Tanzania National Panel Survey

LSMS-ISA: Gender

Gender in the TZNPS

The Tanzania National Panel Survey (TZNPS) differentiates households by the gender of the household head. In households designated "female-headed" a woman was the decision maker in the household, took part in the economy, control and welfare of the household, and was recognized by others in the household as the head.[1] For questions regarding household labor (both non-farm and farm), the gender of the individual laborer is recorded, and we use this to illustrate the responsibilities of male and female household members.[2]

Female-Headed Households Faced Unique Challenges

Twenty-nine percent of non-agricultural households and one quarter of agricultural households were female-headed. Female-headed households were smaller than male-headed households[3], had less educated heads of household and were more likely to have children suffering from malnutrition. Agricultural male-headed households had an average of 5.7 people and agricultural female-headed households had an average of 4.3 people, which may be partially accounted for by the missing male spouse.[4]

> ### KEY FINDINGS
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> - Female-headed households were less likely to sell their crops and on average sold smaller quantities, earning less than male-headed households.
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> - Although female-headed households generally had lower yields and productivity than male-headed households, the differences were small in magnitude and generally not statistically significant.
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> - Female-headed households were less likely to use fertilizer, pesticides, herbicides, fungicides, improved variety seeds, and hired labor than male-headed households.
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> - Women spent over three times as many hours per week on non-agricultural household activities as men.
>
> - Women spent slightly less time on agricultural activities (land preparation, weeding, and harvesting) than men.

Adult women in both non-agricultural and agricultural households were less likely to have attended school than their male counterparts. Three percent of males and 9% of females in non-agricultural households never attended school; in agricultural households 17% of males and 35% of females never attended school. Female heads of household in agricultural households completed less than four years of schooling, compared to an estimated six years for male household heads.

Children under five years old in agricultural female-headed households were more likely to suffer from malnutrition (stunting, wasting, underweight, low BMI for age and/or overweight) than children in male-headed households (54% compared to 48%). However, this difference was not statistically significant.[5]

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1 As defined by the Tanzanian National Bureau of Statistics in the Enumerator Manual for the National Panel Survey, 2008/2009 (LSMS-ISA).
2 Household farm labor, by household members and hired laborers, was recorded as days worked in the entire season (long rainy season or short rainy season). Unpaid non-farm household business and household agricultural activities were recorded as hours worked in the seven days preceding the survey.
3 P-value= 0.000
4 Thirty-nine percent of agricultural female-headed households

included at least one adult male (over age 18), whereas only 24% of non-agricultural female-headed households had at least one adult male. Alternatively, 94% of agricultural male-headed households and 86% of non-agricultural male-headed households had at least one adult female.

5 P-value = .1878

Female-headed Households Grew Fewer Crops, Sold Less, and Earned Less from Crop Sales

Female-headed households on average had fewer plots, smaller household landholding size, and grew fewer crops than male-headed households. Male-headed households were significantly more likely to grow cassava, millet, and mangoes than female-headed households.[6]

With the exception of households that grew sweet potatoes, male-headed households that grew each of the priority crops[7] during the long rainy season were more likely to sell those crops than female-headed households. However, maize was the only priority crop for which the difference was statistically significant[8]; 31% of male-headed households that grew maize sold some of their crop, while only 21% of female-headed households did so. Female-headed households also sold lower quantities of maize and paddy, thereby earning less from sales of these crops in the long rainy season than male-headed households. Female-headed households made an average of $56 and $112 from maize and paddy sales; male-headed households made an average of $97 and $239 (see *Figure 1* & *Figure 2*). The values per kilogram of maize and paddy received by male- and female-headed households were very similar.[9]

