EVANS SCHOOL OF PUBLIC AFFAIRS

UNIVERSITY *of* WASHINGTON

Evans School Policy Analysis and Research (EPAR)

LSMS – INTEGRATED SURVEYS ON AGRICULTURE
UNITED REPUBLIC OF TANZANIA: SORGHUM AND MILLET APPENDIX

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Appendix: *LSMS-ISA: Sorghum and Millet*

The tables below provide the details for analysis done in EPAR Brief #224, including 95% confidence intervals, the number of observations, and Wald Test P-Values where available.

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Sorghum and Millet Cultivation Frequency

Estimated Proportion of Households Cultivating (Long or Short Rainy Season)

Crop Cultivated	Estimated Proportion	95% C.I.	Observations
Either Sorghum or Millet	17%	[15%, 20%]	373 out of 2289
Both Sorghum and Millet	1.4%	[0.6%, 2.2%]	24 out of 2474

Estimated Proportion of Households Cultivating Sorghum by Season

Season	Estimated Proportion	95% C.I.	Observations
Long Rainy Season	11%	[9%, 13%]	265 out of 2289
Short Rainy Season	2.4%	[1.2%, 3.6%]	39 out of 2289
Long and Short Rainy Season	13%	[11%, 15%]	292 out of 2289

Estimated Proportion of Households Cultivating Sorghum by Zone

Zone	Estimated Proportion	95% C.I.	Observations
Tanzania	11%	[9.0%, 13%]	265
Northern	3.0%	[0.4%, 5.6%]	10 out of 265
Lake	9.8%	[3.8%, 16%]	23 out of 265
Eastern	2.9%	[-1.4%, 7.2%]	4 out of 265
Western	8.4%	[4.6%, 12%]	31 out of 265
Southern Highlands	1.2%	[0.1%, 2.2%]	5 out of 265
Central	44%	[28%, 59%]	62 out of 265
Zanzibar	6.2%	[0%, 12%]	15 out of 265
Southern	24%	[17%, 30%]	115 out of 265

Estimated Proportion of Plots Cultivating Sorghum by Zone

Zone	Estimated Proportion	95% C.I.	Observations
Tanzania (all plots)	5.7%	[5.1%, 6.3%]	297 out of 5225
Northern	1.6%	[0.18%, 3.0%]	10 out of 627
Lake	5.2%	[1.6%, 8.8%]	27 out of 521
Eastern	1.6%	[-0.06%, 3.7%]	5 out of 362
Western	3.5%	[1.8%, 5.3%]	32 out of 764
Southern Highlands	0.45%	[0.004%, 0.8%]	5 out of 864
Central	21%	[13%, 29%]	75 out of 335
Zanzibar	2.9%	[-0.1%, 5.9%]	17 out of 644
Southern	10%	[7%, 14%]	126 out of 1108

Estimated Proportion of Households Cultivating Sorghum by Gender of Household Head

Household Head	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Male	11%	[8.6%, 13%]	199 out of 1734	0.4978

Female		12%	[8.3%, 16%]	66 out of 555	

Estimated Proportion of Other Priority Crops Grown by Sorghum Growers and Non-growers

Crop		Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Millet	Grower	13%	[6.0%, 20%]	24 out of 265	0.0185
	Non-grower	4.8%	[2.9%, 6.7%]	75 out of 2024	
Cowpeas	Grower	8.3%	[4.3%, 12%]	23 out of 265	0.3138
	Non-grower	6.2%	[4.6%, 7.7%]	114 out of 2024	
Maize	Grower	73%	[65%,81%]	191 out of 265	0.0487
	Non-grower	64%	[61%, 68%]	1199 out of 2024	
Sweet Potatoes	Grower	12%	[6.3%, 17%]	26 out of 265	0.6601
	Non-grower	10%	[8.5%, 12%]	189 out of 2024	
Groundnuts	Grower	28%	[18%, 38%]	61 out of 265	0.0016
	Non-grower	15%	[12%, 18%]	265 out of 2024	
Beans	Grower	8.8%	[4.0%, 14%]	18 out of 265	0.0000
	Non-grower	27%	[23%, 31%]	471 out of 2024	
Yams	Grower	0.5%	[0%, 1.2%]	2 out of 265	0.7894
	Non Grower	0.4%	[1.3%, 6.6%]	19 out of 2024	
Paddy	Grower	14%	[4.0%, 2.4%]	38 out of 265	0.9265
	Non-grower	14%	[12%, 17%]	396 out of 2024	
Cassava	Grower	3.0%	[1.1%, 4.9%]	21 out of 265	0.8443
	Non-grower	2.8%	[2.0%, 3.6%]	198 out of 2024	

Estimated Proportion of Households Cultivating Millet by Season

Season	Estimated Proportion	95% C.I.	Observations
Long Rainy Season	5.7%	[3.8%, 7.7%]	99 out of 2289
Short Rainy Season	0.5%	[0.1%, 0.9%]	9 out of 2289
Long and Short Rainy Season	6.1%	[4.1%, 8.1%]	105 out of 2289

Estimated Proportion of Millet Cultivated by Type

Zone	Estimated Proportion	95% C.I.	Observations
Pearl (Bulrush)	68%	[57%, 79%]	56 out of 97
Finger	32%	[21%, 43%]	41 out of 97

Estimated Proportion of Households Cultivating Millet by Zone

Zone	Estimated Proportion	95% C.I.	Observations
Tanzania (Country)	5.7%	[3.8%, 7.7%]	99
Northern	1.5%	[0%, 2.9%]	5 out of 99
Lake	0.3%	[-0.3%,1.0%]	1 out of 99
Eastern	0%	-	0 out of 99
Western	2.8%	[0.3%, 5.3%]	9 out of 99

Southern Highlands	4.7%	[1.5%, 7.9%]	16 out of 99
Central	38%	[20%, 55%]	50 out of 99
Zanzibar	0.9%	[-0.3%, 2.0%]	2 out of 99
Southern	4.0%	[1.0%, 6.9%]	16 out of 99

Estimated Proportion of Plots Cultivating Millet by Zone

Zone	Estimated Proportion	95% C.I.	Observations
Tanzania	3.0%	[1.9%, 4.1%]	114 out of 5225
Central	19%	[9.2%, 30%]	64 out of 335
Eastern	-	-	0 out of 362
Southern Highlands	1.8%	[0.6%, 3.1%]	16 out of 864
Lake	0.16%	[0.2%, 0.5%]	1 out of 521
Northern	0.78%	[0.02%, 1.6%]	5 out of 627
Southern	1.6%	[0.4%, 2.8%]	16 out of 1108
Western	1.3%	[0.02%, 2.6%]	10 out of 764
Zanzibar	0.35%	[-0.1%, 0.8%]	2 out of 644

Estimated Proportion of Households Cultivating Millet by Gender of Household Head

