

## Women's roles in decision-making and nutrition-sensitive agriculture

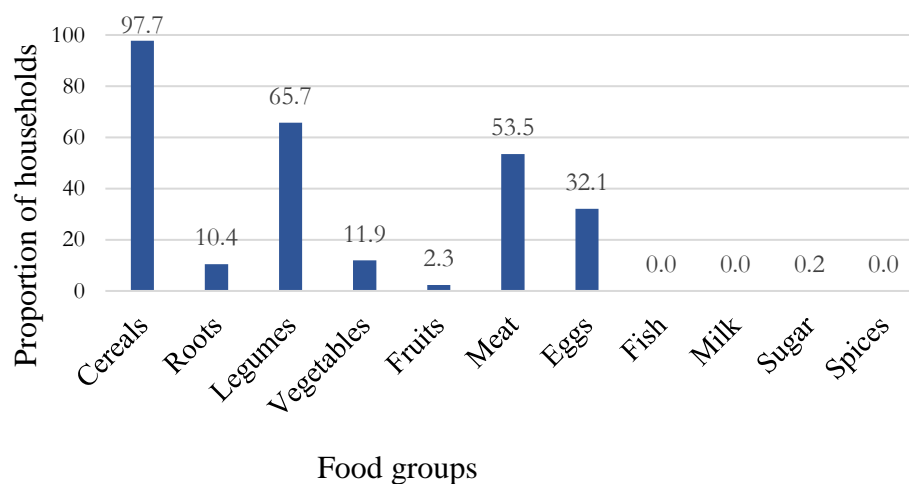
### Online Appendix

**Table A1: Survey questions for the construction women's decision-making variables**

<b>Variables</b>	<b>Components in the survey</b>	<b>Questions asked in the survey</b>
Agricultural production decisions	Crop production	Who in the household mainly makes the decisions on what crops to grow on this particular plot? (Enter HH member ID) [same question repeated for all plots cultivated]
	Livestock production	Who decides concerning this livestock? (Record household member ID) [same question repeated for all livestock species kept]
Agricultural product sales decisions	Crop sales	Who in the household was mainly responsible for selling [crop]? [same question repeated for all crop species sold]
	Livestock sales	Who in the household was mainly responsible for selling [livestock or related product]? (Record household member ID) [same question repeated for all livestock products sold]
Agricultural cash income use decisions	Crop cash income use	Who primarily controls or decides on the use of money gained from the sale of [crop]? (Record household member ID) [same question repeated for all crop species sold]
	Livestock cash income use	Who primarily controls or decides on the use of money gained from the sale of [livestock product]? (Record household member ID) [same question repeated for all livestock products sold]
Food purchase decisions	Food purchase	Who in the household was responsible for purchasing [item name]? (Record household member ID) [same question repeated for all major food items purchased]

**Table A2: Proportion of households consuming different numbers of food groups**

HDDS (12 food groups)	Percentage of households	HDDS (9 food groups)	Percentage of households
1	0.2	0	0.2
2	2.6	2	20.9
3	17.1	3	24.6
4	22.9	4	19.9
5	16.4	5	16.4
6	14.3	6	11.0
7	10.1	7	5.0
8	7.3	8	2.0
9	5.4	9	
10	2.4		
11	1.3		
12	0.0		



