

Online Appendix

Appendix A1 - Topics of Questions Asked and Push Calls
Appendix A2 - Randomisation Check
Appendix A3 - Effects on Sources of Information by Source and Decision Type
Appendix A4 - Components of Profit and Input Expenditure
Appendix A5 - Details of Sample Selection
Appendix A6 - Knowledge Index Questions
Appendix A7 - Balance for Peer Regressions
Appendix A8 - Characteristics of Attritors by Treatment Status
Appendix A9- Adjusting P-value for Family-wise Error Rate
Appendix A10 - Effects on Agricultural Knowledge
Appendix A11 - Heterogeneous Effects
Appendix A12 - Main Results by Sub-Treatments
Appendix A13 - Main Results with Unweighted Indices
Appendix A14 - Effects on Components of Cotton Index
Appendix A15 - Heterogeneity with Respect to Village Size
Appendix A16 - Result from WTP Experiments
Appendix A17 - Yield Results by Survey Round
Appendix A18 - Covariates used for Double Machine Learning
Appendix A19 - Effects on Sowing by Survey Round
Appendix A20 - Components of Summary Indices
Appendix A21 - Main Results by Survey Round
Appendix A22 - Examples of Q&A
Appendix A23 - Breakdown of Costs for AO Service
Appendix A24 - Spillover Effects

APPENDIX TABLE A1: TOPICS OF QUESTIONS ASKED AND PUSH CALLS

Cell Contents	No. of Questions		% of Total Questions		No. of Push Calls		% of Total Push Calls	
	Midline (1)	Endline (2)	Midline (3)	Endline (4)	Midline (5)	Endline (6)	Midline (7)	Endline (8)
<i>Panel A: By Crop</i>								
Cotton	679	960	0.50	0.46	30	59	0.68	0.62
Cumin	80	151	0.06	0.07	15	36	0.34	0.38
Wheat	26	43	0.02	0.02	11	27	0.25	0.28
<i>Panel B: By Theme</i>								
Pest Management	739	1126	0.54	0.54	23	73	0.52	0.77
Crop Planning	197	363	0.14	0.17	30	64	0.68	0.67
Fertiliser	106	154	0.08	0.07	13	32	0.30	0.34
Weather	66	88	0.05	0.04	10	26	0.23	0.27
Irrigation	12	21	0.01	0.01	2	5	0.05	0.05
N	1370	2079			44	95		

Notes:

This table reports information on push calls and questions asked on the AO server, categorized by crop and theme. All push calls contain information on multiple themes. A total of 95 push calls were sent out during September 2011- August 2013, with an average length of approximately 5 minutes. The midline survey took place between 4th June and 8th July 2012. The Endline survey took place between 23rd July and 30th August 2013.

APPENDIX A2: RANDOMISATION CHECK

	Treat vs. Control		
	No. of Variables Significantly Different from Control at Following Levels of Statistical Significance		
	1%	5%	10%
	(1)	(2)	(3)
<i>Panel A. Baseline</i>			
Variables with Imbalance	11	70	142
Total Number of Variables in Baseline	1643	1643	1643
Imbalance Percentage in Baseline	0.67%	4.26%	8.64%
<i>Panel B. Midline</i>			
Variables with Imbalance	130	197	294
Total Number of Variables in Midline	1655	1655	1655
Imbalance Percentage in Midline	7.85%	11.90%	17.76%
<i>Panel C. Endline</i>			
Variables with Imbalance	121	185	252
Total Number of Variables in Endline	1207	1207	1207
Imbalance Percentage in Endline	10.02%	15.33%	20.88%

Notes:

This tables reports balance tests between the combined treatment group (AO+AOE) and the control group (Columns 1-3) for all variables at Baseline survey (Panel A), Midline survey (Panel B), and Endline survey (Panel C). 'Variables with Imbalance' refers to the number of variables where the treatment group mean is significantly different from the control group mean at traditional levels of statistical significance. Columns 1 reports the corresponding number at the 1% level, Column 2 at the 5% level, and Column 3 at the 10% level. The 'Imbalance Percentage' refers to the number of variables where there is an imbalance between treatment and control over the total number of variables collected.

APPENDIX TABLE A3: EFFECTS ON SOURCES OF INFORMATION BY SOURCE AND DECISION TYPE

<i>Impact of AO on Information Sources Used</i>															
<i>Source of Information</i>	Past Experience			Mobile Phone-Based Information			Other Farmers			Input Dealers			Government Extension Workers		
Dependent Variable	Control Mean (Baseline) (1)	Treat-Control ITT (Midline) (2)	Treat-Control ITT (Endline) (3)	Control Mean (Baseline) (4)	Treat-Control ITT (Midline) (5)	Treat-Control ITT (Endline) (6)	Control Mean (Baseline) (7)	Treat-Control ITT (Midline) (8)	Treat-Control ITT (Endline) (9)	Control Mean (Baseline) (10)	Treat-Control ITT (Midline) (11)	Treat-Control ITT (Endline) (12)	Control Mean (Baseline) (13)	Treat-Control ITT (Midline) (14)	Treat-Control ITT (Endline) (15)
<i>Decision Type</i>															
Cotton Planting	0.020 [0.141]	0.008 (0.015)	0.008 (0.012)	0.000 [0.000]	0.074*** (0.010)	0.086*** (0.011)	0.296 [0.457]	0.017 (0.039)	0.034 (0.038)	0.080 [0.272]	-0.017 (0.023)	-0.010 (0.023)	0.005 [0.071]	0.004 (0.004)	0.004 (0.004)
Cotton Fertilisers	0.020 [0.142]	0.011 (0.010)	0.003 (0.012)	0.003 [0.051]	0.062*** (0.009)	0.071*** (0.010)	0.227 [0.419]	-0.001 (0.032)	0.035 (0.032)	0.099 [0.300]	0.015 (0.021)	0.050** (0.022)	0.003 [0.051]	0.000 (0.004)	0.003 (0.003)
Cotton Pesticides	0.023 [0.149]	-0.001 (0.013)	0.011 (0.012)	0.000 [0.000]	0.152*** (0.013)	0.162*** (0.014)	0.399 [0.490]	-0.031 (0.039)	0.007 (0.037)	0.440 [0.497]	-0.072* (0.041)	-0.037 (0.037)	0.003 [0.050]	-0.004 (0.004)	-0.004 (0.004)
Wheat Planting	0.008 [0.087]	-0.002 (0.008)	0.003 (0.007)	0.000 [0.000]	0.112*** (0.012)	0.022*** (0.007)	0.116 [0.320]	-0.016 (0.023)	0.004 (0.023)	0.023 [0.149]	-0.003 (0.011)	0.005 (0.011)	0.000 [0.000]	-0.005 (0.004)	0.000 (0.000)
Wheat Fertilisers	0.005 [0.071]	-0.003 (0.006)	0.003 (0.006)	0.000 [0.000]	0.014*** (0.004)	0.009** (0.004)	0.111 [0.314]	0.009 (0.021)	0.004 (0.021)	0.055 [0.229]	0.014 (0.015)	0.020 (0.014)	0.000 [0.000]	0.000 (0.000)	0.000 (0.000)
Wheat Pesticides	0.005 [0.071]	0.001 (0.004)	0.004 (0.005)	0.000 (0.000)	0.012*** (0.004)	0.003 (0.004)	0.023 [0.149]	0.004 (0.011)	-0.006 (0.010)	0.013 [0.112]	0.004 (0.010)	0.003 (0.008)	0.000 [0.000]	0.000 (0.000)	0.000 (0.000)
Cumin Planting	0.003 [0.050]	-0.002 (0.008)	-0.005 (0.007)	0.000 [0.000]	0.153*** (0.013)	0.049*** (0.009)	0.093 [0.291]	-0.019 (0.024)	-0.027 (0.023)	0.065 [0.247]	0.019 (0.018)	0.037** (0.017)	0.003 [0.050]	-0.003 (0.004)	0.003 (0.003)
Cumin Fertilisers	0.000 [0.000]	-0.008* (0.004)	-0.001 (0.002)	0.000 [0.000]	0.015*** (0.004)	0.016*** (0.006)	0.068 [0.252]	-0.005 (0.018)	0.020 (0.017)	0.025 [0.157]	-0.010 (0.011)	-0.000 (0.011)	0.000 [0.000]	0.000 (0.000)	0.000 (0.000)
Cumin Pesticides	0.005 [0.071]	0.000 (0.006)	0.002 (0.005)	0.000 [0.000]	0.029*** (0.006)	0.043*** (0.009)	0.126 [0.332]	0.001 (0.024)	0.018 (0.023)	0.133 [0.340]	-0.026 (0.027)	-0.003 (0.024)	0.000 [0.000]	0.000 (0.000)	0.000 (0.000)
N	398	2323	2280	398	2323	2280	398	2323	2280	398	2323	2280	398	2323	2280

Notes:

This table reports the impact of AO on usage of different information sources for agricultural decision-making over time. First, we asked survey participants if they received information for a particular decision making category. Then, participants were asked to name their most important source for this category. 'Treat' group refers to the 802 farmers that received access to AO. The midline survey took place between 4th June and 8th July 2012. The Endline survey took place between 23rd July and 30th August 2013. Column 1, 4, 7, and 10 provides the mean and standard deviation for the control group by information source at baseline. Columns 2-3, 5-6, 8-9, and 11-12 report the Intention to Treat (ITT) estimate of the difference in means (and robust standard error) between the treatment groups and control group by information source. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX TABLE A4: EFFECTS ON PROFIT AND COMPONENTS OF TOTAL INPUT COST

