

Pre-Analysis Plan for JFS CSRM Evaluation

Meta-information

Project: TechnoServe R&D Coalition, JFS-SAN CSRM Evaluation

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Background

Sociedade Algodoeira de Niassa (JFS-SAN), of the Mozambican family conglomerate JFS Holdings, is a cotton ginning and export company based in Cuamba District, Mozambique, where it has operated since 1939. Mozambique grants the company exclusive concession to farm and support cotton production in the district. The company supports smallholder contract farmers with services and inputs such as seeds and pesticides.

JFS-SAN is part of the Contract Farming R&D Coalition in which the company receives a three-year matched grant (~500,000 USD) from Technoserve for exploring innovations—coupled with external evaluation by IDinsight—that stand to benefit farmer livelihoods as well as the company's bottom line. Evidence and lessons from explorative interventions will be shared with other companies in the coalition.

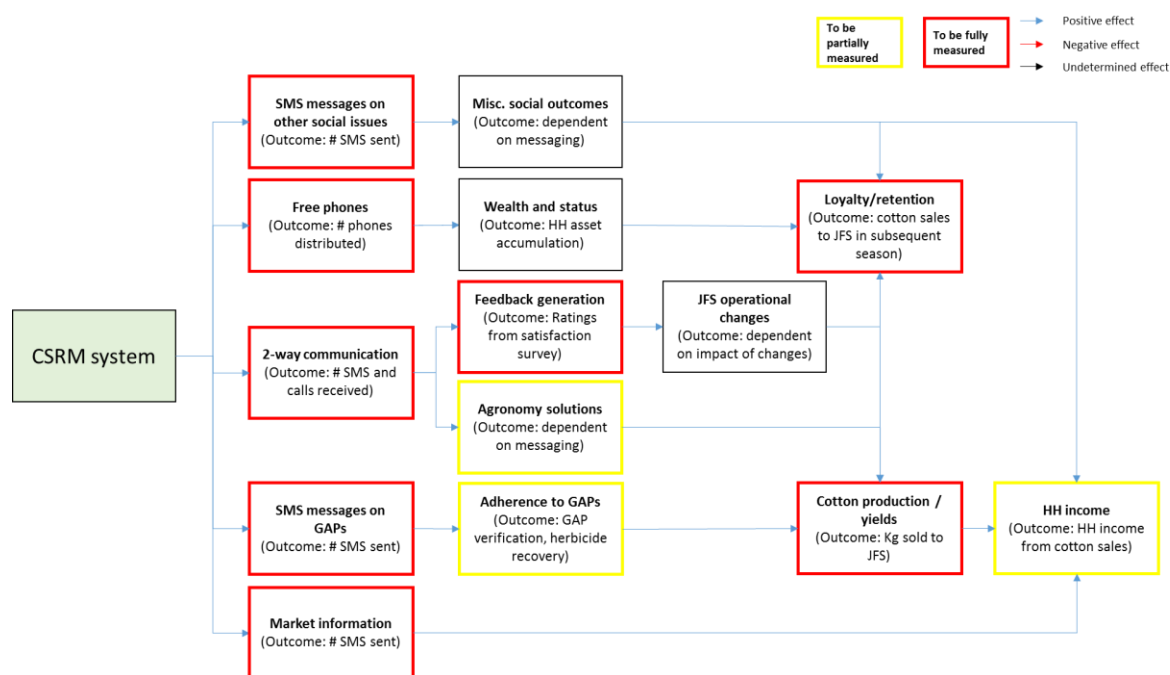
This pre-analysis plan documents the protocol for analyzing and managing data for the impact evaluation of the mobile Customer & Supplier Relationship Management (CSRM) intervention run by JFS. It also provides guiding context on the study's setup and objectives.

The mobile CSRM system is a two-way communication platform with the goal of strengthening company relations with farmers and providing an information service resource for farmers. The CSRM system has 2 main components:

- 1) First, the CSRM communication system consists of an SMS communication platform over which JFS-SAN sends relevant information to farmers about agronomy, market information, weather, farming practices, and other beneficial information (including social and health information) according to a communication plan. These messages are delivered as text or voice messages¹.
- 2) Second, the system has a hotline and call center that allows farmers to obtain specific information relevant to farming or other issues.

