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Determinants of rural farming households' time allocation: A gender perspective

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This study examined various factors which influenced time allocation of farmers living in rural southwestern Nigeria. The study utilized a time use survey which was carried out among farming households during the rainy and dry seasons in 2009. A total of 150 farming households comprising 150 men and 150 women were selected using multi-stage random sampling techniques. Data were analysed using tobit-regression to take the number of respondents reporting no participation in certain activities into consideration. The results of the econometric analysis shows that age of men and women significantly explained their farm work time and non-farm work time and indirectly influenced their housework time at all times. Women's years of education directly determined their non-farm work time during the dry season. Marital status had opposite influence on men's and women's time allocation decisions during the two seasons. Household income is important in the time allocation decisions of men and women with a stronger influence on men's time. Women's time allocation responded more to distance to basic amenities than that of the men during the rainy and dry seasons.

Key words: Determinants, time allocation, gender, rural farming households.

INTRODUCTION

Time, like money, is both a fundamental and a scarce resource. It is one of the most valuable resources available to individuals and families. Unlike money however, it is the one resource with which all individuals are equally endowed on any given day, but allocation differs. Time allocation to various activities (work and leisure) is influenced by both economic (income, prices and education) and non-economic (gender, geographic location, household composition, societal and cultural norms, season of the year, etc.) factors (Kes et al., 2006). Gender constitutes an important dimension of the household. The literature discusses several gender aspects that have implications on time allocation and the gender based division of labour remains strong in industrialized and urban societies as well as agricultural and rural communities (Erdil et al., 2006).

The System of National Accounts (SNAs) defines work as all activities which fulfill the third person criterion. This refers to those activities which are performed for another's benefit or for one's own benefit provided that it could be carried out by someone other than the person benefitting from it, while achieving the desired result. Thus, for example, it is possible to hire someone else to clean the house, look after your child and even do the shopping. In contrast, it is not possible to hire someone else to learn for you, watch television, socialize, sleep or eat. The latter activities, thus, fail the third person test and are not regarded as work or production, but rather leisure.

Gender refers to the rules, norms, customs and practices by which biological differences between males and females are translated into socially constructed differences between men and women and boys and girls. These results in the two genders being valued differently and having unequal opportunities and life chances. In most cultures women and men are expected to develop

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distinctive characteristics. These sex roles are norms assigned on the basis of gender. Some examples are that women are supposed to be gentle, kind, sensitive, and serve the psychological and physical needs in the home while men are to be dominant, active, achieving, control over money and power and are busy outside the home. The social learning theory hypothesizes that gender roles are learned. Men from a young age learn to believe that their actions count and that they have control in their lives. This leads to greater feelings of confidence and competency. Men's activities are defined as more important than women's. The division of labour gives power and prestige to men, who are in the public sphere while many women are in the home or low wage and prestige employment and this makes them voiceless, powerless and poor.

Worldwide, most women and men work in jobs that are done predominantly by one sex (Elson, 1999). Women undertake most of the housework while men do most of the work on farm or work for wages. A larger proportion of men's time is spent in self-employment and wage-work activities than that of women's (Ilahi, 2000). According to Ritchie et al. (2004), women allocate more time to work than men do, particularly when their inputs in non-System of National Account (nSNA) production, namely domestic and care work, are included. National Bureau of Statistics (NBS) (2005) reveals that in Nigeria, women devoted more of their time to unpaid activities in this order: child care (17.2%), cooking (10.1%), care of the elderly (9.8%) and recreation (8.3%). Men spend their time too on childcare (9.9%), recreation (8.2%), care of the elderly (8.2%) and cooking (6.62%).

Evidence from Malawi indicates that women farmers were inclined to limit their labor time in farm activities due to a heavy commitment to domestic chores, while responsibility for children and housekeeping made it difficult for women heads to opt for regular or off-farm labour activities to increase their earnings. Because they must carry out their multiple roles simultaneously, and because the "household time overhead" is not dispensable, women can only engage in directly productive economic activities after or in conjunction with the discharge of their domestic responsibilities (Buvinic et al., 1997).

Time allocation to various activities is not constant over the cycle of the year, especially in rural areas. In hilly Nepal, there is a large variation in this by season (Kumar and Hotchkiss, 1988). In the April-June dry season, women spend less time in agricultural work and more time in the collection of fuel and water. There are similar patterns in Pakistan as reported by Alderman et al. (1991), though they did not provide comparative results for men. Fafchamps et al. (1998) present their summary results in the form of shares of men and women in the activities of the household. They find that the shares vary substantially by season. Several other authors have also observed a seasonal pattern of farm labour demand

(Chambers et al., 1981; Mebrahtu, 1994). According to them, farm labour demand peaks during the production period when planting and weeding work takes place. During the dry season, farm work requirements are at their lowest.

