Tanzania Comparison and Analysis
LSMS and Farmer First Data

EPAR Brief No. 140

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Overview

This brief explores agricultural data for Tanzania from the LSMS and Farmer First surveys. The brief is divided into the following four sections:

Section 1: LSMS and Farmer First Comparison

- Addresses the differences in the LSMS and Farmer First survey design.
- Compares data across the two surveys, looking at the number of crops grown and landholding sizes.

Section 2: Initial LSMS Data Analysis

- Proportion of households growing both staple and cash crops by landholding size.
- Data from the National Panel Survey Report of 2008-2009, including data on major crop yields, erosion problems, irrigation, and other inputs.

Section 3: Segments by Farmer Aspirations in the Farmer First Data

- Farmers' aspirations for themselves and their children.

Section 4: Gender in the Farmer First Data

- Perception of risk by men and women.
- Time allocation to different activities by household members.
- How decision making is shared between men and women.

Section 1: LSMS and Farmer First Comparison

In order to provide a more comprehensive picture, we have compared both the survey methods of the LSMS and the Farmer First survey as well as some of the data themselves.

Survey Comparison

Table 1: LSMS and Farmer First Survey Comparison

	LSMS	**Farmer First**
Objective	Track national poverty levels Evaluate the impact of policies and programs	Farmer segmentation based on psychographic characteristics
Survey Design	National, stratified, panel	Rural survey of small scale farmers in Mali and Tanzania[1]
Sample Size	Household N=3280 Farmer Household N=2284 Plot N=5121[2,3]	N=3848 (49% female, 51% male)[4] (Tanzania individuals)
Questionnaires	Household Questionnaire Agriculture Questionnaire Community Questionnaire	Personal information Household/farm information Farmers attitudes and opinions[5]
Respondents	Head of household Individuals Village or Block Chairperson/ people[6]	Head of household Spouses
Level	Household, Individual, Plot, Crop[7]	Household, Individual[8]

The LSMS Tanzania survey differs largely in focus and depth from the Farmer First survey. It is designed as a panel, to collect information on the same respondents four times over 5-6 years. The LSMS survey reflects a broad, national focus with national programs in mind,[9] while the Farmer First survey concentrates exclusively on smallholder farmers for the purpose of improving donor effectiveness.[10]

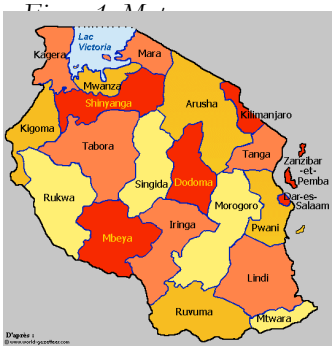
The objectives of the LSMS survey are:

1) Monitor progress towards the National Strategy for Growth and Poverty Reduction goals;
2) Facilitate understanding of poverty reduction determinants in Tanzania; and
3) Evaluate the impact of specific policies and programs.[11]

The objectives of the Farmer First survey are:

1) Understand how farmers could be segmented based on their psychographic characteristics; and
2) Help create interventions that incorporate latent motivations of farmers, and develop optimum modes of information dissemination and communication.[12]

The LSMS survey pursued a nationally representative sample using a stratified, multi-stage cluster design.[13] The principal strata were Mainland v. Zanzibar, then within the strata Rural v. Urban, with a special Dar es Salaam stratum. Clusters within strata represent census enumeration areas or rural villages. The sample gives slightly greater weight to urban areas (due to the higher levels of variability in these areas) and to Zanzibar (in order to allow for separate Zanzibar-specific estimates).[14] The Farmer First survey used a national sample of rural smallholder farmers, specifically asking questions to exclude larger farmers.[15]



The LSMS survey uses three different questionnaires: Household, Agriculture, and Community. These questionnaires concentrate on events and measurable indicators, with different units/levels of analysis (household, individual, plot, and crop).[16] The respondents of the LSMS questionnaires are generally those with the most information on the topic (heads of household or Village/Block Chairpeople), although the Household questionnaire does address each individual in the household on certain topics.[17] The Household Questionnaire collects information on consumption-based welfare. The Agriculture Questionnaire, with the head of household as respondent, collects information on the household's agricultural activities. The Community Questionnaire, responded to by the Village or Block Chairperson/ people, collects information on physical and economic infrastructure and events in community.[18]

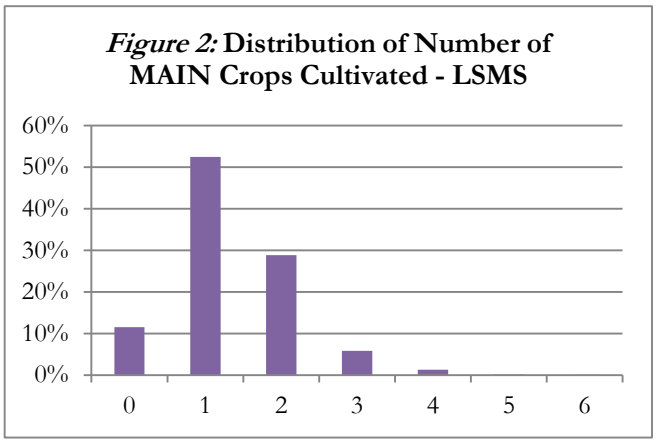
The Farmer First survey uses one basic questionnaire, with additional questions on household information and assets for the head of household.[19] While these questionnaires do provide information on household demographics and socio-economic indicators, they seek more to determine individual attitudes and opinions. Farmer First is unique in separately interviewing both the head of household and the spouse, in order to compare intrahousehold attitude differences across gender.[20] The head of household answers all questions and both answer personal information and attitudes and opinions questions.[21]

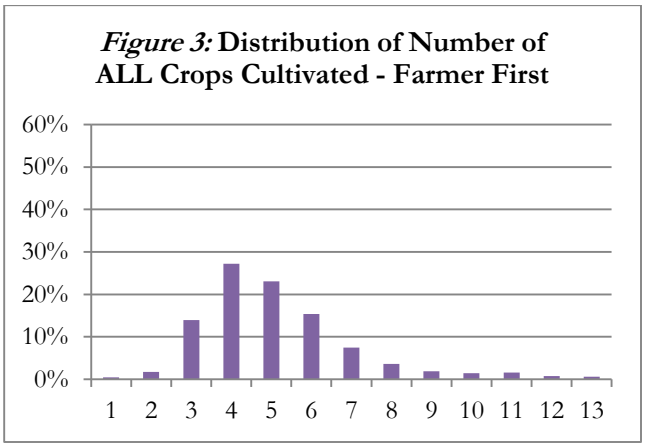
Comparison of LSMS and Farmer First Data

The data in the charts below were collected from the Farmer First survey and from the LSMS data set. When working with the LSMS data set, we weighted the data in order to compensate for the oversampling of urban populations, and therefore our results are nationally representative.

