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Dairy value chains during the COVID-19 pandemic in Ethiopia

Evidence from cascading value chain surveys before and during the pandemic

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ABSTRACT

We combine in-person survey data collected in February 2018 with phone survey data collected in June and September 2021 to study how dairy value chains in Ethiopia have coped with the COVID-19 pandemic. Focusing on the major dairy value chain connecting farmers in North and West Shewa as well as peri-urban and urban producers in and around Addis Ababa to consumers in Addis Ababa, we applied a cascading survey approach in which we collected data at all levels of the value chain: dairy farmers, rural wholesalers, and urban retailers.

In June and September 2021, we see little evidence that the pandemic is exerting a negative effect on the dairy value chain actors. Nine percent of the dairy farmers exited the business between February 2018 and June 2021, but these exits were not caused by the pandemic. Milk yields have increased considerably between 2018 and 2021, particularly among cross-bred cow types. Meanwhile, sales patterns and sales destinations among farmers have remained similar since 2018. In 2021, farmers are processing more and the decision to process or not seems to be formed by the changes in the relative prices of liquid milk and processed dairy products. We see suggestive evidence of a decline in credit availability and access to extension services. Same is true for the availability of daily workers, though not many farmers hire external help. Among farmers, by far the main concern relate to surging feed prices that increased since the onset of the pandemic and June 2021 by 80 to 100 percent. As a result, farmers report purchasing less feed and this is reducing milk yields, and thus farmer incomes.

Rural traders also seem unaffected by the pandemic. The turnover among liquid milk traders is high with 36 percent of the milk wholesalers interviewed in February 2018 reported to have stopped trading dairy products by September 2021. However, only few reported that the pandemic was a factor in their decision to quit the business. The turnover among butter traders was smaller with 4 out of 30 traders quitting between February 2018 and September 2021. We see no dramatic changes in procurement and sales destinations between 2018 and 2021. Traders report that the competition in their sector has increased since February 2020. Meanwhile, the availability of labor at the midstream segment of the value chain has remained the same over time. The main concern among at this segment of the value chain relates to limited supply of milk and butter from rural areas.

The impact of the pandemic seems also minimal at the retail level. About 29 percent of the retail traders had quit the business since February 2018, mostly because their business was no longer profitable. Eight out of the 49 retailers that exited the sector attributed their exit, at least partly, to the pandemic. Comparison of the data collected in 2018 and 2021 reveals that the traded quantities have increased in the dairy retail sector. However, when asked to compare to the situation just before the pandemic was declared, most traders report selling less and having fewer clients now. We see little change in labor use at the retail level across the survey years. Shortage of dairy coming into Addis Ababa was highlighted as the main concern among retail traders.

In line with the high general inflation in Ethiopia over the past years, prices of liquid milk have increased considerably in the last three years. However, when expressed in USD terms, prices of milk have remained surprisingly stable (0.92 USD/liter in 2018 and 0.91 USD/liter in 2021). Comparing the farmgate and retail prices reveal that farm share (i.e., the share of the final retail price that is received by the farmer) increased slightly between 2018 and 2021.

Finally, we see no evidence that increases in post-harvest losses. The physical quantities wasted seem very low, which is in line with the more careful analysis conducted by Minten, Tamru, and Reardon (2020). If anything, these losses at the wholesale and retail level have gone down during the pandemic. However, it is important to note that we did not assess losses in terms of value or quality. On the latter, it is encouraging to see that testing the milk quality with lactometers and alcohol tests have become more common since 2018, particularly at the mid and downstream segment of the dairy value chain.

1. INTRODUCTION

The rapid economic growth accompanied with urbanization over the past decade or so are leading to profound changes in agri-food systems in Ethiopia. Household food consumption baskets are shifting toward high-value foods, such as animal sourced foods, fruit, and vegetables, particularly in urban areas (Bachewe, Minten, & Yimer, 2017; Hassen Worku, Dereje, Minten, & Hirvonen, 2017; Wolle, Hirvonen, de Brauw, Baye, & Abate, 2020). The increased demand from urban consumers – that typically do not produce their own food – elevate the importance of well-functioning agricultural value chains within agri-food systems.