In Nigeria, few studies have been carried out on time allocation (Ikpi, 1993; Rahji, 1999; Alimi et al., 2004). However, very little has been done in the country at studying the determinants of time allocations to work. To the best of the authors' knowledge, the study done so far on the determinants of time allocation by gender in the country is the one by Rahji (1999). In estimating the determinants of time allocations by gender, the study does not include factors such as distance to source of water, forest, primary and secondary schools among others which are important determinants of farming household time allocation (Blackden et al., 2006). The study also does not take into consideration seasonal variations which are a strong determinant of farming household time allocations in rain-fed agriculture as reported by Ilahi (2000). In filling this gap, this study analyses the factors (Individual, Household and Community) affecting time allocation of men and women farmers during the rainy and dry seasons. The objective of this study therefore, is to examine the factors influencing farming households' time allocation into:

(i) Farm work;
(ii) Non-farm work; and
(iii) Housework.

MATERIALS AND METHODS

Study area

The study was carried out in southwestern Nigeria. Southwest is one of the six geopolitical zones in Nigeria. It falls on latitude 6° to the north and latitude 4° to the south. It is marked by longitude 4° to the west and 6° to the east. It is bounded in the north by Kogi and Kwara states, in the east by Edo and Delta states, in the south by Atlantic Ocean and in the west by Republic of Benin. The climate is equatorial with distinct wet (rainy) and dry seasons with relatively high humidity. The wet season starts from April and ends in October, while the dry season is from November to March. The mean annual rainfall is 1480 mm with a mean monthly temperature range of 18-24°C during the rainy season and 30-35°C during the dry season. The climate in the zone favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, kolanut, coffee, palm produce, cashew and so on (National Population Commission, 2006). The zone comprises six states namely: Ekiti, Lagos, Ogun, Ondo, Osun and Oyo states out of which Oyo and Osun are randomly selected.

Data and sampling techniques

Primary data were used for the purpose of this study.

They were collected from the respondents through the use of pre-tested, well-structured questionnaire by trained enumerators under the overall close supervision of the researcher during the rainy and dry seasons to allow for seasonal variations following Wodon et al. (2006). The questionnaire used for data collection consisted of four parts such as:

- Household Identification/composition required to record information on some household characteristics supplied by the household head.
- Individual Identification required to collect information on demographic characteristics of the respondents.
- Individual Diary (simplified time diary) Record – used for providing a diary of activities which the respondents spent time on during the day (24 h) over a seven – day reference week to take account of day-to-day variations in activities and allocation of time to the activities (FOS, 1999).
- Use of Time Summary Schedule – a schedule used for summarizing, on daily basis, time spent by the respondents over various activities (paid or unpaid) by major activity groupings using the United Nation (UN) document "Trial International Classification for Time-Use Activities". This is the document used in classifying and coding time – use activities. The document was adopted by FOS (1999). This study also adopted the document to enhance standardization and international comparability, some very important and useful attributes being canvassed and encouraged by the UN. Twenty-six main types of activity were later classified into farm work, non-farm work and housework.

Multi-stage sampling technique was used in selecting the representative farming households that were used for this study. The first stage of the sampling procedure was the purposive selection of southwestern Nigeria. It is worthy to note that till date, there is no nationally representative time-use data in the country. The time-use pilot survey of 1999 was not published and a full blown survey could not be carried out due to high cost associated with it (FOS, 2000), hence the purposive selection of southwestern Nigeria to minimize cost. The second stage of the sampling was the random selection of Oyo and Osun States from southwestern Nigeria. The stage that follows was the random selection of two rural Local Government Areas (LGAs) from each of the two states. The list of farming households from the LGAs selected was obtained from states' Agricultural Development Projects (ADPs). ADP is a national programme organized by the Nigerian government to foster agricultural development. The final stage was the random selection of representative farming households using probability proportionate to size from each of the LGAs selected. From each household however, one man and one woman who were aged 18-60 years were selected as the target sample. Data were collected in August and December of 2009 representing the rainy and dry

seasons respectively from the same respondents. A total of 200 households and 400 respondents were selected for the two seasons. However, a total of 150 farming households and 300 respondents were used for the analysis due basically to incompleteness of 50 household questionnaires.

Analytical techniques and methods

In the estimation of the factors that affect time allocations by gender, components of time allocation (farm work time, non-farm work time and housework time) were regressed on a set of explanatory variables (individual, household and community). A few respondents in the data set did not undertake the activities specified above on the weeks selected for the interviews for some reasons. Hence, there was high proportion of zero observations. I ran a tobit- regression model, which allows one to take care of the problem as done by Rahji (1999), Kizilirmak et al. (2009) and Bonke (2010). The empirical specification for the tobit model is:

$$Y_{ji}^* = \beta_j^* X_i + \epsilon_{ji} \; ----------------------1$$

where Y_{ji}^* is the latent variable representing time allocated to activity j by individual i, x_i is a vector of explanatory variables, β_j is a vector of parameters and ϵ_{ji} is the error term. The observed time allocation (y_{ji}) variables are related to the corresponding latent time allocation variables by:

$$Y_{jik}^s = Y_{jik}^{s*} \text{ if } Y_{jik}^{s*} > 0, \; Y_{jik}^s = 0 \text{ otherwise } --------------------2$$

Models for farm work, non-farm work and housework using the empirical specification above were estimated for men and women separately so as to determine whether different conditions influence their time allocation in different ways. Where:
j = 1, 2, 3 (activity), that is, farm work, non-farm work and housework respectively.
i = 1, 2……………………150, k = man or woman, and s = rainy season or dry season.