**Figure A1: Proportion of households producing specific food groups**

**Table A3: Associations between women’s decision-making and farm production diversity (full model results)**

	(1) FPDS	(2) FPDS	(3) FPDS	(4) FPDS	(5) FPDS
<b>Women’s decision-making (share of decisions)</b>					
Overall (all domains)	0.713*** (0.227)				
Production decisions		1.218*** (0.169)			
Sales decisions			0.169 (0.148)		
Cash income use decisions				-0.052 (0.158)	
Food purchase decisions					0.423*** (0.157)
<b>Control variables</b>					
Head age (years)	0.003 (0.003)	0.002 (0.002)	0.006** (0.003)	0.007*** (0.002)	0.003 (0.003)
Highest education level (years)	0.046*** (0.016)	0.036** (0.016)	0.029 (0.018)	0.028 (0.019)	0.049*** (0.016)
Female-headed household(dummy)	-0.274* (0.162)	-0.599*** (0.123)	0.147 (0.120)	0.279** (0.136)	-0.091 (0.143)
Household size (adult equivalents)	-0.044 (0.027)	-0.049** (0.024)	-0.061** (0.029)	-0.062** (0.029)	-0.040 (0.026)
Number of shocks	-0.018 (0.022)	-0.027 (0.022)	-0.055** (0.023)	-0.054** (0.024)	-0.011 (0.022)
Non-farm income (in log)	-0.008 (0.011)	-0.003 (0.010)	0.011 (0.012)	0.012 (0.012)	-0.008 (0.011)
Durable assets value (in log)	0.046*** (0.010)	0.044*** (0.010)	0.033*** (0.010)	0.033*** (0.010)	0.046*** (0.010)
Productive assets value (in log)	0.068*** (0.024)	0.069*** (0.024)	0.081*** (0.025)	0.078*** (0.026)	0.081*** (0.025)
Total land cultivated (	0.112*** (0.035)	0.118*** (0.032)	0.141*** (0.030)	0.139*** (0.030)	0.108*** (0.033)
Total input cost (in log)	0.020 (0.012)	0.021* (0.012)	0.004 (0.015)	0.003 (0.015)	0.018 (0.012)
Extension service access (dummy)	0.191** (0.097)	0.182** (0.092)	0.029 (0.095)	0.022 (0.093)	0.193** (0.098)
Produced two seasons (dummy)	0.270*** (0.104)	0.280*** (0.094)	0.208** (0.102)	0.198* (0.103)	0.207** (0.103)
Number of months accessible by car	0.039** (0.018)	0.037** (0.019)	0.049*** (0.019)	0.046** (0.018)	0.041** (0.017)
Distance to daily market (in log)	0.041 (0.049)	0.067 (0.049)	0.018 (0.056)	0.019 (0.056)	0.036 (0.049)
Number of food items in market	-0.000 (0.009)	0.002 (0.008)	0.001 (0.011)	-0.000 (0.011)	-0.002 (0.008)
Extension Planning Area	Yes	Yes	Yes	Yes	Yes
Observations	528	528	390	390	522

Marginal effects at means calculated from Generalized Poisson regression. Clustered standard errors in parentheses. \*, \*\*, \*\*\* Statistically significant at the 10%, 5%, and 1% level, respectively.

**Table A4: Associations between farm production diversity, women’s decision-making (all domains), and household dietary diversity (full model results)**

	(1)	(2)	(3)	(4)	(5)
	HDDS	HDDS	HDDS	HDDS	HDDS
Farm production diversity score (FPDS)	0.056*** (0.014)		0.049*** (0.014)	0.024 (0.016)	0.024 (0.019)
Women’s decision-making, overall (WO)		0.197** (0.077)	0.162** (0.073)		0.004 (0.106)
FPDS*WO interaction				0.061*** (0.021)	0.060* (0.031)
<b>Control variables</b>					
Female-headed household (dummy)	-0.041 (0.035)	-0.149** (0.059)	-0.137** (0.057)	-0.135*** (0.050)	-0.136** (0.057)
Head age (years)	-0.002* (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Highest education level (years)	0.011** (0.006)	0.013*** (0.005)	0.011** (0.005)	0.010* (0.005)	0.010* (0.005)
Household size (adult equivalents)	-0.061*** (0.009)	-0.065*** (0.010)	-0.062*** (0.010)	-0.061*** (0.010)	-0.061*** (0.010)
Number of shocks	-0.013 (0.008)	-0.016* (0.009)	-0.015* (0.008)	-0.015* (0.008)	-0.015* (0.008)
Total land cultivated (in log)	0.131*** (0.034)	0.179*** (0.028)	0.135*** (0.033)	0.138*** (0.033)	0.138*** (0.033)
Produced two seasons (dummy)	0.058 (0.038)	0.072* (0.037)	0.059 (0.038)	0.064* (0.038)	0.064* (0.038)
Durable assets value (in log)	0.011*** (0.003)	0.014*** (0.003)	0.011*** (0.003)	0.012*** (0.003)	0.012*** (0.003)
Productive assets value (in log)	0.024** (0.009)	0.031*** (0.010)	0.027*** (0.010)	0.028*** (0.010)	0.028*** (0.010)
Distance to daily market (in log)	-0.316* (0.176)	-0.279 (0.183)	-0.281* (0.161)	-0.260 (0.163)	-0.260 (0.162)
Number of food items in market	0.058* (0.030)	0.051* (0.030)	0.051* (0.027)	0.047* (0.026)	0.047* (0.026)
Section	Yes	-0.533	-0.549*	-0.490	-0.491
Constant	0.933*** (0.222)	0.996*** (0.222)	0.962*** (0.207)	1.040*** (0.200)	1.039*** (0.199)
atanhdelta	-0.359*** (0.045)	-0.355*** (0.042)	-0.374*** (0.043)	-0.382*** (0.044)	-0.382*** (0.044)
Observations	528	528	528	528	528