Distribution of the number of crops cultivated

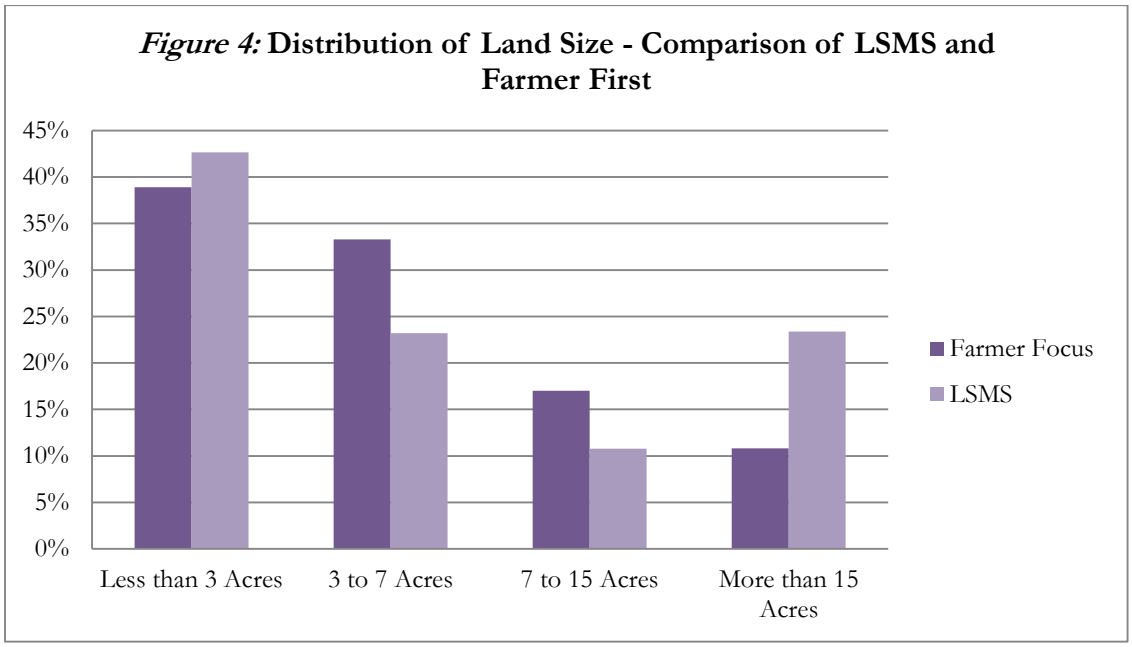
The graphs below depict the number of crops grown by farmers according to both the LSMS survey (mean 1.33) (*Figure 2*) and the Farmer First survey (mean 4.22) (*Figure 3*). However, the questions asked in each survey are worded differently, which could account for the variance in responses between the two surveys. The LSMS Agriculture questionnaire asked for the *main* crop grown on each plot, thereby not taking into account the possibility of inter-cropping on the same plot. The Farmer First questionnaire simply asked which crops were cultivated within the past year.





Distribution of land size

Figure 4 shows the distribution of land size, comparing results from the LSMS and the Farmer First survey. Note that the Farmer First survey specifically focused on "smallholders," defined as farmers holding less than 20 acres. However, in light of that, it is also interesting that the LSMS measures more farmers with less than 3 acres than the Farmer First survey.



Proportion of households growing priority crops

Figure 5 compares LSMS and Farmer First results for the proportion of households growing selected priority crops. Once again the differences here can in part be explained by the wording of the question on crops cultivated. The LSMS asks only for the *main* crop grown on the plot whereas the Farmer First survey asks about *all* crops cultivated. In other words, according to the LSMS, about 50% of respondents reported maize as the main crop cultivated on one of their plots, while almost 90% of Farmer First respondents reported that they cultivate maize. Similarly, while the Farmer First survey found roughly 45% of households cultivate beans, only

5% of households from the LSMS survey reported beans as the main crop cultivated on at least one plot (consistent with beans being used for intercropping with other staples).

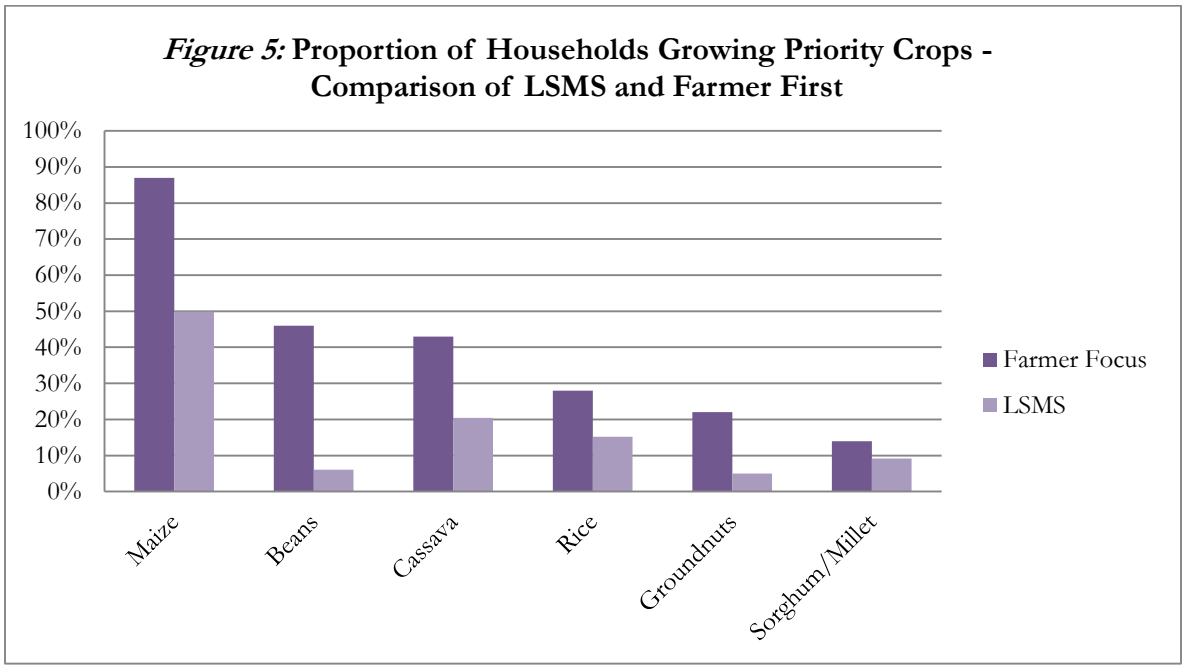


Figure 5: **Proportion of Households Growing Priority Crops - Comparison of LSMS and Farmer First**

Note: We used the Farmer-focus data from the pre-read, where sorghum and millet are combined, but finger millet is separate. We did the same with the LSMS data, so finger millet is not included in the sorghum/millet category.