However, since in the standard tobit model, the estimated coefficients have no natural interpretation, this study reports marginal effects evaluated at sample means by taking the partial derivatives of equation 1 above with respect to each explanatory variable.

Selection of explanatory variables

The explanatory variables specified as determinants of farm work time, non-farm work time and housework time, were selected according to Rahji (1999), Newman (2002), Yang et al. (2004), Matche and Young (2003),

Table 1. Selected individual characteristics by gender.

Variable	Percentage	
	Men	**Women**
Age		
<30	14.0	26.7
30-39	15.3	14.0
40-49	25.3	22.7
>49	45.4	36.7
Mean	46.6	41.8
SD	12.5	12.8
Years of schooling		
0	40.7	40.7
1-6	34.6	36.0
7-12	18.7	12.7
>12	6.0	10.6
Mean	5.2	4.3
SD	4.6	3.5
Marital status		
Married	80.7	86.7
Single	19.3	13.3

Source: Field Survey (2009).

Kizilirmak and Memis (2009), and Schindler (2009) and the peculiar characteristics of the study area. The variables are defined as follows:

- Individual variables: X_1 = Age (years); X_2 = Years of formal education; X_3 = Marital status (married = 1, 0 otherwise).
- Household Variables: X_4 = Income (₦); X_5 = Farm size (hectares); X_6 = Household size (number); X_7 = Number of children aged 0 - 5 years; X_8 = Number of adults above 60 years of age (seniors); X_9 = Access to food processing machine (yes = 1, 0 otherwise); X_{10} = Access to farm machineries (yes = 1, 0 otherwise).
- Community Variables: X_{11} = Distance of the water source from farmers' homes (km);
X_{12} = Distance of the forest from farmers' homes (km); X_{13} = Distance of the nearest public primary school from farmers' homes (km); X_{14} = Distance of the nearest public secondary school from farmers' homes (km).

RESULTS AND DISCUSSION

Descriptive statistics

Here, some selected individual, household and community based characteristics that explain rural farmers' time allocations are summarized.

Selected individual characteristics

As presented in Table 1, men are on the average older than women, the mean age difference is about 5 years. The implication of this is that the farmers (men and women) are still within the very active productive age group in which their farm productivity should be relatively high *ceteris paribus*. About 41% and 47% of men and women respondents respectively have no formal education and the average years of schooling respectively stood at 5 years and 4 years. The analysis shows that men are relatively more educated than women as shown by their average years of schooling. It is in consonance with NBS (2005) which revealed that men are more educated than women in the study area. Generally, there is a low level of education among the farming households who reside in rural areas in Nigeria and this has implications for their income-earning capacity as the respondents may lack the required skill to secure a well-paid job. Also, farmers may find it difficult to adopt modern improved techniques of production or operation because of their lack of education. Not surprisingly, the majority of the respondents are married, however more women than men are married. This is because the respondents are individuals who are 18 years old or more and under the constitution of Nigeria, an individual that is 18 years old or more is an adult and is free to marry. This has implication on the type of activities they are engaged in and the amount of time allocated to such activities.

Selected household characteristics

Table 2 summarizes the relevant household characteristics derived from the sampled households. As shown in the table, the minimum household size among the households was 2 persons and the maximum was 15 persons with the mean size of 5 persons. This compares well with 4 members reported for the area by NBS (2005). Larger household size especially with high percentage of dependants increases men's paid work time and women's housework time with its resultant effects on reduced leisure time of both sexes. The minimum land size that the selected farmers cultivated stood at 0.8 ha while the maximum was 5 ha. They cultivated on the average, 2.3 ha which is rather low. This however, compares well with the national average of 2.0 ha as reported by NBS (2005). This signifies that farmers in the study area are small scale farmers. The majority of the surveyed households reported that women respondents were the ones responsible for water fetching and collection of firewood. This is expected because traditionally, these activities are believed to be the responsibility of women in the study area.

The majority of the households had stream as their main source of water while very few had borehole as their source. This means that the majority of the farmers depend on lower quality water (stream) for their domestic chores. The health implication of this to the people is that they are liable to contact all forms of water-borne diseases associated with using stream water for drinking

Table 2. Relevant household characteristics.

