INCLUSIVE INNOVATIONS

Direct-From-Farm Market Link

Improving incomes by leveraging technology to connect smallholder farmers to end consumers

HIGHLIGHTS

- Farm-to-market platforms eliminate middlemen and shorten the supply chain; farmers can realize farm-gate prices for their produce and decrease costs incurred on transportation to market yards.
- Algorithms match farmers to appropriate buyers based on their price sensitivity and grade preference.
- Then, farmers have the ability to set prices for their produce and do not have to depend on price information provided by middlemen.

Summary

Globally, smallholder farmers are caught in a vicious cycle characterized by low risk taking ability, low investment, low productivity, weak market orientation, low value addition and low margins. One of the key impediments to breaking this vicious cycle is an acute lack of market linkages that deprives them of efficient market access. Middlemen bridge the gap between farms and markets, and earn margins at every stage of the distribution chain, leaving very little for the smallholder farmers.

Recognizing this market gap, social enterprises (SEs) are exploring ways to leverage the power of the internet and increasing mobile ubiquity to provide direct market linkages between smallholder farmers and buyers. By removing middlemen from the distribution chain, these enterprises are helping smallholder farmers to secure higher prices for their produce. They also reduce farmers' working capital requirements by guaranteeing purchase and ensuring payments at the farm gate.

Development Challenge

Approximately 84 percent of all farms worldwide (estimated to be around 570 million[1]), are smaller than two hectares. Most of these smallholder farmers reside in underdeveloped and developing countries. Agricultural markets have not worked efficiently for these smallholder farmers, and the lack of market linkages has proved to be a key bottleneck for efficient market access. Poor market linkages substantially increase transaction costs and post-harvest losses. Marketing chains are characterized by the existence of agents and middlemen at every stage of the supply chain leading to a long series of transactions before the farmer's produce reaches end-consumers. Each of these middlemen retains a margin, allowing only a fraction of the final price of the crops to reach the smallholder farmers.

Often remotely located and disconnected from mainstream market information, smallholder farmers rely on middlemen who are better informed about market conditions, especially about the prices further down the supply chain. However, this knowledge is not transferred to farmers who are forced to accept prices offered to them by middlemen. Lack of price information coupled with

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This series on Inclusive Innovations explores business models that improve the lives of those living in extreme poverty. Editors are Elaine Tinsley and Natalia Agapitova. Researched and developed by Intellecap.

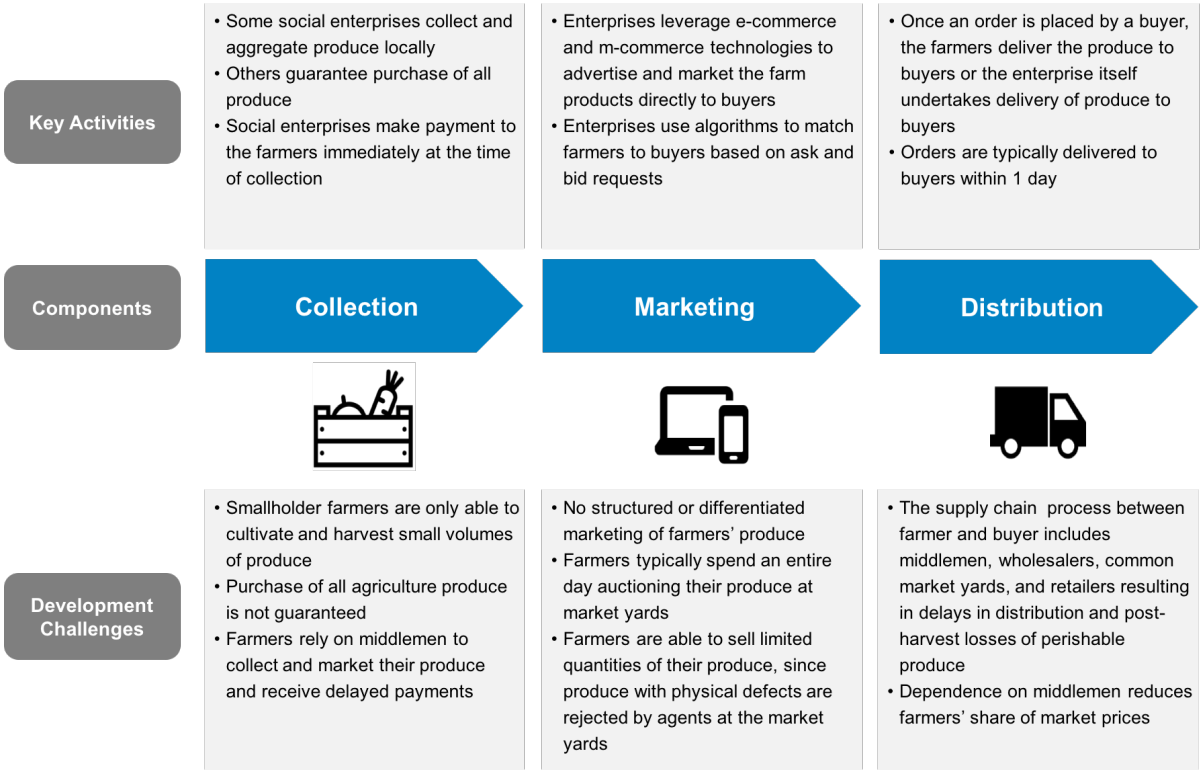
limited access to alternative buyers can lead to high price dispersion in rural areas.[2] Further, smallholder farmers rely on these middlemen for loans to fund their agricultural and personal activities. Subsequently, farmers become indebted to these agents. Smallholder farmers are also unable to negotiate fair prices for their produce as they can only offer small volumes in individual capacity.

With an increase in urban consumers' incomes, their food consumption patterns are changing leading to an upward demand for fresh farm produce like fruits and vegetables as well as other local ingredients. While this opens up opportunities for farmers, they lack efficient market linkages to participate in market-oriented production and tap these market opportunities.

Business Model

SEs are leveraging technology to improve market linkages for smallholder farmers and meet the growing demand for fresh farm produce from consumers. They have developed internet (e-commerce) and mobile (m-commerce) based platforms to market fresh farm products directly to consumers. The enterprises receive orders placed by customers on the technology platforms and collect the produce from the smallholder farmers for distribution. While this model is primarily focused on fresh produce, similar arrangements can be found for products (cereals, grains, rice, pulses, spices, tea, coffee, etc) which are also connect farmers directly to markets.

Figure 1. Components of the model



Collection

Solutions that leverage the internet to connect farmers and buyers are fast gaining currency in emerging markets, and a number of SEs have created online platforms to market agricultural produce directly to buyers. These models are paving the way for efficient market linkages for smallholder farmers, by removing middlemen from the distribution chain and securing higher prices for the farmers. Enterprises procure produce from farm gates, and weigh, grade and package it at the farm. These enterprises pay farmers immediately on purchase of the produce. For example, India-based Go4Fresh procures the entire harvest from farmers at wholesale prices; the enterprise partners with local aggregators to visit farms and collect the produce. Agruppa, based in Colombia,

communicates orders to farmers a day prior to collecting it from their farms; it partners with local transporters to collect the produce from farms.