Household Head	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Male	6.5%	[4.3%, 8.7%]	84 out of 1734	0.0060
Female	3.5%	[1.5%, 5.5%]	15 out of 555	

Estimated Proportion of Other Priority Crops Grown by Millet Growers

Crop		Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Cowpeas	Growers	11%	[3.8%, 19%]	11 out of 99	0.1620
	Non-growers	6.1%	[4.6%, 7.6%]	126 out of 2190	
Maize	Growers	76%	[63%, 88%]	78 out of 99	0.0883
	Non-growers	65%	[61%, 68%]	1312 out of 2190	
Sweet Potatoes	Growers	2.4%	[0%, 5.2%]	3 out of 99	0.0000
	Non-growers	11%	[9.1%, 13%]	212 out of 2190	
Groundnuts	Growers	42%	[23%, 61%]	35 out of 99	0.0037
	Non-growers	15%	[12%, 17%]	291 out of 2190	
Beans	Growers	19%	[10%, 28%]	22 out of 99	0.1939
	Non-growers	26%	[22%, 29%]	467 out of 2190	
Sorghum	Growers	25%	[13%, 38%]	24 out of 99	0.0139
	Non-growers	10%	[8.1%, 12.4%]	241 out of 2190	
Yams	Growers	-	-	0 out of 99	0.0021
	Non-growers	0.4%	[0.2%, 0.7%]	21 out of 2190	
Paddy	Growers	2.3%	[0%, 4.8%]	5 out of 99	0.0000
	Non-growers	15%	[12%, 18%]	429 out of 2190	
Cassava	Growers	0.3%	[0.2%, 0.4%]	2 out of 99	0.0000

Non-growers	3.0%	[2.2%, 3.8%]	217 out of 2190

Sorghum- and Millet-Growing Household Characteristics

Of the 2,474 agricultural households surveyed, 266 households surveyed grew Sorghum, while 99 households grew Millet. The characteristics below reflect households for which data was available, as noted in the Observations column.

Education of Household Head

	Median (Years)	Mean (Years)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	5	4.5	[4.0, 4.9]	245	0.0009
Non-growers	7	5.3	[5.1, 5.5]	1943	
Millet growers	5	4.5	[3.4, 5.5]	95	0.1538
Non-growers	7	5.3	[5.0, 5.5]	2093	
All agricultural households	7	5.31	[5.10, 5.52]	2343	

Distance from Household to Nearest Population Center >20,000 (km)

	Median (km)	Mean (km)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	58.5	60.7	[51.1, 70.3]	225	0.0445
Non-growers	42.3	50.9	[45.9, 56.0]	1825	
Millet growers	29.3	44.3	[31.2, 57.3]	96	0.2192
Non-growers	45.9	52.5	[47.5, 57.5]	1954	
All agricultural households	43.2	50.9	[46.1, 55.7]	2187	

Distance from Household to Nearest Major Road (km)

	Median (km)	Mean (km)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	13.5	23.0	[16.6, 29.5]	225	0.1305
Non-growers	13.2	18.3	[15.9, 20.6]	1825	
Millet growers	9.7	12.7	[8.0, 17.4]	96	0.0082
Non-growers	13.9	19.2	[16.7, 21.7]	1954	
All agricultural households	12.9	18.5	[16.1, 20.8]	2187	

Distance from Household to Nearest Major Market (km)

	Median (km)	Mean (km)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	76.6	81.3	[66.9, 95.7]	225	0.5899
Non-growers	72.7	77.4	[71.1, 83.7]	1825	
Millet growers	84.9	80.2	[63.9, 96.5]	96	0.7597
Non-growers	72.4	77.7	[71.4, 84.0]	1954	
All agricultural households	72.1	76.2	[70.1, 82.2]	2187	

Number of Household Members

	Median	Mean	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	5	5.7	[5.3, 6.2]	265	0.1413
Non-growers	5	5.4	[5.2, 5.5]	2024	
Millet growers	5	4.9	[4.3, 5.5]	99	0.1254
Non-growers	5	5.4	[5.3, 5.6]	2190	
All agricultural households	5	5.4	[5.2, 5.5]	2474	

Age of Household Head

	Median (Years)	Mean (Years)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	48	49.4	[47.4, 51.5]	265	0.0540
Non-growers	45	47.3	[46.4, 48.2]	2024	
Millet growers	46	48.8	[45.1, 52.5]	99	0.4743
Non-growers	45	47.4	[46.5, 48.3]	2190	
All agricultural households	45	47.3	[46.4, 48.1]	2474	

Number of Plots per Household

	Median (plots)	Mean (plots)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	2	2.4	[2.2, 2.5]	265	0.2878
Non-growers	2	2.3	[2.2, 2.4]	2024	
Millet growers	2	2.2	[1.9, 2.5]	99	0.7150
Non-growers	2	2.3	[2.2, 2.4]	2190	
All agricultural households	2	2.2	[2.1, 2.3]	2474	

Size of Total Household Landholding (ha)

	Median (ha)	Mean (ha)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	2	2.4	[2.2, 2.5]	265	0.2878
Non-growers	2	2.3	[2.2, 2.4]	2024	
Millet growers	2	2.2	[1.9, 2.5]	99	0.7150
Non-growers	2	2.3	[2.2, 2.4]	2190	
All agricultural households	2	2.2	[2.1, 2.3]	2474	

Rainfall at Household July 2007-June 2008 (mm)

	Mean (mm)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers

	Mean	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	639	[596, 682]	225	0.0001
Non-growers	741	[718, 763]	1825	
Millet growers	597	[539, 656]	96	0.0000
Non-growers	738	[716, 760]	1954	
All agricultural households	726	[706, 746]	2187	

Temperature 1960-1990 at Household (C)

	Mean (C)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	22.9	[22.5, 23.2]	222	0.0010
Non-growers	22.1	[21.8, 22.4]	1806	
Millet growers	21.8	[21.2, 22.4]	95	0.2257
Non-growers	22.2	[21.9, 22.5]	1933	
All agricultural households	22.2	[22.0, 22.5]	2162	

Value of Total Daily Consumption Equivalent per Adult (USD)

	Median	Mean ($USD)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	$0.88	$1.02	[$0.95, $1.09]	265	0.0000
Non-growers	$1.04	$1.30	[$1.25, $1.36]	2024	
Millet growers	$0.91	$1.06	[$0.96, $1.17]	99	0.0003
Non-growers	$1.03	$1.28	[$1.22, $1.33]	2190	
All agricultural households	$1.04	$1.33	[$1.28, $1.39]	2474	

Gender of Household Head

	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value Compares female to male household heads
Sorghum -female	27%	[20%, 34%]	66 out of 265	0.0000
Sorghum -male	73%	[66%, 80%]	199 out of 265	
Millet –female	15%	[8.6%, 22%]	15 out of 99	0.0000
Millet –male	85%	[78%, 91%]	84 out of 99	
All Ag households -female	25%	[23%, 27%]	596 out of 2474	0.0000
All Ag households -male	75%	[73%, 77%]	1878 out of 2474	