A complete theory of change of the CSRM intervention is detailed below:

¹The text messages are sent twice a week. For the voice messages, JFS tries to send the message up to 3 times a day (once a week) at different times of the day to increase the likelihood of reaching farmers. Voice messages need to be received by farmers similar to a phone call and so JFS makes multiple attempts to make sure farmers receive the message



As detailed in the diagram above, the following outcomes of interest are expected to change as a result of the CSRM intervention:

Channels	Outcomes
Timely provision of key information by SMS or voice. Simple information and reminders may be able to change behaviour for achievement of basic best practices such as timely planting and correct application of pesticides.	<ul style="list-style-type: none"> Improved adoption of agronomy best practices Improved yields (as a result of the intermediate outcome above)
Access to trained call centre operators. Farmers can receive individualized information (by phone or SMS) on specific agricultural best practices or problem-solving (e.g. dealing with crop pests).	<ul style="list-style-type: none"> Improved adoption of agronomy best practices Improved yields (as a result of intermediate outcome above) Improved farmer satisfaction Improved communication between farmers and JFS
Receipt of a mobile phone: Mobile phone penetration is fairly low. Use of a mobile phone may allow farmers to better communicate and receive information outside of the CSRM system that proves useful for production/yield and adoption of GAPs.	<ul style="list-style-type: none"> Improved farmer satisfaction Improved retention (i.e. reliable year-on-year selling to JFS-SAN) Improved adoption of agronomy best practices Improved yields

JFS expects all the changes described overhead to eventually lead to a reduction of per- unit extension overhead over the long term.

From **Dec 2015 to April 2016 (Year 1)**, JFS-SAN distributed mobile phones to approximately 5,400 farmers in 80 markets² to pilot the intervention. This was followed by a process evaluation by IDinsight,

² A market is similar to a small village and serves as an administrative division for buying and selling cotton.

with recommendations³ for potential changes to strengthen the program for the next season. After incorporating numerous process recommendations to strengthen program implementation, JFS distributed approximately 6,000 additional⁴ mobile phones in 109 different⁵ markets from **October to November 2016 (Year 2)**. This Pre- Analysis plan describes the objectives of studies that will measure the impact of the **CSRM intervention just in Year 2** markets.

This Pre Analysis Plan is organized into two parts. The first part describes the larger impact evaluation whose objective is to measure the impact of the overall CSRM intervention. The second part describes a smaller study whose objective is to test the differences in certain operational outcomes between people who receive voice messages and those that receive text messages.

Evaluation 1- largescale impact evaluation

Evaluation Objectives

The objective of this evaluation is to measure the impact of JFS-SAN's distribution of mobile phones to cotton farmers and the implementation of a mobile Customer & Supplier Relationship Management (CSRM) system on cotton production, adoption of good agricultural practices (GAPs), and farmer retention (cotton sales to JFS in consecutive years).

This evaluation will utilize farmer survey and administrative data to allow for a high rigor impact evaluation that measures the impact of the phone distribution and CSRM system on cotton production and farmer retention. Additionally, as the full potential of the CSRM intervention may not be realized for several years, it is relevant to also study secondary outcomes such as knowledge of GAPs and message recall. We will also look at these outcomes using data collected using a farmer survey.

Similarly, we will also look at certain additional outcomes such as platform engagement and customer satisfaction which predict farmer engagement with this intervention and are an important channel of impact.

Study Design

This evaluation is designed as a **two-armed clustered randomized controlled trial (RCT)**, clustered at the market-level. A market is similar to a small village and serves as an administrative division for buying and selling cotton. JFS has a central pickup and drop off point at each market where they meet and interact with all the farmers from that market. The primary objective of this design is to generate an unbiased estimate of the impact of receiving phones by comparing farmers in the markets where all eligible farmers were offered phones to markets where farmers were not offered phones.

This evaluation has a cluster design as we expected the CSRM intervention to have spillover effects on farmers that didn't receive phones within markets in which some farmers receive phones. These spillover effects could have potentially contaminated the outcomes of control group farmers (who didn't receive phones). In order to estimate an unbiased estimate of program impact, we assigned entire markets as a treatment or control market, thereby limiting spillover effects amongst farmers within markets.

³ The IDinsight process evaluation recommended addressing existing problems with hardware, access to charging stations, and low literacy. Conditional on these issues being addressed, IDinsight recommended proceeding with an impact evaluation and a limited scale-up of the intervention solely in Cuamba district, allowing JFS to focus resources on maximizing the potential of the intervention.

⁴ New phones were distributed as the IDinsight process evaluation found that the year 1 batch of phones were of very poor quality which seriously limited impact of the intervention.

⁵ There seem to be 4 markets that received phones in both year 1 and year 2, however, all other markets from year 2 are different to the markets included in the year 1 pilot.

Markets were randomly assigned to one of the following evaluation arms:

1. **Treatment:** All farmers that purchased chemicals in the 2015-2016 planting season in these treatment markets were offered phones from JFS. Farmers had to attend a meeting organized by JFS to receive the phones. The JFS field team visited the markets up to three times to maximize coverage of eligible farmers.
2. **Control:** JFS did not distribute phones in these markets.

