Incentivizing quality in the dairy value chain: A pre-analysis plan

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Motivation

Over the past decade, the dairy sub-sector has developed rapidly in Uganda. Particularly in the areas around Mbarara, commonly referred to as the south-western milk shed, an influx of foreign direct investment has created the pre-conditions for a modern dairy value chain to emerge. The area now has an extensive network of milk cooling and collection centers that link smallholder farmers to a cluster of processors.

Processors indicate that their main challenge is related to sourcing milk of sufficient quality. In particular, they indicate that their profitability depends on butter fat content and solid non-fat content of the milk.

When asked about what farmers need to do to increase quality, the mainly refer to practices that affect milk sanitary attributes.

The above point to several problems within the value chain. At a technological level, instruments necessary to make the desired quality attributed visible are lacking. Milk collection centers only engage in rudimentary testing. Farmers do not have access to testing equipment. At the knowledge level, farmers do not seem to know what quality parameters are important further downstream the value chain.

Research design for a randomized control trial of scaling efforts under the Quality-Based Milk Payment Scheme (QBMPS) that was piloted by DDA and SNV last year in Uganda's SW milkshed.

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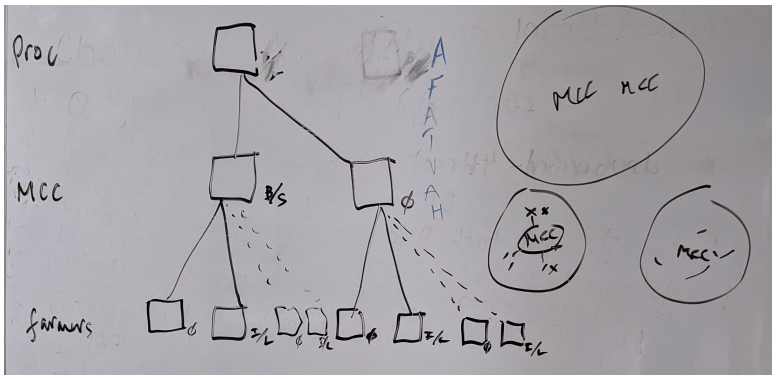

Figure 1: Design

Related Literature

Rao and Shenoy (2021) explore the effect of collective incentives on group production among rural Indian dairy cooperatives. In a randomized evaluation, they find village-level cooperatives can solve internal collective action problems to improve production quality. However, some village elites decline payments when they cannot control information disclosure. Opting out reflects frictions in allocating surplus within a social network, and suggests some transparency-based efforts to limit elite capture may undermine policy goals.

Hypotheses and Interventions

At the level of the milk collection centers, the main focus is on a technological intervention that can be used to discover all relevant quality parameters of the milk that is provided. In close collaboration with SNV and DDA, we install digital lactoscans

At the level of the dairy farmers, we implement and information intervention where we .Furthemrore, we also want to make quality visible by providing a low cost technology. In particular, we will distribute lactometers. These simple tools do not allow farmers to directly measure the parameters of interest. However they can be used to give an indication of solid non-fat content.

Experimental design and power calculations

We randomly allocate quality testing equipment to eligible milk collection centers (MCCs), which agree to implement some kind of quality bonus to suppliers. In a cross-cutting design, at the farmer level, we will randomly allocate training on quality parameters and linkages with production management decisions, as well as distribute lactometers, which serve as partial quality indicators.

Sampling

Context and study area

Specifications

Data collection and endpoints

Outcomes of interest at MCC level: average milk quality levels (for different quality parameters); milk purchase price and volume; milk sales channel (to whom sold), price, volume and profits. Outcomes of interest at farmer level: perceptions of control of output quality parameters; willingness to experiment; changes in production investments and management; milk quality levels (for different quality parameters); milk sales channel (to whom sold), price, volume and profits.

Ethical clearance

Transparency and replicability

To maximize transparency and allow for replicabiliy, we use the following stratgies:

- pre-analysis plan: the current document provides an ex-ante step-by-step plan setting out the hypothesis we will test, the intervention we will implement to test these hypothsis, the data tha will be collected and specifications we will run to bring the hypotheses to the data. This pre-analysis plan will be pre-registered at the AEA RCT registry.
- revision control: the entire project will be under revision control (that is time stamped track changes) and committed regularly to a public repository (github).
- mock report: After baseline data is collected, a pre-registered report will be produced and added to the AEA RCT registry and GitHub. This report will differ from the pre-analyisis plan in that it already has the tables filled with simulated data (drawn from the baseline). The idea is that after the endline, only minimal changes are necessary (basically connecting a different dataset) to obtain the final result, further reducing the opportunity of specification search.

References

Rao, M. and A. Shenoy. 2021. "Got (clean) milk? governance, incentives, and collective action in Indian dairy cooperatives."