Value of Estimated Total Daily Consumption per Adult Equivalent

	Mean ($USD/adult equivalent)	95% C.I.	Observations	Wald test Wald Test P-Value Compares growers to non-growers
Sorghum Growing Households	$0.94	[$0.84, $1.05]	62 out of 134	0.3078
Non-growers	$1.03	[$0.89, $1.18]	72 out of 134	
Millet Growing Households	$1.08	[$0.93, $1.23]	48 out of 134	0.1595

Non-growers	$0.94	[$0.82, $1.06]	86 out of 134
All Ag households	$0.99	[$0.91, $1.08]	134

Sorghum and Millet Plot Characteristics

Plot Size

Crop	Median (ha)	Mean (ha)	95% C.I.	Observations
Sorghum	0.81	1.37	[0.98, 1.75]	296
Millet	0.81	1.34	[0.99, 1.68]	114

Estimated Proportion "Good" Soil on Plot (vs. "Average" or "Bad"), Farmer Reported

	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum growers	44%	[36%, 53%]	155 out of 296	0.2276
Non-growers	50%	[47%, 52%]	1998 out of 3957	
Millet growers	30%	[18%, 42%]	38 out of 113	0.0020
Non-growers	50%	[47%, 53%]	2105 out of 4140	

Estimated Proportion of Plot Decision Making by Gender

Crop	Decision Maker	Estimated Proportion	95% C.I.	Observations
Sorghum	Male	33%	[24%, 41%]	104 out of 291
	Female	25%	[17%, 32%]	66 out of 291
	Shared	43%	[36%, 50%]	121 out of 291
Millet	Male	52%	[43%, 62%]	56 out of 111
	Female	14%	[8%, 20%]	16 out of 111
	Shared	34%	[22%, 45%]	39 out of 111

Sorghum and Millet Inputs

Estimated Proportion of Plots Planted with Improved Variety Seeds

Crop	Estimated Proportion	95% C.I.	Observations
Sorghum	4.6%	[0.3%, 8.9%]	11 out of 297
Millet	2.6%	[-2.5%, 7.8%]	3 out of 114

Estimated Proportion of Plots Using Inputs

Organic Fertilizer	Estimated Proportion	95% C.I.	Observations
Sorghum	9.8%	[4.4%, 15%]	21 out of 295
Millet	22%	[13%, 30%]	21 out of 114
Inorganic Fertilizer			
Sorghum	0.7%	[0.1%, 1.3%]	3 out of 295
Millet	4.5%	[-0.9%, 9.8%]	8 out of 114
Pesticides, Herbicides, Fungicides			
Sorghum	7.1%	[3.9%, 10.4%]	30 out of 295
Millet	5.2%	[0.8%. 9.5%]	7 out of 114
Any input			
Sorghum	21%	[15%, 28%]	63 out of 295
Millet	31%	[21%, 41%]	35 out of 114

Estimated Proportion of Plots Using Organic Fertilizer by Cattle Ownership (Long Rainy Season)

	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value Compares cattle owners to non-cattle owners
Sorghum				
Cattle owners	23%	[8.5%, 38%]	11 out of 57	0.0115
Non-cattle owners	5.6%	[1.7%, 9.4%]	10 out of 238	
Millet				
Cattle owners	37%	[18%, 57%]	10 out of 28	0.0533
Non-cattle owners	17%	[7%, 27%]	12 out of 86	

Sorghum And Millet Yields*

Yield calculations exclude the top 1% yields of each crop.

Plot Yields by Area Planted and Area Harvested

		Median (t/ha)	Mean (t/ha)	95% C.I.	Observations
Sorghum					
Household	Harvested	0.37	0.52	[0.44, 0.61]	240
	Planted	0.25	0.37	[0.30, 0.45]	252
Plot	Harvested	0.36	0.51	[0.42, 0.59]	266
	Planted	0.25	0.37	[0.30, 0.44]	278
Millet					
Household	Harvested	0.53	0.60	[.50, .70]	91
	Planted	0.45	0.50	[.42, .58]	93
Plot	Harvested	0.53	0.58	[.48, .67]	106
	Planted	0.44	0.48	[.40, .55]	108

Sorghum Plot Yields by Zone Using Area Harvested*

Zone	Median (t/ha)	90th Percentile (t/ha)	Mean (t/ha)	95% C.I.	Observations
Tanzania (all plots)	0.36	1.07	0.51	[0.42, 0.59]	266
Central	0.49	1.07	0.54	[0.39, 0.70]	74 out of 266
Southern	0.25	0.71	0.33	[0.24, 0.43]	108 out of 266

Insufficient observations to calculate yields for other zones (less than 30).

Millet Plot Yields by Zone Using Area Harvested*

Zone	Median (t/ha)	90th Percentile (t/ha)	Mean (t/ha)	95% C.I.	Observations
Tanzania (all plots)	0.53	1.07	0.58	[0.48, 0.67]	106
Central	0.53	1.07	0.59	[0.47, 0.71]	62 out of 106

Insufficient observations to calculate yields for other zones (less than 30).

Plot Yields by Gender of Household Head Using Area Harvested

Crop	Household Head	Median (t/ha)	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
Sorghum						
	Male	0.40	0.53	[0.44, 0.63]	203 out of 266	0.2322
	Female	0.25	0.44	[0.32, 0.57]	63 out of 266	
Millet						
	Male	0.52	0.57	[0.47, 0.67]	90 out of 106	0.7231
	Female	0.53	0.60	[0.44, 0.77]	16 out of 106	

Sorghum Plot Yields by Gender of Plot Decision Maker Using Area Harvested *

Decision Maker	Median (t/ha)	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
Male	0.49	0.59	[0.42, 0.73]	97 out of 264	0.3252 (M vs. S)
Female	0.25	0.41	[0.29, 0.52]	58 out of 264	0.0669 (M vs. F)
Shared	0.31	0.49	[0.39, 0.58]	109 out of 264	0.2452 (F vs. S)

Insufficient observations for millet yield analysis by plot decision maker.