We focus on the dairy sector, the sleeping giant of the Ethiopian economy. While Ethiopia hosts one of the largest cattle populations in the world, the productivity of the dairy sector has remained relatively stagnant (Bachewe, Minten, Tadesse, & Taffesse, 2020). In 2004, livestock sector accounted for 12 percent in Ethiopia gross domestic product (GDP) while in 2015, the share was only seven percent (Bachewe et al., 2020). While the total milk production increased by more than 40 percent in 2005-2015, this growth was almost completely due to the increase in the number of dairy cows, not improvements in productivity (yields; output per animal) (Bachewe et al., 2020). Moreover, dairy prices grew 35 percent faster than general inflation during 2007-2016 (Bachewe et al., 2017), implying significant bottlenecks in dairy supply. In 2016, the average Ethiopian consumed 8.7 liters of milk per year – far below the global average of 100 liters a year (Ignowski, Minten, Swinnen, Van Campenhout, & Vandevelde, 2021). Together, these numbers highlight considerable potential for growth in the sector, especially around the large urban centers of the country where an increasing amount of consumers can afford to purchase relatively expensive dairy products (Bachewe et al., 2017).

Dairy is also strongly associated with better nutritional outcomes, especially among children. A convincing case can be made for the so called *Milk hypothesis* that postulates that “greater consumption of milk during infancy and childhood will result greater stature in adult life” (Bogin, 1998). Dairy contains high-quality proteins that are likely to address potentially critical amino acid deficiencies in infancy and early childhood (Dror & H., 2011). Dairy is also rich in several important micronutrients such as calcium, vitamin A, riboflavin and vitamin B12 (Iannotti, Muehlhoff, & Mcmahon, 2013). A series of historical studies, as well as recent experimental and observational research suggest that dairy consumption is linked with better growth outcomes and reduced risk of child stunting (Baten, 2009; Baten & Murray, 2000; Choudhury & Headey, 2018; Headey, Hirvonen, & Hoddinott, 2018; Hoppe, Mølgaard, & Michaelsen, 2006; Takahashi, 1984).

Meanwhile, the COVID-19 pandemic has raised major concerns about the resilience of agricultural value chains amid lockdowns and border closures (Laborde, Martin, Swinnen, & Vos, 2020; Reardon, Bellemare, & Zilberman, 2020). In Ethiopia, the first detected COVID-19 case was confirmed on 13 March 2020. Just three days later, schools were closed, public gatherings and sporting activities were banned, and bars were closed. The government encouraged physical distancing and began major public awareness campaigns across the country. The federal level State of Emergency was declared on 8 April 2020. Land borders were closed, except for cargo. Facemasks became compulsory. Restrictions on long distance public transportation and city transportation were also declared, e.g., by limiting the carrying capacity of public transportation providers by half of their regular capacity. Some administrative regions took even stricter measures by closing restaurants and limiting movement between rural and urban areas. However, unlike some other countries in the region, the country never went into a full lockdown that severely restricted movement, imposed curfews, or fully closed all borders (Hirvonen, 2020). The State of Emergency was lifted on 6 September 2020; transportation restrictions were lifted, bars reopened, and facemasks were no longer compulsory. Schools reopened on 19 October 2020. At the time of writing, Ethiopia had experienced three major COVID-19 infection waves. The first wave occurred between July and September 2020. At the peak of this wave, the 7-day average was about 1,500 new cases per day (JHU CCSE, 2021). Between February and May 2021, the country was undergoing its second major COVID-19 wave, with 7-day average peaking at more than 2,100 cases per day (JHU CCSE, 2021). The third infection wave occurred between August and November 2021. During this period, the highest 7-day average was recorded at the end of August with nearly 1,500 new cases per day (JHU CCSE, 2021).