Dependent Variable	Control Mean (Baseline) (1)	Treat-Control ANCOVA (2)	Treat-Control Spillover (3)	Treat-Control DML (4)
Profit (Rupees)	1.38e+05 [1.39e+05]	5828.896 (4472.776)	6584.266 (4638.208)	3654.255 (4124.959)
Profit (Rupees, winsorized fraction = 0.01)	1.36e+05 [1.26e+05]	1915.998 (3534.125)	2490.148 (3593.720)	915.223 (3426.588)
Profit (Inverse Hyperbolic Sine)	11.726 [3.144]	-0.034 (0.213)	0.018 (0.214)	-0.085 (0.209)
Revenue from Cotton (Rupees, winsorized fraction = 0.01)	1.27e+05 [1.12e+05]	2972.373 (3074.024)	3379.585 (3143.335)	1591.468 (2993.073)
Revenues from Wheat (Rupees, winsorized fraction = 0.01)	1816.671 [8096.134]	46.484 (195.462)	22.579 (195.644)	62.214 (189.475)
Revenue from Cumin (Rupees, winsorized fraction = 0.01)	12012.765 [22764.602]	200.702 (869.345)	297.297 (878.078)	-671.620 (811.949)
Total Input Cost (Rupees)	22777.967 [19425.816]	2190.602** (874.868)	2312.271*** (894.435)	2147.236*** (765.424)
Total Input Cost (Rupees, winsorized fraction = 0.01)	22610.100 [18519.387]	1845.716** (722.518)	1863.003** (728.563)	1632.908** (693.432)
Total Input Cost (Inverse Hyperbolic Sine)	10.451 [0.741]	0.097 (0.078)	0.109 (0.080)	0.107 (0.078)
Total Irrigation Cost (Rupees)	5815.741 [9312.762]	1013.030*** (346.955)	1035.454*** (352.520)	1060.972*** (337.374)
Total Irrigation Cost (Rupees, winsorized fraction = 0.01)	5656.316 [8514.462]	893.888*** (318.208)	920.105*** (323.870)	956.770*** (311.313)
Total Irrigation Cost (Inverse Hyperbolic Sine)	5.199 [4.810]	0.338 (0.208)	0.368* (0.211)	0.330 (0.207)
Total Seed Cost (Rupees)	2932.613 [4880.575]	563.217*** (182.318)	551.992*** (183.767)	479.413*** (169.566)
Total Fertiliser Cost (Rupees)	10204.043 [10146.126]	457.208 (512.572)	513.985 (517.611)	199.577 (424.223)
Total Pesticide cost (Rupees)	2559.099 [3043.068]	169.616 (161.729)	229.704 (164.061)	186.638 (147.412)
Total Hired Labour Cost (Rupees)	1266.471 [1258.352]	84.790* (43.397)	82.313** (41.225)	72.703* (40.963)
N	398	2203	2203	2203

Notes:

This table reports the impact of AO on varying measures of profit and input costs. 'Treat' group refers to the 802 farmers that received access to AO. Column 1 provides the mean and standard deviation for the control group at baseline. Column 2 reports the treatment effect estimate from an ANCOVA specification. Column 3 uses the ANCOVA specification and controls for the baseline treatment status of a respondent's peer group to assess spillover effects. Column 4 reports the ANCOVA specification and uses double ML to pick an optimal set of control variables. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX TABLE A5: DETAILS ON SAMPLE SELECTION

A previous pilot of the technology conducted by the computer scientist who developed the technology (Neil Patel) and the discussions with our NGO partner led us to focus on cotton cultivation, because farmers expressed demand for frequent information in addressing pest shocks. Our partner recommended working in Surendranagar district of Gujarat, where they had relationships with farmers in 7 talukas (a taluka is a sub-district level administrative unit) at the time and where cotton cultivation was widespread.

The NGO's covered 223 villages in Surendranagar in total, with the two largest blocks (Chotila and Sayla) comprising of 156 (70%) of these villages. As such, we focused our study on these two blocks, because they are the main areas of operation of our partner NGO and because their geographic proximity allowed us to minimize travel costs.

For sample selection, crops and the nature of the intervention meant that our respondent had to meet the following selection criteria:

1. Be the agricultural decision-maker of the household
2. Own or have regular access to a mobile phone
3. Intend to grow cotton in the upcoming season

We chose villages where we had support from the extension volunteers (EV) of our NGO partner, adequate mobile networks and a large enough village to list enough cotton farmers from which we could randomize. We worked with our NGO partner to identify these villages.

Based on this criteria, we listed, on average, about 40 people in 40 villages in Sayla and Chotila talukas (the minimum was 44 and the maximum was 62). During May to early June 2011, we informed the EV about our selection criteria and they took us to those households or gave us the geographic makeup of the village. We then spent two to three days in each village assembling a list of respondents from each village.

Our survey team canvassed door-to-door for this listing, but also collected information on farmers they met outside of homes, who reported they were from the village. This listing exercise produced a total of 2,586 farmers: 1450 farmers in Chotila taluka and 1136 farmers in Sayla taluka. We then randomly picked 30 farmers in each village from this frame.

APPENDIX A6: KNOWLEDGE INDEX QUESTIONS

The following are the agricultural questions used to gauge agricultural knowledge. The analysis of this index is presented in Table 6.

A. General

- Q1. Which essential plant nutrients does urea contain?
- Q2. Which is the best fertiliser for adding phosphorus in the soil?
- Q3. If you had the option of using 50 kg (1 bag) of diammonium phosphate (DAP) or 50 kg (1 bag) of 20-20-20 grade NPK fertiliser, which would you use to add phosphorus to the soil?
- Q4. Which is the best fertiliser for adding potash in the soil?
- Q5. If you had the option of using 50kg (1 bag) of muriate of potash or 50kg (1 bag) of 12-32-36 grade NPK fertiliser, which would you use to add potash in the soil?
- Q6. Which is the best fertiliser for adding sulphur in the soil?
- Q7. If you had the option of using 50 kg of ammonium sulphate or 50 kg of sulphur fertiliser, which would you use to add sulphur to the soil?
- Q8. When mixing pesticides in the pump, do you add powder concentrate or liquid concentrate first?

B. Cotton-Related Questions

- Q1. What types of pests does BT cotton provide resistance against?
- Q2. Do you know what a pheromone trap is?
- Q3. What is the use of a pheromone trap in agriculture?
- Q4. After the flowering stage, which type of fertilisers should you spray for good development of bolls and to stop falling of flower buds?
- Q5. During the flowering stage, which fertilizer should you spray to stop yellowing of plants and to increase production?
- Q6. Monocrotophos is used to control which pests?
- Q7. Have you heard of Imidachlorpid (or Confidor/Tatamida/Imidagold)
- Q8. Imidachlorpid (or Confidor/Tatamida/Imidagold) is used to control which pests?
- Q9. Have you heard of acetamaprid?
- Q10. Acetamaprid is used to control which pests?
- Q11. Which pests is acephate pesticide used to control ?
- Q12. If you had the option of using 1 litre of prophanophos or 1 litre of monocrotophos to treat Mealybug in cotton, which would you use?
- Q13. If you had the option of using 1 litre of acetamaprid or 1 litre of monocrotophos to treat Whitefly in cotton, which would you use?
- Q14. If you had the option of using 1 litre of imidachlorpid or 1 litre of monocrotophos to treat Leaf Curl or Aphid in cotton, which would you use?
- Q15. If you had the option of using 1 litre of dithan or 1 litre of monocrotophos to treat Wilt disease in cotton, which would you use?
- Q16. Which fungus or bio-product can be used with compost as a seed treatment or soil application to control Wilt disease?

C. Wheat Related Questions

- Q1. What is the ideal time period for sowing of wheat?
- Q2. For those practicing late sowing, wheat crop should be planted by when at the latest?
- Q3. Which disease affects the grain quality, and ultimately the price of wheat grains
- Q4. Which variety of wheat is recommended in Gujarat for those practicing late sowing?
- Q5. What is the recommended dose of nitrogen in irrigated wheat?
- Q6. What is the recommended dose of phosphorus in irrigated wheat?
- Q7. After the first irrigation at the time of sowing, when should the next irrigation for wheat take place?

D. Cumin -Related Questions

- Q1. Which recommended varieties of cumin are resistant to wilt?
- Q2. What is the best time for planting cumin?
- Q3. What should be done to cumin seeds before sowing to prevent fungal diseases?
- Q4. What is the recommended dose of nitrogen for cumin?
- Q5. Which fungicide is used to control the harmful effects of Wilt disease in cumin?
- Q6. If you had the option of 1 kg of mancozeb or 1 liter of monocrotophos, which would you use to treat Wilt disease in cumin?
- Q7. If you had the option of 1 kg of sulphur or 1 liter of monocrotophos, which would you use to treat powdery mildew in cumin?
- Q8. Which herbicide is used to control weed growth in cumin?
- Q9. Which fungus or bio-product can be used as a seed treatment or soil application to control Wilt disease in cumin?