Section 2: Initial LSMS Data Analysis

LSMS Results

Proportion of households growing priority staple crops by land size

Using LSMS data, we show the distribution of priority staple crop cultivation by landholding size, as depicted in *Figure 6*. The data shows that farmers with larger farms are more likely to grow maize than small farms, while farmers with smaller farms are more likely to grow cassava, or paddy rice, than farmers with large farms. Few respondents reported sorghum as a primary crop.

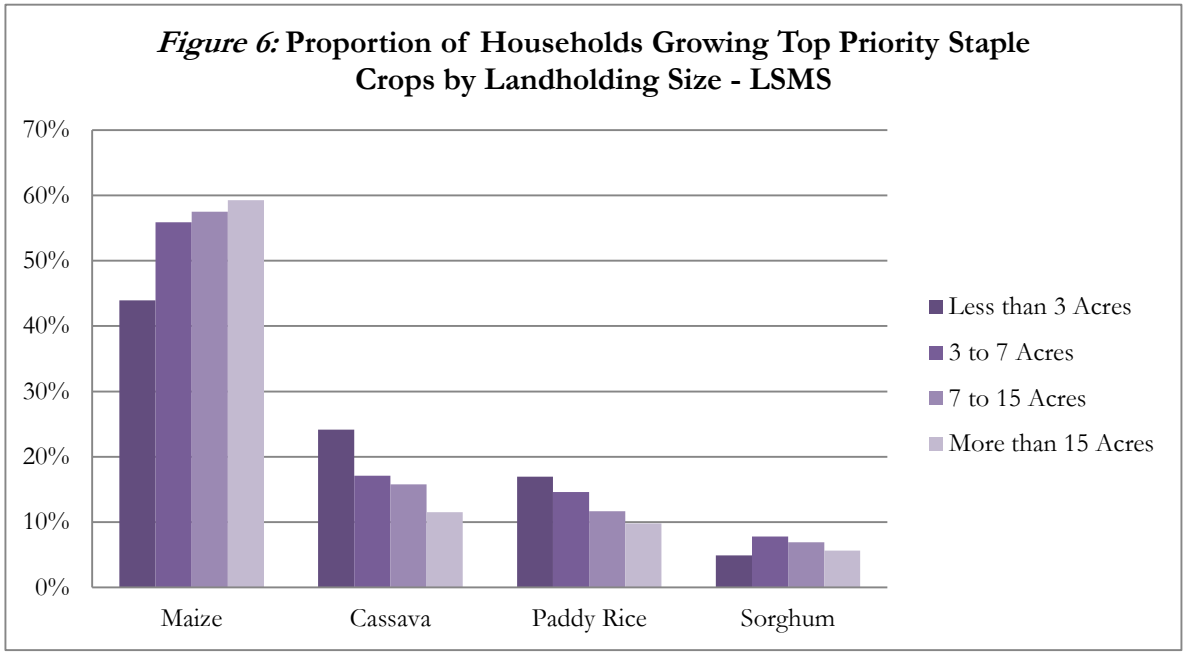
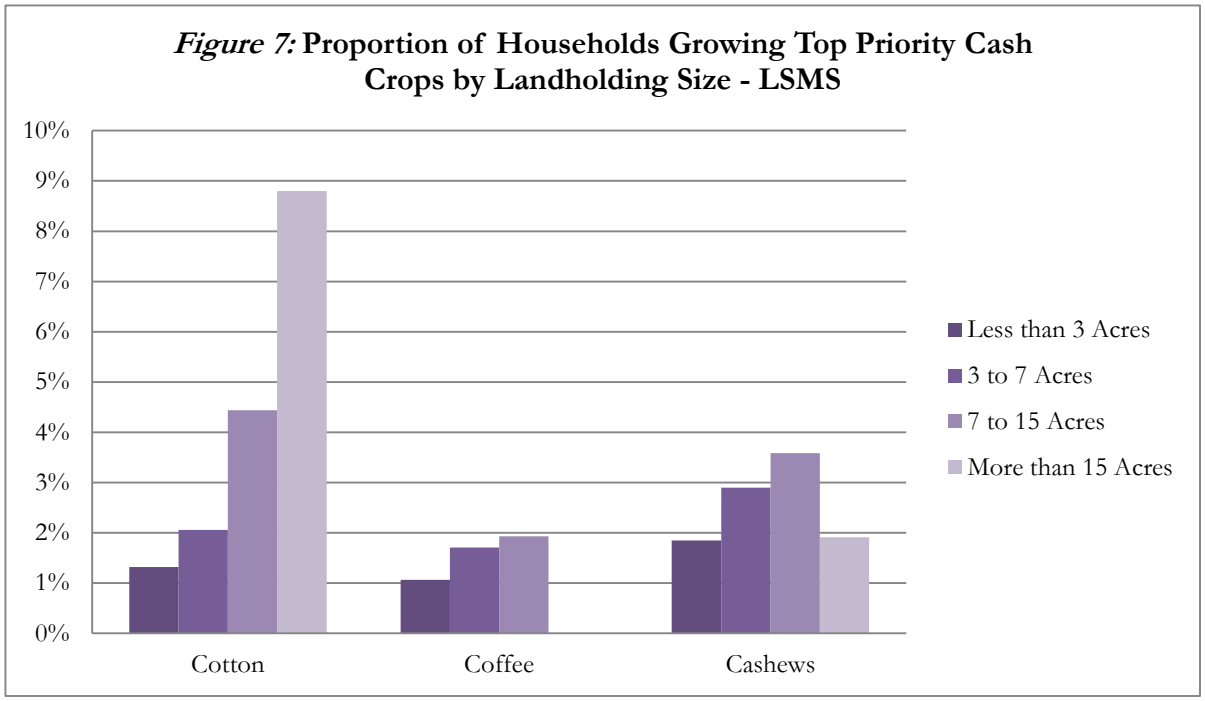


***Figure 6:* Proportion of Households Growing Top Priority Staple Crops by Landholding Size - LSMS**

Proportion of households growing priority cash crops by land size

Figure 7 depicts the distribution across landholding size of households growing the top priority cash crops cultivated in Tanzania. Farmers with more than 15 acres are more likely to grow cotton than smaller landholders. However, coffee is not grown on farms larger than 15 acres. Farms between 3 and 15 acres are more likely to growth cashews than farms less than 3 acres, or farms more than 15 acres.



