava smallholders as male (18.6%) with no formal education while male farmers with tertiary education were almost three times than the female. The larger farm size cultivated by male farmers corroborates previous findings such as Oladeebo & Fajuyigbe (2007) and Adekola *et al.* (2013), who found that women farmers cultivated significantly smaller farm size than their male counterparts. This is attributable to the fact that rural areas in Southwest Nigeria

Table 5: Determinants of time poverty among smallholder farmers by sex.

	Male			Female		
	dy/dx	S.E.	z-value	dy/dx	S.E.	z-value
Religion	-0.076	0.053	-1.430	-0.093	0.056	-1.650
Marital status	0.093	0.103	0.900	-0.033	0.030	-1.100
Household size	0.002	0.008	0.200	0.020	0.008**	2.510
Education	-0.028	0.020	-1.410	0.026	0.018	1.440
Income	0.000	0.000	-0.370	0.000	0.000	0.570
Experience	-0.006	0.003**	-2.560	0.004	0.003	1.450
Extension	-0.048	0.038	-1.240	-0.006	0.046	-0.140
Participation in empowerment projects	0.046	0.065	0.710	0.153	0.065**	2.370
Adoption of radio	0.097	0.151	0.650	-0.064	0.101	-0.630
Adoption of television	-0.202	0.083**	-2.430	-0.064	0.068	-0.930
Adoption of mobile phone*				-0.184	0.075**	-2.460
Non-participation in other income generating activities	0.181	0.059***	3.080	0.133	0.059**	2.250
Use of family labour	-0.013	0.056	-0.230	0.099	0.059	1.670
Use of hired labour	0.127	0.104	1.220	0.030	0.089	0.340
Obs		181			304	
LR chi2(13)		29.11			47.95	
Prob > chi2		0.0063			0.0000	
Pseudo R2		0.1791			0.1141	
Log likelihood		-66.727694			-186.21055	

* There is no variation in the observations of adoption of mobile phone for male smallholders.

** $p < 0.05$, *** $p < 0.01$.

are patrilineal; hence, ownership, access and control of land and assets are androcentric (Amos, 2007; Fapohunda, 2012).

The dependence on family members as source of labour confirmed findings from previous studies of limited capacity of rural smallholders especially women to hire labour for their agricultural activities (Butterworth *et al.*, 2008). Possible explanation is that hiring labour is costly, in terms of cash and kind. The labourers are usually immigrants such as the Igedes from Benue State, Ebiras from Kogi State and the Bassas from neighbouring countries, Togo and Benin. These serve as hired labour among Yoruba communities. They live with the host farmers who are responsible for their daily upkeep and wages at the end of the farming season.

Higher participation of women farmers in empowerment projects corroborates findings from previous studies. These projects include those organised by local and international NGOs and international research centres to build rural dwellers' technical capacities in agriculture. For example, Bunyatta & Mureithi (2007) and Rola *et al.* (2002) in a study among Farmer Field School (FFS) members in Kenya and Philippines, respectively, revealed a higher participation of women farmers. The reason may be that most developmental projects in agriculture are targeted at improving poor smallholder women's productivity and profitability by empower-

ing women more to participate in equitable agricultural systems (Njuki *et al.*, 2013). This is because traditional extension system is biased against women due to cultural inhibitions which prioritise the needs and concerns of men (Asenso-Okyere & Mekonnen, 2012). The lower income of women farmers confirmed previous evidence of gender gap in income between men and women with women at disadvantaged position (Fapohunda, 2012; Alabi *et al.*, 2017). This may be attributable to the constraints experienced by rural women in access to resources, new markets, among others (FAO, 2011). The higher adoption of technologies by male smallholders is unsurprising except in the case of labour-saving technologies which are introduced primarily to assist women. Possible reason for higher adoption of agricultural technologies among men may be due to the potential for commercialisation and profitability which naturally attracts men. Men tend to invest more in cassava processing technologies as opportunities are created for new market that guarantees higher profit for processed cassava (Doss, 2001; Adebayo *et al.*, 2003). This supports the conclusion that the line between gender roles in agricultural activities is dynamic and is determined by factors such as marketability, profitability, access to inputs and resources (Doss, 2001).

