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Gender time allocation and farming households' poverty in rural Nigeria

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This study investigates the influence of gender time allocation on farming households' poverty. It relies on primary data collected from 150 rural farming households comprising 150 men and 150 women farmers in southwest Nigeria during the rainy and dry seasons. The study finds that men's time allocation to farm work is significantly higher than that of the women's, while women's housework time is significantly higher than that of the men's. Furthermore, women committed more time to work than men did. The incidence of poverty was higher during the dry season than rainy season. Years of formal education and non-farm work time of both men and women significantly lowers household poverty during the rainy and dry seasons. Housework time of women aggravates household poverty during the two seasons. The study recommended: human capacity development, promotion of non-farm work and reduction in women's housework time in other to reduce farming households' poverty in Nigeria.

Key words: Gender time allocation, poverty, rainy and dry seasons, rural Nigeria.

INTRODUCTION

Time in economics is a scarce resource and it is one of the valuable resources available to individuals and families. However, it is one resource that is egalitarian in its distribution unlike others, but allocation differs. Time allocation to various activities is influenced by both economic and non-economic factors among which is gender [Kes and Swaminathan, 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 labor remains strong in industrialized and urban societies as well as agricultural and rural communities [Erdil et al., 2006].

Worldwide, most women and men work in jobs that are done predominantly by one sex [Elson, 1999]. Also, it is a well-established stylized fact across the globe that there is gender inequalities in time use with women doing more total and spending more time on unpaid work (non-market work) activities, while men spending more time on leisure and paid work (market work) [Antonopoulos, 2008; Antonopoulos and Memis, 2009]. Ilahi [2000] discussing the composition of male-female time tasks, explains that women work more than men in almost all regions. In sub-Saharan Africa, female allocated more time to work than male particularly when their inputs in non-System of National Account (SNA) production, namely domestic and care work, are included. A cross-country study which includes two countries from the region, South Africa and Kenya shows that girls spend more time on non-SNA work in the form of household work compared with boys [Ritchie et al., 2004]. This is also true for Nigeria where [NBS (National Bureau of Statistics), 2005] revealed that women devoted more of their time to unpaid activity in this order: child care (17.2 %), cooking (10.1%), care of the elderly (9.8%) and recreation (8.3%). Men used their time too on childcare

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(9.9%), recreation (8.2%), care of the elderly (8.2%), going to market (6.67%) and cooking (6.62%). Gender inequalities in labour markets and social exclusion that women experience in a variety of economic and political institutions form the basis for the greater vulnerability of women to chronic poverty [Cagatay, 1998].

Poor households depend heavily on their members' time and labor for the provision of goods and services that are essential for their well-being and survival. When faced with severe time constraints, and lacking the economic resources to access market substitutes, these households may have to resort to making tradeoffs between activities which may directly affect their members' well-being. These may be short-term intersectoral tradeoffs as well as intergenerational tradeoffs with far reaching consequences. The negative impact of these tradeoffs can be observed in various dimensions of "human poverty" such as food security, child nutrition, health, and education. For instance, time that has to be allocated to care responsibilities may cause individuals to forego certain responsibilities in subsistence agricultural production which may adversely affect agricultural output and consequently threaten household food security and compromise child nutrition and health. Conversely, time spent on agricultural production shaped particularly around seasonal labor requirements may lead to tradeoffs in the form of less time on care and domestic work which are done mostly by women. This may impede, among other things, the timely preparation and consumption of adequate food and adversely affect household and particularly children's nutrition.

In sub-Saharan Africa, the issue of time use and its relationship to consumption poverty is especially important because of the high workload carried by many. Households have a high probability of being consumption poor, so that any occasion to enable them to make a better livelihood, for example by shifting time from low- to high-productivity activities should be pursued. Furthermore, time use issues have strong gender dimensions, as African women often have to work long hours for domestic chores and the collection of water and wood apart from working in the fields or in other labor market activities. Although women do more total work, they have less access to money, measured in terms of either own income or assets, have less wealth, and less control over the economic processes they have contributed to [Ironmonger, 1996]. The heavy workload of women coupled with household poverty may require children to contribute time and labor to various tasks and therefore forego education, which in turn perpetuates the intergenerational transmission of poverty, and undermines efforts to meet the Millennium Development Goals (MDGs) hereafter [Bardasi and Wodon, 2006]. Blackden and Wodon [2006] also argue that women face time constraints due particularly to high burdens associated with household tasks and large families.

These constraints sharply reduce the ability of women to engage in market production and thus their assets are not being used in ways that is captured by income growth and income poverty statistics. However, Bussolo and Rafael [2010] and Backiny-Yetna et al. [2009], indicate that a higher share of labor income earned by women within a household tends to increase the share of total spending allocated by the household to investments in human capital, especially for children. In turn, these investments tend to reduce poverty in the long run. Therefore, the fact that women are working mainly at home on domestic chores without being paid may have in itself negative implications for future poverty reduction.

