Technical Appendix

Survey Details

The survey sample was constructed by collating several relevant sources: organizational contacts from a Google search using the search term "sustainable agriculture" plus the name of every county in California (e.g. "sustainable agriculture Yolo county"), participants from several sustainable agriculture workshops in different parts of the state, the mailing list of all UC ANR employees (faculty, county advisers, specialists), all County Agricultural Commissioners, county Farm Bureau contacts, a list of producers group contacts from California Department of Food and Agriculture, and two outreach mailing lists compiled by the UC Davis Agricultural Sustainability Institute.

There are three important points to note about our sample frame. First, because a centralized list of "sustainable agriculture" stakeholders does not exist, we used a very inclusive strategy. While respondents could opt out of the survey if they did not work on sustainable agriculture, we expected a relatively low response rate because many people would simply ignore the email. Accounting for our estimate of ineligible respondents, our response rate varied across source from 57% (workshop participants) to 9% (ASI list), with an overall realized response rate of 28%. Second, we focused on sustainable agriculture rather than agriculture more broadly conceived as a starting place for this type of research. However, we expect many of the findings will apply to the broader set of agricultural stakeholders. Lastly, the survey focuses on sustainable agriculture stakeholders who participate in extension broadly conceived (i.e.; not just the University of California), rather than farmers themselves. While some respondents do manage farms, here we are interested in the members of the knowledge network engaged in

outreach, education, and communication. It will be useful for future research to extend to different types of populations.

Descriptive Statistics for Attributes of Innovations

Figure A1 reports the average perceived relative advantages of different ICT platforms based on diffusion theory. The survey asked each respondent to provide their level of agreement (5-point scale; 1=strongly disagree, 5= strongly agree) regarding how each type of relative advantage applied to social media used for agricultural communication. The figure reports the mean response; an average above indicates three more respondents agree, below three means more respondents disagree, and three is neutral. The primary advantages are related to quickly reaching a larger, more diverse audience across longer distances. It is notable that stakeholders do not see a relative advantage for coordinating professional activities or supporting on-the-ground decisions.

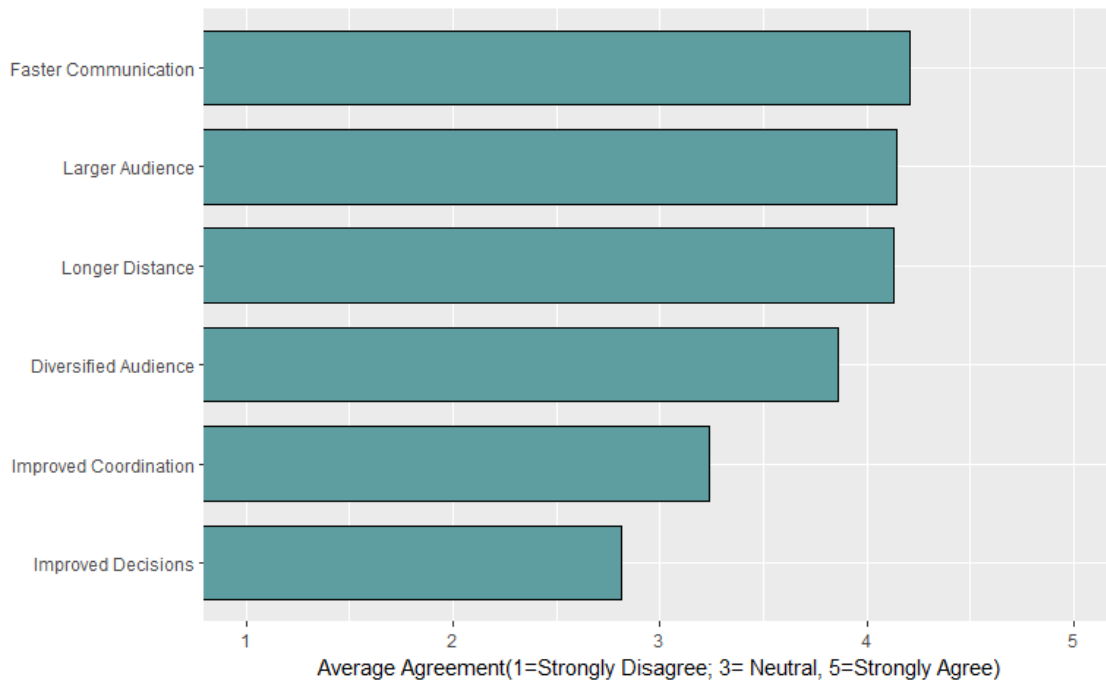**Figure A1: Perceived Relative Advantage**