Estimated generalized Poisson models parameters are shown with clustered standard errors in parentheses. \*, \*\*, \*\*\* Statistically significant at the 10%, 5%, and 1% level, respectively.

**Table A5: Associations between farm production diversity, women’s decision-making in agricultural production, and household dietary diversity (full model results)**

	(1)	(2)	(3)	(4)	(5)
	HDDS	HDDS	HDDS	HDDS	HDDS
Farm production diversity score (FPDS)	0.056*** (0.014)		0.054*** (0.013)	0.048*** (0.014)	0.045*** (0.016)
Women’s decision-making, production (WP)		0.085 (0.063)	0.019 (0.058)		-0.045 (0.085)
FPDS*WP interaction				0.014 (0.017)	0.026 (0.025)
<b>Control variables</b>					
Female-headed household (dummy)	-0.041 (0.035)	-0.087 (0.054)	-0.053 (0.050)	-0.065 (0.046)	-0.056 (0.051)
Head age (years)	-0.002* (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Highest education level (years)	0.011** (0.006)	0.013** (0.005)	0.011** (0.006)	0.011* (0.006)	0.010* (0.006)
Household size (adult equivalents)	-0.061*** (0.009)	-0.064*** (0.009)	-0.061*** (0.009)	-0.061*** (0.009)	-0.060*** (0.010)
Number of shocks	-0.013 (0.008)	-0.016* (0.009)	-0.014 (0.008)	-0.014* (0.008)	-0.014* (0.008)
Total land cultivated (in log)	0.131*** (0.034)	0.182*** (0.028)	0.132*** (0.034)	0.134*** (0.033)	0.134*** (0.033)
Produced two seasons (dummy)	0.058 (0.038)	0.071* (0.038)	0.058 (0.038)	0.060 (0.038)	0.062 (0.038)
Durable assets value (in log)	0.011*** (0.003)	0.014*** (0.003)	0.011*** (0.003)	0.011*** (0.003)	0.011*** (0.003)
Productive assets value (in log)	0.024** (0.009)	0.029*** (0.010)	0.024** (0.010)	0.025** (0.010)	0.025** (0.010)
Distance to daily market (in log)	-0.316* (0.176)	-0.314 (0.203)	-0.314* (0.176)	-0.308* (0.175)	-0.304* (0.174)
Number of food items in market	0.058* (0.030)	0.057* (0.034)	0.057* (0.030)	0.056* (0.030)	0.056* (0.029)
Section	Yes	Yes	Yes	Yes	Yes
Constant	0.933*** (0.222)	0.985*** (0.241)	0.938*** (0.221)	0.958*** (0.213)	0.968*** (0.209)
atanhdelta	-0.359*** (0.045)	-0.338*** (0.043)	-0.359*** (0.044)	-0.361*** (0.045)	-0.362*** (0.045)
Observations	528	528	528	528	528

Estimated generalized Poisson models parameters are shown with clustered standard errors in parentheses. \*, \*\*, \*\*\* Statistically significant at the 10%, 5%, and 1% level, respectively.