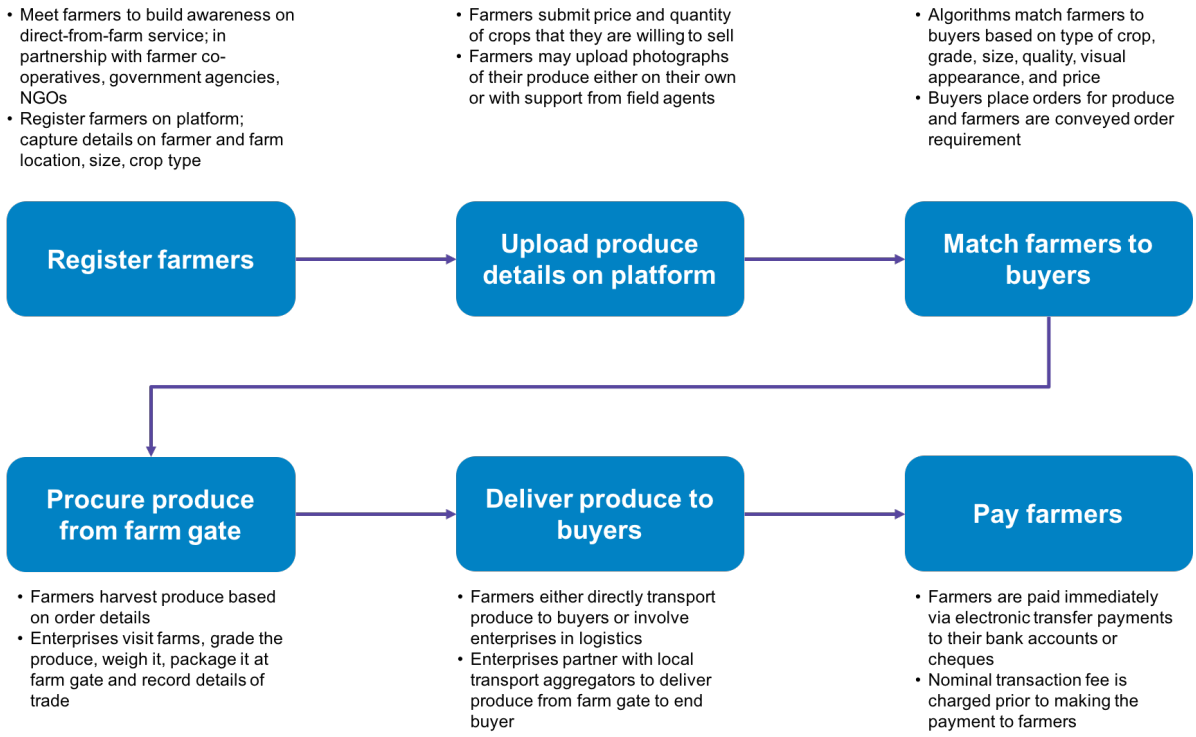
Marketing

Enterprises have leveraged the deep penetration of mobiles phones to connect smallholder farmers and buyers. For example, MLouma in Senegal provides small scale farmers a mobile and online platform to upload information about availability of their produce for sale enabling buyers to connect with them directly. The enterprise also allows farmers to market their produce leveraging on the enterprise's call center. Similarly, SokoText provides an innovative mobile-commerce platform wherein buyers can place orders for goods via SMS. This product allows buyers and sellers to communicate directly and ensures quick and easy order and delivery placements. While not all farmers and buyers have access to the internet, most of them possess a mobile phone and all mobile phones support SMS. Hence, business models attempting to leverage SMS technology can inherently reach a wider smallholder farmer base.

Distribution

A number of enterprises use algorithms to match farmers to buyers based on requirements and prices that farmers and buyers are willing to transact at. Upon sale, farmers either deliver the produce to buyers directly or seek support from the enterprises to transport the produce from farm gate to end buyer. For example, farmers on SokoNect's platform deliver produce to consumers using their own transport or have the option to pay SokoNect a nominal fee to transport the produce to the consumers. In Indonesia, Kecipir engages community hosts to operate centrally located delivery hubs where consumers can collect their orders or have their produce orders delivered to their door step directly for a fee.

Figure 2. Process of the model



Cost Factors

Costs involved in connecting farmers and buyers may depend on the type of communication technology adopted. For instance, for customers served through feature phones, enterprises could choose between using Short Message Service (SMS) or the more efficient but expensive Unstructured Supplementary Service Data (USSD), which involves an upfront booking fee for the

USSD platform followed by monthly maintenance costs paid to mobile network providers. In addition, enterprises incur costs in hiring IT experts to develop and maintain the platform.

A number of enterprises provide farmers the option to either upload details related to the type of produce, prices, and quantities on the platform directly or with the support of field agents. These enterprises incur costs in hiring field agents to train farmers on the use of the platform: field agents visit farmers and educate them on topics related to the use of internet and mobile technology, platform navigation, the manner in which harvested products could be photographed, and methods of pricing produce. In some cases, field agents assist farmers in photographing the produce and uploading relevant details on the platform.

Some enterprises procure the produce from farmers; sort, grade, and package it at the farm gate; and subsequently upload the details on the platform. These enterprises incur costs on equipment such as weighing scales, sorting and grading tables, packaging material and transportation from farm to end consumers. I-Say-Organic incurs 40 percent of its revenue on procuring produce and 15 percent of its revenue on transportation and logistics. Go4Fresh incurs approximately 18 percent of its total sales revenue on transportation, logistics and packaging costs. SokoNect incurs logistics costs of USD 99 to collect orders within a distance of 70 kilometers using 1 truck regardless of the quantities to be transported.

Enterprises spend **15** to **18 percent** of their total revenue on transportation and logistics costs and up to **50 percent** on marketing costs towards on-boarding buyers on the platform.

Enterprises require significant working capital to pay farmers at the time of procurement of produce at the farm; any delay in payments to farmers results in a loss of farmers' trust in this model. Marketing costs towards on-boarding end-buyers constitutes a significant share of overall costs. For instance, SokoNect incurs 50 percent of its total costs on marketing the platform to end-buyers.
Other costs include procuring licenses to operate the platform, taxes and fees to be paid to the governments and marketing expenses to acquire end customers on the platform.

Revenue Streams

Enterprises that allow farmers to directly upload their produce on the platform charge farmers a transaction fee per upload and charge them a commission fee if the transportation of produce from farm to end buyer is undertaken by the enterprise. SokoNect charges farmers a fee if they require the enterprise to collect produce from farm gate and transport to end consumers. Costa Rica based Fruitspot charges a service fee of USD 2 cents once a trade is completed. SokoNect currently charges 2 percent commission fee for products priced lower than USD 99 and 10 percent commission fee for products priced over USD 99.

A number of enterprises such as Go4Fresh procure produce in bulk from farmers regardless of the grade, shape and quality. The produce is sorted and graded either at the farm gate or in a sorting facility and subsequently sold to various customer segments at differentiated prices – the enterprise earns a margin over the prices paid to farmers.

Enterprises also charge fees for providing on-demand customized information to farmers on topics such as soil management, crop and weather conditions, disease alerts and market prices. They earn commission fees from vendors who buy produce on the platform, like in the case of Agruppa, an enterprise that enables sale of produce from farmers to vendors in low-income communities in Colombia.

Financial Viability

Most enterprises that provide direct farmer to buyer linkages operate as for-profit businesses. They ensure sustainability and profitability by adopting differentiated pricing strategies, effectively forecasting demand and generating sufficient demand.

