IFC Private Sector Support to Climate Resilience in Zambia

Mobile Phone Platform for Disseminating Information to Smallholder Farmers

28 September 2012
Produced by ECI*Africa*/DAI

For public release

Table of Contents

NB: Names of institutions, companies and products in the report have been replaced with letters e.g. Company A, B, C or Product 1, 2, 3 in order to maintain confidentiality of stakeholders, companies and products involved.

IFC International Finance Corporation World Bank Group

Climate change is adversely affecting Zambia's population, especially smallholder farmers

As a result of climate change, Zambia is experiencing changing weather conditions and increasing occurrence of extreme weather events (e.g., flood and drought). These changes are disrupting typical farming and market patterns, and a lack of knowledge of how to protect against effects makes smallholder farmers particularly vulnerable.

The International Finance Corporation (IFC) seeks to support climate resilience through private sector investment

The IFC has commissioned four assessments under the Pilot Program for Climate Resilience (PPCR) to identify investment opportunities to help smallholders including:

- Microfinance products
- A mobile platform for disseminating market and climate information
- Weather index-based insurance products
- General private sector innovations in agricultural technology

The IFC and PPCR have US$10 million in concessional financing and US$1 million for capacity-building grants. Access to additional financing resources can be leveraged to catalyze private sector investment in commercially viable initiatives that support climate resilience among Zambia's farmers.

ECI*Africa* conducted an assessment to identify opportunities for investing in a mobile platform to serve smallholders in Zambia

- The market assessment was conducted in Zambia from 23 July to 23 August 2012
- During the assessment, we conducted:
  - A literature review of information and communication technology (ICT) in agriculture
  - Interviews with more than 75 agricultural stakeholders from more than 50 organizations
  - 215 individual surveys with farmers in Southern, Central, and Western Districts located in the priority Kafue and Barotse sub-basins
  - An industry scan and research into potential platforms and technology partners
  - Additional small group interviews with farmers, agro input dealers, and other stakeholders
- The team was led by Jessica Heinzelman (DAI) with invaluable support from Alfred Daka (Green Living Movement), Shainoor Khoja (Better Business Enterprise), and five survey enumerators

See Annex G for the full list of interviews

There is an opportunity to launch a commercially viable mobile platform for disseminating information to farmers

Demand	There is demand from farmers and agricultural stakeholders for a mobile platform that improves access to information and creates stronger communication linkages
Content	Information service providers can source and create valuable base content to engage farmers on an ongoing basis
Platform	Numerous platforms could meet platform requirements of the Zambian farmer and agricultural ecosystem with some customization
Business Models	A profitable mobile platform can be realized in a four- to six-year period with the risk lying in effective implementation
Financing	The risk associated with launching a mobile platform can be mitigated through strategic implementation and PPCR/IFC concessional financing

There is demand from farmers and agricultural stakeholders for a mobile platform that improves access to information and creates stronger communication linkages

Existing Farmer Communications

- Call friends to determine or compare market prices
- Call known buyers of goods before traveling to sell
- Receive indirect communication from lead farmers about training, organized activities, and agricultural advice
- Request assistance from agricultural support organizations or lead farmers when problems arise

Potential Farmer & Stakeholder Communications

- Receive reliable market prices for decision making and negotiations
- Receive offers from **prospective buyers** to improve access to market
- Receive event information, reminders, and agricultural advice from **nongovernmental organizations (NGOs), microfinance institutions (MFIs), associations, input companies, insurance providers, and processors**
- Request assistance from an expanded group of agricultural stakeholders as needed
- Receive information about weather not currently accessible via mobile
- Receive information from **MFIs, insurance providers, input companies, etc.** on promotions and products to improve farming

There is a potential market of more than 1,305,783 agricultural *households* with increasing network coverage and access to mobile phones

Market

Province	# of Ag HH
Central	133,109
Copperbelt	157,570
Eastern	231,120
Luapula	136,554
Lusaka	59,684
Northern	219,115
North-Western	95,334
Southern	144,201
Western	129,096
TOTAL	***1,305,783***

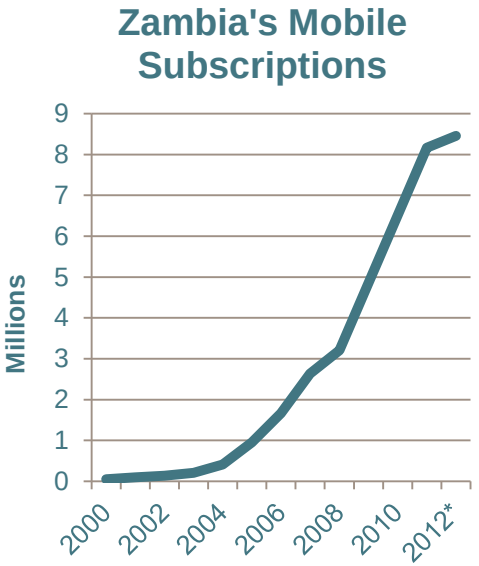
Coverage

Mobile Coverage in Zambia (GSM) as of April 2012

A $16 million seed funding program is anticipated to expand Zambia's mobile network coverage further to reach more of the underserved and unserved population.

Penetration

Zambia has more than 8,455,462 million mobile subscribers, reflecting approximately a **64.5 percent mobile penetration rate.**



Market Source: Agricultural Analytical Report, Republic of Zambia Central Statistical Office, 2003 (based on 2000 Census). Coverage Source: ZICTA, 2012. Penetration Source: Zambian Information & Communication Agency, ICT Sector Report Q1 2012. *2012 numbers reflect growth through the first quarter.

Eighty-four percent of smallholder farmers are willing to pay at least 5,000 kwacha or $1 per month for weather, prices, input information, and agricultural tips

Top Information Needs

#1 Weather

#2 Market prices

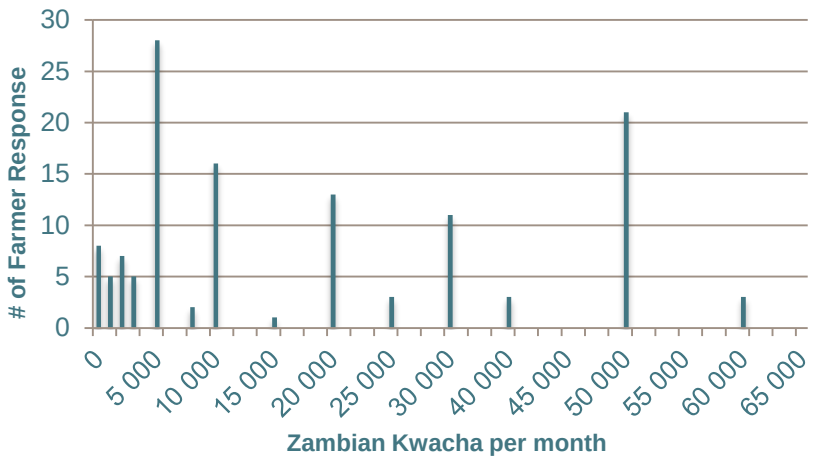
#3 Information on inputs

#4 Agricultural tips

#5 Offers to buy

#6 Promotions

Farmers' Willingness to Pay



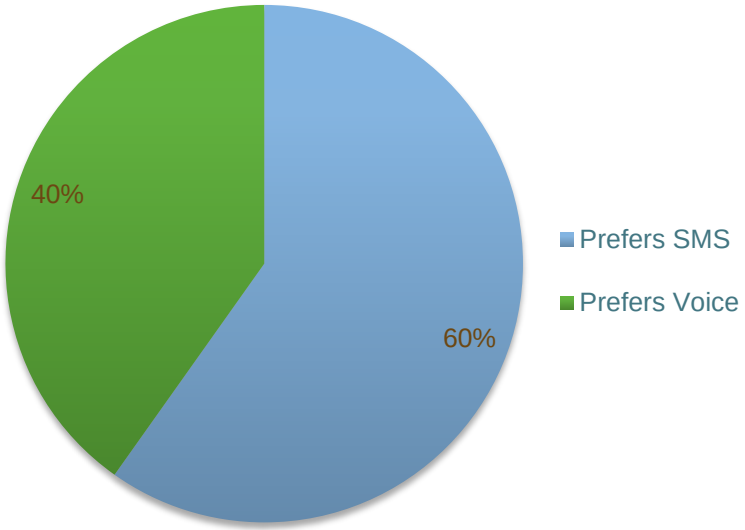
Farmer Income	% Income Spent on Airtime	% Income Willing to Spend on Info
Under 500,000	30%	16%
500,000 - 999,999	13%	6%
Over 1,000,000	6%	3%

USD	Farmer	%
$0.00	8	5%
$0.20	5	3%
$0.40	7	5%
$0.60	5	3%
84% of farmers are willing to pay at least $1 a month		
$1.00	28	18%
$1.20	0	0%
$1.40	0	0%
$1.60	2	1%
$1.80	0	0%
65% of farmers are willing to pay $2 or more a month		
$2.00	16	11%
$3.00	1	1%
$4.00	13	9%
$5.00	3	2%
$6.00	11	7%
$8.00	3	2%
$10.00	21	14%
$12.00	3	2%
$14.00	2	1%
$15.00	2	1%
$16.00	3	2%
$18.00	1	1%
$20.00	8	5%
$24 - $80	10	7%

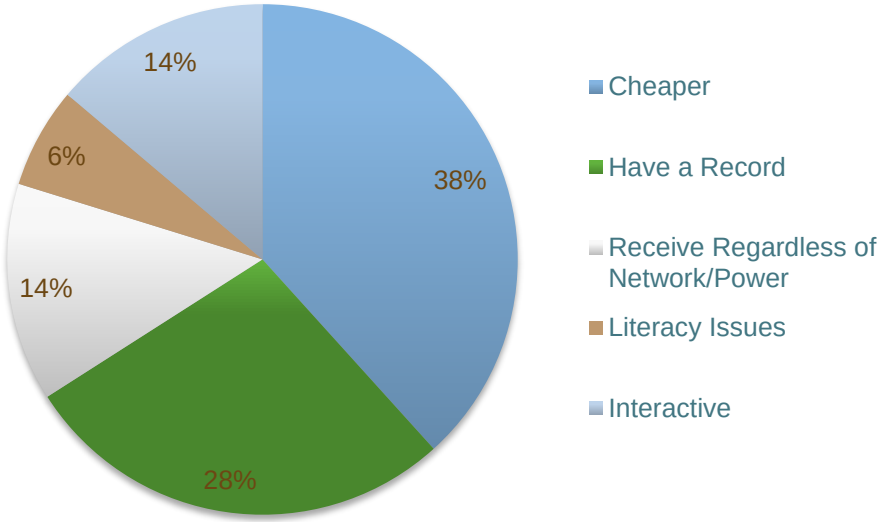
Surveys conducted with 218 farmers in Chome, Mazabuka, Monze, Mumbwa, Kaoma, and Mongu during August 2012. Note: only 152 surveys were collected with reliable data on income, airtime usage, and willingness to pay.

There is a greater demand for information delivered via SMS because it is cheaper and farmers have a record of information received

