



USAID FIRMS PROJECT

Analytical Overview of Mobile Agri-Trading Study

Recommendations for Technology Interventions in the Value Chain

October 2013

This publication was produced for review by the USAID. It was prepared by Muhammad Yar Hiraj for an assignment commissioned by Chemonics International under the USAID Firms Project.



USAID FIRMS PROJECT

Analytical Overview of Mobile Agri-Trading Study

Recommendations for Technology Interventions in the Value
Chain

DISCLAIMER

The author's views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development, the United States Government or Chemonics International Inc.

Data Page

Contract Number: GBTI II Task Order No. EEM-4-07-07-00008-00

Contractor Name: Chemonics International, Inc.

Name of the Component: Value Chain Development (VCD)

USAID Technical Office: Office of the Economic Growth and Agriculture; USAID Pakistan

Date of Report: October 07, 2013

Document Title: Analytical Overview of Mobile Agri Trading Study
Recommendations for Technology Interventions in the Value Chain

Author's Name: Muhammad Yar Hiraj

Editing: Zehra, M and Tahir, Shahzad.

SOW Title and Work Plan & Action ID: Work plan 24130
Action ID 6777
SOW title 2105

Project Area: Nationwide, Pakistan

Key Words: ICT, agriculture, value chain, intervention, model, peach, mango, fish, potato

Abstract:

In this report we have proposed a broad framework and mechanism for introducing ICT tools in the agricultural chain that can benefit the lives of farmers and reduce financial and operational leakages throughout the sale and purchase of agricultural produce.

The objective of this consultancy assignment was to analyze and understand the current agricultural trading scheme in Pakistan with the aim of proposing Technology Interventions that can increase efficiency in Agricultural Value Chain Development. While the assignment SOW initially sought to achieve an online agricultural commodity trading scheme in which buyers and sellers could transact online, during the course of the study it was concluded that the enabling environment to conduct such transactions in the near term did not exist.

Therefore our work was focused on identifying areas where technology interventions could play a significant role in improving the efficiency in the Value Chain through increased information availability to participants in the overall agricultural system. The study was conducted in the context of our target commodities and geographies where the Firms Project has an established presence in Pakistan and where we could leverage existing relationships and expertise. The applicability of our overall framework is discussed in context of those commodities to enable near term implementation of technology tools and to supplement the ongoing work of Firms professionals in the field.

Acronyms

ADB	Asian Development Bank
ADR	Alternate Dispute Resolution
AIP	Annual Implementation Plan
AMP	Award Management Plan
BEE	Business Enabling Environment
COP	Chief of Party
COTR	Contracting Officer's Technical Representative
DEDS	District Economic Development Strategies
EG	Economic Growth
EU	European Union
FATA	Federally Administered Tribal Areas
FLB	Fruit Logistica Berlin
FSN	Foreign Service National
FY	Fiscal Year
GDP	Gross Domestic Product
GIS	Geographical Information System
GOP	Government of Pakistan
HACCP	Hazard analysis and critical control points
IDP	Internally Displaced Person
IMF	International Monetary Fund
IT	Information Technology
IUA	Infrastructure Upgradation Agreement
KPCCI	Khyber Pakhtunkhwa Chamber of Commerce and Industry
KPK	Khyber Pakhtunkhwa
M&E	Monitoring and Evaluation
MGA	Mango Growers Association
MoU	Memorandum of Understanding
NGO	Non-Governmental Organization
PaRRSA	Provincial Reconstruction, Rehabilitation and Settlement Authority
PHDEC	Pakistan Horticulture Development and Export Board
RFP	Request for Proposal
SME	Small and Medium Enterprises
SMEDA	Small and Medium Enterprises Development Authority
SO	Strategic Objective
SOW	Scope of Work
TBD	To Be Determined

TFFs	Trout Fish Farms
US	United States
USAID	United States Agency for International Development
USG	United States Government
WB	World Bank