Poverty in Nigeria is pervasive although the country is rich in human and material resources that should translate into better living standards. NBS (National Bureau of Statistics) [2012] revealed that about 100 million people were living in poverty in 2010, which represents 69.0% of the Nigerian population. Sectorial disaggregation showed urban poverty rate of 61.8% and rural poverty rate of 73.2% in the same year. Evidence abound that among the rural poor, the farming households are poorer. For instance, FOS (Federal Office of Statistics) [1999b] and Olaniyan and Bankole [2000], reveal that in 1980, 1985, 1992, 1996 and 2004, the incidence of poverty were 32.1, 43.1, 38.7, 72.3 and 64.4% respectively for Nigerian farming households and 16.3, 37.2, 36.0, 58.0 and 59.2% for their non-farming counterparts respectively. This shows that poor families are more in farming households than in non-farming households over the period of years studies were carried out on the subject matter in Nigeria. The poverty level rises during the dry season especially at the beginning of the rains. Usually, this period is characterized by hunger and malnutrition leading to sickness, inability to do hard work on regular basis and absenteeism from work which have negative impact on farmer's quality of life as well as their productivity [World Bank, 1975]. Hence, most of poverty discussions in Nigeria are linked with agriculture [Canagarajah and Thomas, 1995; World Bank, 1996; Okumadewa, 1997; Okunmadewa, 2002; Omonona, 2001; Idowu et al., 2011; Apata et al., 2010]. This is because the bulk of agricultural production in Nigeria takes place in the rural areas. About 90% of the country's food is produced by small-scale farmers cultivating tiny plots of land who depend on rainfall rather than irrigation systems [IFAD (International Fund for Agricultural Development), 2007].

Land and labor have been identified as the major inputs into rain-fed agriculture and this makes agricultural production in Nigeria to rely much on these inputs especially labor (time). The importance of time allocation stems in part from the understanding that the welfare of individuals and households is a function not solely of their consumption, but also of their freedom in allocating time. Clearly, time use allocation and constraints, especially as they relate to labor markets, have implications for the

ability of households to escape poverty [Bardasi and Wodon, 2006].

Poverty is a function of time as well as income [Vickery, 1977] as reported by [Harvey and Taylor, 2000]. In Nigeria, attempt was made [Ikpi, 1991; Alimi et al., 2004] to examine time allocation, time allocation of children on household poverty and also the determinants of time allocation respectively. However, to the best of our knowledge, little or no attempt has been made by researchers in the country to examine the influence of gender time allocation on households' poverty. This study, therefore, attempted to fill the research gap by studying gender time allocation and rural farming households' poverty. It is only when the extent of poverty and its determinants as it relates to time allocation of rural farmers in the country is known, that a more robust poverty reduction programme can be put in place.

LITERATURE REVIEW

The researcher Ikpi [1991], relying on primary data collected from respondents, studied the household time allocation of rural farming households in Nigeria. The result of the analysis showed that intercultural and inter-state differences exist in the relative importance of, and time allocation to the identified three principal activity sectors within the rural household. The sectors are farming activity and non-farming activity (monetized activities) as well as home production activity sector (non-monetized activity). A total of 6,368 h is spent by family and non-family labour on all aspects of farm production in one cropping season for an average farm size of 6.10 ha. The gender disaggregation of time use shows that male labour supplied 49.94% (or 3,180 h) of all the work hours, while female labour accounted for the remaining 50.06% (or 3,188 h) of all the work hours. On an age basis, adults (males and females) accounted for 70.57% (or 4,494 h) of the total, while children who were up to working age (males and females) accounted for the remaining 29.43% (or 1,874 h) of all the total work hours. Rural farmers spend on the average, a total of 2,212 work hours on non-farm commercial activities and 1,776 work hours on non-monetized home production activity sector in a year. Gender and age disaggregated time use on the latter by an average household reveals that wives alone contribute 42.93% (or 750 h) of the total work hours per annum, while husbands contribute 18.36% (or 326 h) of the total home production work hours. The children put in a total of 39.41% (or 700 h) of all home production.

National Bureau of Statistics conducted a National Living Standard Survey (NLSS) in 2004 and included a module on time use. The analysis of time-use on household activities reveals that females devoted 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%). The males also allocated their time to

the same set of unpaid activities in this order: childcare (9.9%), recreation (8.2%), care of the elderly (8.2%), going to market (6.67%) and cooking (6.62%).

In another study, Newman [2002] examined the effects of women's employment on the allocation of paid and unpaid labour within the household using primary data collected from survey conducted in two regions of northern Ecuador in May and June 1999. A total of 558 households were surveyed, resulting in 2,541 individual observations from all members of each family (1,861 individuals were 10 years or older). Two types of time use data were collected because of their different strengths. The 24 h data are considered by many to be more accurate because they are more detailed and because it is easier for a respondent to remember what was done a day before. But 24 h data are more likely to miss unusual or irregular activities. They also asked for time dedicated to housework, rest, recreation and work each day in the previous week. Weekly data of this nature have the disadvantage of being less precise and more subject to recall error but they have the advantage of being less burdensome to the interviewee. The 24 h recall data were collected only for the female and the male heads of households. The weekly data were collected for all household members interviewed.