Enterprises that sort products at the farm gate and list it on their platforms typically procure the entire harvest from farmers at wholesale prices and sell it at a price premium to different customer segments on the basis of grade, size, quality and visual appeal. This strategy allows enterprises to price products based on the price sensitivity of customers; for example Go4Fresh and Markit Opportunity sell products based on product quality discrimination – target customers for Grade A produce includes exporters, supermarkets and retail individuals who pay premium prices, lower grades are sold to price conscious customers including processors, hotels, restaurants and canteens.

Typically, smallholder farmers sell small quantities of produce at a time which increases per unit transportation costs for the enterprises. Farmers who sell on D Market Movers, an enterprise based in Trinidad & Tobago, are encouraged to inform the enterprise about their expected production cycles; this helps the enterprise in planning its transportation requirements. Effective order forecasting enables enterprises to match demand and supply; for instance, Go 4 Fresh tracks its orders two days prior to the delivery date – in the event that there is over supply from farmers, the enterprise sells the excess produce to price conscious customers at lower prices, and in a situation of excess demand, the enterprise buys produce from the market to cover for any shortages.

Demand forecasting also allows enterprises to inform smallholder farmers about the amount and type of produce that will attract high demand in a particular season. For example, I-Say-Organic analyzes potential demand for produce based on previous season trends and communicates this information to small-scale farmers. Colombia based Siembra Viva informs farmers when to plant and when to harvest based on demand projections. It guarantees produce purchase at a pre-determined, premium price, and thus, not only builds trust amongst smallholder farmers, but also ensures consistency in supply commensurate to demand.

The financial viability of direct-from-farm platforms corresponds to the amount of demand that it generates for farmers' produce. It is therefore important for enterprises to ensure there are a sufficient number of buyers and sellers on the platform. The cost of customer acquisition and delivery, both which can be quite high, will impact financial viability. In addition, it is crucial for service providers to understand and address preferences of buyers to retain them as customers. For instance, Kudu, a mobile direct-from-farm platform in Uganda, took note that rural farmers can only post small lots of produce, while urban buyers prefer to buy in bulk, resulting in a mismatch between the quantities posted by each group. In response to this, Kudu incorporated a service called 'e-Bulking', coordinating the sales of multiple small-scale farmers to allow them to achieve the large lot sizes desired by buyers. Pakistan based Mandi Express has a presence in the local market yards as well, where it sells any produce that is left unsold on the platform.

Partnerships

It is important for enterprises to build trust with farmer communities and demonstrate the benefit of using a direct market platform to sell their produce as an alternative to depending on middlemen and agents. SEs work with farmer co-operatives, farmer societies, NGOs and rural government agencies to reach smallholder farmers. In addition, a number of enterprises partner with agro-input providers such as seed and fertilizer companies to reach small-scale farmers. Enterprises like Go4Fresh partner with village-level aggregators who are familiar with farmers in rural remote areas to provide transportation and logistics services.

Enterprises such as Markit Opportunity and SokoNect identify local leader farmers and train them to be field agents. These agents conduct frequent meetings with smallholder farmers to create awareness about the platform and guide farmers on the process of uploading pictures, description and prices of the produce onto platform using feature phones and smart phones. D'Market Movers partners with local farmer leaders to increase awareness of its service in farmer communities. Some enterprises involve NGOs in farmer engagement, on-boarding and registration activities. Enterprises such as Mandi Express partners with students from agricultural universities and agricultural technical experts to reach farmers, survey farms, capture farm and farmer details and register farmers onto

the platform. Kudu partners with AgriNet, a private brokerage firm in Uganda, to provide additional in-village services to farmers registered on its mobile marketplace platform. AgriNet agents provide farmers with services such as quality screening, credit lines for bulking, and insurance.

Enterprises partake in information sessions conducted by local county governments and use government facilities as demonstration plots to train farmers on good agricultural practices, uniformity in crop production, and the role of internet and mobile technology in expanding farmers' access to markets and increasing their market knowledge.

Enterprises partner with financial institutions to enable immediate payments to farmers; for example, in the case of SokoNect, financial institutions make payments to farmers upon their sale of produce to end buyers, the enterprise pays the financial institution once the buyer makes the payment on the platform. Enterprises work with banks to open bank accounts for unbanked smallholder farmers, ultimately expediting payment cycles and increasing farmers' confidence in the model.

Implementation: Delivering Value to the Poor

Awareness

The penetration of mobile and internet in smallholder farmer communities, and the ability and ease of farmers to use technology dictates the uptake of direct-from-farm platforms. Enterprises need to hand-hold farmers to navigate through platform features and learn how to use information provided on the platform to price their produce. Enterprises like SokoNect partner with government agencies in their agriculture programs and conduct sessions on the role of technology in enabling direct and transparent access to markets.

Enterprises also identify local farmer leaders and community champions, who interact with farmers and help in spreading awareness about the direct market linkage service. D'Market Movers' farmer network has grown through farmer-to-farmer recommendations and referrals; farmers share information about market demand and work towards increasing their market presence as a group and as a result attract more farmers to join the platform. Mandi Express partners with agricultural university students and agricultural experts to visit farmers and disseminate information about the service. I-Say-Organic, an organic produce platform based in India targets farmers who practice organic farming and reaches these farmers through farmer co-operatives and farmer societies who promote organic farming. Enterprises such as Go4Fresh leverage partners such as farmer producer organizations, co-operatives, government agencies, and agro-input dealer companies to spread awareness amongst farmers.

Creating awareness amongst farmers regarding what kind of products sell (which variety, grade, crop) also plays a crucial role in success. And on the consumer side, enterprises also engage in conducting marketing and awareness campaigns targeted towards on-boarding end customers and creating market demand. Enterprises must raise the awareness that shifts customer behavior and willingness to pay a premium for sustainable, directly sourced products.

Acceptance

Enterprises need to demonstrate the benefits of direct-from-farm platforms in comparison to traditional trading models in farmer communities. This includes the availability of real-time price information as compared to physical market yard auctions, and the ability to receive payments immediately upon the sale of produce in comparison to staggered payments by middlemen. Go4Fresh encourages farmers to use its platform on a trial basis alongside selling their produce through the traditional government auctions and evaluate the mechanism. The enterprise also frequently arranges farmer visits to supermarkets in order to increase their visibility of produce in end markets.

Enterprises need to build trust amongst smallholder farmers for them to accept the model. Enterprises partner with banks to access continuous supply of working capital to pay farmers without delay. Partnering with local government agencies and local community leaders helps in establishing farmers' trust in direct-from-farm platforms. In addition, building trust between buyers and sellers is imperative in setting up a direct-from-farm model, given that buyers often prefer establishing contact through face-to-face interaction first. A study of mobile marketplace Cellbazaar in Bangladesh showed that engaging farmers is likely to require some form of human mediation.[3] Kudu's platform has a rating feature that is meant to mimic the role that relationship-based agents and brokers traditionally play, thereby reducing the risk for farmers to transact with new buyers. Markit Opportunity incorporates high-touch interactions with farmers in the initial stages – registered farmers are provided unique codes, field agents then visit the farms, weigh the produce using digital scales and record the details on an app which is digitally signed by the farmer and buyer. This also lends transparency to the process.