Table of Contents

EXECUTIVE SUMMARY	IX
1. ICT INTERVENTION FRAMEWORK	1
1.1 CONSIDERATIONS FOR PROPOSING ICT TOOLS IN THE AGRICULTURE CHAIN IN PAKISTAN	1
1.1.1 FOCUSING ON INFORMATION AVAILABILITY AND REDUCING OPACITY	1
1.1.2 ENABLING FARMER HANDHOLDING	1
1.1.3 SYSTEM INFORMAL INTERACTIONS	2
1.1.4 RECOGNIZING LIMITATIONS OF FARMERS	2
1.2 CONCEPTUALIZING THE ICT FRAMEWORK	2
1.3 DEFINING A ROLE BASED ASSISTANCE MODEL	5
1.4 TECHNOLOGY ENABLED INFORMATION CENTERS	6
1.5 ICT INTERVENTION METHOD IVRS/SMS/MANNED CALL CENTERS	7
1.6 ICT INTERVENTION METHOD: FARMER NETWORK FOR SURVEYS AND FEEDBACK	8
1.7 ICT INTERVENTION METHOD: LISTING SERVICES TO INCREASE GEOGRAPHIC REACH	9
2. COMMODITY SPECIFIC INTERVENTIONS	11
2.1 DATES SECTOR	11
2.2 MANGO SECTOR	12
2.3 PEACH SECTOR	12
2.4 FISH/TROUT SECTOR	13
2.5 POTATO SECTOR	13
3. CHALLENGES TO THE PROPOSED SCHEME	14

List of Figures

- Figure 1 Introduction of ICT Tools in the Value Chain 3
- Figure 2 Components of Information Repository 4
- Figure 3 Method of Accessing Data from the Information Repository 5
- Figure 4 IVR vs SMS vs Call Centers 8
- Figure 5 IVR 8
- Figure 6 Using Social Media to list Services 9
- Figure 7 Global Listing Service Website 10

Executive Summary

The assignment began with information gathering followed by an assessment of the agricultural scheme and identification of areas where technology intervention could play a significant role. A detailed report was delivered on October 7th, 2013, followed by an addendum on November 17th, 2013.

This report included the following:

- Work plan of the study
- Assignment hypothesis and methodology
- Background preparation work
- Summary of findings from
- Informational meetings
- Field trips

Discussions with sector experts including

- FIRMS professionals
- Assessment of agricultural trading scheme
- Generalized agricultural trading framework
- Stakeholders in the Value Chain
- Trading scheme variations for focus commodities
- Technology interventions
- Identification of areas where technology can play an important role
- Possible ICT interventions
- Applicability of ICT interventions by specific commodities

Subsequently a series of meetings were conducted to review and discuss the findings with colleagues and stakeholders for feedback. These findings were incorporated into our overall framework of ICT interventions described in this report. This report is a set of recommendations, based on the work to date, summarized as a broad methodology for introducing technology in the Value Chain and for applying this methodology to target commodities.

1. ICT Intervention Framework

1.1 Considerations for Proposing ICT Tools in the Agri Chain in Pakistan

As noted previously in the detailed report, the current scheme of agricultural trade between producers and buyers revolves around transacting in an informal market between a seller and a limited number of buyers. The produce seller of a 6 acre peach farm in Swat may typically get purchase bids from 3-4 fruit purchasers. Generally these bids are based on personal knowledge of and relationship between the buyers (middlemen) who operate in the general vicinity of the seller. Additionally, the growers often lack the resources to seek out other buyers or to package their produce and transport it to the markets to secure a better price. Their default path is to take the best deal they can get from the limited choices they have. This inherent inefficiency does not ensure an optimal, market price for the growers.

The assignment sought to utilize ICT tools to increase financial efficiency in sale and purchase of agricultural produce. The hypothesis was that increasing awareness of buyers for sellers and vice versa would increase overall efficiency within the current scheme of produce, sale and purchase of agricultural commodities.

Consequently, our assignment was driven by the following considerations in suggesting the overall framework for ICT intervention in the Value Chain:

1.1.1 Focusing on Information Availability and Reducing Opacity

We noted during our study that, at various levels, sellers as well as buyers were dissatisfied with the level of information available to them in the marketplace. There was general opacity in the agricultural value chain as well as the trading scheme. Even simple listings of sellers and buyers of particular commodities within specific geographies did not exist.