Against this background, we combine in-person survey data collected in February 2018 with phone survey data collected in June 2021 (i.e., 15 months into the pandemic) and September 2021 to study how dairy value chains in Ethiopia have coped with the COVID-19 pandemic. Focusing on the major dairy value chain connecting dairy farmers in North and West Shewa zones and areas surrounding Addis Ababa to consumers in Addis Ababa, we applied a cascading survey approach in which we collected data at all levels of the value chain: dairy farmers, milk and butter wholesalers, and urban retailers. Using these longitudinal data, we report on how many dairy farmers, wholesalers and retailers exited the sector during the pandemic; how the dairy farming and trading practices changed; what happened to input and output prices; and so on.[1]

2. DATA

2.1. In-person survey in January-February 2018

The COVID-19 phone surveys build on an in-person dairy value chain survey conducted by the authors, in January-February 2018 (henceforth February-2018 survey round). Focusing on the main value chain supplying dairy to the urban customers in Addis Ababa, we fielded primary surveys at three different levels of the value chain: dairy producers, wholesale milk and butter traders, and urban retailers.

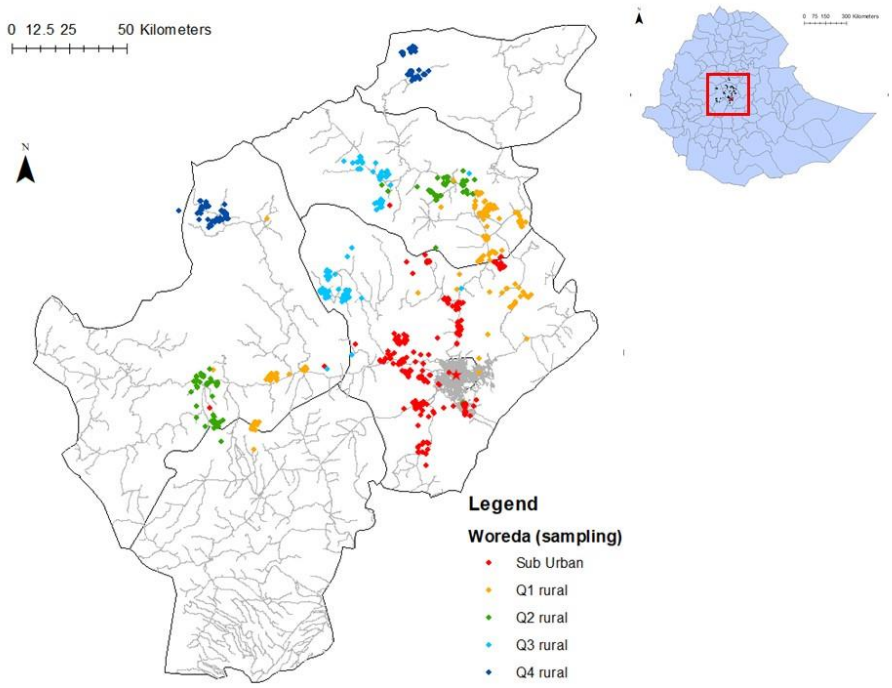
Table 2.1 provides an overview of the sample in the February-2018 survey round. The sampling strategy varied at the level of the value chain. In total, we have 942 dairy producers in our sample. This producer sample was further disaggregated into rural, sub-urban and urban sub-samples (Figure 2.1).

The rural producer sample comes from two main commercial production zones surrounding Addis Ababa: North and West Shewa. All woredas in these two production zones were ranked to quartiles according to their travel time from Addis Ababa based on the available road network. The number of woredas retained from each quartile for the final sample was proportional to the number of cows. In the quartile closest to Addis Ababa, four woredas were randomly selected, while in each of the remaining three quartiles, two woredas were selected. Next, three kebeles were selected randomly in each of these woredas, depending on their distance to the main road. In the two closest woreda quartiles, two kebeles located close to the main road, and one kebele without access to the road were chosen; while in the furthest two woreda quartiles, three kebeles were randomly selected without considering road access. In each of the selected kebeles, a census was conducted on households having at least one cow in milk production. Ten dairy farming households were then randomly selected that had one or two cows in milk, and another ten households were randomly selected that had three or more cows in milk. In total, 600 rural dairy producing households were interviewed. The producer sample also included a sample of sub-urban producers located in the 'Oromia Special Zone', which is the zone surrounding Addis Ababa.