Variable	Percentage	Variable	Percentage
Household size		**Income during rainy season (N)**	
2-5	76.7	**Monthly farm income**	
6-9	21.3	<5001	30.7
>9	2.0	5001-10000	56.7
Mean	5.0	10001-20000	12.0
SD	2.1	>20000	2.7
		Mean	8662.73
Farm size (hectares)		SD	3485.43
<1.6	35.3		
1.6-3	44.0	**Monthly non-farm income**	
>3	20.7	<3101	12.0
Mean	2.3	3101-4000	21.3
SD	1.2	4101-5000	29.3
		5101-6000	19.4
Gender of the person who usually collect water		>6000	18.0
Men	32.0	Mean	4824.00
Women	64.7	SD	1557.02
Both	3.3		
		Monthly other income	
Gender of the person who usually collect firewood		<401	29.3
Men	30.0	401-500	17.3
Women	53.3	501-600	23.3
Both	17.7	601-700	16.7
		>700	13.4
Main source of drinking water		Mean	535.09
Stream	63.3	SD	172.97
Well	28.7		
Borehole	8.0	**Total income**	
		<10001	12.0
Main source of fuel for cooking		10001-20000	78.7
Firewood	86.7	20001-30000	8.0
Kerosene stove	13.3	>30000	1.3
		Mean	14008.49
Access to farm machineries		SD	4613.69
Yes	29.3		
No	70.7	**Income during dry season (N)**	
		Monthly farm income	
Access to food processing machines		<5001	20.0
Yes	37.3	5001-6000	16.7
No	62.7	6001-7000	29.3
		>7000	34.0
Child-5		Mean	5224.00
0	28.7	SD	1557.02
1	51.3		
>1	20.0	**Monthly non-farm income**	
Mean	1.0	<3551	12.0
SD	0.8	3551-4550	25.3
		4551-5550	26.0
		>5550	36.7
Members above 60 years of age		Mean	3432.66
0	60.0	Mean	3432.66
1	26.7	SD	1005.72

Table 2. Cont'd.

>1	13.3		
Mean	2.4	**Monthly other income**	
SD	1.2	<505	13.3
		505-600	23.3
		605-700	22.7
		>700	40.7
		Mean	645.09
		SD	172.97
		Total monthly income	
		<10001	26.0
		10001-20000	68.7
		20001-30000	4.6
		>30000	0.7
		Mean	13015.16
		SD	4547.81

Source: Field Survey (2009).

and cooking. Firewood rather than kerosene stove constituted the main source of fuel for cooking. The figure for firewood is higher than the national average of 79.6% for 2008. This is perhaps due to the rural nature of the study area where the use of firewood is prevalent. The implications of this are enormous. Farmers are exposed to respiratory diseases as a result of cooking in a degraded environment apart from the attended deforestation as a result of pressure on forest trees. Also, the long distance from the farmers' homes to the forest increases the time spent on un-paid housework. Less than one-quarter of the farming households in the study area have access to farm machineries while the remaining was denied access. This is a testimony to the fact that agricultural production in the study area is still at subsistence level. More than half of the households had no access to food processing machine while the remaining (42.0%) had access. This implies that the majority of the farmers, especially women, dedicated substantial part of their working time to food preparation which is also a non-monetized activity.

Not surprisingly, the mean farm income during the two seasons was low, however, the farm income in the rainy season was higher than during the dry season. The low farm income during the two seasons indicates very poor earning situation of the farmers and the higher farm income during the rainy season compared with dry season shows that agricultural production in the study area is still rain-fed. Meanwhile, the average monthly non-farm income was higher during the dry season than rainy season. Total income was higher during the rainy season than during the dry season. The higher income during the rainy season partly explains why consumption is higher during this period thereby likely lowering poverty level.

Relevant community based characteristics

The result of the analysis as shown in Table 3 shows that averagely, farming households traveled for about 2 km to access drinking water source. The implication is that farmers do not have in-house water source and the water sources are located too far away from where farmers reside. The mean distance between the homes and forest where farmers gather firewood is 1 km. This implies that apart from the time required for cooking with firewood, extra time is also needed to travel to the forest to gather firewood. Further to that, the average distance between farmers' homes and primary school was 2.4 km while it was 4.0 km for nearest public secondary school. The meaning of this is that primary as well as secondary schools are located far away from farmers' homes. This will go a long way in influencing farmers' children school's enrollment, attendance and punctuality.

Determinants of time allocation

Here, the estimate from tobit regressions in which the dependent variable is time spent on different activities (farm work, non-farm work and housework) is presented. There was separate estimation for men and women during the rainy and dry seasons because of the differences in their time use patterns during the two seasons.

Determinants of time allocation to farm work by gender and season

The result presented in Table 4 shows that age of the farmers is inversely correlated with their farm work time. This relationship is stronger for women's farm work time than for men at all times. This is in line with earlier

Table 3. Selected community characteristics.

Variable	Percentage
Distance to source of drinking water (km)	
<1	22.0
1-1.9	28.0
2-2.9	20.7
>2.9	29.3
Mean	2.10
SD	1.49
Distance to forest (km)	
<0.6	36.7
0.6-1.0	41.3
1.1-1.5	7.3
1.6-2.0	11.3
>2.0	3.4
Mean	0.9
SD	0.6
Distance to public primary school (km)	
<2	33.3
2-3	50.7
>3	16.0
Mean	2.4
SD	1.5
Distance to public secondary school (km)	
<2.0	8.7
2-3	34.6
>3	56.7
Mean	4.1
SD	2.0

Source: Field Survey (2009).

evidence by Rahji (1999) who opined that the age of the farmers is inversely related with their farm work time. Marital status impacted positively on men's farm work time, while it impacted negatively on women's farm work time during the two seasons, implying that married men spent more time in the farm compared with single, while married women spent less compared with single.