Figure 1: **Mean Value of Maize Sales by Gender of Household Head - Long Rainy Season**
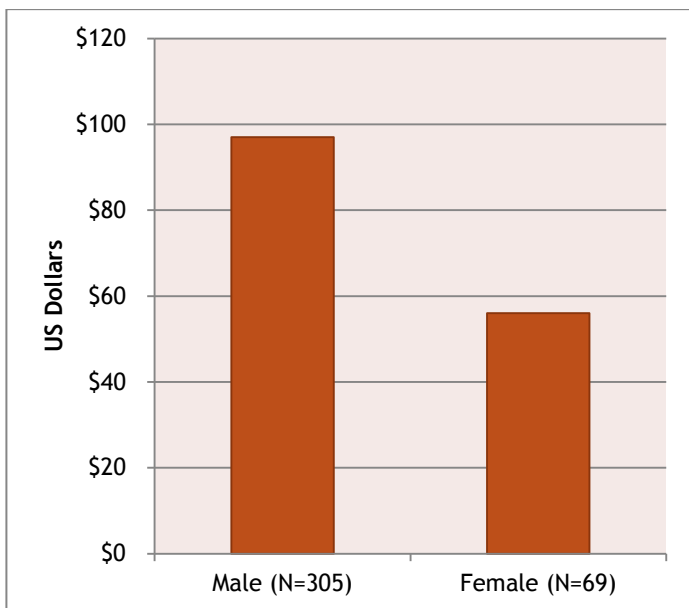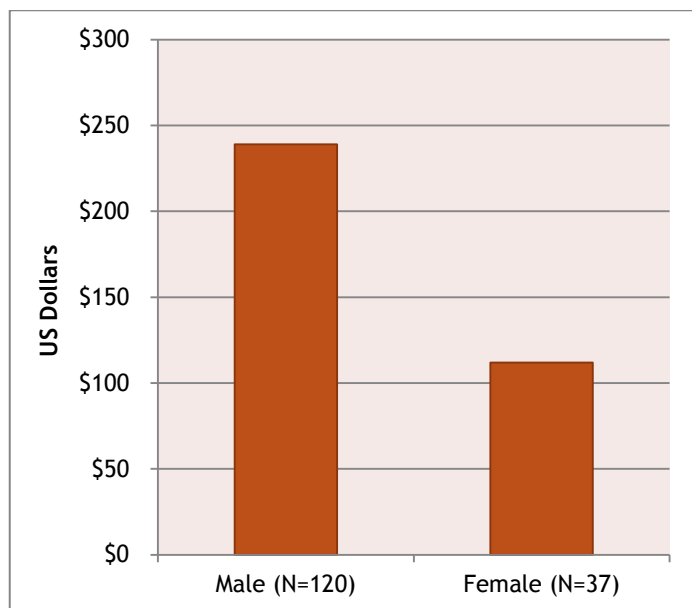

***Difference is statistically significant at the .01 level*

6 Cassava P-value= .016, Millet P-value= .0021, Mango P-value= <0.0001
7 Priority crops include maize, paddy, cassava, sorghum, millet, beans, groundnuts, sweet potatoes, yams, cowpeas, and mangoes.
8 P-value= .0011
9 For more information about maize cultivation in Tanzania, see EPAR Brief #187, and for information about paddy cultivation, see EPAR Brief #188.

Figure 2: **Mean Value of Paddy Sales by Gender of Household Head - Long Rainy Season**

**Difference is statistically signifcant at the .05 level*

Proximity to market did not appear to play a role in the likelihood of selling one's crop. The discrepancies in likelihood to sell and value of sales may have been due to the higher household surpluses of male-headed households. In the long rainy season, male-headed households produced a median total output of 0.084 tons of maize per household member, while female-headed households produced a median total of 0.050 tons per household member.[10]

Female-headed Households were Slightly Less Productive, but not Significantly So

Although female-headed households produced less gross output than male-headed households, the differences in land productivity (measured in USD/hectare)[11] were not large or significant.[12] Male-headed households had higher land productivity for long rainy season harvests and livestock, while female-headed households were more productive in the short rainy season and with fruit and permanent crops (see *Figure 3*).[13]

10 Mean for male-headed households was 0.151 t and for female-headed households was 0.103 t, statistically significant at the 99% level, p-vale=.0033; observations with yields in the top 1% were excluded from analysis along with households that planted, but did not harvest any maize.
11 The value of long and short rainy season productivity was calculated by summing the estimated value of harvest for each crop on a given plot. If the respondent had not finished the harvest, the value of the crop not yet harvested was projected by assigning the same value/kilogram to the amount left to be harvested.
12 Land productivity p-values range from .55 to .65.
13 Productivity figures do not take plant density into account. It may be that the higher fruit, permanent crop and short rainy season productivity numbers for female-headed households simply reflect the smaller average land size pandy therefore smaller denominators for crops that are not usually planted densely on plots. For example, on fruit plots the entire area of the plot is counted as the denominator