LSMS National Panel Survey Report

The National Panel Survey Report 2008-2009, completed by Tanzania's National Bureau of Statistics, provided an initial analysis and interpretation of some of the LSMS data collected in the first round of surveys (conducted October 2008-October 2009). The tables below provide data from this report on yields of staple crops, erosion problems, irrigation, and other inputs.

Table 2: Production of major crops (tons) during the 2008 long rainy season

Maize	2,628,430
Beans	152,175
Groundnuts	407,515
Paddy rice	692,506
Sorghum	242,426
Sweet potatoes	291,840

Table 3: Households with erosion problems

Having erosion problems	23.8%
Using erosion control	25.6%
Type of erosion control	
Terraces	43.2%
Erosion control bunds	36.5%

Table 4: Households using inputs

Irrigation	4.7%
Organic fertilizer	19.2%
Inorganic fertilizer	11.6%
Improved seeds	19.5%
Type of improved seed	
Certified seeds	86.2%
Quality declared seeds	17.5%

Table 5: Use of modern farming methods by gender

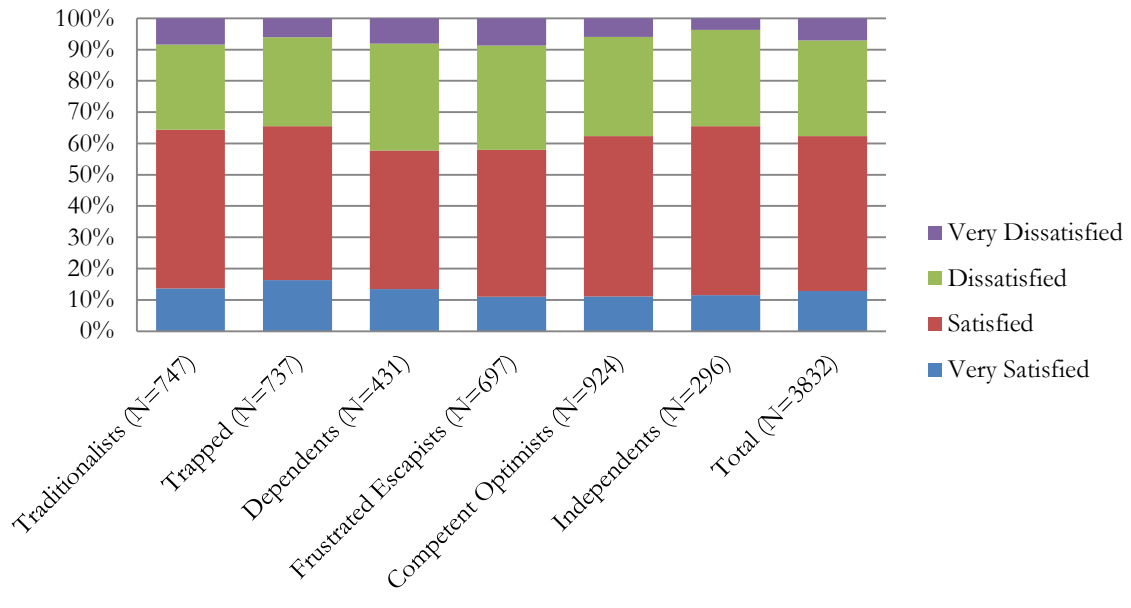
	Male-headed	Female-headed
Irrigation	4.5%	4.3%
Erosion control	24.4%	24.3%
Organic fertilizer	19.7%	12.6%
Inorganic fertilizer	11.8%	9.7%
Pesticides/herbicides	12.6%	8.8%
Improved seeds	20.4%	14.9%

Section 3: Segments by Aspiration in the Farmer First Data

Farmer perspectives towards farming and the future

We did an initial analysis on farmers' satisfaction with their lives as farmers by segment (*Figure 8*). In general, about 60% of farmers across segments were either satisfied or very satisfied with their lives, while about 40% were either dissatisfied or very dissatisfied.

Figure 8: **Satisfaction with Life as Farmer by Segment - Farmer First**



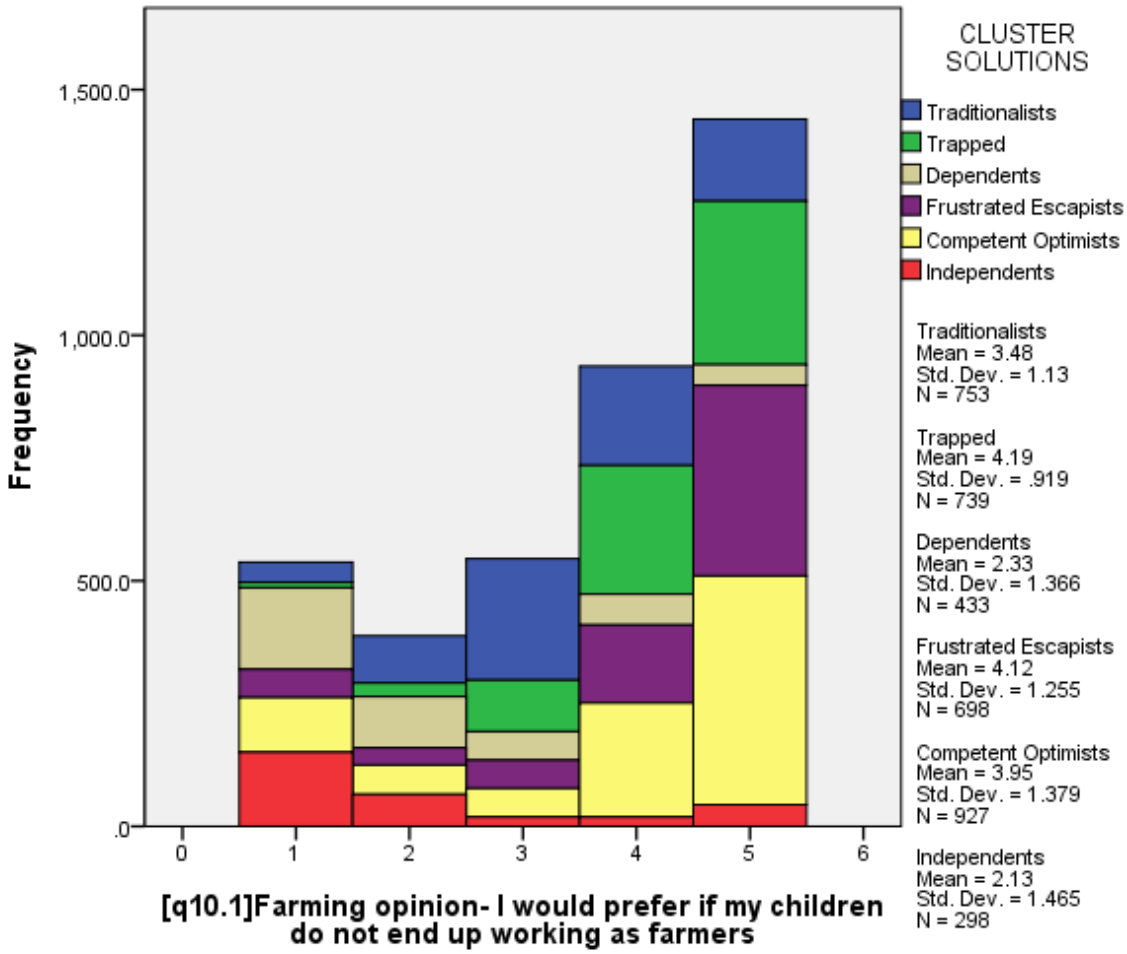
A 5-point Likert scale was used to assess farmers' perspectives towards farming and the future (ranging from strongly disagree (score of 1) to strongly agree (score of 5), with a score of 3 indicating neither agreement nor disagreement.