APPENDIX TABLE A7: BALANCE FOR PEER REGRESSIONS

Dependent Variable	Study Respondents		Non-Study Respondents	
	Control Peer Group Mean	Fraction of Peers Treated	Control Peer Group Mean	Fraction of Peers Treated
	(1)	(2)	(3)	(4)
<i>Panel A: Sample Size</i>				
Entire Sample	266	1200	393	1114
<i>Panel A: Individual Characteristics</i>				
Age	36.241 (10.526)	-0.247 (1.395)	33.232 (9.706)	0.226 (0.715)
Years of Education	4.237 (3.873)	-0.724 (0.511)	5.321 (4.217)	-0.017 (0.317)
Landholdings- Acres	6.344 (5.915)	-1.095 (0.753)	6.681 (10.534)	0.287 (0.627)
<i>Panel B: Agricultural Activity</i>				
Planted Cotton	0.985 (0.124)	0.006 (0.017)	0.781 (0.414)	0.026 (0.026)
Index of Mobile Phone-Based Information Usage (standard deviation units)	-0.026 (0.699)	-0.005 (0.176)	0.000 (1.000)	0.021 (0.066)
Pesticide Management (Standard deviation units)	0.010 (1.014)	-0.047 (0.126)	0.000 (1.000)	0.037 (0.064)
Seed Management (Standard deviation units)	-0.001 (1.002)	0.102 (0.129)	-	-
Fertiliser Management (Standard deviation units)	-0.003 (1.050)	-0.062 (0.131)	-	-
Cotton Management (Standard deviation units)	0.045 (1.043)	-0.044 (0.132)	-	-
Wheat Management (Standard deviation units)	-0.051 (0.944)	0.152 (0.121)	-	-
Cumin Management (Standard deviation units)	-0.050 (0.929)	0.001 (0.118)	-	-
N	259	1200	393 †	1114

Notes:

This table assesses whether the fraction of one's peers assigned to the treatment group is independent of observable characteristics preceeding the treatment. Column 1 reports the mean and standard deviation for all study respondents who did not reference peers -who were subsequently assigned to a treatment group. Column 3 reports the mean and standard deviation for peers who were not respondents in the main study and who were not referenced by a treatment respondent. Columns 2 and 4 report the coefficient on the number of peers who were assigned to the treatment group, from a regression of the characteristic in question on this variable. The regression specifications in Columns 2 and 4 include dummies for the number of peers referenced and village fixed effects. See Appendix Table A20 for details on components of indices. † The sample size for age and education in column 3 is 293 due to missing data. Asterisks denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX TABLE A8: CHARACTERISTICS
OF ATTRITORS BY TREATMENT STATUS

Dependent Variable	Control Mean (Midline) (1)	Treat-Control (Midline) (2)	Control Mean (Endline) (3)	Treat-Control (Endline) (4)
Age of Household Head	44.174 (11.116)	1.151 (3.791)	47.090 (13.173)	-1.467 (2.819)
Years of Education	2.696 (3.470)	0.865 (1.243)	4.077 (4.138)	-0.086 (0.989)
Profit From Agriculture (Rupees, winsorized fraction = 0.01)	1.22E+05 (171000)	55238.051 (56376.051)	1.50e+05 (1.56e+05)	43314.016 (39163.012)
Planted Cotton	1.000 (0.000)	-0.045 (0.056)	0.974 (0.160)	0.014 (0.034)
Total Area, Cotton (Acres)	4.304 (4.085)	0.663 (0.824)	4.859 (4.454)	1.216 (0.914)
Planted Wheat	0.826 (0.388)	-0.285 (0.184)	0.744 (0.442)	-0.054 (0.109)
Total Area, Wheat (Acres)	1.617 (1.892)	-0.350 (0.655)	1.121 (1.555)	-0.278 (0.291)
Planted Cumin	0.391 (0.499)	-0.024 (0.172)	0.308 (0.468)	0.114 (0.115)
Total Area, Cumin (Acres)	1.449 (3.307)	-0.886 (1.123)	0.559 (1.388)	0.082 (0.310)
N	23	77	39	120

Notes:

This table compares baseline characteristics of attritors from the midline and endline. Columns 1-2 compare baseline characteristics (from 2010) for the 23 control group respondents, and 54 treatment group respondents were not reached during the midline survey. Columns 3-4 compare baseline characteristics for the 39 control group respondents, and 81 respondents were not reached during the endline survey. The midline survey took place between 4th June and 8th July 2012. The Endline survey took place between 23rd July and 30th August 2013. Asterisks denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX A9: ADJUSTING P-VALUES FOR FAMILY-WISE ERROR RATE

Specification	Outcome	Coefficient	Standard Error	Asymptotic P-value	WY P-value	BH P-value
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<i>Panel A: Main Outcomes</i>						
ANCOVA	Information Sources	5.543	0.246	0.000	0.000	0.000
Spillover	Information Sources	5.678	0.252	0.000	0.000	0.000
DML	Information Sources	5.606	0.246	0.000	0.000	0.000
ANCOVA	Input Management	0.147	0.087	0.091	0.346	0.623
Spillover	Input Management	0.163	0.088	0.062	0.286	0.623
DML	Input Management	0.133	0.085	0.119	0.390	0.623
ANCOVA	Yield	0.008	0.034	0.816	0.942	1.000
Spillover	Yield	0.011	0.035	0.741	0.898	1.000
DML	Yield	0.002	0.033	0.955	0.952	1.000
ANCOVA	Knowledge	0.350	0.232	0.132	0.390	0.623
Spillover	Knowledge	0.426	0.234	0.069	0.318	0.623
DML	Knowledge	0.411	0.222	0.064	0.312	0.623
ANCOVA	Overall	0.681	0.348	0.051	0.262	0.559
Spillover	Overall	0.633	0.351	0.071	0.318	0.623
DML	Overall	0.737	0.345	0.033	0.184	0.390
<i>Panel B: Input Related Outcomes</i>						
ANCOVA	Cotton Management	0.125	0.065	0.054	0.356	0.869
Spillover	Cotton Management	0.147	0.066	0.026	0.182	0.445
DML	Cotton Management	0.109	0.064	0.088	0.460	1.000
ANCOVA	Cumin Management	0.077	0.135	0.569	0.844	1.000
Spillover	Cumin Management	0.088	0.136	0.518	0.844	1.000
DML	Cumin Management	0.087	0.134	0.517	0.844	1.000
ANCOVA	Wheat Management	0.112	0.144	0.439	0.842	1.000
Spillover	Wheat Management	0.090	0.145	0.535	0.844	1.000
DML	Wheat Management	0.134	0.143	0.350	0.790	1.000
ANCOVA	Seed Management	0.091	0.048	0.058	0.358	0.869
Spillover	Seed Management	0.113	0.048	0.019	0.132	0.336
DML	Seed Management	0.077	0.047	0.103	0.486	1.000
ANCOVA	Pesticide Management	0.050	0.058	0.390	0.830	1.000
Spillover	Pesticide Management	0.069	0.059	0.241	0.708	1.000
DML	Pesticide Management	0.043	0.057	0.447	0.844	1.000
ANCOVA	Fertiliser Management	0.129	0.123	0.293	0.772	1.000
Spillover	Fertiliser Management	0.126	0.124	0.309	0.790	1.000
DML	Fertiliser Management	0.147	0.122	0.227	0.708	1.000

Notes :The table above reports asymptotic p-values (col 3), p-values adjusted using the Westfall-Young method (col 6) and the Bonferroni Holm method (col 7). The WY method uses 500 simulations. Panel A focuses on a set of 15 main comparisons, while Panel B focuses on the family of comparisons relating to input use. Definitions of indices in Panel B are provided in Appendix A20. In Panel A, 'Yield' refers to a normalized index of cotton, cumin, and wheat yields. 'Input Management' aggregates all the constituent variables from the indices in Panel B (i.e. all input recommendations across crops and input types). 'Overall' in Panel A, is a normalized index of all the constituent variables of 'Input Management', 'Information Sources', 'Yield' and 'Knowledge'. in Panel A. 'Information Sources' is a normalized index that aggregates mobile phone use across crop decision, soil preparation, pest management, weather, cotton pesticides, cotton fertilisers, wheat fertilisers, cumin pesticides, and cumin fertilisers. 'Knowledge' is a measure of agricultural knowledge, where respondents were asked 44 questions across crop and topic and a knowledge score was computed based on the proportion of correct answers (See Appendix A6 for the full list of questions). Note, all components of aggregate indices are weighted by the inverse of the covariance matrix (Anderson, 2008).

APPENDIX TABLE A10: EFFECT ON AGRICULTURAL KNOWLEDGE

Dependent Variable	Control Mean (Baseline) (1)	Treat-Control ANCOVA (2)	Treat-Control Spillover (3)	Treat-Control DML (4)
All Questions (44 questions) N	14.156 [5.279] 398	0.350 (0.232) 2203	0.426* (0.234) 2203	0.411* (0.222) 2203
Cotton-related (20 questions) N	4.774 [2.061] 398	0.199 (0.132) 2203	0.262** (0.133) 2203	0.251** (0.126) 2203
Wheat-related (7 questions) N	3.419 [1.629] 310	0.149* (0.086) 1168	0.123 (0.088) 1168	0.147* (0.085) 1168
Cumin-related (9 questions) N	5.164 [1.791] 171	-0.086 (0.128) 675	-0.027 (0.134) 675	-0.127 (0.122) 675
Pesticide-related (8 questions) N	0.887 [0.717] 398	0.075 (0.067) 2203	0.100 (0.067) 2203	0.099 (0.065) 2203
Fertiliser-related (3 questions) N	0.606 [0.656] 398	0.031 (0.033) 2203	0.025 (0.033) 2203	0.036 (0.032) 2203

Notes:

This table reports the effect of AO on respondents' agricultural knowledge. Respondents were asked agricultural questions across crop and topic, and a knowledge score was computed based on the proportion of correct answers. The question categories are not mutually exclusive. `Treat' group refers to the 802 farmers that received access to AO. Column 1 provides the mean and standard deviation for the control group at baseline. Column 2 reports the treatment effect estimate from an ANCOVA specification. Column 3 uses the ANCOVA specification and controls for the baseline treatment status of a respondent's peer group to assess spillover effects. Column 4 reports the ANCOVA specification and uses double ML to pick an optimal set of control variables. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX TABLE A11: HETEROGENEOUS EFFECTS BY EDUCATION AND INCOME

