Tigabu Degu Getahun; Mekonnen, Jemberu Lulie

**Working Paper**

# Time use among rural households in Ethiopia: Implications for household welfare and productivity

ZEF Working Paper Series, No. 229

**Provided in Cooperation with:**
Zentrum für Entwicklungsforschung / Center for Development Research (ZEF), University of Bonn

*Suggested Citation:* Tigabu Degu Getahun; Mekonnen, Jemberu Lulie (2024) : Time use among rural households in Ethiopia: Implications for household welfare and productivity, ZEF Working Paper Series, No. 229, University of Bonn, Center for Development Research (ZEF), Bonn

This Version is available at:
https://hdl.handle.net/10419/301166

zef
Center for
Development Research
University of Bonn

# Working Paper 229

Tigabu Degu Getahun and Jemberu Lulie Mekonnen

## Time Use among Rural Households in Ethiopia: Implications for Household Welfare and Productivity

ISSN 1864-6638 Bonn, June 2024

PARI

ZEF Working Paper Series, ISSN 1864-6638
Center for Development Research, University of Bonn



## Authors' addresses

Tigabu Degu Getahun, Lead Researcher at FDRE Policy Studies Institute & Senior Researcher at the University of Bonn
Addis Ababa, Ethiopia
Email: tigyget14@gmail.com

Jemberu Lulie Mekonnen, Assistant Professor
Addis Ababa University
Addis Ababa, Ethiopia
Email: jemberu21@yahoo.com

# Time Use among Rural Households in Ethiopia

## Implications for Household Welfare and Productivity

Tigabu Degu Getahun and Jemberu Lulie Mekonnen

# Abstract

This study investigates the dynamics of time allocation within Ethiopian rural households. Analysis of daily time allocation shows a contrast in total work hours between men and women, with women shouldering a significantly higher burden. This disparity suggests an incidence of time poverty among women. Further exploration presents the gendered division of labor within households with unpaid work entirely delegated to women and children and men undertaking only paid work. Women's simultaneous engagement in paid and unpaid work reduces their leisure time considerably, especially in low-income households. Moreover, the study analyses women's time use patterns and children's nutritional outcomes. We also analyze infrastructural and service access on time allocation; we find that improved access, particularly to electricity and agricultural technologies, reduces women's unpaid work and increases the leisure of all members of the household.

Keywords: Time-Use, Unpaid Work, Gender Inequality, Children's Diets, Technology

JEL codes: J22, J16, B54

# Acknowledgements

The authors are grateful to Dr Prof. Joachim von Braun, Dr. Sundus Saleemi and Dr. Heike Baumüller for their support of the project. We are also grateful to our field team for their research assistance. Dr Martha Awo, University of Ghana, reviewed an earlier draft of the report, we thank her for her comments and suggestions. We also acknowledge the contributions of our collaborators at the Makerere University, Kampala; Dr Rosemary Emegu Isoto, Irene Nakamatte and Prof Bernard Bashaasha and the University of Ghana, Dr Felix Asante, Benjamin Bonzo and Ralph Sam. A special thanks is due to Mark Muwanguzi of the University of Pretoria.

This study was developed in the context of the Program of Accompanying Research for Agricultural Innovation (PARI), supported by the Federal German Ministry for Economic Cooperation and Development (BMZ).

# Table of contents

# 1 Introduction

Rural households engage in diverse activities that require time and other inputs. Given the diversity of rural household activities, the allocation of time among different activities is crucial. Time use is particularly important for women who do farming and household chores that normally do not count as "work". Compared to men, women tend to work more on caring for children and the elderly, cleaning and cooking, fetching water and collecting firewood, among others. Gender norms and the traditional role of women in a household puts more pressure on women than men in terms of time use. Time use in a household is linked with outcomes such as education, health and nutrition. These outcomes are determined by the household level of income and inputs in home production. On the other hand, time input determines both income and inputs to home production and hence is indirectly related to the outcomes (Agénor and Agénor, 2014). Some households may need to work long hours to meet basic needs which is known as time poverty. However, working long hours alone may not prevent income poverty (Bardasi and Wodon, 2010).

Time used for different activities such as farming, domestic work, caring for children and elderly, market, etc., vis-à-vis gender difference is an important subject in developing countries. Studies such as Charmes (2019) quantify time allocation to different paid and unpaid activities between men and women. Globally, the result reveals that more than two-thirds of the unpaid work is done by women. Women working more hours and experiencing time poverty are reported in several studies (see for example, Bardasi and Wodon, 2010). Following the time/work burden of women, interventions such as technologies or access to some services that help minimize the time-use burden of women have been considered. For example, Carrand and Hartl (2010) found that community-based water schemes in Kenya led to a decline in women's time burdens.

Studies on time use in developing countries are scanty. Particularly studies that relate household time use, particularly women's time use, with nutritional outcomes and productivity are not well developed. Since time poverty is one dimension of poverty, relating it with gender, service access, technology use, welfare and productivity outcomes helps to design impactful policy interventions. This study contributes to this thin line of research by providing evidence from the rural Ethiopian context. The main objective of this report is to assess the time use pattern among men, women and children in Ethiopian rural households and discuss implications for household welfare and productivity. In addition, it aims to identify whether time allocation differs among primary females following households' basic social service and technology access differences. The specific research questions that have been addressed are:

- What is the time use pattern of men, women and children in the study areas?
- What is the relationship between time use and the welfare of children in the study area?
- What is the relationship between time use and household productivity in the study area?
- What are the technologies that have a significant impact on the patterns of men's, women's and children's time use?

The report used the data collected from selected 509 Ethiopian rural households in 2022. Primary data on time use and other household characteristics have been collected from the Amhara and Oromia regions of Ethiopia. Time-use data was collected, in thirty-minute time intervals, for primary and secondary activities undertaken by the reference individual during the last 24 hours (starting yesterday at 4 am, and finishing at 3:59 am of today). In addition, data on households' socio-economic characteristics, dwelling, energy and water access; agricultural assets; use of social services; consumption expenditures; crop and livestock production and households' income has been collected.

The report is structured as follows: following the introduction in section 1, section 2 presents the data and methodology; section 3 describes the sample; section 4 presents households' dwelling

characteristics, assets and use of social services; section 5 presents households' expenditure/consumption; section 6 presents households' crop production and livestock ownership; section 7 presents the time use analysis findings; section 8 discusses the time use result; section 9 provides the conclusion and policy recommendations.

# 2 Data and Methodology

A three-stage stratified sampling was employed to select households for the survey, whereby region, Woreda and households are considered as a Primary Sampling Unit (PSU), Secondary Sampling Unit (SSU) and Tertiary Sampling Unit (TSU) respectively. In the first stage, we purposely selected the two biggest regions, which represent more than 75 percent of the country in terms of population. In the second stage, we randomly selected three woredas from the Amhara region and two woredas from the Oromia region from the list of our previous Agricultural Growth Program Impact evaluation study Woredas. In the third stage, households from within each sampled woredas were selected based on a fresh listing of households residing within each Woredas (district) and selected households randomly until the desired number of households was obtained.

Since it is very costly to conduct a full-scale enlisting exercise and generate a complete list of households in each of the five study woredas, we implemented a more cost-saving sampling strategy to enroll the target of the 90 sample households in each of the three study woredas in Amhara region and the target of 120 households in each of the two sample Woredas in Oromia region. That is, we implemented the right-hand side rule of thumb with the "$J^{th}$" jumping rule. Specifically, the enumerators enlist and interview every "$5^{th}$" household until they complete the target number of household surveys in each Woreda.

Table 1: Sample Distribution

| Region | Woreda | Sample size |
|---|---|---|
| Oromiya | Ejere | 120 |
| Oromiya | Bacho | 120 |
| Amhara | Moretena Jiru | 90 |
| Amhara | Angololab Tera | 90 |
| Amhara | Seya Debrena Wayu | 90 |
| Total | | 510 |

To achieve the research objectives, first, the sampled households have been described. This includes the description of the socio-demographic characteristics of households; households' dwelling characteristics, assets and use of social services; households' expenditure/consumption; and households' crop production, livestock ownership and production.

Time use data has been collected in thirty-minute time intervals for primary and secondary activities undertaken by the primary men, women and the eldest child (over age 10) during the last 24 hours from the date of the interview (starting yesterday at 4 am, and finishing at 3:59 am of today). Time use data has been classified into the following broad categories of activities: self-care, leisure, paid work, unpaid work, total work (the summation of paid and unpaid work); commuting; school work; and other activities. The time use patterns of men, women and children have been mainly analysed using graphical illustrations. Bar graphs have been used to compare the time use patterns of men, women and children in different activities. To learn more about the time use pattern of particularly women, time use patterns have been further described considering household characteristics, income and assets quintiles. The time use differences in different activities between men and women, and male and female children have been tested using t-tests.

Time use patterns and children's diets have been assessed using bar graphs, correlation and a regression model. We have collected data on diets for children up to 60 months of age on what they have consumed before the interview day. Following WHO (2007) guideline, we have considered the

following food groups: (1) grains, roots, and tubers; (2) legumes and nuts; (3) dairy products; (4) flesh foods (meats/fish/poultry); (5) eggs; (6) vitamin A rich fruits and vegetables; and (7) other fruits and vegetables. Then, children's dietary diversity score is computed as the number of consumed food groups. Children with lower than 4 diet diversity scores are categorized as having “low dietary diversity” and above 4 are categorized as “adequate diet diversity”. The time use pattern of women has been analysed using bar graphs and t-tests that compare women's time use in “low dietary diversity” and “adequate diet diversity” households. In addition, a correlation analysis that associates women's time use and children's dietary diversity score has been considered. Further, a regression model that links women's time use with children's dietary diversity score is specified. We have followed Komatsu, et. al. (2018) in the model specification where the dietary diversity score is a function of time use for an activity and individual and household characteristics. The model is specified as follows:

$$y_i = \beta_0 + \beta_j \mathrm{T}_{i,j} + \beta_2 \mathrm{X}_i + \mathrm{U}_i$$

Where;

$y_i$ = child is household i’s dietary diversity score;

$\mathrm{T}_{i,j}$= time use in household i in activity j in hrs

βi is the coefficient of time use of activity j; $\mathrm{X}_i$ is a vector of individual and household characteristics (household size, education level of household head, household head age (in log), land size (measured in acre) and household asset (the monetary value of household and agricultural assets in log)); and Ui is an error term. Time use of an activity is measured in different ways. The first basic measurement, which we have reported as the main result, is the time allocated to a particular activity. However, to deal with the bunded nature of time and the trade-off between various activities, we have considered the proportions of time used for paid and unpaid work and the total time used for paid and paid work by men and women as a robustness check. The model has been estimated using OLS.

Similarly, the relationship between time use and productivity has been analyzed using bar graphs, t-tests and correlations that compare and associate time use patterns of men, women and children with productivity. Moreover, a regression model regressing time use for an activity against productivity and household and individual characteristics has been employed. The above-specified model is used except the dependent variable is time used for an activity i (paid and unpaid work) and one of the independent variables is productivity. Productivity is measured in log yield - the value of crop harvested per cultivation area. For robustness purposes, we have used alternative time use measures: the share of time in activity i out of the total and the total time allocated by adult men and women for an activity. A similar modelling approach has been applied by studies such as Seymour and Floro (2021) and Gammage (2010). OLS has been employed to estimate the model.

The final objective attempts to find out how service access (markets, roads, water, electricity), and domestic and agricultural technologies use affect the time allocation of men, women and children is addressed similarly. Service and technology access differences and associations with time use patterns have been addressed using graphs, t-tests, correlations and regressions. The regression model is similar to the one specified above except the explanatory variables include service accesses and technology use. Electricity access is measured as a dummy variable (with and without access); distance to the nearest markets is measured in km; water access is measured in terms of the minutes it takes to make a single trip; agricultural technology use is measured as a dummy variable considering the application of fertilizers and use of pesticides in the plots. Since households have many plots, a dummy was constructed when households apply fertilizer and pesticides below and above half of the plots. Similar to the above models, for robustness purposes, we have considered the proportion of time allocated to a specific activity out of total time and the summation of time allocation for an activity by men and women. An OLS estimation technique has been employed.

## 2.1 Sample Description

The data consists of a sample of 509 rural households from the Amhara and Oromia regions of Ethiopia. Of these, 71 percent of households are from the Amhara region and 29 percent are from the Oromia region. Table 2 below shows household heads' age, marital status, literacy, school attendance, and the highest level of school attended. The data show all household heads to be men, with a median age of 46 years and married (99 percent). About 59 percent of household heads can read and write in at least one language. The highest school attended, for those who have attended a school, is primary level school. Specifically, about 66 percent of the household heads attended primary school, 13 percent attended secondary school and 20 percent attended informal school (such as religious schools).

Table 2: Socio-demographic characteristics of household heads

| | **Freq.** | **Percent** |
|---|---|---|
| **Household head marital status** | | |
| Single/Never married | 6 | 1.18 |
| Married | 503 | 98.82 |
| Total | 509 | 100.00 |
| **Household head literacy level (in terms of reading and writing in any language)** | | |
| No | 211 | 41.45 |
| Yes | 298 | 58.55 |
| Total | 509 | 100.00 |
| **Household head ever attended a school** | | |
| No | 206 | 40.47 |
| Yes | 303 | 59.53 |
| Total | 509 | 100.00 |
| **Household head highest level of school attended** | | |
| Pre-school | 1 | 0.33 |
| Primary | 199 | 65.68 |
| Secondary | 40 | 13.20 |
| Vocational Training | 2 | 0.66 |
| University | 1 | 0.33 |
| Informal School (Religious School/Church School) | 60 | 19.80 |
| Total | 303 | 100.00 |
| **Household head median age** | 46 | |
| | [min 30 years, max 75 years] | |

Households' dwelling characteristics, household assets and use of social services are provided in Table 3-Table 5. Table 3 describes households' dwellings and the type of toilet the household uses. A greater proportion of the households (about 90 percent) live either in a separate house or in rooms in the same compound house. Specifically, about 35 percent of households live in a separate house, 55 percent in rooms of compound houses and about 10 percent live in several buildings in different compounds. On the other hand, 30 percent of the households reported that they don't have a separate formal toilet facility. The type of toilet the household uses most of the time is unimproved pit latrine toilets. Nearly 67 percent of the households reported the use of unimproved pit latrine toilets. In addition, the result also reveals that the use of community-owned toilets or public toilets is less common.

Table 3: Dwelling and Toilets

| Type of dwelling | Freq. | Percent | Type of toilet | Freq. | Percent |
|---|---|---|---|---|---|
| Separate House | 175 | 34.38 | None | 153 | 30.06 |
| Room(s) [compound house] | 282 | 55.40 | Unimproved pit latrine | 339 | 66.60 |
| Room (s) [other type] | 2 | 0.39 | Improved pit latrine | 10 | 1.96 |
| Several buildings [same compound] | 1 | 0.20 | Community-owned latrine/Public Toilet | 3 | 0.59 |
| Several buildings [different compounds] | 49 | 9.63 | Other | 4 | 0.79 |
| Total | 509 | 100.00 | Total | 509 | 100.00 |

Table 4 shows households' access to electricity, the main lighting source for their dwelling and the types of fuels households use for cooking. Interestingly, about 58 percent of the sampled rural households have access to the electricity grid. Consequently, the main source of lighting for 53 percent of households is electricity. The next important sources of lighting are solar energy and kerosene where 30 percent and 11 percent of the households, respectively, reported the use of these sources for lighting their dwelling. Only 4 percent of the households reported the use of gas lamps for lighting. The rest of the lighting sources (such as generators and candles) are not common in the sampled areas. Although over 50 percent of the households reported access to an electricity grid, only 1 percent of the households use electricity for cooking. The common sources of fuel for cooking are wood and animal manure. About 93 percent and 70 percent of the household mainly use wood and animal manure, respectively, for cooking. Only 1 percent of the households reported the use of electricity for cooking. This implies that wood and animal manure are the most common sources of energy used for cooking. The low utilization of electricity access for cooking may be related to its cost and access to electricity-based household appliances. The use of charcoal, LPG, biogas, kerosene and crop residual as a source of energy for cooking is almost non-existent.

Table 4: Electricity, Source of Lighting and Fuel Type for Cooking

| Access to an electricity grid | Freq. | Percent | Types of fuel used for cooking | Percent |
|---|---|---|---|---|
| No | 212 | 41.65 | None, no cooking | 0 |
| Yes | 297 | 58.35 | Wood | 93.32 |
| Total | 509 | 100.00 | Charcoal | 0.2 |
| **Source of lighting** | | | LPG | 0 |
| Electricity (mains) | 271 | 53.24 | Bio gas | 0 |
| Kerosene | 58 | 11.39 | Electricity | 1.18 |
| Gas Lamp | 20 | 3.93 | Kerosene | 0 |
| Candles/torches | 6 | 1.18 | Crop residual/saw dust | 0 |
| Solar energy | 152 | 29.86 | Animal manure | 69.55 |
| Generator | 1 | 0.20 | Other | 0 |
| Other, specify | 1 | 0.20 | | |
| Total | 509 | 100.00 | | |

Households' main source of water is reported in Table 5. The main source of water for the households is public tap/standpipe which 66 percent of households reported as the source. The next important sources of water are tube wells or boreholes, protected wells (outside the house), and protected springs with 8 percent, 6 percent and 7 percent of households using the sources, respectively.