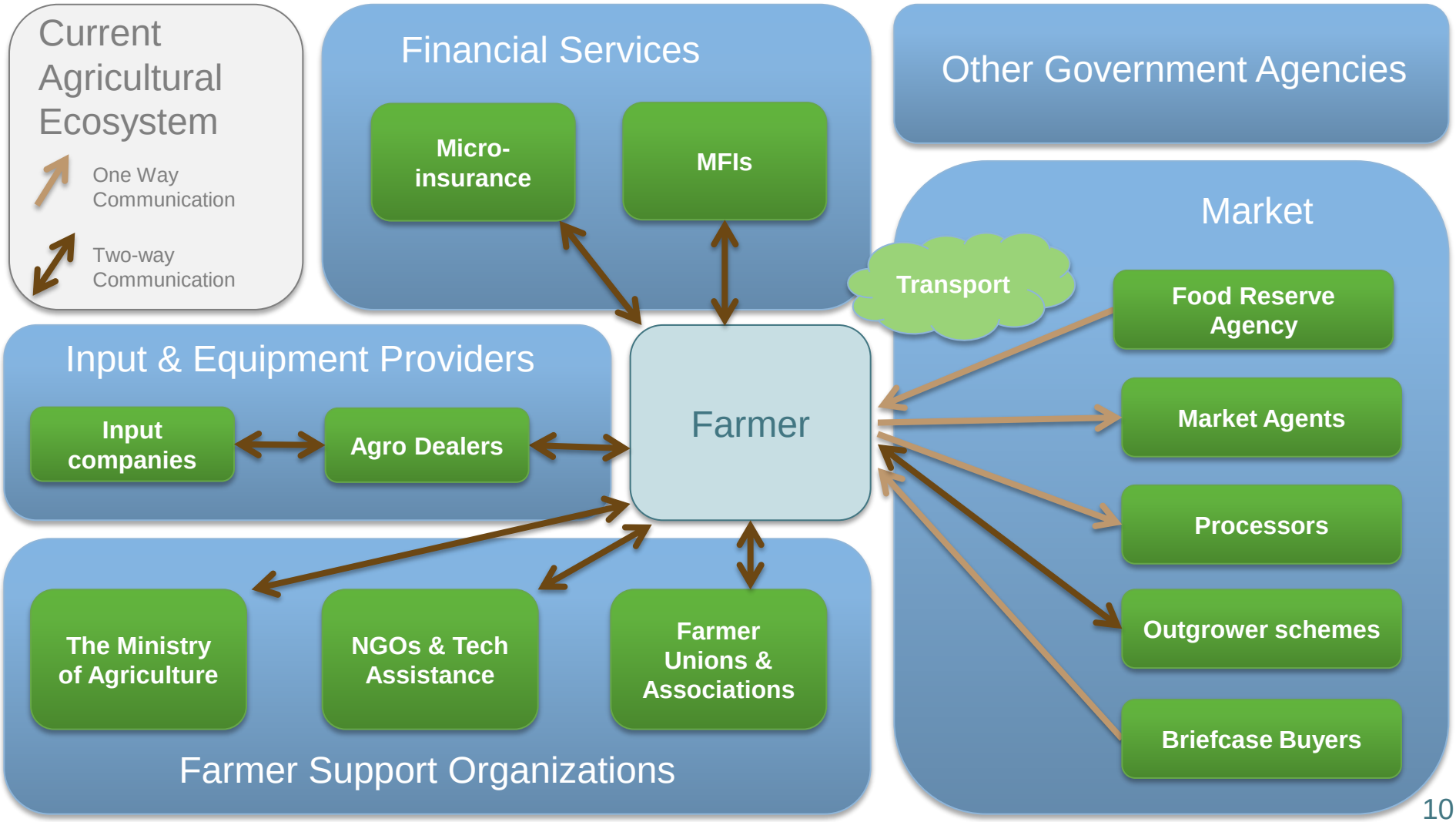
Sixty percent of farmers prefer to receive information via SMS rather than voice.



Sixty-six percent of farmers say they prefer SMS either because it is cheaper or because it provides a record.



Zambia's agricultural stakeholders already communicate with farmers and are a prime market for a mobile platform that could improve direct communication



Agricultural stakeholders have different information and incentives for using a platform and the frequency of communication will vary

Actor	Information	Incentives	Comm. Frequency	Examples
Unions & Associations	▪ Meetings and training announcements ▪ Market information ▪ Alerts on pest/disease ▪ Advocacy information	▪ Serve membership ▪ Increase membership/ funding ▪ Raise quality of commodities	**Weekly to quarterly** depending on size of organization, activity, and budget	Zambia National Farmers Union (ZNFU), Mongu District Farmers Association, Dairy Association of Zambia
Ministry of Agriculture	▪ Meetings and training announcements ▪ Agricultural tips ▪ Market information ▪ Alerts on pest/disease	▪ Efficiency of communication ▪ Supplement extension work ▪ Increase reach	**Quarterly +** to lead farmers, expanding upon current informal use of mobiles by extension officers	Department of Information, extension services, Department of Marketing
NGOs & Technical Assistance Orgs	▪ Training announcements ▪ Agricultural tips and reminders ▪ Alerts on pest/disease	▪ Efficiency of communications ▪ Supplement traditional farmer support ▪ Increase reach	**Monthly +** to lead farmers initially, potentially growing to all beneficiaries as databases are built	Conservation Farming Unit, Concern WW, Musika
MFIs	▪ Repayment reminder ▪ Advertise loan products ▪ Advice and alerts	▪ Encourage timely repayment ▪ Attract customers ▪ Improve productivity to ensure repayment	**Monthly +** to all borrowers	VisionFund, CETZAM, Agora, Microbankers Trust
Micro-insurance	▪ Seasonal weather forecasts ▪ Technical advice to mitigate against loss	▪ Reduce risk and insurance claims	**Quarterly +** to all customers	Zisc, Nico Insurance, potential weather index-based entrants

Agricultural stakeholders have different information and incentives for using a platform and the frequency of communication will vary (continued)

Actor	Information	Incentives	Comm. Frequency	Examples
Input Companies	▪ Field days/demos ▪ Product information ▪ Product availability ▪ Promotions	▪ Increase sales ▪ Develop brand loyalty through information	**Seasonal** input info **Monthly +** technical advice	SeedCo, MRI, Zambia Fertilizer, SkyFarmer
Agro Dealers	▪ Field days/demos ▪ Product availability ▪ Promotions	▪ Increase sales ▪ Efficient communication with customers	**Seasonal** to customer records (50-1,500 farmers)	
Food Reserve Agency	▪ Purchasing information ▪ Payment updates	▪ Communicate purchasing information	**None** – radio is likely more cost-efficient	*The FRA purchases maize from farmers at a price set by the government
Market Agents	▪ Commodity demand ▪ Offers to buy/price	▪ Acquire product	**Daily** to small groups of local farmers	
Processors	▪ Quality control tips ▪ Offers to buy/price	▪ Improve product ▪ Attract sellers	**Weekly to Seasonally** dependent on commodity and quality requirements	Zambeef, Parmalat
Out-grower Schemes	▪ Meetings and training announcements ▪ Reminders/instruction	▪ Improve product ▪ Increase product supply	**Weekly** to out-grower farmers	Yambeeji, Dunavant, Diocese of Mongu Development Center
Transport	▪ Transport price and availability	▪ Increase business	**None** – organization required, potential growth area	
Government	▪ Early warning info ▪ Any information applicable to farmers	▪ Enable rapid and direct communication	**TBD**	DMMU, Ministry of Health

Agricultural stakeholders have demonstrated demand by *already* investing in and planning mobile communications

Examples of Mobile Comm.
- Implementing
- Planning
- Potential

LF Lead Farmer

Financial Services

Product B is using Company W for mobile-facilitated loan disbursements and would like to send monthly repayment reminders and other communications via SMS.

Farmers: 3,000

Other Government Agencies

Market

Company I works with outgrowers and is looking for a mobile solution for communicating distribution and purchase locations and technical instructions 2-3 times per month.

Farmers: 1,500 (expected 5,000 by 2014)

Company J is piloting eVouchers to pay farmers for cotton. eVouchers can be redeemed with local retailers. The money transfer uses the mobile network.

Farmers: 150,000

Input Providers

Input companies are building databases of customer #s to provide product info, publicize events, and deliver advice via SMS (establishing direct communication).

Agro dealers keep customer records and call or SMS event details and stock availability.

Farmer

Farmer Support Orgs

Company G is using bulk SMS notifications with 300 farmers participating in its tractor lease scheme (which has a 100% repayment rate). Company G is interested in expanding mobile communications to more beneficiaries.

Farmers: 180,000+ / 1,850 LF

Company H is working with market agents and vegetable farmers to improve communication and information between them using the Company F' USSD platform. More than 5,000 farmers registered in the first 4 months prior to launch.

Farmers: 16,000 / 200 LF

Company E- 4455 System (see slide 18).
Farmers: 500,000

A certain NGO is considering piloting SMS to send agricultural reminders and tips to farmers.

Mongu farmers: 3,200

The Ministry of Agriculture's Technical Services spends significant money on fuel to communicate with lead farmers. There is interest in formalizing existing use of phones by extension workers to increase communication efficiency and reduce fuel costs.

Farmers: Approx 44,200 LF

Information service providers must source and create valuable base content to engage farmers on an ongoing basis

Potential **value-added services** can be added through partnerships or expansion

Interactive SMS
Farmer Hotline

Services for additional charge to farmers

Paid communication from agricultural stakeholders creates added value for farmers and revenue for the mobile platform provider

Meetings
Training
Ag Tips
Reminders
Alerts
Input info

Paid communications will not be reliable or spread evenly among farmers and should therefore be considered as supplemental

Base content is consistent, attracts farmers to register, and keeps them engaged with the system

Weather
Market Prices
Limited Ag Tips
Alerts

Base content must reflect farmer information priorities and be valuable enough to ***justify cost of subscription***

Base content can be pulled from various sources and improved through additional investment

Info	Existing Information Source	Potential for Base Content
Weather	**Stakeholder A** currently supplies national-level weather information on a daily basis and seasonal forecasts leading up to the rainy season. There is a pilot program that supplies localized weather to the Livingston area. *Limitation:* Infrastructure and capacity is lacking to produce localized weather reports that provide farmers with the level of detail they require.	Today, limited weather information can be sent selectively. Localized weather will be increasingly available as DoM capacity and infrastructure are built. A number of donors are currently working to provide technical assistance and funding. For example, SDC Weather Index-based Insurance project has 3.5 million Swiss Francs earmarked for the project starting in 2012 and continuing for 3 years. *Timeline*: 3 years + *Cost:* Beyond platform scope
Market Prices	Ministry A collects market prices for major commodities from district markets on Mondays and releases information on Thursdays; ZNBC broadcasts Saturday morning. The Department also produces district reports monthly that outline trends. *Limitation:* The information is sufficient to identify trends, but less useful for informing real-time trades due to delay between collection and reporting and limited distribution. No information on vegetables.	Monthly reports that rarely make it to the individual farmer can be distributed, providing trend information to farmers. Weekly statistics can be a useful tool for verifying accuracy of other market price collection systems, and information reporting lags could be shortened by introducing mobile phones for data collection by Marketing Officers. *Timeline:* Ready, but not adequate *Cost:* Minimal – staff time to aggregate

Base content can be pulled from various sources and improved through additional investment (continued)

Info	Existing Information Source	Potential for Base Content
Market Prices (Cont.)	**Company H** is working to create Company F, a mobile system that collects market data through market agents. Agents are incentivized to record sale prices as part of a system that increases their ability to increase business and commissions. Prices are aggregated from approximately 10 agents to arrive at a market price. *Limitation:* Still in pilot phase, focused on "line or rail" area and vegetables.	This system brings value to the data collectors and, over time, could expand into new geographies and commodities for a sustainable source of market information. There may be an opportunity to use the technology and promote the data collection system with investment in additional training and customization of the platform for additional crops. *Timeline:* The system will be rolled out for vegetables in Southern, Central, and the Copperbelt during 2013 *Cost:* Training ($300) per market not including staff time, follow-up support, and cost of technology to be negotiated with company H
	The mobile platform provider could create market information from scratch.	A mobile platform provider may consider creating its own market price collection system by engaging informants to report from major district markets. This could be managed directly or outsourced to an organization such as the Zambia National Farmers Union that has a vested interest and some pre-existing infrastructure at the district level. *Timeline:* 3 months start-up *Cost: $*24,000+ per year

Base content can be pulled from various sources and improved through additional investment (continued)

Info	Existing Information Source	Potential for Base Content
Agricultural Tips	Ministry A and **other Agricultural Support Organizations** often have "best practices" or handbooks that provide tips for Zambian farmers in the different regions. *Limitation:* Information is decentralized and requires significant work to package into electronic format for dissemination.	The platform's data aggregator(s) can harvest relevant information and create crop-specific SMS programs for each ecological zone that can be sent to farmers. The creation of these message packages could also be done through partnership with NGOs or associations. *Timeline:* Two weeks per crop per ecological zone (and ongoing updates) *Cost:* $500 per crop/zone or potentially free if created in partnership with union, NGO, or Ministry of Agriculture

Base content can be pulled from various sources and improved through additional investment (continued)

Info	Existing Information Source	Potential for Base Content
Offers to Buy	Company E collects offering prices from 160 buyers in Zambia for 14 commodities. Some buyers update their prices regularly; others must be contacted by the system administrator regularly. *Limitation:* Prices are not available for all commodities in every province and not all districts have coverage. Some buyers require a minimum sale that is out of reach for smallholders.	Offers to buy from active buyers who regularly update their information could be fed into the mobile platform. With additional resources, Company E could work to expand its outreach to include more and smaller buyers throughout the country, working through its district offices. *Timeline:* 6 months *Cost:* $10,000 to expand network and additional funding to keep information up to date
	The mobile platform provider could build up information on offers from scratch.	A number of the platforms currently available or in development allow buyers to update the system directly with offers to buy. This would not be considered “base content” because it would be out of the control of the provider, but could be highly successful if potential buyers were trained on how to update offers. *Timeline:* Would require farmers to be in the system before incentives exist to introduce buying platform and be a “Phase II” feature *Cost:* Depends on the platform and required customization

Farmers would like an average of 18 base content messages per month

Frequency and Volume

Farmer demand (frequency and volume) will shift over time as farmers use and benefit from information or are disappointed by content. Frequency and volume should be monitored over time and pricing adjusted accordingly to maximize subscriptions, satisfaction, and revenue.

Average Frequency of Base Information Requested by Farmers	
Weather	10 messages per month
Market prices	4 messages per month
Agricultural tips	4 messages per month
TOTAL	**18 messages per month**

Recommendation: Supply a portion of the messages as part of the base subscription. This will keep cost per farmer low and keep the service affordable to the majority of farmers. Enable farmers to pay per message afterwards or offer a premium subscription that includes additional information each month.