Dependent Variable	Education		Income		
	Control Mean	Treat	Treat*Educ	Treat	Treat*Income
	(1)	(2)	(3)	(4)	(5)
Panel A: AO Usage					
Called AO line	0.000 [0.000]	0.778*** (0.016)	-0.011 (0.023)	0.755*** (0.018)	0.029 (0.023)
Total Incoming AO Usage (Minutes)	0.000 [0.000]	112.202*** (12.449)	34.057 (22.474)	95.714*** (10.819)	59.589*** (20.736)
N	398	2203		2203	
Panel B: Indices of Input-related Practices (standard deviation units)					
Cotton Management	0.000 [1.000]	0.125 (0.092)	0.005 (0.132)	-0.007 (0.102)	0.238* (0.136)
Wheat Management	0.000 [1.000]	-0.101 (0.219)	0.383 (0.296)	-0.216 (0.238)	0.560* (0.304)
Cumin Management	0.000 [1.000]	0.027 (0.206)	0.102 (0.276)	0.188 (0.203)	-0.193 (0.279)
Total Correct Answers (44 questions)	14.156 [5.279]	0.543 (0.348)	-0.249 (0.463)	0.672* (0.359)	-0.515 (0.475)
N	398	2203		2203	
Panel C: Agricultural Productivity					
Profit From Agriculture (Rupees, winsorized fraction = 0.01)	1.36e+05 [1.26e+05]	9640.480* (5234.158)	-1.41e+04* (7193.183)	1518.482 (4484.537)	967.351 (6905.483)
N	398	2203		2203	
Cotton Yield (kg/acre)	694.818 [468.751]	16.777 (21.192)	-24.015 (29.391)	3.814 (22.017)	-0.393 (29.030)
N	392	2093		2093	
Wheat Yield (kg/acre)	981.132 [702.002]	25.588 (68.405)	-92.569 (92.473)	-31.962 (72.536)	17.975 (89.788)
N	309	681		681	
Cumin Yield (kg/acre)	172.570 [191.017]	1.181 (25.309)	2.517 (33.188)	30.354 (26.506)	-37.715 (32.758)
N	169	402		402	

Notes:

This table tests for heterogeneity in the treatment effect across baseline levels of education and income. All indices aggregates a set of components normalized by the control group and then weighted by the inverse of the covariance matrix of the components as in Anderson (2008). Management practices indices: seed usage + pesticide purchase + pesticide usage +fertiliser purchase + fertiliser usage +for the three different crops – cotton, wheat, and cumin. (See Appendix Table A20 for index details). Education and income are all collected during the Baseline survey, which took place in June 2011. Income refers to agricultural income for the past 12 months. Columns 2 and 3 report estimates from an ANCOVA specification with an interaction between a dummy for above median education (Educ) and Treat. Columns 4 and 5 report estimates from an analogous specification for above median income. All regressions include survey round fixed effects and village fixed effects. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX TABLE A12: MAIN OUTCOMES BY SUB-TREATMENT ARMS

Dependent Variable	Control Mean (Baseline) (1)	AOE-Control ANCOVA (2)	AO-Control ANCOVA (3)	AOE-AO ANCOVA (4)	Reminder-Control ANCOVA (5)	Reminder-Treat ANCOVA (6)
Incoming AO Usage + Push Calls listened (minutes)	0.000 [0.000]	341.871*** (18.907)	289.187*** (10.032)	54.083*** (20.890)	346.557*** (16.340)	80.075*** (19.197)
Index of Mobile Phone-Based Information Usage (standard deviation units)	0.000 [1.000]	6.059*** (0.335)	5.060*** (0.315)	1.085** (0.433)	5.416*** (0.298)	-0.438 (0.460)
Cotton Management (Standard deviation units)	0.000 [1.000]	0.143* (0.075)	0.101 (0.076)	0.034 (0.078)	0.188** (0.073)	0.157* (0.083)
Wheat Management (Standard deviation units)	0.000 [1.000]	0.109 (0.165)	0.096 (0.169)	0.036 (0.168)	0.185 (0.160)	0.176 (0.183)
Cumin Management (Standard deviation units)	0.000 [1.000]	-0.024 (0.156)	0.182 (0.155)	-0.213 (0.155)	-0.005 (0.150)	-0.166 (0.170)
Seed Management (Standard deviation units)	0.000 [1.000]	0.116** (0.057)	0.067 (0.056)	0.060 (0.058)	0.113** (0.054)	0.056 (0.063)
Pesticide Management (Standard deviation units)	0.000 [1.000]	0.030 (0.067)	0.067 (0.069)	-0.037 (0.071)	0.089 (0.066)	0.122 (0.076)
Fertiliser Management (Standard deviation units)	0.000 [1.000]	0.083 (0.142)	0.163 (0.145)	-0.105 (0.150)	0.130 (0.138)	0.012 (0.164)
Total Correct Answers to Questions (44 questions)	14.156 [5.279]	0.213 (0.264)	0.476* (0.276)	-0.229 (0.277)	0.349 (0.260)	0.033 (0.302)
Cotton Yield (kg/acre)	694.818 [468.751]	5.638 (16.104)	0.363 (16.693)	4.005 (16.451)	15.432 (15.777)	29.379* (17.600)
N (Cotton Yield)	392	1411	1380	1395	1578	1395
Wheat Yield (kg/acre)	981.132 [702.002]	-35.530 (55.595)	-8.844 (54.826)	4.834 (63.425)	-75.817 (48.360)	-137.279* (76.814)
N (Wheat Yield)	309	446	459	454	515	454
Cumin Yield (kg/acre)	172.570 [191.017]	-13.459 (16.495)	21.221 (18.719)	-22.219 (18.067)	6.430 (16.258)	17.042 (19.780)
N (Cumin Yield)	169	281	267	251	324	251
Total Input Expenditure (Rupees, winsorized fraction = 0.01)	22610.100 [18519.387]	2431.128*** (845.252)	1228.632 (836.921)	1360.193 (867.210)	2061.854** (812.983)	627.876 (981.322)
Total Irrigation Expenditure (Rupees, winsorized fraction = 0.01)	5656.316 [8514.462]	1218.607*** (381.003)	524.667 (365.921)	705.227* (391.954)	1090.705*** (367.550)	505.547 (427.526)
Profit From Agriculture (Rupees, winsorized fraction = 0.01)	1.36e+05 [1.26e+05]	5589.680 (4208.889)	-1396.358 (4012.438)	6979.154 (4279.307)	1508.470 (3998.574)	-359.737 (4530.958)
N	398	1480	1457	1469	1659	1469

Notes:

This table reports treatment effects using an ANCOVA specification for the sub-treatment arms. The results use data from both the Midline survey and the Endline survey. The indices aggregate information over multiple outcomes for which we expect unidirectional treatment effects. Each index consists of the average of the z-scores for each component of the index, with the control group mean and standard deviation as reference. The component scores are then weighted by the inverse of the covariance matrix of the components as in Anderson (2008). Mobile phone-based information usage index: Aggregates mobile phone use across crop decision, soil preparation, pest management, weather, cotton pesticides, cotton fertilisers, wheat fertilisers, cumin pesticides, and cumin fertilisers. Pesticide management index: dummy to indicate purchase/use of recommended pesticides. Fertiliser management index: dummy to indicate purchase/use of recommended fertilisers. Seed management index: dummy to indicate purchase/use of recommended seeds. (See Appendix Table A20 for index details). Specifically, Column 1 reports the control mean at baseline, Column 2 reports the difference between the AOE group and control, Column 3 reports the difference between the AO group and control, Column 4 reports the difference between the AOE and AO groups, and Column 5 reports the difference between the subset of treatment respondents who received biweekly reminders and control. Column 6 restricts attention to treated respondents and compare those who received reminders to those who did not. All estimates use both the Midline and Endline data. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX TABLE A13: TREATMENT EFFECTS USING UNWEIGHTED INDICES

Dependent Variable	Control Mean (Baseline) (1)	Treat-Control ANCOVA (2)	Treat-Control Spillover (3)	Treat-Control DML (4)
Index of Mobile Phone-Based Information Usage (standard deviation units)	-0.000 [0.704]	3.545*** (0.158)	3.632*** (0.162)	3.586*** (0.158)
Cotton Management (Standard deviation units)	-0.001 [0.285]	0.038** (0.018)	0.045** (0.019)	0.036** (0.018)
Cumin Management (Standard deviation units)	-0.006 [0.364]	0.005 (0.034)	0.017 (0.034)	-0.002 (0.033)
Wheat Management (Standard deviation units)	-0.000 [0.428]	0.038 (0.038)	0.033 (0.038)	0.042 (0.037)
Seed Management (Standard deviation units)	-0.000 [0.281]	0.025* (0.015)	0.031** (0.015)	0.021 (0.015)
Fertiliser Management (Standard deviation units)	-0.000 [0.319]	0.030 (0.027)	0.031 (0.027)	0.028 (0.027)
Pesticide Management (Standard deviation units)	-0.004 [0.343]	0.016 (0.027)	0.027 (0.027)	0.008 (0.027)
N	398	2203	2203	2203

Notes:

