



INNOVATION AWARD

Advancing financial inclusion through data innovation

AgriGO: A farmer's tool to grow greater financial harvest

DataHack4FI Innovation Award Season 2
In-country winner for Rwanda

Targeting farmers with an accounting and credit score product

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Advancing Financial Inclusion

Case Study

Across sub-Saharan Africa, agriculture is a key source of employment and income, with 62% of adults in the region earning their primary income through agriculture¹. Despite smallholder farmers representing such a significant target market for financial services, they are a financially underserved group. According to the Global Findex 2017, approximately half of smallholder farmers had experienced a bad harvest or significant livestock loss in the previous five years, but less than 10% of smallholder farmers have access to formal financial products that could assist them in overcoming such challenges². The combination of a risky sector, low productivity and the lack of access to financial tools, traps smallholder farmers in a cycle of uncertainty, in which many families find themselves living hand-to-mouth³. From the supply perspective, traditional financial service providers (FSPs) face several challenges in serving smallholder farmers. One of the major challenges is the lack of records of the farmers' finances, activities and collateral.

AgriGO, winner of the Rwandan leg of the DataHack4FI Innovation Award Season 2, uses a data-driven approach to assist farmers with their productivity, as well as access to financial tools.

The company: GO Limited

The motto of GO Limited (a software company based in Kigali, Rwanda) is "GO enter the digital world", and that is exactly what it strives to do with its AgriGO product.

GO Limited was founded by Shikama Dioscore and has been fully operational since 2016. The idea for the agricultural management service arose from personal experience, as Shikama witnessed first-hand how challenging it was for his family to manage their farming inputs and activities in a structured way. As with many smallholder farms across Africa, individuals might not have strong business skills or operations management tools in place. This means that it can be time-consuming to keep track of activities and costs involved, ultimately hampering agricultural productivity and profitability. Shikama envisioned AgriGO as a service to help farmers keep track of their activities and use better agricultural processes, to help them graduate into modern farming. It quickly became apparent that the lack of access to finance is one of the major obstacles that farmers face. As a result, the financial component was incorporated into the vision from the start.

AgriGO collects data from a variety of sources to inform timed and tailored agricultural notifications. These are interactive, as they are informed by users recording their farming activities via USSD. AgriGO's advisory platform to date has signed up 30 cooperatives, through which they serve a total of 90,000 individual farmers. The platform currently supports rice, maize and potatoes, and it covers the entire Rwanda. The platform is accessible through USSD, Web and SMS, and revenue comes from account management fees (paid by cooperatives) or user subscription fees (paid by independent farmers).

1 Chakravarty, S., Das, S., & Vaillant, J. (2017). Gender and youth employment in Sub-Saharan Africa: A review of constraints and effective interventions. Policy research working paper 8245. Washington DC: The World Bank.

2 Demirguc-Kunt, A., Klapper, L., Singer, D., Ansar, S., & Hess, J. (2018). The Global Findex Database 2017: Measuring financial inclusion and the fintech revolution. Washington DC: The World Bank.

3 Osman, N. (2017). Here's how African farmers can reap economic independence in agriculture. Retrieved June 24, 2018, from https://www.huffingtonpost.co.za/nuradin-osman/heres-how-african-farmers-can-reap-economic-independence-in-agriculture_a_23246072/

The challenge: Financial vulnerability of smallholder farmers

Depending on the crops involved, smallholder farmers might harvest as infrequently as once or twice a year. Such infrequent lump sum payments can make cashflow management a challenge, especially considering that agricultural yield, and thus harvest profitability, can be uncertain. This in itself is problematic, but it has the added effect of financial stress on a farmer, increasing the likelihood that they will feel obliged to accept any price for their harvest, just to ensure a sale and thus cashflow. This tends to decrease a farmer's overall profitability.