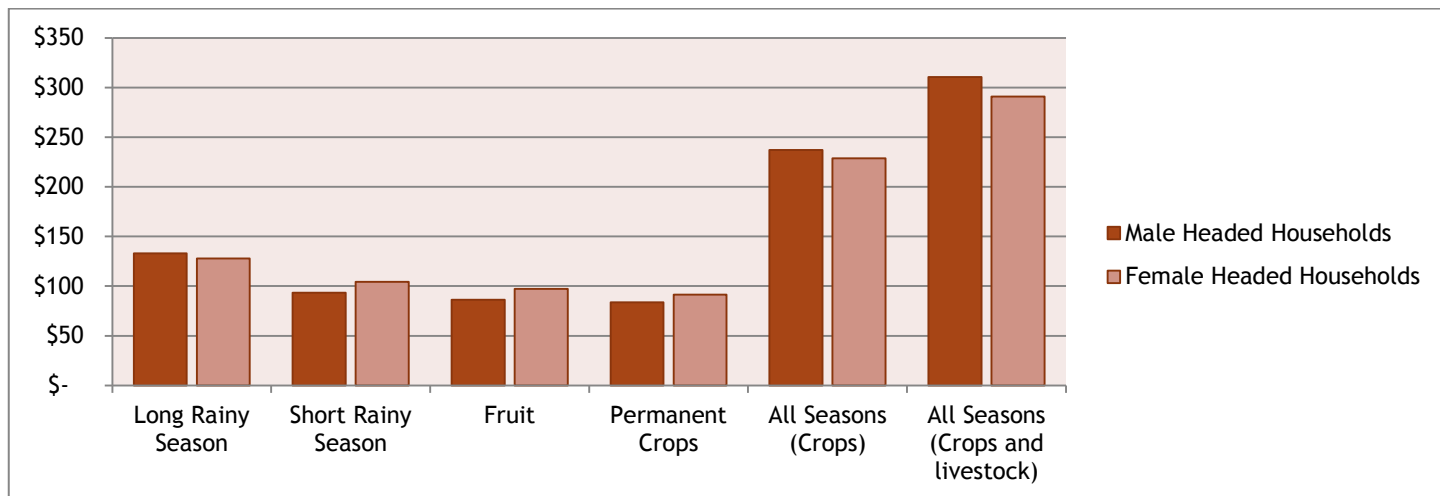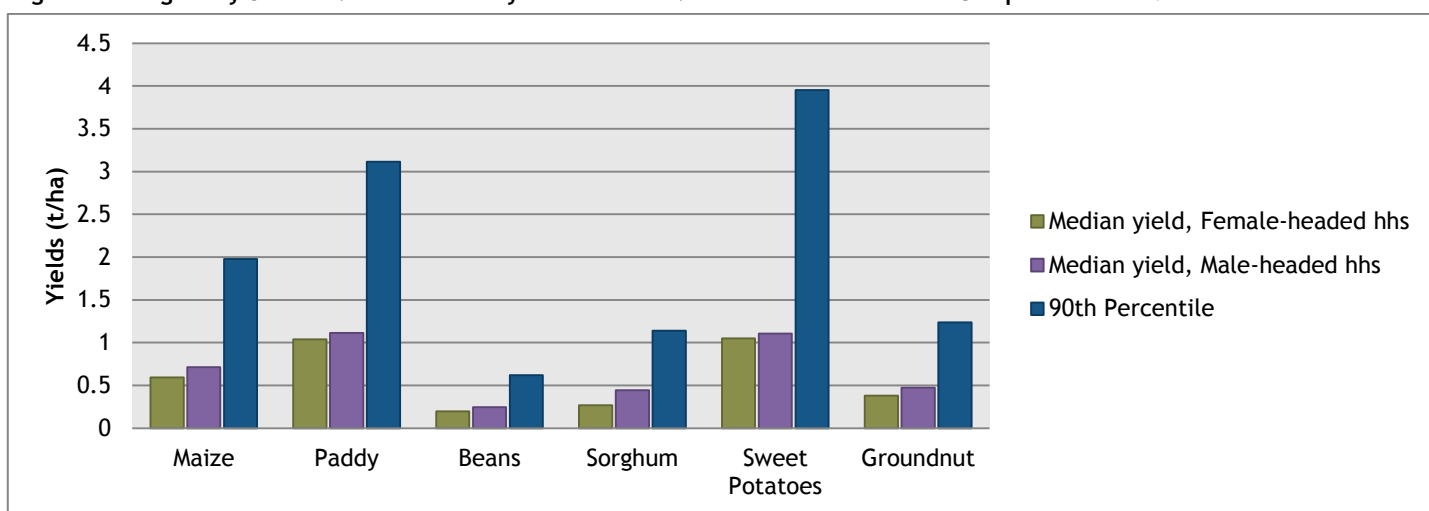*Figure 3:* **Mean Productivity of Female- and Male-headed Households**

