Appendix A

Table A1. Further baseline and endline descriptive statistics and balance between treatment groups

	Overall	T1	T2	C	T1- T2	T1-C	T2- C
Panel A: Household Characteristics (baseline)							
HH head married (1=yes)	**0.831**	0.835	0.831	0.830	0.004	0.005	0.001
	(0.375)	(0.372)	(0.375)	(0.376)	(0.028)	(0.024)	(0.023)
Literacy HH head (1=yes)	**0.561**	0.532	0.560	0.574	-0.028	-0.041	-0.013
	(0.496)	(0.499)	(0.497)	(0.495)	(0.036)	(0.029)	(0.032)
No. of hh members	**5.340**	5.269	5.342	5.368	-0.073	-0.099	-0.026
	(2.071)	(2.105)	(2.074)	(2.057)	(0.187)	(0.156)	(0.154)
TV owned (1=yes)	**0.016**	0.011	0.019	0.017	-0.008	-0.006	0.002
	(0.125)	(0.105)	(0.136)	(0.128)	(0.010)	(0.006)	(0.010)
Received remittances (1=yes)	**0.102**	0.089	0.100	0.108	-0.011	-0.018	-0.008
	(0.302)	(0.285)	(0.300)	(0.310)	(0.020)	(0.015)	(0.019)
Received support from social programs (1=yes)	**0.204**	0.167	0.212	0.217	-0.045	-0.050	-0.004
	(0.403)	(0.373)	(0.409)	(0.412)	(0.060)	(0.046)	(0.057)
Food insecure (1=yes)	**0.279**	0.263	0.250	0.297	0.013	-0.034	-0.047
	(0.449)	(0.441)	(0.433)	(0.457)	(0.045)	(0.039)	(0.040)
Panel B: Agricultural Production Characteristics (baseline)							
Reduced tillage practiced (1=yes)	**0.067**	0.091	0.051	0.064	0.040	0.027	-0.013
	(0.250)	(0.288)	(0.220)	(0.245)	(0.032)	(0.031)	(0.020)
Manure applied (1=yes)	**0.487**	0.505	0.479	0.482	0.025	0.023	-0.003
	(0.500)	(0.500)	(0.500)	(0.500)	(0.042)	(0.037)	(0.038)
Urea applied (1=yes)	**0.639**	0.701	0.664	0.603	0.038	0.098*	0.060
	(0.480)	(0.458)	(0.473)	(0.489)	(0.060)	(0.055)	(0.052)
Intercropping applied (1=yes)	**0.169**	0.187	0.175	0.159	0.013	0.029	0.016
	(0.375)	(0.391)	(0.380)	(0.365)	(0.047)	(0.040)	(0.039)
Grown green manure crops (1=yes)	**0.022**	0.030	0.026	0.018	0.003	0.012	0.009
	(0.148)	(0.170)	(0.160)	(0.131)	(0.014)	(0.010)	(0.011)
Experienced shock in last season (1=yes)	**0.818**	0.803	0.793	0.834	0.010	-0.030	-0.040
	(0.386)	(0.398)	(0.405)	(0.372)	(0.045)	(0.038)	(0.035)
Av. perception of change in soil fertility (1-decreased, 2-same, 3-increased)	**1.881**	1.876	1.903	1.875	-0.028	0.001	0.029
	(0.686)	(0.694)	(0.691)	(0.681)	(0.096)	(0.080)	(0.074)

Table A1. Further baseline and endline descriptive statistics and balance between treatment groups (cont.)

Panel C: Community Level Characteristics (endline)

MWS receives support in agriculture from other development organizations (1=yes)	**0.337**	0.364	0.306	0.339	0.057	0.025	-0.032
	(0.473)	(0.481)	(0.461)	(0.473)	(0.112)	(0.095)	(0.092)
No. of agricultural trainings offered in mws (apart from ISFM+)	**3.244**	3.180	3.976	2.973	-0.796	0.207	1.002
	(2.625)	(2.748)	(3.532)	(2.019)	(0.746)	(0.504)	(0.625)
Agri-input dealer in Kebele (1=yes)	**0.628**	0.612	0.699	0.606	-0.087	0.007	0.094
	(0.483)	(0.488)	(0.459)	(0.489)	(0.112)	(0.097)	(0.093)
Seed enterprise in Kebele (1=yes)	**0.118**	0.139	0.109	0.114	0.030	0.025	-0.005
	(0.323)	(0.346)	(0.312)	(0.318)	(0.078)	(0.067)	(0.062)
N	2382	539	532	1311	1071	1850	1843

Note: HH stands for household. Calculation of food insecurity status based on self-experienced events of food insecurity, based on Household Food Insecurity Access Scale (HFIAS). MWS stands for microwatershed. Kebele is the lowest administrative unit in Ethiopia. For means, standard deviations in parentheses. For mean comparisons, robust standard errors in parentheses, clustered at the microwatershed level. Significance levels indicated as following: *** p<0.01, ** p<0.05, * p<0.1.