Table 5: Main Source of Water

| Source of water | Freq. | Percent | Source of water | Freq. | Percent |
|---|---|---|---|---|---|
| Piped into dwelling | 17 | 3.34 | Protected Well (outside house) | 31 | 6.09 |
| Piped to yard/plot | 7 | 1.38 | Unprotected Well (outside house) | 2 | 0.39 |
| Public Tap/standpipe | 336 | 66.01 | Protected Spring | 34 | 6.68 |
| Tube well or borehole | 42 | 8.25 | Unprotected Spring | 3 | 0.59 |
| Protected Well (inside the house) | 16 | 3.14 | Surface Water (Lakes, Rivers, Dams) | 19 | 3.73 |
| Unprotected Well (inside the house) | 2 | 0.39 | Total | 509 | 100.00 |

### *2.1.1 Household assets*

Table 6 shows the asset ownership of the households. The report considers whether any member of the household owned the listed assets. The common assets owned by the households are a cooking range/stove, radio/audio cassette/CD player, television, basic or smartphone, non-agricultural land, residential building and solar panels. Specifically, about 24 percent own cooking ranges/stoves, 52 percent own radio/Audio cassette/CD Player, 32 percent own television, 86 percent own basic phones, 30 percent own smartphone, 23 percent own non-agricultural land, 94 percent own residential building and 27 percent own solar panels. This implies that radio/CD players, mobile (basic or smart) and residential buildings are the most common types of assets owned by households. On the other hand, very few or no households reported ownership of a computer/laptop, rickshaw /cart, motorcycle /scooter, car, truck, sewing machine, landline phone, microwave oven, rice cooker, water flask, washing machine, air conditioner/cooler, domestic water pump and generator.

Table 6: Households asset ownership

| Asset | Percent of cases | Asset | Percent of cases |
|---|---|---|---|
| Cooking range/Stove | 23.58 | Landline Phone | 0 |
| Radio/Audio cassette/CD Player | 52.46 | Refrigerator/Freezer | 0.98 |
| Television | 31.83 | Microwave Oven | 0 |
| Computer/laptop | 0 | Rice Cooker | 0 |
| Sewing machine | 0 | Water Flask | 0 |
| Bicycle /Tonga | 1.38 | Washing Machine | 0 |
| Rickshaw /Cart | 0 | Air Conditioner/cooler | 0 |
| Motorcycle /Scooter | 0 | Domestic Water Pump | 0.39 |
| Car | 0 | Generator | 0.39 |
| Truck | 0.2 | Non-Agricultural land | 22.99 |
| Other transport equipment (Specify) | 0.79 | Residential Building | 93.71 |
| Basic Mobile Phone | 86.05 | Other | 0 |
| Smart Mobile Phone | 29.86 | Solar Panels | 26.52 |

### *2.1.2 Households use of social services*

For the households that use schools, health facilities, markets, roads, and input shops, Table 7 shows the average distance to these places nearest to the households' dwellings. The average distance to the nearest primary school is about 2 km. On the other hand, the average distance to the nearest secondary school is about 6 km. Primary schools are more accessible compared to secondary schools. Relatively, the nearest health facility that a household could use in time of illness is far. The average

distance to the nearest health facility is about 5 km with a minimum of 0.2 km and a maximum of 12 km. The nearest distance to different types of input and output markets is quite diverse. For example, while the households' distance to the nearest market where they usually get their supplies is about 6 km and to the market for agricultural produce is about 4 km, the average nearest distance to the agricultural input shop is about 2 km. The result implies that agricultural inputs are accessible nearby while accessing output markets either to buy or sell is relatively far away. The all-weather road is accessible without travelling much. As indicated in the table, the average distance to an all-weather road is less than a kilometer.

Table 7: Distance to the nearest school, health facility, market, road and input shop

| Distance to the nearest | Mean | Median | SD | Min | Max |
|---|---|---|---|---|---|
| Primary school | 1.887 | 1.5 | 1.459 | .02 | 6 |
| Secondary school | 5.942 | 6 | 3.226 | 1 | 12 |
| Health facility | 5.235 | 5 | 3.453 | .2 | 12 |
| Supplies market | 5.78 | 6 | 3.289 | .5 | 12 |
| All-weather road | .977 | .5 | 1.263 | 0 | 6 |
| Input shop | 2.152 | 2 | 1.985 | .01 | 9 |
| Market for agricultural produce | 4.038 | 3 | 3.421 | .02 | 12 |

Note: values below 1 percent and above 99 percent have been winsorized.

### *2.1.3 Households' expenditure/consumption*

Households' monthly expenditure on various goods and services is presented in Table 8. The data show how much households usually expend on goods and services including purchased and non-purchased items. When we look into the data, some households haven't spent anything on some expenditure items. To deal with such deviations, the median values are used to make sure the numbers are not affected by outliers. The top 5 goods and services that the households spend in a usual month are non-durable and personal goods, beverages and tobacco consumed at home, education, clothing and footwear, and food consumed at home. The median household spends 5200 birrs (98.5 USD) on food consumed at home; 5000 birrs (95 USD) on clothing and footwear (men's, women's and children's clothing, materials, tailoring, repair costs, shoes); 2000 birrs (40 USD) on education (school fee, boarding, school uniform, books and supplies, evening help, home tuition); 800 birrs (15 USD) on beverages and tobacco consumed at home (tea, coffee, soda, soft drinks, alcohol, cigarettes); and 500 birr (9.5 USD) on non-durable and personal goods (soaps, cosmetics, detergents, toothpaste) in a usual month. The median household spends 0 birr on housing/house rent; recreation and culture; other expenditures; furnishings, and furnishing maintenance; and household equipment and equipment maintenance. Given the households are rural, very low expenditure on housing, recreation and culture, furniture and household equipment are justifiable.

Table 8: Households' usual monthly consumption expenditure

| | Mean | Median | SD | Min | Max |
|---|---|---|---|---|---|
| Housing/House Rent | 143 | 0 | 824 | 0 | 7000 |
| Recreation and Culture | 19 | 0 | 150 | 0 | 1200 |
| Other expenditures | 30 | 0 | 103 | 0 | 800 |
| Furnishings, and furnishing maintenance | 1043 | 0 | 2937 | 0 | 17000 |
| Household equipment and Equipment maintenance | 1256 | 0 | 3324 | 0 | 24000 |
| Water, electricity, gas and other utilities | 67 | 30 | 99 | 0 | 500 |
| Miscellaneous goods and services | 121 | 100 | 94 | 0 | 500 |
| Communications | 163 | 100 | 158 | 0 | 1000 |
| Transport | 222 | 120 | 325 | 0 | 2000 |
| Food and Beverages | 458 | 300 | 536 | 0 | 2000 |
| Health | 1125 | 410 | 2171 | 0 | 15000 |
| Non-Durable and Personal Goods | 508 | 500 | 272 | 100 | 1500 |
| Beverages and tobacco consumed at home | 869 | 800 | 398 | 240 | 2500 |
| Education | 2296 | 2000 | 1887 | 0 | 10000 |
| Clothing and footwear | 5828 | 5000 | 4400 | 0 | 20000 |
| Food Consumed at home | 4578 | 5200 | 3006 | 300 | 12000 |

Note: values below 1percent and above 99percent has been winsorized. The average survey period exchange rate: 1 United States Dollar equals 53.75 Ethiopian Birr.

### *2.1.4 Crop production, livestock ownership and production*

Crop production status, number of plots cultivated, size of plots and crops cultivated have been surveyed for the Ethiopian main harvest season (Meher) that lasts from May to September. Almost all households (99.2 percent) were involved in farm production in the Meher season (June 2021 to September 2021). The number of plots cultivated ranges from 1 to 10, (Table 9). Most of the households (87 percent) cultivated between 2 and 6 plots of land. The most common number of plots that households cultivated are 3 and 4 plots. The median size of the plot cultivated is about 4.6 acre with a minimum of 0.6 acres and a maximum of 14 acres. The common types of crops cultivated are wheat, beans/peas, red teff, white teff, barley, sorghum, lentils, onion, maize and potatoes (Figure 1). According to Figure 2, almost all households (99.4 percent) own some form of small/large livestock or poultry. The common types of livestock owned are donkeys, cows, poultry, calves, bulls, sheep, goats, bees, chickens and others.

Table 9: Number of plots cultivated

| **Number of plots cultivated** | **Freq.** | **Percent** | **Number of plots cultivated** | **Freq.** | **Percent** |
|---|---|---|---|---|---|
| 1 | 14 | 2.77 | 7 | 26 | 5.15 |
| 2 | 55 | 10.89 | 8 | 16 | 3.17 |
| 3 | 115 | 22.77 | 9 | 7 | 1.39 |
| 4 | 122 | 24.16 | 10 | 2 | 0.40 |
| 5 | 90 | 17.82 | Total | 505 | 100.00 |
| 6 | 58 | 11.49 | | | |
| **Size of plot cultivated (acre)** | | | | | |
| | **Mean** | **Median** | **SD** | **Min** | **Max** |
| **Plot size** | 5.005 | 4.62 | 2.538 | .617 | 14.208 |

Note: plot size values below 1percent and above 99percent has been winsorized.

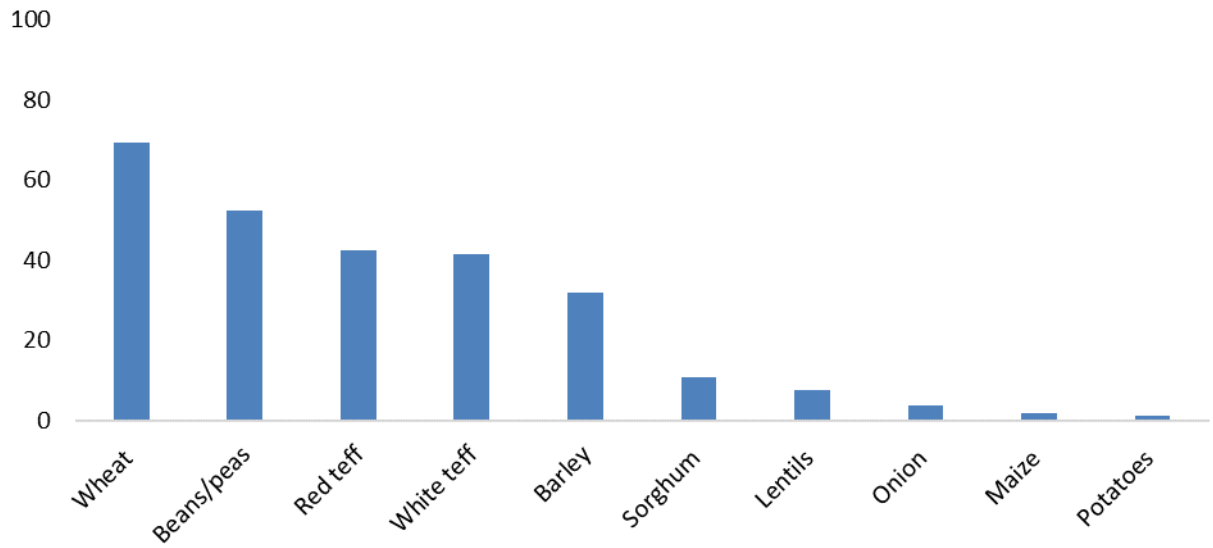



Figure 1: Types of crops cultivated in all plots of land (% of cases)

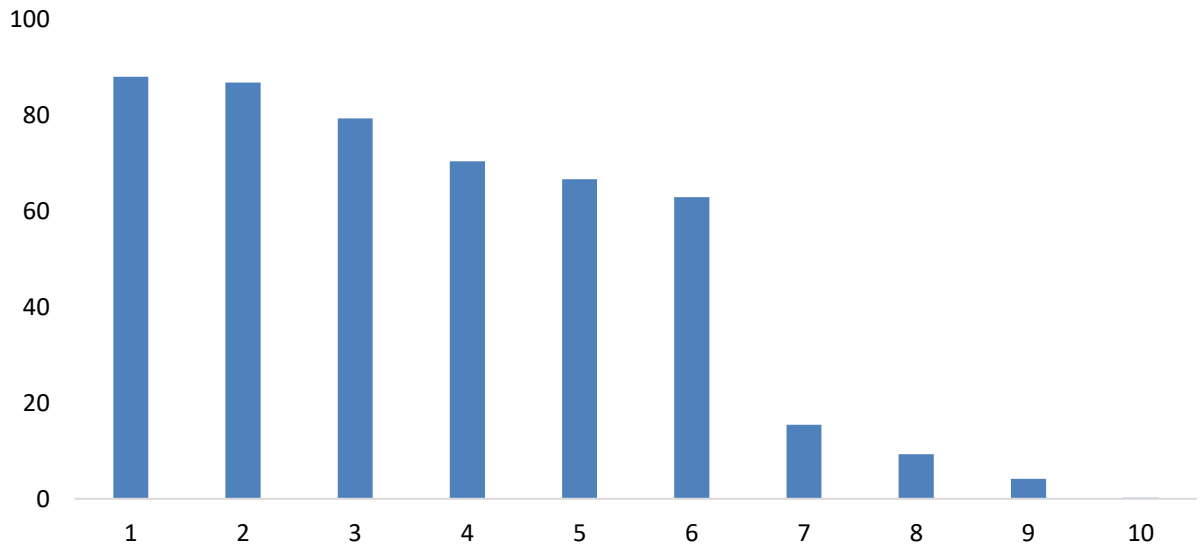



Figure 2: Households' livestock ownership (% of cases)

# 3 Results

## 3.1 Time Use Patterns

In this report, we have classified time allocation into Self-Care (sleeping and resting, personal care and eating and drinking); Leisure (watching TV/listening to radio/reading, exercising, social activities and hobbies and religious activities); Paid Work (work as employed, own business work, farming/livestock/fishing); Unpaid Work (shopping/getting service (incl. health services), weaving/sewing/textile care, cooking, domestic work, fetching wood/fuel, fetching water and care for children/adults/elderly/sick); Total work (the summation of paid and unpaid work); commuting; School work; and Other activities. The result presents the time allocation when the day is the usual day. This is important since activities systematically vary over the type of day. This is particularly important in Ethiopia where during weekends or religious days only limited activities are done. In addition, the report considers the primary activity during the specified time interval.

### *3.1.1 Time Use Patterns of Men, Women and Children*

The time allocation of men, women, and children (male or female children over age 10) of the households is provided in Figure 3. The figure shows the average time (hrs. per day) the household members spent on those activities. Men's and women's time allocation shows significant differences in commuting, unpaid work, paid work, total work, leisure and self-care activities. The most striking time allocation difference between men's and women's is in unpaid work. While women spent an average of 7.2 hrs. in unpaid work in the day, men on average spent less than 30 minutes in the day. On the other hand, men on average allocated 8.2 hrs. for paid work while women allocated 2.7 hrs.[1] Considering both the time allocated to paid and unpaid work, women worked an average of 10 hrs. of total work while men worked an average of 8.6 hrs. This difference led men to allocate more time (double) for leisure than women. Relatively, however, men spent on average 30 minutes more commuting while women spent about 30 minutes more on self-care activities.

The time allocation of children shows a different pattern compared to men and women. Time allocated to work is lower since children allocate significant time to school work. On average, children spent more than 4 hrs. on schoolwork. Male and female children have significant time allocation differences for paid and unpaid work. The time allocation difference for these works shows a similar pattern with men's and women. Female children spent an average of 2.2 hrs. on unpaid work while male children spent only 1.3. hrs. On the other hand, male children allocated an average of 3.8 hrs. for paid work while female children allocated an average of 2.5 hrs. When paid and unpaid work are combined, there is no significant time allocation difference between male and female children. Moreover, the result shows the absence of significant difference in time allocation for leisure, school, commuting and self-care among male and female children.

[1] In this study, paid work almost refer only self-employment in agriculture. Therefore, paid work may be considered as synonym with farming.

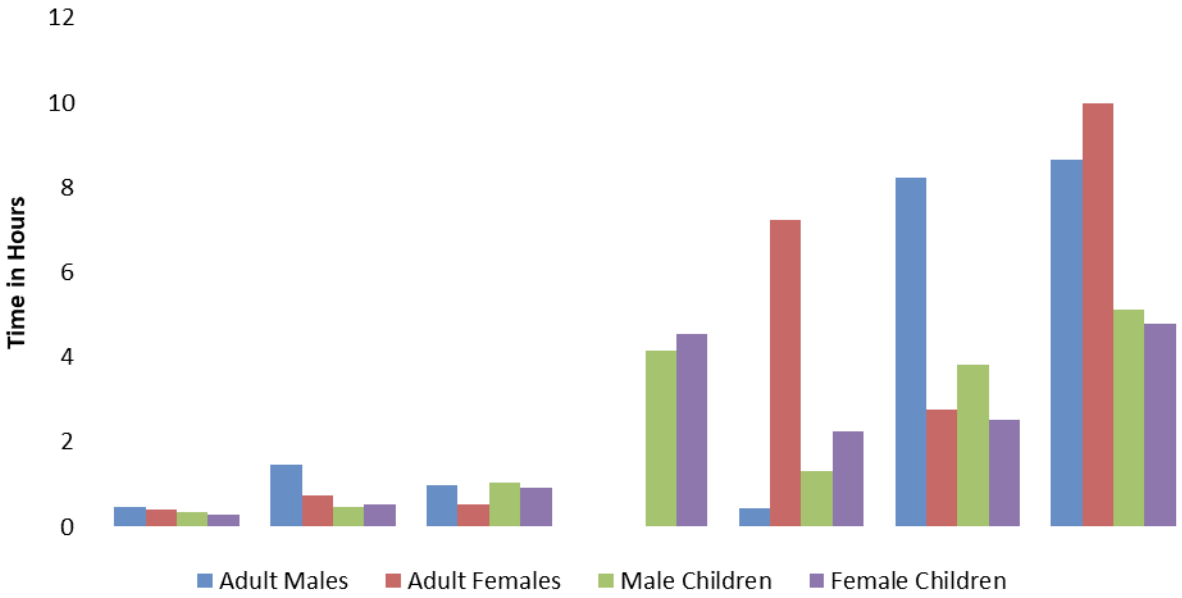



Figure 3: Time use patterns of men, women and children
Note: see annex a for significance test results.