Note: The business models outlined later in the report assume 10 messages per month included in a basic subscription with the additional 8 messages paid for by farmers as needed.

The perceived quality of information will affect farmers' willingness to pay

Quality

Incorrect information can hurt farmers and the mobile platform's business. Bad intelligence can lead farmers to take actions that are harmful (e.g., damaging crops or paying to transport goods without being able to recoup the cost) or feel as though they have wasted money. If farmers consistently receive inaccurate information, or perceive information as poor, subscriptions will drop and adoption will slow.

Recommendation: The mobile platform provider must invest in systems and partners that will yield quality data and perform regular quality control. **Messages must be *localized* and *timely* to ensure accuracy!** Collecting regular feedback from farmers will help monitor perceptions of value as well. Where issues in information quality arise, they should be dealt with quickly and transparently. Information sources that are consistently bad should be discontinued. Messages about weather and other information that is based on projections should be carefully phrased to manage expectations.

Base content needs to be translated into local languages to increase accessibility and support climate resilience

Language

Zambia has 75 ethnic languages, with **eight official languages** used in mass communications (e.g., TV and radio). Most farmers speak more than one of the official languages.

While farmers will have an easier time interpreting information that is received in their native language, there is usually someone in their social network who can help interpret messages if they are sent via SMS. However, the more steps a farmer must go through to access information, the less likely s/he is to consume it, reducing the value of the service and less effectively supporting climate resilience. The platform providers must balance these trade-offs, more deeply exploring the language issue through pilot testing.

Recommendation: The mobile platform should allow farmers to identify preferred languages through a registered farmer profile that can be used to target translated messages appropriately. The platform provider should translate base content and target messages as much as possible.

Note: Translation services for paid communications could be another revenue stream and increase the effectiveness of the overall platform.

Farmers surveyed spoke an average of 2.2 of Zambia's 8 main languages.

Base content needs to be packaged for farmers to increase utilization and support climate resilience

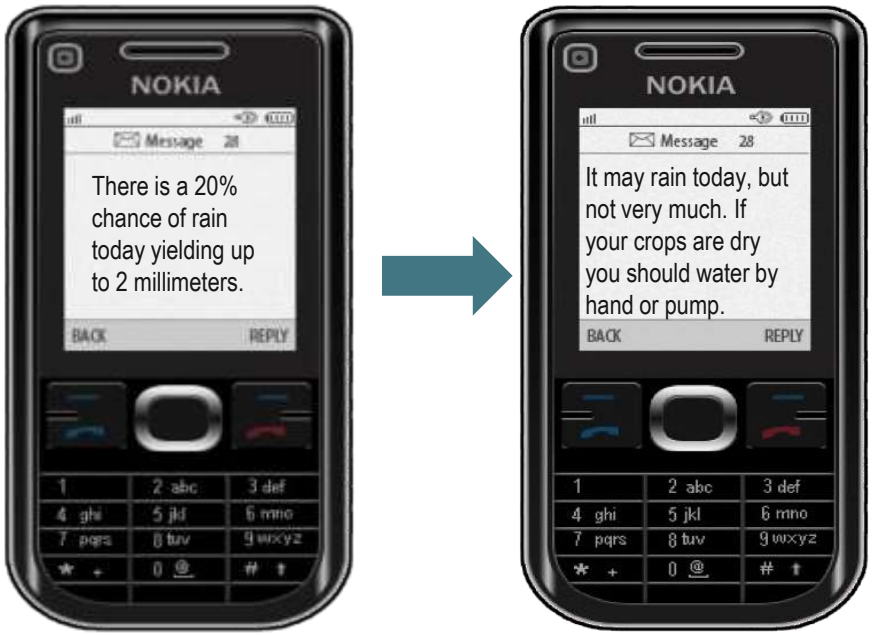
Utilization

Information will only help farmers if they know *how* to use it. Because consistent market and climate information will be a relatively new resource, farmers will need assistance in translating the information into action.

Recommendation: The mobile platform provider and partners should work with agricultural experts and those who interface closely with farmers to package information into actionable messages that use colloquial language that farmers can interpret and utilize to inform decisions and activities.

The mobile platform provider should also work with farmer support organizations to provide financial literacy training to teach farmers how to make marketing decisions based on price information.

Note: Financial training could be a potential revenue stream for the platform provider.



Agricultural stakeholders can provide and fund paid content that is desired by farmers

Info	Existing Information Source	Potential for Paid Communications
Information on Inputs	**Input companies** already have information on inputs—including product information, prices, and availability—that could be sent to a large group of farmers to market products.	Input companies would need to package information in a format that is suitable for SMS. Information could be sent in English or translated and targeted for greater impact. *Timeline*: Immediate *Cost*: Minimal and funded through marketing budgets of input companies
Agricultural Tips	Many **input companies** currently supply written information with seeds, fertilizers, animal health, and other products that provides best practices and instructions for use. Many companies report that there is "reading fatigue" and farmers are not referring to these materials on an ongoing basis.	Product instructions can be divided up into smaller SMS tips that can be pushed to farmers at relevant times. The information will likely require input companies to collect data on what products individual farmers are using and in which ecological zones. *Timeline*: Data collection can be done during high sales period at the beginning of the planting season *Cost*: Depends on data collection method, which can range from pen and paper forms to an SMS registration system

Agricultural stakeholders can provide and fund paid content that is desired by farmers (continued)

Info	Existing Information Source	Potential for Paid Communications
Agricultural Tips (continued)	**Processors** and **outgrower schemes** have technical advisors that provide information to farmers through training, personal visits, lead farmers, and informal mobile contact to improve productivity and quality of crops.	Technical advisors can create and send SMS messages to potential sellers and/or outgrowers that will supplement other communications, increasing the frequency of advice. *Timeline*: The time required depends on the organization's existing access to contact information and how quickly databases of target farmers can be built; time to create content will be done on an ongoing basis *Cost*: Depends on individual organization
	NGOs provide technical assistance to farmers as part of their daily work. The advice is currently delivered through meeting, training sessions, visits, and lead farmers (similar to processors and outgrower schemes).	The information, timeline, and cost is similar to the processor/outgrower option above.

Agricultural stakeholders can provide and fund paid content that is desired by farmers (continued)

Info	Existing Information Source	Potential for Paid Communications
Promotions	**Agro dealers** will sometimes offer reduced pricing for loyal customers. **Input companies** reduce pricing and/or offer chances to win agricultural products to customers.	Promotions that are currently publicized through radio and informal communication from agro dealers can be publicized through direct targeted messaging. Agro dealers and input companies can work together to create relevant content and target appropriately, whether to a specific database of customers or to a portion of the farmer population for whom the promotion is relevant. *Timeline*: Immediate *Cost*: Minimal and funded through marketing budgets of input companies
Base Content	See base content slides.	Base content can be sponsored by agricultural stakeholders (likely agribusiness) to increase recognition of their organization or brand and support outreach and marketing goals. *Timeline:* Dependent on specific base content *Cost:* Part of marketing and sales budget

Agricultural stakeholders can provide support for additional value-added services

Info	Existing Information Source	Potential for Value-Added Services
Agricultural Tips	Ministry A supports farmers through mass media—radio, television, publications, and Product C launched in November 2011. Farmers can text questions into the system in any language and receive answers from knowledgeable staff members. Trending questions are used to inform other media outputs (e.g., radio programming) *Limitation:* Product C has not had the resources to publicize the platform or provide training, leading to extremely low usage.	The staff of Product C would like to increase direct communication with farmers and would benefit from having their service bundled into a larger platform with resources for training and publicity. An agreement would have to be worked out to ensure adequate staffing to respond to demand as it grows. *Timeline:* Dependent on negotiations with Ministry of Agriculture *Cost:* Depends on platform and required customization to integrate SMS Helpline; potential additional revenue stream/revenue share

The Zambian market requires a mobile platform that offers 11 key features to ensure uptake from farmers and stakeholders

Requirement	Smallholder Farmers	Stakeholders
1) Ability to engage **multiple stakeholders** in content and revenue generation	✓	✓
2) Farmer database that captures **profile**	✓	✓
3) **Message targeting** based on farmer profile information to ensure relevance and cost effectiveness of messaging	✓	✓
4) Platform and information accessible in **multiple languages**	✓	
5) **Push and pull** options for accessing data	✓	✓
6) Database upload function with **contact management system** for organizations including ability to create contact groups		✓
7) **Scheduled and manual** outgoing messaging		✓
8) Farmer interface that enables information access with **minimal training**	✓	
9) **Flexibility to incorporate new services and features** such as SMS or voice helpline, polling features, and analytics	✓	✓
10) **Ability to customize** platform based on user feedback through either platform provider service offering or independent software developer	✓	✓
11) **Security settings** to protect user information and keep some databases proprietary	✓	✓

The ability for farmers to push and pull information is critical and any platform can and should be customized to support both

Push

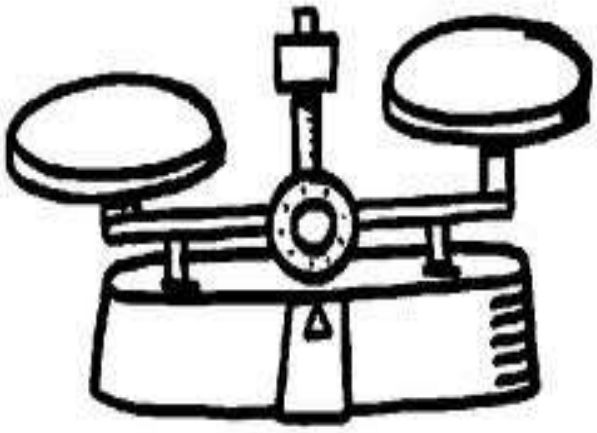
Pushing information is critical to keep farmers engaged with the platform and alert them to new information.

Without the push function, the platform risks losing customers who stop engaging on their own and will not have the ability to rapidly deliver alerts in the case of emergency.

Pull

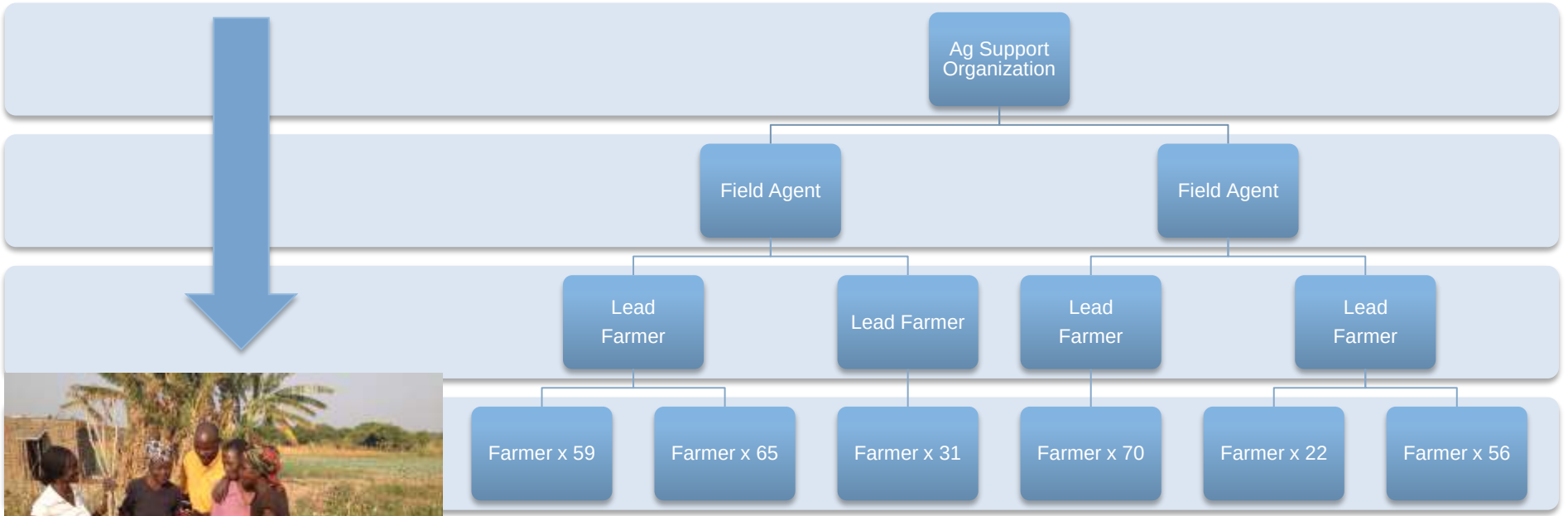
Pulling information allows farmers to access information on demand—getting it when they need it.

Without a *user-friendly* pull function, the platform risks frustrating customers who want to access information on demand and limits farmers' ability to get information they need when they need it.