Farmers' aspirations for themselves and their children

Across much of the Tanzanian sample farmers appeared unoptimistic about the future of farming for themselves and their families. Fully 45% of Tanzanian respondents agreed (4) or strongly agreed (5) with the statement "If I had a choice I would not be a full time farmer." And over 60% of Trapped and Frustrated Escapists indicated a preference for not being a full time farmer if possible. Only one cluster – Competent Optimists – contained a majority who favored farming full time over some alternative activity (54.4%).

Respondents were even more pessimistic about farming for their children. As shown in *Figure 9*, nearly 2,500 of the 3,848 Tanzanian respondents either somewhat agreed (score of 4) or completely agreed (score of 5) with the statement "I would prefer if my children do not end up working as farmers."

Figure 9: **Tanzanian respondents preferring their children to leave farming (5-point Likert scale)**



Frustrated Escapists (in purple) and Trapped (in green) cluster members most strongly desired for their children to not end up working as farmers, but even Competent Optimists (who favored a career in farming for themselves, as noted above) overwhelmingly asserted that they wanted their children to leave farming behind. Only Independents (in red) and Dependents (in gray) showed a preference for having their children take up farming in the future ($p<0.05$).

Frustrated Escapist and Trapped cluster members were also less likely to prioritize investing in their children's education, perhaps suggesting these clusters would prefer to leave agriculture as soon as possible (and take their children with them).

Figure 10 depicts the top priority aspirations of farmers by segment. There is not much variation across segments. The most common top aspiration in every segment was to invest in farming and the least common was off-farm employment—only six people, out of the 3,824 respondents chose off-farm employment as their top aspiration. Invest in farming includes being a successful livestock farmer, expanding farm activities, or buying own farm equipment. The "other" category encompasses having a modern house, transportation, contracting farm activities, SACCO membership, or owning a grain milling machine.

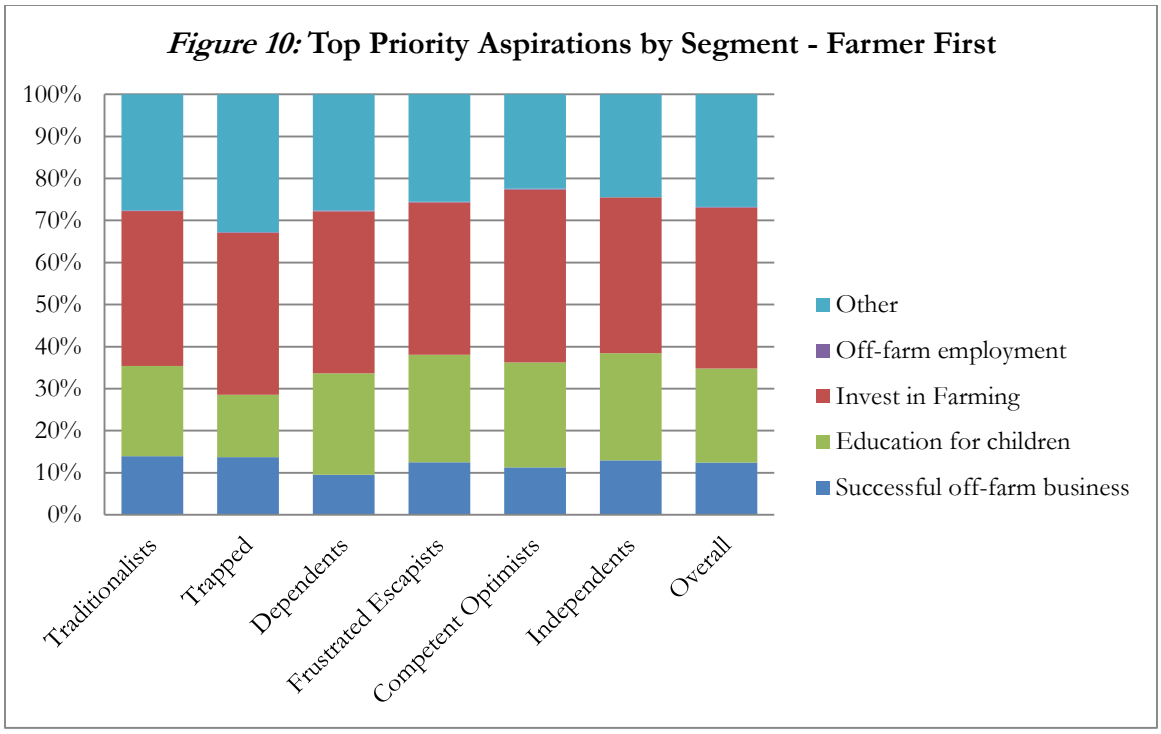


Figure 10: Top Priority Aspirations by Segment - Farmer First
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Traditionalists
Trapped
Dependents
Frustrated Escapists
Competent Optimists
Independents
Overall
Other
Off-farm employment
Invest in Farming
Education for children
Successful off-farm business