Farm size and income are positively associated with farm work time of men and women at all times, meaning that an increase in farm size, say by one hectare, leads to increase in farm work time of men and women. This is perhaps not a surprising result because the larger the farm size *ceteris paribus*, the higher the income realized from farm and since the respondents' primary source of income is farm, the larger income will then motivate the farmers to expand the farm size which will then require more time. This is in accordance with Rahji (1999), who reported that the higher the farm income, the more the time allocated to farm work. In the same vein, income is

directly linked with the farm work time of men and women at all times. It follows that for every naira increase in income, there will be increase in farm work time of men and women. This is because *ceteris paribus*, an increase in income will serve as incentives to the farmers to want to expand their scales of operation so as to earn more income.

Household size is directly related to daily farm work time of men and inversely related to daily women's farm work time. This connotes that increase in household size will lead to an increase in men's farm work time and a decrease in women's farm work time. This could be attributed to the fact that as the household size increases, the need for the men as the bread winners of their households to provide basic needs of life like food, clothing and shelter place the pressure on them to stay longer in the farm. The reason for a decrease in women's farm work time is as a result of the burden of housework due to increase in the number of family members who are mainly care receivers. This is in agreement with Yang et al. (2004) who reported a direct link between household size and farm work time of men and an indirect link with that of the women.

Result shows that availability and access to food processing machine is associated with more time spent on farm work by women farmers during the rainy season. This is due to the fact that availability and access to food processing machine such as grinding machine will lead to a reduction in the amount of time spent in cooking food. The time gained from food preparation was then substituted for farm work, hence, increase in farm work time. Farm machineries do matter in time allocation of men respondents most especially during the rainy season. The technology is associated with lesser time spent on farm work by men during the rainy season. This is because the use of farm machineries such as knapsack sprayer and oil palm processing machine help to reduce the drudgery associated with farming which leads to reduction in the time spent by men respondents on the activity during the rainy season.

Determinants of time allocation to non-farm work by gender and season

As shown in Table 5, the age of farmers is inversely correlated with their daily non-farm work time at all times. The effect of age is more on the two genders' non-farm work time during the dry season than the rainy season and the influence is stronger on men's non-farm work time than that of the women. Years of schooling are unequivocally directly associated with women's non-farm work time during the dry season. This may be basically due to the fact that the higher the level of education of the women respondents, the greater the opportunity to be employed in non-farm market work. Also, with higher level of education, the women respondent is expected to have acquired time management skill which will then allow her to spend lesser time in the kitchen and

Table 4. Estimate of Tobit regression for the determinants of farm work time by gender and season of the year.

Variable	Rainy Season				Dry season			
	Men		**Women**		**Men**		**Women**	
	Marginal effects	**t-value**	**Marginal effects**	**t-value**	**Marginal effects**	**t-value**	**Marginal effects**	**t-value**
Age	-0.0356*** (0.0125)	-2.85	-0.2474*** (0.0810)	-3.05	-0.0324** (0.0159)	-2.03	-0.6475*** (0.2147)	-3.02
Education	-0.0051 (0.0049)	-1.03	-0.0383 (0.0330)	-1.16	-0.0437 (0.1977)	-0.22	-0.0223 (0.0352)	-0.63
Marital status	0.7140*** (0.1552)	4.60	-0.5170*** (0.1176)	-4.40	0.0232 *** (0.0063)	3.69	-0.5554*** (0.0815)	-6.81
Household size	0.0001*** (0.0000)	3.70	-0.0957*** (0.0300)	-3.19	0.0001 ** (0.0000)	2.13	-0.0529*** (0.0086)	-6.13
Farm size	0.1963** (0.080)	2.43	0.1755* (0.1046)	1.68	0.1800 * (0.0928)	1.94	0.08253*** (0.0262)	3.15
Income	0.0042*** (0.0014)	3.09	0.0006** (0.0003)	2.11	0.0009* (0.0005)	1.66	0.0003* (0.0002)	1.88
Child-5	0.1056 (0.0825)	1.28	-0.1732 (0.2189)	-0.79	0.0748 (0.1053)	0.71	-0.0243 (0.0233)	-1.04
Seniors	0.0183 (0.0976)	0.19	-0.0594 (0.2583)	-0.23	0.0564 (0.1221)	0.46	-0.0276 (0.0276)	-1.00
Food processing machine	0.0398 (0.0975)	0.41	0.0062*** (0.3548)	2.84	0.0468 (0.1243)	0.38	0.0330 (0.0278)	1.19
Farm machineries	-0.0966* (0.0558)	-1.73	-0.02384 (0.2606)	-0.91	-0.0761 (0.1698)	-0.45	-0.00643 (0.0067)	-0.96
Distance to forest	-0.0355 (0.0571)	-0.62	-5.43e-06 (0.0000)	-0.13	-0.0527 (0.0722)	-0.73	-0.1494 (0.1595)	-0.94
Distance to water source	-0.0452 (0.0397)	-1.14	-0.0440 (0.1502)	-0.29	-0.0627 (0.0502)	-1.25	0.0722 (0.2490)	0.29
Distance to primary school	-0.0000 (0.0000)	-1.21	0.0000 (0.0000)	-0.86	-0.0835 (0.0586)	-1.43	-0.0000 (0.0000)	-0.26
Distance to secondary school	-0.0160 (0.0303)	-0.53	-0.0195 (0.0119)	-1.64	-0.0576 (0.0389)	-1.48	-0.3544 (0.3950)	-0.90
Number of obs.	150		150		150		150	
Constant	7.15115*** (0.9497)	7.53	2.7975*** (0.7896)	3.54	5.2812*** (1.0669)	4.95	3.2444*** (0.8319)	3.90
Sigma	0.5049 (0.0300)		0.3367 (0.0776)		0.6078 (0.0468)		0.4248 (0.0827)	
Prob>chi2	0.0000		0.0000		0.0000		0.0000	
Pseudo R2	0.4170		0.3674		0.4060		0.3673	
Log likelihood	-113.1848		-156.2631		-132.6620		-165.7507	