Figure A2 reports the perceived compatibility of social media using the same approach described for Figure A1. The largest perceived compatibility barrier is the spread of misinformation, which may become even more of a concern as attention is focused on the idea of "fake news". Stakeholders are also concerned about the availability of professional incentives and collegial support for the use of social media, which is seen by some as a less legitimate form of extension activity than traditional publication and personal communication.
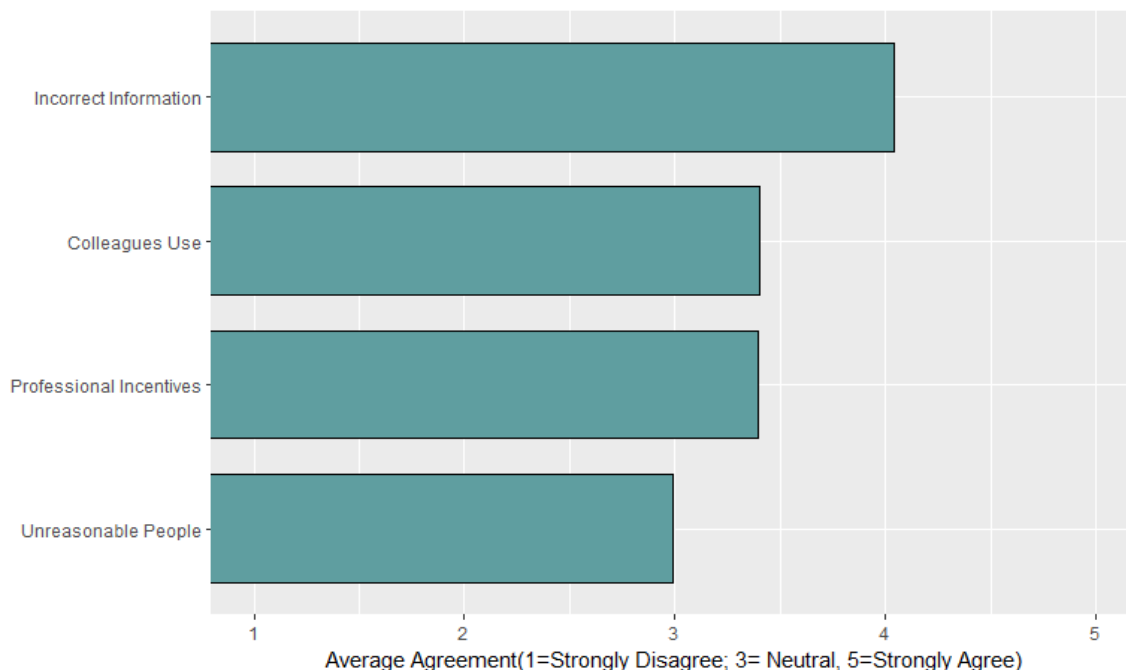
Figure A2: Perceived Compatibility

Figure A3 reports perceptions of complexity and observability, again using the same quantitative approach as Figure A1. The respondents report the time and number of platforms as the biggest obstacles relating to complexity, but they also are challenged by a lack of knowledge

about best practices for specific platforms and how to identify the appropriate audience and

measure effectiveness. The technical challenge of actually using the technology is minimal.

Figure A3: Perceived Complexity and Trialability

Average Agreement(1=Strongly Disagree; 3= Neutral, 5=Strongly Agree)
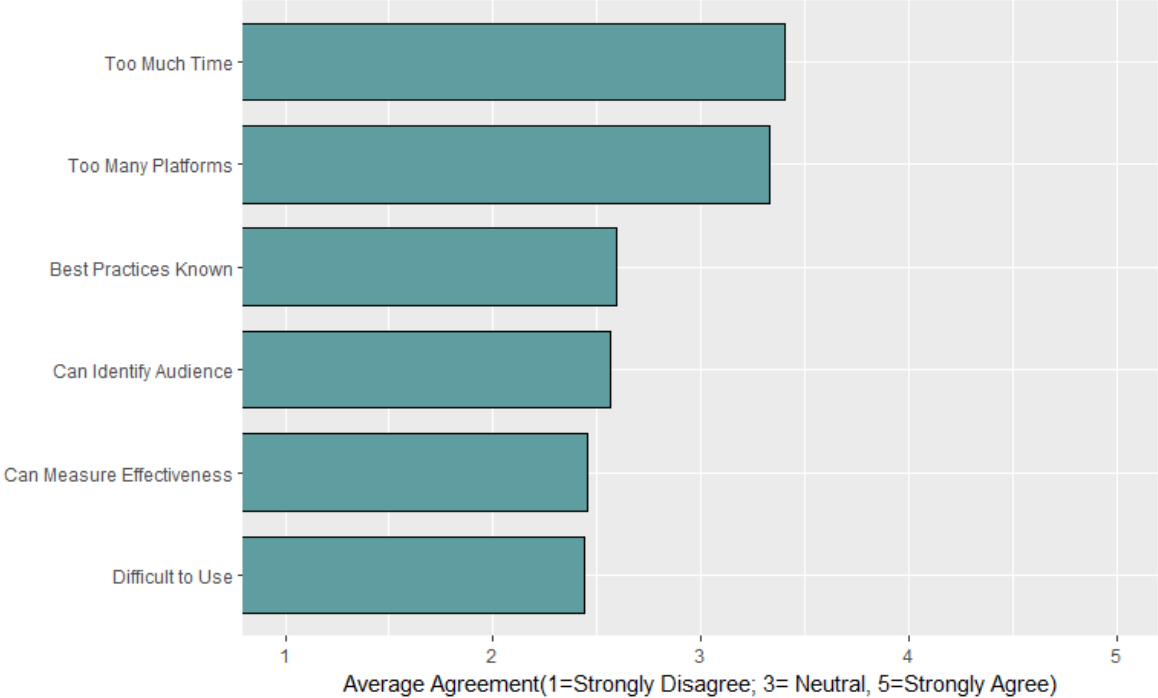
Full Results of Regression Models