This table reports the impact of AO on sources of information for agricultural decision-making, input decisions for seeds, pesticides, and fertilisers. All indices use unweighted components. The results use data from both the Midline survey and the Endline survey. The indices aggregate information over multiple outcomes for which we expect unidirectional treatment effects. Each index consists of the average of the z-scores for each component of the index, with the control group mean and standard deviation as reference. Mobile phone-based information usage index: Aggregates mobile phone use across crop decision, soil preparation, pest management, weather, cotton pesticides, cotton fertilisers, wheat fertilisers, cumin pesticides, and cumin fertilisers. Pesticide management index: dummy to indicate purchase/use of recommended pesticides. Fertiliser management index: dummy to indicate purchase/use of recommended fertilisers. Seed management index: dummy to indicate purchase/use of recommended seeds. (See Appendix Table A20 for index details). 'Treat' refers to the 802 farmers that received access to AO. Column 1 provides the mean and standard deviation for the control group at baseline. Column 2 reports the treatment effect estimate from an ANCOVA specification. Column 3 uses the ANCOVA specification and controls for the baseline treatment status of a respondent's peer group to assess spillover effects. Column 4 reports the ANCOVA specification and uses double ML to pick an optimal set of control variables. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX TABLE A14: EFFECTS ON COMPONENTS OF COTTON MANAGEMENT INDEX

Dependent Variable	Control Mean (Baseline) (1)	Treat-Control ANCOVA (2)	Treat-Control Spillover (3)	Treat-Control DML (4)
Used Vikram	0.422 [0.495]	0.059*** (0.019)	0.060*** (0.020)	0.061*** (0.019)
Used Rasi	0.261 [0.440]	-0.000 (0.017)	0.002 (0.017)	-0.003 (0.016)
Used Ajit	0.111 [0.314]	-0.019 (0.017)	-0.011 (0.017)	-0.021 (0.017)
Used Navbharat	0.113 [0.317]	0.004 (0.014)	0.006 (0.014)	0.002 (0.013)
Used Tulsi	0.010 [0.100]	0.007 (0.009)	0.008 (0.008)	0.010 (0.009)
Used Ankur	0.008 [0.087]	0.005 (0.005)	0.005 (0.005)	0.004 (0.005)
Used Ganga Kaveri	0.060 [0.238]	0.008 (0.011)	0.009 (0.011)	0.007 (0.011)
Purchased Chloropyrithos	0.010 [0.101]	0.004 (0.005)	0.005 (0.005)	0.004 (0.005)
Used Chloropyrithos	0.003 [0.050]	0.005 (0.004)	0.005 (0.005)	0.005 (0.004)
Purchased Phosphamidon	0.033 [0.179]	0.003 (0.007)	0.001 (0.007)	0.003 (0.007)
Used Phosphamidon	0.028 [0.164]	0.002 (0.007)	0.000 (0.007)	0.002 (0.007)
Purchased Imidachlorpid	0.477 [0.500]	0.053** (0.021)	0.061*** (0.021)	0.057*** (0.020)
Used Imidachlorpid	0.437 [0.497]	0.056*** (0.021)	0.065*** (0.021)	0.061*** (0.021)
Purchased Acetamapride	0.249 [0.433]	0.016 (0.022)	0.025 (0.022)	0.016 (0.021)
Used Acetamapride	0.186 [0.390]	0.013 (0.022)	0.022 (0.022)	0.014 (0.021)
Purchased Acephate	0.889 [0.314]	-0.027* (0.014)	-0.024* (0.014)	-0.026* (0.014)
Used Acephate	0.869 [0.337]	-0.024* (0.014)	-0.021 (0.014)	-0.026* (0.014)
Purchased Dicofof	0.010 [0.101]	0.001 (0.003)	0.000 (0.003)	0.001 (0.002)
Used Tricoderma	0.026 [0.158]	0.003** (0.001)	0.003** (0.002)	0.003** (0.001)
Purchased Ammonium Sulphate	0.078 [0.268]	0.037*** (0.011)	0.037*** (0.012)	0.040*** (0.011)
Used Ammonium Sulphate	0.078	-0.008	-0.008	-0.005

	[0.268]	(0.020)	(0.020)	(0.019)
Purchased Murate of Potash	0.023	0.005	0.006	0.001
	[0.149]	(0.008)	(0.008)	(0.008)
Used Murate of Potash	0.023	-0.018	-0.017	-0.016
	[0.149]	(0.018)	(0.019)	(0.018)
Purchased NPK Grade 1	0.113	0.044**	0.049***	0.047***
	[0.317]	(0.018)	(0.018)	(0.018)
Used NPK Grade 1	0.113	-0.028	-0.025	-0.021
	[0.317]	(0.024)	(0.024)	(0.023)
Purchased Manure	0.761	-0.000	0.001	-0.004
	[0.427]	(0.016)	(0.016)	(0.016)
Used Manure	0.003	0.006	0.007	0.006
	[0.050]	(0.011)	(0.011)	(0.011)
Purchased Biofertiliser	0.005	0.005***	0.005***	0.005***
	[0.071]	(0.002)	(0.002)	(0.002)
Used Biofertiliser	0.005	0.004***	0.005**	0.005***
	[0.071]	(0.002)	(0.002)	(0.002)
Purchased Castor Cake	0.020	0.011**	0.013**	0.011**
	[0.141]	(0.006)	(0.006)	(0.006)
Used Castor Cake	0.020	0.012**	0.013**	0.012**
	[0.141]	(0.005)	(0.006)	(0.005)
N	398	2203	2203	2203

Notes:

This table reports the impact of AO on the components of the cotton management index. (See Appendix Table A20 for index details). The results use data from both the Midline survey and the Endline survey. ‘Treat’ group refers to the 802 farmers that received access to AO. Column 1 provides the mean and standard deviation for the control group at baseline. Column 2 reports the treatment effect estimate from an ANCOVA specification. Column 3 uses the ANCOVA specification and controls for the baseline treatment status of a respondent's peer group to assess spillover effects. Column 4 reports the ANCOVA specification and uses double ML to pick an optimal set of control variables. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX TABLE A15: HETEROGENEITY BY VILLAGE SIZE

Dependent Variable	Control Mean	Treat-Control	Village Population		Proportion of Cultivators		Weighted
			Treat	Treat*Pop	Treat	Treat*Prop Cult	Treat-Control
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Incoming AO Usage + Push Calls listened (minutes)	0.000 [0.000]	115.946*** (14.490)	32.564* (18.427)	314.792*** (24.227)	50.865*** (16.625)	268.309*** (16.413)	131.694*** (16.047)
Index of Mobile Phone-Based Information Usage (standard deviation units)	0.000 [1.000]	1.963*** (0.350)	0.579 (0.392)	5.232*** (0.404)	0.678* (0.389)	5.291*** (0.401)	2.035*** (0.399)
Cotton Management (Standard deviation units)	0.000 [1.000]	0.032 (0.068)	0.034 (0.073)	-0.007 (0.098)	-0.023 (0.072)	0.224** (0.099)	0.056 (0.079)
Wheat Management (Standard deviation units)	0.000 [1.000]	0.033 (0.147)	-0.004 (0.157)	0.140 (0.222)	-0.029 (0.156)	0.258 (0.213)	0.147 (0.168)
Cumin Management (Standard deviation units)	0.000 [1.000]	0.196 (0.133)	0.245* (0.144)	-0.187 (0.203)	0.171 (0.144)	0.101 (0.196)	0.113 (0.151)
Seed Management (Standard deviation units)	0.000 [1.000]	0.005 (0.049)	-0.035 (0.054)	0.152** (0.070)	-0.025 (0.053)	0.126 (0.078)	0.053 (0.059)
Pesticide Management (Standard deviation units)	0.000 [1.000]	0.051 (0.062)	0.057 (0.066)	-0.021 (0.085)	0.026 (0.067)	0.104 (0.084)	0.035 (0.064)
Fertiliser Management (Standard deviation units)	0.000 [1.000]	0.133 (0.129)	0.184 (0.137)	-0.190 (0.187)	0.074 (0.139)	0.243 (0.181)	0.110 (0.145)
Total Correct Answers to Questions (44 questions)	14.156 [5.279]	0.349 (0.242)	0.177 (0.258)	0.652* (0.350)	0.412 (0.257)	-0.259 (0.348)	0.357 (0.284)
Cotton Yield (kg/acre)	694.818 [468.751]	-3.659 (14.469)	2.601 (15.454)	-24.013 (21.764)	-9.916 (15.479)	25.912 (19.927)	5.998 (16.745)
N (Cotton Yield)	392	2093	2093		2093		2051
Wheat Yield (kg/acre)	981.132 [702.002]	-7.089 (50.058)	17.241 (53.950)	-86.685 (65.542)	-10.079 (56.208)	11.984 (72.589)	35.818 (49.467)
N (Wheat Yield)	309	681	681		681		673
Cumin Yield (kg/acre)	172.570 [191.017]	19.518 (16.180)	19.125 (17.230)	1.748 (19.678)	26.907* (16.323)	-30.129 (25.305)	36.893* (21.112)
N (Cumin Yield)	169	402	402		402		383
Total Irrigation Expenditure (Rupees, winsorized fraction = 0.01)	5656.316 [8514.462]	-83.564 (328.648)	-387.093 (350.049)	1146.491** (496.716)	-385.358 (360.318)	1246.542** (485.647)	-410.087 (355.713)
Total Input Expenditure (Rupees, winsorized fraction = 0.01)	22610.100 [18519.387]	-77.425 (741.639)	-333.863 (774.369)	965.870 (1132.896)	-948.580 (818.274)	3590.382*** (1036.939)	-466.350 (837.241)
Profit From Agriculture (Rupees, winsorized fraction = 0.01)	1.36e+05 [1.26e+05]	-4433.051 (3574.746)	-5673.706 (3849.554)	4677.959 (5417.768)	-6104.767 (3927.380)	6895.556 (5483.195)	-2154.638 (4288.312)
N	398	2203	2203		2203		2158