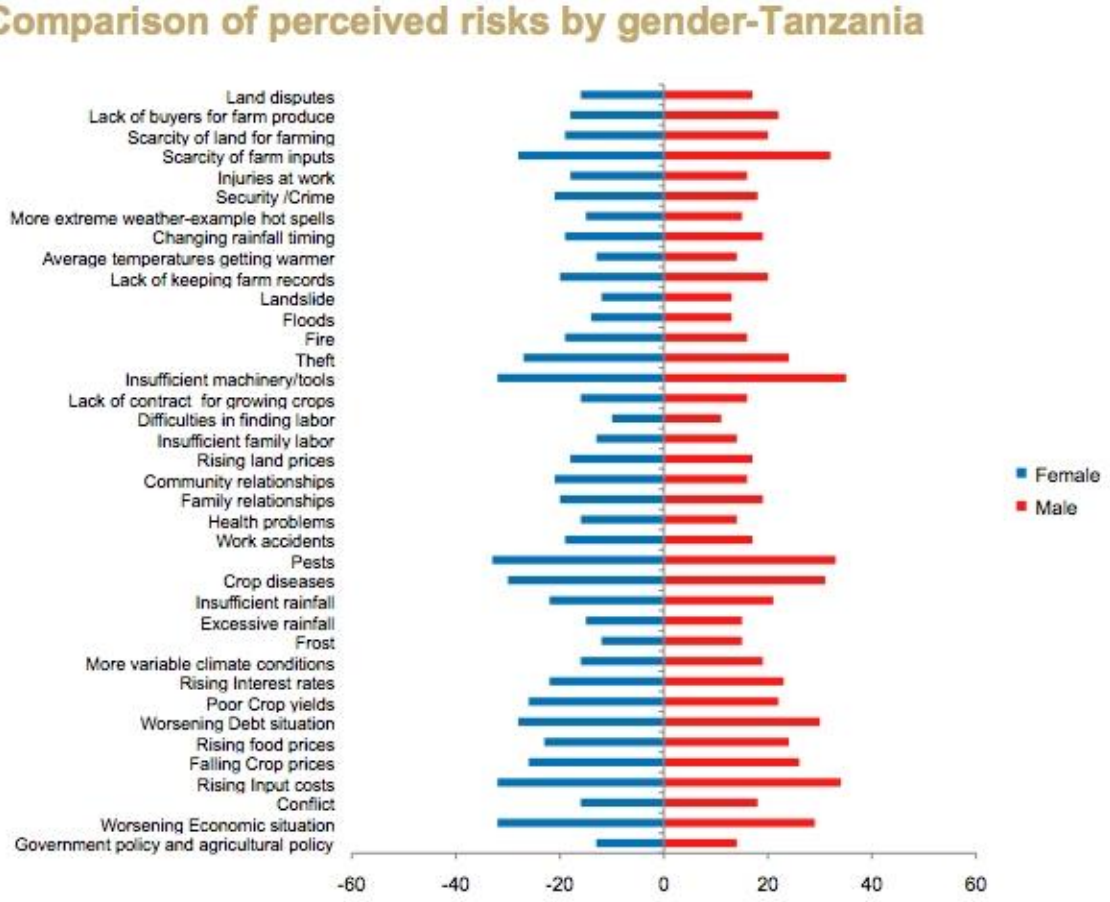
Section 4: Gender in the Farmer First Data

Initial analysis of the Farmer First data at January 2011 convening suggested surprising risk perception similarities among men and women in Tanzania. Pre-convening findings also noted that men generally work more hours per day on agricultural related activities and that men and women have similar perceptions on their relative decision-making power within the household. We have done some further analysis on the Farmer First data, and found that gender differences in Tanzania are more nuanced than the initial analysis suggests.

Risk Perception

Our analysis of the Farmer First data revealed that although men and women may initially appear to have very similar perceptions of risk (*Figure 11*), real differences emerge when we examine each risk individually.

Figure 11: **Farmer First Pre-Read Interpretation of Perceived Risks by Gender**



Source: Farmer First Pre-Read, Slide #108

In EPAR Brief #139, we conducted a deeper analysis of the relation between gender and risk perceptions on both the Mali and Tanzania data. Accounting for the "not mentioned" answers and the tendency for respondents to choose middle ground answers, we found that there is some difference (as given by a Chi-square test of independence) across various risk perceptions between men and women in Tanzania. Furthermore, as illustrated in *Table 6*, significant gender differences emerge when we examine perceptions of individual risks. For example, men are more likely to perceive frost, climate variability, and scarce inputs as major risks, while

women are more likely to worry all of the time about community relationships and poor yield. Overall, men and women had significantly different risk perceptions for 23 of the 38 types of risk.

A p-value of 0.05 or lower suggests that with a 95% level of confidence, one's gender is not independent of how one will respond to the risk question. Note that small differences in the "worried all the time" scores reported in columns three and four imply that the significant gender differences appeared in one or both of the other responses that are not reported (worried "sometimes" or "not at all").

Table 6: Gender perception of risks (Farmer First, Tanzania sample, n = 3,826)

Type of Risk	Tanzania	% of Men worried all the time	% of Women worried all the time
Government Policy	.675	13.8%	12.9%
Economic Situation	.016*	29.4%	32.0%
Conflict	.204	17.7%	16.5%
Input Costs	.192	33.8%	32.3%
Falling Crop Prices	.012*	26.2%	26.2%
Rising Food Prices	.144	23.9%	22.8%
Debt	.000**	30.3%	27.8%
Poor Crop Yield	.007**	22.5%	26.4%
High Interest Rates	.005**	22.8%	22.3%
More Variable Climate	.003**	18.6%	16.5%
Frost	.000**	14.7%	11.9%
Excessive Rainfall	.755	15.1%	14.6%
Insufficient Rain	.757	21.2%	22.2%
Crop Disease	.477	31.2%	30.3%
Pests	.629	32.6%	33.6%
Work Accident	.086	17.0%	19.0%
Health Problems	.213	14.4%	16.0%
Family Relationship	.055	19.4%	19.9%
Community Relationships	.000**	15.7%	21.5%
Rising Land Prices	.057	17.5%	18.2%
Insufficient Family Labor	.065	13.9%	13.3%
Finding Labor	.000**	10.7%	10.1%
No Contract for Crops	.000**	15.8%	16.3%
Insufficient Machinery	.000**	35.0%	31.9%
Theft	.189	24.4%	26.8%
Fire	.000**	16.2%	19.2%
Flood	.390	13.3%	13.9%
Landslide	.090	13.1%	11.9%
Not Keeping Farm Records[1]	.003**	20.5%	20.4%
Temperature getting Warmer	.0179*	13.7%	12.8%
Changing Rainfall Timing	.490	19.1%	19.2%
More Extreme Weather	.350	15.3%	15.0%
Security and Crime	.002**	17.9%	21.4%
Work Injuries	.165	15.6%	17.7%
Scarce Farm Inputs	.000**	32.4%	28.0%
Land Scarcity	.016*	20.5%	19.1%