Table A1: Innovation Attribute Models		
	Frequency of Social Media Use	**Number of ICT Platforms Used**
Intercept	0.98*	0.88***
	(0.44)	(0.25)
Advantage	0.39***	0.16***
	(0.08)	(0.05)
Fake News	-0.12*	-0.00
	(0.06)	(0.03)
Incentives	0.07	0.01
	(0.06)	(0.03)
Colleagues	0.12*	0.10***
	(0.05)	(0.03)
Trolls	-0.11	-0.10**
	(0.06)	(0.03)
No Time	-0.13**	-0.04
	(0.05)	(0.03)
Tech Difficult	-0.13*	-0.09**
	(0.06)	(0.04)
Know Practices	0.03	0.00
	(0.05)	(0.03)
Too Many	0.04	0.03
	(0.05)	(0.03)
Measurable	0.13*	0.01
	(0.06)	(0.03)
R^2	0.26	
Adj. R^2	0.24	

Num. obs.	501	509
RMSE	0.89	
AIC		2048.48
BIC		2095.04
Log Likelihood		-1013.24
Deviance		463.78
***p < 0.001, **p < 0.01, *p < 0.05		

Table A2: Demographic Models

	Frequency of Social Media Use	Number of ICT Platforms Used
Intercept	2.35***	1.32***
	(0.33)	(0.17)
Age	-0.00	-0.01**
	(0.00)	(0.00)
Education	-0.31*	-0.01
	(0.13)	(0.06)
Male	-0.19	-0.13*
	(0.11)	(0.05)
Income	-0.01	0.03*
	(0.03)	(0.02)
Sustainability Attitude	0.09	0.08**
	(0.05)	(0.03)
UC System	-0.19	-0.15**
	(0.11)	(0.05)
R^2	0.07	
Adj. R^2	0.06	
Num. obs.	425	430
RMSE	1.00	
AIC		1771.45
BIC		1799.89
Log Likelihood		-878.72
Deviance		438.66

***p < 0.001, **p < 0.01, *p < 0.05

Question Wording

Dependent Variables: Information and Communication Technology Use

Which of the following information and communication technologies, if any, do you use in your professional responsibilities?

- Blog
- Website
- Email
- Mobile Apps

How frequently do you use the following social media tools to communicate or learn about sustainable agriculture (1=Do not use this tool; 2=Less often; 3=Ever few weeks; 4=A few days a week; 5=Once a day; 6=Several times a day)

- Facebook
- Twitter
- Pinterest
- Instagram
- LinkedIn
- Other social media

Independent Variables: Innovation Attributes

(Names of scales associated with each item in parentheses)

To what extent do you agree or disagree with the following statements about the use of social media such as Twitter, Facebook, and others in the context of agricultural decision-making or information sharing (1=Strongly disagree; 2=Disagree; 3=Neither agree no disagree; 4=Agree; 5=Strongly Agree)

Relative Advantage

- Social media enables communication with a more diverse set of people (*Advantage)*
- Social media enables communication with a larger number of people (*Advantage)*
- Social media enables communication across a greater physical distance (*Advantage)*
- Social media enables information to spread more quickly (*Advantage)*
- Social media makes on-the-ground decisions more effective (*Advantage)*
- Social media improves coordination of professional activities (*Advantage)*

Compatibility

- Social media risks spread of false or incorrect information (*Fake news)*
- There are positive professional incentives for using social media (*Incentives)*
- Most of my professional colleagues use social media (*Colleagues)*
- Social media requires interacting with too many unreasonable people *(Trolls)*

Complexity

- Social media takes too much time (*No time)*
- Social media is technically difficult to use (*Tech difficult)*
- The best practices for using social media are well-known (*Know practices)*
- The large number of different social media tools is confusing (*Too many)*

Observability/Trialability

- It is easy to measure the effectiveness of social media (*Measureable)*
- It is easy to identify the appropriate audience for social media (*Measurable)*