The sellers felt that while they had strong relationships with the intermediaries, the *aartis*, since the produce was eventually sold in the open market, if there could be a mechanism to increase the number of buyers in each auction it would be to their benefit. There was also a desire to deal directly with non-local *mandis* since it was perceived that there was often a price arbitrage to be captured if only it was easily known. Hence, it was established that there is a market need for informational and listing type services that could enable sellers to seek buyers and vice versa all through the Value Chain. Specific commodity listings could not only help buyers of the commodities but also other sellers to determine suitable asking price. Additionally this could provide greater market access by allowing buyers and sellers in distant places to become aware of each other. The farmers were also more likely to get better payment terms, reduce dependence by increasing diversity in the number of buyers, and manage produce losses from lack of timely sales.

1.1.2 Enabling Farmer Handholding

A consensus in the agricultural community of farmers and growers was that there is no one looking out for them. Whether it is the small farmer or the relatively large grower, the commonly held belief is that everyone in the buyer and provider community is there to take advantage of them one way or the other. The government is also accepted as being callous to the farmers' needs and is largely absent from their lives. The only help available to farmers is through informal means and the information available through such means is often not the most reliable. Farmer handholding is a missing link in the agricultural chain today. Creating a broader process flow for helping farmers is an essential need of the day. The farmer should have the comfort that

someone is on their side and is available to help them when needed. Using ICT tools for access or for information organization can play an important role in providing essential help and authentic information, and in giving confidence to the farming community.

1.1.3 System Informal Interactions

We noted during our study that numerous unsophisticated and non-legitimized participants who all interact with the growers characterize the agricultural chain. From the seed and pesticide supplier, to the moneylender, to the wholesaler bidding in the open market, there is hardly any player in the market whose role can be verified formally (such as through government licensing/registration of input suppliers, moneylenders or wholesales, or even private sector certification of an authorized dealer.) There was also no established mechanism for grading or quality verification of commodities. Buyers ascertain the quality of the produce themselves before confirming a sale and sellers must accept the terms available to them on the day of the sale. There are no third party verifications or any certification standards that can be used by buyers to purchase produce without having to check it themselves or for sellers to be sure that they received the optimal price for their produce. It seems that almost every interaction in this chain is devoid of standards and marred with subjectivity. ICT tools can help reduce this subjectivity through readily available information.

1.1.4 Recognizing Limitations of Farmers

In the existing agricultural landscape farmer education and awareness is limited. While most of the farmers in our focus group discussions used mobile phones and could read Urdu text, hardly any of them had ever used data services to access something as simple as weather forecast from the Internet. Additionally most farmers were smallscale producers who have limited means to market their own produce. They lacked scale and resources to establish credibility with potential buyers themselves. The concept of farmer collectives was also virtually non-existent. Most of the information exchange was through traditional means such as word of mouth. Therefore, we concluded that our mode of using ICT tools for information organization and information access should not be overly complex or sophisticated. Farmers should have multiple options for and be able to choose their means of accessing information – whether it is simply making a phone call to a call center and talking to a live operator or going over an information center where someone can look up relevant information for them using the PC.

Our ICT design philosophy is focused on hardware independence for access of information, allowing use of any of the standard channels such as basic phones, PCs, tablets or devices. Additionally the means of access have to be inclusive and include SMS, browsers and IVRs. Information Centers staffed with personnel who can help farmers by looking up information for them and/or training them would also be useful.

1.2 Conceptualizing the ICT Framework

The primary concept in our simplified framework of introducing ICT tools in the agricultural value chain is to separate the information from the means and methods of interacting with it.



Figure 1 Introduction of ICT Tools in the Value Chain

We propose to centralize information relevant to a farmer across the Value Chain organizing it in the form of an information repository and separating it out into four components:

- Crop inputs
- Crop care
- Crop harvest and sale preparation
- Crop sale

This information repository will be developed using data from various different sources including agricultural department, Firms Project professionals, technical experts and other specialists. This repository should be easily accessible over the Internet and useable through different access methods. It should be professionally maintained and constantly updated. The information repository should be broadly accessible. A farmer should be able to get the relevant information through different methods:

Tools (self connect)

- SMS – broadcast and bi-directional
- IVR – outgoing and inquiry based
- Internet – over browser or apps in local language

Professionals

- Call center personnel – a farmer will call a call center to get the required help and information. The professional answering the call would access the repository and answer questions
- Physical centers staffed by professionals – a farmer will visit a center to get the required help and information. The professional available at the center would access the repository and answer questions

Peers

- Farmers ask other farmers for help and they in turn use the tools or call center etc. to help them with their needs
- A schematic representation of this framework and the various components are noted below.