The impact estimate will come from a comparison of farmers in the treatment markets to those in control markets. For some pieces of analysis, the unit of analysis is the individual farmer, while other pieces will be conducted at the market level. More detailed description of the analysis is included in the sections below.

Data Collection

Data will be collected through the following two sources:

1. **Household survey:** A farmer survey will be completed with approximately 1700 farmers (953 treatment market farmers from 95 markets and 747 comparison market farmers from 83 markets). The survey will gather information on knowledge of Good Agriculture Practices (GAPs), knowledge of cotton prices throughout the selling season, amount of cotton harvested and sold, phone usage and barriers to use, proportion of farmers receiving messages, farmer engagement with platform and farmer satisfaction with the CSRM system (see Appendix).
2. **Administrative data:** Certain data (cotton sales & loan repayment) will come from buying center records of cotton purchased from participants. We have access to buying center records (JFS database) for 106 control markets and 109 treatment markets. Treatment and comparison farmers from our survey data will be matched⁶ to the JFS database to get data on cotton production, sale, loan repayment, and to understand the extent of retention from the previous year. Administrative data from the CSRM system will also be used to assess farmer engagement with the platform.

Study Sample

Sampling frame: The sampling frame for markets consists of 386 markets, which constitute nearly all the markets serviced by JFS in the Cuamba region. 109 markets from this sample were randomized into the treatment arm and 109 were randomized into the control arm. This randomization was stratified by the variables described below. This sample excludes markets that were deemed too rural to effectively administer randomization and any markets that were involved in the evaluation of a parallel study on concentration farming.

Arm assignment: Market- level Randomization was stratified by the following:

- 1) Agency - unit of geography composed of multiple markets that JFS uses to describe the area that one extension officer ("Tecnico") is responsible for. The size of an agency varies between 16-51 markets.
- 2) Access to charging panel - This was a binary indicator signifying access to a charging panel. Access to a charging panel was defined as presence of a charging panel within a 60- minute walking radius

Evaluation sample: The evaluation sample includes 95 treatment markets (out of a total of 109 originally randomized treatment markets) and 83 control markets (out of a total of 109 originally randomized control

⁶ Matching will be done using a combination of identifying information such as farmer name, market they sell in, contact number etc.

markets). We surveyed approximately 1700 farmers across these 178 markets. Survey respondents were sampled from lists of farmers who received chemicals from JFS during the 2015-2016 planting season⁷.

Analysis framework

For both primary and secondary outcomes, we will estimate the impact of the intervention by comparing farmers in our treatment sample to those in the control sample. We will consider specifications in which either the individual or the market is the unit of analysis.

Framework 1: Individual-level analysis

The regressions specifications for this analysis are defined below:

$$Y_{ij} = \beta_0 + \beta_1 * treat_j + \beta_2 * Ypre_{ij} + \beta_3 * X + \beta_4 * pre_{miss} + \beta_5 * cov_{miss} + \varepsilon,$$

The variables are defined as follows:

- Y_{ij} : This is the dependent variable, measured for individual i in market j . There will be a few outcomes, which are discussed in Table 1 below.
- $treat_j$: This is a dummy that takes the value of 1 for participants in a treatment market
- $Ypre_{ij}$: This is the value of the dependent variable pre-intervention. Since we did not conduct a baseline survey, this pre-data comes from administrative data, and is only available for certain outcomes.
- pre_{miss} : This is a dummy that takes the value of 1 if pre-intervention data for the dependent variable is not available for this observation. This is only included for variables in which $Ypre_{ij}$ is included in the regression.
- X : Is a vector of additional controls. This includes a series of dummies that define the stratification groups, as well as four other variables. The additional controls are area for planting cotton declared at time of pesticide receipt, and the amount of loan taken for chemicals (a separate control for different types of chemicals), age, and gender of farmer.
- cov_{miss} : This is a dummy that takes the value of 1 if covariate data on area declared for planting cotton is not available for this observation.
- ε_{ij} : This is an error term, assumed to be correlated within markets. We will cluster by market to correct for this.

The stata code the corresponds to the above specification is:

```
reg Y treat Y_pre i.strat_dum covar1 ...covarX pre_miss, cluster(market_name)
```

The sample for the individual-level regressions will consist of the sample of individuals who received the household survey.