Notes: Marginal effects (rather than coefficients) are shown in the table. The marginal effects are computed at the mean of regressors, for dummy variables it is given for a discrete change from 0 to 1. The reference groups for the categorical variables are: single and not available. *** Significant at 1%, ** at 5% and * at 10%. The figures in parenthesis are standard error of the mean. **Source:** Field Survey (2009).

Table 5. Estimate of Tobit regression for the determinants of non-farm work time by gender and season.

Variable	Rainy Season				Dry Season			
	Men		Women		Men		Women	
	Marginal effects	t-value	Marginal effects	t-value	Marginal effects	t-value	Marginal effects	t-value
Age	-0.0222*** (0.0060)	-3.70	-0.0129*** (0.0038)	-3.36	-0.0398*** (0.0061)	-6.56	-0.0161*** (0.0040)	-4.06
Education	0.0891 (0.0696)	1.28	0.0110 (0.0225)	0.49	0.0483 (0.0699)	0.69	0.0443** (0.0190)	2.34
Marital status	0.1967 (0.1907)	1.03	-0.1305* (0.0718)	-1.82	0.2431 (0.1892)	1.28	-0.6056* (0.2530)	-2.39
Household size	0.1792* (0.1011)	1.77	-0.1027* (0.0529)	-1.94	0.2029 * (0.1190)	1.71	-0.1139** (0.0552)	-2.06
Farm size	-0.0531*** (0.0154)	-3.46	-0.0182** (0.0080)	-2.27	-0.0509 *** (0.0152)	-3.34	-0.0132* (0.0068)	-1.96
Income	0.0001*** (0.0000)	3.03	0.0001*** (0.0000)	3.34	0.0001** (0.0000)	3.57	0.0001*** (0.0000)	4.11
Child-5	0.0108 (0.0075)	1.44	-0.0235* (0.0126)	-1.88	-0.0144 (0.0508)	-0.28	-0.0263* (0.0149)	-1.76
Seniors	0.0214 (0.0501)	0.43	-0.0284 (0.0176)	-1.61	-0.1353 (0.1201)	-1.13	-0.0197 (0.0148)	-1.33
Food processing machine	0.0712 (0.1188)	0.60	0.4073* (0.2424)	1.68	0.0148 (0.0119)	1.23	0.2228 (0.1496)	1.49
Farm machineries	0.1722 (0.1615)	1.07	0.0228 (0.0178)	1.28	0.0588 (0.1626)	0.36	0.0218 (0.0204)	1.07
Distance to forest	-0.1218 (0.0981)	-1.24	-0.0086 (0.1448)	-0.06	-0.0072 (0.0990)	-0.07	-(0.0034) (0.1217)	-0.03
Distance to water source	-0.0216 (0.0482)	-0.45	-0.0171 (0.0713)	-0.24	-0.0386 (0.0487)	-0.79	-0.0639 (0.0599)	-1.07
Distance to primary school	0.0064 (0.0539)	0.12	-0.1415 (0.1025)	-1.38	0.0680 (0.0544)	1.25	-0.0919 (0.0857)	-1.07
Distance to secondary school	0.0128 (0.0369)	0.35	-0.0494 (0.0745)	-0.66	0.0372 (0.0372)	1.00	-0.0253 (0.0464)	-0.55
Number of obs.	150		150		150		150	
Constant	5.2421 *** (0.6088)	8.61	3.0947*** (0.5389)	5.74	5.9269*** (0.5688)	10.42	3.6550 *** (0.4475)	8.17
Sigma	0.6153 (0.0361)		0.9121 (0.0530)		0.6211 (0.0360)		0.7656 (0.0452)	
Prob>chi2	0.0000		0.0000		0.0000		0.0000	
Pseudo R2	0.4680		0.5336		0.4127		0.5028	
Log likelihood	-141.5346		-129.3772		-141.8160		-134.5544	