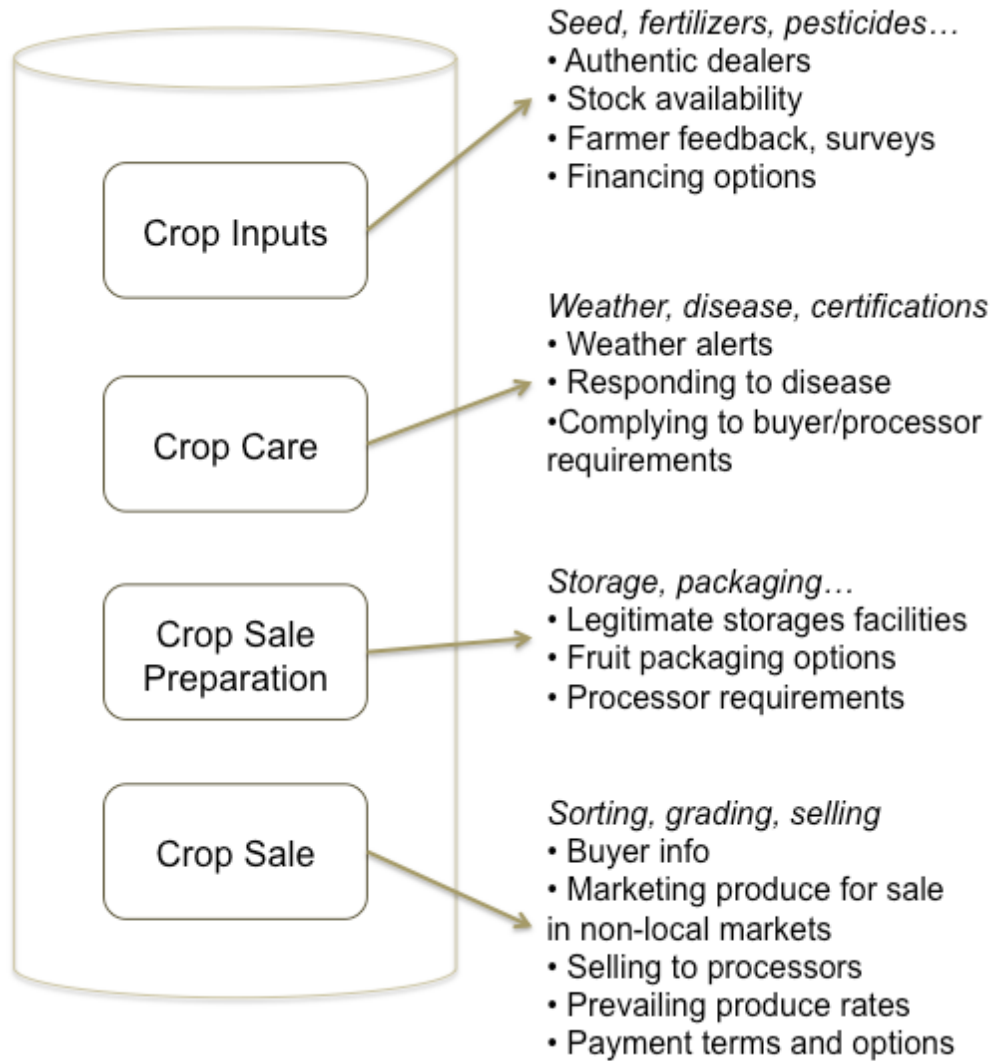


Figure 2 Components of Information Repository

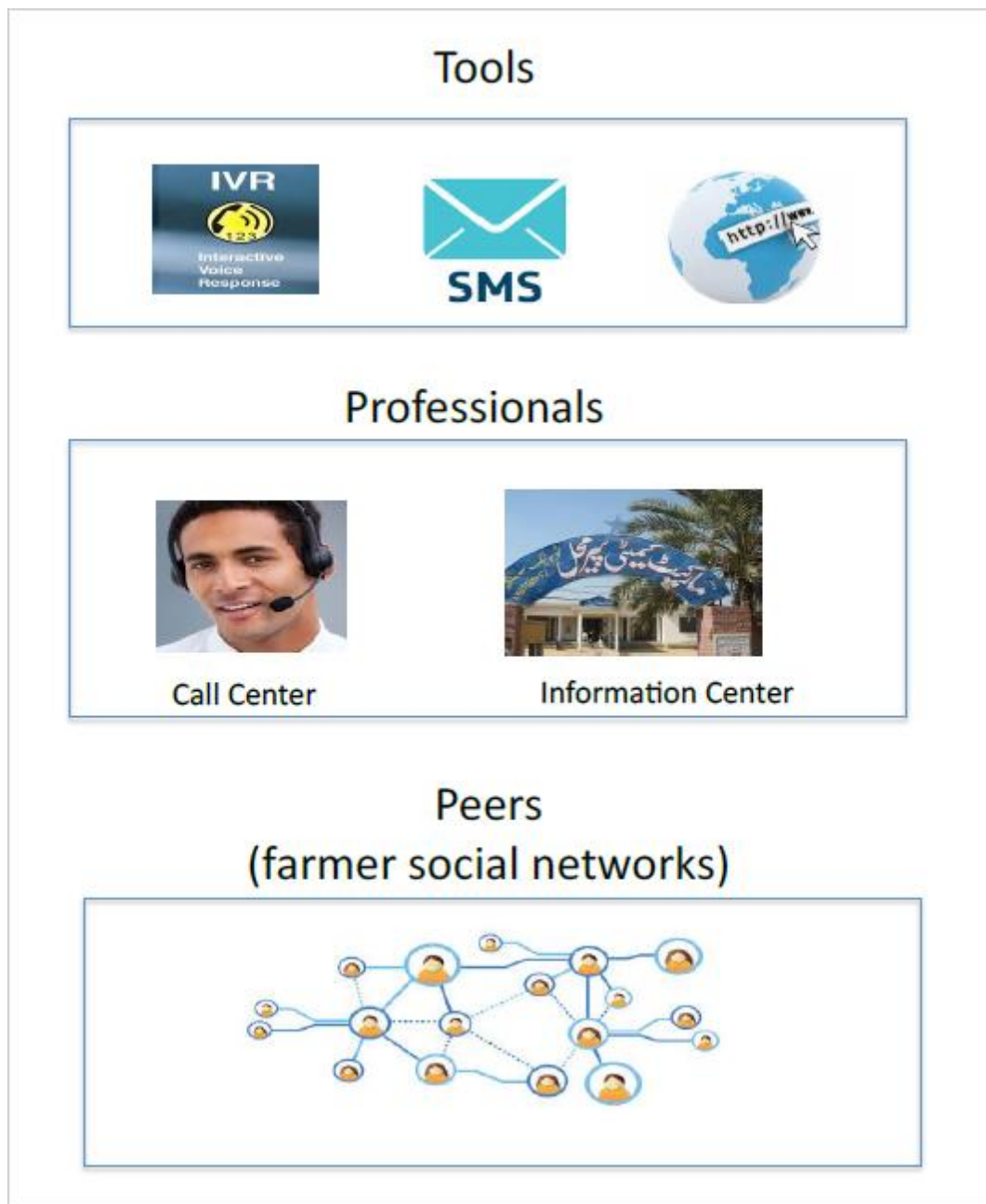


Figure 3 Method of Accessing Data from the Information Repository

1.3 Defining a Role Based Assistance Model

We believe that a role-based assistance model that brings together participants in the agricultural ecosystem while clearly defining responsibilities is essential for undertaking ICT interventions. This will ensure better planning, on-ground execution and eventual results.