Enterprises design their marketplace platforms by leveraging existing interfaces that smallholder farmers are familiar with in order to overcome the challenge of low technology literacy. For example, SokoNect conducted a survey among target farmers in Kenya and learnt that they are familiar with the M-Pesa app. The enterprise re-designed its interface to replicate select features from M-Pesa thereby increasing farmer acceptance.

Accessibility

Direct-from-farm platforms break down physical barriers to access, and provide an opportunity for farmers to sell their produce directly to end customers on the basis of transparent price information. Farmers are connected to end buyers through different platforms: voice calls, website, SMS on feature phones, or mobile apps on internet-enabled smart phones. Enterprises design and develop the platform layout based on the level of mobile and internet penetration amongst the farmer communities that they intend to serve. Mandi Express, Kudu and Markit Opportunity are SMS based mobile phone applications that don't require farmers to be internet savvy. MLouma provides farmers access to end buyers through multiple channels - the web, SMS service, mobile application and a call centre.

Research on providing services to rural populations showed that information must be presented in local languages for greater acceptance.[4] Mandi Trades, an app based platform in India revised its service a year into operations to provide content in Hindi, Tamil, Telugu, Kannada and Malayalam in addition to English.[5] Similarly, Sri Lanka based Dialog Telekom provides farmers and buyers access to its SMS service in English, Sinhala and Tamil.

A number of enterprises such as I-Say-Organic, SiembraViva, Veggie Kart, Markit Opportunity and D'Market Movers provide their farmers feedback on crops that are on high demand and information on how to cultivate these crops.

Affordability

Smallholder farmers located in remote rural areas are subject to weak market linkages owing to inadequate infrastructure, bad road network, and expensive transport options. For instance, farmers in Fiji residing within 500 meters of the packing sheds would incur approximately USD 15 to hire a vehicle from the farm to the facility. Direct-from-farm marketplace platforms help farmers avoid this expense as buyers source the produce at the farm gate. In Tanzania, for example, rural farmers have to invest significant time and money to reach distantly located '*kariakoos*' or markets. At the market, they have to rent stall, which is often unaffordable for them. As a result, most farmers in Tanzania depend on middlemen to transport their produce to markets.[6] Small-scale farmers who sell their harvest through middlemen and agents incur costs in terms of trader and commission fee. Direct-from-farm platform services are either provided free of charge or at nominal subscription rates to farmers; for example, Fruitspot and SokoNect charge farmers only once the transaction is completed.

Many small-scale farmers rely on a limited number of middlemen or traders to receive price information, given that search costs for finding information elsewhere are often high.[7] In addition, these farmers are forced to sell their produce at sub-market prices to middlemen who sell it to end buyers at a premium. Farmers are able to send query messages once registered on direct-from-farm platforms for real-time information on prices, historical prices and market trends, and make informed decisions to sell their produce.

Farmers also incur significant costs in employing labor for harvesting produce, and are often strapped for funds at this time. Enterprises like Markit Opportunity match farmers with buyers and provide an advance deposit as assurance of sale, enabling farmers to pay farm laborers. The enterprise provides this free of charge to farmers, who only have to pay USD 1 cent to post their ask requests via SMS.

Results and Cost Effectiveness

Direct-from-farm platforms shorten supply chains for farmers along with providing them information on prevailing market prices, access to customer segments that command higher prices and the ability to set prices for their produce. The model enables smallholder farmers to increase their income owing to better market access, lower post-harvest losses, relevant connections with price-appropriate buyers and the opportunity to realize market prices. In addition, these platforms save farmers the time they would otherwise spend in traveling to market yards and waiting through prolonged auctions.

Scale and Reach

Leveraging on technology, enterprises providing farmers with direct access to buyers have removed price and demand information asymmetries; this has helped farmers realize higher farm-gate prices and increased their sales volumes. With the increase in uptake of mobile and internet technology across developing countries, a number of enterprises have adopted the direct-from-farm model, primarily to enable disintermediation.

MLouma, a platform connecting farmers to buyers through SMS, USSD, online website and call centres caters to 75,000 farmers in Senegal – the use of multiple modes of technology enables MLouma to reach different segments of smallholder farmers. The external financial support from AMEA Orange Developer Challenge in 2014 allowed the enterprise to integrate SMS and USSD features and resulted in expanding its reach from 1000 farmers to 75,000 farmers in Senegal.

Indian direct-from-farm services, **Go4Fresh and Mandi Trades,** have registered **10,000 farmers** on their platforms within **three years of operation.**

Direct-from-farm platforms in India have been able to reach a large base of smallholder farmers within a few years in operation; this may be attributed to the density of farmers in the country, their transition from subsistence to commercial farming practices on a small-scale, and their awareness of growing urban consumer demand coupled with their desire to circumvent existing imperfect supply chains and adopt technology to shorten the distribution process. For instance, within 3 years of operating its platform, Mandi Trades has 10,000 registered farmers in India and has enabled USD 7.47 million worth of trade.[8] Go4Fresh has reached over 10,000 farmers in Maharashtra, India and connected them to 8000 retail and 500 corporate customers.

Enterprises at a lower scale are either young (under 3 years) or operate in a single country or small region. SokoNect in Kenya has over 5000 registered smallholder farmers on its platform. Markit Opportunity has served 300 smallholder farmers in Kenya and intends to partner with an NGO to launch the platform to 3,000 farmers in 2017.[9] Kudu has been operational in Uganda for 18 months and has registered over 1000 farmers and traders and received USD 1 million in bids from buyers

and USD 1.7 million in asks from sellers.[10] D'Market Movers brings together 60 local organic producers and 650 consumers in Trinidad and Tobago on its digital platform.[11]

Table 1. Examples of companies and reach

Company	Country of operation	Years of operation	Number of farmers reached
D'Market Movers	Trinidad and Tobago	5	60 organic farmers connected to 650 consumers on the platform
Go4Fresh	India	3	10,000 farmers connected to 8500 consumers on the platform
Kudu	Uganda	4	1000 farmers
Mandi Trades	India	3	10,000 farmers
Markit Opportunity	Kenya	1	300 farmers
MLouma	Senegal	4	75,000 farmers
SokoNect	Kenya	3	5000 farmers

Improving Outcomes

While direct-from-farm platforms are nascent and are yet to scale, they have been able to deliver significant impact to farmers in increasing their market access in comparison to traditional models. A study conducted by International Research Development Centre (IRDC) found that produce typically changes hands 3 or 4 times from farm-gate to buyer; middlemen in Kenya, on average, take 23 percent of the wholesale market price and 14 percent of the price is directed towards packaging, grading, market access fees and transport resulting in farmers retaining only 63 percent of the produce price.[12]

Direct-from-farm platforms help farmers in Kenya realize farm gate prices versus traditional models that allow farmers to retain only **63 percent** of produce price.

Direct-from-farm services enable farmers to realize maximum farm-gate prices by eliminating middlemen in the long supply chain. The model has also helped farmers reduce post-harvest wastages. Dialog Telekom's model has enabled farmers in Sri Lanka to increase incomes by 40 percent due to elimination of middlemen.[13] In Colombia, according to SiembraViva, farmers receive 25 percent to 35 percent of the amount paid by the end buyer. By using its model, farmers have been able to receive 48 percent of the price paid by consumers. Ekgaon Technologies, through its online marketplace and advisory services has increased farmer incomes by USD 127 or 67 percent on average.