Mean and Median Sorghum Plot Yields by Input Use

	Median (t/ha)	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
Any input	0.49	0.68	[0.46, 0.90]	59 out of 265	0.0349
No inputs	0.31	0.46	[0.38, 0.54]	206 out of 265	

Mean and Median Sorghum Plot Yields by Input Use

	Median (t/ha)	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
Any input	0.66	0.69	[0.49, 0.90]	34 out of 106	0.1168
No inputs	0.47	0.52	[0.45, 0.60]	72 out of 106	

Estimated Proportion Organic Fertilizer Use on Plots by Priority Crop

Crop	Estimated Proportion	95% C.I.	Observations
Millet	22%	[13%, 30%]	21 out of 114
Cowpeas	18%	[10%, 26%]	23 out of 147
Maize	15%	[12%,18%]	276 out of 1991
Sweet Potatoes	15%	[10%, 20%]	33 out of 223
Groundnuts	13%	[8%, 17%]	41 out of 362
Beans	14%	[9.5%, 18%]	88 out of 607
Sorghum	9.8%	[4.4%, 15%]	21 out of 295
Yams	6.5%	[-3.3%, 16%]	4 out of 28
Paddy	5.3%	[2.3%,8.4%]	24 out of 532
Cassava	3.6%	[-1.0%, 8.4%]	6 out of 300

Estimated Proportion Inorganic Fertilizer Use on Plots by Priority Crop

Crop	Estimated Proportion	95% C.I.	Observations
Millet	4.5%	[-0.7%, 9.6%]	8 out of 114
Cowpeas	10%	[3.0%, 17%]	16 out of 147
Maize	14%	[10%, 17%]	301 out of 1991
Sweet Potatoes	4.7%	[1.9%, 7.5%]	14 out of 223
Groundnuts	9.7%	[4.6%, 15%]	38 out of 362
Beans	18%	[12%, 24%]	126 out of 607
Sorghum	0.7%	[-0.01%, 1.5%]	3 out of 295
Yams	-	-	0

Paddy	9.0%	[4.0%, 14%]	59 out of 532
Cassava	2.8%	[-0.6, 6.3%]	4 out of 300

Sorghum and Millet Constraints and Losses

Estimated Proportion of Plots Not Fully Planted Due to Constraints

	Estimated Proportion	95% C.I.	Observations
Sorghum	16.7%	[10.9%, 22.6%]	37 out of 261
Millet	21.3%	[11.7%, 30.9%]	22 out of 101

Constraints Impeding Planting of Entire Plot on Sorghum Plots That Were Not Fully Planted*

Causes	Estimated Proportion	95% C.I.	Observations out of 37
Lack of Tools/Equipment	48.5%	[27.8%, 69.2%]	20
Drought	32.1%	[11.2%, 53%]	9
Lack of Seeds	14.3%	[0.6%, 28.1%]	6
Lack of Agricultural Equipment	5.1%	[-2.7%, 12.9%]	2
Floods	-	-	0
Lack of Loans	-	-	0

Insufficient observations to report for millet

Estimated Proportion of Plots with Area Harvested Less Than Area Planted

Crop	Estimated Proportion	95% C.I.	Observations
Maize	30%	[26%, 33%]	522 out of 1862
Paddy	22%	[16%, 28%]	99 out of 500
Beans	33%	[28%, 37%]	176 out of 557
Sorghum	31%	[22%, 40%]	83 out of 272
Millet	40%	[31%, 48%]	41 out of 110
Sweet Potatoes	23%	[15%, 30%]	44 out of 213
Yams	-	-	0 out of 22
Cowpeas	38%	[30%, 47%]	43 out of 129
Groundnut	26%	[19%, 32%]	86 out of 346
Cassava	27%	[19%, 35%]	69 out of 207

Estimated Proportion of Plots with Area Harvested Less Than Area Planted Due to Drought

Crop	Estimated Proportion	95% C.I.	Observations
Maize	52%	[46%, 58%]	262 out of 531
Paddy	67%	[51%, 84%]	51 out of 103
Beans	32%	[24%, 39%]	56 out of 176
Sorghum	59%	[46%, 71%]	42 out of 85
Millet	51%	[30%, 71%]	20 out of 41
Sweet Potatoes	30%	[15%, 45%]	10 out of 44
Cowpeas	40%	[23%, 57%]	17 out of 43
Groundnut	42%	[26%, 58%]	35 out of 87
Cassava	10%	[1%, 20%]	7 out of 70

Reasons for Harvesting a Smaller Area of Sorghum Plots Than the Area Planted

Causes	Estimated Proportion	95% C.I.	Observations
Drought	59%	[46%, 71%]	42 out of 83
Other	17%	[3%, 30%]	16 out of 83
Insects	11%	[3%, 18%]	11 out of 83
Animals	8%	[1%, 14%]	11 out of 83
Rain	4%	[-1%, 9%]	2 out of 83
Diseases and Community Problems	2%	[-1%, 6%]	2 out of 83
Fire	-	-	0 out of 83
Crop Theft	-	-	0 out of 83
Lack of Casual Labor	0.0%	[0.0%-0.0%]	1 out of 83

Reasons for Harvesting a Smaller Area of Millet Plots Than the Area Planted

Causes	Estimated Proportion	95% C.I.	Observations

Drought	51%	[30%, 71%]	20 out of 41
Other	21%	[11%, 32%]	9 out of 41
Animals	13%	[2%, 25%]	6 out of 41
Insects	8%	[1%, 16%]	3 out of 41
Diseases and Community Problems	5%	[-4%, 14%]	2 out of 41
Crop Theft	2%	[-2%, 5%]	1 out of 41
Rain	-	-	0 out of 41
Fire	-	-	0 out of 41
Lack of Casual Labor	-	-	0 out of 41

Estimated Proportion of Plots with Pre-Harvest Losses			
	Estimated Proportion	95% C.I.	Observations
Sorghum	43%	[35%, 52%]	121 out of 273
Millet	53%	[39%, 66%]	54 out of 110

Causes of Sorghum Pre-Harvest Losses (Long Rainy Season)			
Causes	Estimated Proportion	95% C.I.	Observations
Birds	76%	[68%, 84%]	80 out of 121
Animals	12%	[6.0%, 19%]	24 out of 121
Insects	8.2%	[1.5%, 15%]	9 out of 121
Theft	2.5%	[-0.1%, 5.6%]	3 out of 121
Diseases	1.0%	[0%, 2.0%]	5 out of 121
Other	-	-	0 out of 121

Causes of Millet Pre-Harvest Losses (Long Rainy Season)			
Causes	Estimated Proportion	95% C.I.	Observations
Birds	71%	[59%, 83%]	37 out of 54
Animals	19%	[10%, 28%]	12 out of 54
Insects	9.5%	[1.4%, 18%]	5 out of 54
Diseases	-	-	0 out of 54
Theft	-	-	0 out of 54
Other	-	-	0 out of 54

Estimated Proportion of Households with Post-Harvest Losses *			
	Estimated Proportion	95% C.I.	Observations
Sorghum	14%	[9.2%, 19%]	29 out of 254
Millet	8.4%	[3.0%, 14%]	6 out of 96

*Insufficient observations to estimate causes of post-harvest losses.