We suggest the following roles of the different participants for implementation of the ICT framework:

Firms Personnel

- Project planning

- Project management
- Overall coordination between stakeholders
- Responsibility for execution and achievement of defined milestones
- Eventual handover of project to other stakeholders such as Government

Government

- Provide on-ground support (locations, personnel)
- Staff and manage support centers
- Manage program after initial setup

Farmers

- Interact with project teams for awareness and training
- Use information resources as a “first-stop” for all their agri needs
- Technology partners
- Provide enabling infrastructure
- Operate contact management solutions as necessary

Suppliers

- Engage with project team to authenticate crop input availability

Processors

- Work with project teams to create awareness for their requirements

Wholesalers

- Create mechanism for direct purchase of produce from grower instead of through the aarti

Specialists

- Should be engaged as needed to fill in knowledge gaps of the working group

1.4 Technology Enabled Information Centers

During discussions with growers it was noted that they felt the need to interact with experts and expressed a desire for active handholding during times of distress. We believe that technology enabled centers which could function as hubs for agricultural information and assistance would be well received by the grower community. Such Information centers will be physical locations operating as facilitation areas for growers.

The focus will be on making information available to both growers and purchasers. During the project we explored the viability and usefulness of operating such centers, including operational responsibility for such centers on a long-term basis. The Government of KP was open to the idea of supporting such centers, at least during the pilot phase, and committed to designating staff for launching them.

Technology interventions to growers can also be initiated through such centers. These centers can serve as the initial locations where the growers are taught to use the proposed tools.

Grower Needs:

- Require active handholding during regular crop cycle
- Believe they do not have anyone to turn to during times of crop distress
- Desire easy access to credible resources for agricultural needs
- Feel that Government representatives are neither available nor responsive

Functions:

- Hubs for agricultural information in the community
- "Go-To" locations for Growers' crop management needs

Technology tools information

- Access to Information Repository for the farmers through designated personnel
- Farmer training to access information themselves in the future

Types:**Full-service Centers**

- Staffed with agricultural advisory professionals
- Maintain and update repositories of information
- Provide necessary information on demand to walk-in personnel
- Broadcast locality specific info to immediate community through phone based applications.

Satellites

- Individuals/cluster-leaders equipped with tablet computers
- Local community leaders connected to nearby growers
- Provide on-ground feedback and connectivity between growers and centers
- Provide sale/purchase data as available
- Create awareness of other available resources (technology tools)

Such centers should have the look and feel of an NGO rather than government because of perceived unavailability of agricultural department staff.

1.5 ICT Intervention Method IVRs/SMS/Manned Call Centers

Create helpline for farmers through a call center. Additional information access can be done through automated IVRs and SMS (bi-directional). Using these methods, farmers can easily get information on crop inputs, weather and other information related to managing the crop cycle.



Figure 4 IVR vs SMS vs Call Centers

Similarly, IVR/SMS-based proximity-based, tools can be used by farmers to find dealers/input providers who are authorized agents of reputable companies. Farmers can call an IVR line and be sent an SMS that contains a list of such providers. Similar mechanism can be followed for sorting and grading services to growers.

1.6 ICT Intervention Method: Farmer Network for Surveys and Feedback

The information repository will not be complete without an ongoing feedback loop of information collected through the farmers. Such feedback loop may be created through automated or physical interaction:

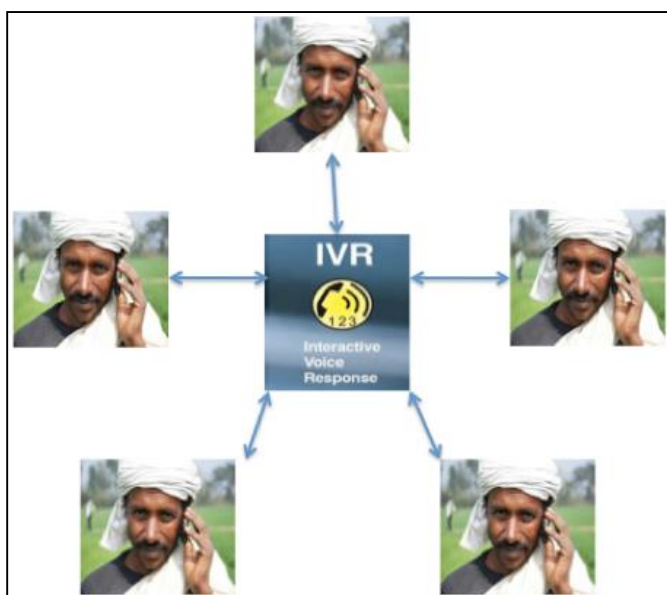


Figure 5 IVR

the ecosystem. Furthermore, location based services can be used to conduct surveys and solicit feedback.