Figure 4: **Long Rainy Season Median Yields by Female- and Male-headed Households Compared to the 90th Percentile**

The median female-headed household produced lower yields than the median male-headed household for all priority crops with sufficient observations in the long rainy season. However, in most cases the magnitude of difference was small and not significant. The median yields[14] by both male- and female-headed households were well below the 90th percentile, indicating that most households could potentially achieve higher yields regardless of the gender of the household head (see *Figure 4*). These comparisons do not control for other factors that affect yields, such as women's smaller average landholding size (which is positively correlated with yields) or lower input use (which is expected to negatively affect female yields). While average cassava yields reported in the long rainy season were significantly higher for male-headed households (2.03 t/ha compared to 1.51 t/ha), average cassava yields reported as permanent crops were higher for female-headed households (0.82 t/ha compared to 1.03 t/ha).

Female-headed Households Used Fewer Inputs[15]

Overall, a minority of farmers used non-labor inputs during the long and short rainy seasons.[16] Female-headed households were significantly less likely to use these inputs on at least one plot during the long and short rainy seasons. As shown in *Figure 5*, a greater proportion of male-headed households used each type of input. The differences were statistically significant for organic fertilizer and pesticides, herbicides, or fungicides, but not significant for inorganic fertilizer and inputs on credit.[17] Female-headed households were significantly less likely to use improved variety maize seeds than were male-headed households.[18] Notably, the differences in rates of input use between male- and female-headed households do not take other factors into account. For example, while Zanzibar had lower than average rates of improved variety seed and

15 For more information about input adoption in Tanzania, see EPAR Brief #179
16 The TZNPS looks at non-labor inputs including improved variety seeds, fertilizer, pesticides, herbicides, fungicides, and inputs purchased on credit.
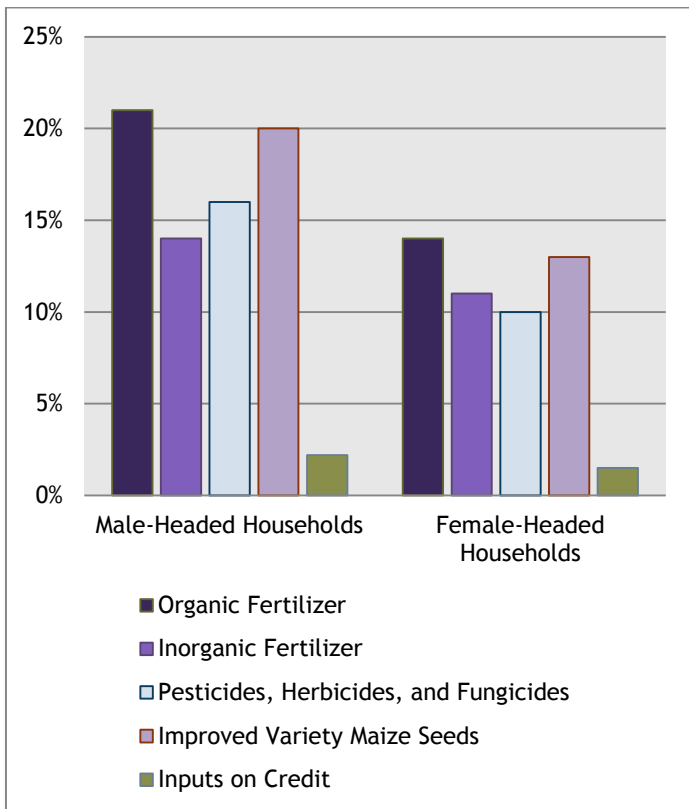17 Organic fertilizer p-value = .003; Inorganic fertilizer p-value = .156; Pesticide/herbicide/fungicide p-value = .001; Inputs on credit p-value = .417
18 P-value= .01