Table 10 provides the proportion of persons who participated (participation rate) in each of the activities, regardless of the time allocation. Men's unpaid work participation rate remains very low. Only 18 percent of men reported participating in unpaid work at least once during the day while almost all women reported engagement in unpaid work. On the other hand, about 98 percent and 68 percent of men and women engaged in paid work, respectively. This shows that although most men engaged in paid work, a high proportion of women also engaged in paid work. Participation rates for the rest of the activities complement the findings in Figure 3. 55 percent of men reported having some leisure time while only 38 percent of women reported they had some leisure time during the day. Children's participation rate in the activities is largely similar except for participation in paid and unpaid work. Although the total work hours are similar for male and female children, the distribution of the work hours between paid and unpaid activities is significantly different. About 44 percent of male children and 71 percent of female children reported participation in unpaid work. On the other hand, 78 percent of male children and 62 percent of female children reported participation in paid work.

The major time allocation difference particularly among men and women is on unpaid and paid work. Following this difference, the time allocation of children could be different based on the men's and women's participation in these activities. Since only a small proportion of men participated in unpaid work, it would be interesting to see the time allocation difference of children when women participated in paid work.

Table 10: Men's, Women's and Children's Participation rates

| Activity | Response | Group (percent Response) | | | | |
|---|---|---|---|---|---|---|
| | | Men's | Women | Male Children | Female Children | Total |
| Other | No | 36.11 | 35.26 | 40.80 | 46.50 | 38.32 |
| | Yes | 63.89 | 64.74 | 59.20 | 53.50 | 61.68 |
| School | No | 100.00 | 100.00 | 22.40 | 19.11 | 71.59 |
| | Yes | 0.00 | 0.00 | 77.60 | 80.89 | 28.41 |
| Commuting | No | 31.39 | 55.37 | 21.60 | 24.84 | 36.02 |
| | Yes | 68.61 | 44.63 | 78.40 | 75.16 | 63.98 |
| Unpaid work | No | 81.67 | 0.83 | 55.60 | 29.30 | 42.65 |
| | Yes | 18.33 | 99.17 | 44.40 | 70.70 | 57.35 |
| Paid work | No | 2.22 | 33.06 | 22.00 | 38.22 | 21.50 |
| | Yes | 97.78 | 66.94 | 78.00 | 61.78 | 78.50 |
| Total work | No | 1.11 | 0.83 | 3.20 | 1.91 | 1.59 |
| | Yes | 98.89 | 99.17 | 96.80 | 98.09 | 98.41 |
| Leisure | No | 45.00 | 61.71 | 74.40 | 75.16 | 61.06 |
| | Yes | 55.00 | 38.29 | 25.60 | 24.84 | 38.94 |
| Self-care | Yes | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |

Note: "Yes" if participated at least once during the day in the specified activity; "No" if haven't participated in the specified activity.

Figure 4 compares the time allocation of male and female children when the women do and do not participate in paid work. Male children were found to be spending significantly more on school work, and less on total work and other activities when the women participated in paid work. On the other hand, female children spend less time on leisure and other activities and more time commuting and in paid work when women participate in paid work. In addition, there is an indication that female children spend more time in school work and less time in unpaid work when the women spend time in paid work. However, the differences are not statistically significant compared to female children living in households where women do not engage in paid work.

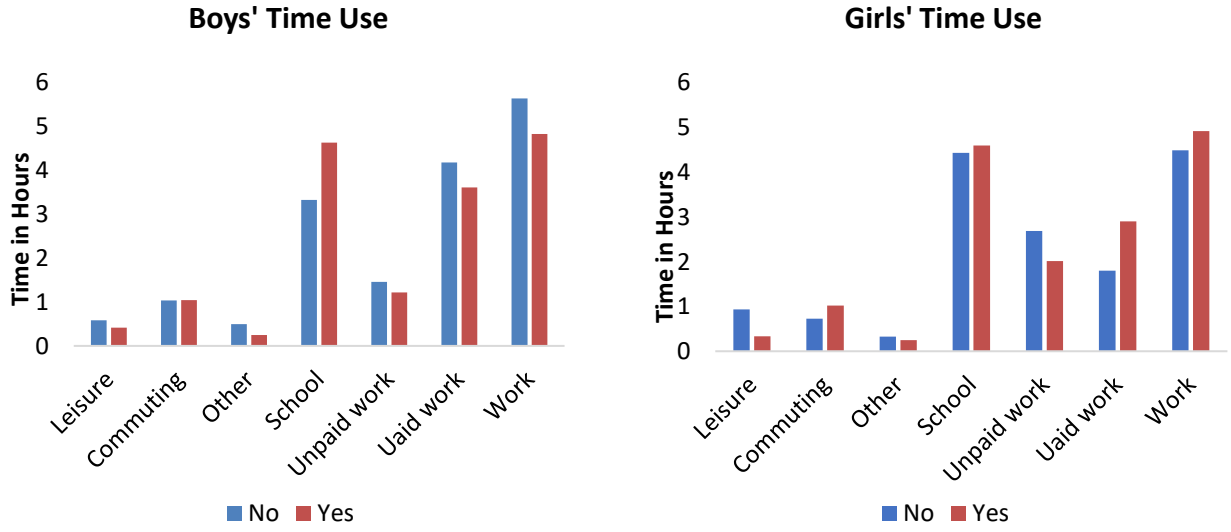



Figure 4: Women's engagement in paid work and time use patterns of children

Note: "yes" – women participate in paid work; "no" – women do not participate in paid work. See annexe b for significance test results.

### *3.1.2 Time Use Patterns and Household Characteristics*

Time use patterns differ by the characteristics of the households. Household size, age composition, livelihood, literacy and other factors can be related directly to how a particular household uses its time. Since households are not very different by employment, region, dual status household and type of crops cultivated, we have considered whether the size of the household and literacy level of the household head affect the time use pattern of women. We have considered women since unpaid work falls on them while participating in paid work.

Figure 5 shows whether the size of the household affects the time use pattern of women. We have taken the median family size and classified the sample below and above the median size as “small household” and “large household”. Except for leisure, there is no statistically significant difference in time use patterns by household size. Women in large households spend less leisure time. Figure 6 shows the time use of women when the household head is/is not literate. Interestingly, when the household head is literate, women spend significantly more time in paid work and less time in unpaid work than in a household where the household head is not literate.

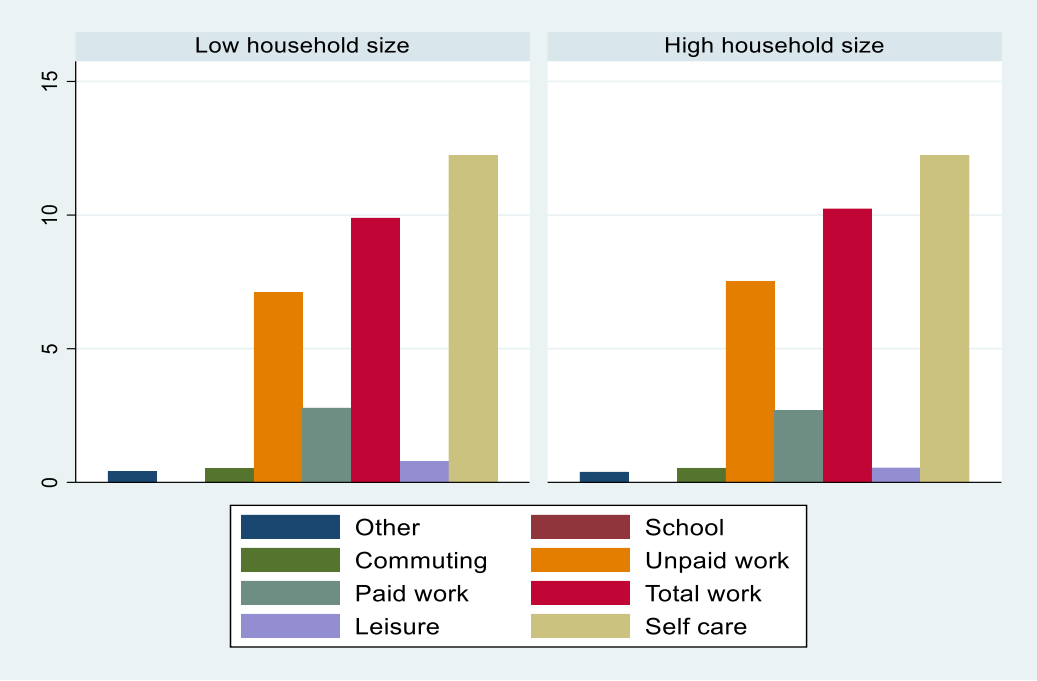



Figure 5: Household size and women's time use patterns

Note: see annex c for significance test results.

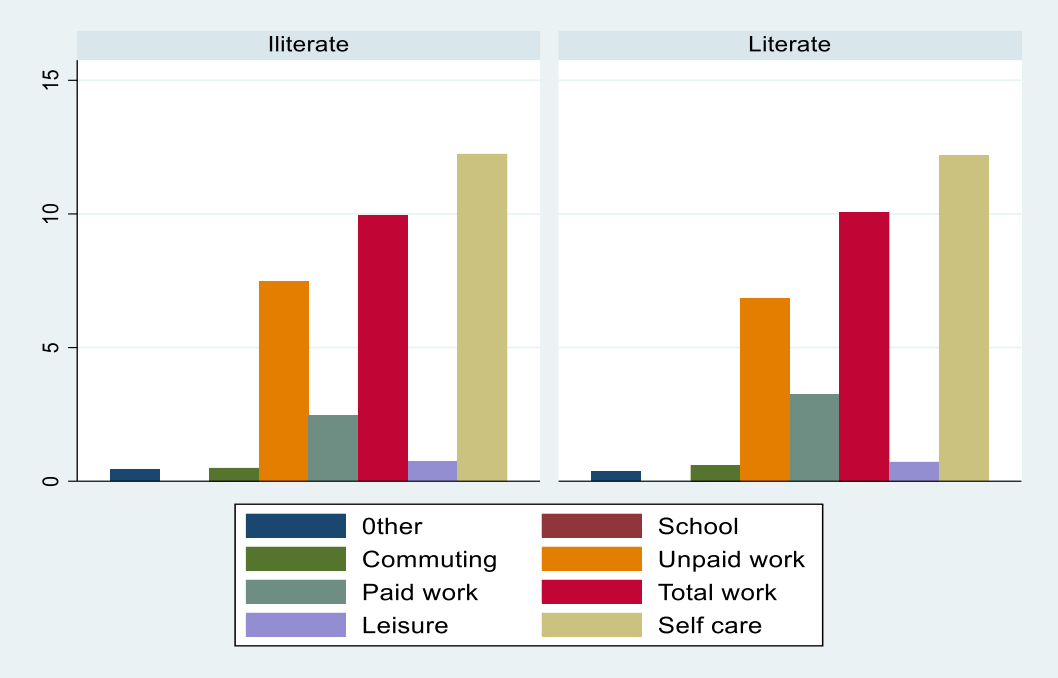



Figure 6: Household head literacy and women's time use patterns

Note: see annex c for significance test results.

### *3.1.3 Household Income, Assets and Time Use*

The sampled households have been classified into income classes (quintiles) and analyzed against the households' time use patterns. Figure 7 shows the time allocation of men, women and children in the bottom 20 percent of the income distribution. Compared to the general result in Figure 3, in the lower income quintiles, women tend to work less unpaid work and more paid work while men's time allocation largely remains the same. On the other hand, compared to the general result in Figure 3, in the upper-income quintiles, women tend to work more unpaid work and less paid work than men (Figure 8). Conversely, men do not have a significantly higher leisure time than women.

The time allocation of children is roughly unchanged when the households are grouped by income classes. The difference in paid and unpaid work between male and female children remains significant. Relatively, in the lower bottom of the income distribution, female children were found to be working more unpaid work. An interesting finding in the upper class of income is that female children are found to be spending significantly more time on schoolwork than male children.

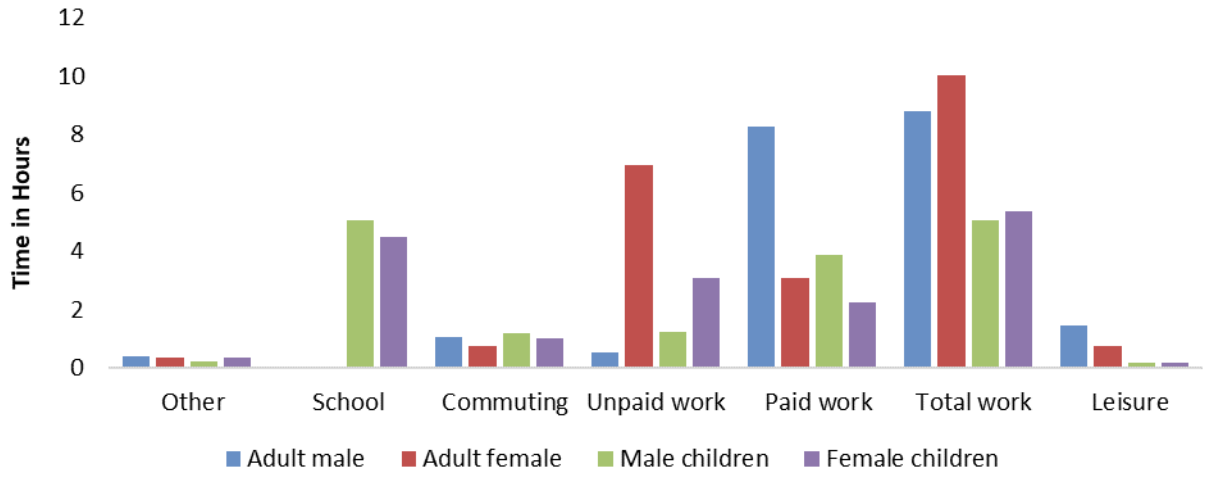



Figure 7: Men's, Women's and Children's Time Use in the bottom 20 percent of the income distribution

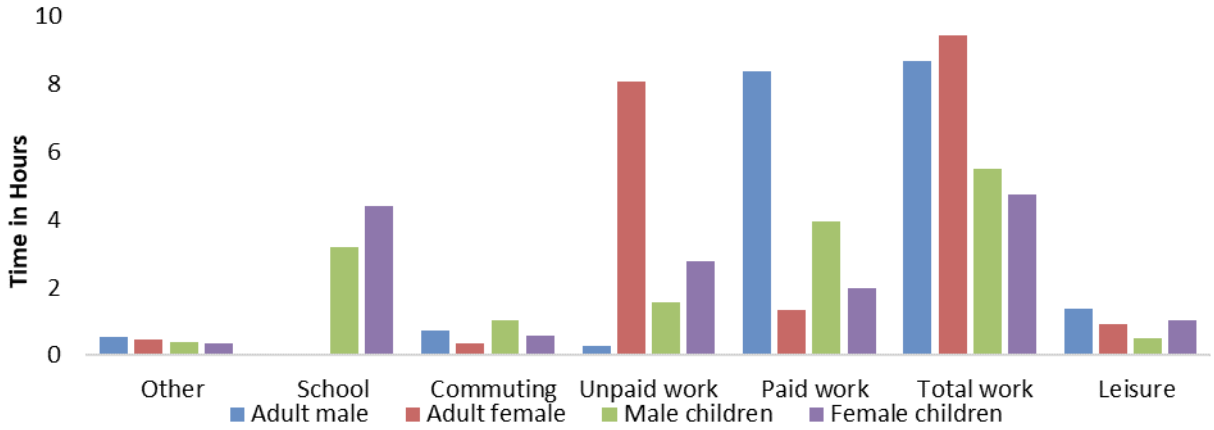



Figure 8: Time use patterns of men, women and children in the upper 20 percent of the income distribution

Note: details of the results in Figures 7 and 8 are available in annex d. see annex f for significance test results.

In addition to income, we have taken the assets of the household and compared the time use of household members in the bottom and upper 20 percent of the asset classes. Income is a flow concept compared to assets, which are stock. Hence, assets show a stable economic status of the households than income. Figure 9 and Figure 10 presents the results. In the bottom 20 percent of the asset ownership, the results remain largely the same in Figure 3 where men and women have significant differences in time allocation for commuting, leisure, paid work, unpaid work and self-care. There is some interesting time allocation difference for the household members in the upper 20 percent of asset ownership. Women allocated less time for unpaid work and more time for paid work compared to households at the bottom of the asset classes. For children, in the upper class, both female and male children worked lower unpaid work and higher paid works, compared to the result in Figure 3. The time allocation difference between male and female children is only significant for paid work. Overall, female children worked higher hrs. of total work although the difference is not statistically significant.