The results indicate that the total time worked by women in Cayambe was slightly less than that worked by women in Cotocachi, although the differences are not significant. Compared with men, women in both areas spent significantly more time working, including both paid work and housework. The ratio of men's time in total work to women's was only slightly higher in Cayambe (82%) than in Cotocachi (80%). Men worked about 8.5 h a day and women worked about 10.5 h a day and difference that is common in developing economy [Ilahi, 1999]. Not surprisingly, women in Cayambe spent more time performing paid work (229 min, or 3.8 h, a day) than women do in Cotocachi (171 min, or 2.9 h, a day), but women in both regions spent less time performing paid work than men do. Men in Cayambe spent significantly more time performing paid work (361min, or 6 h a day) than men do in Cotocachi (202 min, or 5 h, a day).

Ilahi [2000] studied seasonality in time use among farmers in Mozambique. The results indicate that time-use is not constant over the cycle of the year. In the April-July dry season, women spend less time in agricultural work and more time in the collection of fuel and water. In winter - associated with low overall labour use on the farm - there is a clearer division of labour across gender. In this season men work in farm activities and women do housework. This is altered in the late season when farm labour use is higher. Then, women contribute more work on own or others' farms but men reduce their contribution to housework. It appears also that women tend to consume a slightly higher proportion of household leisure than do men in the peak season than in the lean season.

In a similar perspective, Tu [2001] points out that due to

the typical nature of self-employed/family-based farm production, the length of women's time in farm work is somewhat irregular and flexible. The length of time varies with the natural process of farm production (especially crop) and seasons. Time flexibility results from the autonomy of their time allocation and use of other family labour as supplementary labour input. Furthermore, women may be engaged in two different tasks at the same time. The coexistence of different activities comes from the self-employment status the women have.

Gender differentials in household poverty reduction activities of rural children in Iwo local government area of Osun state, Nigeria was studied. The primary data collected was analysed using descriptive and inferential statistics as well as regression model. It was revealed that the amount of hours per week, involvement in domestic activities, and the proportion contributing to family welfare are significantly higher for girls than for boys. Boys rather than girls put in significant extra hours per week in family farm labour and hired labour; significantly less hours in household food preparation, and in caring for infants; and almost equal amount in street trading and other household chores. The study recommended gender-specific policies so as to free children for their future capacity building [Alimi et al., 2004].

Researcher [Akarro, 2008] studied the impact of time use differentials on poverty levels in the Eastern and Northern zones of Tanzania, using the data collected by NUFU project from sampled areas of Tanzania. Time use variable was collected for household head, spouse and the two eldest children. Time use on the various activities was collected by gender so as to assess the contribution of gender to poverty in the households. Tanzania is a vast country with diversified environment, people with different ethnic and cultural backgrounds and different main occupations. Thus sampling procedure was designed to capture the heterogeneity of the population units by stratifying the country into six zones. Thus analysis was done for the two zones only, namely The Eastern Zone and the Northern Zone using Principal Component Analysis.

The result of the analysis shows that contribution for spouse appears to be highly significant for Mtwara and Tanga, (significance levels of 0.011 and 0.049) respectively, implying that the contribution of spouse's total time in productivity to households welfare in these regions is eminent. The contribution of the spouse's time in productivity seems to explain the positive contribution of their households' poverty levels for Mtwara and Tanga. This shows that in Mtwara and Tanga women are more involved in productive activities than men do. For Arusha, the contribution by the Households Head (HH) total time in productivity is almost significant (0.060) but again it does not differ much from that of spouse (0.131). For the other remaining regions, the contributions from HH head do not differ much from the spouse. This implies that as

far as household's poverty status is concerned, women are equally involved in contributing to household's welfare. It was recommended that since women are equally involved in the production process, there is a need for policy makers to call for a greater push for the women's cause. Policy initiatives by both government and non-governmental bodies targeting reduction of gender imbalances are called for. This implies that the policy makers should equally involve women in fighting poverty. This study therefore examines the contributions of women and men farmers to households' poverty.

METHODOLOGY

This study was conducted in southwest geopolitical zone of Nigeria using Osun and Oyo states as the case study states. The selection of the zone was based on the fact that out of the three geo-political zones in the southern divide when the country was divided into northern and southern parts, the zone had the highest incidence of poverty in 2004. The poverty incidence in the zone was 43%, followed by south-south 35.1% and south-east 26.7% [NBS (National Bureau of Statistics), 2005]. Also, it is noteworthy that till date, there is no nationally representative time-use data in the country. The time-use pilot survey of 1999 which was sponsored by UNDP programmes and the UN statistics division was not published and a full blown survey could not be carried out due to the high cost associated with it [FOS (Federal Office of Statistics), 1999]. Hence, the random selection of Osun and Oyo states from the zone to minimize cost. Other states in the zone are: Ekiti, Lagos, Ogun and Ondo. The main inhabitants of the region are the Yorubas, one of the major ethnic groups in the country.

Southwest is one of the six geopolitical zones in Nigeria. It falls on latitude 6° to the North and latitude 4° to the south. The climate is equatorial with distinct wet (rainy) and dry seasons with relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. 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 favours the cultivation of crops like maize, yam, cassava, millet, rice, plantains, cocoa, palm produce, cashew, etc.

The primary data for this study were obtained through the use of pre-tested, well-structured questionnaire by trained enumerators during the rainy and dry seasons following [Wodon and Beegle, 2006]. The questionnaire used for data collection consisted of four parts:

− Household identification/composition required to record information on some household socio-economic characteristics and expenditure.
− 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 over a 7 – day reference week to take account of day – to- day variations in activities and allocation of time to the activities [35].
– Use of time summary schedule – a schedule used for summarizing, on daily basis, time spent by the respondents over various activities by major activity groupings using the United Nation (UN) document "Trial International Classification for Time-Use Activities".