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regardless if the whole plot is used for cultivation or just one tree is planted.
14 Yields calculated using area harvested, top 1% of observations were excluded from analysis

Figure 5: Input use Estimates by Gender of Household Head

Women Were Predominant in the Paid Workforce

Women appeared to perform the majority of hired labor. Of those households that hired labor, 38% hired exclusively female help with land preparation, weeding, and/or harvesting, 18% hired exclusively male help with these tasks, and 45% hired both female and male workers (see *Figure 6*). Women were somewhat more likely to be hired as paid labor than men (14% of households that hired female workers did not pay any wages on a plot where women worked compared to 17% of households that hired male laborers). Data on comparative wages between male and female laborers were unavailable.

Figure 6: Distribution of Household Labor by Gender of Workers

inorganic fertilizer use, it was also the zone with the lowest proportion of agricultural female-headed households (17%). The Northern Zone had higher than average use of inputs and improved variety seeds, and also had the highest proportion of agricultural female-headed households (29%).

A higher proportion of male-headed households hired labor[19] for one or more plots during the long rainy season than female-headed households (45% compared to 39%).[20] However, female-headed households were more likely to have unpaid hired help on one or more plots for planting, weeding, and/or harvesting (23% of female-headed households compared to 15% of male-headed households).[21]

LABOR ALLOCATION

In addition to differences in access to and use of labor by female- and male-headed households, there were also differences in the way labor was allocated between male and female household members within households and in the gender of hired workers. The following section examines household and farm labor by the gender of the individual performing the tasks, regardless of whether the household was female- or male-headed. We conclude with a comparison of intra-household labor allocation in female-and male-headed households.

Women Bore Most Responsibility for Unpaid Household Work

Adult women reported spending over 25 hours, more than three times the number of hours as adult men, on unpaid non-farm household business in the seven days preceding the survey in both agricultural and non-agricultural households.[22] As shown in *Figure 7*, the discrepancy was somewhat less pronounced for agricultural households where men spent slightly more time and women spent slightly less time on these activities than in non-agricultural households.

Adult males in agricultural households on average spent 18 hours on agricultural activities in the seven days preceding the survey (whether the resulting products were for sale or household consumption) while females spent 16 hours on average. The difference was small, but statistically significant.[23]

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19 The definition of "hired labor" includes all work from non-household members including family members that did not reside in the household, regardless if they were paid or not.
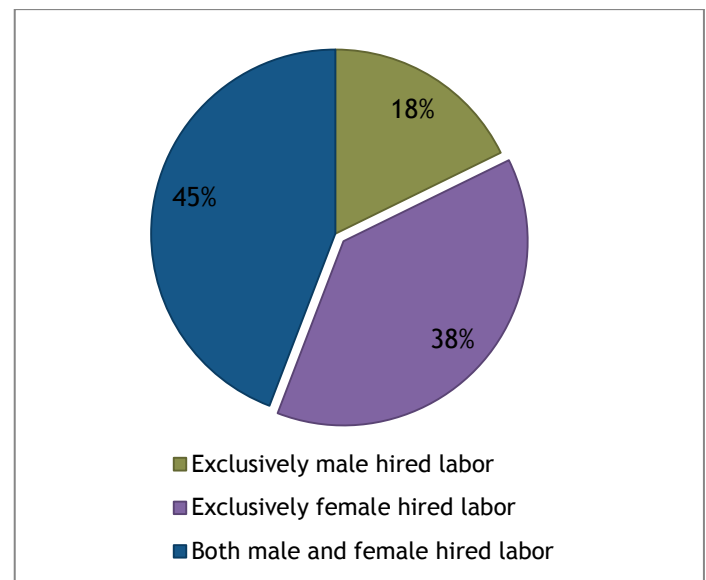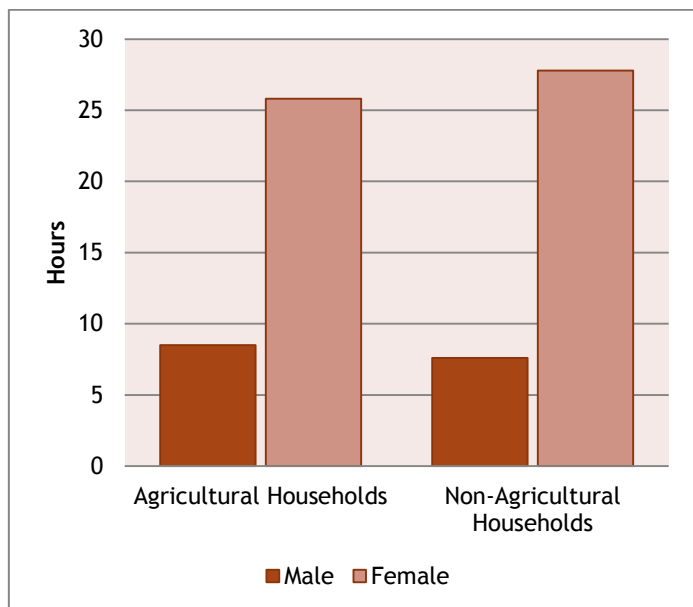20 P-value=.0444
21 P-value=.0409