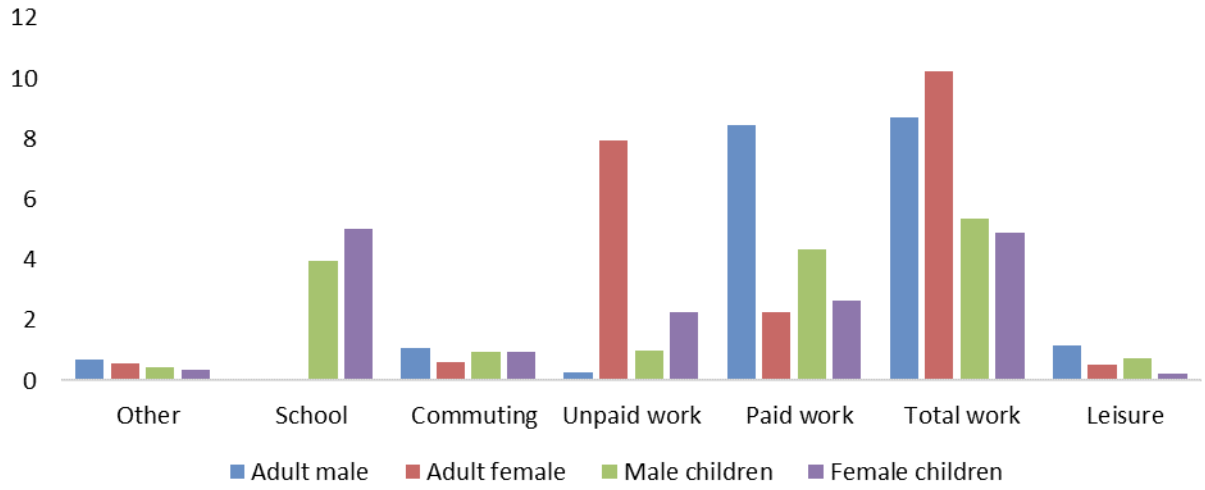



Figure 9: Time use patterns of men's, women and children in the bottom 20 percent of the asset distribution

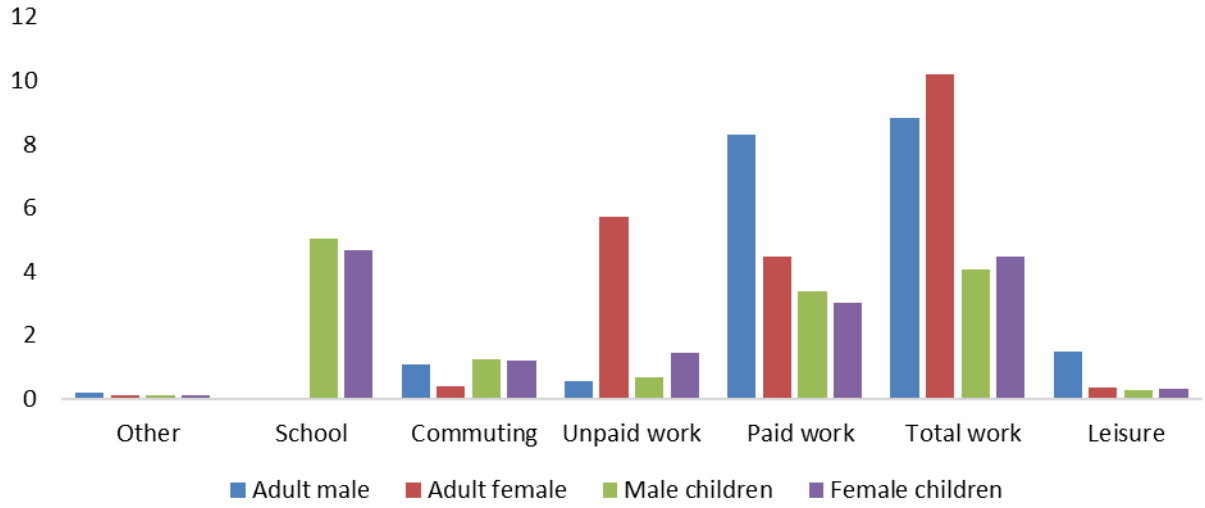



Figure 10: Time use patterns of men's, women and children in the upper 20 percent of the asset distribution

Note: details of the result in Figures 9 and 10 are available in annex g. see annex i for significance test results.

## 3.2 Time Use and Children's Diets

This section examines the impact of women's time use on children's diets. Children's diets are influenced by the time their mothers spend in paid and unpaid work. On one hand, when mothers engage in paid work, their incomes can improve the quality of their children's diets by providing access to a wider variety of nutritious foods. These earned incomes enable families to afford better-quality food, which can positively impact children's diets. However, on the other hand, mothers' time spent in unpaid work can also enhance children's diets. Through meal preparation, mothers create healthy, balanced, and diverse meals for their children. We have analyzed the effect of women's time in paid and unpaid work on children's diet diversity score. The 18 consumption items have been grouped into 7 food groups and the consumption diversity score has been calculated as "low dietary diversity" and "adequate diet diversity" when the diet diversity score is less than and more than 4, respectively.

The first result that describes women's time use patterns and children's diet diversity is presented in Figure 11. The figure compares women's time use in households that scored inadequate and adequate

children's diet diversity. The result informs that in adequate diet households, women tend to work more in paid work and have more leisure than inadequate diet households. However, the differences are not statistically significant.[2] Further, a simple and multiple regression analysis has been run to find out the association between women's paid and unpaid work and children's diet diversity. The regression analysis results in all specifications failed to be significant.[3]

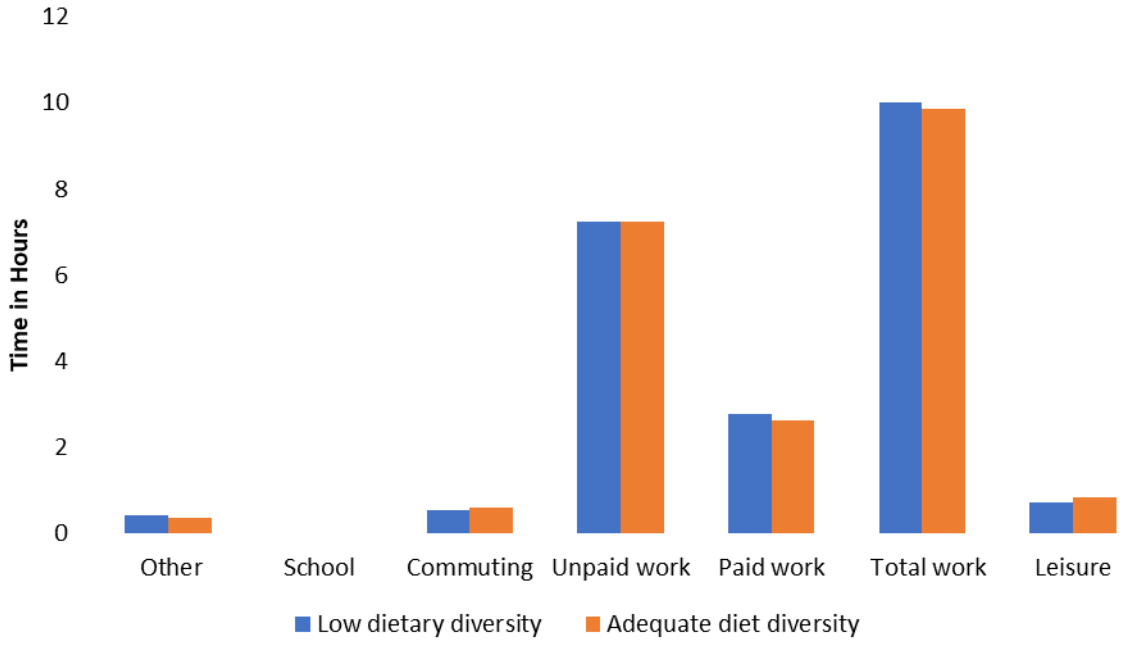



Figure 11: Women's time use and children's diet diversity

## 3.3 Time Use and Productivity

We have assessed the relationship between time use and household productivity. We have used yield as a measure of land productivity. That is the total value of crop harvested per cultivation area as a measure of productivity has been employed. Establishing a clear link between productivity and time use in paid and unpaid work poses several challenges. There is a complex interplay of time and input use that determines productivity. Moreover, paid work in our definition includes the time spent in farm activities – on the one hand, higher productivity on the farm may allow members of the households to engage in paid work outside farming. On the other hand, higher productivity (and thereby higher incomes generated from the farm) may decrease the time spent on the farm i.e., paid work. This creates a dynamic where technology may affect the time devoted to different types of work within the household. We still assess how household members' time use relates to our indicator of productivity.

Concerning time use, productivity is said to have occurred when it is possible to minimize the time required to accomplish a task. Figure 11 shows the correlation between productivity and time allocation of men, women and children to various activities. For women, productivity is positively and significantly correlated to leisure and negatively to paid/total work. Whereas to males, it is not significantly related to any of the activities. Compared to male children, female children's time allocation for leisure and self-care is positively and significantly correlated with productivity and negatively related to total work.

[2] Significance test results are omitted for brevity reason.
[3] The result is not significant after including control variables such as household size, education level of household head, household head age, land size and household asset.

Table 11: Household Productivity and Time Use of men, women and children

| Variables | Women | Men | Male children | Female children |
|---|---|---|---|---|
| Leisure | 0.100* | 0.012 | 0.025 | 0.158* |
| Commuting | -0.047 | 0.045 | 0.068 | -0.114 |
| Other | 0.010 | 0.003 | 0.019 | -0.125 |
| School | | | -0.11* | -0.037 |
| Unpaid work | 0.017 | -0.023 | -0.04 | -0.088 |
| Paid work | -0.09* | -0.004 | 0.104 | -0.049 |
| Total work | -0.08* | -0.015 | 0.079 | -0.136* |
| Self-care | 0.056 | -0.017 | -0.012 | 0.176 * |

*** p<.01, ** p<.05, * p<.1.

As can be seen from the above table, productivity seems to have more effect on women and female children than men's and male children. To further exploit the issue, we have specifically assessed the relationship between women's time use and household productivity in the study area. First, we have divided the households into two groups: below and above the average productivity. Then, women's time use in "low" (below average) and "high" (above average) productive households has been compared. Figure 12 shows the results. Compared to women living in low-productive households, women living in above-average productive households allocated significantly less time for paid and total work.

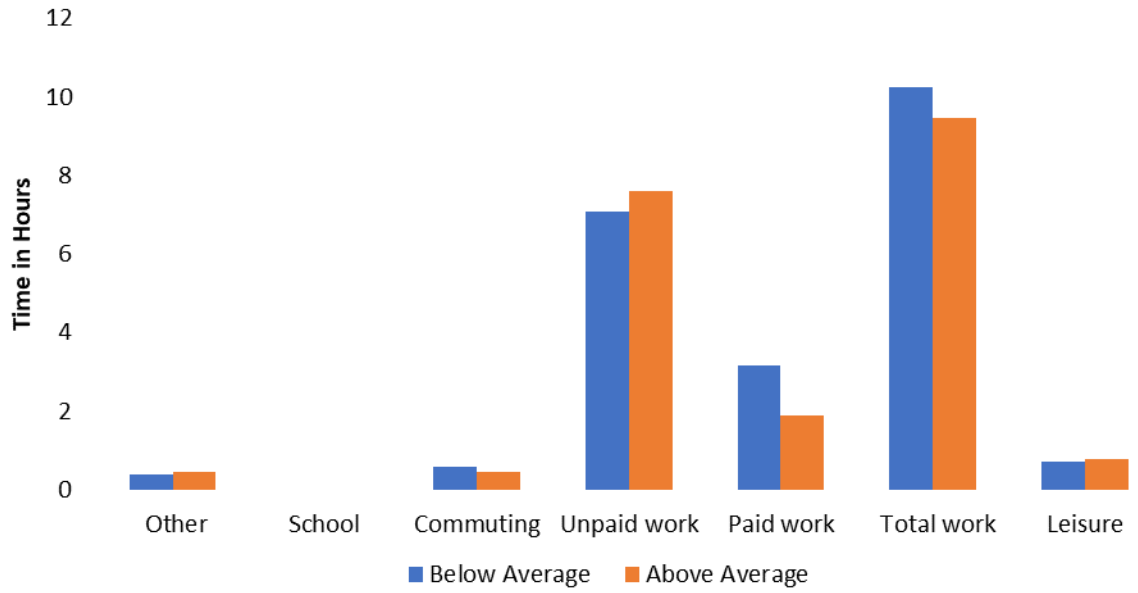



Figure 12: Women's Time Use and Household Productivity

Note: see annexe j for significance test results.

For a more robust analysis, an OLS regression has been used to determine the role of productivity in women's time allocation, particularly for paid and unpaid work. The regression controlled for key household characteristic variables to account for variations between households. The selected control variables are household size, education level of household head, household head age, land size and household asset. Table 12 presents the regression results. The result reveals that household productivity is negatively and significantly related to women's paid work and positively and significantly related to unpaid work. This indicates that in higher productivity farms women save time for paid work (farming) when the household is productive. Specifically, a 1 percent increase in

productivity leads to a 0.01 hrs. decline in paid work (farming activities). On the contrary, as productivity increases women spend more time for unpaid work.

Table 12: Household Productivity and Women's Time Use

Dependent variable: women's time use (1) for paid work (in hrs.) and (2) for unpaid work (in hrs.)

| **Variables** | **(1)** | **(2)** |
|---|---|---|
| Productivity | -1.033*** | .64** |
| Household size | -.101 | .392** |
| Household head age | .931 | -1.758 |
| Education level of household head | .493 | -.613*** |
| Assets | .358** | -.435*** |
| Total land size (acre) | -.221** | .142 |
| Constant | 7.081 | 10.125* |
| R-squared | 0.154 | 0.204 |
| F – test (p-value) | 0.000 | 0.000 |
| Number of obs. | 131 | 131 |

*** p<.01, ** p<.05, * p<.1. Standard errors are robust standard errors. Assets values (in logs) are measured by taking the monetary values of household and agricultural assets. Household head age and productivity has been measured in logs. An alternative specification that measures paid and unpaid work in proportion to total work provides a similar significant result.

## 3.4 Time Use and Technology

To identify the technologies that impact the patterns of men's, women's and children's time use, we have assessed the relationship between access to infrastructure (markets, roads, electricity, water), and technologies (domestic and agricultural technologies) with time use patterns.

### *3.4.1 Infrastructure and Time Use*

Access to services such as supplies and inputs market, roads, electricity and water impact the allocation of time. For example, water access reduces the time required to fetch water, and accessible markets and roads reduce commuting time allowing members to undertake other tasks.

How far the nearest market from the household's dwelling affects the time use of households. We have asked whether the household usually obtains its supplies from the market nearest to their dwelling. Using the "yes" and "no" answers to the questions, we have analyzed whether the time use pattern of men, women and children varies following the variation in market accessibility. We have compared each of the categories among themselves, for example, women having markets in their nearest dwelling are compared with women that haven't market access in their nearest dwelling, and so on. From the results presented below, however, it is also possible to compare time use patterns across groups of respondents.

Figure 13 shows the variation in time use patterns and the accessibility of markets. The effect of market access is more pronounced for women and girls than men and boys. Contrary to expectations, women with market access spend more time for unpaid work, total work and other activities; and less time for paid work than women without market access to their nearest dwelling. Girls with market access also spend more time in unpaid work, school work and other activities; and less time for commuting and paid work. However, when the distance to the markets is considered, we see the greater the distance, the less time women spend in paid work. Distance to the market is negatively related to paid work and positively related to unpaid work for both women and girls.

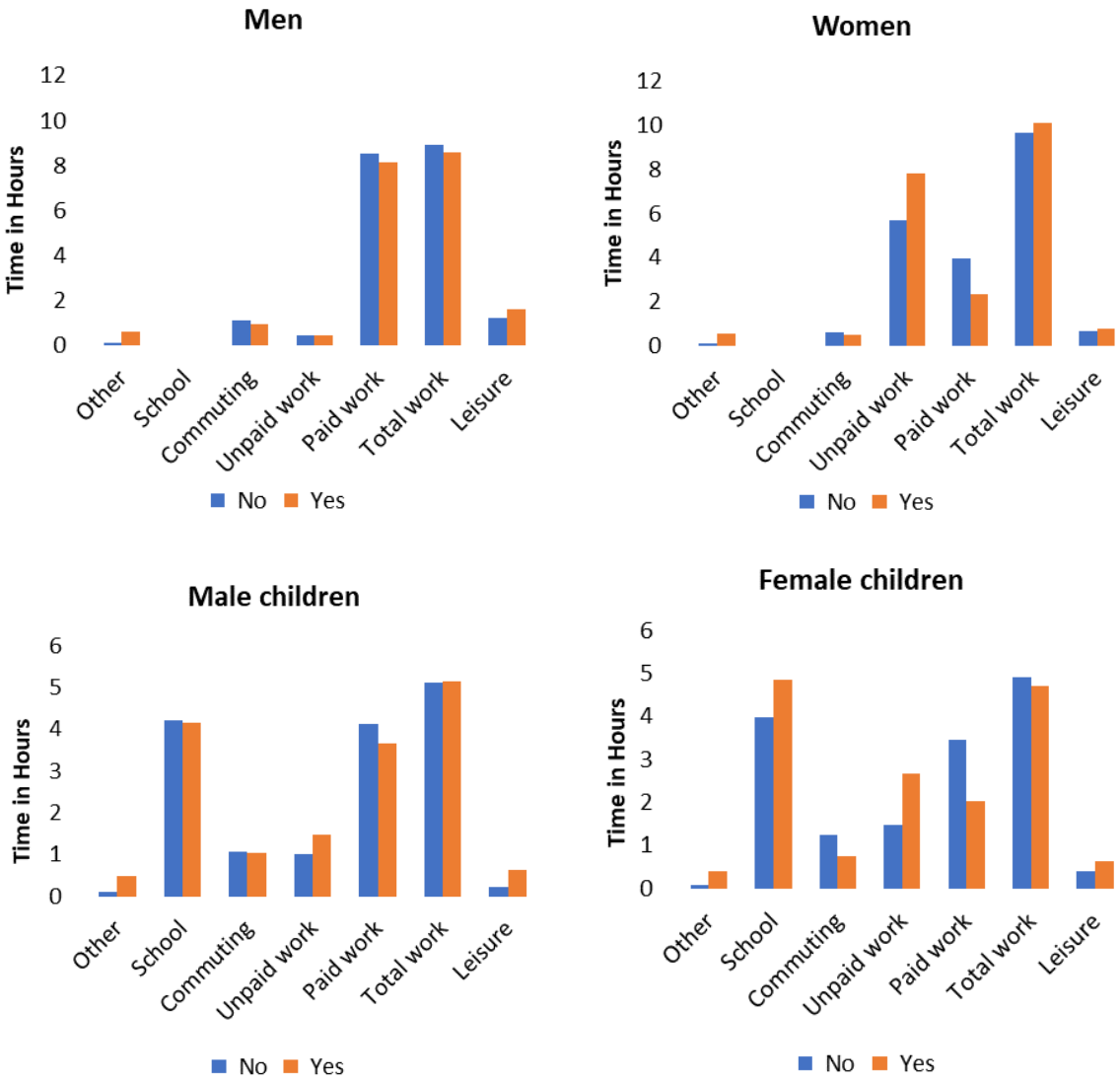



Figure 13: Household access to supplies markets and time use patterns

Note: see annex k for significance test results. “yes” refers markets are available nearest to households dwelling; “no” refers not accessible.