**Table A6: Associations between farm production diversity, women’s decision-making on agricultural product sales, and household dietary diversity (full model results)**

	(1)	(2)	(3)	(4)	(5)
	HDDS	HDDS	HDDS	HDDS	HDDS
Farm production diversity score (FPDS)	0.056*** (0.014)		0.049*** (0.018)	0.041** (0.018)	0.040** (0.020)
Women’s decision-making, sales (WS)		0.102** (0.049)	0.092* (0.048)		-0.016 (0.107)
FPDS*WS interaction				0.031** (0.014)	0.036 (0.032)
<b>Control variables</b>					
Female-headed household (dummy)	-0.041 (0.035)	-0.091** (0.043)	-0.098** (0.044)	-0.102** (0.044)	-0.101** (0.044)
Head age (years)	-0.002* (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Highest education level (years)	0.011** (0.006)	0.013* (0.006)	0.012* (0.006)	0.011* (0.006)	0.011* (0.007)
Household size (adult equivalents)	-0.061*** (0.009)	-0.066*** (0.011)	-0.063*** (0.011)	-0.063*** (0.011)	-0.063*** (0.011)
Number of shocks	-0.013 (0.008)	-0.018* (0.009)	-0.015 (0.009)	-0.015 (0.009)	-0.015 (0.009)
Total land cultivated (in log)	0.131*** (0.034)	0.190*** (0.036)	0.145*** (0.039)	0.147*** (0.039)	0.148*** (0.039)
Produced two seasons (dummy)	0.058 (0.038)	0.055 (0.037)	0.048 (0.038)	0.051 (0.038)	0.051 (0.038)
Durable assets value (in log)	0.011*** (0.003)	0.011*** (0.003)	0.010*** (0.003)	0.010*** (0.004)	0.010*** (0.003)
Productive assets value (in log)	0.024** (0.009)	0.030** (0.012)	0.027** (0.012)	0.028** (0.012)	0.028** (0.012)
Distance to daily market (in log)	-0.316* (0.176)	-0.131 (0.214)	-0.116 (0.193)	-0.082 (0.196)	-0.079 (0.195)
Number of food items in market	0.058* (0.030)	0.028 (0.035)	0.026 (0.031)	0.020 (0.032)	0.019 (0.031)
Section	Yes	Yes	Yes	Yes	Yes
Constant	0.933*** (0.222)	1.178*** (0.277)	1.127*** (0.261)	1.194*** (0.256)	1.201*** (0.260)
atanhdelta	-0.359*** (0.045)	-0.369*** (0.048)	-0.390*** (0.051)	-0.392*** (0.052)	-0.392*** (0.052)
Observations	528	390	390	390	390

Estimated generalized Poisson models parameters are shown with clustered standard errors in parentheses. \*, \*\*, \*\*\* Statistically significant at the 10%, 5%, and 1% level, respectively.

**Table A7: Associations between farm production diversity, women’s decision-making on cash income use, and household dietary diversity (full model results)**

	(1)	(2)	(3)	(4)	(5)
	HDDS	HDDS	HDDS	HDDS	HDDS
Farm production diversity score (FPDS)	0.056*** (0.014)		0.050*** (0.018)	0.042** (0.018)	0.035* (0.020)
Women’s decision-making, income (WI)		0.081 (0.053)	0.077 (0.052)		-0.101 (0.098)
FPDS*WI interaction				0.032* (0.017)	0.060* (0.031)
<b>Control variables</b>					
Female-headed household (dummy)	-0.041 (0.035)	-0.081 (0.050)	-0.091* (0.050)	-0.106** (0.049)	-0.098* (0.050)
Head age (years)	-0.002* (0.001)	-0.002* (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Highest education level (years)	0.011** (0.006)	0.012* (0.007)	0.011* (0.007)	0.011 (0.007)	0.010 (0.007)
Household size (adult equivalents)	-0.061*** (0.009)	-0.067*** (0.011)	-0.064*** (0.011)	-0.064*** (0.011)	-0.063*** (0.012)
Number of shocks	-0.013 (0.008)	-0.017* (0.009)	-0.015 (0.009)	-0.015 (0.009)	-0.014 (0.009)
Total land cultivated (in log)	0.131*** (0.034)	0.187*** (0.036)	0.141*** (0.039)	0.142*** (0.039)	0.142*** (0.039)
Produced two seasons (dummy)	0.058 (0.038)	0.057 (0.038)	0.050 (0.038)	0.054 (0.038)	0.055 (0.038)
Durable assets value (in log)	0.011*** (0.003)	0.011*** (0.004)	0.009*** (0.004)	0.009*** (0.004)	0.009*** (0.004)
Productive assets value (in log)	0.024** (0.009)	0.031** (0.012)	0.028** (0.012)	0.028** (0.012)	0.028** (0.012)
Distance to daily market (in log)	-0.316* (0.176)	-0.140 (0.204)	-0.123 (0.182)	-0.094 (0.179)	-0.080 (0.179)
Number of food items in market	0.058* (0.030)	0.029 (0.034)	0.027 (0.030)	0.021 (0.029)	0.018 (0.029)
Section	Yes	Yes	Yes	Yes	Yes
Constant	0.933*** (0.222)	1.183*** (0.263)	1.131*** (0.248)	1.201*** (0.239)	1.243*** (0.237)
atanhdelta	-0.359*** (0.045)	-0.365*** (0.048)	-0.387*** (0.052)	-0.393*** (0.053)	-0.394*** (0.053)
Observations	528	390	390	390	390