Framework 2: Market-level analysis

The regressions specification for the market-level analysis is very similar to the individual-level specification:

$$Y_j = \beta_0 + \beta_1 * treat_j + \beta_2 * Ypre_j + \beta_3 * X + \beta_4 * pre_{miss} + \beta_5 * cov_{miss} + \varepsilon_j,$$

The primary difference is that the X vector does not include the additional individual-level covariates. As above, for some variables pre-intervention data is not available. Also, we assume that ε_j is i.i.d, but correct for heteroscedasticity using the Huber-White correction. The stata code is:

⁷ Since all farmers that purchased chemicals in the 2015/16 planting season were given phones in the treatment markets, this sample of farmers was used to randomly select individual farmers for the survey across treatment and control markets

```
reg Y treat Y_pre i.strat_dum pre_miss, robust
```

This specification will be run on a couple of different samples. First, for variables in which the data comes from the survey, the sample of markets will be all markets that were surveyed, and the market-level data will be constructed as either totals or averages from the individual-level survey data. For variables that come from administrative data, the sample will be all markets that took part in the experiment, and the market-level data will be constructed as either totals or averages from the individual-level administrative data.

Outcomes and data sources

Primary and Secondary outcomes

The CSRM system intervention has several avenues through which it can affect cotton sales for the company and could affect farmer households. This evaluation will examine the outcomes outlined in Table 1. The respective data will be obtained from the buying centre records of cotton purchased from farmers and a farmer endline survey conducted by IDinsight.

Table 1: Outcomes and respective data sources

Outcome	Indicators	Data sources	Research question(s)	Unit of Analysis	Sample
<i>Primary outcomes</i>					
Cotton production	Cotton sold to JFS-SAN (Kgs)	Buying Centre Records	Do treatment farmers have significant increases in cotton production?	Individual farmer	Surveyed Households in Sampled Markets
	Cotton sold to JFS-SAN (Kgs)	Survey	Do treatment farmers have significant increases in cotton production?	Individual farmer	Surveyed Households in Sampled Markets
	Total amount of Cotton sold to JFS-SAN (Kgs)	Buying Centre Records	Do treatment farmers have significant increases in cotton production?	Market	All Markets in Evaluation
	Cotton income	Survey	Do treatment farmers have significant increases in cotton production?	Individual farmer	Surveyed Households in Sampled Markets
	Cotton income	Buying Centre Records	Do treatment farmers have significant increases in cotton production?	Individual farmer	Surveyed Households in Sampled Markets

	Cotton yield	Survey	Do treatment farmers have significant increases in cotton production?	Individual farmer	Surveyed Households in Sampled Markets who produced cotton
Producer retention	Dummy representing status of sale of cotton by farmer in 2017	Survey	Does treatment lead to higher farmer retention?	Individual farmer	Surveyed Households in Sampled Markets
	Dummy representing status of matching of farmers in the survey sample to the latest buying centre records ⁸	Survey, Buying Centre Records	Does treatment lead to higher farmer retention?	Individual farmer	Surveyed Households in Sampled Markets
	Number of cotton sellers in the market	Buying Centre records	Are treatment farmers more likely to sell cotton ?	Market	All Markets in Evaluation
<i>Secondary outcomes</i>					
Knowledge of Good Agricultural practices (GAPs)	Index representing farmer knowledge of GAPs for cotton planting, watering, harvesting, pest-management and post-harvest management and cotton prices (topics on which JFS sends SMS messages to farmers)	Survey	Do treatment farmers have significant increases in knowledge of good agriculture practices ?	Individual farmer	Surveyed Households in Sampled Markets who produced cotton
Loan repayment	Variable indicating proportion of credit repaid by farmers	Buying Centre Records	Are treatment farmers more likely to pay off loan? Are they likely to repay a larger proportion of the loan undertaken?	Individual farmer	Surveyed Households in Sampled Markets

⁸ This matching represents the number of farmers from last season that also sold this season according to JFS records. This helps give us a sense of how many farmers from the previous season also sold cotton to JFS this season.

	Dummy indicating if farmer repaid the full loan amount	Buying Centre Records	Are treatment farmers more likely to pay off loan? Are they likely to repay a larger proportion of the loan undertaken?	Individual farmer	Surveyed Households in Sampled Markets
	Dummy indicating if farmer repaid anything (could be part of the total loan taken)	Buying Centre Records	Are treatment farmers more likely to pay off loan? Are they likely to repay a larger proportion of the loan undertaken?	Individual farmer	Surveyed Households in Sampled Markets
	Variable indicating total proportion of credit repaid by farmers in that market	Buying Centre Records	Are treatment farmers more likely to pay off loan? Are they likely to repay a larger proportion of the loan undertaken?	Market	All Markets in Evaluation
	Variable representing proportion of total farmers that repaid the full loan amount in market	Buying Centre Records	Are treatment farmers more likely to pay off loan? Are they likely to repay a larger proportion of the loan undertaken?	Market	All Markets in Evaluation
	Variable representing proportion of total farmers that repaid anything (could be part of loan taken) in market	Buying Centre Records	Are treatment farmers more likely to pay off loan? Are they likely to repay a larger proportion of the loan undertaken?	Market	All Markets in Evaluation