A multistage sampling technique was employed for the study. The first stage is the purposive selection of southwest due to its poverty profile. The second stage involves the random selection of Osun and Oyo states to minimize cost. The stage that follows was the stratification of Local Government Areas (LGAs) of each selected state into urban and rural strata as indicated by the ministry of local government and chieftaincy offices of both states. The next stage was the random selection of two rural LGAs from each of the two states. Osun state has 30 LGAs while Oyo has 33 LGAs. The list of farming households from the villages selected was obtained from states' Agricultural Development Projects (ADPs). ADP is a national programme organized by the Nigerian government to foster agricultural development. However, the enumerators and the village heads assisted in compiling the list of multi-person farming households in the selected LGAs. The fifth and final stage was the random selection of representative multi-person farming households using probability proportionate to population size of the selected LGAs. From each household however, one man and one woman who were age 18-60 years (economically active members) were selected as the target sample. Data were collected in August and December 2009 representing the rainy and dry seasons respectively from the same households and respondents. In all, 86 households (comprising 86 men and 86 women) were sampled in Osun state, while 114 households (comprising 114 men and 114 women) were sampled in Oyo state. However, a total of 150 farming households and 300 respondents were used for the analysis due basically to incompleteness of 50 household questionnaires.
   Various analytical techniques such as descriptive statistics, Foster, Greer, and Thorbecke (FGT) poverty measures and the probit regression model were used in analyzing the data collected from the study area.

The poverty measure

The analysis of poverty was based on the P-alpha measure proposed by Foster et al. [1984], even though there are other poverty measures. This is because of its simplicity and ease of computation. The use of the FGT class of measures required the definition of a poverty

line, which was calculated on the basis of disaggregated data on expenditure during the two seasons. The FGT index is based on a single mathematical formulation as follows:

$$p_\alpha = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{z - y_i}{z} \right]^\alpha \qquad (1)$$

Where q is the number of households below the poverty line; n is the population size; y_i is the per capita expenditure of household i; z is the poverty line; α is the degree of aversion and takes on the values 0, 1, 2; and P_α = the weighted poverty index. In this study, no weight is attached to poverty, hence we consider only when α is 0, which is P_0.
   P_0 (Head–Count Index): The proportion of households living with per capita expenditure below the poverty line. It's a measure of the prevalence of poverty.

The poverty line

The analysis of poverty in Nigeria starts with the derivation of a poverty line. The poverty line is that level of welfare which distinguishes poor households from non-poor households [Mukherjee and Benson, 2003]. Also, poverty line is a predetermined and well-defined standard of income or value of consumption. Though several methods can be used to obtain the poverty threshold, in this paper, we followed the standard practice and chose per capita expenditure as a measure of welfare instead of per capita income. Some of the studies on poverty in Nigeria that used the per capita expenditure approach on poverty in Nigeria include [World Bank, 1996; FOS (Federal Office of Statistics), 1999a; FOS (Federal Office of Statistics), 1999b; Okunmadewa et al., 2005; Omonona, 2001; Obayelu and Awoyemi, 2010]. We also preferred to use household expenditure of farming households on basic needs (food and non- food) items because literature has shown that income, as a measure of welfare is prone to many flaws, especially in sub-Saharan African countries [OECD (Organization for Economic and Cooperation Development), 2008]. First, income varies from year to year and from season to season depending on farm production and prices. Secondly, most individuals are often reluctant to declare their true income and lastly, it is not the amount of income only that matters but the amount spent on consumption. So, an analysis of poverty limited to income of the household may underestimate (if the household borrows to augment consumption) or overestimate (if the household saves much of the income earned without spending on consumption items that would translate to improved welfare).
   However, many of the poverty studies in the country listed above made use of two-third of mean per capita

household expenditure as the poverty line. In this study, a relative approach was used in which a household was defined as poor relative to others in the same society (25, 50 and 75% of the median). We made use of 50% of the median household expenditure adjusted for household size as the moderate poverty line, while 25% of the median was taken as the line of extreme poverty following [OECD (Organization for Economic and Cooperation Development), 2008]. It is worth discussing why this poverty metric uses the percentage of the median rather than the mean household expenditure. First, the mean is highly subject to distortion, while the median is a robust metric that isn't influenced as much by outliers. The Median Per Capita Household Expenditure (MPCHHE) poverty metrics is relevant to this study due to high level of inequality in expenditure that is prevalent in the study area. Secondly, because the goal is to describe the economic situation with as few data points as possible, the median is a more accurate reflection of reality than the mean. Based on the poverty line, the poor households are those spending less than halve of the median household expenditure, while the non-poor are those spending greater than median household expenditure. The categorization of the poverty line is given as:

Extreme poor: those spending < 25% of MPCHHE
Moderately poor: those spending 50% of MPCHHE
Non-poor: those spending >50% of MPCHHE