22 Observations of 140 hours or more (20 hours per day) were deemed improbable and excluded from analysis.
23 P-value= 0.000

Figure 7: **Mean Number of Hours Spent in Last Seven Days by Adult Males and Females on Unpaid Non-Farm Household Business**

Household Farm Labor was Distributed Relatively Evenly between Male and Female Family Members

Over the course of the season, male household members worked slightly more days on land preparation, weeding, and harvesting than female household members. This finding was driven by the larger proportion of male-headed households, in which men worked more days on average than women (see *Box 1*). The household farm labor workforce for this analysis included both males and females over age 18; only households with at least one adult male and one adult female were included for analysis.

The distribution of household agricultural work by gender varied by geographic location. The proportion of female workers during the long rainy season (number of females from the household who worked during the season compared to total number of household members who worked) was significantly higher in the Lake and Eastern zones for all work activities, and significantly lower for all activities in Zanzibar relative to all other zones.[24] Female and male workdays also varied between zones. During the long rainy season, the Lake and Northern zones had fewer workdays for both female and male workers compared to the country as a whole. Zanzibar and the Southern Zone had more workdays for both males and females across activities. These differences may be attributed to the variation in season length between zones.[25]

24 Lake Zone P-values: Land Prep= .001, Weeding= .00, Harvesting= .00; Eastern Zone P-values: Land Prep= .08, Weeding= .01, Harvesting= .01; Zanzibar P-values: Land Prep= .00, Weeding= .00, Harvesting= .00
25 The majority of Tanzania has one long rainy season that typically lasts from December through April. The north and northeastern parts of the country have a long rainy season lasting from March through May and a short rainy season with lighter rainfall from October to December (Minot, N. (2010). *Staple food prices in Tanzania*. Washington, D.C. International Food Policy Research Institute).

BOX 1: TZNPS DATA PRESENT A DIFFERENT PICTURE OF AGRICULTURAL LABOR ALLOCATION IN MALE-HEADED HOUSEHOLDS THAN PREVAILING LITERATURE

According to the World Bank's Tanzania Strategic Country Gender Assessment, time-use studies, economic data, and census information consistently show that women are more active in agriculture than men.[26] The TZNPS data find similar results for the 25% of agricultural households headed by females, but not for the 75% headed by males. Men and women worked a similar number of days in the long rainy season in male-headed households, but women worked significantly more days in female-headed households. Overall, however, partly because of the greater proportion of male-headed households, male and female farm work burden by household members in the TZNPS was approximately equal, with men on average working slightly more than women.[27] These results highlight the importance of understanding survey techniques across different studies. Results may be affected by the number of days over which individuals are asked to recall data, over the definition of a "day's work," and according to whether each individual responds for themselves or whether the household head responds for all household members.