The GAP outcomes will be combined into an index using an Anderson index (Anderson, 2008). We will conduct analysis on separate themes and also on this composite index

Operational outcomes

Table 2 outlines certain additional operational outcomes that we also be considering. The respective data will be obtained from farmers who received the JFS phones in our survey sample and from the JFS CSRM records. Operational outcomes will not be compared between treatment and control (because it is not possible to collect this data for both groups), but will be used to help with the following:

- examine the causal channels for impact of the CSRM system,
- examine potential operational improvements for JFS, and
- determine farmer satisfaction with the service

Table 2: Operational outcomes, definitions and data sources

Outcomes	Indicators/definitions	Data source	Unit of Analysis	Sample
Platform engagement	Proportion of farmers calling or messaging JFS at least once	Survey	Individual farmer	Surveyed Households in Sampled Markets that Received Phones
	Proportion of farmers calling or messaging JFS at least once	CSRM System Records	Individual farmer	All farmers that Received Phones
	Variable representing number of times farmers called or messaged JFS	Survey	Individual farmer	Surveyed Households in Sampled Markets that Received Phones
	Variable representing number of times farmers called or messaged JFS	CSRM System Records	Individual farmer	All farmers that Received phones
Customer satisfaction	Reported satisfaction with the CSRM platform	Survey	Individual farmer	Surveyed Households in Sampled Markets that Received Phones
	Farmer feedback on the CSRM system	Survey	Individual farmer	Surveyed Households in Sampled Markets that Received Phones
Phone usage & barriers to use	Proportion of farmers with a working phone at the end of the season	Survey	Individual farmer	Surveyed Households in Sampled Markets that Received Phones
	Reasons for not utilizing JFS phones	Survey	Individual farmer	Surveyed Households in Sampled Markets that received Phones

Limitations and corrections to the analysis

Outliers: During data cleaning, all variables will be checked for outliers. If the reason for the outlier is clear (e.g. missing decimal point), the error will be fixed. If the outlier seems to be a plausible value, it will be left as is. If the value is unreasonable and the correct value cannot be imputed from other available data, the value will be changed to missing.

Sub-sample analysis

We may also carry out analysis on other predefined sub-samples of the population that are policy-relevant:

- Individual Agencies
- Women and men
- Young/old producers

Since the study is not powered to detect differences among sub-samples of the population, this analysis is meant to be exploratory to examine indications of heterogeneity of treatment effects.

Evaluation 2 - Voice vs Text messaging mini evaluation

Evaluation objectives

In April 2017, JFS decided to conduct a pilot using voice messages as an alternative to text-based communication as voice messages may be more accessible to populations with low literacy rates. Voice-based mobile communication has been shown to be effective in communicating information to farmers, in particular among farmers in rural areas (Payne, Woodard, & IRIS, 2010; International Rice Research Institute (IRRI), 2011).

The objective of this mini evaluation is to generate evidence to allow JFS to choose the most cost-effective way to communicate with farmers and encourage farmer action – via text or voice messages.

Intervention

A random sample of farmers from 15 markets were chosen to receive voice messages instead of text messages whenever communication is sent out to farmers. The content is determined by JFS, but is similar to the content being shared over SMS (to ensure the comparison is not between different content).

Study design

This pilot evaluation is designed as an **individual** randomized study. The pilot was implemented in 15 markets due to operational constraints and high cost of implementing voice messages. Overall farmers in each market were divided into the following 2 evaluation arms.

1. **Voice Message Arm:** 50% of the farmers in a market received voice messages.
2. **Text Message Arm:** 50% of the farmers in a market received text messages.

A total of 627 farmers across these 15 markets received voice messages and 619 farmers received text messages. The goal is to generate an unbiased estimate of the impact of receiving voice messages by comparing the outcomes of farmers receiving voice messages to those receiving text messages. The unit of analysis is the individual farmer.

Data collection

We will use two sources of data:

- **System / Administrative data:** Information from the voice and text messaging system will be used to collect data on outcomes like proportion of messages delivered and responded to.
- **JFS farmer survey:** the survey will be administered to a randomly selected sub-sample of farmers that received each type of message in the pilot markets

Study sample

Sampling frame: The evaluation sample was randomly selected from the 15 pilot markets (selected from a total of 109 possible treatment markets).

Arm assignment: Farmers in these markets were randomly assigned into the voice message and text message arms defined above.