Estimated Proportion of Growing Households Storing Crop at Time of Survey			
	Estimated Proportion	95% C.I.	Observations
Sorghum	29%	[18%, 41%]	70 out of 254
Millet	54%	[40%, 68%]	48 out of 97

Method of Storage, Sorghum

	Estimated Proportion	95% C.I.	Observations
Sack/Open Drum	55%	[41%, 69%]	34 out of 70
Local Traditional Structure	30%	[18%, 41%]	22 out of 70
Airtight Drum	3.0%	[-0.2%, 6.2%]	2 out of 70
Ceiling	1.3%	[-0.1%, 3.2%]	2 out of 70
Improved Local Structure	1.2%	[-0.1, 3.1%]	2 out of 70
Other	10%	[1.5%, 19%]	8 out of 70

Method of Storage, Millet

	Estimated Proportion	95% C.I.	Observations
Sack/Open Drum	68%	[49%, 87%]	32 out of 48
Local Traditional Structure	18%	[6.2%, 31%]	8 out of 48
Airtight Drum	1.6%	[-1.9%, 5.1%]	1 out of 48
Ceiling	3.4%	[0%, 7.2%]	2 out of 48
Improved Local Structure	1.3%	[-1.6%, 4.3%]	1 out of 48
Other	7.2%	[-1.3%, 16%]	4 out of 48

Reported Reason for Storage, Sorghum

	Estimated Proportion	95% C.I.	Observations
Food for household	95%	[90%, 99%]	90 out of 95
To sell at a higher price	2.4%	[-.4%, 5.2%]	3 out of 95
Seed for planting	2.1%	[-1.8%, 6.0%]	1 out of 95
Other	0.8%	[-0.8%, 2.5%]	1 out of 95

Insufficient observations to report storage reasons for millet

Sorghum 'High Producers' with Yields ≥ 70th Percentile

In total, 297 plots produced Sorghum. Of those, 269 reported yields. Excluding the highest 1% yielding plots, there were 266 plot observations. Of those, 76 plots were 'high producers' (≥ 70th Percentile), while 190 were 'lower producers' (< 70th Percentile).

Sorghum Plot Yields Above and Below the 70th Percentile

Plot Yield	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	1.05	[.94, 1.17]	76 out of 266	0.0000
< 70th Percentile	0.26	[.23, .28]	190 out of 266	

Mean Plot Size for Sorghum Plots

Plot Yield	Median (ha)	Mean (ha)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	0.81	1.54	[0.6, 2.5]	75 out of 266	0.7167
< 70th Percentile	0.81	1.36	[0.9, 1.8]	190 out of 266	

Input Use for Sorghum Plots

Input	Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Any Input	≥ 70th Percentile	32%	[19%, 46%]	23 out of 75	0.0416
	< 70th Percentile	17%	[9.3%, 24%]	36 out of 190	
Any Fertilizer	≥ 70th Percentile	24%	[10%, 37%]	14 out of 75	0.0048
	< 70th Percentile	4.9%	[1.1%, 8.8%]	9 out of 190	
Inorganic Fertilizer	≥ 70th Percentile	-	-	0 out of 75	0.0202
	< 70th Percentile	1.2%	[.2%, 2.1%]	3 out of 190	
Organic Fertilizer	≥ 70th Percentile	24%	[10%, 37%]	14 out of 75	0.0028
	< 70th Percentile	3.8%	[0%, 7.5%]	6 out of 190	
IV Seed	≥ 70th Percentile	2.5%	[-1.0%, 6.0%]	3 out of 76	0.4266
	< 70th Percentile	5.4%	[-1.0%, 12%]	7 out of 190	
Pesticide/Herbicide/ Fungicide	≥ 70th Percentile	9.4%	[1.9%, 17%]	8 out of 75	0.4808
	< 70th Percentile	6.4%	[2.7%, 10%]	20 out of 190	

Farmer Reported Soil Type for Sorghum Plots

Plot Yield		Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥70th Percentile	Sandy	11%	[2.6%, 20%]	7 out of 75	0.0394
	Loam	65%	[51%, 79%]	44 out of 75	0.4166
	Clay	23%	[10%, 36%]	23 out of 75	0.5640
	Other	1.2%	[-1.2%, 3.6%]	1 out of 75	0.7734
< 70th Percentile	Sandy	23%	[15%, 30%]	47 out of 190	
	Loam	57%	[48%, 67%]	105 out of 190	
	Clay	18%	[11%, 26%]	35 out of 190	
	Other	1.7%	[-1.1%, 4.5%]	3 out of 190	

Geovariable Soil Characteristics for Sorghum Plots

Soil	Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Slight or no nutrient availability constraints	≥ 70th Percentile	36%	[17%, 55%]	23 out of 71	0.1826
	< 70th Percentile	49%	[32%, 67%]	52 out of 153	
Slight or no workability constraints	≥ 70th Percentile	47%	[25%, 69%]	33 out of 71	0.3693
	< 70th Percentile	38%	[22%, 54%]	75 out of 153	

Hired Labor for Sorghum Plots

Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	46%	[35%, 57%]	32 out of 75	0.0001
< 70th Percentile	18%	[12%, 25%]	37 out of 190	

Hired Labor for Sorghum Plots

Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	46%	[35%, 57%]	32 out of 75	0.0001
< 70th Percentile	18%	[12%, 25%]	37 out of 190	

Education Level for Household Head of Sorghum Plots

Plot Yield	Median (Years)	Mean (Years)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	8	5.1	[4.1,6.1]	75	0.1042
< 70th Percentile	5	4.0	[3.2,4.7]	174	

Age of Household Head of Sorghum Plots

Plot Yield	Mean (Years)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	48.4	[44.5, 52.2]	76	0.5945
< 70th Percentile	49.8	[46.5, 53.1]	190	

Gender of Household Head of Sorghum Plots

Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile				
Male-headed household	80%	[70%, 90%]	60 out of 76	0.1818
Female-headed house	20%	[10%, 30%]	16 out of 76	
< 70th Percentile				
Male-headed household	71%	[61%, 81%]	143 out of 190	0.1818
Female-headed house	29%	[19%, 39%]	47 out of 190	

Mean Distance from Household to Population Center >20,000 [1]

Plot Yield	Mean (km)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	60.4	[44.6, 76.3]	71 out of 224	0.9769
< 70th Percentile	60.7	[51.0, 70.4]	153 out of 224	

Mean Distance from Household to Nearest Major Road [1]

Plot Yield	Mean (km)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	20.0	[9.3, 30.8]	71 out of 224	0.5243
< 70th Percentile	23.3	[16.8, 29.7]	153 out of 224	

Mean Distance from Household to Nearest Major Market [1]

Plot Yield	Mean (km)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	91.4	[70.8, 112.0]	71 out of 224	0.0757
< 70th Percentile	72.4	[55.9, 89.0]	153 out of 224	

Annual Mean Temperature, 1960-1990 (Degrees C) [1]

Plot Yield	Mean (Degrees C)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	22.7	[22.1, 23.3]	71 out of 224	0.7140
< 70th Percentile	22.8	[22.4, 23.2]	151 out of 224	

Mean Rainfall Variation in July 2007- June 2008 from Nine Year Average (2001-2009)(mm) [1]

Plot Yield	Mean (mm)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	-94.5	[-118.7, -70.2]	71 out of 224	0.6440
< 70th Percentile	-89.5	[-104.0, -75.0]	153 out of 224	

Twelve Month Rainfall Total July 2007-June 2008 (mm) (NOAA-CPC) [1]

Plot Yield	Mean (mm)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	607.9	[553.9, 661.8]	71 out of 224	0.5963
< 70th Percentile	626.3	[577.7, 675.0]	153 out of 224	

Household Elevation (m) [1]

Plot Yield	Mean (m)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	1059.0	[923.0, 1195.1]	71 out of 224	0.0530
< 70th Percentile	920.9	[827.2, 1014.6]	153 out of 224	

Millet Producers with Yields ≥ 70th Percentile

In total, 114 plots produced Millet. Of those, 107 reported yields. Excluding the highest 1% yielding plots, there were 106 plot observations. Of those, 34 plots were 'high producers' (≥ 70th Percentile), while 72 are 'lower producers' (< 70th Percentile).