Notes: Marginal effects (rather than coefficients) are shown in the table. The marginal effect is computed at the mean of regressors, for dummy variables it is given for a discrete change from 0 to 1. The reference groups for the categorical variables are: single and not available. *** Significant at 1%, ** at 5% and * at 10%. The figures in parenthesis are standard error of the mean. **Source:** Field Survey (2009).

releasing more time for non-farm work. The marital status of women respondents significantly lowers their non-farm work time at all times. However, the burden of the housework which has to be substituted for by the non-farm work time is responsible for the negative sign. Also,the influence of marital status is stronger on women's non-farm work time during the dry season than rainy season.

Farm size has an inverse relationship with farmers' daily non-farm work time at all times, implying that the larger the farm size, the lesser the daily non-time. The influence of farm size is stronger on men's non-farm work time than women's non-farm work time and also during the rainy season than dry season for the two genders. This is true because, increase in farm size implies more requirements in terms of time in the farm, which has to be supplied by the respondents if hired labor is not available. Income is positively correlated with daily non-farm work time of the respondents. Note that income had the same magnitude on non-farm work time of all at all times but the level of significance varies. This is because, as the income increases, the farmer will be encouraged to work more on non-farm market work so as to earn more. The household size shows a strong positive association with time allocated to non-farm work by men and a strong negative relationship with women's time during the rainy and dry seasons.
Child-5 is inversely correlated with daily non-farm work time of women at all times. The association is stronger during the dry season than during the rainy season. This may not be unconnected with the fact that the women gender is the one responsible for the care of the young and elderly ones. The time required to take care of them lowers the time available for non-farm work. Food processing machine is linked with more time allocated to daily non-farm work by women gender most especially during the rainy season. Reason being that those who have access to the technology are able to free some time from food preparation and substitute the saved time on non-farm work than those that did not have.

Determinants of time allocation to housework by gender and season

The results in Table 6 show that age of the women respondents is a strong factor which has a positive association with their housework time. This may be simply due to the fact that as women farmers grow older, the strength to be involved in outside strenuous activities decreases, hence more time freed for house chores and leisure. Marital status of women is directly linked with their housework time at all times. Married women allocated more hours to housework during the rainy season and dry season than single respondents. The association is stronger during the dry season than rainy season. The results concur with the findings of Newman (2002) and Skoufias (1993).

Income shows a negative relationship with the daily housework hour of both genders during the rainy and dry seasons. It has the same influence on men's and women's time during the rainy season but the influence is stronger on men's housework time than that of women during the dry season. This may be because the wealthier households can pay for the services of those who will do the housework for them which in turn lead to reduction in their own involvement in housework. Household size shows a strong negative association with time allocated to housework by men during the rainy season and a positive association with housework time of women during the rainy and dry seasons. An additional household member lowers the daily housework time of men during the rainy season, while it increases women's time during the rainy and dry season. The relationship is stronger during the dry season than rainy season. This is because men as the bread winners of their homes are expected to have little or no time for housework, whereas, women as the home makers have the responsibility of staying longer at home. The large family size will force the men to stay longer in the farm and other non-farm work so as to be able to meet the supply of basic needs of the numerous household members.

The increase in the variable will force the women to stay longer at home hence the positive coefficients.
Child-5 is directly correlated with the time allocated to housework by women at all times. The association is stronger during the dry season than rainy season. This is because children in this age group need extra attention which is to be supplied by the women members of the household according to the tradition in the study area. This is in line with Skoufias (1993) and Mueller (1984). Access to food processing machine is inversely correlated with the amount of time committed to housework by women respondents especially during the rainy season. Availability of home time – saving cooking technology led to a reduction in time spent cooking and hence housework time for women in the households where the technology is available compared with those that do not have access.

Distance to water source shows a strong positive association with farmers' housework time. The distance to the forest where farming household members gather firewood for cooking has a direct significant association with the time women respondents allocated to housework. The implication is that an increase in these variables results in an increase in the time that women allocated to housework at all times. The influence is more on time allocated during the rainy season than during the dry season. This is so because the farther away the water source and forest, the more the time it will take to go and come back to the farmers' homes, and the more the housework time. Distance to secondary school has positive significant influence on women's housework time at all times. The association is stronger during the dry season than rainy season. The explanation for this is that the farther away the secondary school, the more the time

Table 6. Estimate of Tobit regression for the determinants of housework time by gender and season.