Analytical Framework

For the primary and secondary outcomes, the main analysis will compare the outcomes between farmers who receive voice messages and those that receive text messages. A fitted regression analysis will be used to estimate the effect of the intervention on direct recipients. In Stata, the following model will be used:

$$Y_i = \beta_0 + \beta_1 * treat_voice_i + \beta_3 * X + \varepsilon_i$$

The variables are defined as follows:

Y_i : This is the outcome of interest for individual i

$treat_voice_i$: This is a dummy that takes the value of 1 for participants that received voice messages

X : This is a vector of dummies including fixed effects for each market as well as controls for the farmer's age and gender

This corresponds to the following code in stata:

```
reg depvar treatment_voice i.market_dum covar1 ...covarX, robust
```

Evaluation Outcomes

The evaluation will focus on operational outcomes, comparing these outcomes between farmers who receive voice messages and farmers who receive text messages. The primary focus of the evaluation is to understand the operational effectiveness and impact on farmer engagement.

Table 1: Outcomes and respective data sources

Outcome	Indicators	Data sources
Message response	Dummy representing if farmers called or messaged JFS	CSRM System Data
	Dummy representing if farmers called or messaged JFS	Survey
	Variable representing number of times farmers called or messaged JFS	CSRM System Data
	Variable representing number of times farmers called or messaged JFS	Survey Data
Message receipt	Dummy representing farmer's memory of receiving any messages from JFS	Survey
Message recall	Total categories that farmers recall receiving messages about	Survey
Loan repayment	Variable indicating proportion of credit repaid by farmers	Buying Center Records
	Dummy indicating if farmer repaid the full loan amount	Buying Center Records
	Dummy indicating if farmer repaid anything (could be part of the total loan taken)	Buying Center Records
Producer retention	Dummy representing status of sale of cotton by farmer in 2017	Survey
	Dummy representing status of matching farmers in the survey sample to the latest buying centre records	Survey, Buying Center Records

Operational/ Descriptive outcomes

Operational/ Descriptive outcomes will not be compared between treatment and control (because it is not possible to collect this data for both groups), but will be used to contextualize main impact findings.

- Proportion of voice messages that are delivered (system data)
- Proportion of farmers who said that they received text messages (survey data)
- Farmer satisfaction with the system

References

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- Payne, J. W. (2010, November). *ICT to Enhance Farm Extension Services in Africa. Briefing Paper. USAID*. Retrieved from <https://www.microlinks.org/sites/microlinks/files/resource/files/FACETExtensionServices.pdf>

APPENDIX: Evaluation Survey

Question no	Potential question	Potential Response options	Skip pattern	Rationale	Themes
1	Surveyor name				Surveyor details
2	Market name				
3	Do you wish to participate in the survey?	a. Yes b. No	If b. >> skip to the end of the survey		Informed consent
4.a	Is the respondent's full name xxxxxx?	a. Yes b. No		Get demographic data on the Farmers	Farmer details
4.b	Do you have any other names in addition to xxxxx?	a. Yes b. No	If b.>>skip to 5		
4.c	If yes, please enter the other names				
5	Gender of respondent	a. Female b. Male			
6	What is your year of birth?				
7	What is the highest level of education that you have completed? (surveyor: please note year COMPLETED)	a. Basic level b. Medium level c. No schooling			
8	Do you have a producer card given by JFS SAN?	a. Yes b. No	If b.>>skip to 9b		
9	What is the number of your producer card?				
9.a	Can we take a photograph of your card? (Surveyor please take a picture of the farmer producer card)	a. Yes b. No			
9.b	What happened to the producer card provided by JFS SAN?	a. I never received one b. I lost my card c. Cannot find card d. Returned to JFS e. Other (specify)			

10	Do you have a phone provided by JFS?	a. Yes b. No	If a.>> skip to 10. b	Understand what farmers are using the phones for, their interaction with JFS, and their reasons for/for not interacting with JFS	JFS phones
10. a	What happened to the phone you received?	a. It got lost b. I gave it to someone c. It broke/ stopped working d. Other (specify)	Skip to >>38		
10.b	What is the phone number for the phone JFS gave you?				
11	Do you have another phone?	a. Yes b. No	If b.>>skip to 12		
11.a	What is the telephone number for the other phone?				
11.b	Do you usually keep this other phone charged?	a. Yes b. No c. Sometimes			
11.c	Which phone do you use more regularly?	a. JFS phone b. Other phone c. Use both equally d. Other (specify)			
12	Can we look at your phone now? (Surveyor: check if the phone is on or off)	a. Phone is on b. Phone is off c. Doesn't have phone on them	If a. or c. >> skip to 13		
12.a	Why is your phone switched off?	a. The battery is dead b. I have no need for it now c. To save my battery d. My charger does not work e. There is no network at my house/ here f. Other (specify)			
12.b	How often is your phone switched off?	a. Always b. Sometimes c. Never			