A simple user interface is key to enabling sufficient uptake and market capture to support profitability

Zambian agricultural support organizations and MFIs have well-developed communication structures that utilize lead farmers to share information. A train-the-trainer model can be leveraged to introduce the mobile platform, but training must be *simple enough to pass through existing communication infrastructure without confusion.*



Lesson learned: Company E's current SMS system relies on complex codes for farmers to request market prices. It has experienced declining use over the past six years. The system receives an average of 3,000 requests a month, including 600 errors in which farmers inaccurately input codes and are charged but receive no information. Company E is currently exploring an alternative USSD option outlined in platform section.

The mobile platform can utilize SMS or USSD technology for providing information to farmers

	SMS	USSD
What is it?	Short Message Service (SMS) or text message	Unstructured Supplementary Service Data
How it works	Messages of 160 characters or less are sent to a phone and recipient is alerted to the new message with an icon. Recipients open and read the message and have the option to save or delete.	Users type a USSD short code (e.g., *188#) into their phone to initiate a session that enables two-way exchange of information. Most USSD-based agri applications utilize a *menu* that farmers navigate through options to find the information they want.
Benefits	▪ Farmers already are familiar with using SMS. ▪ Alerts farmers when new information is received. ▪ Accessing info is as easy as pushing one button. ▪ Can save useful SMS and access without cost. ▪ Voice SMS option can hold voice messages until farmers can access.	▪ Enables access to large amounts of information through menu options without requiring memorization of complex codes. ▪ Can access multiple pieces of information with single charge.

Continued on next page.

The mobile platform can utilize SMS or USSD technology for providing information to farmers (continued)

	SMS	USSD
Challenges	▪ Requesting information requires training and use of codes for different types of information; incorrect codes still cost money. ▪ Expensive to request information—costs 1 SMS for communication each way in an interaction. ▪ Voice SMS is as costly as calling and doesn't maintain record.	▪ Requires farmers to proactively access new info. ▪ Many farmers are not familiar with navigating USSD menus; requires additional training. ▪ USSD platforms in Zambia are still a bit unstable and are not intelligent enough to recognize individual users to adapt content; as demand grows, network operators will likely invest in upgraded systems. ▪ Returning to information previously accessed costs additional funds.
Cost	Usually about .5 cents per SMS, 3 cents per voice SMS.	Requires provider to have USSD code (negotiated, but tends to be around $5k/yr). Billing varies from weekly subscription to cost per session (approx. 1 SMS or .5 cents). USSD service charges are not well established and are at risk of changing as demand grows.

A hybrid platform that combines SMS to engage farmers and USSD to offer flexibility and cost savings is recommended to facilitate the greatest access to information

SMS is recommended as the foundational communication method because it requires little training to use and can be sent to farmers to promote engagement as they get used to using the system. It's effective use relies on updated farmer profiles that enable relevant message targeting.

USSD offers a cost-effective way to supplement an SMS-based system and enable farmers to navigate through menus to find desired information on demand. USSD should be seriously considered as a supplemental offering of an SMS platform. As farmers get more and more accustomed to accessing and using USSD, it can play a greater role.

Numerous platforms could meet platform requirements of the Zambian farmer and agricultural ecosystem with some customization

Technical Partner	Location	Multiple Stakeholder	Farmer Profile	Message Targeting	Multiple Languages	Push & Pull	Contact Mgmt.	Schedule & Manual Messaging	Minimal Training Reqs.	Flexible Services & Features	Ability to Customize	Security
Company A (SMS and USSD)	Uganda (w/ Zambia Office)	✓	½	✓	✓	✓	✓	✓	½	✓	✓	✓
Company B (SMS)	Ghana	✓	✓	✓	✓	✓	✓	✓	½	✓	½	✓
Company C (SMS)	India	✓	✓	✓	✓	Push only	✓	✓	✓	✓	✓	✓
Company D (SMS)	Kenya	½	✓		½	Pull only	½		½	✓	½	½
Company E (USSD)	Zambia	½	✓	✓	½	Pull only		½			½	½
Company F (USSD)	Zambia		½	½	½	Pull only	½	½	½	½	½	½

See Appendix C for greater detail.

A platform and provider should be selected based on their ability and willingness to customize for the Zambian market

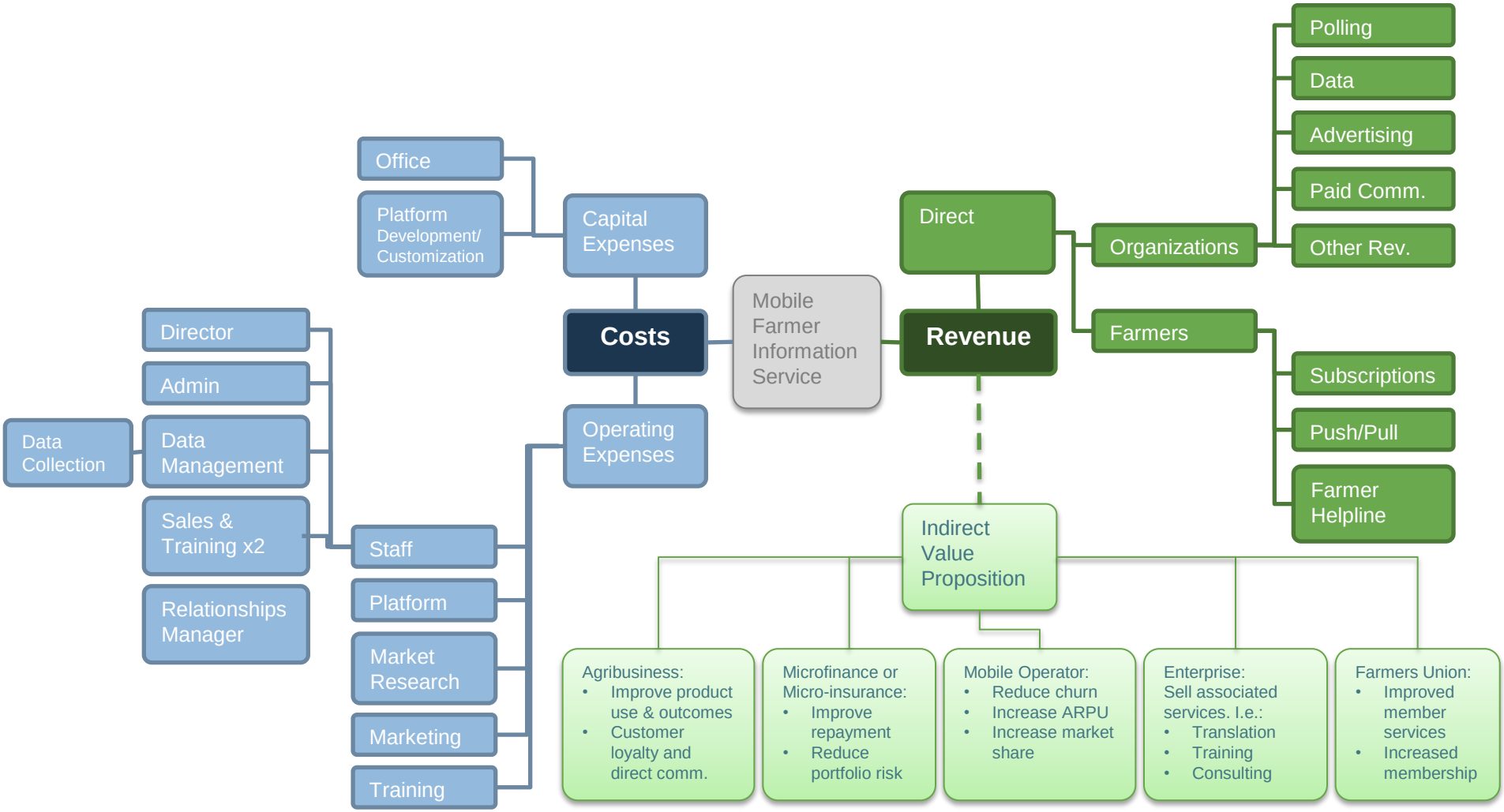
There is not a single platform that exists today that is a perfect fit for the Zambian market, but many of the available options are a close customization away.

A platform provider should be selected based on its willingness and ability to adapt the existing technology to the uniquely Zambian requirements *or* willingness to allow a local implementer full access to the code to enable customizations.

The customization team should have:

- Skilled software developers available to work on customizations.
- Experience building ICT applications for development—ideally, but not necessarily, agriculture.
- Ability to participate in pilot-testing to guide refinement of tools.

A profitable business can be realized in three to five years, with the risk lying in effective implementation



Value Added Service, Independent Enterprise, And Value Proposition models are commercially viable

Value Added Service (VAS):
A mobile network operator (MNO) partners with a content provider to offer an information service to farmers. Farmers pay a $1 subscription fee to register and the cost of two SMS (approximately 10 cents) each time they request and receive data. Revenue is collected through direct debit of airtime through the MNO and shared 70:30 with the content provider. The content provider can make additional profit by offering bulk SMS services to organizations that get a 10 percent discount on SMS and avoid the hassle of negotiating with the MNO.

Independent Enterprise:
An independent business is set up to run a mobile platform. It manages partnerships with content partners, works with farmer support organizations to train farmers how to use the technology, builds a database of registered users, and sells bulk SMS to organizations that want to communicate directly with farmers. A $1 subscription fee is paid each month, which covers the cost of base content (64 SMS per year). Additional revenue is generated through bulk SMS and potentially other services such as training and translation.

Value Proposition:
The costs of running a mobile platform are assumed by a business that receives a significant indirect value from the system (e.g., MFI, micro-insurance, agribusiness company). Expenditures are built into the parent company's cost of doing business and recouped through interest on loans, insurance premiums, or increased sales (depending) until the platform turns a profit. The day-to-day operation of the platform can be outsourced and run similarly to the independent enterprise model.

The financial models have been calculated on a conservative basis that reflects the reality of operationalizing a mobile platform in Zambia

Market

Year	1	2	3	4	5	6	7	8	9	10
Addressable Market	1,400,000 farming households									
Market Capture	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
No. of Farmers	14,000	28,000	42,000	56,000	70,000	84,000	98,000	112,000	126,000	140,000
Provinces Served	4	5	6	7	9	10	10	10	10	10
Districts	20	30	40	50	60	70	79	79	79	79

Usage

Year	1	2	3	4	5	6	7	8	9	10
Farmer Subscription Fee	$1 per month with farmers subscribing eight months in a year, which includes 10 base content SMS per month									
Farmer SMS Requests	Farmers are assumed to *average* two information requests a month during an eight-month period and pay for both the request SMS and return SMS (approximately 10 cents for the two-way exchange)									
Paid Communications	Organizations in aggregate are assumed to sponsor an *average* of 64 messages per farmer per year (eight a month) over an eight-month period									

Note: An eight-month period is assumed for farmer engagement based on the farming cycle. Farmers are expected to significantly reduce their spending during the lean period (October through January) when money is tight and agricultural activities are low.

See Appendix D for greater detail on assumptions

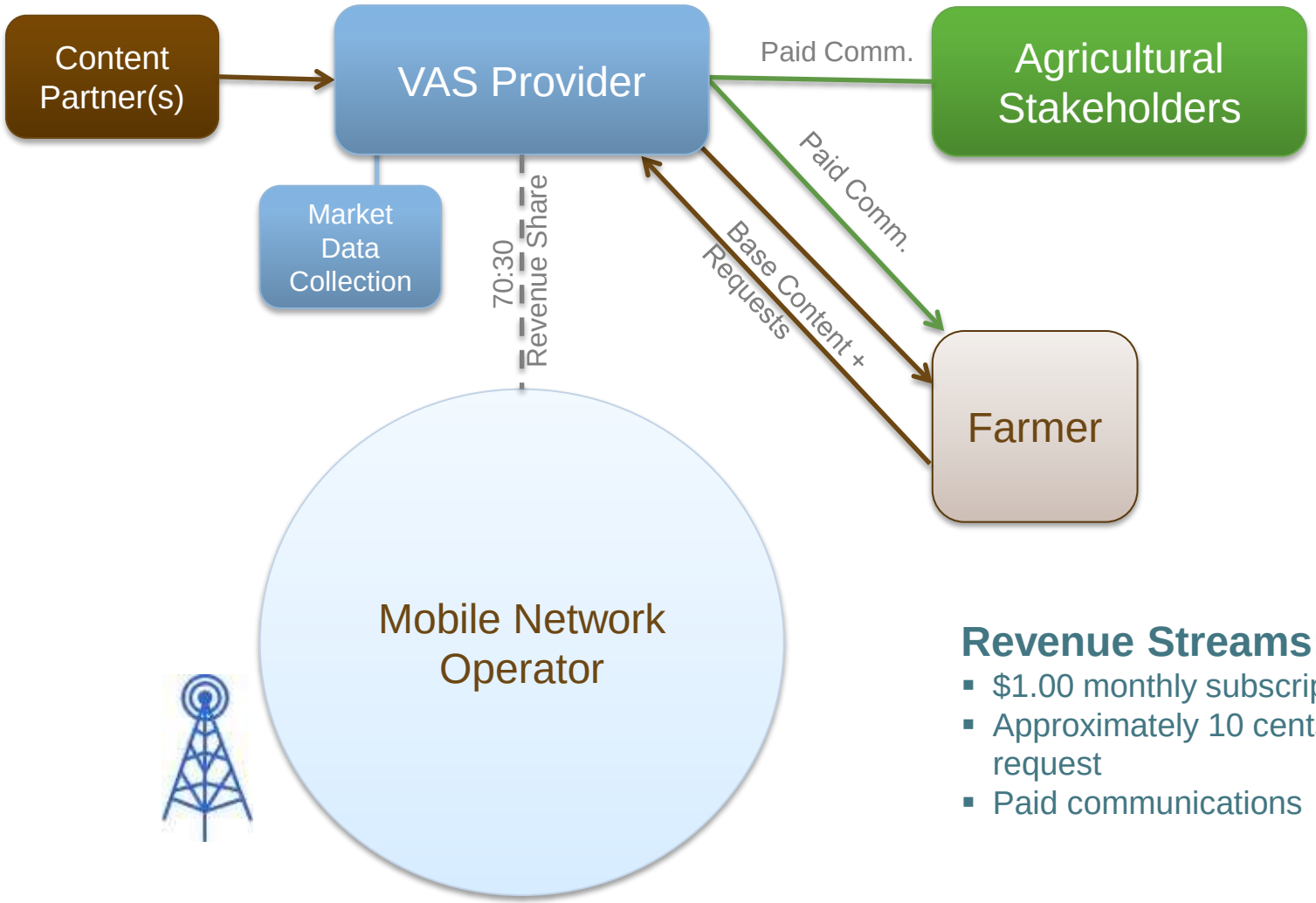
The financial models have been calculated on a conservative basis that reflects the reality of operationalizing a mobile platform in Zambia (continued)