Estimated generalized Poisson models parameters are shown with clustered standard errors in parentheses. \*, \*\*, \*\*\* Statistically significant at the 10%, 5%, and 1% level, respectively.

**Table A8: Associations between farm production diversity, women’s decision-making on food purchases, and household dietary diversity (full model results)**

	(1)	(2)	(3)	(4)	(5)
	HDDS	HDDS	HDDS	HDDS	HDDS
Farm production diversity score (FPDS)	0.056*** (0.014)		0.054*** (0.014)	0.038** (0.015)	0.028 (0.019)
Women’s decision-making, food (WF)		0.101** (0.045)	0.079* (0.043)		-0.075 (0.092)
FPDS*WF interaction				0.032** (0.013)	0.052* (0.028)
<b>Control variables</b>					
Female-headed household (dummy)	-0.041 (0.035)	-0.089** (0.044)	-0.087** (0.044)	-0.088** (0.042)	-0.074* (0.044)
Head age (years)	-0.002* (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)	-0.002** (0.001)
Highest education level (years)	0.011** (0.006)	0.014** (0.005)	0.011** (0.005)	0.011** (0.005)	0.011** (0.005)
Household size (adult equivalents)	-0.061*** (0.009)	-0.065*** (0.010)	-0.062*** (0.010)	-0.061*** (0.010)	-0.061*** (0.010)
Number of shocks	-0.013 (0.008)	-0.017** (0.008)	-0.015* (0.008)	-0.015* (0.008)	-0.014* (0.008)
Total land cultivated (in log)	0.131*** (0.034)	0.172*** (0.029)	0.124*** (0.035)	0.122*** (0.035)	0.122*** (0.035)
Produced two seasons (dummy)	0.058 (0.038)	0.068* (0.038)	0.056 (0.038)	0.057 (0.038)	0.059 (0.039)
Durable assets value (in log)	0.011*** (0.003)	0.014** (0.003)	0.011*** (0.003)	0.012*** (0.003)	0.012*** (0.003)
Productive assets value (in log)	0.024** (0.009)	0.031*** (0.010)	0.027*** (0.010)	0.028*** (0.010)	0.028*** (0.010)
Distance to daily market (in log)	-0.316* (0.176)	-0.325* (0.192)	-0.321* (0.166)	-0.319* (0.164)	-0.322* (0.166)
Number of food items in market	0.058* (0.030)	0.056* (0.032)	0.056** (0.028)	0.055** (0.028)	0.056** (0.028)
Section	Yes	Yes	Yes	Yes	Yes
Constant	0.933*** (0.222)	0.989*** (0.232)	0.963*** (0.212)	0.993*** (0.206)	1.014*** (0.204)
atanhdelta	-0.359*** (0.045)	-0.351*** (0.043)	-0.374*** (0.044)	-0.380*** (0.044)	-0.381*** (0.044)
Observations	528	522	522	522	522

Estimated generalized Poisson models parameters are shown with clustered standard errors in parentheses. \*, \*\*, \*\*\* Statistically significant at the 10%, 5%, and 1% level, respectively.