Time allocation and household poverty

Probit Regression Model was used due to binary response [Idowu et al., 2011]. The specification is designed to analyze qualitative data reflecting a choice between two alternatives, which in this case, are the poor and the non-poor. The probit model thus represents a convenient way of quantifying the relationship between individual characteristics and households poverty status. The dependent variable takes the value of zero or one, where one represent being poor and zero otherwise. The choice of the probit model is premised on the fact that ordinary least squares assume a continuous dependent variable while in the case of poverty; the response is a binomial process. Therefore, the dependent variable which is the household median per capita expenditure is transformed into a dichotomous response variable y_h with binary outcomes taking two values ($\sum \{0,1\}$, with $y_h = 1$ if the household is poor and 0 otherwise. Based on the above, the probability of the poor is derived using the following probit equation:

$$Pr(y_h = 1)^s = \Phi[\sum \beta_k D_k] \qquad (2)$$

In the same vein, since the response is a binary outcome,

the probability associated with alternative event of being non-poor is represented by:

$$Pr(y_h = 0)^s = 1 - \Phi[\sum \beta_k D] \qquad (3)$$

Where Pr is the likelihood of being poor and where y_h = poverty status of household i
D_{ik} = k-th explanatory variable of the likelihood of poverty of household i
β_k = parameter associated with D_k
s = rainy season or dry season

The estimation of Equations 2 and 3 yields predicted probabilities given the set of values taken by the explanatory variables. We also analysed the elasticity of each explanatory variable on the probability of the effect. This is because policy recommendation becomes easier with elasticity analysis.

Selection of explanatory variables

The choice of explanatory variables in the specifications above is guided by previous studies as well as the objectives of this study. Hence the main explanatory variables are those of individual demographic as well as time allocation variables. The variables are:

- Age: It measures the age of men and women farmers in years. The coefficient is expected to be positive as reported by [Omonona, 2001; Omonona and Adenle, 2008].
- Years of formal education: This is the number of years spent in formal school. The expected sign is negative [Omonona, 2001; Omonona and Adenle, 2008; El-Osta and Morehart, 2008; Etim et al., 2010].
- Farm work time: This refers to the daily hours men and women allocated to farm work. It refers to all the activities related to agricultural production in the study area starting from planting of crops and rearing of animals to the marketing of their output as well as the amount of time spent per day on each activity by gender and season of the year. Planting, fertilizer application, weeding, harvesting, processing, compound gardening and livestock husbandry. It is worthy of note that land preparation which is also an important activity in agricultural production was not reported by the respondents. This may be because of the months in which data were collected which are August and December as earlier mentioned in the methodology. However, this is a paid activity, *Ceteris paribus*, it is believed that the more the time people spend working on monetized activity, the higher the income which should then translate to higher welfare, the coefficient is therefore, expected to be negative. Whether this would be the case for men and women cannot be determined a

Table 1. Selected individual characteristics by gender.

Variables	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	47.3
1-6	34.6	33.4
7-12	18.7	12.7
>12	6.0	6.6
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).

priori. If the distribution of paid farm work is not egalitarian, we might get asymmetric empirical results among men and women.
- Non-farm work time: This is the daily hours allocated to non-farm work by the respondents. These include the endeavours of respondents other than farming for the sole purpose of making money. The activities include: trading, motor cycling, hand crafts, hunting wildlife, collecting wild products and labour production. The coefficients are also expected to be statistically significant and negative. The reason being that this is also a paid activity.
- Housework time: This is the hours respondents allocated to housework in a day. The activities are stated explicitly as food preparation, care of the children and elderly members, house maintenance, water fetching and firewood gathering. Our expectations here are towards getting a statistically significant and positive impact on household poverty. Whether this will be true for men's and women's time cannot be determined *a priori* given the level of inequality in time allocation of men and women to housework in the study area.

Data limitations and other methodological problems

The study was confined to the selected men and women in rural farming households in Osun and Oyo states. Due to cost consideration, this study could not cover all the states of the federation, all the LGAs in the selected states, entire households in the selected LGAs and every member of the household in the selected households; hence this study limits itself to Osun and Oyo states and one man and one woman per household. Also, the survey could not be carried out every month of the year to really capture the seasonal differences in farming households' time allocation and consumption, hence the survey was carried out once during the rainy and dry seasons. The problems encountered during the survey and which imposed some limitations on the study include the following:

- First, lack of record keeping by household heads of the expenditure on food and non-food items. The values were supplied by household heads based on their memory recall which made some of the values to be unrealistic. The researcher had to check for validity before the analysis.
- Second, conducting a time use survey in highly illiterate rural areas with culturally poor sense of time with many not wearing watches posed a lot of challenges. The use of seven-day week and two times in a year rather than just one day once in a year, posed response burden. Some respondents discontinued the interview after the first four days, while some demanded for compensation before they cooperated further. This act was responsible for the low response rate in the questionnaire distributed (75.0%).

DISCUSSION OF RESULTS

Individual demographic characteristics

The individual demographic characteristics some of which explained household poverty are presented as follow:

As presented in Table 1, men are on the average older than women with the mean age difference of 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 percent and 47% of men and women 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 (National Bureau of Statistics), 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

Table 2. Daily time allocated to farm work, non-farm work, housework and leisure in hours.