Notes:

This table reports treatment effect estimates using an ANCOVA specification and exploiting heterogeneity in village size. Village population and the proportion of cultivators in each village are computed using the Population of Census of India 2011. Column 1 provides the mean and standard deviation for the control group at baseline. Column 2 reports the treatment effect estimate from an ANCOVA specification. Column 3-4 uses an ANCOVA specification and interacts the indicator for treatment with a dummy for whether the village population is above the median for all villages in the study. Column 5-6 uses an ANCOVA specification and interacts the treatment dummy with a dummy for whether the number of respondents at baseline (30) divided by the number of cultivators in the village is above or below median with respect to all villages in the study. Column 7 uses the aforementioned measure of the proportion of cultivators to compute population weights and reports weighted treatment effect estimates using an ANCOVA specification. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX TABLE A16: RESULTS FROM WILLINGNESS TO PAY EXPERIMENTS

Panel A: Average Willingness to Pay in BDM Exercise								
Cell Contents	Participated in WTP (N)	Bought AO (N)	Avg. WTP for AO (rupees)					
	(1)	(2)	(3)					
Respondent Group:								
Entire Sample	1043	347	109.0					
Study	586	209	121.2					
Treatment	407	151	123.9					
Control	179	58	115.3					
Non-Study	457	138	93.3					
Panel B: Predictors of Purchasing Aavaaj Otaalo (AO)								
Dependent Variable	Bought AO	Bought AO	Bought AO	Bought AO	Bought AO	Bought AO	Bought AO	Bought AO
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Offer Price	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)	-0.001*** (0.000)
Treatment Status	0.032* (0.018)	0.035** (0.017)	0.033* (0.018)	0.032* (0.018)	0.032* (0.018)	0.032* (0.018)	0.032* (0.018)	0.034* (0.018)
Total duration of calling in time	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)
Years of Education		0.009*** (0.002)						0.008*** (0.002)
Total Correct Answers to Knowledge Questions			0.002 (0.002)					0.001 (0.002)
Total Area of Cotton Planted (Acres)				0.001 (0.002)				0.001 (0.002)
Referrals in the Treatment Group					-0.001 (0.020)			-0.001 (0.019)
Skepticism toward Technology						-0.021 (0.020)		-0.016 (0.020)
Age of Household Head							-0.001 (0.001)	-0.001* (0.001)
N	7885	7885	7885	7885	7885	7885	7885	7885
N(Clusters)	1200	1200	1200	1200	1200	1200	1200	1200

Notes:

This table reports results from the willingness to pay study that was carried out between 23rd July and 30th August 2013 along with the Endline paper survey. Respondents took part in two types of willingness to pay exercises – 75% participated in a bidding game based on the Becker-Deegroot-Marschak (BDM) method and 25% participated in a simpler take-it-or-leave-it (TIOLI) exercise. Column 1 in Panel A refers to the number of respondents from each respondent group that participated in the BDM exercise. Column 2 reports the number of respondents that purchased AO. Column 3 refers to the average willingness to pay for AO (in rupees) by respondent group in the BDM exercise. Study: Treatment + Control. Entire Sample: Study + Non-Study. Panel B reports predictors of purchasing the service based on characteristics from the baseline survey and the bids placed during the willingness to pay exercise. This table includes only those farmers that were part of the treatment or control group. Skepticism towards technology is measured by a dummy that codes the question 'I am skeptical of new technologies'. Referrals in the treatment group refer to those respondents who referenced peers - a maximum of three were elicited - who were themselves assigned to treatment. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX TABLE A17: EFFECTS ON YIELD BY SEASON

	Control Mean	Treat-Control	Treat-Control	Treat-Control	Treat-Control	Treat-Control	Treat-Control
		ANCOVA			Difference-in-Difference		
Dependent Variable	(Baseline)	All Rounds	Midline	Endline	All Rounds	Midline	Endline
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cotton Yield (kg/acre)	694.818 [468.751]	3.130 (14.130)	12.576 (19.737)	-3.525 (19.509)	34.678 (30.921)	38.876 (34.273)	30.093 (33.981)
N (Cotton Yield)	392	2093	1090	1003	3303	2286	2197
Cumin Yield (kg/acre)	172.570 [191.017]	2.142 (14.563)	-38.350** (19.539)	48.219** (23.114)	18.281 (20.699)	-7.709 (23.915)	51.252** (23.474)
N (Cumin Yield)	169	402	218	174	1171	855	811
Wheat Yield (kg/acre)	981.132 [702.002]	-22.167 (45.237)	-14.001 (74.221)	14.118 (53.045)	-37.087 (61.319)	-31.578 (77.449)	-36.049 (70.676)
N (Wheat Yield)	309	681	365	322	1669	1293	1265

Notes:

This table reports treatment effect estimates from ANCOVA (Column 2-4) and Difference-in-Difference (Columns 5-7) specifications on yield. Column 1 reports the control mean at baseline, Column 2 uses an ANCOVA specification with data from both the midline and endline, whereas column 3 and 4 report results from the midline and endline separately. Columns 5-7 report analogous estimates using a Difference-in-Difference design. All regressions include village fixed effects, and the specifications in Column 2 and 5 include survey round fixed effects. Asterisks denote statistical significance: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

APPENDIX A18 : DOUBLE LASSO CONTROL VARIABLES

Variable Name	Variable Description
a0_2_age_BM	Age of household head
edu_years_BM	Years of Education
ag_income_BM	Agricultural income for past 12 months (Rupees)
b1_1_BM	Total Land Owned - Area in Acres
k1_3_1_BM	Used Info from Past Experiences to make agricultural decisions?
k1_3_2_BM	Used Info from TV Program to make agricultural decisions?
k1_3_3_BM	Used Info from Mobile Phone-Based Sources to make agricultural decisions?
k1_3_4_BM	Used Info from Newspaper/magazine - to make agricultural decisions?
k1_3_5_BM	Used Info from Extension Workers to make agricultural decisions?
k1_3_6_BM	Used Info from NGO's to make agricultural decisions?
k1_3_7_BM	Used Info from Other Farmer Friends - to make agricultural decisions?
k1_3_8_BM	Do you use - Ag_dealer - to make agricultural decisions?
k1_3_9_BM	Do you use - commission_agent - to make agricultural decisions?
overall_corre~M	Total correct answer on agricultural knowledge
c1_3_BM	Cotton Planted in Kharif 2010
c1_5a_BM	Cotton Area Planted in Kharif 2010 (Acres)
c2_3_BM	Wheat Planted in Rabi 2010
c2_5a_BM	Wheat Area Planted in Rabi 2010 (Acres)
c3_3_BM	Cumin Planted in Rabi 2010
c3_5a_BM	Cumin Area Planted in Rabi 2010 (Acres)
cotton_yield_BM	Cotton Yield in 2010 (Kg/Acre)
wheat_yield_BM	Wheat Yield in 2010 (Kg/Acre)
cumin_yield_BM	Cumin Yield in 2010 (Kg/Acre)
totcost_pest_rs	Total Cost of Pesticides (Rupees)
totcost_fert_rs	Total Fertiliser Cost (Rupees)
totcost_irrig~s	Total Irrigation Cost (Rupees)
totcost_labour~s	Total Hired Labour Cost (Rupees)

Notes:

This table reports the set of baseline variables used in implementing the double LASSO/machine learning approach to selecting control variables (Belloni, Cherkzov and Hansen, 2014).

APPENDIX TABLE A19: EFFECTS ON SOWING

Dependent Variable	Control Mean (Baseline) (1)	Treat-Control (Both Rounds) (2)	Treat-Control (Midline) (3)	Treat-Control (Endline) (4)
Planted Cotton	0.985 [0.122]	-0.002 (0.008)	0.002 (0.008)	-0.005 (0.014)
Planted Wheat	0.776 [0.417]	0.014 (0.020)	0.004 (0.028)	0.024 (0.029)
Planted Cumin	0.425 [0.495]	-0.026 (0.019)	-0.033 (0.027)	-0.018 (0.027)
N	398	2203	1123	1080

Notes:

This table reports the impact of AO on sowing. The results use data from both the Midline survey and the Endline survey in column 2 and then separately at midline (column 3) and endline (column 4). 'Treat' refers to the 802 farmers that received access to AO. Column 1 provides the mean and standard deviation for the control group at baseline. All regressions use an ANCOVA specification. All specifications include village fixed effects and survey round fixed effects. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX A20 : COMPONENTS OF AGGREGATE INDICES