Dialog Telekom's model enables farmers in Sri Lanka to increase their incomes by **40 percent** and EkGaon Technologies enables farmers in India to increase their income by **USD 127** or **67 percent .**

Enterprises buy farmers' entire harvest, regardless of the grade, and then sell it at differentiated prices to end customers. Under the traditional model, smallholder farmers sell their produce to agents who transport it to market yards. Typically, crops that have physical or aesthetic defects, such as being the wrong shape or size, broken or having a blemish are rejected. Farmers therefore have to bear the post-harvest quality related losses. Direct-from-farm platforms allow farmers to sell such produce too and cuts down on the number of intermediaries, thereby boosting farmers share of the final price.

Enterprises have also contributed to creating other positive impacts on the lives of small-scale farmers besides enabling them to earn higher incomes. For instance, Kuchara, an online marketplace connecting farmers with buyers in Peru allows consumers to buy subscriptions to crowdfund education of future farmers, in exchange of long-life discounts on their purchases.

Cost Effectiveness

In India, nearly USD 20 million worth of crops are wasted per day owing to rejection at farm-gate and delays in the distribution process. Direct-from-farm platforms can be a cost-effective alternative to selling to private traders and auctioning in government operated marketplaces when their entire produce is bought by the enterprise and there is no produce that is rejected at farm-gate.

A number of enterprises procure produce from farmers at wholesale prices; farmers are satisfied since their entire harvest is sold, regardless of the shape and visual appearance of crops and on the other hand, enterprises are able to maintain low costs of procurement. Further, farmers benefit when the enterprise matches them to buyers and undertakes the transportation and delivery of produce to customers, thereby decreasing costs incurred by farmers in transporting produce to market yards or to end buyers themselves.

Enterprises require financial support to pay for initial costs involved in building the software and hardware for the platform or mobile-based solutions. They seek grant funds, prize money from awards and support from innovation labs to improve their solutions, and achieve better reach and scale results. For instance, Senegal based enterprise, MLuoma won the 2014 AMEA Orange Developer Challenge and was able to leverage on the financial assistance to integrate SMS and USSD features, resulting in its user base growing from under 1000 to 75,000 farmers.[14] SokoNect was offered a USSD testing bed by Mlab East Africa for a period of 3 months, however, the monthly maintenance fee of USD 465 proved to be a significant expense and led to the company discontinuing this application.

To keep costs low, it is also beneficial for enterprises to partner with local stakeholders in farmer engagement, procurement and transportation activities. By leveraging on these partners, enterprises can reduce costs on employing and training staff to undertake these activities. For instance, Kecipir, an enterprise in Indonesia that enables smallholder farmers to eliminate dealing with middlemen or '*tengkulaks*', sells organic produce via its online and smartphone application by organizing its customers based on community market clusters. It identifies local community hosts, who are paid a 10 percent commission fee on the orders, to serve as delivery hubs, customer service agents, and community organizers. Go4Fresh involves local aggregators or '*gundegaris*' to support the company in arranging transportation of produce from remotely located farms. Markit Opportunity leverages the trust that NGOs have with their farmer beneficiaries and involves these NGOs as field officers to facilitate farmer registration and trading activities, thereby reducing the enterprise's agent costs.

> Using the appropriate technology is imperative to reach a larger number of farmers through direct from farm platforms. Enterprises require financial support to incur high costs involved in integrating more farmer-friendly software like USSD or 'quick codes' over SMS.

Many enterprises work on an aggregator model, wherein orders are placed by buyers on the platform, demand is aggregated and produce is transported by enterprises from farms or centrally located collection points to buyers. They create efficiencies in this process to keep their costs low - they aggregate collection, consolidate groups of farmers growing crops with similar production cycles, and use technology to group orders for collection so they reduce costs across transactions. For instance, Agruppa creates a daily collective order based on orders placed on the platform and buys wholesale quantities from farmers generating discounts of up to 30 percent.[15] It is important for enterprises that operate on an aggregator model to track location-based orders in a timely manner so as to enable optimal scheduling of produce collection from remotely located farms which will result in lowering transportation and logistics costs. SokoNect is working towards grouping farmers based on the types of crops they produce in order to streamline the consolidation and collection process.

Taking it to Scale

Challenges

Agents, brokers or middlemen who are known to exploit smallholder farmers by procuring their produce at low prices represent the main threat to enterprises connecting farmers directly to buyers. Small-scale farmers are reluctant to change traditional practice and switch over to technology platforms that enable direct access to buyers. A study on TradeNet, a Sri Lankan based mobile platform showed that farmers continued to sell to the same traders because they depended on them as a source of loans and information.[16] Enterprises find it difficult to build trust with farmers who have traditionally built personal relationships and social ties with middlemen.[17]

The uptake of direct-from-farm services relies on farmers' familiarity and comfort with adopting mobile and internet based technology. Small-scale farmers in developing countries are typically illiterate, making it easier for them to interact with middlemen instead of adopting a technology based service to connect with end customers. In response to this challenge, enterprises have incorporated user-friendly design features that mimic widespread internet and mobile platforms that farmers are familiar with, such as M-Pesa. A number of enterprises such as Mandi Trades and Dialog Telekom introduced their services in different local languages. Markit Opportunity and SokoNect send field agents to visit farmers and educate them in using their technology platforms to sell produce directly to buyers.

> Farmers are reluctant to shift from traditional practices of selling through middlemen to technology based platforms owing to personal relationships that they have built with middlemen and their limited understanding of mobile and internet technology.

Many enterprises have cited that securing funds for working capital is a major challenge. An essential component to building trust amongst smallholder farmers is linked to timely payments. Enterprises require significant working capital to support immediate payments to farmers, with the risk of losing them as suppliers. Enterprises also face challenges in sourcing funds for their marketing activities – a critical requirement in generating demand and growing the end customer base on their platforms.

Role of Government and Policy

Given that farmers in developing countries predominantly practice subsistence farming due to lack of efficient market linkages, they would benefit from policies that foster transparency in price and demand information available to farmers, establish clear standards and create a market environment that embraces technology.

For instance, in India, the government is leveraging technology to provide transparent markets for previously underserved farmers. Until recently the Government, under the Agriculture Produce Market Committee (APMC) Act had mandated that the first sale of crops can only take place in regulated market yards or *mandis* within the same state. This mandate curtailed the market for farmers and forced them to sell to traders or commission agents licensed to operate in APMC markets. In some cases, licenses were required to trade in different yards within the same state.[18] As a step towards expanding markets for farmers, the Central Government of India has advised states to allow free exchange of agricultural produce across states; farmers can use a common electronic platform – e National Agricultural Market (e NAM) – to sell their produce to local traders or to online buyers across India. Under a USD 30 million scheme as part of the Digital India campaign, the Government plans to bring 585 regulated wholesale markets across the country on an electronic platform by 2018.[19]

The Unified Market Platform (UMP) launched by Rashtriya e-Market Services is an example of a public-private partnership between the Government of Karnataka, India and Mumbai-based NCDEX

Spot Exchange. The platform enables farmers and end buyers to negotiate on prices directly without the presence of an intermediary or agent. Circumventing middlemen allows farmers to receive payments in their bank accounts within an hour of the trade as compared to being paid in installments over a month.[20]

There are some gaps that governments across developing countries are yet to bridge – enterprises providing technology based platforms to directly link farmers with consumers have cited challenges in terms of receiving government financing, delays in provision of licenses, prohibitive tax structures and high-levels of corruption and bureaucracy. For instance, in Kenya, SokoNect incurs a license fee to operate its online and SMS based platform, pays an annual transportation fee of KSH 5000 and KSH 2500 to procure a license to distribute marketing brochures in Nairobi. Given the need to have sufficient end buyers on a farmer to buyer platform, marketing to urban consumers is essential for its business model.