Table A2. ITT effects on number of adopted ISFM technologies, using alternative 0-4 measure

	Number of ISFM technologies adopted (0-4)					
	OLS		Poisson (AME)		Oprobit	
	(1)	(2)	(3)	(4)	(5)	(6)
T1	0.541***	0.326***	0.543***	0.341***	0.446***	0.397***
	(0.169)	(0.078)	(0.165)	(0.087)	(0.139)	(0.093)
p-value	0.002	0.000	0.001	0.000	0.001	0.000
T2	0.662***	0.418***	0.650***	0.406***	0.558***	0.527***
	(0.157)	(0.079)	(0.149)	(0.089)	(0.135)	(0.094)
p-value	0.000	0.000	0.000	0.000	0.000	0.000
Test T1=T2 (p-value)	0.483	0.282	0.482	0.468	0.462	0.217
Endline control mean			2.199			
Additional controls	No	Yes	No	Yes	No	Yes
(Pseudo) R-squared	0.051	0.505	0.010	0.107	0.018	0.225
Observations	2,382	2,382	2,382	2,382	2,382	2,382

Note: All models show treatment effects on number of practices adopted (0 to 4, excluding lime) measured at endline, controlling for baseline level of the outcome (respectively a proxy) in one specification each. Poisson results show average marginal effects (AME). Additional control variables identical to those listed in notes of Table 2. Tests of equality of T1 and T2 are Wald tests. Robust standard errors in parentheses, clustered at the microwatershed level. Significance levels indicated as following: *** p<0.01, ** p<0.05, * p<0.1.

Table A3. ITT effects on integrated adoption of the full ISFM package, using alternative measures

	Integrated adoption of full ISFM package					
	At least 4 out of 5		3 out of 3		Region-specific	
	(1)	(2)	(3)	(4)	(5)	(6)
T1	0.152***	0.123***	0.113**	0.095***	0.062***	0.062***
	(0.044)	(0.027)	(0.048)	(0.028)	(0.017)	(0.014)
p-value	0.001	0.000	0.017	0.001	0.000	0.000
T2	0.188***	0.148***	0.156***	0.124***	0.075***	0.064***
	(0.042)	(0.024)	(0.047)	(0.025)	(0.021)	(0.014)
p-value	0.000	0.000	0.001	0.000	0.000	0.000
Test T1=T2 (p-value)	0.466	0.375	0.429	0.336	0.481	0.876
Additional controls	No	Yes	No	Yes	No	Yes
Endline control mean	0.157		0.185		0.033	
(Pseudo) R-squared	0.039	0.274	0.025	0.269	0.042	0.238
Observations	2,160	2,160	2,160	2,160	2,160	2,095

Note: Average marginal effects (AME) of probit models for outcomes measured at endline, controlling for baseline level of the outcome (respectively a proxy) in one specification each. In Columns (1) to (2), full quickwin package is a dummy variable defined as adopting at least four out of five practices (including lime). In Columns (3) to (4), full package is a dummy variable defined as adopting all three practices (compost, blended fertilizer, line seeding). In Columns (5) to (6), full package is a dummy variable defined as adopting all five practices in Amhara and Oromia (including lime), but only four in Tigray, since lime is not relevant there. Additional control variables identical to those listed in notes of Table 2. Tests of equality of T1 and T2 are Wald tests. Robust standard errors in parentheses, clustered at the microwatershed level. Significance levels indicated as following: *** p<0.01, ** p<0.05, * p<0.1.

Table A4. ITT effects on number of adopted ISFM technologies and integrated adoption of the full ISFM package, excluding model farmers

	Number of ISFM technologies adopted						Integrated adoption of full ISFM package	
	OLS		Poisson (AME)		Oprobit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
T1	0.582***	0.390***	0.582***	0.404***	0.460***	0.463***	0.077*	0.066***
	(0.183)	(0.076)	(0.176)	(0.085)	(0.136)	(0.082)	(0.042)	(0.024)
p-value	0.002	0.000	0.001	0.000	0.001	0.000	0.068	0.005
T2	0.737***	0.526***	0.717***	0.508***	0.597***	0.629***	0.106**	0.091***
	(0.178)	(0.081)	(0.166)	(0.086)	(0.138)	(0.090)	(0.044)	(0.025)
p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.015	0.000
Test T1=T2 (p-value)	0.441	0.128	0.440	0.234	0.393	0.102	0.552	0.374
Endline control mean	2.222						No	Yes
Additional controls	No	Yes	No	Yes	No	Yes	0.152	
(Pseudo) R-squared	0.054	0.525	0.012	0.121	0.019	0.221	0.015	0.271
Observations	2,300	2,300	2,300	2,300	2,300	2,300	2,078	2,078

*Note:*All models show outcomes measured at endline, controlling for baseline level of the outcome (respectively a proxy) in one specification each. Poisson and probit models (Columns (3), (4), (7) and (8)) show average marginal effects (AME). Number of ISFM technologies adopted ranges from 0 to 5. Full quickwin package is a dummy variable taking 1 if all four practices (compost, blended fertilizer, line seeding and improved seeds) have been adopted together on at least one main crop plot. 82 model farmers from treatment groups excluded. Additional control variables identical to those listed in notes of Table 2. Tests of equality of T1 and T2 are Wald tests. Robust standard errors in parentheses, clustered at the microwatershed level. Significance levels indicated as following: *** p<0.01, ** p<0.05, * p<0.1.

Table A5. Probit regression results for calculation of propensity score to predict FREG membership, used for matching with potential FREG members in control group

	FREG membership
Gender HH head (1=male)	-0.464**
	(0.221)
Age HH head (in years)	-0.003
	(0.004)
No. of months per year hh head away	-0.041
	(0.058)
HH head married (1=yes)	0.260
	(0.216)
Education HH head (completed grades)	0.035**
	(0.014)
HH head participates in off-farm wage employment (1=yes)	0.096
	(0.138)
No. of HH members	0.017
	(0.027)
No. of organisations involved (0-12)	0.005
	(0.026)
Father of HH head important in community (1=yes)	0.132
	(0.103)
Walking distance from homestead to nearest FTC in minutes	-0.000
	(0.002)
No. of times talked to DA in the last 12 months	0.012***
	(0.004)
Attended agric. training in the last 12 months (1=yes)	0.774***
	(0.095)
Basic assets score (0-4)	0.015
	(0.055)
Radio owned (1=yes)	-0.177*
	(0.105)
Food insecurity score (0-12)	-0.071***
	(0.018)
Received support from social programs (1=yes)	0.168
	(0.117)
Total land size (in ha)	0.125***
	(0.040)
No. of TLU owned	-0.025
	(0.019)
No. of adopted quickwins (0-5)	0.173***
	(0.046)
Grows main crop (1=yes)	0.257
	(0.315)
Constant	-2.103***
	(0.424)
Pseudo R-squared	0.180
Observations	1,513