13	How is the network/signal in your area?	a. Not good b. Sometimes it is good c. Always good			
14	What do you use this JFS phone for? (Select all that apply)	a. Calling/ messaging other people b. Contacting (messaging or calling) JFS c. Flashlight d. Other (specify)			
15	Have you ever received text or voice messages from JFS?	a. Yes b. No	If a.>>skip to 17		
16	Have you heard about the tips from friends or neighbours?	a. Yes b. No	If a.>> skip to 21 If b.>> skip to 24		
17	What messages did you receive?	a. Voice messages b. Text messages			
18	In the last week, how many messages do you receive from JFS?	a. One b. Two c. Three d. More than three e. Does not remember			
19	Do you understand these messages?	a. Yes b. No	If a.>> skip to 20		
19.a	Why don't you understand the messages? (Select all that apply)	a. I don't understand the messages b. I don't understand the content c. I can't read d. Other (specify)	Skip to >> 24		
20	What information do the messages provide?	a. Pest control b. Weeding c. Weather d. Harvesting time/ principles e. Post-harvest land management f. Cotton price information			

		g. Other (specify)			
21	How often are the tips different from your normal farming practices?	a. Always b. Sometimes c. Never d. Don't know			
22	When the tips are different from what you usually do, how often do you change your practice to match the tips?	a. Always b. Sometimes c. Never d. Don't know	If c.>> skip to 23		
23	Why don't you change your practice to match the information in the tips?	a. I received/saw the message too late b. I did not understand the message c. I did not have the money/resources to implement the change d. I did not believe the message would help me e. Other (specify)			
24	We have heard that some people are not receiving messages, do you know why this is the case? (Select all that apply)	a. They do not have a phone b. The phone is off c. The network is not good d. Their battery died e. Other (specify)			
25	Have you ever contacted JFS using the phone?	a. Yes b. No	If b.>>skip to 30		
26	How many times have you contacted JFS in the last week?	a. Once b. Less than 3 times c. More than 3 times but less than 5 times d. More than 5 times d. I do not recall			

		e. None		
27	When was the last time you contacted JFS?	a. Today b. This week c. More than 1 week but less than 2 weeks ago d. More than 2 weeks but less than 1 month ago e. Last month f. More than a month ago		
28	How did you contact them?	a. Text message b. Phone call		
29	What was your enquiry to JFS? (Select all that apply)	a. Advice on planting cotton b. Advice on harvesting cotton c. Advice on pest control d. Request for pesticides/chemicals e. Request for harvest bags f. Request for subsidy g. Request for the price of the chemicals h. Reporting phone issues, i.e., phone not working, SMS not getting through, battery not working i. Confirming that the JFS contact number works j. Request for a loan k. Advice on administration issues e.g., producer cards l. Enquiry on cotton pricing m. Requesting JFS to come and buy cotton		

		<p>n. Requesting a visit from a tecnico or to speak to a specific tecnico</p> <p>o. Confirm if there is a meeting with a JFS official or if the tecnico is going to a specific market</p> <p>p. Responding to a question from JFS</p> <p>q. Other (specify)</p>			
30	Why have you never contacted JFS?	<p>a. I have had no enquiries</p> <p>b. I have not been able to reach JFS staff, e.g., no one picks up, the phone does not go through</p> <p>c. I did not know that I could contact them</p> <p>d. I don't have their contact details</p> <p>e. My phone does not have battery</p> <p>f. I don't have airtime</p> <p>g. JFS can't help</p> <p>h. Other (specify)</p>			
31	Do you enjoy the JFS text/voice messaging program?	<p>a. Yes</p> <p>b. No</p>	If b.>> skip to 33	Understand whether the producers are happy with the service and why	Producer satisfaction of the JFS service
32	Why do you enjoy the program?	<p>a. The messages are sent at the right time when I can use them</p> <p>b. The messages are useful</p> <p>c. Other (specify)</p>			
33	Why don't you enjoy the program?	<p>a. I don't receive/see the messages on time</p> <p>b. I don't understand the messages</p> <p>c. The messages are not useful</p> <p>d. Other (specify)</p>			
34	What language do you prefer to receive your messages in?	<p>a. Macua</p>			

		b. Portuguese			
35	Did you learn anything new from the JFS messages that you did not already know?	a. Yes b. No	If b.>>37		
36	What new information did you learn?	a. How and when to spray pesticides b. When to sell cotton c. When to harvest cotton d. How to dry cotton e. How to bag cotton f. Health information g. How to plant cotton h. Other (specify)			
37	Is there any other information that you would like to receive that you do not currently receive	a. Yes b. No			
38	Did you grow cotton this season?	a. Yes b. No	If b.>>skip to 56	Asking about Good Agricultural Practices (GAPs) and other JFS messages	Cotton harvesting and selling
38.a	How much land did you use to grow cotton (in acres) this season?				
39.b	Have you harvested any cotton so far in this season?	a. Yes b. No c. Other (specify)	If a.>> skip to 39. d		
39.c	When do you intend on harvesting your cotton	a. September b. October c. I have already harvested all my cotton			
39.d	How many bags have you harvested so far?				
39.e	Do you expect to harvest more cotton this season?	a. Yes b. No	If b.>>skip to 40		
39.f	When do you intend on harvesting the rest of your cotton for this season?	a. September			