Table 13: Distance to Market and Time Use

| **Independent variables** | **Women** | | **Female children** | |
|---|---|---|---|---|
| | Paid | Unpaid | Paid | Unpaid |
| Distance to market (km) | -1.65*** | 1.36** | -1.304*** | .982** |
| Household size | | .33 | -.018 | -.222* |
| Household head age | | -2.303 | 1.434 | -1.068 |
| Education level of household head | | -.501 | .016 | -.498 |
| Assets | | -.21 | -.059 | .041 |
| Total land size (acre) | | .03 | -.045 | .226** |
| Constant | 3.98 | 15.765 | .366 | 5.14** |
| R-squared | 0.07 | 0.21 | 0.06 | 0.15 |
| F – test (p-value) | | 0.000 | 0.03 | 0.000 |
| Number of obs. | 363 | 131 | 151 | 151 |

*** p<.01, ** p<.05, * p<.1. Standard errors are robust standard errors. Assets values (in logs) are measured by taking the monetary values of household and agricultural assets. Household head age and productivity has been measured in logs. Insignificant regression results are omitted. In addition, when a regression with control variable is not significant, only the simple regression results are presented. The effect of cooking stove use on paid and unpaid work failed to be significant for both women and female children. An alternative specification that measures paid and unpaid work in proportion to total work provides largely a similar result.

The accessibility of agricultural input markets to households impacts the time allocation of household members. According to Figure 14, men, women and children have more time for leisure and other activities when the input market is nearest to their dwelling. In addition, women and female children spend more time on unpaid work compared to households that do not have markets nearby. Interestingly, children living in households with the nearest market access spent significantly less time commuting.

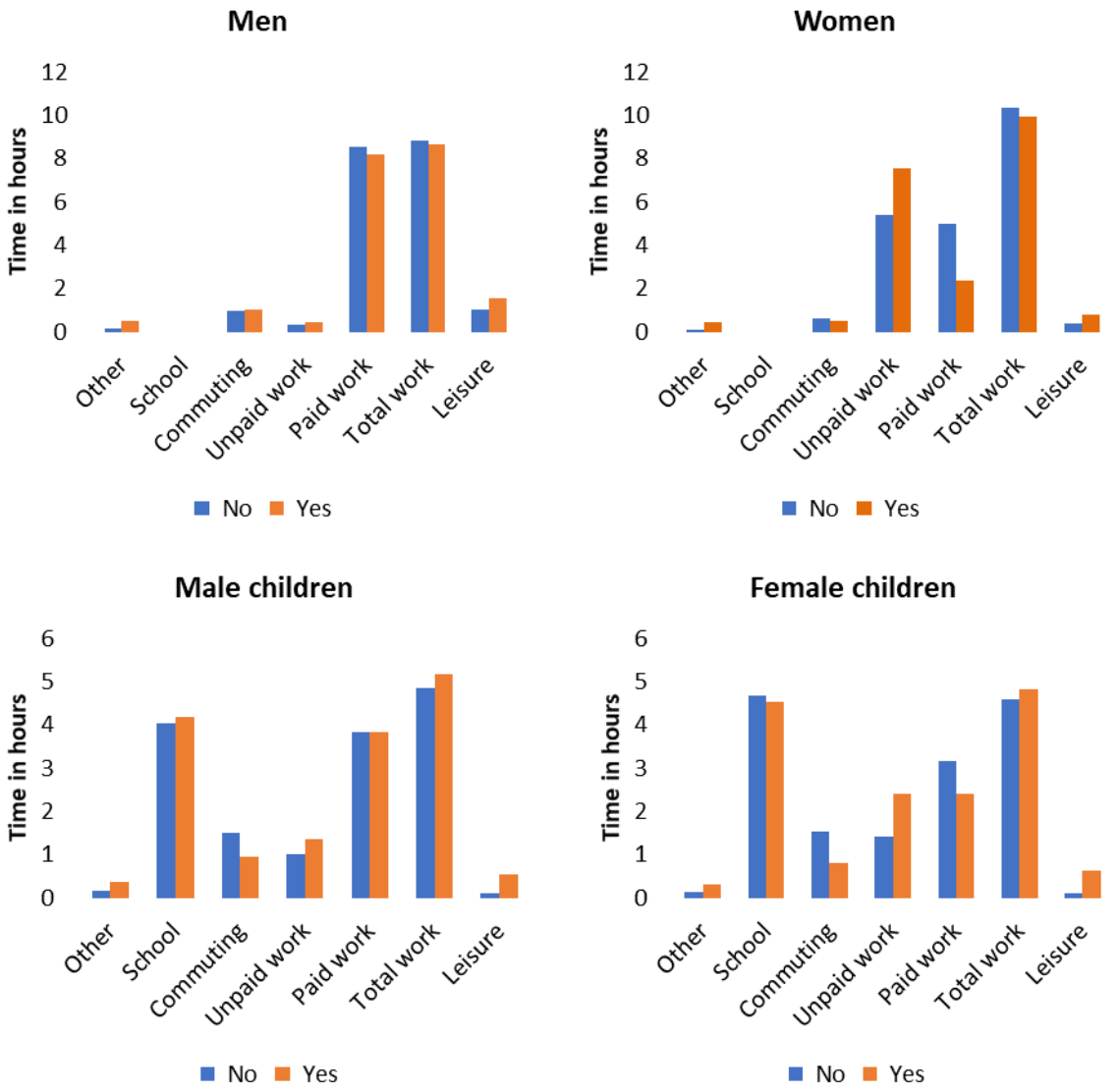



Figure 14: Household access to agricultural input markets and time use patterns

Note: see annex l for significance test results. “yes” refers markets are available nearest to households dwelling; “no” refers not accessible.

Road accessibility is also linked with time use as it affects travel time and hence the time allocation to the rest of activities. Since about 96 percent of the respondents have said that they have access to an all-weather road, we have accounted for the relative distance to the road and analyzed the time use pattern for women. Households’ access to the road has been grouped into two groups: above-average distance and below-average distance to the all-weather road. Figure 15 presents the result. Compared to households that are far from the all-weather road, women living in households where the distance is below average have allocated more time to leisure, and less time to unpaid and total work.

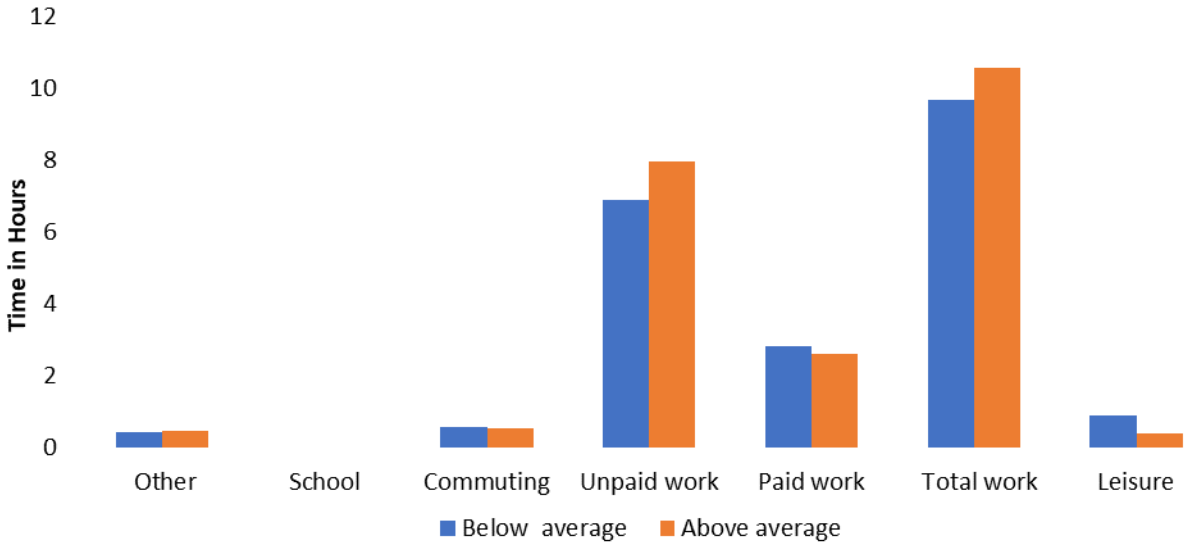
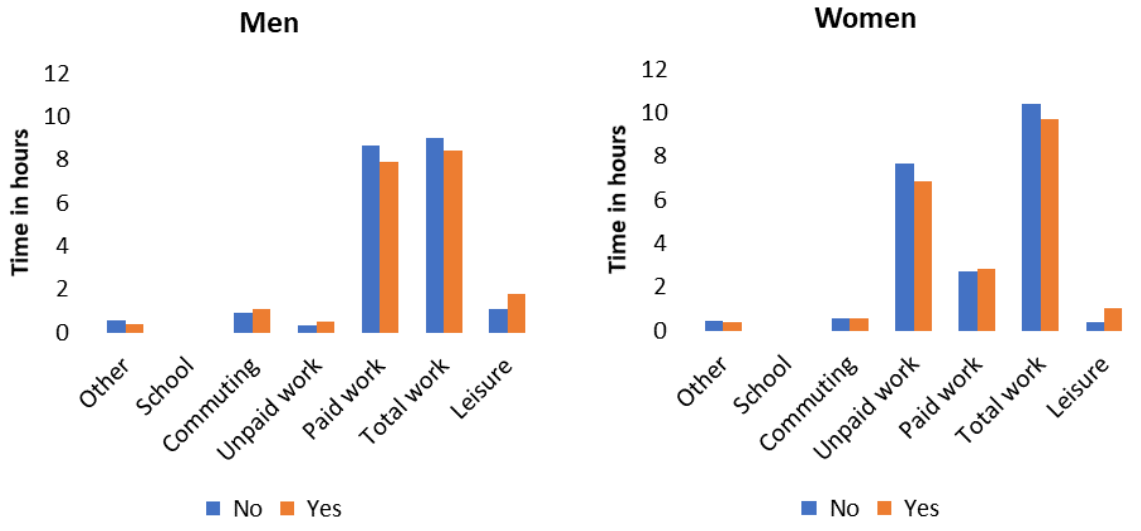



Figure 15: Household access to the nearest all-weather road and women's time use patterns

Note: see annex m for significance test results.

Households vary by electricity access. In the sample, 58 percent have access to electricity and 42 percent do not. We have used this variation to assess whether households differ in their time allocation following electricity access differences. Figure 15 presents household access to electricity and time use patterns of men, women and children. The most common effect of electricity access across the household members was found to be an increased time allocation for leisure compared to households without electricity access. More specifically men living in households with electricity access have significantly more leisure time, less paid work (farming), and less total work; and women have more leisure, less unpaid work time and less total work time. On the other hand, boys have more leisure, more time for school work, less time for paid work and less time for self-care while female children have more leisure time and less time for commuting. The regression results confirm that women spend less time in unpaid work when the household has electricity access.



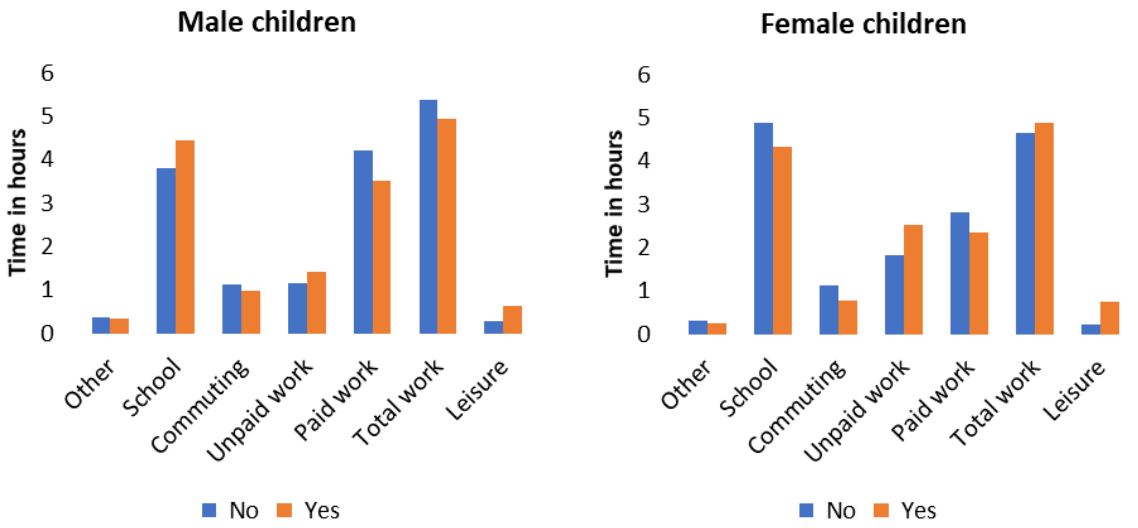



Figure 16: Household access to electricity and time use patterns

Note: see annex n for significance test results.

Accessibility of water is mainly linked with women's and girls' time use. Owing to the traditional gender roles, mostly women are responsible for fetching water. We run a regression to find out the relationship between the time it takes to fetch water in a single trip with women and female children's time used for paid and unpaid work. As the time to fetch water increases, women allocate more time to paid work and less time to unpaid work. On the other hand, female children allocate less time for unpaid work.

Moreover, we have divided households in the sample into two groups: households below and above average time to fetch water in a single trip and assessed the time allocation difference for women. Figure 17 shows that women living in households with below-average time to fetch water have significantly higher time for leisure and unpaid work and less time for paid work. Combining the regression and the figure result, it seems that there is no clear time use pattern effect in relation to water access and the time use pattern of women.

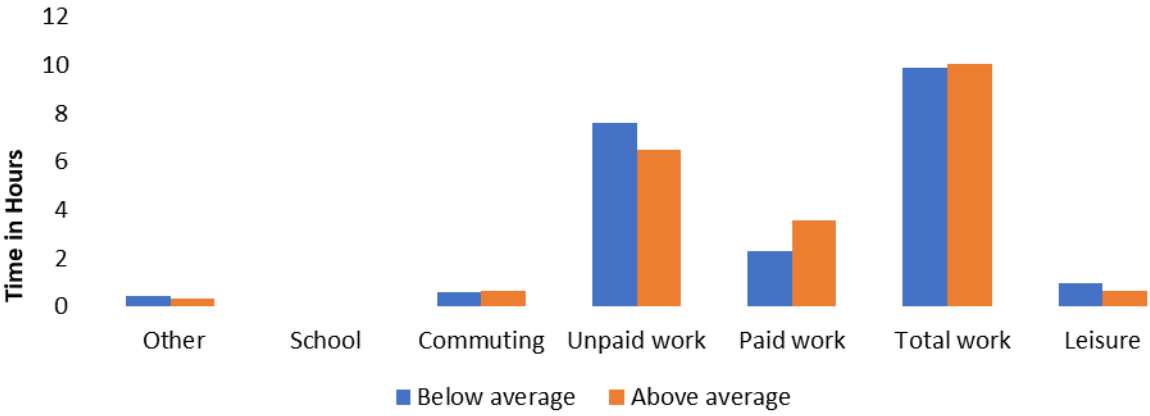



Figure 17: Household access to water and women's time use patterns

Note: see annex o for significance test results.

Table 14: Agricultural technology, Time to fetch water and Time Use

| **Variables** | **Women** | | **Female children** | | **Women** | | **Female children** | |
|---|---|---|---|---|---|---|---|---|
| | Paid | Unpaid | Paid | Unpaid | Paid | Unpaid | Paid | Unpaid |
| Agricultural technology use | -3.39*** | 3.117*** | -1.94* | 1.41*** | | | | |
| Time to fetch water (minutes) | | | | | .02** | -.02** | | -.021** |
| Household size | .018 | .403** | .191 | | | | | -.207 |
| Household head age | 1.074 | -2.339 | .248 | | | | | -.637 |
| Education level of household head | .431 | -.555** | .026 | | | | | -.531* |
| Assets | .241 | -.502** | .243 | | | | | -.033 |
| Total land size (acre) | -.072 | .031 | -.033 | | | | | .265*** |
| Constant | -.952 | 17.291*** | -.478 | 1.0** | 2.27*** | 7.68*** | | 5.746** |
| R-squared | 0.15 | 0.23 | 0.17 | 0.01 | 0.01 | 0.01 | | 0.14 |
| F – test (p-value) | 0.000 | 0.000 | 0.05 | | | | | 0.000 |
| Number of obs. | 103 | 103 | 121 | 126 | 356 | 356 | | 145 |

*** p<.01, ** p<.05, * p<.1. Standard errors are robust standard errors. Assets values (in logs) are measured by taking the monetary values of household and agricultural assets. Household head age and productivity has been measured in logs. Insignificant regression results are omitted. In addition, when a regression with control variable is not significant, only the simple regression results are presented. The effect of agricultural technology use failed to be significant for primary men's and male children. Both time to fetch water and agricultural technology use effect on paid and unpaid works is significant in alternative specifications only for women.

### 3.4.2 *Domestic and Agricultural Technology and Time Use*

From domestic technology, we have considered the effect of cooking stoves on women's time use. Given the samples are from rural Ethiopia, the use of relatively modern cooking methods may have an impact on the time use of women. We have compared the time use patterns of women who have and haven't a cooking stove. According to Figure 18, women who use cooking stoves allocate significantly more time for leisure, less time for commuting and less time for other activities. Regression results failed to provide a significant time allocation difference due to the use of the cooking stove.