Note: Probit regression results for calculation of propensity score for FREG membership. FREG stands for "Farmer Research and Extension Group". HH stands for household. FTC stands for farmer training center. DA stands for development agent. TLU stands for tropical livestock unit. For further variable definitions see notes of table 1. Robust standard errors in parentheses. Baseline variables used. Significance levels indicated following: *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Balance between treatment groups in FREG sample, composed of actual FREG members and matched controls

	T1	T2	C	T1 vs. T2	T1 vs. C	T2 vs. C
Gender HH head (1=male)	0.904	0.906	0.910	-0.001	-0.006	-0.004
	(0.040)	(0.030)	(0.022)	(0.050)	(0.045)	(0.037)
Age HH head (in years)	42.021	45.792	43.180	-3.771*	-1.159	2.612
	(1.434)	(1.336)	(0.981)	(1.948)	(1.725)	(1.645)
No. of months HH head away	0.053	0.123	0.080	-0.069	-0.027	0.043
	(0.031)	(0.088)	(0.048)	(0.093)	(0.057)	(0.100)
HH head married (1=yes)	0.872	0.934	0.900	-0.062	-0.028	0.034
	(0.057)	(0.025)	(0.019)	(0.062)	(0.059)	(0.031)
Education HH head (completed grades)	3.489	3.566	3.480	-0.077	0.009	0.086
	(0.588)	(0.467)	(0.309)	(0.747)	(0.659)	(0.556)
HH head participates in off-farm wage employment (1=yes)	0.149	0.160	0.145	-0.011	0.004	0.015
	(0.031)	(0.042)	(0.023)	(0.052)	(0.039)	(0.048)
No. of HH members	5.734	5.830	5.905	-0.096	-0.171	-0.075
	(0.270)	(0.214)	(0.128)	(0.342)	(0.297)	(0.247)
No. of organisations involved (0-12)	5.511	5.000	5.395	0.511	0.116	-0.395
	(0.349)	(0.239)	(0.191)	(0.420)	(0.395)	(0.304)
Father of HH head important in community (1=yes)	0.777	0.726	0.780	0.050	-0.003	-0.054
	(0.050)	(0.051)	(0.033)	(0.071)	(0.060)	(0.061)
Walking distance from homestead to nearest FTC (in min)	31.106	30.755	33.445	0.352	-2.338	-2.690
	(3.542)	(4.056)	(2.119)	(5.350)	(4.095)	(4.534)
No. of times talked to DA in the last 12 months	9.851	11.755	9.230	-1.904	0.621	2.525
	(2.243)	(1.687)	(1.369)	(2.789)	(2.607)	(2.157)
Attended agric. training in the last 12 months (1=yes)	0.628	0.613	0.600	0.014	0.028	0.013
	(0.067)	(0.053)	(0.036)	(0.085)	(0.075)	(0.064)
Basic assets score (0-4)	1.968	2.208	2.100	-0.239*	-0.132	0.108
	(0.097)	(0.086)	(0.077)	(0.129)	(0.123)	(0.115)
Radio owned (1=yes)	0.298	0.434	0.345	-0.136**	-0.047	0.089
	(0.047)	(0.047)	(0.035)	(0.066)	(0.058)	(0.059)
Food insecurity score (0-12)	1.489	0.962	1.230	0.527	0.259	-0.268
	(0.346)	(0.281)	(0.174)	(0.443)	(0.384)	(0.328)
Received support from social programs (1=yes)	0.191	0.226	0.220	-0.035	-0.029	0.006
	(0.046)	(0.062)	(0.035)	(0.077)	(0.057)	(0.071)
Total land size (in ha)	1.476	1.827	1.654	-0.351	-0.178	0.172
	(0.152)	(0.296)	(0.108)	(0.331)	(0.185)	(0.312)
No. of TLU owned	3.782	4.682	4.216	-0.900	-0.434	0.466
	(0.308)	(0.453)	(0.279)	(0.544)	(0.413)	(0.527)
No. of adopted quickwins (0-5)	2.660	2.708	2.635	-0.048	0.025	0.073
	(0.214)	(0.170)	(0.101)	(0.272)	(0.235)	(0.195)
Grows main crop (1=yes)	0.989	1.000	1.000	-0.011	-0.011	0.000
	(0.010)	(0.000)	(0.000)	(0.010)	(0.010)	(0.000)
N	94	106	200	200	294	306

Note: Total no. of observations N=400. FREG stands for "Farmer Research and Extension Group". HH stands for household. FTC stands for farmer training center. DA stands for development agent. Basic asset score comprises the following: hh has modern roof, improved stove, modern lighting, toilet facility. Calculation of food insecurity score based on self-experienced events of food insecurity, based on Household Food Insecurity Access Scale (HFIAS). TLU=Tropical livestock unit, conversion factors used for calculation: camel=1, horse=0.8, oxen/cow/mule=0.7, donkey=0.5, goat/sheep=0.1, chicken=0.01. Main crops are teff, wheat, barley, maize, sorghum. Robust standard errors in parentheses, clustered at the microwatershed level. Significance levels indicated as following: *** p<0.01, ** p<0.05, * p<0.1.

