Nudging assembly traders to do their job - harnessing data to signal arbitrage opportunities to middlemen and make markets work for smallholder farmers.

Why is the idea an unconventional or creative approach to the problem outlined in the topic?

Poorly integrated agricultural commodity markets, characterized by weak trade links between rural producer areas and urban consumer centers, have many undesirable consequences, ranging from inefficient product allocation and trade flows to excess seasonal price variability and food and nutrition insecurity. In addition, as most of the transaction costs involved in getting produce from the field to the restaurants and shops in towns are passed on to the farmer, the resulting low prices directly impact decision making at the farm level: A lack of market access is thought to be an important barrier to sustainable intensification, trapping farmers in self-subsistence agriculture. The importance of a well-functioning market system has prompted many interventions aimed at reducing transaction cost, such as improving infrastructure, encouraging marketing cooperatives or setting up market information systems, often with mixed results.

This project is novel in that in aims to increase market integration by targeting itinerant assembly traders. These "middlemen" are often overlooked, vilified as exploitative and branded as parasites by farmers and policymakers alike. We consider them the grease that keeps the value chain running and argue that problems are created by too few middlemen, rather than too many. The study is also creative in that it aims to turn something generally regarded as an obstacle into an opportunity: excess variability and uncertainty about localized agro-ecological conditions, likely to become even more outspoken due to climate change, provides the basis of arbitrage opportunities. By combining big data obtained from remote sensing, weather stations and markets in realtime decision support systems, arbitrage opportunities can be spotted quicker and at a much more granular level and signaled immediately to nearby traders through location aware devices.

Describe the hypothesis for the proposal and why it is expected to succeed.

Search costs, which refers to the costs incurred and effort needed to find a suitable trading partner, are an important component of transaction costs, hence interventions aimed at reducing search costs, often through simply providing information, are likely to increase market interconnectedness. However, recent research suggests that the benefits of providing farmers with information is limited: Farmers in remote rural areas often have no other option than to sell an itinerant trader that visits the village only once, even if they know the price they get is too low.

Providing information to traders will also reduce search costs and increase market interconnectedness. However, to be able to exert monopoly power, traders will have an incentive to keep information on arbitrage opportunities hidden from other traders. Providing information about profitable time and location sensitive arbitrage opportunities to a pool of traders is expected to increase competition at the farmgate. This will reduce market power of the trader and part of the efficiency gains due to the information will accrue to the farmer, resulting in a win-win.

Describe the implementation plan, including any new technologies or tools that will be developed.

The project will be implemented and tested as a cluster randomized controlled trial. First, catchment areas for agricultural commodities will be determined around consumer centres. Within each catchment area, a trader census will be organized. Half of these catchment areas will then be assigned to the treatment group and the other half will serve as control. To evaluate the effectiveness of the project, an endline survey among both traders and farmers will be conducted to compare outcomes between treatment and control.

Within the treatment areas, traders will be register in a system through smart-phones and will get detailed information on time and location sensitive arbitrage opportunities. More in particular data from satellites, hyper-local weather stations (through Kakua), market price information (through FIT Insights) and information on transaction logged into the system will be combined into a realtime decision support system designed to forecast arbitrage opportunities. Information about these opportunities will be sent to registered traders depending on their location with respect to where the opportunity occurs.

Explain how the work will be performed within the budget (USD$100,000) and time (12 months) allowed?

The pilot will be implemented in Uganda, where a large share of the population produces mainly for own consumption following customary practice and using little or no technology, despite the potential for agricultural intensification and commercialization. The agroecology in Uganda results in substantial variability in the agricultural calendar, even in small areas, and climate change has added uncertainty to weather patterns. Uganda also has a high population density and a reasonable degree of urbanization means. The above means there will be sufficient arbitrage opportunities that can be exploited within the time and budget constraints of the project.

What essential data will be generated during this pilot?

Apart from the data that will be collected to run the decision support system, an endline survey will be carried out to investigate if the project had an effect on key variables that are likely to affect decision making at the farm level, such as interactions with traders and the bargaining process (eg. prices received). We will also collect data from traders. For instance, we will collect data on willingness to pay to determine appropriate business model and sustainability.

If the pilot is successful, what are the next steps?

If the pilot proves to be successful, the project can easily be brought to scale by including additional catchment areas. However, instead of simply rolling out the intervention, additional learning should be built-in. For instance, it is well known that the effectiveness of information often depends on seemingly small design attributes (eg. how information is framed, how information is delivered,…) and small experiments can be included to learn about ways to engage particular groups of people (youth, women, the ultra-poor). Finally, a suitable business model should be developed based on what is learned, and the feasibility of converting the project into a social enterprise evaluated.