Governments need to strengthen data collection and dissemination processes in order to promote enterprises providing direct market linkages to farmers cut off from mainstream markets. For instance, in Fiji, there are limited sources of accurate price information available to the private sector. Fiji AgTrade, a division within the Ministry of Agriculture, maintains a record of weekly market prices across Fiji. However, farmers located in interior rural areas can seldom access this information. There are no available data sets of farm gate prices and, at present, Fiji AgTrade appears to be the only source of local market prices.[21] In Nigeria, daily information on market prices can be found in newspapers for traditional export crops such as cocoa, but is unavailable for other crops such as rice, sorghum, cassava, maize, and horticultural crops. Public agencies publish information on a monthly basis which is of limited use to farmers.[22] Enterprises require credible data on prices and market trends so that they can build trust among smallholder farmers who are otherwise subject to information asymmetries.

Conclusion

Direct-from-farm platforms shorten the supply chain and help small-scale farmers to realize higher revenues owing to the direct connection to end buyers and elimination of middlemen. The business model is scalable owing to the increase in adoption of mobile and internet technology in developing countries. However, reluctance of farmers to switch from middlemen, who they have built personal and social relationships with, to technology based services may restrict the uptake of the direct-from-farm model. This scalability of the model is also determined by the critical number of farmers willing to move from subsistence to commercial agricultural practices and their awareness of market prices and demand. Platforms serving farmers who are only looking to sell small quantities of produce after meeting their own needs may not be financially sustainable.

Enterprises that provide value added services that include procuring produce from farm gates, packaging it and hosting it on their platforms for sale to consumers, keeping their transportation and logistics costs low, are more profitable than enterprises that only provide direct market linkage software to farmers to upload their produce. In addition, enterprises that design algorithms that consolidate individual farmers' produce and sell to consumers in larger quantities attract larger number of buyers to the platform, thereby increasing the volume of sales on the platform.

* INR to USD rate conversion: 1 INR = 0.015 USD
* KES to USD rate conversion: 1 KES = 0.0099 USD
*FJD to USD rate conversion: 1 FJD = 0.49 USD

Table 2. SEs: Direct-from-farm market link

Company	Country	Solution Description
Agruppa	Colombia	Formerly known as SokoText Colombia, the enterprise leverages mobile technology to connect farmers with fruit and vegetable vendors serving low-income communities. Vendors place orders via WhatsApp or voice calls and the company communicates the orders to farmers through voice calls.
D'Market Movers	Trinidad and Tobago	The enterprise provides market access to farmers growing high-quality, but perishable products in more remote island areas who previously only had limited access to local markets. The enterprise has 60 local organic producers and 650 consumers.
Dialog Telekom	Sri Lanka	Dialog TradeNet is an online platform connecting farmers to buyers. The service is operated by Dialog Telekom in partnership with GoviGnanaSeva (GGS). Information on the TradeNet platform is disseminated via multiple digital communication technologies such as SMS, Unstructured Supplementary Service Data (USSD) via mobile phones, web and Interactive Voice Response (IVR).
Ekgaon Technologies	India	Ekgaon Technologies (Ekgaon) is a Delhi based social enterprise that leverages ICT to provide farm advisory services and direct market linkages to smallholder farmers.
Fruitspot	USA, Europe and Latin America	Fruitspot provides an online platform linking farmers with buyers. Fruitspot verifies every user registered on its platform using the Fruitspot Verification Program, thereby establishing trust in the trading process.
Go4Fresh	India	Go4Fresh is based in Maharashtra, India. Its model allows farmers to sell all grades of their fresh produce. Go4Fresh's customers include export companies, supermarkets and retail individuals in the premium price bracket and price-conscious customers including processors, hotels, canteens and restaurants.
I-Say-Organic	India	I-Say-Organic is an e-commerce platform for organic produce. The enterprise procures organic produce from smallholder farmers, grades and ensures quality, and delivers the produce to end-customers based on sales generated on its platform. The company also provides feedback to farmers on when to plant and when to harvest based on demand projections.
Kecipir	Indonesia	Kecipir provides an online platform for farmers to connect with end consumers. The model shortens the supply chain by eliminating the presence of traders, central market, wholesaler, and retailer in the supply chain.
Kudu	Uganda	The company uses a double auction system to match farmers to buyers. Buyers and sellers separately communicate their requirements and the prices they are willing to trade at. The system takes into account price, location and other factors to automatically find the best matches.
MLouma	Senegal	Mlouma functions as a virtual commodity exchange connecting farmers to buyers through various communication platforms: internet, SMS, mobile app, and call center.
Mandi Express	Pakistan	Mandi Express is an online and SMS based platform that connects remotely located farmers in Pakistan with end consumers. The model eliminates '*Arthis*' or middlemen in the supply chain process. It is present in the market yards or '*mandis*' as well where any excess produce is sold.
Mandi Trades	India	A multi-lingual marketplace platform where farmers can post crop details using a phone and connect with buyers and traders directly. The platform publishes prices of farm commodities as provided by the Government of India to make it easier for farmers and buyers to decide on the trade.
Markit Opportunity	Kenya	The enterprise's e-commerce platform enables smallholder farmers to access information about the markets they buy and sell in, exchange high-quality produce through a double auction platform, and procure transportation services. The enterprise oversees harvesting and transportation logistics after a match has been approved.

SiembraViva	Columbia	The enterprise uses technology and an e-commerce platform to connect smallholder farmers in rural Colombia to a consumer base in urban cities. It also provides support and assistance to allow farmers to switch from growing commodities to value-added organic products.
SokoNect	Kenya	SokoNect links small holder farmers to buyers through mobile phone technology, online website, SMS and Android application. Buyers include retail individuals, supermarkets, export companies. In addition, the enterprise also provides business capacity training to farmers.

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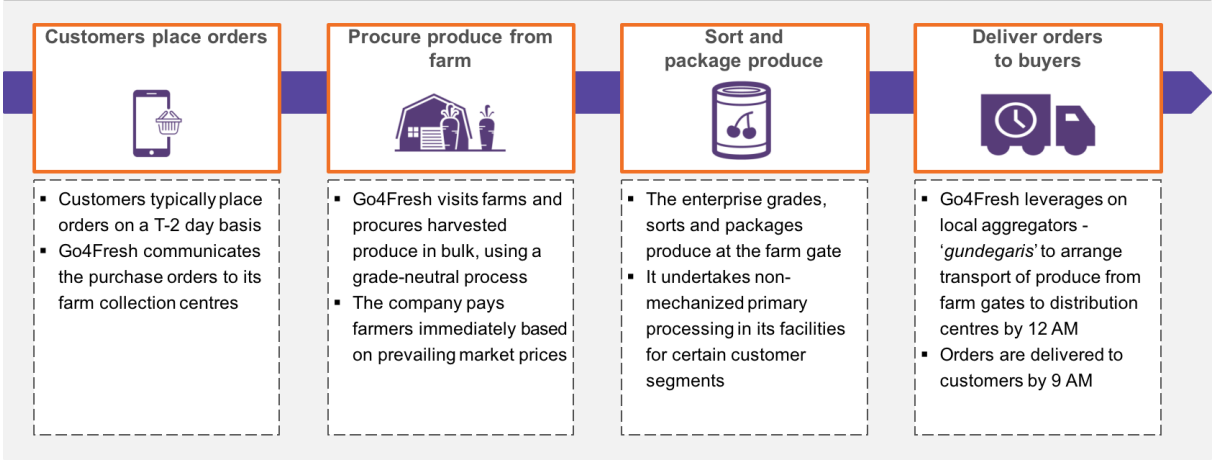
CASE STUDY: GO4FRESH