Table A7. Balance between treatment groups in non-FREG sample, composed of actual non-FREG farmers and matched controls

	T1	T2	C	T1 vs. T2	T1 vs. C	T2 vs. C
Gender HH head (1=male)	0.880	0.876	0.882	0.004	-0.002	-0.006
	(0.020)	(0.015)	(0.013)	(0.025)	(0.024)	(0.020)
Age HH head (in years)	45.834	46.109	46.299	-0.274	-0.465	-0.190
	(0.740)	(0.847)	(0.594)	(1.118)	(0.943)	(1.027)
No. of months HH head away	0.115	0.101	0.095	0.015	0.021	0.006
	(0.046)	(0.033)	(0.020)	(0.056)	(0.049)	(0.039)
HH head married (1=yes)	0.858	0.855	0.863	0.003	-0.005	-0.008
	(0.022)	(0.020)	(0.013)	(0.029)	(0.025)	(0.023)
Education HH head (completed grades)	1.981	2.282	2.070	-0.301	-0.089	0.212
	(0.275)	(0.254)	(0.157)	(0.372)	(0.314)	(0.296)
HH head participates in off-farm wage employment (1=yes)	0.123	0.178	0.151	-0.056	-0.028	0.028
	(0.018)	(0.030)	(0.015)	(0.035)	(0.024)	(0.033)
No. of HH members	5.317	5.393	5.399	-0.075	-0.081	-0.006
	(0.150)	(0.147)	(0.090)	(0.208)	(0.173)	(0.171)
No. of organisations involved (0-12)	4.399	4.310	4.362	0.089	0.037	-0.052
	(0.145)	(0.163)	(0.121)	(0.217)	(0.188)	(0.201)
Father of HH head important in community (1=yes)	0.666	0.656	0.650	0.010	0.016	0.006
	(0.034)	(0.035)	(0.026)	(0.049)	(0.042)	(0.043)
Walking distance from homestead to nearest FTC (in min)	33.304	33.330	34.790	-0.026	-1.486	-1.460
	(2.849)	(2.870)	(1.790)	(4.018)	(3.340)	(3.358)
No. of times talked to DA in the last 12 months	5.120	4.881	5.218	0.239	-0.098	-0.337
	(0.684)	(0.767)	(0.499)	(1.021)	(0.841)	(0.908)
Attended agric. training in the last 12 months (1=yes)	0.245	0.284	0.260	-0.039	-0.015	0.024
	(0.036)	(0.036)	(0.022)	(0.051)	(0.042)	(0.042)
Basic assets score (0-4)	1.769	1.866	1.826	-0.096	-0.056	0.040
	(0.079)	(0.085)	(0.049)	(0.115)	(0.093)	(0.097)
Radio owned (1=yes)	0.279	0.264	0.281	0.015	-0.003	-0.018
	(0.026)	(0.032)	(0.019)	(0.041)	(0.032)	(0.037)
Food insecurity score (0-12)	2.406	2.367	2.482	0.039	-0.076	-0.115
	(0.253)	(0.252)	(0.155)	(0.354)	(0.294)	(0.294)
Received support from social programs (1=yes)	0.159	0.204	0.182	-0.045	-0.023	0.022
	(0.039)	(0.053)	(0.027)	(0.065)	(0.047)	(0.059)
Total land size (in ha)	1.347	1.285	1.317	0.063	0.030	-0.032
	(0.138)	(0.095)	(0.064)	(0.166)	(0.150)	(0.114)
No. of TLU owned	3.198	3.324	3.298	-0.126	-0.100	0.026
	(0.236)	(0.182)	(0.152)	(0.296)	(0.279)	(0.236)
No. of adopted quickwins (0-5)	2.250	2.196	2.242	0.054	0.008	-0.045
	(0.127)	(0.111)	(0.092)	(0.168)	(0.156)	(0.144)
Grows main crop (1=yes)	0.950	0.961	0.971	-0.012	-0.022	-0.010
	(0.012)	(0.010)	(0.007)	(0.016)	(0.014)	(0.012)
N	416	387	803	803	1219	1190

Note: Total no. of observations N=1,606. FREG stands for "Farmer Research and Extension Group". HH stands for household. FTC stands for farmer training center. DA stands for development agent. Basic asset score comprises the following: hh has modern roof, improved stove, modern lighting, toilet facility. Calculation of food insecurity score based on self-experienced events of food insecurity, based on Household Food Insecurity Access Scale (HFIAS). TLU=Tropical livestock unit, conversion factors used for calculation: camel=1, horse=0.8, oxen/cow/mule=0.7, donkey=0.5, goat/sheep=0.1, chicken=0.01. Main crops are teff, wheat, barley, maize, sorghum. Robust standard errors in parentheses, clustered at the microwatershed level. Significance levels indicated as following: *** p<0.01, ** p<0.05, * p<0.1.

Figure A1. Histogram of estimated propensity score used for matching FREG members with control observations, using nearest-neighbor matching