[1] Our research with the 2018 data are reported in D'Haene, Vandevelde, and Minten (2020); Minten, Habte, Baye, and Tamru (2020); Minten, Tamru, et al. (2020); Vandercasteelen, Minten, and Tamru (2021); and Ignowski et al. (2021).

Following a similar sampling strategy as for the rural zones, 248 farmers were interviewed in this suburban area[2]. First, three woredas were selected with a probability of selection proportional to their level of dairy production. Four kebeles then were randomly selected in each selected woreda – three kebeles located close to the main road and one kebele with poor road access. In each kebele selected, a census was done of active dairy producing households. We randomly selected ten households with one or two cows in milk and ten households with three or more cows in milk in each selected kebele. We also interviewed 94 urban producers located in Addis Ababa. This sub-sample was based on a stratified sampling approach based on the size of the dairy farm. Out of the 94 urban producers, 27 are dairy farmers with less than three cows and 67 are dairy farmers with more than two cows.

Figure 2.1: Map of the survey area



Source: Vandercasteelen et al. (2021).

At the wholesale level, the sampling frame was based on all milk and butter traders operating in rural areas. A total of 50 milk and 48 butter traders were randomly selected for an interview.

At the retail level, we used a stratified sampling approach. Five sub-cities (out of a total of 10) were randomly selected. In each sub-city, four woredas were also selected randomly. Based on different retail outlet categories, samples were drawn for these different administrative levels of the city. At city level, all the bigger open markets where dairy products are sold were visited. There are 6 in total, and 4 shops were randomly selected from each. At the sub-city level, 6 supermarkets were randomly selected for the survey after a census is obtained at the sub-city level. At the woreda level a census of all minimarkets, dairy shops and regular shops selling dairy products were made. One minimarket, 4 dairy shops and 5 regular shops were randomly selected per woreda. In total, 254 dairy retailers were interviewed.

[2] The area consists of six woredas (Akaki, Berek, Mulo, Sebeta – Awas, Sululta, and Welmera) and eight major towns (Burayu, Dukam, Gelan, Holata, Laga Xaafoo – Laga Daadhi, Sebeta, Sendafa – Beke, and Sululta).

Table 2.1: February 2018 in-person survey outcomes and respondents with a phone number

	Interviews	Respondents with a phone number	
	N	N	%
Dairy producers	942	594	63.1
Rural	600	327	54.5
Sub-urban	248	175	70.6
Urban	94	92	97.9
Milk wholesalers	50	46	92.0
Butter wholesalers	48	40	83.3
Dairy retailers	254	250	98.4
Total	**1,294**	**930**	**71.9**

Source: Own calculation based on the February 2018 dairy value chain survey data.

2.2. Phone survey in June 2021

This report focuses on the phone survey conducted in June 2021 and September 2021. The sampling frame in the June-2021 survey round was formed of all respondents in the January-February 2018 survey for which we had a phone number. Unfortunately, not all respondents had a phone in 2018. Table 2.1 above shows the share of producers, wholesaler traders, and retailers with a phone number in 2018. We see that while most of the wholesale and retail traders had access to mobile phone back in 2018, this is not the case for dairy producers. Only 63 percent of the dairy producers in our 2018 sample had a mobile phone. Moreover, compared to sub-urban (70.6 %) and urban producers (97.9 %), mobile phone ownership was considerably lower among rural producers (54.5 %).

In June-2021 survey round, we attempted to recontact roughly 50 percent of the respondents in the February-2018 survey round. The survey was conducted by STSMOD Economic Modeling Institute PLC with inputs from IFPRI researchers. The survey team had extensive experience in conducting similar value chain surveys in Ethiopia and has led the previous phone surveys conducted in the vegetable value chain in 2020 and 2021. The team consisted of 1 supervisor and 12 enumerators. The enumerator training took place between 26 and 29 May and the phone interviews began on 2 June and ended on 18 June.