Location-based outgoing IVR calls to farmers to collect data through simple questions

- “Do you consider xyz fertilizer supplier to provide genuine products? Press 1 for ‘yes’, 2 for ‘no’, and 3 for ‘don’t know’.
- “Most farmers in your area consider abc seed supplier to be trustworthy. Do you agree? Press 1 for ‘yes’, 2 for ‘no’.”

Information centers can also ask questions from farmers to populate data

Social Network of farmers can also allow farmers to send SMS/IVR message broadcasts to local groups and rate dealers, artis, and other participants in

1.7 ICT Intervention Method: Listing Services to Increase Geographic Reach

An information system, which can aggregate and provide pricing and auction data, can help growers reach buyers outside of their immediate geography.

For example creating a brand for Swat Trout and marketing it to the affluent population in urban Punjab, and generating a “pull” for the product, would help develop the demand and supply chain along the way. Online advertising to the 30 million Pakistan using broadband Internet could be a useful way to do so. A similar system to this for Khairpur Dates could also be implemented. Screenshot of using twitter-type service for such listings is noted below:



Figure 6 Using Social Media to list Services

Listing Services targeting middleman/aggregator

As noted previously, it is possible that listing services are more useful to the aarti and the processor/wholesaler rather than the farmer. Creating more efficiency in the trade between aarti and processor will benefit the entire value chain, benefiting the grower along the way.

Additionally, an international listing service along the lines of the global listing service alibaba.com may be created to market Pakistani agricultural produce abroad.

The screenshot displays the Alibaba.com interface for a search on rice. At the top, the search bar contains the text 'Please input a keyword' and a 'Search' button. Below the search bar, the breadcrumb trail reads 'Home > Products > Agriculture > Grain > Rice : 12,082 Product(s) found'. The main content area is divided into three columns. The left column contains a 'Category' dropdown set to 'Agriculture > Grain > Rice', an 'Active Filters' section with 'White Rice' selected, and a 'Variety' section listing options like 'Long-Grain Rice (11332)', 'Medium-Grain Rice (1073)', and 'Short-Grain Rice (817)'. The middle column shows a list of product listings. The first listing is for 'white rice grain packing in 25kg/50kg per pp bag origin China' by 'Dalian Masoo International Trading Co., Ltd.', with a minimum order of 25 metric tons and an FOB price of US \$655-755. The second listing is for 'konjac rice' by 'Sichuan Moli Technology Co., Ltd.', with a minimum order of 100 kilograms and an FOB price of US \$7-11. The third listing is for 'Vietnamese Long Grain White Rice 25% Broken - High Quality' by 'PHUONG QUAN CO., LTD.', with a minimum order of 50 metric tons and an FOB price of US \$350-440. The right column features a 'Post Buying Request' section and 'Premium Related Products' with images of various rice-related items.

Figure 7 Global Listing Service Website

2. Commodity Specific Interventions

The preliminary findings in the previous report were shared with Firms sector specialists and their feedback was solicited. The following interventions were agreed to be useful to the farming community, listed by focus commodities.

2.1 Dates Sector

	Information	Method	Notes
1	Weather and crop updates	SMS broadcast	Daily or periodic SMS message in Urdu/Sindhi to farmers
2	Crop inputs - Pesticides feedback	SMS broadcast, IVR recorded messages	Surveying by location to assess usefulness of particular chemicals and broadcasting results to other farmers
3	Cold storage listings	Farmers call the Call Center, receive SMS with list of cold storages in desired geography	Information of cold storages is gathered by location and organized for easy dissemination through SMS
4	Farmer listing of produce for local and export purchasers	Buyers use tools to view listed produce and contact sellers	Sellers send SMS with info or place a call to a call center to provide the info. This information gets listed on the system Buyers use internet or apps to access information