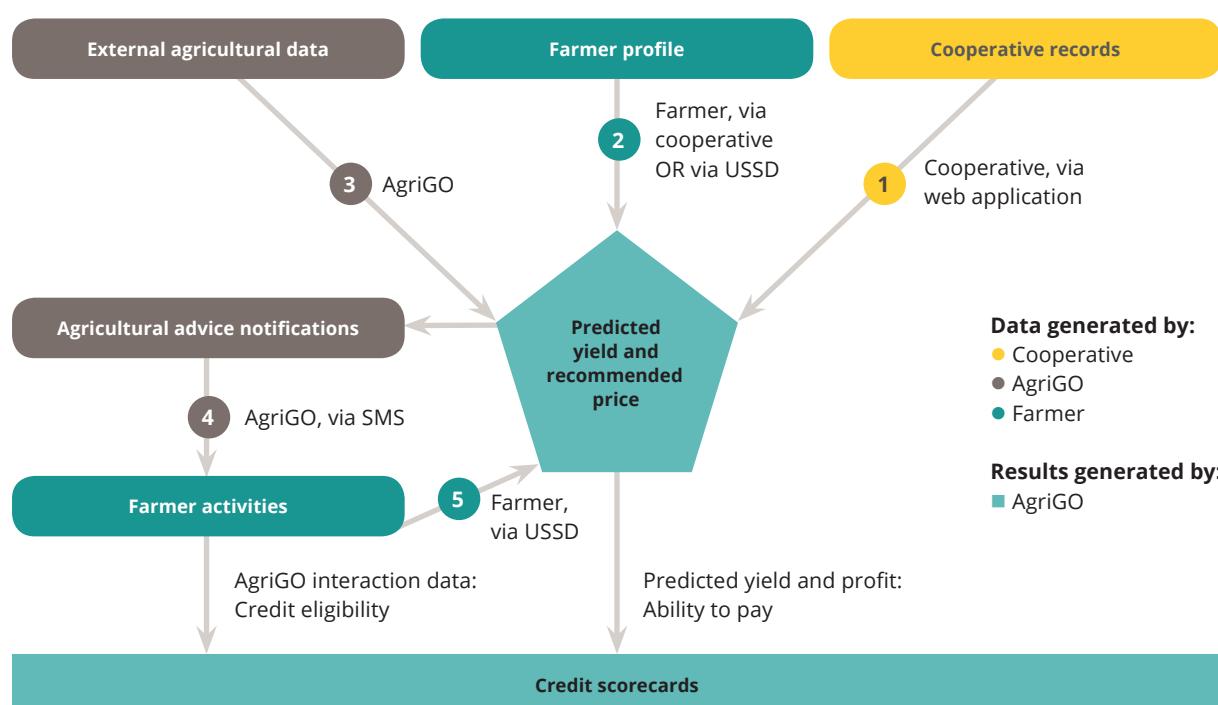
Although credit facilities might provide a solution to such cashflow challenges and thus alleviate the resulting financial stress, these are generally not available to smallholder farmers. This is due

to a variety of reasons. Among others, banks and microfinance institutions (MFIs) simply do not see smallholder farmers as a viable target market, and thus do not offer their services. Savings and credit cooperative organisations (SACCOs) may be more willing to provide agricultural credit, but still need a way of determining a farmer's creditworthiness. The nature of smallholder agriculture is such that there tends to be little data on farmers' activities and transaction histories, which hampers institutions' ability to create credit scores.

The data source: Farming inputs and activity scores

AgriGO's farming advisory service combines a number of data sources. Figure 1 gives a visual representation of how the different data sources interact with one another.

Figure 1: Interaction of different data sources in the AgriGO platform



Source: Author's own

- **Cooperative records.** The cooperatives that subscribe to AgriGO's services provide the initial input of historical data on the individual farmers via the platform's web application. The amount of data involved here depends per cooperative, but it will generally include records of historical farming input purchases by farmers, records of loan repayments from farmer to cooperative and possibly historical records of harvest yields and sales.
- **Farmer profile.** The farmers that make use of AgriGO provide this data, generally through USSD, and sometimes through their cooperative (if the cooperative has this data on file for its members). The most important pieces of information to be collected here are the location and size of the farm.
- **External agricultural data.** This data is sourced by AgriGO from a variety of government databases, such as offered by the Rwandan Meteorological Services or the Ministry of Agriculture. It includes weather data, soil data, aggregated agricultural performance data and market prices, among others.
- **Farmer activities.** Farmers on the AgriGO platform input this data via USSD, and this information forms the backbone of AgriGO users' digital records. These records include information on time, date, price, quantity, type of purchases (of various farming inputs such as seeds and fertiliser) and type of activity (such as seeds planted or other non-input related activities, like preparing the field and weeding).
- **AgriGO interaction data.** This data is compiled by the AgriGO back-end, by comparing the farming recommendation notifications that farmers receive via SMS, with their subsequent activities as captured via USSD. This data thus gives an idea of the extent to which AgriGO's advice is followed and the dedication with which farmers engage with the platform.