The final phone survey sample was formed of 378 dairy producers, 33 milk traders, 30 butter traders and 168 dairy retailers. The average phone interview took approximately 35 minutes. The questionnaire administered to farmers focused on dairy output, marketing, input prices, access to extension services. The questionnaire administered to wholesale traders centered around procurement and sales patterns, transportation issues and recent changes in the trading business. At the retail level we asked questions about labor use, sales patterns. and recent changes in the trading business. All three instruments asked about the dairy prices at the time of the survey permitting us to compare prices at different levels of the value chain in the same period.

Table 2.2 summarizes the number of successful and unsuccessful calls. While only few respondents refused an interview, many of the phone numbers provided to us in 2018 no longer worked. Consequently, for each successful phone interview, the survey team had to attempt approximately 1.5 numbers with the ratio between successful and unsuccessful calls being considerably higher among dairy producers than among traders.

Table 2.2: June-2021 phone survey outcomes

	Interviews (N)	Unsuccessful calls (N) *	Refusals (N)
Dairy producers	378	200	5
Rural	208	119	1
Sub-urban	112	53	2
Urban	58	28	2
Milk wholesalers	33	9	3
Butter wholesalers	30	8	0
Dairy retailers	168	59	4
Total	**609**	**277**	**12**

Note: * “Unsuccessful calls” refers to cases where the phone number no longer worked, the phone was switched off, the network was down, nobody answered the phone, or the person who answered the phone was not the same person as in the previous survey and was not knowledgeable of the dairy farming or trading activities.
Source: Own calculation based on the June 2021 dairy value chain survey data.

Using data from the February 2018 round, Table 2.3 compares characteristics between respondents that took part in the phone survey and those who did not. At the wholesale and retail levels, we see that the two randomly selected sub-samples are well-balanced; the differences in means are not statistically different from zero. However, this is not the case at the farmer level. Households that were included in the phone survey are more likely to be male-headed households (94 % vs. 89 %), have more education (5.3 years vs. 2.6 years) and have larger livestock herds (3.6 cows vs. 2.9 cows) than households that were not included in the phone survey. These differences between the two groups are statistically different from zero. The reason for these differences is because many of the rural remote households did not have a phone back in 2018 and these households are generally less well-off and less educated. In what follows, we restrict the analysis to households that took part in both surveys. As a result, we compare like-for-like, but the drawback is that our survey is no longer fully representative of the value chain at the farmer level. For example, it may well be that the trajectories of these more remote farm households without phone numbers are different to other farm households with phone numbers.

Table 2.3: Comparing respondent characteristics in the February-2018 survey sample between respondents that were and were not included in the June-2021 phone survey

Observations and variables	Included in phone survey	Not included in phone survey	Difference	p-value
Farmers				
Number of observations:	378	564		
Male headed households (%)	94.3	88.5	5.8	0.004
Level of education (in years)	5.3	2.6	2.7	0.0001
Dairy farmer has 10 or more years of experience (%)	90.9	93.1	-2.3	0.212
Number of cross-bred cows	2.1	1.3	0.8	0.0001
Number of local cows	1.5	1.6	-0.04	0.703
Number of cows owned	3.6	2.9	0.7	0.0001
Milk Trader				
Number of observations:	33	17		
Milk trade is male (%)	81.8	86.7	-4.9	0.684
Level of education (in years)	10.2	9.4	0.8	0.485
Experience in milk business (in years)	4.9	5.2	-0.3	0.855
Butter Trader				
Number of observations:	30	18		
Butter trader is male (%)	70.0	64.7	5.3	0.716
Level of education (in years)	6.7	6.5	0.2	0.824
Experience in butter business (in years)	11.0	7.4	3.6	0.164
Urban retailers				
Number of observations:	168	86		
Dairy shop not open market (%)	33.9	25.6	8.4	0.175
Minimarket (%)	7.7	8.1	-0.4	0.911
Regular shop (%)	39.9	38.4	1.5	0.817
Supermarket (%)	10.1	15.1	-5.0	0.245
Dairy shop open market (%)	8.3	12.8	-4.5	0.261
The shop owner is male (%)	50.3	60.5	-10.2	0.133
Level of education (in years) of the shop owner	9.1	8.1	1.0	0.128
Experience in dairy business (in years)	4.0	6.4	-2.4	0.013