Costs

Year	1	2	3	4	5	6	7	8	9	10
Platform	$40,000 – this is a placeholder figure and will vary based on platform selected. Owner-operated platforms will have minimal cost (customization only); others may have an annual licensing fee.									
Staffing	Business operations consist of **four staff**—Director, Finance/Admin, Data Management, Sales & Training. Additional training staff could be hired on a contract basis through training funds. Market price collection assumes one Price Collector in each province and one Market Information Informants in each district paid a small stipend. This could be reduced or increased depending on strategic partnerships and collection approach.									
Training & Education	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$60,000	$0	$0	$0
Marketing	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000

Note: This assessment assumes that cost savings are realized by leveraging strategic partnerships and existing resources, such as existing data collection efforts, and piggybacking on training. Additional savings can be realized by sharing office space, administrative staff, etc. Numbers should be taken as a starting point and may change drastically depending on the specific profile of the implementer.

The Value Added Service model requires a VAS provider to aggregate and collect data for sale



Revenue Streams:

- $1.00 monthly subscription fee
- Approximately 10 cents per info request
- Paid communications

The VAS model requires $434,352, has a IRR of 38 percent, and is profitable in year 4.

Year	1	2	3	4	5	6	7	8	9	10
Investment Required	(297,060)	(137,292)	(33,640)	-	-	-	-	-	-	-
Revenues	127,120	254,240	381,360	508,480	635,600	762,720	889,840	1,016,960	1,144,080	1,271,200
Net Income	(253,060)	(148,292)	(44,640)	57,849	156,427	267,363	370,282	545,370	660,097	774,453
Cumulative Cash Flows	(297,060)	(434,352)	(467,993)	(459,289)	(390,153)	(222,113)	45,750	416,283	955,890	1,615,254
Cash Required	**$434,352**									
IRR	**38%**									

The VAS Model is **profitable in year 4.**

The focus of a MNO-initiated VAS is the revenue, not the farmer

It should be noted that the VAS model will likely yield a fairly generic information service that does not support highly customized agricultural information that would be provided by a passionate entrepreneur or organization. MNOs are focused on their core competencies, and the underlying goal of the VAS would be to generate SMS requests (and revenue), reduce churn (customer turnover), and attract new customers—rather than developing content that is carefully customized to support the Zambian farmer above and beyond the level of information required to achieve financial objectives.

The MNO is nonetheless a critical partner in the success of the platform and should be engaged to provide use of network through a reasonable revenue share agreement (at *most* 70:30) and contribute to marketing efforts.

From the perspective of supporting climate resilience, the VAS model is the least attractive alternative. In the absence of another alternative, a basic VAS service could be better than the status quo.

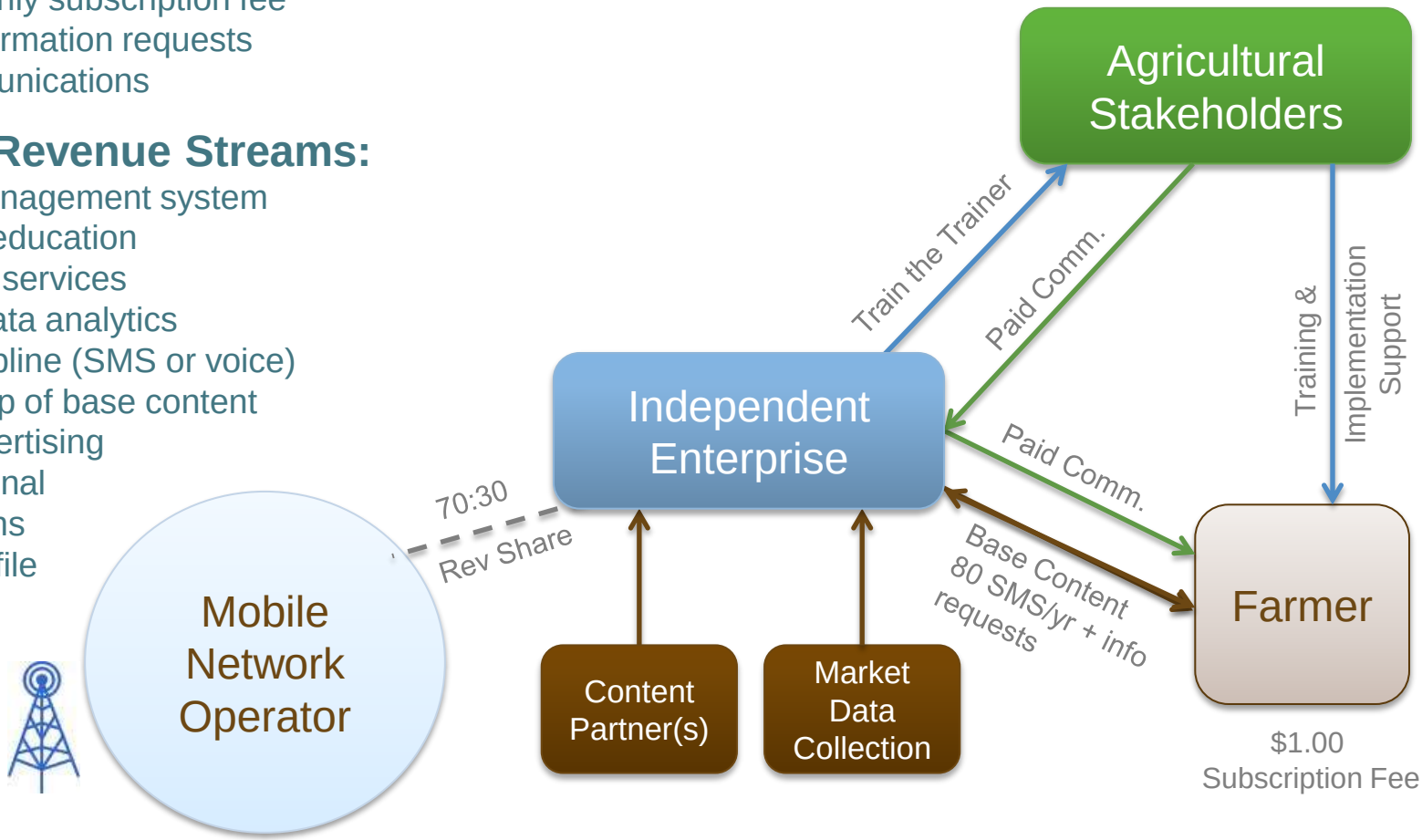
The Independent Enterprise model relies on a platform provider or entrepreneur to enter the market and run the business

Revenue Streams:

- $1.00 monthly subscription fee
- Farmer information requests
- Paid communications

Potential Revenue Streams:

- Contact management system
- Training & education
- Translation services
- Polling & data analytics
- Farmer helpline (SMS or voice)
- Sponsorship of base content
- Data & advertising
- Organizational subscriptions
- Farmer profile collection



The Independent Enterprise model requires $527,962, has an IRR of 17 percent, and is profitable in year 6

Year	1	2	3	4	5	6	7	8	9	10
Investment Required	(327,100)	(210,862)	(150,806)	(91,983)	(37,149)	-	-	-	-	-
Revenues	175,000	350,000	525,000	700,000	875,000	1,050,000	1,225,000	1,400,000	1,575,000	1,750,000
Net Income	(272,100)	(210,862)	(150,806)	(91,983)	(37,149)	18,963	78,050	209,980	281,534	352,699
Cumulative Cash Flows	(327,100)	(537,962)	(688,769)	(780,752)	(817,901)	(808,414)	(779,255)	(671,585)	(359,488)	233,621
Cash Required	**$527,962**									
IRR	**17%***									

The Independent Enterprise model **is profitable in year 6**.

***Note:** This model relies on additional revenue streams such as consulting, training, and translation services to be profitable. The specific revenue streams would be selected based on the platform provider's core competencies. For instance, Company B makes approximately 70 percent of its income through training and consulting services that complement its platform and information services.

The Enterprise model is the most flexible, and the most risky, because of its independent nature

Because the Enterprise model relies on a business being built from the ground up, it has the greatest flexibility to design a business that directly addresses the market and leverages complementary revenue streams. Unlike the VAS and Value Proposition models, the Enterprise model does not have to compete with priorities of parent organizations and can adapt with greater ease and efficiency to deliver innovative products.

The flexibility, focus, and financial freedom of the Enterprise model, however, is also what makes it the riskiest. With so many potential strategies, finding the right combination and balance of priorities may be tricky and will require a deep knowledge of agriculture in Zambia, a commitment to soliciting and integrating feedback from customers, and disciplined and strategic leadership.

From the perspective of supporting climate resilience, the Enterprise model will serve farmers well, quickly responding to market demand and information needs. It will be open to serving and working with the entire spectrum of agricultural stakeholders.

There is precedence for the success of complementary revenue streams in ICT-enabled businesses globally

Potential Revenue	Description	Precedent	Pricing
Contact Management System	Organizations will pay for an easy database that can be stored, shared, and linked with communication tools and records.	Constant Contact is an online contact management tool and email marketing company.	Tiered pricing based on number of contacts
Training & Education	Organization may outsource specialty training and/or grants may be available for training associated with packaging, accessing, and utilizing farmer information.	Company B makes 70 percent of its revenue from training and consulting services in Ghana, where it has the most developed market.	Per-training fee
Translation Services	In order to make the greatest impact, organizations without internal translation capacity will pay for their messaging to be translated into farmers' preferred languages.	A quick Google search yields hundreds of translation services that are sustainable businesses.	Fee per message translated
Polling & Data Analysis	Mobile polls are an efficient way for organizations to collect information and can reduce monitoring costs for customer feedback efforts.	Company Y polls individuals through SMS. It operates in more than 100 countries, polling citizens and providing clients with analytics.	Per survey sent or received