Figure 8: **Average Farm Labor Days by Crop, Long Rainy Season**
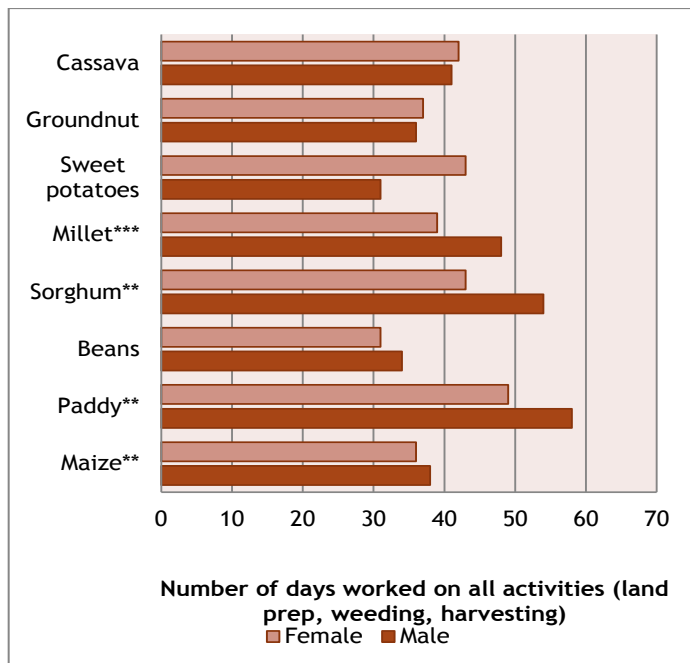
**statistically significant at the .05 level
***statistically significant at the .01 level

26 Blackden, C.M., Rwebangira, M., Ramin, Z. (2004). Tanzania: Strategic Country Gender Assessment. World Bank. http://www.ansaafrica.net/index.php/views/pub_view/tanzania_strategic_country_gender_assessment/
27 The TZNPS asks how many days each household member spent on land preparation and planting, weeding, and harvesting for each plot in the long and short rainy seasons

On plots where maize, paddy, and millet were the main crops planted there was a significantly lower proportion of female workers (48%, 47%, and 44%, respectively).[28] Men also worked more days on these same crops (see *Figure 8*). Women made up about 50% of the workers on plots where cassava, ground-nuts, and sweet potatoes were the main crop planted, and worked more days on these crops than men; however, these results were not statistically significant.[29]

Labor Allocation Differed in Female- and Male-Headed Households

In female-headed households, women constituted a significantly larger portion of the workforce across all activities; females performed 60% of land preparation, 61% of weeding, and 61% of harvesting during the long rainy season.[30] They worked five more days preparing land and six more days weeding than men in the household (see *Figure 9*). This difference could be a result of the missing adult male partner, although households with no adult males were not included in this analysis. (Just over half of agricultural female-headed

Figure 9: **Average Number of Days Spent on Agricultural Activities in the Long Rainy Season by Female and Male Household Members**

households had at least one adult male household member. Of those that did, 70% had an adult son, 16% had a husband, and 12% had an adult grandson.)

Males constituted a larger portion of the household farm labor workforce than women across all activities in male-headed households in the long rainy season, although the difference was smaller than in female-headed households.[31] Females represented 48% of the land preparation workforce, 49% of the weeding workforce, and 49% of the harvesting workforce in male-headed households. On average, during the long rainy season, men spent 34 days preparing the land, 30 days weeding, and 25 days harvesting; females spent 31 days preparing the land, 29 days weeding, and 23 days harvesting. In male-headed households during the short rainy season the farm labor workforce had slightly more female participation, although the difference was only significant for harvesting.[32] This distribution of farming tasks between men and women suggests that farming tasks are not necessarily allocated by gender, as is often assumed in the literature, but more by crop.