Variable Name	Variable Description
<i>Panel A: Cotton Management Index</i>	
s1_seed_1	Purchased Vikram
s1_seed_2	Purchased Rasi
s1_seed_3	Purchased Ajit
s1_seed_4	Purchased Navbharat
s1_seed_5	Purchased Tulsi
s1_seed_6	Purchased Ankur
s1_seed_7	Purchased Nath
s1_seed_9	Purchased Ganga Kaveri
s1_seeduse_1	Used Vikram
s1_seeduse_2	Used Rasi
s1_seeduse_3	Used Ajit
s1_seeduse_4	Used Navbharat
s1_seeduse_5	Used Tulsi
s1_seeduse_6	Used Ankur
s1_seeduse_9	Used Ganga Kaveri
p1_7c6	Purchased Chlorpyrifos
p1_7c6_use	Used Chlorpyrifos
p1_8c1	Purchased Phosphamidon
p1_8c1_use	Used Phosphamidon
p1_71_8	Purchased Imidacloprid
p1_71_8_use	Used Imidacloprid
p1_71_9	Purchased Acetamiprid
p1_71_9_use	Used Acetamiprid
p1_71_10	Purchased Acephate
p1_71_10_use	Used Acephate
p1_8c6	Purchased Dicofol
p1_10tf	Used Tricoderma
f1_8b	Purchased Ammonium Sulphate
f1_8b_use	Used Ammonium Sulphate
f1_8d	Purchased Muriate of Potash
f1_8d_use	Used Muriate of Potash
f1_8e	Purchased NPK Grade 1
f1_8e_use	Used NPK Grade 1
f1_12a	Purchased Manure
f1_12a_use	Used Manure
f1_12b	Purchased Biofertiliser
f1_12b_use	Used Biofertiliser
f1_12d	Purchased Castor Cake
f1_12d_use	Used Castor Cake
<i>Panel B: Wheat Management Index</i>	
c2_7a	Added Organic Manure
s2_seed_1	Purchased GW 496
s2_seeduse_1	Used GW 496
s2_seed_5	Purchased LOK 1
s2_seeduse_5	Used LOK 1

s2_10c	Used Biological Method
s2_10b	Used Pesticides
f2_8d	Purchased Muriate of Potash
f2_8d_use	Used Muriate of Potash
f2_8e	Purchased Micronutrients
f2_8e_use	Used Micronutrients
f2_12a	Purchased Manure
f2_12a_use	Used Manure
f2_12b	Purchased Biofertiliser
f2_12b_use	Used Biofertiliser

Panel C: Cumin Management Index

s3_seed_4	Purchased GC 4
s3_seeduse_4	Used GC 4
s3_10a	Used Fungicides
s3_10b	Used Pesticides
p3_71_6	Purchased Phosphamidon
p3_71_6_use	Used Phosphamidon
p3_71_8	Purchased Imidacloprid
p3_71_8_use	Used Imidacloprid
p3_71_9	Purchased Acetamiprid
p3_71_9_use	Used Acetamiprid
p3_71_16	Purchased Mancozeb
p3_71_16_use	Used Mancozeb
p3_8c1	Purchased Carbendazim
p3_8c1_use	Used Carbendazim
p3_71_20	Purchased Sulphur
p3_71_20_use	Used Sulphur
p3_9tf	Used Tricoderma
f3_8b	Purchased Ammonium Sulphate
f3_8b_use	Used Ammonium Sulphate
f3_8d	Purchased Muriate of Potash
f3_8d_use	Used Muriate of Potash
f3_8e	Purchased Micronutrients
f3_12a	Purchased Manure
f3_12a_use	Used Manure
f3_12b	Purchased Biofertiliser
f3_12b_use	Used Biofertiliser
f3_12d	Purchased Castor Cake
f3_12d_use	Used Castor Cake

Panel D: Seed Management Index

Recommended Cotton Seed Varieties

s1_seed_1	Purchased Vikram
s1_seed_2	Purchased Rasi
s1_seed_3	Purchased Ajit
s1_seed_4	Purchased Navbharat
s1_seed_5	Purchased Tulsi
s1_seed_6	Purchased Ankur
s1_seed_7	Purchased Nath

s1_seed_9	Purchased Ganga Kaveri
s1_seeduse_1	Used Vikram
s1_seeduse_2	Used Rasi
s1_seeduse_3	Used Ajit
s1_seeduse_4	Used Navbharat
s1_seeduse_5	Used Tulsi
s1_seeduse_6	Used Ankur
s1_seeduse_9	Used Ganga Kaveri

Recommended Wheat Seed Varieties

s2_seed_1	Purchased GW 496
s2_seed_2	Purchased GW 322
s2_seed_3	Purchased GW 173
s2_seed_4	Purchased GW 273
s2_seed_5	Purchased LOK 1
s2_seeduse_1	Used GW 496
s2_seeduse_2	Used GW 322
s2_seeduse_3	Used GW 173
s2_seeduse_4	Used GW 273
s2_seeduse_5	Used LOK 1

Recommended Cumin Seed Varieties

s3_seed_4	Purchased GC 4
s3_seeduse_4	Used GC 4

Panel E: Pesticide Management Index

Pesticides Recommended for Cotton Cultivation

p1_7c6	Purchased Chlorpyrifos
p1_7c6_use	Used Chlorpyrifos
p1_8c1	Purchased Phosphamidon
p1_8c1_use	Used Phosphamidon
p1_71_8	Purchased Imidacloprid
p1_71_8_use	Used Imidacloprid
p1_71_9	Purchased Acetamiprid
p1_71_9_use	Used Acetamiprid
p1_71_10	Purchased Acephate
p1_71_10_use	Used Acephate
p1_8c6	Purchased Dicofol
p1_8c6_use	Used Dicofol
p1_10tf	Used Tricoderma

Pesticides Recommended for Cumin Cultivation

p3_71_6	Purchased Phosphamidon
p3_71_6_use	Used Phosphamidon
p3_71_8	Purchased Imidacloprid
p3_71_8_use	Used Imidacloprid
p3_71_9	Purchased Acetamiprid
p3_71_9_use	Used Acetamiprid
p3_71_16	Purchased Mancozeb
p3_71_16_use	Used Mancozeb
p3_8c1	Purchased Carbendazim

p3_8c1_use	Used Carbendazim
p3_71_20	Purchased Sulphur
p3_71_20_use	Used Sulphur
p3_9tf	Used Tricoderma

Panel F: Fertiliser Management Index

Fertilisers Recommended for Cotton Cultivation

f1_8b	Purchased Ammonium Sulfate
f1_8b_use	Used Ammonium Sulfate
f1_8d	Purchased Muriate of Potash
f1_8d_use	Used Muriate of Potash
f1_8e	Purchased NPK Grade 1
f1_8e_use	Used NPK Grade 1
f1_12a	Purchased Manure
f1_12a_use	Used Manure
f1_12b	Purchased Biofertiliser
f1_12b_use	Used Biofertiliser
f1_12d	Purchased Castor Cake
f1_12d_use	Used Castor Cake

Fertilisers Recommended for Wheat Cultivation

f2_8d	Purchased Muriate of Potash
f2_8d_use	Used Muriate of Potash
f2_8e	Purchased Micronutrients
f2_8e_use	Used Micronutrients
f2_12a	Purchased Manure
f2_12a_use	Used Manure
f2_12b	Purchased Biofertiliser
f2_12b_use	Used Biofertiliser

Fertilisers Recommended for Cumin Cultivation

f3_8b	Purchased Ammonium Sulfate
f3_8b_use	Used Ammonium Sulfate
f3_8d	Purchased Muriate of Potash
f3_8d_use	Used Muriate of Potash
f3_8e	Purchased Micronutrients
f3_8e_use	Used Micronutrients
f3_12a	Purchased Manure
f3_12a_use	Used Manure
f3_12b	Purchased Biofertiliser
f3_12b_use	Used Biofertiliser
f3_12d	Purchased Castor Cake
f3_12d_use	Used Castor Cake

Notes: The panels above detail the variables used to compute aggregate indices that are used in Table 4 and others. Each index consists of the average of the z-scores for each component of the index, with the control group mean and standard deviation as reference. The component scores are then weighted by the inverse of the covariance matrix of the components as in Anderson (2008). Note, no pesticides were recommended for wheat cultivation.

APPENDIX TABLE A21: MAIN OUTCOMES BY SURVEY ROUND

Dependent Variable	Control Mean	Treat-Control	Treat-Control	Treat-Control
	(Baseline)	ANCOVA		
	(1)	All Rounds (2)	Midline (3)	Endline (4)
Incoming AO Usage + Push Calls listened (minutes)	0.000 [0.000]	316.033*** (11.398)	214.857*** (11.078)	421.211*** (19.681)
Index of Mobile Phone-Based Information Usage (standard deviation units)	0.000 [1.000]	5.543*** (0.246)	4.204*** (0.301)	6.956*** (0.388)
Cotton Management (Standard deviation units)	0.000 [1.000]	0.125* (0.065)	0.144* (0.075)	0.105 (0.105)
Wheat Management (Standard deviation units)	0.000 [1.000]	0.112 (0.144)	0.031 (0.030)	0.174 (0.284)
Cumin Management (Standard deviation units)	0.000 [1.000]	0.077 (0.135)	-0.028 (0.096)	0.181 (0.241)
Seed Management (Standard deviation units)	0.000 [1.000]	0.091* (0.048)	0.061 (0.059)	0.123 (0.076)
Pesticide Management (Standard deviation units)	-0.000 [1.000]	0.050 (0.058)	0.008 (0.091)	0.093 (0.071)
Fertiliser Management (Standard deviation units)	0.000 [1.000]	0.129 (0.123)	0.099 (0.071)	0.144 (0.235)
Total Correct Answers to Questions (44 questions)	14.156 [5.279]	0.350 (0.232)	0.218 (0.288)	0.533 (0.362)
Cotton Yield (kg/acre)	694.818 [468.751]	3.130 (14.130)	12.576 (19.737)	-3.525 (19.509)
N (Cotton Yield)	392	2093	1090	1003
Wheat Yield (kg/acre)	981.132 [702.002]	-22.167 (45.237)	-14.001 (74.221)	14.118 (53.045)
N (Wheat Yield)	309	681	356	322
Cumin Yield (kg/acre)	172.570 [191.017]	2.142 (14.563)	-38.350** (19.539)	48.219** (23.114)
N (Cumin Yield)	169	402	218	174
Total Input Expenditure (Rupees, winsorized fraction = 0.01)	22610.100 [18519.387]	1845.716** (722.518)	2555.512** (1007.245)	1012.254 (1020.403)
Total Irrigation Expenditure (Rupees, winsorized fraction = 0.01)	5656.316 [8514.462]	893.888*** (318.208)	1322.507*** (483.508)	384.511 (400.365)
Profit From Agriculture (Rupees, winsorized fraction = 0.01)	1.36e+05 [1.26e+05]	1915.998 (3534.125)	-1030.540 (5135.528)	4694.354 (4593.511)
N	398	2203	1123	1080