Activities	Rainy season			
	Mean	Standard deviation	Minimum	Maximum
Men				
Farm work	7.59^{gs}	0.60	6.00	9.00
Non-farm work	4.74	0.98	3.00	7.00
Housework	4.46	1.65	1.26	5.95
Leisure	7.21^{gs}	0.12	6.30	11.00
Women				
Farm work	6.22	0.65	5.00	8.00
Non-farm work	4.27	1.16	0.00	6.00
Housework	8.15^{g}	1.62	4.30	10.70
Leisure	5.36	0.24	4.6	8.70
Dry season				
Men				
Farm work	6.31	0.56	5.00	7.00
Non-farm work	5.10	1.47	3.00	7.50
Housework	4.37	0.87	2.30	6.30
Leisure	8.22	0.80	7.00	9.50
Women				
Farm work	5.08	0.61	4.00	6.00
Non-farm work	4.46	0.42	1.00	6.00
Housework	9.17^{s}	1.60	4.80	10.20
Leisure	5.29	0.16	6.70	9.20

Note: g = significantly higher than that of the opposite gender at P=0.5, s = significantly higher than the other season at P=0.5. Source: field survey (2009).

adopt modern improved techniques of production or operation because of their lack of education. Not surprisingly, the majority of the respondents are married. This is because the respondents are individuals who are 18 years or more and under the constitution of Nigeria, an individual that is 18 years 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.

Time allocation of respondents by gender and season

The analysis in Table 2 shows that men spend between 6 and 9 h of their day in the farm during the rainy season, while it is 5 and 7 h during the dry season. The mean hours spend in the farm by them stood at approximately 8 and 6 h during the rainy and dry season respectively. Women on the other hand spend between 5 and 8 h working on the farm during the rainy season while it is between 4 and 6 h during the dry season. The mean farm work time during the rainy season was about 6 hours and

about 5 h during the dry season. This implies that men and women farmers allocate significantly higher time to farm work during the rainy season than during the dry season and men allocate more time than women. The difference between men and women time is also significant. This could be because of the high demand for farm labour during the rainy season because agricultural production in the study area is still rain-fed. Gender disparity in farm work could have its explanation rooted in the cultural belief that men are the supposed bread winners of their homes and will have to work more on the farm so as to be able to provide for their households. This however contradicts the findings of [Ikpi, 1991] who opined that women devoted more of their time endowment to agricultural activities than men.

Men in the study area allocated averagely 4 h to market non-farm work during the rainy season and 5 h during the dry season, while women allocated 4 and 5 h respectively. The minimum hours spent by men and women during the rainy season was 6 and 0.00 h respectively, while during the dry season it was 3 and 1 h respectively. The maximum hour spent on non-farm work was 8 h for men during the rainy season, 6 h during the

Table 3. Average monthly expenditure of farming households on food and non-food items.

Items	Rainy season		Dry season	
	Average monthly expenditure (₦)	Percentage of total	Average monthly expenditure (₦)	Percentage of total
Food	14728.60	62.9	11465.23	62.7
Clothing and foot wear	1499.80	6.4	980.37	5.4
Rent	85.07	0.4	85.07	0.4
Health care	862.16	3.7	498.78	2.7
Children Education	2105.45	9.0	1700.32	9.3
Fuel and Lightning	703.19	3.0	500.13	2.7
Transportation	879.14	3.8	945.87	5.2
Other Expenditure	2570.26	11.0	2097.68	11.5
Total Non-Food	8705.08	37.1	6808.22	37.3
Total (Food + Non-Food)	23433.68	100.0	18273.45	100.0
Median per Capita Household Expenditure(MPCHHE)	4368.50		3723.92	
Poverty line (50% of MPCHHE)	2184.25		1862.00	

Source: field survey (2009).

dry season and 6 h for women during the two seasons. This implies that men spent slightly though not statistically significant higher time on non-farm work than the women during the rainy and dry seasons. The reason may be because men as the supposed bread winners according to cultural norms are expected to work more on income earning activities. Not surprisingly, both men and women allocated more time to non-farm work during the dry season than during the rainy season. This could be because the burden of farm work is greatly reduced during the dry season, and hence more time freed for non-farm activities. The differences are not significant for the two during the two seasons. The revelation however concurs with [Newman, 2002] who opines that men allocated more time to market activities than women.

The analysis shows that mean hours spent on housework by men during the rainy season stood at nearly 5 h, while for the women, it was 8 h and varies from 4 to 11. During the dry season, the mean hours committed to housework by men was about 4 h which varies from 2 to 6. Women spent on the average 9 h with minimum of 5 h and maximum of 10 h. It then follows that, contrary to paid farm and non-farm work, women allocated significantly higher time to housework during both seasons than men do. The difference is also significant between seasons. The gender difference may not be unconnected with the fact that in the study area as it is in most African countries, the responsibility for housework falls mainly on the shoulder of the women according to their culture. The difference in time use observed during the rainy and dry seasons could be due to scarcity of potable water in the study area which becomes scarcer during the dry season. The findings confirm earlier evidence by [Newman, 2002; Ikpi, 1991].