Variable	Rainy Season				Dry Season			
	Men		Women		Men		Women	
	Marginal effects	t-value	Marginal effects	t-value	Marginal effects	t-value	Marginal effects	t-value
Age	0.0102 (0.0065)	1.57	0.0392*** (0.011)	3.52	0.0005 (0.0069)	0.07	0.0417*** (0.01195)	3.49
Education	-0.0108 (0.0164)	-0.66	-0.0197 (0.2428)	-0.08	-0.0261 (0.0175)	-1.49	-0.1529 (0.2278)	-0.67
Marital status	(0.3176) (0.2043)	-1.55	1.5452*** (0.3837)	4.03	-0.1006 (0.2170)	-0.46	1.8773 *** (0.4103)	4.58
Household size	-0.2280** (0.1084)	-2.10	0.0625*** (0.0179)	3.50	-0.0072 (0.0577)	-0.12	0.0957 *** (0.0251)	3.82
Farm size	-0.3274*** (0.1065)	-3.08	-0.2095 (0.1724)	-1.21	-0.1063 ** (0.0424)	-2.51	-0.1587 (0.1609)	-0.99
Income	-0.0001*** (0.0000)	-2.85	-0.0001*** (0.0000)	-2.99	-0.0001 *** (0.0000)	-2.22	-0.2.59e-06*** (0.0000)	-3.06
Child-5	-0.0319 (0.1329)	-0.24	0.1388*** (0.0330)	4.20	0.1093 (0.1150)	0.95	0.16419*** (0.0307)	5.36
Seniors	-0.0857 (0.1611)	-0.53	-0.0431 (0.2907)	-0.15	-0.1593 (0.1366)	-1.17	-0.1556 (0.2729)	-0.57
Food processing machine	-0.0405 (0.1283)	-0.32	-0.7503** (0.3705)	-2.03	-0.1174 (0.13642	-0.86	-0.1647 (0.29754)	-0.55
Farm machineries	-0.1486 (0.1740)	-0.85	0.5886 (0.3952)	1.49	0.0143 (0.1850)	0.08	0.1279 (0.2791)	0.46
Distance to forest	0.0625 (0.0754)	0.83	0.0833*** (0.0216)	3.85	0.0537 (0.0554)	0.97	0.0681*** (0.0231)	2.95
Distance to water source	0.0641 (0.0521)	1.23	0.2133 * (0.1116)	1.91	0.2565** (0.1131)	2.27	0.2359** (0.1102)	2.14
Distance to primary school	0.0012 (0.0582)	0.02	0.1383 (0.1348)	1.03	0.0357 (0.0619)	0.58	0.0751 (0.1263)	0.59
Distance to secondary school	0.0289 (0..0796)	0.36	0.3521*** (0.0823)	4.28	0.0450 (0.0399)	1.13	0.4100*** (0.0876)	4.68
Number of obs.	150		150		150		150	
Constant	3.9460*** (0.8788)	4.49	8.1128*** (0.9894)	8.20	4.4576*** (0.8589)	5.19	8.0135*** (0.7795)	10.28
sigma	0.6651 (0.0386)		1.0400 (0.0607)		0.7068 (0.0410)		0.8983 (0.0521)	
Prob>chi2	0.0000		0.0000		0.0045		0.0000	
Pseudo R2	0.3310		0.5850		0.2714		0.5682	
Log likelihood	-151.8727		-118.3391		-160.1408		-126.8003	

Notes: Marginal effects (rather than coefficients) are shown in the table. The marginal effect is computed at the mean of regressors, for dummy variables it is given for a discrete change from 0 to 1. The reference groups for the categorical variables are: single and not available. *** Significant at 1%, ** at 5% and * at 10%. The figures in parenthesis are standard error of the mean. **Source:** Field Survey (2009).

it will take the household children to and from the school. The non-availability of these children especially girls at home because of the long distance they have to cover before getting to school and back home makes the women respondents to do the housework themselves; hence increase in housework time.

CONCLUSION AND POLICY RECOMMENDATIONS

Years of schooling have positive significant effects on non-farm work time of women during dry season. It was suggested that skill – building and training of human resources be put in place as this is very paramount both in promoting agricultural development and increase their chances of earning more income from non-farm work.

Income is a strong determinant of time allocation of farming households at all times. Hence, a policy that will increase farmers' income will go a long way in reducing farmers' poverty rate. Direct supports for income increase may be through price support and input subsidies. Food processing machine has a direct influence on women's farm work time, while farm machineries have an indirect impact on men's farm work time. Time-saving food processing machine that will help in reducing food cooking time as well as availability and accessibility of farm machineries that will help in reducing drudgery associated with farming is required.

Distance to social amenities such as schools and water source influenced housework time positively. In order to reduce housework time therefore, government should prioritize public investment in infrastructure that reduces housework time, such as rural water projects within the vicinity of farmers that will ensure all year round water supply, and primary and secondary schools should adhere to UNESCO recommended daily 15 minutes' walk to- and from school.

In summary, the variables have a larger impact on women than on men. The study is in line with the time allocation theory that states that both economic and non-economic factors determine time allocation decisions of the household. Also, the results are to a large extent in line with previous research most of which are not from Nigeria. This makes the study unique most especially in the area of some variables introduced which were due to the peculiar nature of the study area.

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