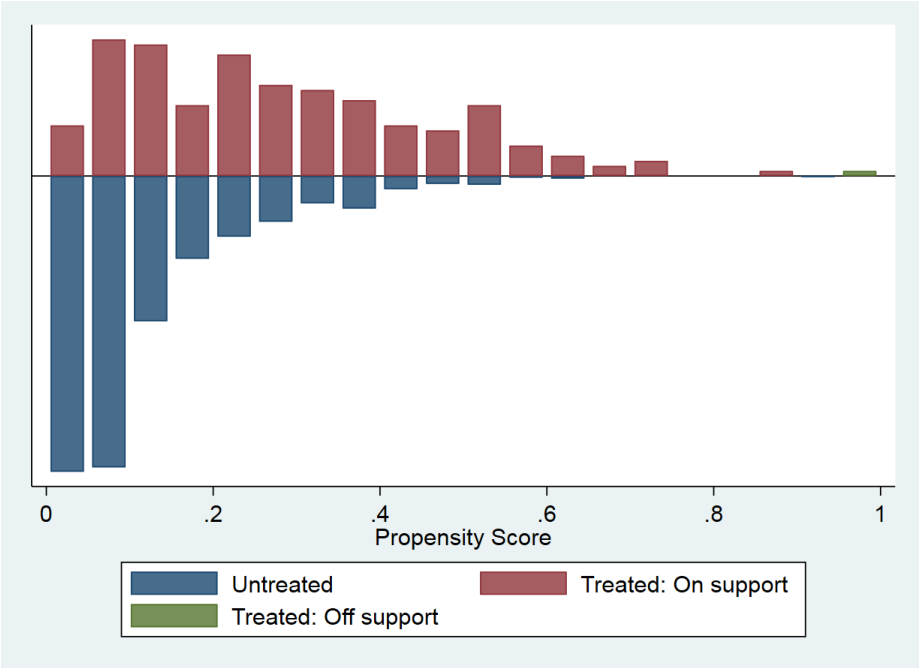


Figure A2. Sensitivity test ACME of overall knowledge (T1), no. of adopted practices

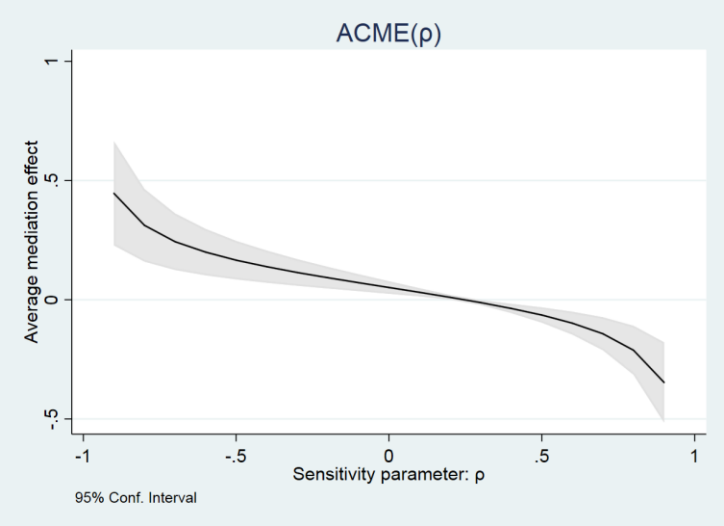


Figure A3. Sensitivity test ACME of overall knowledge (T2), no. of adopted practices

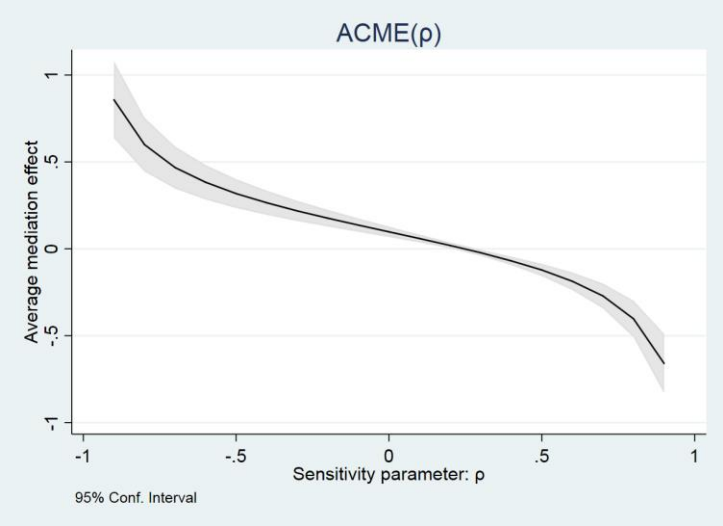


Figure A4. Sensitivity test ACME of overall knowledge (T1), integr. adoption

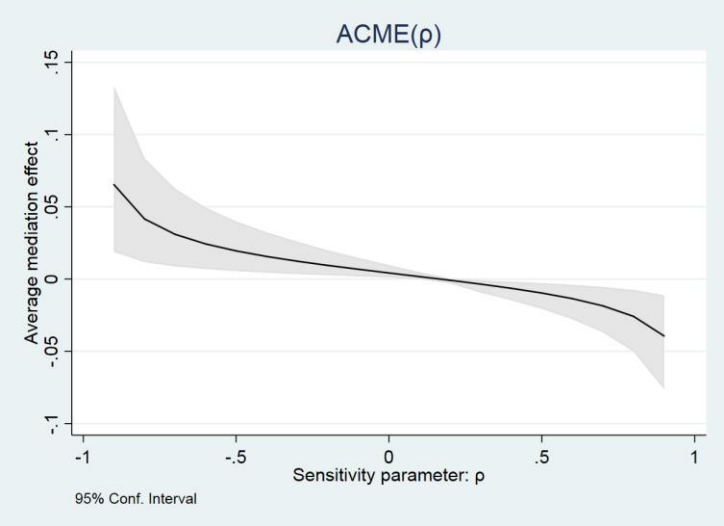


Figure A5. Sensitivity test ACME of overall knowledge (T2), integr. adoption

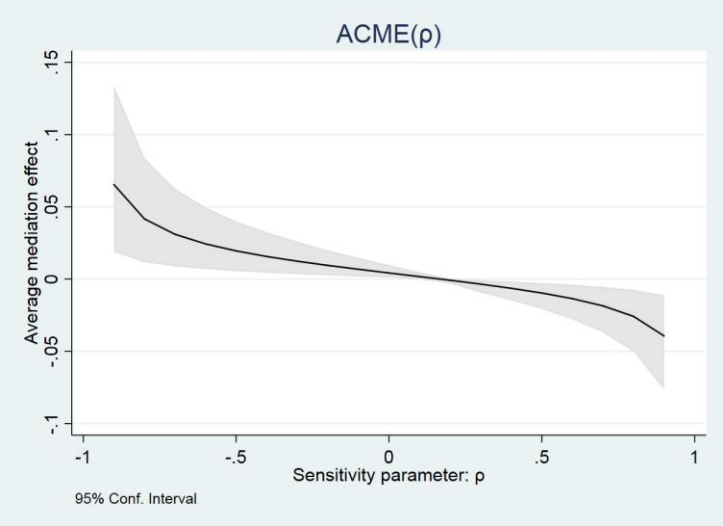


Figure A6. Sensitivity test ACME of prin. knowledge (T1), no. of adopted practices