Notes:

This table reports treatment effect estimates from the main ANCOVA specification at midline and endline. Column 1 reports the control mean at baseline, Column 2 uses an ANCOVA specification with data from both the midline and endline, whereas Columns 3 and 4 report results from the midline and endline separately. The indices aggregate information over multiple outcomes for which we expect unidirectional treatment effects. Each index consists of the average of the z-scores for each component of the index, with the control group mean and standard deviation as reference. The component scores are then weighted by the inverse of the covariance matrix of the components as in Anderson (2008). Mobile phone-based information usage index: Aggregates mobile phone use across crop decision, soil preparation, pest management, weather, cotton pesticides, cotton fertilisers, wheat fertilisers, cumin pesticides, and cumin fertilisers. Pesticide management index: dummy to indicate purchase/use of recommended pesticides. Fertiliser management index: dummy to indicate purchase/use of recommended fertilisers. (See Appendix Table A20 for index details). All regressions include village fixed effects, the specification in Column 2 also includes survey round fixed effects. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.

APPENDIX A22: EXAMPLES OF QUESTIONS AND ANSWERS FROM AO SERVICE

Crop	Topic	Question	Answer
Cotton	Pests	Leaves of cotton crop have become curly. Which pesticide should I use for this?	Cotton leaves can become curly due to pests. To get rid of the pests Acephate powder (1 pump- 30 gm) or Imidacloprid (1 pump - 10 ml) can be used.
Cotton	Pests	Which pesticide can I use to control mealy bug in cotton?	To rid the crop of mealy bug, Imidacloprid can be used. It is available under the brand names Confidor or Tatamida in the market. To control the pest 1 pump or 10 ml should be used.
Cotton	Pests	My cotton crop is infected with Thrips and other pests. Which pesticide should I use to treat my crop and how much?	To get rid of Thrips and other pests Imidacloprid (1 pump - 10 ml), Acetamiprid (1 pump - 4 to 5 gm) or Dimethoate (1 pump - 30 ml) can be used. These are available in the market under the brand names Pride, Supreme and Roger, respectively. Moreover, Profenofos (1 pump - 20 ml) can also be used.
Cotton	Pests	Aphids (Molo mashi) are attacking my cotton crop. Which pesticide should I use to control these?	For Aphids (Molo mashi), you can use Imidacloprid (1 pump- 10 ml) which is available in the market under the brand names Confidor or Tatamida. Alternatively, Acetamiprid (1 pump - 5 gm) or Thiamethoxam (1 pump - 4gm) can also be used to control the pests.
Cotton	Pests	White fly and other pests are attacking my cotton crop. Which pesticide can I use to address this problem?	To protect your crop from white fly and other pests you can use Imidacloprid (1 pump- 10 ml) which is available in the market under the brand names Confidor or Tatamida. This is can be used with Acephate powder (1 pump- 20 ml).
Cotton	Fertiliser	I cannot find Urea and DAP at the market. How can I ensure that my cotton crop gets nutrients like Nitrogen without Urea and DAP?	Ammonium Sulphate can be used, in case Urea and DAP is not available. 1 vigha-1 bag should be used which will provide nutrients to the crop such as nitrogen and sulphur.
Cotton	Fertiliser	My cotton crop is turning yellow. How can I save my crop?	There can be a number of reasons for this. It can primarily be due to deficiency of micronutrients. You can treat the crop with Urea fertiliser or Ammonium Sulphate (1 vigha- 20 to 25 kg).
Cotton	Seeds	I want to sow cotton crop and there is a limited quantity of water available. Should I sow the crop now or not?	Cotton crop can be sown within 15 days of a good rainfall. For this use seed varieties which grow quickly such as Ganga, Ganga Kaveri, Ankur, Vikram and so forth.
Cotton	Seeds	Which seeds should I use to grow a cotton crop?	There are no recommended BT cotton seeds but the government has certified the seeds from some companies. You can use the seeds from these companies such as Ankur, Ganga Kaveri, Ajit and Vikram.
Cotton	Irrigation	I want to practice irrigation for my cotton crop. Can I get information about rain and weather for this?	According to the Weather Department and Krishi University no rain is expected between 7th to 11th September. You can use irrigation during this time.

Notes: The table above displays a set of actual questions posed by treatment farmers in our study and the answers they received by an agronomist on the Avaaj Otalo (AO) platform. The questions and answers have been transcribed from the Gujarati voice recordings and translated into English.

APPENDIX A23: BREAKDOWN OF COSTS FOR AO SERVICE

Description	Monthly Cost (USD)
Airtime	312.4
Server Hosting Fee	180.9
Agronomist	328.8
Total Monthly Cost	822.1
Monthly Cost Per Farmer	0.82
Yearly Cost Per Farmer	9.87

Notes: The costs above are estimates provided by our field partner. The airtime here is a bulk purchase that provides farmers with the average amount of monthly call time. They do not account for the cost of software development nor farmer training or marketing costs. The former was practically zero in our case because of open-source software.

APPENDIX A24: SPILLOVER EFFECTS

Dependent Variable	Study Respondents			
	Control Mean	Treat	Fraction of Peers Treated	Fraction of Peers Treated *Treat
	(Baseline) (1)	(2)	(3)	(4)
Incoming AO Usage + Push Calls listened (minutes)	0.000 [0.000]	297.249*** (18.802)	18.851 (57.270)	129.690* (69.272)
Index of Mobile Phone-Based Information Usage (standard deviation units)	0.000 [1.000]	5.461*** (0.383)	-1.133 (1.166)	1.447 (1.410)
Cotton Management (Standard deviation units)	0.000 [1.000]	0.129 (0.080)	-0.033 (0.244)	0.122 (0.295)
Wheat Management (Standard deviation units)	0.000 [1.000]	0.163 (0.176)	0.033 (0.536)	-0.490 (0.648)
Cumin Management (Standard deviation units)	0.000 [1.000]	0.145 (0.162)	0.409 (0.495)	-0.381 (0.599)
Seed Management (Standard deviation units)	0.000 [1.000]	0.092 (0.060)	-0.070 (0.182)	0.142 (0.220)
Pesticide Management (Standard deviation units)	0.000 [1.000]	0.056 (0.072)	-0.183 (0.220)	0.087 (0.266)
Fertiliser Management (Standard deviation units)	0.000 [1.000]	0.169 (0.153)	0.349 (0.465)	-0.285 (0.563)
Total Correct Answers to Questions (44 questions)	14.156 [5.279]	0.210 (0.284)	-0.516 (0.865)	1.443 (1.046)
Cotton Yield (kg/acre)	694.818 [468.751]	-4.205 (17.261)	-64.246 (52.349)	63.026 (63.502)
N (Cotton Yield)	392			2093
Wheat Yield (kg/acre)	981.132 [702.002]	-83.418 (61.212)	-333.258* (174.748)	327.733 (215.650)
N (Wheat Yield)	309			681
Cumin Yield (kg/acre)	172.570 [191.017]	1.627 (18.483)	39.509 (53.125)	27.480 (68.400)
N (Cumin Yield)	169			402
Total Input Expenditure (Rupees, winsorized fraction = 0.01)	22610.100 [18519.387]	1371.156 (895.292)	-3748.834 (2728.351)	3286.016 (3300.127)
Total Irrigation Expenditure (Rupees, winsorized fraction = 0.01)	5656.316 [8514.462]	827.694** (399.882)	-452.886 (1216.619)	615.347 (1473.476)
Profit From Agriculture (Rupees, winsorized fraction = 0.01)	1.36e+05 [1.26e+05]	-2213.843 (4383.933)	-2.89e+04** (13357.911)	31412.010* (16148.887)
N	398			2203

Notes:

This table assesses whether the fraction of one's peers assigned to the treatment group influences one's own outcomes and how this varies for study respondent. The results corresponding to study respondents (Columns 2-4) use data from both the Midline survey and the Endline survey. Column 1 reports the mean and standard deviation for the control group at baseline. Column 2 reports the coefficient on a dummy variable for receiving the AO treatment. Column 3 reports the coefficient on the number of peers who were assigned to the treatment group (Fraction of Peers Treated). Column 4 reports the interaction between 'Fractions of Peers Treated' and 'Treat'. The indices aggregate information over multiple outcomes for which we expect unidirectional treatment effects. Each index consists of the average of the z-scores for each component of the index, with the control group mean and standard deviation as reference. The component scores are then weighted by the inverse of the covariance matrix of the components as in Anderson (2008). Mobile phone-based information usage index: Aggregates mobile phone use across crop decision, soil preparation, pest management, weather, cotton pesticides, cotton fertilisers, wheat fertilisers, cumin pesticides, and cumin fertilisers. Pesticide management index: dummy to indicate purchase/use of recommended pesticides. Fertiliser management index: dummy to indicate purchase/use of recommended fertilisers. Seed management index: dummy to indicate purchase/use of recommended seeds. (See Appendix Table A20 for index details). All regression specification include dummies for the number of peers referenced and village fixed effects. The regressions for study respondents also include fixed effects for survey round. Asterisks denote statistical significance: * p<0.10, ** p<0.05, *** p<0.01.