A gender analysis of time allocation reveals that while agricultural activities were the primary work activity undertaken by men (occupying about 70 % of their time on a daily basis), women's work-related activities were more diverse with four productive and reproductive activities occupying about 90 % of their time (Table 4). These are agriculture (32.3 %), own business such as trading and processing of agricultural produce (27.9 %), cooking (19.3 %) and domestic work such as sweeping, fetching water, etc. (11.2 %). This confirmed previous studies in rural household setting which shows women's triple role activities and men's exclusion from domestic and reproductive activities (Adeyonu & Oni, 2014). These results are consistent with findings from Arora (2014), Bardasi & Wodon (2010) and Gammage (2010). The only difference being in agricultural production in rural Mozambique where women spent more time than men (Arora, 2014).

The determinants of time poverty among rural male smallholders are discussed below. Sole dependence on agriculture as the primary source of livelihoods will necessitate spending more time on the farm, cultivating larger piece of farm in order to generate enough income to sustain the farmer's livelihood. This possibly explains the positive relationship between dependence on agriculture as the primary source of livelihoods and time poverty among male smallholder farmers. This becomes more important for the man who in the context of this study spent about 70 % of their daily work-related activities on farming. On the contrary, ownership of television may decrease the likelihood of time poverty because it is a measure of wealth and status symbol in rural areas. This is because majority of the rural areas in Nigeria are off electricity grid; hence, they have to rely on alternative energy sources to power their television. Hence, farmers who adopt television may likely have some level of wealth to hire labour which also suggests large farm size, high income and therefore ability to have enough time for leisure and rest. This probably explains the reason while male smallholders on the average, spent as much as twice the time spent by their female counterparts on watching television (Table 4). However, women hardly have time to watch television even in few households where it exists. While gender roles dominant in rural areas depict domestic activities as the domain of women, men are excluded from such. Arora & Rada (2016) in the study among smallholders in rural Mozambique observed that rigid gender roles limit the exchange between men's and women's contribution to household production and care work. Hence, women continue to engage in different forms of domestic activities even after returning from their farms or shops.

The relationship between experience in agriculture and time poverty among male smallholders can be explained by the fact that farmers' experience is an important determinant of his/her knowledge and capacity to take up new technologies and also in the prevention and management of risk (Ajah & Ajah, 2014). Knowledge is very important and having the technical know-how about an issue can reduce the time invested in fixing it. In addition, since most rural farmers rely on age-long, indigenous practices for coping with and adapting to the variability in weather patterns, these practices offer a sustainable path to tackling the challenges of changing climate (Ajani *et al.*, 2013). The fact that knowledge of the practices is largely transferred through observation and cumulative experience passed from generation to generation (Pareek & Trivedi, 2011) places male farmers at an advantage since gender norms and belief has placed the responsibility of farming on them even at young age. Therefore, experience in agriculture seems to favour men as they usually have longer years of experience in farming and agricultural activities when compared with women.

On factors influencing women's time poverty, the positive relationship between household size and time poverty is explained by the fact that women's workload is increased with increasing size of the household. This is particularly true when the demographic distribution comprised mainly of children, aged or physically challenged. According to Lawson (2008) in the study of time poverty in Lesotho, demographic distribution of a household is important in determining whether the household members will be time poor or not. This is because larger household size may imply larger responsibilities (Arora, 2014). While several studies have shown that increasing household size may reduce the possibility of time poverty for women due to distribution of workload among members of the household (Bardasi *et al.*, 2006; Ribeiro & Marinho, 2012); Seymour *et al.* (2017) argued that the exemption of male adults from household chores in most rural African settings nullifies the distribution proposition of household chores since male adults devote their time and energy to agriculture and other productive activities. Hence, in large households where membership is largely adult male, the bulk of the domestic activities will fall on the adult women; hence, exacerbating their time poverty. In China for instance, Maurer-Fazio & Connelly (2017) found that while care of young children adds more time in care work to everyone in the household, it adds three times more caregiving time to women than men. Similarly, in a study of time use patterns among the elderly in South Africa, Posel & Grasp (2017) found that division of labour in multi-generational households is bisected by gender and age. Therefore, workload among elderly women vary

depending on the composition of the household. In households with large number of non-elderly women, elderly women tend to spend more time on leisure or personal care activities since their daughters and grandchildren will usually take care of the domestic, household chores.

