Incentivizing quality in dairy value chains - experimental evidence from Uganda (registered report)

Richard Ariong[*], Jordan Chamberlin[†], Sarah Wairimu Kariuki[†], Bjorn Van Campenhout[‡]

September 28, 2023

Abstract

In value chains where quality of the underlying commodity is hard to observe and track, quality upgrading my be challenging. We test two barriers to the development of a market for quality in Ugandan dairy value chains using a field experiment with treatments at different levels. At the farmer level, we conjecture that farmers are paying attention to the wrong quality attributes and design a video-based information campaign to point out what the quality parameters are that matter for processors. We also provide them with a small incentive to put what they learned into practice. Midstream, at milk collection centers where milk is bulked and chilled, we install technology that enables for quick and cheap testing of the milk that is brought in. We look at impact of both interventions at both farmer and milk collection center level and consider outcomes such as milk quality, prices received and quantities transacted.

JEL: O13, O17, Q13

Keywords: value chain upgrading, dairy, quality assurance, information

1 Data collection

We collected data in 4 districts in the southwestern milk shed (Kazo, Kiruhura, Mbarara, and Ntungamo).

Treatment assignment. Sometimes, there is more than one milk collection center in a particular village or trading center. To avoid issues related to providing one MCC with a milk analyzer and the other not, we group milk collection

[*]Development Strategy and Governance Division, International Food Policy Research Institute, Kampala, Uganda

[†]CIMMYT, Nairobi, Kenia

[‡]Development Strategy and Governance Division, International Food Policy Research Institute, Leuven, Belgium

centers that are less than 2 km apart (and associated farmers in catchment areas) into the same treatment group. Doing so, we

2 Baseline Balance

During baseline data collection, we collected information on 10 variables at each level to demonstrate balance. The table below list

(although we may only report a subset - indicated with a star - in the paper for space considerations) At the milk collection center level, we will collect the following characteristics:

1. Is this milk collection center (part of a) cooperative? (yes=1)*
2. Number of people employed (full-time) at this MCC? (number)
3. Number of farmers/traders that supply on an average day during the rainy season. (number)
4. Total Capacity of MCC (in liters)*
5. Capacity use during dry season (percentage)
6. Does the MCC pay a premium for quality (yes=1)*
7. Years Experience in MCC*
8. Number of milk cans owned by the MCC
9. Supplies credit/loans to cooperative members and regularly supplying farmers? (yes=1)
10. Facilitates supply of acaracides to cooperative members and regularly supplying farmers? (yes=1)*

At the level of the farmer household, we will collect information on the following 10 characteristics:

1. Household Members (number)
2. Household Head Age* (years)
3. Current Total herd size (cows+heifers+calves) (number)*
4. Number of improved animals in total herd (share) *
5. Liters Produced Total Per Day (average during rainy season) (liters)
6. Liters milk sold per day (on average in the rainy season) (liters)*
7. Normally during the rainy season sells most of its milk to a milk collection center? (yes=1)

Table 1: Balance table

	mean ctrl	analyzer	video	bundle	nobs
		milk collection centers			
Is this milk collection center (part of a) cooperative? (yes/no)	0.584	-0.108			125
	(0.495)	(0.087)			
Total Capacity of MCC (in liters)	4583.544	1002.375*			125
	(2468.126)	(426.905)			
Does the MCC pay a premium for quality (yes=1)	0.232	-0.059			125
	(0.424)	(0.078)			
Years Experience in MCC	9.685	0.881			124
	(8.108)	(1.602)			
Facilitates supply of acaracides? (yes=1)	0.544	-0.058			125
	(0.5)	(0.09)			
		dairy farmers			
Household Head Age (years)	54.144	0.697	-0.244	-2.142	2263
	(13.509)	(2.574)	(2.376)	(3.13)	
Current Total herd size (number)	68.423	11.399	-16.656	18.557	1982
	(80.178)	(16.261)	(13.009)	(20.429)	
Number of improved animals in total herd (share)	76.052	-1.712	-2.218	24.061	2263
	(85.205)	(20.987)	(11.903)	(22.032)	
Liters milk sold per day (on average in the rainy season) (liters)	64.335	9.489	-0.573	9.187	2263
	(66.834)	(15.361)	(11.379)	(16.179)	
Average monthly expense (USD) on chemical purchases	71.825	22.859	-13.028	-27.262	906
	(112.524)	(29.832)	(45.12)	(53.168)	

Note: First column reports control group means (and standard deviations below); **, * and + denote significance at the 1, 5 and 10 percent levels.

8. Uses only steel can/bucket during sales transactions in the last 7 days before survey? (yes=1)

9. Member of dairy cooperative? (yes=1)

10. What is your average monthly expense (UGX) on chemical purchases to fight ticks (acaracides)? (average during rainy season)*

3 Appendix

Table 2: Balance table

	mean ctrl	analyzer	video	bundle	nobs
		milk collection centers			
Number of people employed (full-time) at this MCC? (number)	3.104	0.299			125
	(1.95)	(0.326)			
Number of farmers/traders that supply on an average day during the rainy season. (number)	51.938	-6.939			113
	(50.709)	(9.776)			
Capacity use during dry season (share)	35.058	-6.111^{+}			120
	(21.479)	(3.63)			
Number of milk cans owned by the MCC	21.16	0.857			125
	(43.509)	(7.681)			
Supplies credit/loans to cooperative members and regularly supplying farmers?(yes=1)	0.856	0.071			125
	(0.353)	(0.069)			
		dairy farmers			
Household Members (number)	9.571	-0.063	-0.463	2.175*	2263
	(4.558)	(0.915)	(0.627)	(1.087)	
Liters Produced Total Per Day (average during rainy season) (liters)	76.052	-1.712	-2.218	24.061	2263
	(85.205)	(20.987)	(11.903)	(22.032)	
Normally during the rainy season sells most of its milk to a milk collection center? (yes=1)	0.791	0.024	-0.03	-0.014	2263
	(0.407)	(0.073)	(0.048)	(0.065)	
Uses only steel can/bucket during sales transactions in the last 7 days before survey? (yes=1)	0.778	0.132	0.022	-0.074	2263
	(0.416)	(0.087)	(0.06)	(0.092)	
Member of dairy cooperative? (yes=1)	0.713	-0.204^{+}	-0.012	0.086	2263
	(0.452)	(0.113)	(0.055)	(0.085)	

Note: First column reports control group means (and standard deviations below); **, * and + denote significance at the 1, 5 and 10 percent levels.