Determination of poverty incidence

The poverty line as specified in the methodology was used to define the poverty status and aid in classifying the farmers into poor and non-poor groups. Table 3 shows the summary of farming households' expenditure on both food and non-food items during the rainy and dry seasons. The mean household size in the study area stood at 6. As shown in the table, during the rainy season the farming households' monthly MPCHHE is ₦4368.50 while the 50% of MPCHHE stood at ₦2184.25 with the poverty incidence of 44.1%. During the dry season however, MPCHHE is ₦3723.92 while the 50% of MPCHHE is ₦1862.00 with poverty incidence of 48.7%. The figures are somewhat higher than 43% reported by [8] for the zone. This is probably because of the difference in methodology used, [8] used two-third of the mean per capita expenditure. It could also be as a result of worsened poverty situation in the zone since 2004 when NBS collected its data. The poverty incidences obtained at the two seasons showed that poverty is on the increase among farmers and they are poorer during the dry season than raining season which confirms earlier evidence by [35, 26, 46] that poverty is more rampant among farmers during the dry season (hunger season). It should be pointed out, however, that the poverty line used in the current study is far below the internationally recognized level of one US $/day. At the time of this study, the average official and parallel market exchange rate was $1 to ₦148.70 and ₦155.00 respectively.

Determinants of household poverty by gender factors

The results of the influence of respondents' demographic

Table 4. Result of the estimates of gender time allocation and household poverty during the rainy season.

Variables	Men			Women		
	Coefficients	P>Izl	Elasticity	Coefficients	P>Izl	Elasticity
Age	0.0286 (0.0156)	0.458	1.7373 (0.9830)	0.0031 (0.0146)	0.834	0.1439 (0.6868)
Education	-0.0161*** (0.0037)	0.000	-0.1085*** (0.0292)	-0.0180*** (0.0042)	0.000	-0.0858*** (0.0238)
Farm time	-0.0151 (0.0403)	0.704	-0.0114 (0.0428)	-0.6175 (0.3833)	0.107	-0.0352 (0.0220)
Non-farm time	-0.0012*** (0.0004)	0.007	-0.0072*** (0.0029)	-0.0047*** (0.0010)	0.000	-0.0078*** (0.0021)
Housework time	0.04631 (0.2296)	0.814	0.0734 (0.2600)	0.0069** (0.0025)	0.043	1.3095** (0.5940)
Constant	-4.2017*** (1.3409)	0.002		-4.6843*** (1.3676)	0.001	
Prob > chi^2	0.0000			0.0000		
LR chi2 (5)	59.49			71.28		
Pseudo R^2	0. 4138			0.5017		
Log likelihood	-45.0264			-50.7032		
Number of Observation	150			150		

Note: The dependent variable is the poverty incidence. Figures in parentheses are the standard errors of the mean. *** Significant at 1% and ** at 5%. Elasticity evaluated at the mean. Source: field survey, 2009.

factors (age and years of formal education) as well as time allocation factors (farm work, non-farm work and housework) time on household poverty during the rainy and dry seasons are shown in Tables 4 and 5. We reported both the coefficients and the elasticity. The rural farming household poverty elasticity was reported so as to see the degree to which household poverty responds to changes in gender factors. The two estimates were computed from probit regressions as stated in the methodology. On the aggregate, the included variables are all highly statistically significant determinants of household poverty as revealed by the probability values. The estimated coefficients confirm most of our a priori expectations.

Determinants of household poverty by gender factors during the rainy season

The analysis shown in Table 4 shows that the combined effect of both the individual demographic characteristics and time allocation variables of men and women respectively explained about 41.4% and about 50.2% of the total variation in household poverty level as shown by

their R^2. This indicates that the models have fairly good fit to the data.

As shown in the table, years of formal education of both men and women significantly reduce the probability of household being poor. The men's and women's education elasticity of household poverty is -0.1085 and -0.0858 respectively. The values of the elasticity imply that if men's and women's education is increased by 100%, household poverty is more likely to reduce by 10.9% and 8.6% respectively. This means that, equivalent percentage increase in gender education will lower disproportionately the farming household poverty. This is so because the highly educated ones are better able to adopt new improved agricultural technologies to raise productivity and income than the uneducated ones. Also, education helps in controlling the rate of child birth and prevent under age marriage; hence reducing the child dependency ratio in such educated farming households. The difference observed between men and women could perhaps be due to the disparity in the level of schooling of the two as revealed by the descriptive analysis.

Non-farm time of both men and women is negatively correlated with farming households' poverty level. The implication of this is that increases in the non-farm work

Table 5. Result of the estimates of gender time allocation and household poverty during the dry season.

Variables	Men			Women		
	Coefficients	P>lzl	Elasticity	Coefficients	P>lzl	Elasticity
Age	0.0027 (0.0017)	0.113	1.3314 (0.8545)	0.0020 (0.0014)	0.131	1.2555 (0.8639)
Education	-0.0169*** (0.0036)	-0.000	-0.0912*** (0.0220)	-0.02305*** (0.0050)	0.000	-0.07517*** (0.0218)
Farm time	-0.0217 (0.0364)	0.650	-0.8879 (1.8299)	-0.0144 (0.2721)	0.958	-0.0601 (1.1314)
Non-farm time	-0.0108*** (0.0039)	0.006	-0.0572*** (0.0214)	-0.0068** (0.0030)	0.026	-0.0629** (0.0298)
Housework time	0.0120 (0.0389)	0.802	0.0513 (0.1721)	0.0550** (0.0254)	0.030	1.6224** (1.3067)
Constant	-3.8368*** (1.2409)	0.002		-5.3110*** (1.4142)	0.000	
Prob > chi2	0.0000			0.0000		
LR chi2 (5)	64.49			71.93		
Pseudo R2	0.4182			0.6795		
Log likelihood	-49.10			-42.8056		
Number of Observation	150			150		