Findings from this study also reveal that women who depended on agriculture as the only source of livelihoods were more likely to have high workload and less time for leisure and social activities; thereby increasing their likelihood of time poverty. Kes & Swaminathan (2006) in the study of time poverty in sub-Saharan Africa found out that participation in agricultural production especially around seasonal labour may be time-tasking and leave women with less time for care and domestic work. In southwest Nigeria; especially among the Yorubas, studies have shown that the women are highly entrepreneurial; hence, they participate actively in other productive activities such as petty trading and crafts including weaving, bead making and mat weaving, (Levin *et al.*, 1999; Odeyemi, 2013). This study confirmed this by revealing a more diversified income generating activities among rural women in Southwest Nigeria who are usually Yorubas. However, women who depended on agriculture as their only source of livelihoods will have to spend more time on production and processing the produce and sometimes marketing these products. This is worsened by their lack of capacity to hire labour for production or processing activities and high domestic workload. The time spent on marketing agricultural products either at the farm gate or commuting to neighbourhood markets worsened their likelihood of time poverty.

The study found a negative relationship between mobile phone adoption and likelihood of time poverty. This implies reduction in possibility of time poverty as a result of mobile phone adoption. Literature has shown that adoption of mobile phone creates more opportunity for farmers, opens up new markets, new network and reduces time for travelling (Ragasa, 2012; Balasubramanian *et al.*, 2010). In addition, mobile phone-enabled solutions assist farmers to access financial services, obtain agricultural information, improve data visibility for supply chain efficiency and enhance access to markets (Vodafone Group and Accenture, 2011). Mobile phones are veritable tool of social capital accumulation; hence, women smallholder farmers readily use mobile phones in learning and sharing of information on agricultural activities (Ragasa, 2012).

A surprising result is that participation in empowerment projects increased the possibility of rural women's time poverty. This stems from the fact that these projects are targeted at empowering rural women to participate in equitable agricultural systems by improving their productivity

and profitability (Njuki *et al.*, 2013). While these projects in many instances have empowered rural women in terms of capacity building, facilitating access to market, adoption of new technologies, among others, it could actually increase their workload; hence, the likelihood of time poverty. This can be attributable to the burden of additional time spent on meetings and other activities included in such interventions. This puts pressure on women because of the opportunity cost to domestic and productive activities (Tanwir & Safdar, 2013). According to Walker (2013), when poverty is defined in terms of scarcity of time, many interventions that have been designed primarily to alleviate poverty have in fact contributed to increasing it. Hence, if empowerment projects are not well planned to integrate men and women's concerns, they can constitute a kind of burden especially to women who are already over-burdened with lots of roles.

5 Conclusion

Control and use of time are important and crucial to efforts directed at improving the well-being of rural populace. This paper contributes to literature on gender and development by expanding the multidimensional nature of poverty to issue on the control of time. The study also assessed the gender differences in the correlates of time poverty. The study found that while interventions such as participation in empowerment projects may achieve development outcomes such as access to market and increase productivity, it may actually increase the possibility of time poverty among rural women. Hence, interventions that focus on empowerment and other development outcomes in agriculture should consider a broader definition of empowerment which considers not only income but control over the use of time. A possible way of achieving this is by integrating a mix of technologies with unique and different value addition possibilities such as integrating mobile phone and labour-saving technologies. This will ensure that new opportunities with the potential of additional income for rural women can at the same time lead to reduction of workload. Engaging men as partners in the development process will further enhance the possibility of achieving empowerment for rural women.

Conflict of interest

The authors declare that they have no conflict of interest.

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