Founding year: 2013
HQ: Mumbai, India
Countries of operation : India
Orientation: For-profit
Employees: 25
Turnover: USD 1.2 million

Small-scale and marginal farmers in India are underserved by formal market linkages, which leads to post-harvest losses and excessive dependence on middlemen to price farmers' produce. The traditional procurement process involves selective procurement based on grades. Farmers are therefore left with lower-grade unsold produce that they can either sell to processors, who are typically difficult to reach, or through middlemen at significantly lower prices. In addition, farmers have to use shared transportation to reach mandis and end markets further delaying the distribution process.

Go4Fresh is a technology enabled platform that provides a direct farm to market linkage for smallholder and subsistence farmers, bypassing middlemen, traders and government operated auctions - '*mandis*'. The enterprise provides a grade neutral procurement option to farmers. It visits farms and procures all the harvested produce irrespective of its grade, shape and size, and sells it to varied customer segments at differentiated prices. Go4fresh customers include exporters, resellers, grocers, hotels, canteens, restaurants, processors, juicers, and retail individuals. The enterprise has reached over 10,000 farmers and has over 8500 end customers on its platform.



Operating Model

Go4Fresh enables smallholder farmers to directly sell their fresh produce to buyers. The company transports the produce from farm gate to end customers, thereby streamlining the supply chain. It caters to diverse customer segments such as export companies, resellers, grocers, supermarkets, and individual retail customers who prefer premium grade produce; and hotels, restaurants, canteens (HoReCa segment), and processors who are price-conscious, but not averse to buying produce that have physical defects as long as it is fresh and edible.

The model eliminates the presence of middlemen in the procurement process, reduces the burden on farmers to arrange for transport to reach government operated auction houses or '*mandis*', enables farmers to realize prices upfront, and reduces post-harvest losses stemming from lengthy procurement and distribution activities. In addition, Go4Fresh's model involves grade neutral produce procurement from smallholder farmers, a diversion from the traditional selective-buying model.

Under the traditional model, smallholder farmers in India transport their produce to Agricultural Produce Market Committee (APMC) market yards, where produce is sorted and purchased based on quality, shape, size and visual appeal. Farmers are generally able to sell their premium grade produce, but find it difficult to find buyers for lower grade produce. In order to avoid complete wastage of the lower grade produce, farmers resort to selling it either at sub-par prices to middlemen or agents, or to processors.. Go4Fresh provides these farmers a platform to sell their bulk produce at transparent prices to a single procurer at the farm gate.

WORLD BANK GROUP

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Buyers place orders on the Go4Fresh platform, which then conveys this information to its Farm Collection Centers two days prior to order delivery date. The team then visits farmers on their fields and procures all their produce for an upfront price. The produce is then sorted, graded and packaged at the farm gate, and transported to buyers. Farmers dealing directly with the enterprise are paid immediately. Farmers who are associated with aggregators receive payment in a two-step process – Go4Fresh pays the aggregators within 15 days, who then pay the farmers.

Go4Fresh sources produce from individual smallholder and marginal farmers, farmer co-operatives, and farmer producer organizations. Local aggregators or '*gundegaris*' as they are known in Maharashtra, India, support the company in arranging transportation of produce from remotely located farms. The enterprise partners with non-governmental organizations such as the Krishi Pragati Foundation, and agro-input dealers such as Syngenta, Bayer and Marico's agricultural input subsidiary to mobilize farmers. Go4Fresh conducts sessions on demonstration plots to create awareness on the model amongst farmer communities. It also partners with local government 'taluka' officers to conduct agriculture programs and leverages on the facilities of Krishi Vigyan Kendra - a government based agricultural extension center - to conduct farmer training. Go4Fresh also organizes supermarket visits to educate farmers on industry practices in packaging and resale. In an attempt to on-board farmers, it encourages farmers to evaluate its model on a trial basis in parallel with using the traditional model and subsequently choose their preferred option to sell produce.

Financial Sustainability

With 8000 retail customers and 500 corporate customers, the company generated USD 1.2 million in revenues in 2015 and is currently EBITDA positive. The company's strategy of buying produce in bulk quantities from farmers gives it a price advantage. Go4Fresh works with food companies on pre-determined buying and selling contracts that are well-matched, and hence limits the risk of carrying perishable inventory or disappointed buyers. In addition, the enterprise forms farmer groups and provides *Good Agricultural Practices* (GAP) certifications to them at a nominal fee.

The company's primary costs include farm to buyer transportation costs (USD 0.03 per kg, approximately 6 percent-10 percent of total sales), packaging costs (USD 0.01 per kg, approximately 3 percent-4 percent of total sales), non-mechanized primary processing facility cost (3 percent-4 percent of total sales), labor costs (USD 0.01 per kg) and capital expenses towards crates used in produce transportation, weighing scales, and sorting & grading tables.
The viability of the company's operations relies on the volume of demand generated on the platform and the consistency in supply. In order to ensure this balance, it is critical for Go4Fresh to create significant awareness among end-buyers and establish trust with its farmer base by paying them without delays.

Impact

Go4Fresh's farmer base includes farmers who own **2 acre plots**, cultivate **4-5 vegetable crops** and earn **USD 7472 per year** in gross income.

Go4Fresh has enabled over 5,000 farmers in Maharashtra, India with improved access to buyers. The company's direct-from-farm model has helped small-scale and marginal farmers in reducing post-harvest losses, increasing their knowledge about market prices and industry standards, and provided them with the opportunity to realize value from their entire harvest. The company has also provided capacity building services, helped farmers receive *Good Agricultural Practices* (GAP) certification, and educated them in managing transaction records. The company has also partnered with HDFC, a private bank in India, to open accounts for unbanked smallholder farmers; the company electronically transfers payments to farmer accounts.

Challenges and Lessons

The company faces significant challenges in generating demand and on-boarding end buyers, given its minimal marketing budget. Limited financial support hinders the company's ability to secure sufficient working capital to pay farmers on an immediate basis – a pivotal factor in strengthening farmers' confidence in Go4Fresh's direct-from-farm model.