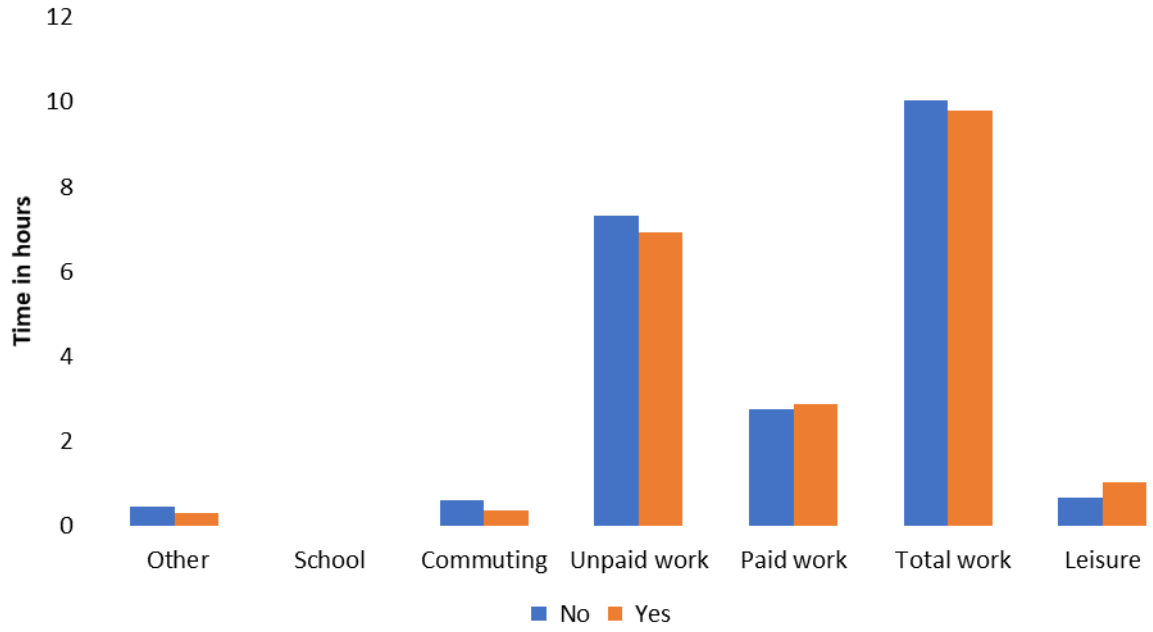



Figure 18: Household use of cooking stove and women's time use

Note: see annex p for significance test results.

The agricultural technologies considered are the application of fertilizers and pesticides. Since there are several plots per household, we categorize households that apply fertilizers and pesticides below and above half of their plots. Then, we have compared the time use patterns of men, women and children. The results are presented in Figure 19. For men and male children, there is no significant difference between fertilizers and pesticide users and non-users concerning time allocation. On the other hand, women living in the user household allocated more time for leisure and unpaid work and less time for paid work (farming). Similarly, female children have allocated less time for paid work (farming) and commuting. The regression result in Table 15 supports the descriptive results. Fertilizer and pesticide application in a household is negatively related to time allocation to paid work (farming) and positively related to time use in unpaid work for both women and female children.

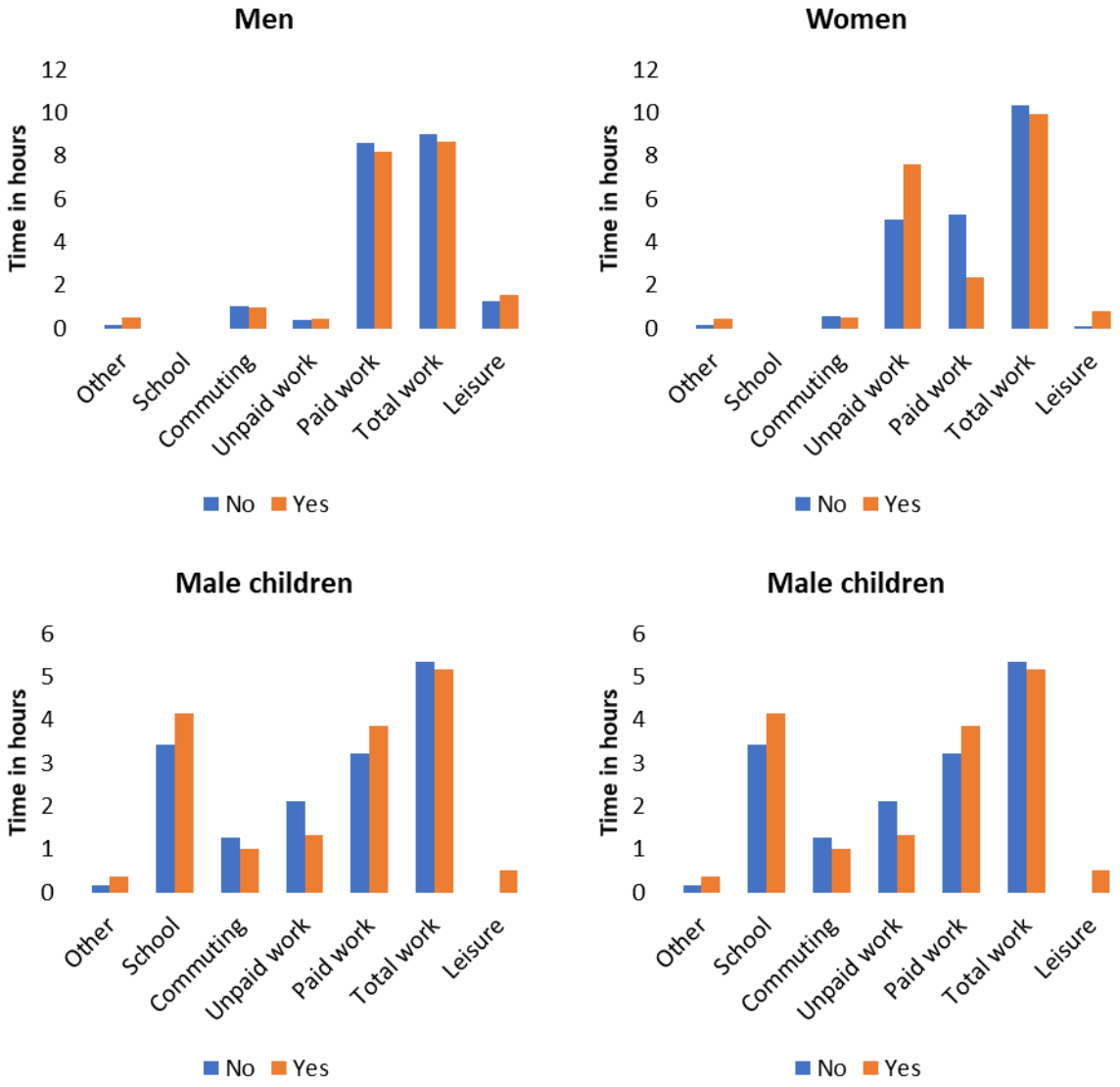



Figure 19: Household use of fertilizers and pesticides and time use

Note: see annex q for significance test results. “yes” refers a household applies fertilizers and pesticides for more than half of the plots; “no” refers applies for less than half of the plots. Only inorganic fertilizers use has been considered since organic fertilizer are not applied in most of the plots.

# 4 Discussion and Policy Recommendations

The time use in Ethiopian rural households reveals an interesting time allocation pattern and gender gap. Out of the total time in the day, men and female have on average worked a total of 8.6 hrs. and 10hrs., respectively. On the other hand, on average, the leisure time was 1.48 hrs, and 0.73hrs. for men and women, respectively. The incidence of high working time and less time allocation for leisure indicate the prevalence of time poverty. Time poverty is said to occur when there is a lack of time for leisure after doing domestic, paid or unpaid work, (Bardasi & Wodon 2010). The poor particularly rely on their labor to make their living which leads to the need to work long hours to meet basic needs.

Further decomposition of the total work into paid and unpaid work exposes the gender norm of tasks within households. Unpaid work such as shopping, cooking, domestic work, fetching wood/fuel/water and caring for children/elderly/sick is almost entirely the responsibility of women. Whereas paid work (farming) is predominantly males' activity. However, women are observed to do nearly all of the unpaid work and some of the paid work which makes their total work burden higher than their male counterpart. The fact that women have both higher total work and less time for leisure indicates the incidence of time poverty is higher for women than males. Moreover, the relatively higher time of leisure for men indicate that the household heads relative position in having more time for social and religious activities in rural Ethiopia. Evidence of gender disparities in unpaid work is substantial. For example, the United Nations (2015) found that "on average, women spend at least three times as many hours as men on unpaid work, and as a result, have a higher total work burden than men, when both unpaid and paid work are considered". The implication is that since women engage more in unpaid work, they will have less time for leisure and minimize their chance to join labor market for paid employment. In Africa, women disproportionately engaged in unpaid activities, work more total work and hence face time poverty (Bardasi & Wodon 2010). Even when women do paid works, they tend to work unpaid works simultaneously while men tend to do things sequentially, (Blackden and Wodon, 2006). Blau and Marianne (1986) linked the high participation of women in unpaid work with the low opportunity cost of women's labour.

For children, the time spent in total for work and leisure doesn't have a significant difference. In addition, the time spent on schoolwork is roughly equivalent. However, the allocation of time to paid and unpaid work shows a similar gender gap to that of men and women. Female children spend more time on unpaid work than paid work as compared to male children. There is evidence from developing countries that stress the role of female children in unpaid work. For example, Agesa & Agesa (2019) stated that in Africa it is common to see girls fetching water from long distances which takes a substantial amount of time. In both women and female children cases the portion of time allocated to unpaid work is very high. This confirms the hypothesis that most works in developing countries are not accounted for as they don't have an immediate market value. If converted into monetary value, unpaid works constitute a significant portion of an economy. For example, Gammage (2010) estimated that unpaid work constituted 30 percent of the Guatemalan GDP in 2000.

However, there is a relative difference in time allocation and gender gap by household characteristics. For example, women living in larger households have less time for leisure. Given the gender role of women, with higher family size more domestic works are expected. The literacy of household heads is also negatively related to unpaid work for women. Although the difference is not substantial female children in lower income classes tend to work more unpaid work and women and female children living in the upper 20 percent of the asset class worked less unpaid work. The inverse relation of income/asset levels with women and female children's time allocation for unpaid work signals the co-existence of time and income poverty in low-income/asset households where mainly women have to work more.

Our finding shows that the time use pattern of women is linked to children's dietary diversity. It has been observed that when women engage more in paid work/unpaid work, the children's dietary diversity improves/deteriorates. Women time poverty and child nutritional outcomes are generally

negatively related (see for example, Seymour et. Al., 2019; Stevano, 2017). However, it may also be positively related if the women spend their time more on food and income-generating activities. In our findings, there is no significant difference in the total work hours among women. Instead, it has been observed that those women who allocate more of their time to paid work can improve children's diets. Evidence from other countries is mixed. For example, Komatsu, et. al. (2018) showed that the effect of women's time allocation to paid and unpaid work on household nutritional status depends on the socio-economic status and local contexts. In their finding, in Mozambique, women who spend more time in domestic work and cooking were able to improve diet diversity. This effect, however, is valid for non-poor women. The prevalence of mixed evidence is related to the trade-off between paid and unpaid work (Blackden and Wodon, 2006). Spending more time on domestic work and care for children may positively affect welfare but may lead to forgoing the income that would have been obtained through income-generating activities. Conversely, when women engage in paid work, they may sacrifice caring for children which affects the welfare of children negatively.

The finding clearly shows that productivity is positively correlated with leisure and negatively related to total work for both women and female children. This confirms that enhancing productivity is one mechanism to deal with time poverty. A further decomposition shows that productivity reduces the time allocation to paid work while enhancing the time allocation for unpaid work. This may be taken as some sort of substitution effect. When time is saved from paid work (farming), more time would be allocated to unpaid domestic work.

The finding largely attests to the prevalence of time poverty given the small amount of time allocated for leisure and the high amount of time allocated to total work. The problem is more pronounced for women and female children. Time allocation assessment against service access, infrastructural and technology use provides interesting outcomes. Market accessibility, be it supplies or inputs market, led women to undertake more paid work and less unpaid work. Although the total work hasn't declined as a result of market accessibility, women may be using the advantage of saved time in paid work to allocate more time to unpaid work as the gender norm encourages them to do more of the household domestic work. Moreover, women having better access to roads and input markets spend more time in leisure. Although not robust, water accessibility hints at the allocation of some more leisure time for women. On the other hand, electricity access significantly led to an increase in leisure time across the group of household members. This shows the strong effect of electricity access as compared to other service accesses. The use of agricultural technology is very significant in improving leisure for women. The finding showed that women living in household that uses agricultural technology allocated more time for leisure and unpaid work and less time for paid work (farming). The above-stated results are largely in line with other similar studies. For example, Bardasi and Wodon (2010) stated that, in addition to the traditional gender role of women, lack of basic infrastructure such as water, road access, and electricity contributes to time poverty in poor countries such as Sub-Saharan African countries. In addition, Gammage (2010), Bardasi and Wodon (2010) found that infrastructural investments in household technology, and electric or gas stoves can reduce time poverty, particularly by enhancing efficiency for unpaid work.

The study found a clear difference in time use patterns and a gender gap in time allocation in rural Ethiopia. Moreover, there is evidence of time poverty since households are found to be working longer hours in total work and have a small amount of time allocated for leisure. The decomposition of the total work into paid and unpaid work reveals the gender norm of tasks within households. Unpaid work such as cooking, domestic work, fetching water, and caring for children is almost entirely done by women. Although paid works are mainly done by men, women also allocate a significant amount of time to paid work making women work higher total work than their male counterparts. Therefore, it can be said that time poverty is more pronounced in women than men. Time poverty gets worse for women living in the lower bottom of the income/asset distribution. The time allocation of children also shows a gender gap where female children work more unpaid work than male children.

The finding shows that service and infrastructural accesses (such as electricity, markets, roads and agricultural technologies) are effective in enhancing leisure time, particularly for women and female

children. Therefore, to improve the welfare of households and women, policymakers should consider making electricity and service accessible and introducing agricultural technologies. The evidence of welfare improvement when a woman is having paid work suggests that skill-enhancing training, technology and market success of their produce would further improve the household and children's welfare.

# References


Agénor, P. R., and Agénor, M. (2014). Infrastructure, women's time allocation, and economic development. Journal of Economics, 113(1), 1-30.

Agesa, R. U., & Agesa, J. (2019). Time spent on household chores (fetching water) and the alternatives forgone for women in Sub-Saharan Africa: Evidence from Kenya. The Journal of Developing Areas, 53(2).

Bardasi, E., & Wodon, Q. (2010). Working long hours and having no choice: Time poverty in Guinea. Feminist Economics, 16(3), 45-78.

Bardasi, Elena and Quentin Wodon. 2006. ''Measuring Time Poverty and Analyzing Its Determinants: Concepts and Application to Guinea,'' in C. Mark Blackden and Quentin Wodon, eds. Gender, Time Use and Poverty in Sub-Saharan Africa, pp. 75–95. Working Paper 73. Washington, DC: World Bank.

Blackden, C.M., and Wodon, Q., 2006. Gender, Time Use, and Poverty in Sub-Saharan Africa. The World Bank, Washington, D.C.

Blau, Francine D. and Marianne A. Ferber. 1986. The Economics of Women, Men, and Work. Englewood Cliffs, NJ: Prentice-Hall.

Carrand, M., and Hartl, M. (2010). Lightening the load: Labor-saving technologies and practices for rural women.

Charmes, J. (2019). The Unpaid Care Work and the Labour Market. An analysis of time use data based on the latest World Compilation of Time-use Surveys. International Labour Office.

Eissler, S., Heckert, J., Myers, E., Seymour, G., Sinharoy, S., & Yount, K. M. (2021). Exploring gendered experiences of time-use agency in Benin, Malawi, and Nigeria as a new concept to measure women's empowerment (Vol. 2003). Intl Food Policy Res Inst.

Gammage, S. (2010). Time pressed and time poor: unpaid household work in Guatemala. Feminist Economics, 16(3), 79-112.

Komatsu, H., Malapit, H. J. L., & Theis, S. (2018). Does women's time in domestic work and agriculture affect women's and children's dietary diversity? Evidence from Bangladesh, Nepal, Cambodia, Ghana, and Mozambique. Food Policy, 79, 256-270.

Seymour, Greg; and Floro, Maria S. 2021. Signs of change: Evidence on women's time use, identity, and subjective well-being in rural Bangladesh. Journal of Gender, Agriculture and Food Security 6(1): 1-17. https://doi.org/10.19268/JGAFS.612021.1

Seymour, G., Masuda, Y. J., Williams, J., & Schneider, K. (2019). Household and child nutrition outcomes among the time and income poor in rural Bangladesh. Global food security, 20, 82-92.

Stevano, S., 2017. The limits of instrumentalism: informal work and gendered cycles of food insecurity in Mozambique. J. Dev. Stud. 1–16. https://doi.org/10.1080/

United Nations. 2015. The World's Women 2015: Trends and Statistics. New York: United Nations, Department of Economic and Social Affairs, Statistics Division.