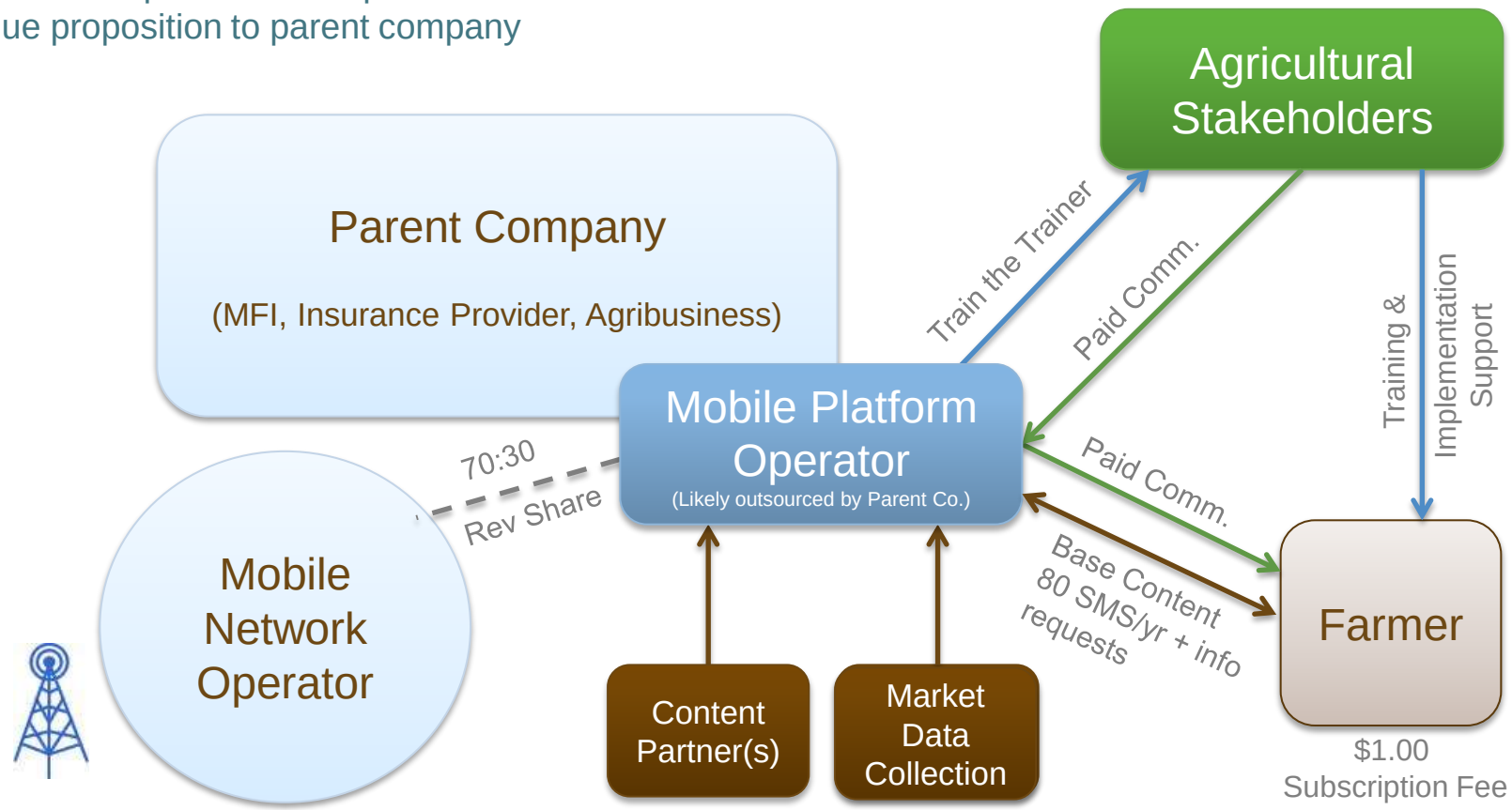
There is precedence for the success of complementary revenue streams in ICT-enabled businesses globally (continued)

Potential Revenue	Description	Precedent	Pricing
Farmer Helpline	Farmers willing to pay more than the base subscription and who want interactive advice will pay to call for live consultation.	Product A is a farmer helpline operated by a provider in Kenya. They provide agri information to farmers within 24 hours and captured a market of 30,000 farmers in 18 months.	Cost per call
Sponsorship of Base Content	Organizations may want to sponsor content (such as weather) and have a short advertisement or sponsorship message appended to base content.	Company X sponsors TV weather reports in Zambia currently.	Cost per message sent
Data and Advertising	Organizations that are building or have not yet built their own database will pay to reach specific demographics with their messaging.	Facebook is free to users, but funds the platform through advertising sales.	Cost per message sent
Organizational Subscriptions	Organizations will pay a fee to utilize software and services provided by a platform provider.	Salesforce.com sells software licenses to companies wanting to manage and track contacts, communication, and business operations through an online platform.	Tiered pricing based on # of users

In the Value Proposition model a parent company funds the first three years of data collection, training, and the technology by spreading the cost over customer base and then operates like an independent enterprise

Revenue & Potential Streams:

Same as Independent Enterprise
+ value proposition to parent company



MFIs, insurance companies, agribusinesses, and other actors each has different challenges and opportunities that can be leveraged through the Value Proposition model

	MFI	Insurance Co.	Agribusiness	Other
Financing Start-up	▪ Spread initial platform costs across loan portfolio	▪ Bundle cost in premiums	▪ Passed to customer through small increase in product cost	Yours to imagine!
Financial Incentives Note: Social and mission incentives required as well	▪ Improve repayment ▪ Decrease portfolio risk	▪ Reduce portfolio risk through information	▪ Sell more product ▪ Enable direct communication with customer ▪ Build brand loyalty	
Limitations	▪ Industry focus currently on building financial access and microfinance capacities ▪ Relatively small customer network	▪ Industry not currently serving significant number of smallholders	▪ Competitive marketplace restricts all stakeholders from utilizing platform and promotes duplication, diluting profitability and value to farmer	
Mitigations	▪ Potentially partner with insurance or other MFIs ▪ Build into PPCR/IFC investment in microfinance products	▪ Build into PPCR/IFC investment in weather index-based insurance products	▪ Establish period of exclusivity before opening to competitors (they'll likely find another way to use SMS anyway)	

The Value Proposition model requires $403,445, has an IRR of 83 percent, and is profitable in year 5

Year	1	2	3	4	5	6	7	8	9	10
Investment Required*	(129,940)	(136,752)	(136,752)	(23,149)	196,397	612,793	1,328,382	2,448,354	4,144,303	6,538,507
Revenues	175,000	350,000	525,000	700,000	875,000	1,050,000	1,225,000	1,400,000	1,575,000	1,750,000
Net Income	(129,940)	(6,812)	116,120	94,929	196,027	298,483	403,922	581,530	698,777	815,653
Cumulative Cash Flows	(129,940)	(136,752)	(136,752)	(23,149)	196,397	612,793	1,328,382	2,448,354	4,144,303	6,538,507
Cash Required	**$403,445**									
IRR	**83%**									

The Value Proposition Model **is profitable in year 5**.

Assumption: Data collection and technology costs passed to the customer in years 1-3.

*****This model assumes many of the initial implementation costs are passed on to parent company customers through year 3. That could continue for additional savings.*

The Value Proposition model is the lowest risk due to existing financial and operational resources

Because the Value Proposition model is built out from an existing organization that already works with or serves farmers, it benefits from access to pre-existing networks and has the ability to spread the cost of the mobile service over the parent company's operational costs.

From the perspective of supporting climate resilience, the Value Proposition model is strong. The parent company will inherently have an interest in supporting the same goals. However, there is a risk that the parent company may have other interests driven by a competitive landscape that might shape the business in a way that limits usage or access to serve competing priorities (e.g., not allowing competitors to utilize the platform, only serving parent company customers, etc.).

The IRR is attractive as a paper exercise, but *faces significant risks* that must be mitigated for the full potential to be achieved

The IRR relies on assumptions:	Risk	Mitigation
It is possible to collect and source timely and reliable base content (market prices and weather).	Without quality data, farmers will fail to see the value of the service and subscriptions will drop.	Invest in creating consistent base content of high quality and consistent quantity. This will require ongoing training, management, and oversight of data collector. Incentives for collecting and reporting data must also be designed to motivate over the long term. Additionally, watch the Company F pilot success and consider expansion of tools to new areas and commodities.
Farmers will have the financial literacy and resources to utilize market information.	The potential benefits of market information will not be realized and farmers will drop subscriptions.	Identify agricultural support organization partners that will provide financial literacy training in conjunction with system training and registration. This is a **beneficial use for IFC capacity-building grants** that could also help cement participation from anchor client organizations.
Agricultural support organizations will open their networks *and support the training and implementation* of the mobile platform.	Organizations will not want to contribute resources or training and registration of farmers will be a low priority, significantly affecting the ability to scale up to profitability.	Secure memoranda of understanding from anchor customers prior to significant investment and clearly outline expectations and roles. Ensure that the platform meets specific requirements set forth by the organization and, as possible, work with anchor customers to secure external funding for training (see above as one example).

The IRR is attractive as a paper exercise, but *faces significant risks* that must be mitigated for the full potential to be achieved (continued)

The IRR relies on assumptions:	Risk	Mitigation
Training will be simple enough to successfully percolate through the field agents to lead farmers and from the lead farmers to all farmers.	Farmers do not understand how to register and/or use the platform and do not subscribe to the service.	Choose a platform with minimal training requirements and create simple training materials that can be easily understood, replicated, and shared.
Direct competitors will not enter the market and the majority of agricultural stakeholders will utilize a single platform rather than competing platforms or private mobile solutions like bulk SMS providers, private short codes, or open-source software.	Agricultural stakeholders build their own systems, launch competing systems, or contract with bulk SMS providers to reach farmers.	Mobile platform providers must 1) engage stakeholders and potential competitors early in the process as partners and customers, 2) foster open communication with customers and integrate feedback into platform customizations and service plans, and 3) continue to monitor the features and pricing being offered by other mobile service providers and strive to remain competitive.
Government will not create new regulations that limit mobile communications.	Regulations are introduced that restrict the number or types of information that can be sent through the platform.	Follow legal and regulatory developments affecting the mobile industry. Engage in conversation with ZICTA and the Zambian Government and advocate for favorable regulations.

Concessional financing and grant funding can provide the breathing room to focus on meeting market demand for long-term sustainability

Many cash-strapped initiatives fail because they are forced to focus on paying the bills in the short term rather than addressing the market and its challenges for long-term success.

IFC and PPCR concessional financing will not only lower the financial barriers to entering the market, but will also enable a mobile platform provider to focus on strategic implementation until the business reaches a point of stability.

Concessional Financing for Zambia

- **Up to $10 million in concessional financing** – interest, repayment term, and general terms of investment to be negotiated
- **Up to $1 million in capacity-building grants** – could be used to establish a functioning and timely market data collection system or train farmers and farmer support organizations on the platform and/or on utilizing information for climate resilience
- **Additional financing** – the IFC can leverage additional financing through a number of mechanisms including equity agreements, risk sharing, associated funds, or standard commercial loans

A business plan competition can help the IFC identify which individuals, organizations, or partnerships are the best positioned to launch a commercially viable mobile platform

This report outlines the investment opportunity for launching a commercially viable mobile platform for Zambian farmers at a high level. Each of the models presented within are general and can be augmented or approached in numerous ways to grow a successful business.

Based on initial conversations, multiple individuals and organizations are interested and well-positioned to enter the Zambian market with a mobile platform for farmers. Each has competencies, business models, and experience to bring to the opportunity.

A business plan competition that engages interested parties to lay out their unique qualifications, approach, complementary revenue streams, and financial proposal (including proposed terms for the concessional financing) may be the most effective, fair, and efficient means of determining a way forward for investment.

Investment decisions should be made based on a sound financial plan as well as the parties' neutrality, focus, and experience.

The IFC *should invest* in a business that demonstrates a strong financial plan, can maintain neutrality and focus, and has relevant experience

Criterion	Justification	Business Model		
		VAS	Ind Ent	Val Prop
Neutrality	To implement a successful business, the organization must maintain neutrality within the agricultural sector that will enable it to partner with and serve all agricultural stakeholders. It will need to develop strong partnerships with organizations to assist with training and below-the-line marketing and remain open to serving all stakeholders as customers for paid communications. Lack of neutrality will shrink potential revenue and could catalyze a competing service that would negatively affect the viability of both platforms.	✓	✓	Proceed with Caution
Focus	Without well-proven models for reaching profitability and supporting climate resilience through ICT, the organization must adhere to strategic discipline focused on serving the smallholder farmer and agricultural stakeholder markets. They must not be subject to competing agendas that could make them vulnerable to decision making dictated by internal or external actors with different priorities.	Proceed with Caution	✓	Proceed with Caution
Experience	Making a mobile platform profitable will require a range of expertise, including experience in: ▪ Agriculture ▪ ICT for development ▪ Training and education ▪ Data collection & management ▪ Business strategy & implementation, and ▪ The Zambian context Experience in these areas must be taken into consideration along with the financial strength of any business plan.	Proceed with Caution	Proceed with Caution	Proceed with Caution

Appendices

- Appendix A: Demand Support Slides
- Appendix B: Content Support Slides
- Appendix C: Platform Support Slides
- Appendix D: Business Model Support Slides
- Appendix E: Useful Resources
- Appendix F: Market Profiles
- Appendix G: Interview List

Appendix A: Demand
Survey Demographics

- 215 farmers surveyed in Southern Province (Monze, Choma, Mazabuka), Central Province (Mumbwe, Kaoma), and Western Province (Kaoma, Mongu)

Closest Town	# Respondents	% Respondents
Choma	31	14%
Kaoma	47	22%
Mazabuka	22	10%
Mongu	57	27%
Monze	40	19%
Mumbwa	18	8%
Total	**215**	**100%**

- 140 male respondents (65 percent) and 77 female respondents (35 percent)
- Average age of respondents is 45 years old
- 28 percent of respondents hold a leadership position in a farmer group, cooperative, or association
- Crops/commodities produced by respondents:

	Maize	Soya	Rice	Grndnuts	Beans	Sorghum	Rice	Sunflwr	Cotton	Cow peas	Cassava	Honey	Wheat	Veg	Sheep	Pigs	Goats	Beef	Chicken	Dairy
# Resp	109	3	146	58	2	2	33	64	19	9	32	0	11	39	0	2	1	53	2	59
% Resp	51	1	68	27	1	1	15	30	9	4	15	0	5	18	0	1	0	25	1	27

Appendix A: Demand
Survey Demographics (continued)

- Household income and assets of respondents:

Income Range	% of Respondents Providing Income
Under 500,000	56%
500,000 – 999,999	25%
1,000,000 – 1,499,999	6%
1,500,000 and over	13%
Don't know	35%

	Radio	TV	Plough	Cell Phone	Cattle	Goats	Hammer Mill	Bicycle
% Respondents Own 1 or more	70%	31%	49%	85%	48%	41%	7%	65%

	Airtel	MTN	Zamtel
% have SIM card from:	79%	36%	1%

Appendix B: Content

Greater access to information will support climate resilience through increased productivity/profitability and improved mitigation/disaster response

Productivity & Profitability. Additional profits and/or food reserves will increase food and financial security as well as enable farmers to invest in products that support climate resilience.