Note: Difference in means between the groups tested with a t-test (null-hypothesis: difference in means = 0).
Source: Own calculation based on the Dairy value chain surveys conducted in February 2018 and June 2021.

2.3. Phone survey in September 2021

The purpose of the September-2021 phone survey was two-fold. First, we wanted to understand how the situation of the farmers, traders and retailers had changed since we last called them in June 2021. Second, the June-2021 survey revealed some interesting and somewhat unexpected dynamics and trends in the value chain. To gain a better understanding of some of these issues, we added new questions and modules to the September-2021 survey instruments. However, in order to keep the interviews relatively short we had to drop some of the questions and modules we had in the previous surveys to accommodate this new material.

As before, the survey was carried out by STSMOD Economic Modeling Institute PLC and largely by the same enumerators as in the June-2021 survey round. The sampling frame for this survey consisted of all respondents in the June-2020 survey round, except those respondents who reported to have quit dairy farming or trading in the June-2021 survey. The enumerator training took place between 16 and 20 September and the phone survey was conducted between September 21 and 6 October. We call this survey round in this report as the September-2021 survey round.

Table 2.4 provides the overview of the survey outcomes. Out of the targeted 344 farmers, the survey team successfully interviewed 315 farmers. Only 4 farmers refused, and 25 farmers could not be recontacted because of connection problems. Meanwhile, all 21 milk traders interviewed in June 2021 were recontacted and they agreed to be interviewed in September. Out of the 29 butter traders, 24 were successfully interviewed, 1 refused and 4 could not be contacted despite multiple attempts. Finally, out of the 119 retailers that were interviewed in June 2021 and had not quit the business by then, the survey team successfully interviewed 109. Three retailers refused, and 7 could not be reached. The total attrition rate was 8.6 percent with attrition rates being highest among milk traders at 17 percent.

Table 2.4: September 2021 phone survey outcomes

	Interviews	Unsuccessful calls *	Refusals
Dairy producers	315	25	4
Rural	184	12	2
Sub-urban	94	9	0
Urban	37	4	2
Milk wholesalers	21	0	0
Butter wholesalers	24	4	1
Dairy retailers	109	3	7
Total	**469**	**32**	**12**

Note: * "Unsuccessful calls" refers to cases where the phone number no longer worked, the phone was switched off, the network was down, nobody answered the phone, or the person who answered the phone was not the same person as in the previous survey and was not knowledgeable of the dairy farming or trading activities.
Source: Own calculation based on the September 2021 dairy value chain survey data.

3. FINDINGS – FARMER LEVEL

3.1. Introduction

We begin by presenting the survey findings focusing on the dairy farmers. The chapter is organized by themes. In Section 3.2 we look at farmer turnover; how many dairy farmers abandoned dairy farming since February 2018 and the reasons associated with these departures. In Section 3.3 we report on the evolution of dairy cow herds over time. In Section 3.4 we focus on dairy production, section 3.5 on input use and input prices. In Section 3.6 we look at dairy marketing and sales. In Section 3.7 we report on dairy farmers' access to credit, their exposure to extension services and availability of labor. Finally, we report the concerns of dairy farmers regarding their dairy farming activities in Section 3.8.

In all sections, as much as possible, we compare the data collected in June 2021 and September 2021 to the data collected in February 2018. However, the phone survey methodology puts a limit on the interview length and therefore, we could not administer exactly the same modules as we did in the in-person survey in February 2018.