Note: The dependent variable is the poverty incidence. Figures in parentheses are the standard errors of the mean. *** Significant at 1% and ** at 5%. Elasticity evaluated at the mean. Source: field survey, 2009.

time of men and women would lead to reduction in the probability of household poverty. The non-farm work time elasticity of household poverty is -0.0072 for men and -0.0078 for women. The value of men's and women's non-farm work time elasticity means that if the amount of time men and women committed to non-farm work is increased by 100%, the probability of household poverty will decrease by 0.7% and 0.8% indicating a rather low response for the two of them. Thus, equivalent percentage increase in men and women non-farm work time respectively will lower the household poverty disproportionately. This is not unconnected with the fact that all other things being equal, the more the time spent on income generating non-farm work, the more the income which can be spent on consumption and hence lowers the poverty level. Surprisingly, non-farm time of women has a more reducing influence on household poverty than that of the men. The explanation for this is not far-fetched. Women tend to spend their income earnings on every member of the household including their husbands and children which will then increase consumption, whereas, men prefer to spend theirs on non-household members and themselves alone.

The housework time of women farmers and farming households' poverty are directly related. This indicates that increases in the amount of time allocated to housework by women would increase household poverty and vice versa given other factors. The absolute value for the coefficient for women housework elasticity of household poverty is 1.3095, showing a high elastic response. This means that if the amount of time women allocate to housework is increased by 100%, household poverty will likely increase by 131.0%. This has to do with the fact that, housework is a non-income generating activity, the more the time women members of the household allocated to this important though with no direct monetary value attached to it, the higher the household poverty.

Determinants of household poverty by gender factors during the dry season

As shown in Table 5, the combined effect of both the individual demographic characteristics and time allocation variables of men and women respectively explained about 41.8% and about 68.0% of the total variation in household poverty level. This indicates that the models

have good fit to the data.

Again, as shown in the table, years of formal education of the two is statistically significantly indirectly correlated with farming households' poverty status. This suggests that increases in the years of formal education of men and women respondents lead to reduction in the probability of the rural farming households being poor *Ceteris paribus*. The men's and women's education absolute elasticity values of household poverty are -0.0912 and -0.0752 respectively. The values of the elasticity imply that if men's and women's year of formal education is increased by 100%, the probability of the likelihood of household poverty will decrease by 9.1 and 7.5% respectively. This means that, equivalent percentage increase in men's and women's education will lower disproportionately the farming household poverty. The reason is as earlier stated under the rainy season.

Non-farm work time of both genders is negatively correlated with farming households' poverty level. The implication of this is that increases in non-farm work time of men and women in the study area would lead to reduction in the likelihood of household poverty. The non-farm work time elasticity of household poverty is -0.0572 for men and -0.0629 for women. The value of men and women non-farm work time elasticity means that if men's and women's time allocation to non-farm work is increased by 100%, the likelihood of household poverty will decrease by 5.7 and 6.3% respectively, indicating a rather low response for the two. Thus, equivalent percentage increase in men's and women's non-farm work time respectively will lower the household poverty disproportionately. Again, the explanation for this is as stated under the rainy season.

The analysis shows that housework time of women and farming household poverty are directly related. This indicates that increases in the amount of time allocated to housework by women would likely increase household poverty and vice versa given other factors. The absolute value for the coefficient for women's housework time elasticity of household poverty is 1.6224, showing a high elastic response. This means that if the amount of time women allocated to housework is increased by 100%, the likelihood of household poverty will increase by 162.2%. What could be responsible for this has been discussed under rainy season.

Conclusions

Wide spread poverty has been a major challenge in Nigeria most especially among the farming folks. Evidence has shown that gender time allocation to various activities has implications for poverty status of households. Using primary data collected from farmers (men and women) in rural Nigeria during the rainy and dry seasons, the study examined the association between gender time allocation and farming households'

poverty. The study provides empirical evidence that while men allocated more time to paid farm and non-farm work than women, the reverse is the case for unpaid housework during the two seasons. The total workday is longer for women than for men (often considerably so during the dry season), as a result, women have less leisure than men at all times.

It is evidenced from the study that the incidence of poverty is still high and higher during the dry season than rainy season among the rural farmers. Also, years of formal education and non-farm work time of these farmers has a reducing effect on poverty, while women's housework time aggravated it during the rainy and dry seasons. Individual demographic factor drove poverty more during the rainy season than during the dry season, while time allocation factors influenced poverty more during the dry season compared with rainy season.

This study has revealed that education of both women and men reduces poverty in the study area, it is then suggested that there is a need to encourage human capacity development among respondents. The study also suggests that policy makers interested in alleviating the poverty of the farmers all year round is advised to make effort at freeing more time for men's and women's non-farm work. Since women are equally involved in the production process, there is a need for policy makers to call for a greater push for the women's cause. This implies that the policy makers should equally involve women in fighting poverty.

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