- **Climate information** helps farmers plan for a season—what crops to grow, when to plant, and other weather-related decisions that affect production and outputs.
- **Weather information** helps farmers plan for the immediate, enabling them to leverage natural resources such as rain or mitigate against extreme climate events such as extreme cold.
- **Agricultural tips** can supplement and amplify existing extension services and technical assistance by providing farmers with advice and reminders that will increase the quality and yield of their produce.
- **Market information** improves farmers' ability to make decisions about when and where to sell commodities and negotiate higher prices to increase earnings. Earnings can be saved for times of need or put toward purchase of insurance or technologies that can help farmers maintain crops during harmful climate events.

Mitigation & Disaster Response. The mobile platform creates a direct channel of communication to disseminate critical information and advice to farmers about impending issues.

- **Climate information** helps farmers proactively plan for climate events and secure (through either purchase, loan, or community share) technologies such as irrigation pumps or storage to mitigate against harmful climate events.
- **Early warning alerts** about pests, disease, and weather events can give farmers warning as well as advice on how best to protect their crops or livestock and details on available resources.
- **Disaster response information** can be disseminated by government and humanitarian response organizations in the event of an emergency to help farmers protect themselves, access support, and minimize the impacts of disaster.

Appendix C: Platform

Platform Industry Scan and Criteria

This report looks at a selection of platforms that currently offer technology that provides agricultural and/or market price information to farmers via mobile phone. The list is not exhaustive, but was chosen based on the following criteria:

- Existing use in Zambia
- Demonstrated success in other countries/regions
- Unique features and/or business model

There are other technologies and technology providers that can be considered, but this initial scan provides information on some of the most promising platforms as well as *a framework with which to assess other options.*

Appendix C: Platform

Requirement 1: Multiple Stakeholders

Requirement			Smallholder Farmers	Stake-holders
1) Ability to engage multiple stakeholders in content and revenue generation for all farmers			✓	✓
Why?: A platform that enables multiple stakeholders to create content for all farmers will expand the platform's reach, improve its value to farmers who are not affiliated with a particular organization, and expand the potential of paid communication revenue stream that is critical for commercial viability.				
Company A	✓	Users can log in through a web interface to send content to farmers in their database or databases that have been shared with them at the cost of SMS.		
Company B	✓	Organizations that have paid for a subscription (from $300 to $8,000) can send SMS to farmers that are registered in their network at the cost of SMS.		
Company C	✓	Users can log in through a web interface to send content to registered farmers at the cost of SMS (pricing flexible).		
Company D	½	The platform is currently accessible to multiple buyers and sellers and future plans include integration with messaging for advertisers or other paid content providers.		
Company E	½	A single entity manages the platform, but other stakeholders can contribute information to the information database through the manager.		
Company F		The current system only enables market agents to develop content for farmer consumption. There is interest in expanding this in the future through either customization or linking with another platform.		

Appendix C: Platform

Requirement 2: Farmer Profile

Requirement			Smallholder Farmers	Stake-holders
2) Farmer database that captures profile			✓	✓
Why?: A farmer profile allows the platform and platform users to make more informed choices about what information will and will not be relevant to farmers and will support targeting as well as investment in further content development.				
Company A	½	Profile function is minimal without ability for organizations to customize.		
Company B	✓	Enables flexible farmer profile that can be built through in-person registration by farmer support organizations or by uploading customer databases.		
Company C	✓	Enables flexible farmer profile that can be built through in-person registration, SMS polling, voice calls, or submission of codes distributed at events or through product purchases.		
Company D	✓	supports basic profile information on users		
Company E	✓	The system is built to enable each farmer to create a profile on the central platform that determines what information is displayed in his or her menus.		
Company F	½	Basic profiles are captured through the market agent interface for a limited number of farmers interacting with participating market agents. When farmers subscribe directly to utilize the USSD platform, they do not generate a profile and USSD does not currently support this feature.		

Appendix C: Platform

Requirement 3: Message targeting

Requirement			Smallholder Farmers	Stake-holders
3) Message targeting based on farmer profile information to ensure relevance and cost-effectiveness of messaging			✓	✓
Why?: Targeting allows users to deliver the most useful and relevant information to farmers with the greatest efficiency. Farmers will not be overwhelmed by information that doesn't matter to them and stakeholders will not waste resources sending.				
Company A	✓	Allows users to make groups based on different demographic criteria that can be used for targeting messages. Groups can be shared between users if desired.		
Company B	✓	Allows users to select demographic features of farmers and send a message to all within their organizations that meet the criteria.		
Company C	✓	Allows users to select demographic features of farmers and send a message to all within the database that meet the criteria.		
Company D		The platform is based on a pull mechanism where farmers request data.		
Company E	✓	Profiles can determine what information is displayed in the menu.		
Company F	½	SMS messaging feature is under development. Market agents will be able to target their messages from among their registered farmers when complete. Potential to expand further.		

Appendix C: Platform

Requirement 4: Multiple Languages

Requirement			Smallholder Farmers	Stake-holders
4) Platform and information accessible in multiple languages			✓	
Why?: The likelihood that content is understood is increased by providing content in different languages – both the content itself and the interface through which it is accessed.				
Company A	✓	SMS can be sent in any language. USSD menus can be translated into different languages.		
Company B	✓	SMS can be sent in any language.		
Company C	✓	SMS can be sent in any language.		
Company D	½	SMS can be sent in any language. Current SMS codes and smart phone applications are in English, but could be translated.		
Company E	½	Current platform is being designed in English only—USSD menu and content. Could be translated.		
Company F	½	Content is being made available in Bemba and Nyanja, but currently the USSD menu required for navigation is only in English. There are hopes to translate the USSD menu into at least five main languages after the pilot phase is complete.		

Appendix C: Platform

Requirement 5: Push and Pull

Requirement			Smallholder Farmers	Stake-holders
5) Push and pull options for accessing data			✓	✓
Why?: Push (platform-initiated communication) enables platform providers to alert farmers to new information and keep them engaged with the platform; pull (farmer-initiated requests) increases the utility for farmers who can access information on demand as needed.				
Company A	✓	Push is enabled through SMS. Pull through SMS requires farmers to be trained to use codes. Codes can be given “aliases” for common misspellings or errors.		
Company B	✓	Push is enabled through SMS. Pull through SMS requires farmers to be trained to use codes. Codes can be given “aliases” for common misspellings or errors.		
Company C	Push only	Push is enabled through SMS. Currently no pull option.		
Company D	Pull only	Pull through SMS requires farmers to be trained to use codes. Codes can be given “aliases” for common misspellings or errors.		
Company E	Pull only	USSD is ideal for enabling flexible pull. Currently no push option.		
Company F	Pull only	USSD is ideal for enabling flexible pull. SMS push “message link” planned for development either through customizing the platform or by linking it with another SMS-oriented option.		

Appendix C: Platform

Requirement 6: Contact Management System

Requirement			Smallholder Farmers	Stake-holders
6) Database upload function with contact management system for organizations				✓
Why?: Organizations that will want to use the platform often have existing databases of members, customers, or beneficiaries that they'd like to upload into the system and manage on an ongoing basis.				
Company A	✓	Allows organizations to import, export, and manage contacts.		
Company B	✓	Allows organizations to import, export, and manage contacts.		
Company C	✓	Allows organizations to import, export, and manage contacts.		
Company D		Contact management is accessible only by the system administrator.		
Company E		Currently not an option on USSD system.		
Company F	½	Enables market agents to build and manage contacts through their phones, but does not provide the tools for organizations to import, export, or manage large groups of farmer contacts.		

Appendix C: Platform

Requirement 7: Scheduled and Manual Messaging

Requirement		Smallholder Farmers	Stake-holders
7) Scheduled and manual outgoing messaging			✓
Why?: Scheduling messages can allow an organization to save time and ensure the regular flow of content, including timed agricultural tips or loan repayment reminders. Manual messaging allows the organization to send information as it becomes relevant.			
Company A	✓	Both scheduled and manual messaging supported.	
Company B	✓	Both scheduled and manual messaging supported.	
Company C	✓	Both scheduled and manual messaging supported.	
Company D		The platform is used primarily for real-time prices so does not support future scheduling.	
Company E	½	USSD menu allows for start and end dates to be provided for data accessed through a USSD menu, but does not have the ability to alert farmers to new information.	
Company F	½	SMS feature is under development and will likely include both scheduled and manual messaging.	

Appendix C: Platform

Requirement 8: Minimal Training

Requirement			Smallholder Farmers	Stake-holders
8) Farmer interface that enables information access with minimal training			✓	✓
Why?: To successfully reach a significant number of farmers, the training must be simple enough to be passed through farmer communication networks. Complex training and concepts will not be passed on (or will be passed on incorrectly) and farmers further down the communication chain will not be able to access or use the service.				
Company A	½	SMS push requires little training. The pull service requires a code that must be created and learned by farmers. The large-scale market pricing coding would be new to SMS Media.		
Company B	½	The SMS push service requires little training. The pull service requires codes, but Company B has experience testing and using codes with farmers in many African countries.		
Company C	✓	The SMS push service requires little training. Currently, all information is delivered through push, which simplifies training but reduces flexibility for farmers.		
Company D	½	The push service requires farmers to learn codes. The smartphone apps are more intuitive and tested with farmers, but require access to and familiarity with higher-end technology.		
Company E		Most Zambian farmers are not familiar with the USSD menu and the robust Summum platform and will require training on how to navigate through the layers of information.		
Company F	½	Company F limits the amount of information/navigation required to simplify use. Early pilot-testing is showing that training conducted by Company F implementers is successful and farmers are picking up the system relatively quickly. No testing has been done on success of on-training.		

Appendix C: Platform

Requirement 9: Flexibility to Incorporate Additional Services and Features

Requirement			Smallholder Farmers	Stake-holders
9) Flexibility to incorporate additional services and features such as SMS or voice helpline, polling features, and analytics			✓	✓
Why?: Ability to integrate with additional services will open up the potential to develop complementary revenue streams and meet shifting farmer demand.				
Company A	✓	Very flexible platform with existing polling and basic analytics, interactive voice response (IVR), USSD, and other mobile services.		
Company B	✓	Already incorporates a voice helpline and polling and analytics. Currently exploring numerous other communication features including voice SMS, online wiki, smartphone apps, API, IVR, and USSD.		
Company C	✓	Already incorporates ability to set up helpline, polling, analytics, IVR, and smartphone apps. Able to link with or integrate other services.		
Company D	✓	Platform began very focused on market prices, but is exploring new features. Technically the platform is flexible.		
Company E		Currently conceived as a focused USSD platform.		
Company F	½	Platform is still under development and open to incorporating features and services in demand or linking to a complementary platform.		

Appendix C: Platform

Requirement 10: Ability to Customize on Demand

Requirement			Smallholder Farmers	Stake-holders
10) Ability to customize platform based on user feedback through either platform provider service or independent software developer			✓	✓
Why?: Platforms will need customization to meet market demand. It is important that either the platform is open source and customizable by a software developer or the platform providers offer customization as a service.				
Company A	✓	Platform customization offered as service.		
Company B	½	Customizations driven by organizational priorities, which are influenced by user feedback.		
Company C	✓	Platform customization offered as service.		
Company D	½	Customizations driven by organizational priorities, which are influenced by user feedback.		
Company E	½	Customizations driven by organizational priorities, which are influenced by user feedback.		
Company F	½	The platform is being developed under a grant and Company H. No formal customization policy, but open to input from potential partners.		

Appendix C: Platform

Requirement 11: Security Settings

Requirement			Smallholder Farmers	Stake-holders
11) Security settings to protect user information and keep private databases proprietary for different users			✓	✓
Why?: Organizations and farmers need to trust that their information will be protected and not abused. This is particularly important for private sector companies that may want to upload customer databases into the system.				
Company A	✓	Secure accounts with ability to share or secure contact databases between users.		
Company B	✓	Secure accounts with ability to share or secure contact databases and content (on website and for pull) between users.		
Company C	✓	Secure accounts with ability to secure contact databases with different access levels for different users. Different levels of access for shared data.		
Company D	½	Data are protected but wholly managed by platform implementers.		
Company E	½	Data are public once uploaded. Security settings exist to protect user information, managed by central administrator.		
Company F	½	Login feature exists for market agents, but full security requirements and features are not yet developed—process and use have not yet dictated this as a needed feature.		