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[1] Geospatial data provided by the World Bank. See "World Bank Appendix A: Confidential Information, Geospatial Variables" for more information.

Millet Plot Yields Above and Below the 70th Percentile

Plot Yield	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	1.02	[0.35, 0.40]	34 out of 106	0.0000
< 70th Percentile	0.38	[0.88, 1.17]	72 out of 106	

Mean Plot Size for Millet Plots

Plot Yield	Median (ha)	Mean (ha)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	0.8	1.4	[0.7, 2.2]	34 out of 106	0.5435
< 70th Percentile	0.8	1.2	[0.9, 1.5]	72 out of 106	

Input Use for Millet Plots

Input	Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Any Input	≥ 70th Percentile	49%	[33%, 65%]	15 out of 34	0.0059
	< 70th Percentile	25%	[15%, 34%]	19 out of 72	
Any Fertilizer	≥ 70th Percentile	40%	[26%, 54%]	12 out of 34	0.0117
	< 70th Percentile	22%	[22%, 31%]	16 out of 72	
Inorganic Fertilizer	≥ 70th Percentile	1.8%	[-1.9%, 5.5%]	1 out of 34	0.2382
	< 70th Percentile	5.6%	[-1.7%, 13%]	6 out of 72	
Organic Fertilizer	≥ 70th Percentile	38%	[24%, 52%]	11 out of 34	0.0018
	< 70th Percentile	16%	[8.4%, 24%]	10 out of 72	
IV Seed	≥ 70th Percentile	5.9%	[-5.4%, 17%]	2 out of 34	0.2936
	< 70th Percentile	1.3%	[-1.3%, 4.0%]	1 out of 72	
Pesticide/Herbicide	≥ 70th Percentile	3.2%	[-3.4%, 9.8%]	1 out of 34	0.5103
Fungicide	< 70th Percentile	6.4%	[-0.1%, 13%]	6 out of 72	

Soil Type for Millet Plots

Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	Sandy 22%	[2.8%, 40%]	6 out of 34	0.1273
	Loam 74%	[55%, 93%]	26 out of 34	0.0615
	Clay 4.3%	[-2.7%, 11%]	2 out of 34	0.6090
	Other -	-	0 out of 34	0.3330
< 70th Percentile	Sandy 38%	[27%, 49%]	26 out of 71	
	Loam 54%	[43%, 66%]	40 out of 71	
	Clay 6.5%	[-1.3%, 12%]	4 out of 71	
	Other 1.2%	[-1.3%, 3.7%]	1 out of 71	

Soil characteristics - Geovariables

Soil	Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Slight or no nutrient availability constraints	≥ 70th Percentile	30%	[2.9%, 58%]	8 out of 31	0.0439
	< 70th Percentile	53%	[24%, 82%]	34 out of 72	

Slight or no workability constraints	≥ 70th Percentile	47%	[18%, 77%]	15 out of 31	0.1309
	< 70th Percentile	31%	[4.9%, 57%]	26 out of 72	

Hired Labor for Millet Plots

Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	34%	[15%, 53%]	11 out of 34	0.4343
< 70th Percentile	43%	[31%, 55%]	29 out of 72	

Education level of Household Heads of Millet Plots Percentile

Plot Yield	Median (Years)	Mean (Years)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	5.0	4.9	[3.6, 6.2]	11 out of 34	0.1877
< 70th Percentile	4.0	4.0	[2.7, 5.4]	29 out of 72	

Age of Household Heads of Millet Plots

Plot Yield	Mean (Years)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	48.2	[41.7, 54.6]	34	0.9413
< 70th Percentile	48.5	[42.8, 54.2]	72	

Gender of Household Head of Millet Plots

Plot Yield	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile				
Male-headed household	87%	[78%, 98%]	29 out of 34	0.5129
Female-headed house	12%	[2.2%, 22%]	5 out of 34	
< 70th Percentile				
Male-headed household	83%	[76%, 91%]	61 out of 72	0.5129
Female-headed house	17%	[8.9%, 24%]	11 out of 72	

Mean Distance from Household to Population Center >20,000[1]

Plot Yield	Mean (km)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	48.8	[31.4, 66.1]	31 out of 103	0.2648
< 70th Percentile	40.0	[23.0, 57.0]	72 out of 103	

Mean Distance from Household to Nearest Major Road (km)[1]

Plot Yield	Mean (km)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	12.5	[6.4, 18.7]	31 out of 103	0.8132
< 70th Percentile	11.8	[6.9, 16.7]	72 out of 103	

Mean Distance from Household to Nearest Major Market (km) [1]

Plot Yield	Mean (km)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	95.7	[75.2, 116.2]	31 out of 103	0.0333
< 70th Percentile	69.9	[46.7, 93.1]	72 out of 103	

Annual Mean Temperature, 1960-1990 (Degrees C) [1]

Plot Yield	Degrees (C)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	21.8	[21.1, 22.6]	31 out of 103	0.9444
< 70th Percentile	21.9	[21.3, 22.4]	72 out of 103	

Variation in Rainfall July 2007-June 2008 from Nine Year Average (mm) [1]

Plot Yield	Mean (mm)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	-44.8	[-73.6, -16.0]	31 out of 103	0.0506
< 70th Percentile	-63.2	[-90.3, -36.2]	72 out of 103	

Twelve Month Rainfall Total July 2007-June 2008 (mm) (NOAA-CPC) [1]

Plot Yield	Rainfall (mm)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	632.5	[563.0, 701.9]	31 out of 103	0.0204
< 70th Percentile	551.6	[493.8, 609.4]	72 out of 103	

Household Elevation (m) [1]

Plot Yield	Mean (m)	95% C.I.	Observations	Wald Test P-Value
≥ 70th Percentile	1272.0	[1138.8, 1405.2]	31 out of 103	0.0375
< 70th Percentile	1170.2	[1076.3, 1264.1]	72 out of 103	

Sorghum and Millet Plot Intercropping and Productivity

Estimated Proportion of Intercropped Sorghum and Millet Plots (Long Rainy Season)