Strategic Implications and Outstanding Questions

Female-headed households appear to participate less in the agricultural value chain. The data indicate that this limited participation may be due in part to smaller or non-existent surpluses produced by female-headed households. As a result, interventions that focus on strengthening market access may disproportionately benefit male-headed households unless they also address the smaller yields produced by female-headed households. While lower total output by female-headed households may be explained in part by smaller average landholding sizes, additional analysis could help identify the other factors that contribute to this discrepancy.
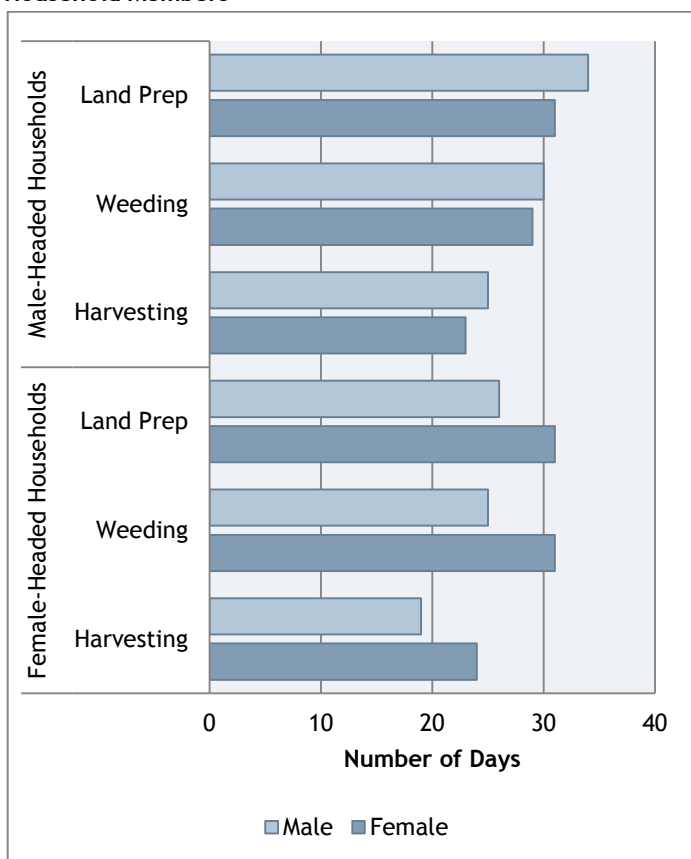
Female-headed households were not significantly less productive per hectare than male-headed households in spite of being less educated and using fewer inputs. However, the median yields for both male- and female-headed households were much lower than the 90th percentile, indicating potential for increased yields for most households. Addressing low input use among female-headed households could be a useful approach to increasing yields.

Labor constraints may be an important factor contributing to low input adoption and yields for female farmers. While adult men and women worked similar amounts of time on farm activities, averaging 16-18 hours/week, adult women in agricultural households worked an additional 25 hours or more on non-agricultural unpaid household activities – almost triple the time of adult men. Therefore, interventions that require additional time commitment could be undesirable or infeasible for women who already have multiple demands on their time.

28 Proportion P-values: Maize= .001, Paddy= .003, Millet=.02; Days P-values: Maize= .002, Paddy=.004, Millet= .00
29 Proportion P-values: Cassava= .43, Groundnuts= .99 Sweet Potatoes= .52; Days P-values: Cassava=.76, Groundnuts= .71, Sweet Potatoes= .14
30 Land Preparation P-value= .000, Weeding P-value= .000, Harvesting P-value= .000

31 Land Preparation P-value= .0019, Weeding P-value= .0433, Harvesting P-value= .3817
32 Land Preparation P-value= .877, Weeding P-value= .1345, Harvesting P-value= .0007

Female-headed households also had a smaller labor pool to draw from. Female-headed households were smaller on average than male-headed households and 61% of female-headed agricultural households did not have even one adult male. Additional data on the management and labor input on specific plots and crops would contribute to a better understanding of intra-household farm management and the implications of various intervention strategies for female farmers.

Please direct all comments or questions to Leigh Anderson and Mary Kay Gugerty at eparx@u.washington.edu

This brief presents summary statistics from the Tanzania National Panel Survey (TZNPS), which was implemented by the Tanzania National Bureau of Statistics, with support from the World Bank Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS-ISA) team. The LSMS-ISA data were collected over a twelve-month period from October 2008 through September 2009. The sample design was constructed to produce nationally representative estimates, and it consists of 3,265 households from eight administrative zones, each with a rural/urban cluster, for a total of sixteen sampling strata. The resulting data can produce nationallly representative estimates at the national and zonal level. Sample size limitations preclude reliable statistics at the regional or district level. Agricultural households completed an additional farm questionnaire, resulting in 2,474 respondents who report involvement in any crop, fishing or livestock cultivation.

In 2011 EPAR completed the Tanzania LSMS-ISA Reference Report, a document consisting of eight sections that highlights specific areas such as crops and productivity, livestock, and inputs. The Reference Report provides summary statistics, detailed information on EPAR's methodology for analysis, and the opportunities and challenges that the LSMS-ISA survey data present. Please refer to the Section A: Introduction and Overview and Section D: Crops and Productivity of the Reference Report for more information on the data and analytical methodology used in this brief.

An appendix with confidence intervals and number of observations for all data in this brief is available upon request. While LSMS-ISA data was collected in kilograms and acres, we have converted units to metric tons (t) and hectares (ha) for this brief. One hectare = 2.47 acres and 1 t = 1000 kg.