2.2 Mango Sector

	Information	Method	Notes
1	Weather and crop updates	SMS broadcast	Daily or periodic SMS message in Urdu/Saraiki/Punjabi etc. to farmers
2	Surveys of crop care, crop inputs, packaging etc.	SMS broadcast, IVR recorded messages	Surveying by location to compile and disseminate crop related issues and useful counter steps; results broadcast to other farmers
3	Crop certifications	Consultation with specialists at information centers	Farmers visit centers to understand process for procuring different certifications and to prepare crops for export market
4	Farmer listing of produce for local and export purchasers	Buyers use tools to view listed produce and contact sellers	Sellers send SMS with info or place a call to a call center to provide the info. This information gets listed on the system Buyers use internet or apps to access information

2.3 Peach Sector

	Information	Method	Notes
1	Weather and crop updates	SMS broadcast, IVR contact center	Daily or periodic SMS message in Urdu/Pashto etc. to farmers
2	Listings of legitimate pesticide and other input suppliers (carton providers)	SMS broadcast, IVR recorded messages	Surveying farmers by location to compile and disseminate farmer experience with input suppliers in their areas Compile and make available list of legitimate dealers of major companies

2.4 Fish/Trout Sector

	Information	Method	Notes
1	Weather and crop updates	SMS broadcast	Daily or periodic SMS message in Urdu/Pashtu etc. to farmers
2	Listings of legitimate suppliers of fish food and other input suppliers	SMS broadcast, IVR recorded messages	<p>Surveying farmers by location to compile and disseminate farmer experience with input suppliers in their areas</p> <p>Make available list of legitimate dealers of major companies supplying fish food (which have the right nutritional content)</p>
3	Farmer listing of produce for local purchasers	Buyers use tools to view listed produce and contact sellers	<p>Sellers send SMS with info or place a call to a call center to provide the info. This information gets listed on the system</p> <p>Buyers use internet or apps to access information</p>

2.5 Potato Sector

	Information	Method	Notes
1	Weather and crop updates	SMS broadcast	Daily or periodic SMS message in Urdu/Pashto to farmers
2	Listings of legitimate suppliers of potato seed and other inputs	SMS broadcast, IVR recorded messages	<p>Surveying farmers by location to compile and disseminate farmer experience with input suppliers in their areas</p> <p>Make available list of legitimate dealers of seeds</p>

3. Challenges to the Proposed Scheme

Any initiatives that have the potential to disrupt the status quo in a traditional industry like agriculture are likely to face several challenges. While most of these challenges can be overcome with time and effort, they are nonetheless noted below.

a) Resistance to change

In some ways various part of the agricultural production chain have not changed for centuries in this region. Farmers tend to be very set in their ways and changing their habits will require significant effort. To achieve success, the benefits to adopting new ways of doing thing should be clearly demonstrated and bring immediate benefits to the farming community.

b) Entrenched financial relationships

Most of the farmers do their purchasing on credit and pay their debts when they sell their produce. They have limited ability to store produce or to wait for payments from buyers. Their room to maneuver is constrained by their dependence on the moneylender and the middleman (– the aarti). For many farmers the aarti dictates what they can and cannot do and when and where they can sell their produce. For any significant change in the sale/purchase chain, viable alternatives to the aarti system may need to be demonstrated.

c) Limited level of education and sophistication

The farming community is highly unsophisticated and operates in a very informal economic system. Even a slight amount of confusion on any front will make it difficult for our ICT interventions to reach mass adoption in their target segments.

d) Coordinating efforts of numerous stakeholders

There are numerous stakeholders in this sector who will impact intervention efforts. These include Firms project professional, government agricultural departments, and across a range of commodities, wholesalers, processors, buyers, input suppliers and others. Coordinating their efforts and keeping their incentives aligned for mutual benefit is likely to be a complex project management exercise.

e) Commitment and long-term ownership

ICT interventions are not likely to yield mass scale, across country results overnight. While the project's initial management is likely to be with the Firms' professionals, the long term ownership and operation is expected to be with the Government. Keeping the government committed to the success of a long-term project is not likely to be an easy task, especially in light of shifting priorities around election cycles.

The next steps in this consultancy project are to provide a high level overview of the work done to date to senior US Aid personnel.

USAID Firms Project
info@epfirms.com