	Estimated Proportion	95% C.I.	Observations
Sorghum	63%	[55%, 71%]	185 out of 273
Millet	45%	[31%, 59%]	50 out of 108

Crops that Were Intercropped with Millet (< 5% Not Reported)

Crop	Estimated Proportion of Sorghum Plots	95% C.I.	Observations
Maize	55%	[44%, 66%]	110 out of 185
Cassava	19%	[13%, 25%]	43 out of 185
Mango	17%	[8.4%, 26%]	27 out of 185
Groundnuts	17%	[7.0%, 26%]	28 out of 185
Banana	11%	[4.7%, 17%]	19 out of 185
Cashew	11%	[7.8%, 15%]	36 out of 185
Pigeon Pea	9.10%	[4.1%, 14%]	25 out of 185
Papaya	7.1%	[2.9%, 11%]	13 out of 185
Sweet Potatoes	7.1%	[1.7%, 12.5%]	9 out of 185
Millet	6.8%	[1.5%, 12%]	8 out of 185
Guava	5.8%	[1.1%, 11%]	7 out of 185
Cowpeas	5.7%	[1.6%, 9.7%]	12 out of 185
Beans	5.5%	[2.1%, 10.0%]	8 out of 185

Crops that Were Intercropped with Millet (< 5% Not Reported)

Crop	Estimated Proportion of Millet Plots	95% C.I.	Observations
Maize	50%	[31%, 70%]	29 out of 50
Groundnuts	33%	[15%, 52%]	15 out of 50
Mango	19%	[5%, 32%]	10 out of 50
Beans	18%	[7.5%, 28%]	10 out of 50
Sorghum	17%	[3.6%, 30%]	8 out of 50
Sunflower	13%	[2.7%, 23%]	6 out of 50
Guava	11%	[-0.8%, 23%]	6 out of 50
Bambara nuts	9.3%	[-0.02%, 19%]	5 out of 50
Cowpeas	9.1%	[-3.6%, 22%]	4 out of 50
Cassava	9.1%	[2.2%, 16%]	6 out of 50
Banana	7.0%	[-1.4%, 15%]	4 out of 50

Reasons for Intercropping (All Crops)

	Estimated Proportion	95% C.I.	Observations
More fertile for soil	4%	[3%, 5%]	121

Substitute if either crop fails	82%	[79%, 85%]	2243	
Other	8%	[6%, 11%]	218	
Combination of reasons	6%	[5%, 7%]	151	

Plot Yields for Not Intercropped and Intercropped Crops Using Area Harvested				
	Mean (t/ha)	95% C.I.	Observations	Wald Test P-Value
Sorghum				
Not Intercropped	0.58	[0.47, 0.68]	86	0.0291
Intercropped	0.46	[0.38, 0.56]	180	
Millet				
Not Intercropped	0.62	[0.50, 0.73]	57	0.0478
Intercropped	0.52	[0.44, 0.62]	49	

Land Productivity			
	Mean Land Productivity (USD/ha)	95% C.I.	Observations
Sorghum	$16.03/ha	[$11.65, $20.40]	150
Millet	$14.19/ha	[$11.16, $17.22]	69

Labor Productivity			
	Mean Labor Productivity (USD/day)	95% C.I.	Observations
Sorghum	$1.16/day	[$0.82, $1.49]	151
Millet	$0.97/day	[$0.76, $1.17]	69

Sorghum and Millet Sales and Value

Estimated Proportion of Cultivating Households that Sold Crops

Crop	Estimated proportion	95% C.I.	Observations
Sorghum	15%	[11%, 20%]	37 out of 255
Millet	41%	[31%, 51%]	42 out of 97
Maize	28%	[25%, 31%]	374 out of 1337
Paddy	52%	[44%, 60%]	157 out of 423
Beans	34%	[28%, 41%]	161 out of 457
Sweet Potatoes	26%	[19%, 33%]	53 out of 200
Yams	53%	[25%, 81%]	10 out of 18
Cowpeas	26%	[16%, 37%]	30 out of 121
Groundnuts	46%	[37%, 54%]	148 out of 315

Estimated Proportion Sold of Quantity Harvested Among Households that Sold (Observations>30)

Crop	Estimated proportion	95% C.I.	Observations
Sorghum	51%	[40%, 63%]	34
Millet	48%	[38%, 59%]	40
Maize	38%	[35%, 41%]	368
Paddy	51%	[40%, 63%]	34
Beans	51%	[48%, 55%]	157
Sweet Potatoes	54%	[47%, 62%]	50
Pigeon pea	66%	[58%, 73%]	49
Cowpeas	67%	[59%, 74%]	30
Groundnuts	54%	[48%, 60%]	147
Cassava*	48%	[43%, 54%]	131
Cotton	100%	[100%, 100%]	65
Sunflower	78%	[73%, 83%]	86
Sesame	94%	[90%, 97%]	61

*permanent observations

Mean Quantity Sold per Selling Household

Crop	Median (kg)	Mean (kg)	95% C.I.	Observations
Sorghum	100	269	[112, 426]	36
Millet	100	277	[62, 492]	42

Total Mean Sales per Selling Household

Crop	Median ($US)	Mean ($US)	95% C.I.	Observations
Sorghum	$44.30	$44.30	[$17.17, $71.44]	36
Millet	$44.81	$44.81	[$15.77, $73.84]	42

Estimated Proportion of Households Selling Crops by Gender of Household Head

	Household Head	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Sorghum					
	Male	18%	[11%, 24%]	32 out of 37	0.1207
	Female	9.1%	[1.0%, 17%]	5 out of 37	
Millet					
	Male	40%	[29%, 50%]	34 out of 83	0.4472
	Female	50%	[25%, 75%]	8 out of 14	

Estimated Proportion of Total Country Crop Sales (Long Rainy Season Crops)

	Estimated Proportion of Total Crop Sales
Sorghum	0.8%
Millet	1.1%

Mean Price per Kilogram of Crop Sales

	Median ($USD/kg)	Mean ($USD/kg)	95% C.I.	Observations
Sorghum	$0.17	$0.21	[$0.17, $0.25]	36
Millet	$0.19	$0.22	[$0.18, $0.26]	42

Sorghum and Millet Consumption and Malnutrition

Estimated Proportion of Households Reporting Consumption of Millet and Sorghum Grain Over Last 7 Days

	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value Compares agricultural to and non-agricultural households
All households	2.5%	[1.8%, 3.3%]	91 out of 3265	
Agricultural households	2.8%	[1.9%, 3.7%]	79 out of 2474	0.0017
Non-agricultural households	1.0%	[0.3%, 1.7%]	12 out of 791	
Grew sorghum or millet	7.7%	[4.3%, 11.2%]	37 out of 72	.0008
Did not grow sorghum or millet	1.8%	[1.1%, 2.5%]	35 out of 72	