WHO (2007), Indicators for assessing infant and young child feeding practices: conclusions of a consensus meeting held. Washington DC: World Health Organization, 2007

# Appendix [4]

**Annex a: Time use patterns of men's, women and children**

| Activities | (1) | (2) | (3) | (4) | (1)-(2) | (3)-(4) |
|---|---|---|---|---|---|---|
| | **Men's** | **Women** | **Male Children** | **Female Children** | **Pairwise t-test** | **Pairwise t-test** |
| | Mean/(Var) | Mean/(Var) | Mean/(Var) | Mean/(Var) | P-value | P-value |
| Other | 0.453 | 0.409 | 0.338 | 0.274 | 0.463 | 0.139 |
| | (0.821) | (0.459) | (0.250) | (0.069) | | |
| School | 0.000 | 0.000 | 4.162 | 4.541 | - | 0.173 |
| | (0.000) | (0.000) | (7.177) | (7.862) | | |
| Commuting | 0.994 | 0.534 | 1.038 | 0.920 | 0.000*** | 0.139 |
| | (1.072) | (0.614) | (0.634) | (0.563) | | |
| Unpaid work | 0.433 | 7.227 | 1.306 | 2.242 | 0.000*** | 0.000*** |
| | (1.593) | (8.438) | (5.180) | (6.278) | | |
| Pai work | 8.231 | 2.766 | 3.816 | 2.532 | 0.000*** | 0.000*** |
| | (9.328) | (8.151) | (9.245) | (7.262) | | |
| Total work | 8.664 | 9.993 | 5.122 | 4.774 | 0.000*** | 0.208 |
| | (7.970) | (5.452) | (7.737) | (6.742) | | |
| Leisure | 1.478 | 0.729 | 0.476 | 0.538 | 0.000*** | 0.635 |
| | (4.061) | (1.637) | (1.676) | (1.617) | | |
| Self-care | 11.728 | 12.233 | 12.790 | 12.863 | 0.000*** | 0.677 |
| | (3.211) | (4.232) | (3.043) | (2.826) | | |
| N | 360 | 363 | 250 | 157 | 723 | 407 |

[4] All results are average hrs. unless stated

**Annex b: Women engagement in paid work and time use patterns of children**

| Activity | Male children | | | Female children | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) |
| | No | Yes | Pairwise t-test | No | Yes | Pairwise t-test |
| | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 0.583 | 0.416 | 0.327 | 0.934 | 0.337 | 0.005*** |
| | (0.158) | (0.092) | | (0.244) | (0.084) | |
| Commuting | 1.033 | 1.041 | 0.945 | 0.726 | 1.019 | 0.020** |
| | (0.092) | (0.060) | | (0.096) | (0.075) | |
| Other | 0.494 | 0.250 | 0.000*** | 0.330 | 0.245 | 0.054* |
| | (0.076) | (0.022) | | (0.033) | (0.026) | |
| School | 3.328 | 4.631 | 0.000*** | 4.434 | 4.596 | 0.733 |
| | (0.290) | (0.200) | | (0.435) | (0.256) | |
| Unpaid work | 1.456 | 1.222 | 0.437 | 2.689 | 2.014 | 0.111 |
| | (0.256) | (0.173) | | (0.357) | (0.239) | |
| Paid work | 4.183 | 3.609 | 0.152 | 1.802 | 2.904 | 0.015** |
| | (0.379) | (0.211) | | (0.350) | (0.265) | |
| Total work | 5.639 | 4.831 | 0.027** | 4.491 | 4.918 | 0.331 |
| | (0.345) | (0.192) | | (0.341) | (0.260) | |
| Self-care | 12.828 | 12.769 | 0.798 | 13.085 | 12.750 | 0.239 |
| | (0.189) | (0.136) | | (0.274) | (0.146) | |
| N | 90 | 160 | 250 | 53 | 104 | 157 |

**Annex c: Household size, household head literacy and women time use patterns**

| Activity | Household size and women time use | | | Household head literacy and women time use | | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) |
| | Low HH size | High HH size | Pairwise t-test | Illiterate | Literate | Pairwise t-test |
| | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 0.799 | 0.549 | 0.095* | 0.744 | 0.724 | 0.891 |
| | (0.084) | (0.104) | | (0.086) | (0.110) | |
| Commuting | 0.533 | 0.539 | 0.942 | 0.498 | 0.600 | 0.242 |
| | (0.050) | (0.072) | | (0.049) | (0.076) | |
| Other | 0.416 | 0.392 | 0.766 | 0.440 | 0.364 | 0.312 |
| | (0.045) | (0.053) | | (0.051) | (0.037) | |
| School | 0.000 | 0.000 | - | 0.000 | 0.000 | - |
| | (0.000) | (0.000) | | (0.000) | (0.000) | |
| Unpaid work | 7.107 | 7.534 | 0.208 | 7.479 | 6.828 | 0.043** |
| | (0.181) | (0.281) | | (0.189) | (0.259) | |
| Paid work | 2.789 | 2.706 | 0.803 | 2.464 | 3.240 | 0.014** |
| | (0.176) | (0.285) | | (0.178) | (0.270) | |
| Total work | 9.897 | 10.240 | 0.208 | 9.942 | 10.068 | 0.629 |
| | (0.148) | (0.214) | | (0.154) | (0.207) | |
| Self-care | 12.236 | 12.225 | 0.966 | 12.250 | 12.184 | 0.773 |
| | (0.130) | (0.194) | | (0.133) | (0.190) | |
| N | 261 | 102 | 363 | 234 | 125 | 359 |

**Annex d: Time use patterns of men's, women and children by income quintiles**

| Quintile | Activities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Other | School | Commuting | Unpaid work | Paid work | Total work | Leisure | Self care |
| **Men** | | | | | | | | |
| 1 | 0.38 | 0.00 | 1.04 | 0.52 | 8.26 | 8.79 | 1.45 | 11.81 |
| 2 | 0.42 | 0.00 | 1.06 | 0.33 | 8.55 | 8.88 | 1.55 | 11.58 |
| 3 | 0.30 | 0.00 | 1.19 | 0.37 | 8.11 | 8.48 | 1.57 | 11.75 |
| 4 | 0.62 | 0.00 | 0.98 | 0.64 | 7.81 | 8.45 | 1.48 | 11.65 |
| 5 | 0.54 | 0.00 | 0.72 | 0.29 | 8.39 | 8.67 | 1.36 | 11.83 |
| **Women** | | | | | | | | |
| 1 | 0.4 | 0.0 | 0.8 | 6.9 | 3.1 | 10.0 | 0.7 | 12.0 |
| 2 | 0.4 | 0.0 | 0.6 | 6.6 | 3.8 | 10.4 | 0.7 | 11.9 |
| 3 | 0.3 | 0.0 | 0.5 | 6.8 | 3.0 | 9.8 | 0.7 | 12.7 |
| 4 | 0.5 | 0.0 | 0.4 | 7.5 | 2.9 | 10.4 | 0.6 | 12.1 |
| 5 | 0.5 | 0.0 | 0.4 | 8.1 | 1.3 | 9.4 | 0.9 | 12.5 |
| **Male children** | | | | | | | | |
| 1 | 0.23 | 5.05 | 1.20 | 1.22 | 3.85 | 5.07 | 0.17 | 12.28 |
| 2 | 0.28 | 4.01 | 1.13 | 1.60 | 3.92 | 5.52 | 0.39 | 12.56 |
| 3 | 0.29 | 4.67 | 0.93 | 1.33 | 3.49 | 4.81 | 0.50 | 12.67 |
| 4 | 0.46 | 4.15 | 0.93 | 0.86 | 3.82 | 4.67 | 0.76 | 12.98 |
| 5 | 0.39 | 3.20 | 1.02 | 1.56 | 3.94 | 5.50 | 0.52 | 13.29 |
| **Female children** | | | | | | | | |
| 1 | 0.36 | 4.50 | 1.01 | 3.10 | 2.27 | 5.37 | 0.20 | 12.56 |
| 2 | 0.22 | 4.45 | 1.10 | 1.92 | 2.73 | 4.65 | 0.75 | 12.73 |
| 3 | 0.15 | 4.27 | 1.08 | 1.18 | 3.66 | 4.84 | 0.36 | 12.97 |
| 4 | 0.28 | 5.12 | 0.81 | 2.10 | 2.03 | 4.14 | 0.40 | 13.26 |
| 5 | 0.36 | 4.41 | 0.59 | 2.77 | 1.98 | 4.75 | 1.02 | 12.86 |

**Annex e: Time use patterns of men's, women and children in the bottom 20percent of the income distribution**

| Activity | (1) | (2) | (3) | (4) | (1)-(2) | (3)-(4) |
|---|---|---|---|---|---|---|
| | **Men's** | **Women** | **Male Children** | **Female Children** | **Pairwise t-test** | **Pairwise t-test** |
| | Mean/(SE) | Mean/(SE) | Mean/(SE) | Mean/(SE) | P-value | P-value |
| Leisure | 1.448 | 0.741 | 0.167 | 0.200 | 0.002*** | 0.707 |
| | (0.185) | (0.120) | (0.048) | (0.080) | | |
| Commuting | 1.041 | 0.771 | 1.198 | 1.014 | 0.056* | 0.210 |
| | (0.113) | (0.082) | (0.083) | (0.127) | | |
| Other | 0.384 | 0.380 | 0.229 | 0.357 | 0.946 | 0.034** |
| | (0.035) | (0.051) | (0.036) | (0.048) | | |
| School | 0.000 | 0.000 | 5.052 | 4.500 | .n | 0.322 |
| | (0.000) | (0.000) | (0.308) | (0.493) | | |
| Unpaid work | 0.523 | 6.946 | 1.219 | 3.100 | 0.000*** | 0.002*** |
| | (0.167) | (0.317) | (0.312) | (0.540) | | |
| Paid work | 8.262 | 3.084 | 3.854 | 2.271 | 0.000*** | 0.008*** |
| | (0.273) | (0.331) | (0.366) | (0.464) | | |
| Total work | 8.785 | 10.030 | 5.073 | 5.371 | 0.000*** | 0.618 |
| | (0.250) | (0.230) | (0.342) | (0.518) | | |
| Self-care | 11.814 | 12.024 | 12.281 | 12.557 | 0.447 | 0.416 |
| | (0.150) | (0.234) | (0.226) | (0.246) | | |
| | 86 | 83 | 48 | 35 | 169 | 83 |

**Annex f: Time use patterns of men's, women and children in the upper 20percent of the income distribution**

| Activity | (1) | (2) | (3) | (4) | (1)-(2) | (3)-(4) |
|---|---|---|---|---|---|---|
| | **Men's** | **Women** | **Male Children** | **Female Children** | **Pairwise t-test** | **Pairwise t-test** |
| | Mean/(SE) | Mean/(SE) | Mean/(SE) | Mean/(SE) | P-value | P-value |
| Leisure | 1.361 | 0.937 | 0.517 | 1.016 | 0.192 | 0.137 |
| | (0.264) | (0.194) | (0.165) | (0.334) | | |
| Commuting | 0.722 | 0.361 | 1.017 | 0.594 | 0.011** | 0.023** |
| | (0.103) | (0.094) | (0.126) | (0.088) | | |
| Other | 0.535 | 0.456 | 0.390 | 0.359 | 0.447 | 0.522 |
| | (0.092) | (0.053) | (0.027) | (0.040) | | |
| School | 0.000 | 0.000 | 3.195 | 4.406 | - | 0.056* |
| | (0.000) | (0.000) | (0.336) | (0.581) | | |
| Unpaid work | 0.285 | 8.095 | 1.559 | 2.766 | 0.000*** | 0.041** |
| | (0.112) | (0.329) | (0.353) | (0.449) | | |
| Paid work | 8.389 | 1.335 | 3.941 | 1.984 | 0.000*** | 0.003*** |
| | (0.332) | (0.244) | (0.407) | (0.452) | | |
| Total work | 8.674 | 9.430 | 5.500 | 4.750 | 0.085* | 0.217 |
| | (0.316) | (0.301) | (0.362) | (0.473) | | |
| Self-care | 11.826 | 12.525 | 13.288 | 12.859 | 0.031** | 0.261 |
| | (0.205) | (0.242) | (0.225) | (0.304) | | |
| N | 72 | 79 | 59 | 32 | 151 | 91 |

**Annex g: Time use patterns of men's, women and children by asset quintiles**

| | Activities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Quintile** | **Other** | **School** | **Commuting** | **Unpaid work** | **Paid work** | **Total work** | **Leisure** | **Self care** |
| Men | | | | | | | | |
| 1 | 0.69 | 0.00 | 1.06 | 0.28 | 8.44 | 8.72 | 1.17 | 11.71 |
| 2 | 0.63 | 0.00 | 0.76 | 0.33 | 8.48 | 8.80 | 1.55 | 11.61 |
| 3 | 0.32 | 0.00 | 1.08 | 0.48 | 7.73 | 8.21 | 1.93 | 11.68 |
| 4 | 0.27 | 0.00 | 1.03 | 0.64 | 8.20 | 8.84 | 1.20 | 12.07 |
| 5 | 0.19 | 0.00 | 1.10 | 0.55 | 8.30 | 8.84 | 1.48 | 11.65 |
| Women | | | | | | | | |
| 1 | 0.59 | 0.00 | 0.61 | 7.94 | 2.27 | 10.21 | 0.54 | 11.96 |
| 2 | 0.51 | 0.00 | 0.52 | 7.79 | 2.10 | 9.89 | 0.71 | 12.16 |
| 3 | 0.41 | 0.00 | 0.50 | 7.51 | 2.99 | 10.49 | 0.79 | 11.78 |
| 4 | 0.31 | 0.00 | 0.59 | 6.51 | 2.56 | 9.07 | 1.23 | 12.70 |
| 5 | 0.11 | 0.00 | 0.41 | 5.72 | 4.45 | 10.18 | 0.35 | 12.88 |
| Male children | | | | | | | | |
| 1 | 0.44 | 3.95 | 0.94 | 1.01 | 4.34 | 5.35 | 0.76 | 12.45 |
| 2 | 0.37 | 4.03 | 1.21 | 1.38 | 3.77 | 5.15 | 0.52 | 12.67 |
| 3 | 0.35 | 4.05 | 0.90 | 2.04 | 3.33 | 5.37 | 0.54 | 12.72 |
| 4 | 0.39 | 3.93 | 0.89 | 1.15 | 4.32 | 5.47 | 0.21 | 13.10 |
| 5 | 0.10 | 5.04 | 1.26 | 0.69 | 3.39 | 4.08 | 0.28 | 13.14 |
| Female children | | | | | | | | |
| 1 | 0.37 | 5.04 | 0.95 | 2.25 | 2.66 | 4.91 | 0.22 | 12.51 |
| 2 | 0.44 | 4.96 | 0.80 | 3.12 | 1.36 | 4.48 | 0.74 | 12.58 |
| 3 | 0.33 | 4.37 | 0.79 | 2.29 | 2.39 | 4.67 | 0.44 | 13.40 |
| 4 | 0.15 | 3.80 | 0.83 | 2.25 | 2.90 | 5.15 | 0.97 | 12.74 |
| 5 | 0.13 | 4.65 | 1.22 | 1.45 | 3.02 | 4.47 | 0.30 | 13.23 |

**Annex h: Time use patterns of men's, women and children in the bottom 20percent of the asset distribution**

| Activity | (1) | (2) | (3) | (4) | (1)-(2) | (3)-(4) |
|---|---|---|---|---|---|---|
| | **Men's** | **Women** | **Male Children** | **Female Children** | **Pairwise t-test** | **Pairwise t-test** |
| | Mean/(SE) | Mean/(SE) | Mean/(SE) | Mean/(SE) | P-value | P-value |
| Leisure | 1.171 | 0.542 | 0.760 | 0.224 | 0.003*** | 0.113 |
| | (0.180) | (0.102) | (0.287) | (0.101) | | |
| Commuting | 1.059 | 0.613 | 0.938 | 0.947 | 0.004*** | 0.947 |
| | (0.121) | (0.091) | (0.093) | (0.117) | | |
| Other | 0.694 | 0.589 | 0.438 | 0.368 | 0.607 | 0.156 |
| | (0.166) | (0.117) | (0.028) | (0.041) | | |
| School | 0.000 | 0.000 | 3.948 | 5.039 | .n | 0.050* |
| | (0.000) | (0.000) | (0.368) | (0.407) | | |
| Unpaid work | 0.282 | 7.935 | 1.010 | 2.250 | 0.000*** | 0.009*** |
| | (0.085) | (0.318) | (0.253) | (0.416) | | |
| Paid work | 8.435 | 2.274 | 4.344 | 2.658 | 0.000*** | 0.007*** |
| | (0.350) | (0.301) | (0.420) | (0.436) | | |
| Total work | 8.718 | 10.208 | 5.354 | 4.908 | 0.000*** | 0.420 |
| | (0.335) | (0.218) | (0.338) | (0.449) | | |
| Self-care | 11.706 | 11.958 | 12.448 | 12.513 | 0.342 | 0.844 |
| | (0.190) | (0.184) | (0.211) | (0.260) | | |
| N | 85 | 84 | 48 | 38 | 169 | 86 |

**Annex i: Time use patterns of men's, women and children in the upper 20percent of the asset distribution**

| Activity | (1) | (2) | (3) | (4) | (1)-(2) | (3)-(4) |
|---|---|---|---|---|---|---|
| | **Men's** | **Women** | **Male Children** | **Female Children** | **Pairwise t-test** | **Pairwise t-test** |
| | Mean/(SE) | Mean/(SE) | Mean/(SE) | Mean/(SE) | P-value | P-value |
| Leisure | 1.482 | 0.352 | 0.275 | 0.300 | 0.000*** | 0.903 |
| | (0.270) | (0.147) | (0.123) | (0.169) | | |
| Commuting | 1.098 | 0.407 | 1.262 | 1.217 | 0.000*** | 0.831 |
| | (0.173) | (0.074) | (0.141) | (0.160) | | |
| Other | 0.188 | 0.111 | 0.100 | 0.133 | 0.317 | 0.574 |
| | (0.068) | (0.031) | (0.037) | (0.048) | | |
| School | 0.000 | 0.000 | 5.037 | 4.650 | .n | 0.525 |
| | (0.000) | (0.000) | (0.371) | (0.495) | | |
| Unpaid work | 0.545 | 5.722 | 0.688 | 1.450 | 0.000*** | 0.043** |
| | (0.200) | (0.333) | (0.195) | (0.339) | | |
| Paid work | 8.295 | 4.454 | 3.388 | 3.017 | 0.000*** | 0.575 |
| | (0.451) | (0.361) | (0.403) | (0.537) | | |
| Total work | 8.839 | 10.176 | 4.075 | 4.467 | 0.005*** | 0.497 |
| | (0.382) | (0.263) | (0.356) | (0.462) | | |
| Self-care | 11.652 | 12.880 | 13.137 | 13.233 | 0.000*** | 0.825 |
| | (0.210) | (0.237) | (0.323) | (0.249) | | |
| N | 56 | 54 | 40 | 30 | 110 | 70 |