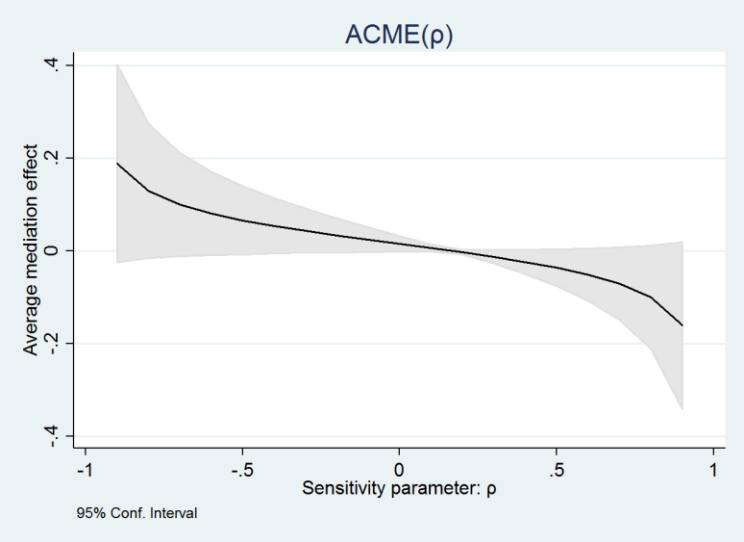


Figure A7. Sensitivity test ACME of prin. knowledge (T2), no. of adopted practices

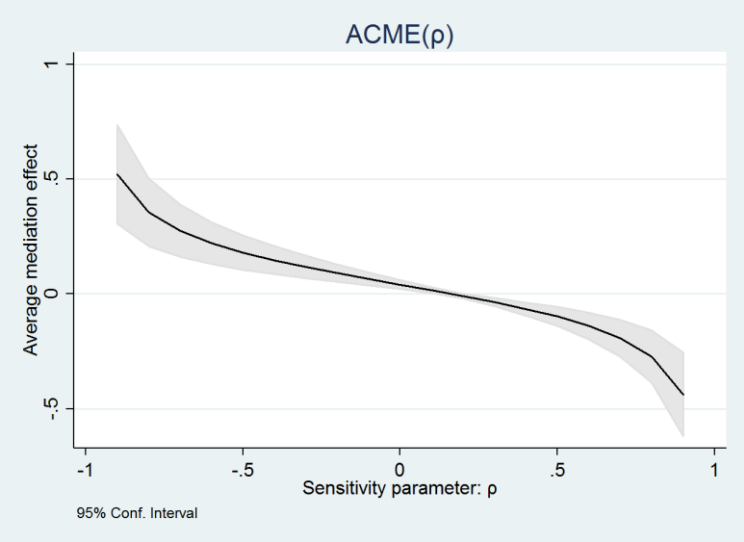


Figure A8. Sensitivity test ACME of prin. knowledge (T1), integr. adoption

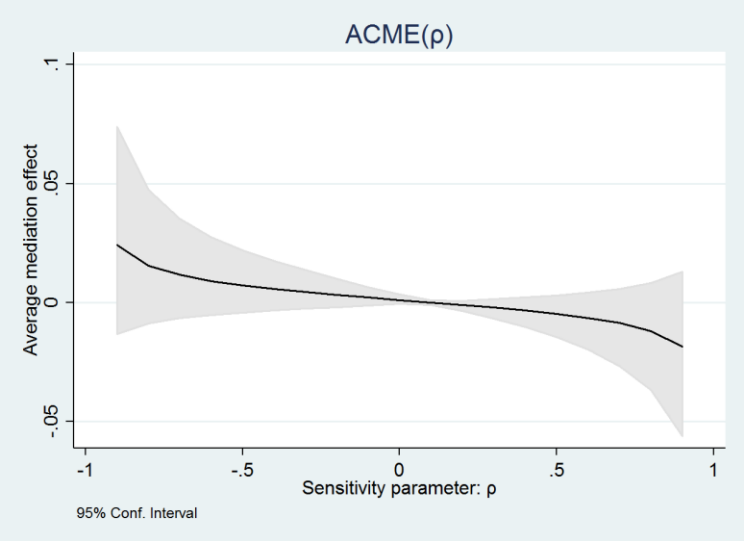


Figure A9. Sensitivity test ACME of prin. knowledge (T2), integr. adoption

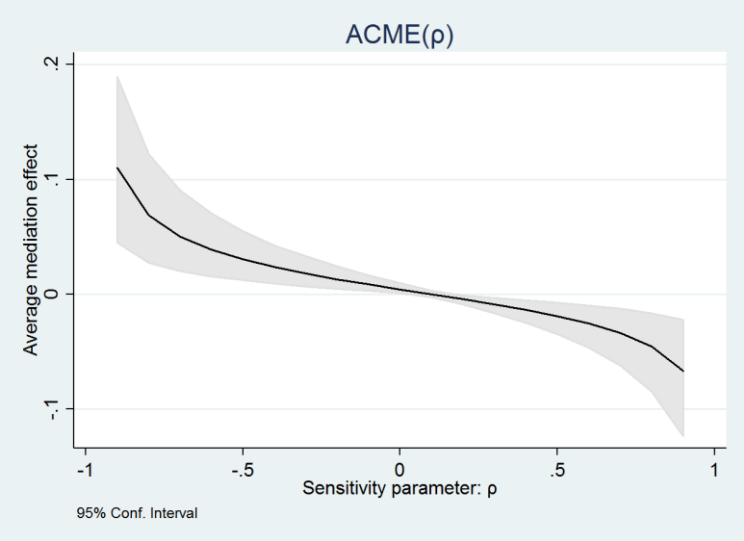


Figure A10. Sensitivity test ACME of how-to knowledge (T1), no. of adopted practices