Appendix D: Business Models

Assumptions Unpacked

- **Addressable Market** is based on farming *households* rather than individual farmers because information would likely be shared within a household unit rather than a member making a second expenditure. The 1.4 million figure is the most recent hard statistic on agricultural households and is based on the 2000 census. One can assume that growth has occurred (and will continue to occur) in the sector, but the 1.4 million is used as a conservative estimate.

- **Market Capture** is conservative and based on an assumption that adoption of the service will require "below the line" marketing that taps into existing information networks to reach farmers rather than relying on "above the line" techniques such as billboards and radio spots. Below the line marketing conducted through training has proved to be essential for Company B , Company D, and other mobile platforms in Africa as well as generally for introducing new mobile services such as mobile money that require some level of trust, whether in financial security or information veracity. Services that rely on this type of marketing are slower to roll out and have the additional risk of having to rely on third-party actors, such as MFIs, NGOs, extension services, or other actors trusted by farmers to meet uptake targets. Company B independently estimated that it could reach 70,000 Zambian farmers by year 5, matching these assumptions.

- **Geographic roll-out** should focus resources on a few of the highest potential areas first and build out from there. "Highest potential" should be determined not only by province or district farming population, mobile penetration, literacy, and income, but, most importantly, based on where partnerships can be developed with organizations that are interested in introducing the agricultural information service to a large base of farmers.

- **Human resource costs** are estimated based on hire of four full time Zambian national staff, calculated at an *average* salary of US$3,350 a month, and take into consideration a 35 percent tax rate and a modest increase of 3 percent per year. The Managing Director is assumed to be the highest paid and may be further incentivized through an equity agreement. A network of provincial price collectors will help manage inputs from market informants operating in the major district markets. These individuals are assumed to already be operating in markets as traders or farmers and data collection will merely supplement their existing income. Data collection costs may be drastically reduced if the Company F pilot proves successful and is expanded beyond vegetables.

Appendix D: Business Models

Assumptions Unpacked (continued)

- **Farmer revenue** estimates are based on frequency requests and willingness to pay. Farmers indicate on average wanting 18 messages per month. It is estimated that 10 messages a month are included in the base fee of $1.00. An additional 65 percent of farmers are willing to spend $2.00 or more a month. A conservative assumption has been made that, *on average*, farmers can fund an additional additional 8 SMS costing approximately 80 cents. Revenue could be captured by pulling information (cost of 2 SMS per information item). The supplemental SMS are estimated at 4.5 per month rather than the full 8 because of the greater level of training required for pulling data, likely leading to a lower uptake.
- **Revenue share** between the business and MNO will be based on private negotiation. Estimates are based on feedback from stakeholders that have negotiated previously to establish agreements ranging from 80:20 to 60:40. Bigger providers that hold a large percentage of Zambia's mobile customers will likely demand higher revenue share.
- **Training & education** budget is split between direct and indirect training. Direct training (40 per year) costs will fund training of organizational users (content providers and paid communications), training development for farmers, and training of trainers employed by farmer support organizations who will carry information forward through the organizations' communication network. Direct training costs include venue, lodging, per diem, vehicle, and fuel. The indirect training (90 per year) budget is focused on providing training materials and small financial support to organizations and trainers to supplement the cost of the pre-existing training programs on which the mobile platform training is included (piggybacking on existing efforts).
- **Marketing** is focused on some "above the line" marketing such as radio advertisements directed at farmers as well as marketing toward organizations that can utilize the platform to send paid communications. This may include some research on average cost savings or increased profitability of organizations using the platform.
- **Other costs** are included in the financial model, including hardware, depreciation of equipment, maintenance, customer acquisition cost, office space, reporting, upgrades, and development.

Appendix E: Best Practices

Top Five Lessons from ICT and Ag Literature Review

- **Understand the market.** The most successful agricultural information systems start with a market assessment that identifies information needs, existing resources, and the potential value propositions a mobile platform offers different stakeholders. This should be the starting point for designing a platform, a process, and a sustainability plan.
- **Design focused on needs, not technologies.** Few out-of-the-box technical solutions or implementation plans will meet the specific needs of every country context. Each context presents varied opportunities and challenges, including language, literacy, network coverage, farmer attitudes, agro-ecological zones, cultural issues, and gender dynamics. These must be considered in the design of information systems—whether starting from scratch or customizing an information system.
- **Engage partners.** In most countries, there are established relationships between organizations and farmers. These organizations and their staff usually have the incentives, influence, and reach to introduce new resources and skills to farmers. Personal, hands-on training is key to successful implementation and continued use by farmers.
- **Develop a business model for sustainability.** Sustainability requires a system to be self-supporting, although market information systems are rarely profitable on their own. Think beyond the information system and develop complementary revenue streams that can contribute to sustainability.
- **Build in feedback mechanisms.** There is always room for improvement. By monitoring user trends, soliciting feedback, and systematically integrating user comments into technical and process design modifications, the system will be more effective and sustainable.

Appendix E: Best Practices

Useful Resources

- infoDev offers a robust *ICT in Agriculture Sourcebook*
  www.infodev.org/en/Project.134.html
- GSMA has compiled mAgri resources. The *Agricultural Value Added Services: Market Entry Toolkit* is particularly clear and relevant to launching a mobile platform in Zambia
  http://www.gsma.com/developmentfund/programmes/magri/
  http://www.gsma.com/developmentfund/agricultural-value-added-services-agri-vas-market-entry-toolkit/
- The U.S. Agency for International Development FACET project has briefing papers and platform overviews *https://communities.usaidallnet.gov/ictforag/documents*
- The E-Agriculture website links to numerous papers and presentations supplied by the agriculture and ICT communities
  www.e-agriculture.org

Appendix F: Market Profiles

Stakeholder B says reliable market prices could help him increase profits from his crops and avoid misinformation from middle men

Village:	Molodoni – 16km from Mumbwa
Age:	53
Farm Size:	12 hectares
Crops:	Maize, soy, cotton, groundnuts, cow peas, rape, cabbage, tomato
Income:	Kwa 4.5–5 million (US$1,00) per month
Airtime:	Kwa 120,000–150,000 per month
Affiliations:	Local coordinator for the Conservation Farming Unit; buyer for Cargill (Cotton)

Stakeholder B is one of the more successful farmers in his community and is a leader. He receives training on farming techniques from the Conservation Farming Unit and **trains approximately 90 farmers in his area**. He is dedicated to this work and spends more than most of his neighbors on airtime, communicating about training events and organizing purchases for Cargill.

Stakeholder B says that he would like to receive information on his mobile—in particular, **prices of inputs, updates on opening of nearby depots, and market prices.** He says that it is difficult for farmers in his community to get good prices because there isn't much competition and they are forced to buy from "brief case buyers" who offer low prices when the farmers don't know what they could get elsewhere.

Stakeholder B will sometimes hire transport to take his vegetables to market in Lusaka. He acquires market prices from *kopnyas* (middle men) in Lusaka sell his produce on commission. He would like to get market information from a service because when business is slow, the *kopnyas* will sometimes provide the wrong price to get him to come. In the past, he has traveled to Lusaka expecting Kwa 4 million in sales and only received Kwa 1 million. After transport costs, this is devastating, and he risks losing his entire profit. This type of incident happens approximately once a year, but Stakeholder B often has no other option than to rely on the *kopnyas* for prices.

Appendix F: Market Profiles

Stakeholder C believes that a mobile platform can improve the bank's bottom line and help farmers improve profitability and resilience

"The cost of not keeping in touch in this business is much more expensive than doing so. When borrowers default it can cost 4x cost of regular communication."
– *Stakeholder C, CEO of Product B*

Product B is a microfinance institution that is actively using mobile phones to make its business processes more efficient and looking for a solution that could improve the flow of information between the organization and its 8,500 borrowers.

Stakeholder C approached Company W to create a system for electronic loan disbursements. Product B clients receive an SMS with a pin number that they take to a nearby Company W agent to receive a cash payment for no more than 1 percent of the total loan cost (a cost that Product B passes on to the customer). According to Stakeholder C, the loan officers have been critical in providing the sensitization and training that is required for borrower adoption. This has improved internal efficiency of disbursement and Product B is looking for similar ways to use technology to improve its business practices including communication of information. Company V is now also working with Company W and other MFIs are expected to follow.

Stakeholder C priority for technology is to introduce a system that his loan officers and head office can use to manage borrower contacts and SMS communications. Currently, his 38 loan officers are given $10 a month in airtime to call and text borrowers. They are sending one message at a time and the process is time-consuming. As a result, they save staff time and airtime to communicate with delinquent customers.

Stakeholder C would like a system that enables rapid, easy communication with all of his borrowers and through which he can achieve broader reach and benefit from bulk rate messaging. Product B has phone numbers for 70 percent of its borrowers and others receive information through loan group leaders. Some of information that he imagines could be sent to both farmers and traders includes:

- Automated reminders of repayment and meetings (monthly)
- Account statements (quarterly or more frequently)
- Introduction of new loan products (quarterly)
- Updates on recommended products and other information

Stakeholder C also believes that information packages that contain market information from local and national markets could help his borrowers negotiate with buyers and sellers. He believes that farmers and traders would pay for this product and would be interested in building the price into the cost of the loan.

Finally, Stakeholder C believes that a polling function would be a useful addition to a mobile platform. This function could help headquarters monitor field activity through direct communication with borrowers as well as help gather data for the social performance indicators.

Product B would be an excellent anchor customer that could facilitate the implementation and training required around a mobile platform as well as work closely to fine-tune the product as it has for the successful Company W mobile transfer payment system.

Appendix F: Market Profiles

Company T could send a significant number of SMS to customers as its Kenyan affiliate, Company U, does—80,000 SMS a month to its 20,000 customers

Company T began Zambian operations in 2011 and deals in livestock care products.

Company T employs veterinarians on staff who sell products through training events and regular visits to communities during which they provide animal health advice and products. Company T is building a database of customers (approximately 1,000 to date) and already uses SMS to publicize upcoming visits and seminars. It currently does this by using partner groups' databases and sending through its sister company, Company U, in Kenya, which works with a bulk SMS provider in Uganda. Company U serves 20,000 customers and sends 80,000–100,000 SMS a month. A local solution that expands access to farmers and enables targeting by geography and livestock farmers could be an attractive option for Company T.

Appendix F: Market Profiles

Company W's innovative mobile money transfers have taken 30 percent market share since 2007—demonstrating the potential of ICT-related businesses

In 2007, when Company W started, 100 percent of domestic money transfers were conducted through the Zambian Post Office. Five years later, in 2012, Company W has 30 percent of Zambia's money transfer market share and is growing fast.

In that time, the Zambian IT start-up has grown from a team of two to a staff of more than 25 and has attracted $4 million of private investment.

Mobile phones are at the core of Company W 's business model and processes. It has set up a network of agents who work on a commission basis around Zambia. Customers who wish to send money to other parts of the country visit a Company W agent, pay the money, and provide their and the recipient's phone numbers. Both parties receive an SMS confirming the transfer. The recipient is given a secret code and the addresses of nearby agents. The recipient visits an agent and, again, through the mobile, pins in his or her secret code. The agent receives an SMS confirming the amount sent and disperses the cash.

Company W has developed additional products, including an eVoucher system for input distribution that has been used by Company J and a loan disbursement system that has been adopted by Zambian MFIs (see Product B Market Profile).

Company W's 74 agents span Zambia and the network continues to grow daily.

Appendix F: Market Profiles

Small farmer support organizations are a potential growth area once the large organizational market is captured

Company S started in 2009 and has 132 members and five staff. It supports its membership by teaching better farming methods, helping farmers fight disease, and providing relevant information.

Farmers bring their milk to one of four milk collection centers and the cooperative sells it to the community for a profit of 1,000 ZMK per liter. The cooperative has a vested interest in improving quality and quantity and would eventually like to be able to sell in large quantities to dairy processors.

Company S operates in four areas around Mongu District. It communicates to farmers through relationships with local headmen, radio, lead farmers, and posters. It has a database of members and member contact information and believes that a system that would allow it to send bulk SMS messages would be helpful, saving time and money. For example, when company S plans training events, it publicizes them by driving around relevant areas and hanging posters. It relies on farmers seeing the posters and remembering the information. Company S estimates that these publicity efforts cost 100,000 ZMK for fuel and 120,000 ZMK for printing, totaling 220,000 ZMK (US$44).

The target audience is usually around 60–70 farmers. If there were an easy way to send SMS, company S could reduce costs to approximately $3.50 and reach farmers directly.

Although a mobile platform will likely target larger organizations first, rather than small remote organizations that are more difficult and costly to serve, the “long tail” (the large number of organizations that will buy small quantities, but, in aggregate, represent a large revenue stream) is a potential customer base that will be key as the mobile platform looks to grow beyond serving the larger agricultural organizations in Zambia.