**Annex j: Women time use and household productivity**

| Activity | (1) Below average | (2) Above average | (1)-(2) Pairwise t-test |
|---|---|---|---|
| | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 0.715 | 0.759 | 0.764 |
| | (0.078) | (0.130) | |
| Commuting | 0.572 | 0.451 | 0.175 |
| | (0.046) | (0.085) | |
| Other | 0.390 | 0.451 | 0.433 |
| | (0.018) | (0.108) | |
| School | 0.000 | 0.000 | .n |
| | (0.000) | (0.000) | |
| Unpaid work | 7.068 | 7.585 | 0.117 |
| | (0.172) | (0.309) | |
| Paid work | 3.163 | 1.875 | 0.000*** |
| | (0.179) | (0.256) | |
| Total work | 10.231 | 9.460 | 0.004*** |
| | (0.129) | (0.266) | |
| Self-care | 11.996 | 12.763 | 0.001*** |
| | (0.110) | (0.241) | |
| | 251 | 112 | 363 |

**Annex k: Household access to supplies markets and time use patterns**

| Activities | Men | | | Women | | | Male children | | | Female children | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) |
| | No | Yes | Pairwise t-test | No | Yes | Pair wise t-test | No | Yes | Pair wise t-test | No | Yes | Pair wise t-test |
| | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 1.206 | 1.585 | 0.108 | 0.670 | 0.751 | 0.591 | 0.213 | 0.617 | 0.018** | 0.393 | 0.619 | 0.288 |
| | (0.177) | (0.130) | | (0.136) | (0.077) | | (0.066) | (0.119) | | (0.132) | (0.140) | |
| Commuting | 1.083 | 0.959 | 0.306 | 0.580 | 0.517 | 0.495 | 1.057 | 1.028 | 0.778 | 1.232 | 0.748 | 0.000*** |
| | (0.108) | (0.063) | | (0.073) | (0.050) | | (0.087) | (0.062) | | (0.113) | (0.063) | |
| Other | 0.098 | 0.593 | 0.000*** | 0.110 | 0.523 | 0.000*** | 0.092 | 0.469 | 0.000*** | 0.080 | 0.381 | 0.000*** |
| | (0.021) | (0.064) | | (0.039) | (0.045) | | (0.022) | (0.044) | | (0.025) | (0.023) | |
| School | 0.000 | 0.000 | .n | 0.000 | 0.000 | .n | 4.213 | 4.135 | 0.828 | 3.973 | 4.856 | 0.058* |
| | (0.000) | (0.000) | | (0.000) | (0.000) | | (0.267) | (0.218) | | (0.328) | (0.293) | |
| Unpaid work | 0.412 | 0.442 | 0.839 | 5.675 | 7.817 | 0.000*** | 0.994 | 1.472 | 0.114 | 1.473 | 2.668 | 0.004*** |
| | (0.124) | (0.079) | | (0.276) | (0.169) | | (0.208) | (0.190) | | (0.287) | (0.258) | |
| Paid work | 8.505 | 8.122 | 0.285 | 3.965 | 2.310 | 0.000*** | 4.121 | 3.653 | 0.248 | 3.446 | 2.025 | 0.001*** |
| | (0.295) | (0.192) | | (0.278) | (0.170) | | (0.298) | (0.248) | | (0.333) | (0.267) | |
| Total work | 8.917 | 8.564 | 0.286 | 9.640 | 10.127 | 0.076* | 5.115 | 5.126 | 0.977 | 4.920 | 4.693 | 0.602 |
| | (0.271) | (0.178) | | (0.266) | (0.135) | | (0.272) | (0.228) | | (0.348) | (0.259) | |
| Self-care | 12.113 | 11.576 | 0.010** | 12.995 | 11.943 | 0.000*** | 13.247 | 12.546 | 0.002*** | 13.179 | 12.688 | 0.080* |
| | (0.201) | (0.104) | | (0.248) | (0.111) | | (0.183) | (0.135) | | (0.228) | (0.164) | |
| N | 102 | 258 | 360 | 100 | 263 | 363 | 87 | 163 | 250 | 56 | 101 | 157 |

**Annex l: Household access to agricultural input markets and time use patterns**

| Activities | Men | | | Women | | | Male children | | | Female children | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) |
| | No | Yes | Pairwise t-test | No | Yes | Pair wise t-test | No | Yes | Pair wise t-test | No | Yes | Pair wise t-test |
| | Mean /(SE) | Mean /(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 1.027 | 1.561 | 0.068* | 0.391 | 0.789 | 0.033** | 0.105 | 0.542 | 0.055* | 0.100 | 0.621 | 0.060* |
| | (0.246) | (0.117) | | (0.135) | (0.075) | | (0.060) | (0.095) | | (0.071) | (0.119) | |
| Commuting | 0.982 | 0.997 | 0.923 | 0.591 | 0.524 | 0.563 | 1.487 | 0.958 | 0.000*** | 1.520 | 0.807 | 0.000*** |
| | (0.113) | (0.061) | | (0.096) | (0.045) | | (0.137) | (0.052) | | (0.172) | (0.059) | |
| Other | 0.143 | 0.510 | 0.005*** | 0.091 | 0.466 | 0.000*** | 0.158 | 0.370 | 0.016** | 0.140 | 0.299 | 0.005*** |
| | (0.033) | (0.056) | | (0.026) | (0.041) | | (0.043) | (0.036) | | (0.046) | (0.023) | |
| School | 0.000 | 0.000 | .n | 0.000 | 0.000 | .n | 4.026 | 4.186 | 0.735 | 4.660 | 4.519 | 0.818 |
| | (0.000) | (0.000) | | (0.000) | (0.000) | | (0.390) | (0.188) | | (0.433) | (0.254) | |
| Unpaid work | 0.304 | 0.457 | 0.403 | 5.373 | 7.558 | 0.000*** | 1.013 | 1.358 | 0.390 | 1.420 | 2.398 | 0.074* |
| | (0.129) | (0.075) | | (0.327) | (0.163) | | (0.310) | (0.160) | | (0.382) | (0.225) | |
| Paid work | 8.509 | 8.179 | 0.459 | 4.955 | 2.375 | 0.000*** | 3.829 | 3.814 | 0.977 | 3.160 | 2.413 | 0.205 |
| | (0.424) | (0.174) | | (0.370) | (0.154) | | (0.464) | (0.211) | | (0.447) | (0.241) | |
| Total work | 8.813 | 8.637 | 0.669 | 10.327 | 9.933 | 0.250 | 4.842 | 5.172 | 0.502 | 4.580 | 4.811 | 0.685 |
| | (0.383) | (0.162) | | (0.303) | (0.134) | | (0.400) | (0.195) | | (0.463) | (0.231) | |
| Self-care | 12.420 | 11.600 | 0.002*** | 12.591 | 12.169 | 0.161 | 13.368 | 12.686 | 0.026** | 13.000 | 12.837 | 0.658 |
| | (0.293) | (0.096) | | (0.284) | (0.117) | | (0.267) | (0.120) | | (0.261) | (0.152) | |
| N | 56 | 304 | 360 | 55 | 308 | 363 | 38 | 212 | 250 | 25 | 132 | 157 |

**Annex m: Household access to the nearest all weather road and women time use patterns**

| Activities | | (1) | | (2) | | (1)-(2) |
|---|---|---|---|---|---|---|
| | | Below average | | Above average | | Pairwise t-test |
| | N | Mean/(SE) | N | Mean/(SE) | N | P-value |
| Leisure | 209 | 0.900 | 95 | 0.411 | 304 | 0.003*** |
| | | (0.100) | | (0.093) | | |
| Commuting | 209 | 0.572 | 95 | 0.532 | 304 | 0.688 |
| | | (0.054) | | (0.087) | | |
| Other | 209 | 0.416 | 95 | 0.453 | 304 | 0.687 |
| | | (0.060) | | (0.020) | | |
| School | 209 | 0.000 | 95 | 0.000 | .n | .n |
| | | (0.000) | | (0.000) | | |
| Unpaid work | 209 | 6.871 | 95 | 7.953 | 304 | 0.003*** |
| | | (0.205) | | (0.294) | | |
| Paid work | 209 | 2.809 | 95 | 2.605 | 304 | 0.569 |
| | | (0.200) | | (0.294) | | |
| Total work | 209 | 9.679 | 95 | 10.558 | 304 | 0.003*** |
| | | (0.176) | | (0.190) | | |
| Self-care | 209 | 12.340 | 95 | 11.937 | 304 | 0.118 |
| | | (0.154) | | (0.174) | | |

**Annex n: Household access to electricity and time use patterns**

| Activities | Men | | | Women | | | Male children | | | Female children | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) |
| | No | Yes | Pairwise t-test | No | Yes | Pair wise t-test | No | Yes | Pair wise t-test | No | Yes | Pair wise t-test |
| | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 1.105 | 1.801 | 0.001*** | 0.405 | 0.995 | 0.000*** | 0.278 | 0.622 | 0.038** | 0.218 | 0.747 | 0.010** |
| | (0.132) | (0.159) | | (0.075) | (0.102) | | (0.125) | (0.107) | | (0.115) | (0.146) | |
| Commuting | 0.916 | 1.062 | 0.183 | 0.543 | 0.528 | 0.856 | 1.108 | 0.986 | 0.231 | 1.129 | 0.784 | 0.005*** |
| | (0.081) | (0.074) | | (0.066) | (0.052) | | (0.086) | (0.060) | | (0.099) | (0.072) | |
| Other | 0.527 | 0.389 | 0.149 | 0.442 | 0.382 | 0.400 | 0.354 | 0.326 | 0.669 | 0.298 | 0.258 | 0.346 |
| | (0.093) | (0.037) | | (0.062) | (0.040) | | (0.022) | (0.052) | | (0.031) | (0.028) | |
| School | 0.000 | 0.000 | .n | 0.000 | 0.000 | .n | 3.802 | 4.427 | 0.068* | 4.887 | 4.316 | 0.213 |
| | (0.000) | (0.000) | | (0.000) | (0.000) | | (0.265) | (0.219) | | (0.381) | (0.273) | |
| Unpaid work | 0.335 | 0.518 | 0.171 | 7.677 | 6.857 | 0.007*** | 1.160 | 1.413 | 0.386 | 1.831 | 2.511 | 0.097* |
| | (0.097) | (0.092) | | (0.235) | (0.196) | | (0.229) | (0.185) | | (0.284) | (0.271) | |
| Paid work | 8.647 | 7.870 | 0.016** | 2.692 | 2.827 | 0.656 | 4.217 | 3.521 | 0.074* | 2.806 | 2.353 | 0.304 |
| | (0.234) | (0.219) | | (0.229) | (0.198) | | (0.292) | (0.254) | | (0.346) | (0.275) | |
| Total work | 8.982 | 8.389 | 0.047** | 10.369 | 9.683 | 0.005*** | 5.377 | 4.934 | 0.214 | 4.637 | 4.863 | 0.595 |
| | (0.214) | (0.205) | | (0.168) | (0.173) | | (0.271) | (0.231) | | (0.353) | (0.254) | |
| Self-care | 11.805 | 11.661 | 0.445 | 12.155 | 12.296 | 0.517 | 13.024 | 12.618 | 0.069* | 12.831 | 12.884 | 0.846 |
| | (0.125) | (0.139) | | (0.156) | (0.149) | | (0.145) | (0.158) | | (0.185) | (0.187) | |
| N | 167 | 193 | 360 | 164 | 199 | 363 | 106 | 144 | 250 | 62 | 95 | 157 |

**Annex o: Household access to water and women time use patterns**

| Activity | (1) | | (2) | | (1)-(2) |
|---|---|---|---|---|---|
| | Below average | | Above average | | Pairwise t-test |
| | N | Mean/(SE) | N | Mean/(SE) | N | P-value |
| Leisure | 173 | 0.931 | 117 | 0.637 | 290 | 0.067* |
| | | (0.113) | | (0.100) | | |
| Commuting | 173 | 0.572 | 117 | 0.641 | 290 | 0.491 |
| | | (0.064) | | (0.076) | | |
| Other | 173 | 0.431 | 117 | 0.338 | 290 | 0.241 |
| | | (0.060) | | (0.038) | | |
| School | 173 | 0.000 | 117 | 0.000 | .n | .n |
| | | (0.000) | | (0.000) | | |
| Unpaid work | 173 | 7.590 | 117 | 6.487 | 290 | 0.001*** |
| | | (0.218) | | (0.244) | | |
| Paid work | 173 | 2.280 | 117 | 3.551 | 290 | 0.000*** |
| | | (0.208) | | (0.265) | | |
| Total work | 173 | 9.870 | 117 | 10.038 | 290 | 0.531 |
| | | (0.174) | | (0.202) | | |
| Self-care | 173 | 12.046 | 117 | 12.325 | 290 | 0.220 |
| | | (0.128) | | (0.200) | | |

**Annex p: Household use of cooking stove and women time use**

| Activity | (1) | | (2) | | (1)-(2) |
|---|---|---|---|---|---|
| | No | | Yes | | Pairwise t-test |
| | N | Mean/(SE) | N | Mean/(SE) | N | P-value |
| Leisure | 287 | 0.652 | 76 | 1.020 | 363 | 0.025** |
| | | (0.072) | | (0.168) | | |
| Commuting | 287 | 0.580 | 76 | 0.362 | 363 | 0.031** |
| | | (0.049) | | (0.061) | | |
| Other | 287 | 0.444 | 76 | 0.276 | 363 | 0.054* |
| | | (0.042) | | (0.053) | | |
| School | 287 | 0.000 | 76 | 0.000 | .n | .n |
| | | (0.000) | | (0.000) | | |
| Unpaid work | 287 | 7.308 | 76 | 6.921 | 363 | 0.302 |
| | | (0.172) | | (0.331) | | |
| Paid work | 287 | 2.737 | 76 | 2.875 | 363 | 0.708 |
| | | (0.171) | | (0.314) | | |
| Total work | 287 | 10.045 | 76 | 9.796 | 363 | 0.409 |
| | | (0.136) | | (0.280) | | |
| Self-care | 287 | 12.186 | 76 | 12.408 | 363 | 0.405 |
| | | (0.117) | | (0.265) | | |

**Annex q: Household use of fertilizers and pesticides and time use**

| Activities | Men | | | Women | | | Male children | | | Female children | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) | (1) | (2) | (1)-(2) |
| | No | Yes | Pairwise t-test | No | Yes | Pairwise t-test | No | Yes | Pairwise t-test | No | Yes | Pairwise t-test |
| | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value | Mean/(SE) | Mean/(SE) | P-value |
| Leisure | 1.267 | 1.568 | 0.582 | 0.077 | 0.771 | 0.056* | 0.000 | 0.519 | 0.153 | 0.000 | 0.613 | 0.257 |
| | (0.571) | (0.121) | | (0.077) | (0.076) | | (0.000) | (0.091) | | (0.000) | (0.120) | |
| Commuting | 1.033 | 0.979 | 0.846 | 0.538 | 0.500 | 0.864 | 1.269 | 1.014 | 0.263 | 1.750 | 0.808 | 0.001*** |
| | (0.241) | (0.062) | | (0.155) | (0.047) | | (0.263) | (0.054) | | (0.335) | (0.060) | |
| Other | 0.167 | 0.507 | 0.188 | 0.154 | 0.447 | 0.150 | 0.154 | 0.360 | 0.164 | 0.250 | 0.292 | 0.699 |
| | (0.063) | (0.059) | | (0.067) | (0.043) | | (0.067) | (0.037) | | (0.112) | (0.023) | |
| School | 0.000 | 0.000 | .n | 0.000 | 0.000 | .n | 3.423 | 4.150 | 0.336 | 4.000 | 4.454 | 0.701 |
| | (0.000) | (0.000) | | (0.000) | (0.000) | | (0.820) | (0.182) | | (0.904) | (0.260) | |
| Unpaid work | 0.367 | 0.436 | 0.840 | 5.038 | 7.590 | 0.002*** | 2.115 | 1.333 | 0.250 | 1.000 | 2.413 | 0.192 |
| | (0.367) | (0.076) | | (0.559) | (0.168) | | (0.877) | (0.161) | | (0.500) | (0.239) | |
| Paid work | 8.600 | 8.200 | 0.621 | 5.269 | 2.346 | 0.000*** | 3.231 | 3.845 | 0.476 | 4.417 | 2.362 | 0.068* |
| | (0.869) | (0.179) | | (0.794) | (0.156) | | (0.755) | (0.210) | | (1.012) | (0.244) | |
| Total work | 8.967 | 8.635 | 0.659 | 10.308 | 9.936 | 0.575 | 5.346 | 5.179 | 0.832 | 5.417 | 4.775 | 0.563 |
| | (0.663) | (0.168) | | (0.313) | (0.138) | | (0.748) | (0.192) | | (0.880) | (0.243) | |
| Self-care | 12.067 | 11.609 | 0.319 | 12.923 | 12.224 | 0.249 | 13.808 | 12.693 | 0.026** | 12.583 | 12.942 | 0.631 |
| | (0.341) | (0.103) | | (0.383) | (0.126) | | (0.398) | (0.122) | | (0.490) | (0.164) | |
| N | 15 | 288 | 303 | 13 | 295 | 308 | 13 | 207 | 220 | | | |

zef
Center for
Development Research
University of Bonn

# Working Paper Series


Authors: Tigabu Degu Getahun and Jemberu Lulie Mekonnen

Contact: tigyget14@gmail.com


Photo: Counthaku (CC BY-SA 4.0)


Published by:
Zentrum für Entwicklungsforschung (ZEF)
Center for Development Research
Genscherallee 3
D – 53113 Bonn
Germany

Phone: +49-228-73-1861
Fax: +49-228-73-1869
E-Mail: presse.zef@uni-bonn.de

www.zef.de