No Buyers for Farm Produce	.007**	21.7%	18.5%
Land Disputes	.462	16.7%	16.0%

*Significant figures identified as follows: * p<0.05, ** p<0.01*

[1] *A similar share of women and men were "Worried all the time", but women were more likely to respond "Not at all concerned" about keeping farm records.*

The results in *Table 6* above are similar to a World Bank participatory rural assessment that asked groups of men and groups of women to identify the five most severe problems facing their villages. From this exercise and from conversations with the participant groups the men identified major concerns as transportation, cost of inputs, soil fertility, pests and lower outputs, characterized by the author as farming process. Women focused on what the author categorized as consequences of poor farming: hunger, malnutrition, poor health, and migration and wage labor that they are forced to undertake when yields are bad.[22]

Time Allocation

Initial discussion of the Farmer First results also highlighted that men do more farm work than women. Our analysis reveals that while men do spend an average of 40 minutes more per day on farm work than women, women spend more time on every other activity surveyed with the exception of leisure. *Figure 12* shows the breakdown of farm activities by gender as presented in the pre-read material. The pre-read material noted, "Men are seen as doing more in the farm compared to women by both genders. Children are also engaged in farm activities, although to a lesser extent than adults."

Figure 12: **Farmer First Comparison of Farm Activities by Gender**

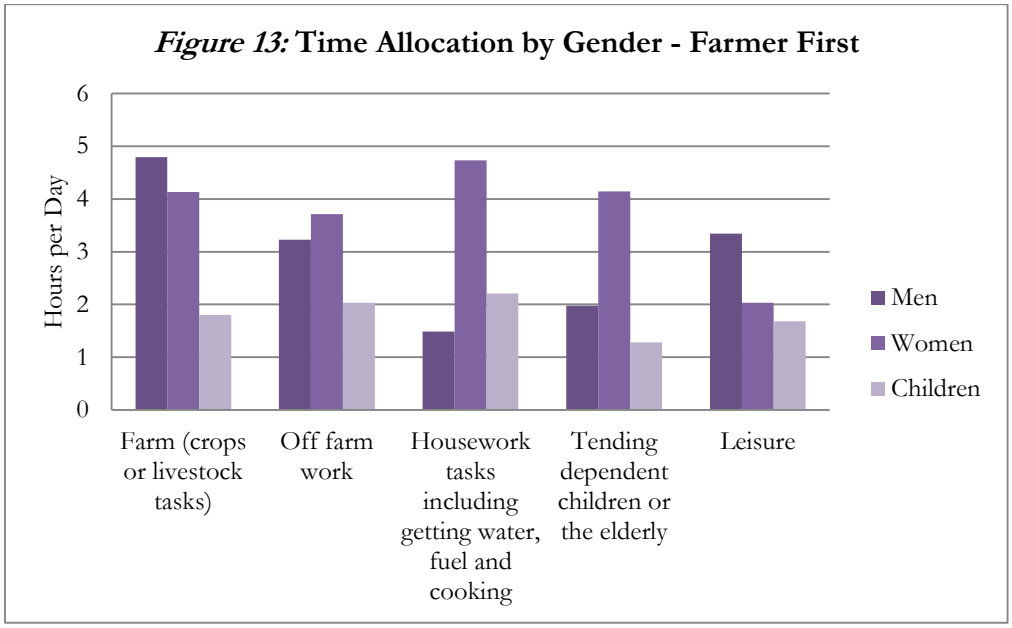
Activity	Men rating men	Men rating women	Men rating children
Land preparation	4.94	3.77	1.26
Planting	4.55	3.96	1.45
Weeding	4.61	3.9	1.46
Harvesting	4.58	3.9	1.48
Processing	4.92	3.82	1.23
Marketing	5.55	3.52	0.78
Tending Livestock	4.14	3.22	1.76
Tending Children	2.91	5.6	1.12

Activity	Women rating men	Women rating women	Women rating children
Land preparation	4.85	3.94	1.19
Planting	4.38	4.23	1.36
Weeding	4.29	4.25	1.44
Harvesting	4.4	4.1	1.47
Processing	4.79	4.01	1.16
Marketing	5.66	3.46	0.66
Tending Livestock	4.01	3.2	1.72

Tending Children	2.57	6.15	0.98

Source: Farmer First Pre-Read, Slide #101

Figure 13 compares time allocation to different activities by household members. With the exception of farm activties and leisure, women on average spend more time on each activity than men.