The solution: Scorecards for agricultural finance

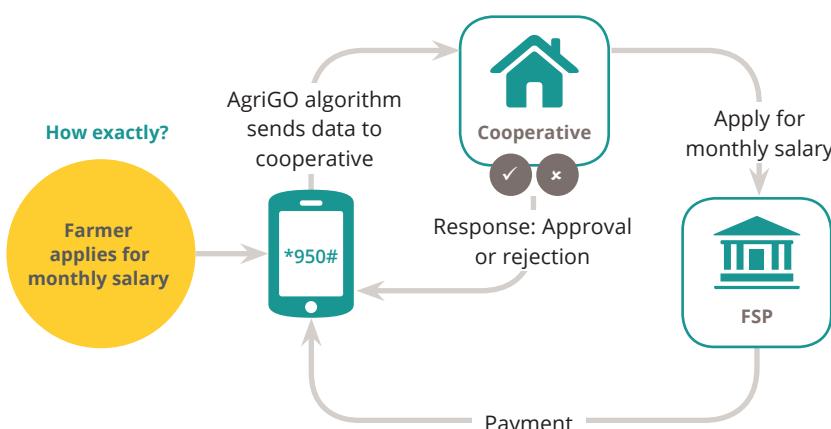
Using its unique combination of data types, AgriGO develops a scorecard for each data type described above and combines these to advise as to the creditworthiness of farmers. The five scorecards together provide insight into the two key metrics for creditworthiness – *ability to repay* and *willingness to repay*.

- **Ability to repay:** A farmer's ability to repay is informed by his/her predicted yield and profit. These two metrics are based on the external agricultural data, the farmer's assets, and his/her daily activity costs. The timing and nature of farming inputs and activities, combined with certain independent variables such as weather and farm location, give AgriGO a sense of predicted yield. Based on the cost of inputs, the system advises on a fair price for the harvest, which increases the farmer's negotiating position and makes him/her more likely to make a profit.
- **Willingness to repay:** This is essentially a behavioural metric, and it needs to be inferred through other measurable indicators. AgriGO does this based on the cooperative's historical records of the farmer (which includes a measure of consistency of purchase and loan repayments) and the farmer's interactions with AgriGO. The assumption is that consistent and regular interaction with the AgriGO platform indicates sound behaviour and intent to repay. Given that the notifications are highly flexible and responsive to changes in daily activities, inputs and weather, there is a high level of confidence that the system cannot be manipulated.

AgriGO users can apply for a monthly advance on their harvest through AgriGO's USSD menu. Based on their scorecards, which cooperatives have access to, these organisations can accept or reject the application for credit. If this poses a cashflow problem for the cooperative, they can subsequently use the farmers' scorecards to access the credit through a larger SACCO or bank.



Figure 2: Farmers' access to finance through AgriGO



Source: AgriGO – DataHack4FI pitch deck

The impact: Decreased financial vulnerability and improved profitability

For smallholder farmers, the impact of accessing more regular cashflow is significant. The knowledge that money will flow in on a monthly basis reduces financial stress, and it enables AgriGO's users to plan their financial decisions better.

Most importantly, it makes farmers less vulnerable at the time when they need to make their most important financial decision: the price at which to sell their harvest. As farmers are likely to be less desperately cash-strapped at the time of harvest, their negotiating power increases. AgriGO's records on input costs and recommended price for harvest improve negotiating power further, ultimately resulting in increased profitability for farmers.

An important additional impact holds for female farmers, who tend to perform the bulk of agricultural work, but normally cannot access any agricultural finance as they do not own the land. AgriGO's platform and scorecards apply to the individual who cultivates, rather than who owns, the land, thus opening up increased financial access to women.

The future: Internet of things for more detailed farmer profiles

AgriGO's future plans revolve around improving the current financial offering to its users. Firstly, it is exploring the possibility of incorporating connected soil-testing devices. The quality of the soil under cultivation would then form an important part of the "farmer profile" data bucket, and it will inform the SMS notifications to make them more tailored. Secondly, AgriGO is actively looking for partners to expand the variety of financial services it can offer its users, considering insurance products, for example.

This case study is part of the DataHack4FI Innovation Award competition Season 2 series. It describes the solution as developed by the tech startup and its partnered data fellows during the competition. The competition brings together data enthusiasts and financial service providers to promote the use of data-driven decision-making in financial inclusion.

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