Estimated Proportion of Households Reporting Consumption of Millet and Sorghum Flour Over Last 7 Days

	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value Compares agricultural to and non-agricultural households
All households	11%	[9.3%, 13%]	336 out of 3265	
Agricultural households	11%	[9.1%, 13%]	262 out of 2474	0.9555
Non-agricultural households	11%	[8.3%, 14%]	74 out of 791	
Grew sorghum or millet	32%	[26%, 38%]	102 out of 239	0.0000
Did not grow sorghum or millet	6.6%	[5.2%, 8.1%]	137 out of 239	

Estimated Proportion of Households with Children Suffering from Moderate or Severe Nutrition Measures

		Estimated Proportion	95% C.I.	Observations	Wald Test P-Value
Sorghum					
Wasting	Growers	4.1%	[1.0%, 7.6%]	7 out of 146	0.9753
	Non-growers	4.1%	[2.9%, 5.4%]	53 out of 1090	
Stunting	Growers	50%	[41%, 58%]	69 out of 146	0.9606
	Non-growers	50%	[46%, 53%]	515 out of 1090	
Underweight	Growers	28%	[18%, 39%]	37 out of 146	0.1762
	Non-growers	21%	[18%, 23%]	226 out of 1090	
Low BMI for age	Growers	4.2%	[0.9%, 7.7%]	7 out of 146	0.8602
	Non-growers	4.0%	[2.3%, 5.2%]	44 out of 1090	
Overweight	Growers	4.4%	[1.1%, 7.8%]	8 out of 146	0.2341
	Non-growers	6.8%	[5.0%, 8.6%]	69 out of 1090	
Millet					
Wasting	Growers	3.4%	[-0.9%, 7.7%]	3 out of 51	0.7212
	Non-growers	4.2%	[3.0%, 5.3%]	57 out of 1185	
Stunting	Growers	51%	[40%, 62%]	26 out of 51	0.8302
	Non-growers	50%	[46%, 53%]	558 out of 1185	
Underweight	Growers	25%	[9.7%, 41%]	12 out of 51	0.6550
	Non-growers	22%	[19%, 24%]	251 out of 1185	
Low BMI for age	Growers	3.4%	[-0.9%, 7.7%]	3 out of 51	0.7780
	Non-growers	4.0%	[2.9%, 5.2%]	48 out of 1185	
Overweight	Growers	1.5%	[-1.4%, 4.5%]	1 out of 51	0.0034
	Non-growers	6.8%	[5.1%, 8.5%]	76 out of 1185	

Rainfall

Rain Variation from Nine Year Average by Zone

Zone	Rain Variation (mm)	95% C.I.	Observations
Tanzania (country total)	-54	[-64, -44]	5422
Central	-79	[-103, -54]	340 out of 5422
Eastern	-8.4	[-52, 35]	710 out of 5422
Southern Highlands	-38	[-59, -17]	889 out of 5422
Lake	-27	[-60, 6]	287 out of 5422
Northern	-46	[-74, -17]	679 out of 5422
Southern	-108	[-129, -87]	961 out of 5422
Western	-74	[-98, -50]	716 out of 5422
Zanzibar	-50	[-73, -27]	839 out of 5422

Central Zone Analysis

Proportion of Total Sorghum and Millet Growing Households in Central Zone

	Estimated Proportion	95% C.I.	Observations
Sorghum	39%	[29%, 48%]	62 out of 265
Millet	64%	[50%, 79%]	50 out of 99

Estimated Proportion of Central Zone Households Growing Crops

	Estimated Proportion	95% C.I.	Observations
Sorghum	44%	[27%, 60%]	62 out of 136
Millet	38 %	[19%, 57%]	50 out of 136

Estimated Proportion of Central Zone Female-Headed Households Cultivating Sorghum & Millet, Growers and Non-Growers

	Estimated Proportion	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	29%	[16%, 42%]	18 out of 62	0.3166
Non-Growers	20%	[11%, 29%]	15 out of 74	
Millet Growers	20%	[9.8%, 30%]	10 out of 50	0.2724
Non-Growers	26%	[19%, 34%]	23 out of 86	
All Ag Households	24%	[18%, 30%]	33 out of 136	

Education Level of Central Zone Household Heads, Growers and Non-Growers

	Mean (Years)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	4.4	[3.5, 5.4]	60 out of 131	0.6205
Non-growers	4.7	[3.8, 5.6]	71 out of 131	
Millet Growers	4.1	[2.5, 5.7]	48 out of 131	0.4457
Non-growers	4.8	[3.9, 5.7]	83 out of 131	
All Ag households	4.6	[3.8, 5.3]	131	

Ages of Central Zone Household Heads, Growers and Non-Growers

	Mean (Years)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	46.5	[42.7, 50.2]	62 out of 136	0.8105
Non-growers	45.8	[42.3, 49.3]	74 out of 136	
Millet Growers	49.0	[43.4, 54.5]	50 out of 136	0.1996
Non-growers	44.4	[41.2, 47.5]	86 out of 136	
All Ag households	46.1	[43.8, 48.4]	136	

Number of Central Zone Household Members, Growers and Non-Growers

	Mean	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	5.5	[5.0, 5.9]	62 out of 136	0.0054
Non-growers	4.7	[4.2, 5.1]	74 out of 136	
Millet Growers	4.7	[3.8, 5.5]	50 out of 136	0.2283
Non-growers	5.2	[4.8, 5.6]	86 out of 136	
All Ag households	5.0	[4.6, 5.4]	136	

Distance from Central Zone Households to Nearest Population Center >20,000 (km), Growers and Non-Growers

	Mean (km)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	57.9	[43.2, 72.6]	62 out of 134	0.5463
Non-growers	51.5	[26.9, 76.1]	72 out of 134	
Millet Growers	39.1	[20.1, 58.2]	48 out of 134	.0590
Non-growers	63.2	[42.5, 83.9]	86 out of 134	
All Ag households	54.3	[36.4, 72.2]	134	

Distance from Central Zone Households to Nearest Major Road (km), Growers and Non-Growers

Characteristic	Mean (km)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	15.8	[5.9, 25.6]	62 out of 134	0.4276
Non-growers	12.8	[5.0, 20.6]	72 out of 134	
Millet Growers	7.7	[2.9, 12.4]	48 out of 134	0.0191
Non-growers	17.9	[8.2, 27.6]	86 out of 134	
All Ag households	14.1	[6.2, 22.1]	134	

Total Central Zone Rainfall July 2007- June 2008 (mm), Growers and Non-Growers

	Mean (mm)	95% C.I.	Observations	Wald Test P-Value Compares growers to non-growers
Sorghum Growers	504	[447, 561]	62 out of 134	0.8144
Non-growers	497	[456, 539]	72 out of 134	
Millet Growers	488	[445, 531]	48 out of 134	
Non-growers	507	[458, 557]	86 out of 134	
All Ag households	500	[461, 540]	134	