* INR to USD rate conversion: 1 INR = 0.015 USD

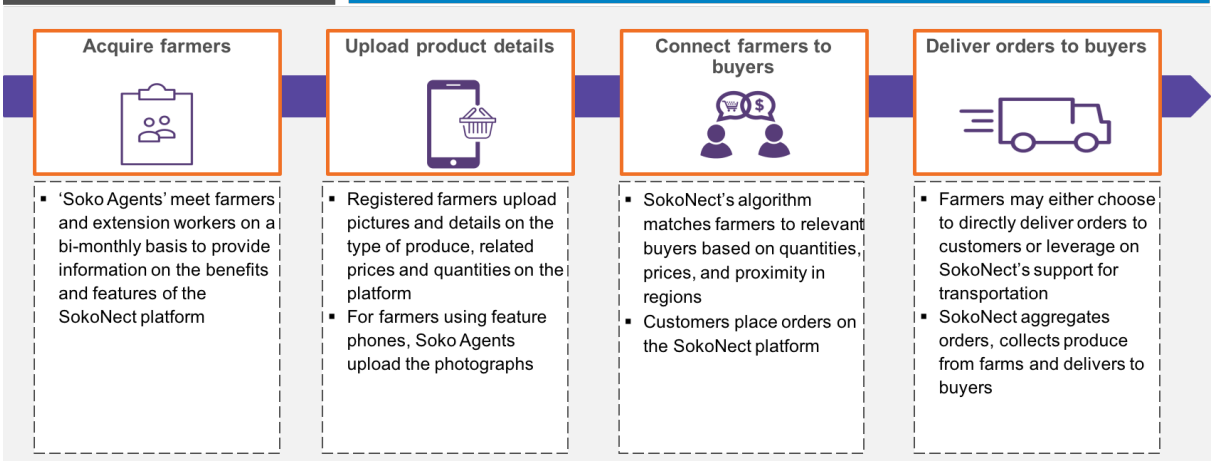
CASE STUDY: SOKONECT

Founding year: 2013
HQ: Nairobi, Kenya
Countries of operation : Kenya
Orientation: For-profit
Employees: 7
Turnover: USD 1482

Smallholder farmers in Kenya have limited access to end markets and lack knowledge on market prices. These farmers primarily depend on middlemen who charge them high commission rates, diminishing the revenues that farmers receive. Small quantities of produce, inconsistent quality of crops, and lack of market information diminishes the buying power of farmers. In addition, fragmented distribution channels result in post-harvest losses that further decrease farmers' incomes.

SokoNect is a mobile and internet technology based marketplace that allows farmers to directly sell their agricultural produce and livestock to end buyers based on prices set by them. The enterprise provides farmers updated information on prices for crops and livestock across different markets and access to consumers located in regions that were previously difficult for farmers to directly reach.

SokoNect currently operates in 4 counties across Kenya and has over 5000 registered farmers on its website, SMS and Android App based platforms. In addition to providing a marketplace for farmers, the enterprise has also trained farmers on the use of mobile and internet technology.



Operating Model

SokoNect's software provides smallholder farmers in Kenya a platform to sell their agricultural, horticultural and livestock products to buyers using a mobile phone. The algorithm matches farmers to potential buyers within their proximity and enables transactions without the presence of a middleman or broker. It also provides farmers with information on market prices and agricultural news updates. Buyers on SokoNect's platform include export businesses, supermarkets and retail individuals.

80 percent of SokoNect's current registered farmer base uses feature phones.

The company partners with well-known farmers and makes them 'Soko Agents', who support the enterprise in its marketing and farmer interaction activities. Soko Agents visit farmers on a bi-monthly frequency to provide them with information on the use of the platform and on-board them as users. Once farmers are registered on the platform, they can upload their product details using the SMS based service on their feature phones or website and mobile application on their smart phones.

Farmers advertise their products by uploading pictures and descriptions related to type of product, quantities and prices. The algorithm then matches farmers to buyers as per their locations. Farmers using smart phones can also upload pictures, while Soko Agents assist farmers using feature phones—SokoNect charges a fee of USD 0.06 for each upload by SMS. The enterprise currently charges two percent commission fee for products priced lower than USD 99 and 10 percent commission fee for products priced over USD 99. The payments are made either by using mobile money or transactions through Equity Bank.

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Following the placement of an order by a buyer, farmers may either choose to deliver the products directly to the buyer or avail of SokoNect's support for transportation from farm to buyer. SokoNect charges an additional fee to farmers or buyers who require transportation and logistics support.

Financial Sustainability

With over 5,000 farmers on its platform, SokoNect is working towards achieving break-even. The enterprise intends to operate at a sustainable level by incorporating differential quantity based pricing and transaction fee strategies. Efficient scheduling of purchase orders helps reduce logistics costs, thereby improving the model's financial viability. Typically, smallholder farmers sell small quantities of produce at a given point of time, which increases per unit transportation costs. For instance, the company incurs logistics costs of USD 99 to collect orders within a distance of 70 kilometers using one truck regardless of the quantities to be transported.

Despite the enterprise charging farmers a fee to transport their produce to buyers, it is not optimal for SokoNect to undertake frequent visits to farms to collect small quantities of produce. It encourages farmers to upload information two weeks prior to harvest, thus enabling streamlined consolidation of location-based orders that helps in planning a cost-effective logistics schedule. It also intends to cluster farmers into different groups or '*saccos*' based on the types of products and harvest periods for easier aggregation and collection of orders. Nearly 50 percent of SokoNect's overall costs comprise marketing costs – the enterprise finds it more challenging to acquire buyers in comparison to acquiring farmers to register on the platform. Logistics costs and Soko Agent salaries are other major costs incurred by the enterprise.

Since the product launch in July 2013, the company has spent over USD 9881. It received USD 4940 in funds from MLab East Africa and USD 1976 from Safaricom.

Impact

SokoNect's platform currently enables 5,000 smallholder farmers in Kenya to leverage on mobile phone technology to connect with end buyers directly. The elimination of middlemen and brokers translates to increased revenues for farmers stemming from higher purchasing power and reduction in exorbitant agent fees. The efficiency in the supply chain process, backed by real-time communication between farmers and buyers, reduces post-harvest losses ultimately resulting in increased farmer incomes.

Small-scale farmers typically earn **USD 99** on average per month, but have the potential to earn **USD 494** by eliminating middlemen. SokoNect enables smallholder farmers realize better returns from their produce.

Most rural smallholder farmers in Kenya are illiterate and not internet or mobile savvy. SokoNect in partnership with the government provides knowledge and capacity building to farmers on topics related to role of technology and the internet in improving their agricultural practices and productivity.

Challenges and Lessons

SokoNect was initially developed as an Android application. However, upon realizing that most farmers in Kenya have feature phones, the enterprise introduced a version using short code SMS application—a platform it purchased for USD 1778[1]. SokoNect was then offered a USSD test bed by Mlab East Africa for a period of 3 months. It later adopted the USSD (an interactive mobile phone

query service application) platform, costing the enterprise USD 1452 from Africa'sTalking Limited. Despite the benefits of USSD—an application that provides farmers a simpler query and response mechanism in comparison to SMS services, the monthly maintenance fee of USD 168 proved to be a significant expense and led to the company discontinuing this application.
The uptake of SokoNect's direct-from-farm service relies on farmers' familiarity and comfort with adopting mobile and internet based technology. It trains farmers on internet and mobile usage and role of technology in agriculture at government organized farmer meetings or '*barazas*'. SokoNect also redesigned its interface to mimic that of M-Pesa, a mobile payment platform that most farmers in Kenya are familiar with.

Limited government funding and support towards technology based enterprises in Kenya prove to be a critical challenge for SokoNect; capital is provided to companies with a minimum of 8 - 12 founders and there are high-levels of bureaucracy and corruption when working with county governments. In addition, it also has to pay taxes and license fees which are major expenses, for example the company pays the government USD 50 as transportation tax and USD 25 as an annual fee for distribution of marketing brochures in Nairobi.

* KES to USD rate conversion: 1 KES = 0.0099 USD