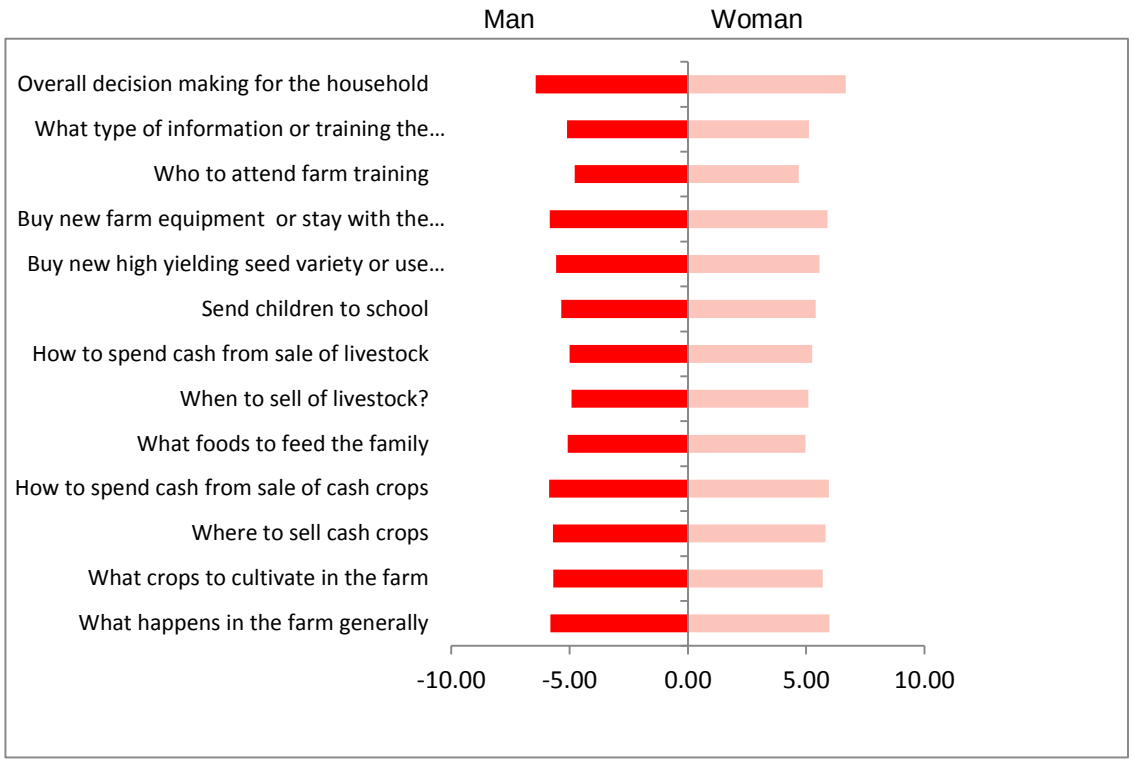


Overall, men spend more time on farm activities, an average of 4.79 hours per day, compared to the average 4.13 hours perday spent by women on farm activities. When we compare the combined time spent on farm and off-farm work, women spend an average of 7.84 hours on these activities, while men on average spend 8.02 hours. Therefore, there is very little difference between men and women in the time they spend on income-generating activities. The main difference between men and women appears to be the amount of time spent on activities outside of the formal economy. On average, women spend 8.87 hours per day on housework and tending dependent children or the elderly, while the average man reported spending 3.47 hours on these activities. Overall, on average men reported spending 11.49 hours per day on non-leisure activities and women reported an average of 16.71 hours on these activities. However, some of this time likely reflects double-tasking, for example doing housework and tending to children and the elderly at the same time. The average man reported about 1.3 more hours of leisure time per day than the average woman.

Decision Making

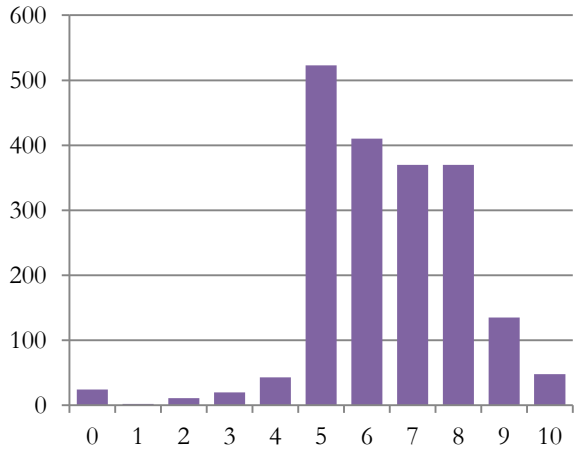
In the pre-read materials for the January 2011 Farmer First Meeting, RI reported, "There is a concordance of opinion between men and women concerning decision making of men in the home. Men have a greater power of decision making in the home in Mali than in Tanzania."

Figure 14: **Farmer First Tanzania Data on Decision-Making Power by Gender**



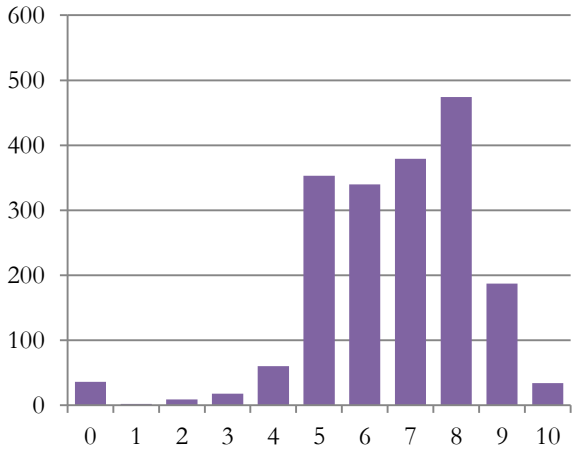
When asked to specify how overall decision making for the household is shared between men and women on a scale from one to ten, the average response was that men hold 65.4% of the decision making power and women hold 33.5% of the decision making power. However, as indicated by the figures below, men and women had different perspectives on their relative power in decision making.

Figure 15: **Male perceptions of overall decision making power by men in the household - Farmer First**



N= 1,956; Mean = 6.43

Figure 16: **Female perceptions of overall decision making power by men in the household - Farmer First**



N=1,892; Mean=6.65

These figures do not look like they should have the same mean, but perhaps the 40 or so zeroes in the women data (probably from women-headed households with no husband) are driving the women's mean down. While there is not a large difference between the average overall decision-making power in the household as reported by men and women, the difference is statistically significant. Using a 95% confidence interval, the mean overall decision making power of men reported by men ranges from 63.6% to 65%, while the mean decision making power of men reported by women ranges from 65.7% to 67.3% (p-value < .000). The charts demonstrate that the distribution of responses between the two groups was quite different: the most commonly reported number by men was five—indicating equal decision making power, while the most common response by women was eight, indicating that men hold 80% of the decision making power.

Please direct comments [23]or questions about this research to Leigh Anderson, at eparx@u.washington.edu

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[1] Farmer First Pre-Read Draft, 2011, p.7
[2] Background Information Document, 2010, p.7
[3] Author's own calculations
[4] Farmer First Pre-Read Draft, 2011, p.14
[5] Farmer First Final Questionnaire, 2010, p.ii
[6] Background Information Document, 2010, p.2
[7] Background Information Document, 2010, p.2
[8] Farmer First Final Questionnaire, 2010, p.ii
[9] Tanzania National Panel Survey Report, 2010, p.5
[10] Farmer First Pre-Read Draft, 2011, p.3
[11] Tanzania National Panel Survey Report, 2010, p.5
[12] Farmer First Pre-Read Draft, 2011, p.3
[13] Tanzania National Panel Survey Report, 2010, p.6
[14] Tanzania National Panel Survey Report, 2010, p.6
[15] Farmer First Pre-Read Draft, 2011, p.7
[16] Background Information Document, 2010, p.2-6
[17] Background Information Document, 2010, p.2-6
[18] Background Information Document, 2010, p.2-6
[19] Farmer First Final Questionnaire, 2010, p.ii
[20] Farmer First Pre-Read Draft, 2011, p.11
[21] Farmer First Pre-Read Draft, 2011, p.11
[22] Deepa Narayan, Voices of the Poor: Poverty and Social Capital in Tanzania, Environmentally and Socially Sustainable Development Studies and Monographs Series No. 20, World Bank, Washington, D.C. 1997.)