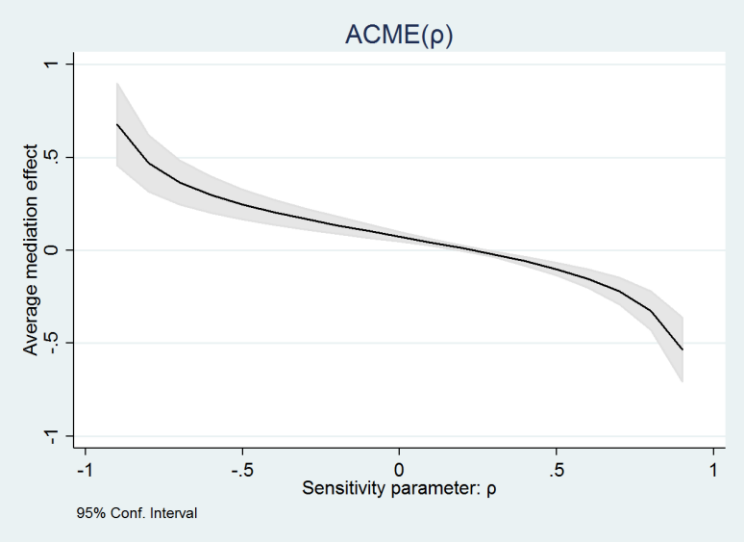


Figure A11. Sensitivity test ACME of how-to knowledge (T2), no. of adopted practices

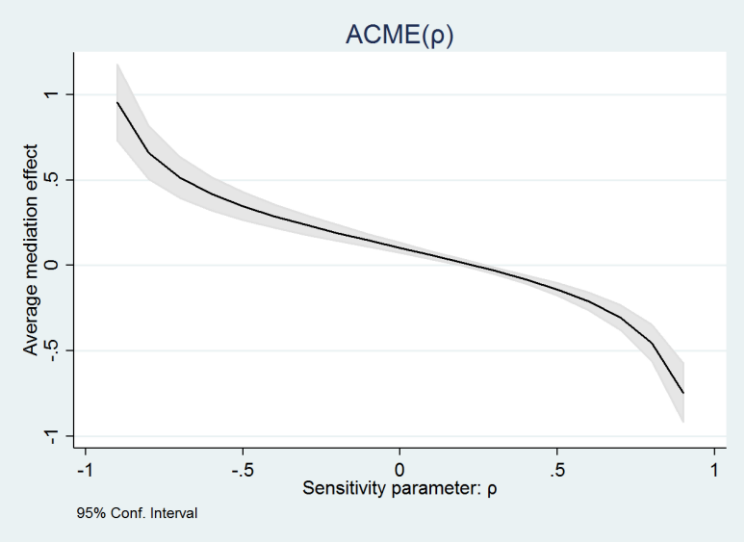


Figure A12. Sensitivity test ACME of how-to knowledge (T1), integr. adoption

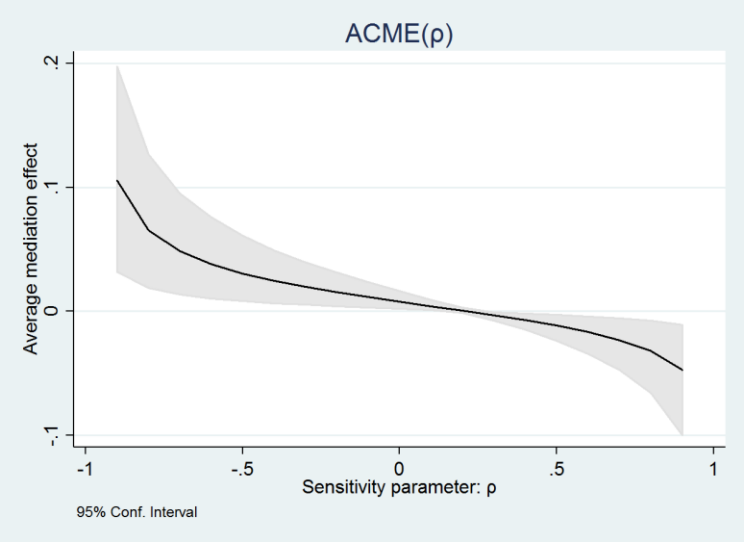
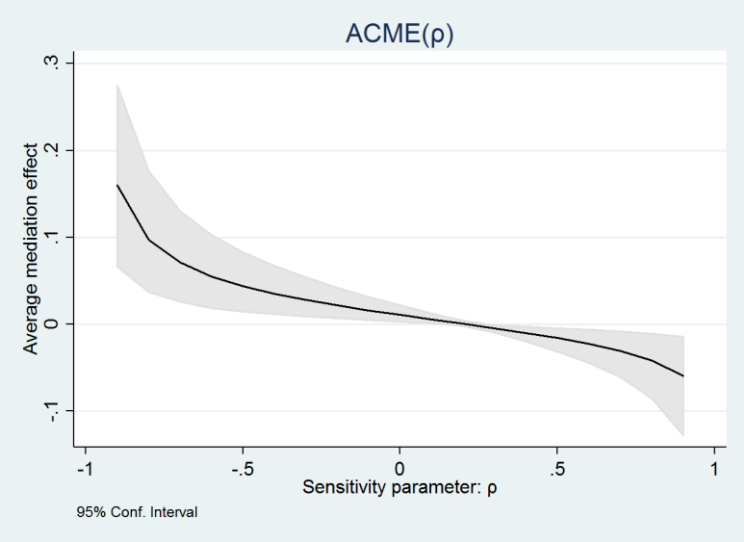