		b. October c. I have already harvested all my cotton		
39.g	How many more bags of cotton do you think you will harvest this season?			
40	Have you sold any cotton this season?	a. Yes b. No	If b.>>skip to 40. b	
40.a	How many bags have you sold so far?			
40.b	When do you intend on selling the rest of your cotton for this season?	a. September b. October c. I have already harvested all my cotton d. Don't know		
41.b	What price did you receive for selling 1 kg of cotton this season?	a. 23 MT' b. 24 MT' c. Other (specify)		
41.c	Do you have a receipt of sale for cotton this season? (Surveyor: Please take picture of receipt)	a. Yes b. No		
42	What is the current price of cotton?	a. 20 MT' b. 21 MT' c. 22 MT' d. 23 MT' e. Does not know		
43	How does the price of cotton vary from the beginning to the end of the selling season?	a. Price increases b. Price remains the same c. Price goes down d. Does not know		
44		a. Make sure you have good soil		

	How should you prepare your farm for planting? (Select all that apply)	b. Clear the land of the previous crop c. Check the soil's humidity d. Crop rotation e. Other (specify)			Cotton planting
45	What do you do not to lose your cotton? (Select all that apply)	a. Weeding b. Use pesticides c. Thinning d. Sow early e. Other (specify) f. Don't know			
46	What is the best way to sow cotton seeds?	a. Space the seeds out when planting b. Ensure the soil is moist enough c. Other (specify)			
47	This season, how did you know when rains were going to begin?	a. Did not know b. Neighbours or friends c. Radio d. JFS Mobile phone messages e. I saw the weather changing when the rains began f. Prior experience g. Other			Weather forecast
48	When do you think you should spray pesticides?	a. When you see a bug in the crop b. When the cotton starts opening c. Anytime the crop is in the field d. Other (specify) e. Does not know			Pesticide use
49	What should you take care of while spraying pesticides?	a. Wear long-sleeved clothing, gloves b. Cover the mouth c. Spray against the wind			

50		d. Do not eat, drink, or smoke e. Don't wash materials in rivers and well f. Other (specify) g. Does not know			
	How do you know it is time to harvest?	a. When half of the cotton field has all capsules open b. When all the cotton plants have all capsules open c. When cotton starts opening d. When my neighbour starts harvesting e. When the Activista tells me to harvest f. Other (specify) g. Does not know			Harvesting and bagging cotton
	Why is it advisable to pick cotton early? (Select all that apply)	a. Preserve quality of cotton fibre b. Protect from rain c. Get better prices d. Protect from pests e. Cotton weighs more f. Other (specify)			
	What should you do if the cotton is opening and it is starting to rain?	a. Pick the cotton and put it in the dryer b. Leave it in the field c. Other (specify) d. Don't know			
	How do you dry your cotton?	a. Put it out on a dryer b. Leave it in the field to dry naturally c. I don't know d. Other (specify)			Cotton drying

54	How should you harvest and bag the cotton to maintain the quality of the cotton? (Select all that apply)	a. Dry the cotton b. Separate the primary cotton from the secondary quality cotton and do not mix while bagging c. Do not fill the bag to the brim d. Nothing needs to be done e. Other (specify) f. Don't know			Cotton storage
	What do you do when you have cotton ready for the market (Select all that apply)	a. Call the Activista/tecnico b. Wait for information from the Activista c. Stay in the market until JFS-SAN sees you d. Call JFS-SAN to inform them e. Other (specify) f. Don't know			Preparation for sale
	Did you receive chemicals from JFS last season?	a. Yes b. No			
	Will you grow cotton next season?	a. Yes b. No c. Don't know	If a. or c. >> skip to 58		Growing cotton next season
	Why will you not grow cotton next season?	a. I want to try another crop with higher profits b. I did not have a good crop this year c. I am not happy with JFS d. Cotton is difficult to grow e. Other (specify)			
	Do you listen to the JFS radio program?	a. Yes b. No	If b.>> skip to the end of the survey		JFS Radio program

58.a	What day does JFS SAN radio program air?	c. Sometimes		
		a. Monday b. Tuesday c. Wednesday d. Thursday e. Friday f. Saturday g. Sunday		
58.b	What information do you get from the radio program? (Select all that apply)	a. Cotton planting tips b. Cotton harvesting tips c. Pest management tips d. Post-harvest management tips e. Health tips f. Weather information g. Other (specify)		