Figure A13. Sensitivity test ACME of how-to knowledge (T2), integr. adoption



Appendix B

B1. Compost Quality Index

Compost production process, comprises six components:

(1) Input mix: considered appropriate if farmers use at least three different materials to produce their compost, of which at least one is rich in nitrogen and one in carbon
(2) No. of times compost was turned: correct if compost was turned three times
(3) Days waited until compost was turned for the first time: correct is 30 day (acceptable range 25 to 35 days)
(4) Days until compost was finished: correct is 90 days (acceptable range 75 to 120 days)
(5) Stick or tube used for aeration of compost pit/heap? correct if yes
(6) Compost pit/heap covered? correct if yes

Compost end product, comprises three components:

(1) Compost color: correct if dark brown or black
(2) Compost odor: correct if described as good or neutral smell (on a scale from 0=very bad smell to 4=good smell (like good quality soil))
(3) Compost texture: correct if almost or fully decomposed (on a scale from 0=not at all decomposed to 5=fully decomposed)

B2. Knowledge Exam

Known by Memory

K1.) What are the most important components of integrated soil fertility management?
(open question)

Known by Name

K2.) Which of the following technologies have you heard of before this interview?
(list of several ISFM technologies read out)

How-to Knowledge

K3.) Imagine you buy improved seeds for wheat. For how many cropping seasons could you reuse them until you should purchase new ones?

Up to four cropping seasons *(correct)*
Five to eight cropping seasons
I can use them endlessly, no need to purchase again
Don't know

K4.) What are the three most important ingredients if you want to produce good-quality compost? *(open question; correct if mentions at least one nitrogen- and one carbon-rich material)*

K5.) What is the optimal sequence of layers to produce improved compost?
(choose the correct out of three pictures)

K6.) In order to produce good-quality compost, how many days should you wait at least until you turn the material? *(open question; correct: 30; acceptable range 25 to 35)*

K7.) In order to produce good-quality compost, how many times should you turn the materials in the pit or heap until the composting is finished? *(open question; correct: 3)*

K8.) If you seed maize in lines, how wide should the distance between lines usually be?
(open question, assessed with measurement tape; correct: 75 to 80 cm; acceptable range: 65 to 90 cm)

K9.) If you seed faba beans in lines, how wide should the distance between lines usually be?
(open question, assessed with measurement tape; correct: 30 to 40 cm; acceptable range: 25 to 45 cm)

Principles Knowledge

K10.) For which purpose/benefit should you use improved seeds?
(open question; correct if mentions at least two correct points, i.e. one beyond "higher crop yield")

K11.) What are the major advantages of blended fertilizer (NPS+/NPK+) over DAP fertilizer? Which statements are correct?

K11_1.) Blended fertilizer contains a greater number of nutrients than DAP. *(correct)*
K11_2.) Nutrient supply is better balanced in blended fertilizer than in DAP. *(correct)*
K11_3.) Blended fertilizer directly improves soil structure.
K11_4.) Blended fertilizer is more suitable for your location's soil type than DAP. *(correct)*
K11_5.) Blended fertilizer controls weeds and pathogens.

K12.) Why is it important to use compost/organic fertilizer?
(open question; correct if mentions at least three correct points, i.e. two beyond "higher crop yield")

K13.) What are the major advantages of line seeding over broadcasting? Which statements are correct?

K13_1.) Line seeding reduces the crops' competition for space, nutrients and water. *(correct)*
K13_2.) Seeding a crop in lines is faster than broadcasting.
K13_3.) Line seeding reduces soil acidity.
K13_4.) With line seeding usually less seeds are needed. *(correct)*
K13_5.) With line seeding less fertilizer is needed because it can be targeted directly to the roots. *(correct)*
K13_6.) Line seeding makes weeding and harvesting easier. *(correct)*
K13_7.) Line seeding has no advantages.

K14.) Why is it important to use inorganic fertilizer and compost at the same time? Which statements are correct?

K14_1.) It is always better to apply inorganic fertilizer only.
K14_2.) Because the soil needs both organic and inorganic nutrient sources to be healthy and fertile. *(correct)*
K14_3.) Less seeds are needed when using inorganic and organic fertilizer at the same time.

K15.) What are the important characteristics of a fertile soil?
(open question; correct if mentions at least three correct points)

K16.) What are the benefits of applying inorganic fertilizer in lines or by band/microdosing? Which statements are correct?

K16_1.) It has no benefits.
K16_2.) It is faster than broadcasting.
K16_3.) It leads to less leaching of nutrients because they are directly targeted to the roots. *(correct)*

B3. Formula p-value correction

$$p_{adj} = 1 - (1 - p(k))^{g(k)}$$

Where $g(k) = M^{(1-r(.k))}$, with

M as the number of tested outcomes in a family,

$r(.k)$ as mean correlation among all outcomes other than outcome *k*, and

$p(k)$ as the unadjusted p-value for the k^{th} outcome.

Source: McKenzie (2012b), based on Sankoh et al. (1997) and used in Aker et al. (2011).