3.2. Farmer turnover

Since our first visit in January-February 2018, nine percent (34 out of 378) of the farmers in our phone survey sample had stopped dairy farming by June 2021. Between June and September 2021, an additional four of the 315 recontacted farmers in the September-2021 survey had quit dairy farming.[3] Table 3.1 shows that the reasons for quitting farming since 2018 were mostly related to dairy farming not being profitable (32 % of the responses) or difficulties in getting inputs (21 %). We also specifically asked if the reason to quit dairy farming was linked to the COVID-19 pandemic. Out of the 19 farmers that had quit during the pandemic (i.e., during or after March 2020), none of the farmers reported that the COVID-19 pandemic was the main factor for quitting and only 2 farmers responded that it was a factor, but not the main factor. Thirteen out of the 38 farmers that had quit (34 %), reported that they plan to restart their dairy farming activities in the next 12 months.

Table 3.1: Reasons for quitting dairy farming since February 2018

	Feb. 2018 to June 2021		June to September 2021		Total	
Reason	**N**	**%**	**N**	**%**	**N**	**%**
Business was not profitable	10	29.4	2	50.0	12	31.6
Unavailability or difficulty to get inputs	7	20.6	1	25.0	8	21.0
Illness in the family (including Covid-19)	3	8.8	0	0.0	3	7.9
Other personal reasons	7	20.6	0	0.0	7	18.4
Cows died or contracted a disease	3	8.8	1	25.0	4	10.5
Retired, too old	2	5.9	0	0.0	2	5.3
Government mandated closures	2	5.9	0	0.0	2	5.3
Total number of farmers who quit dairy farming	**34**	**100.0**	**4**	**100**	**38**	**100.0**

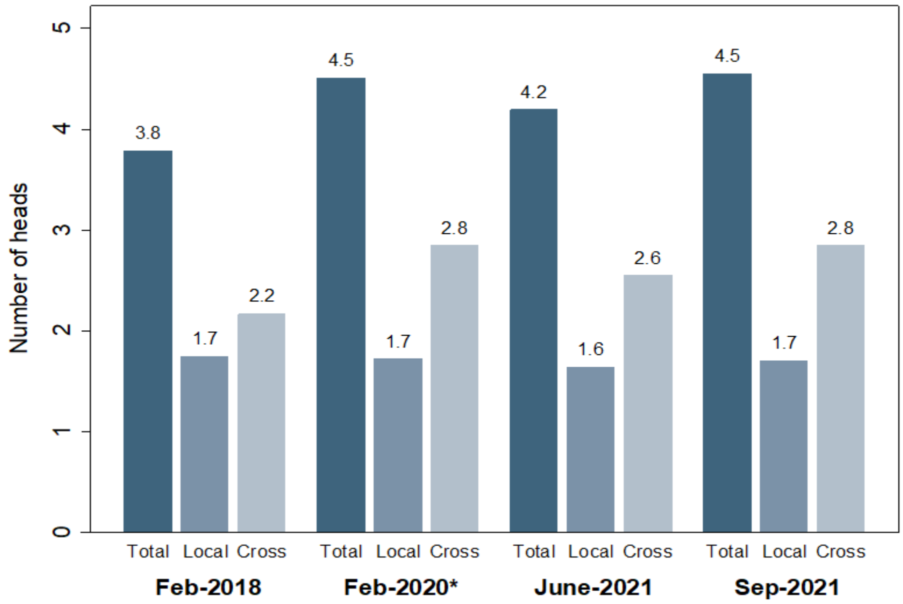
Source: Own calculation based on June-2021 and September-2021 dairy phone survey data.

3.3. Evolution of dairy cow stocks over time

We now shift our focus to those dairy farmers who were still producing dairy in September 2021. Restricting the sample to farmers who were interviewed in all survey rounds, we see that the average number of dairy cows has remained relatively stable over the study period (Figure 3.1). The average farmer in our sample had 3.8 dairy cows in February 2018 and this increased to 4.2 in June 2021 and to 4.5 in September, driven by the increase in the number of cross-bred cows (from 2.2. to 2.6 in June 2021 and to 2.8 in September 2021). In the June-2021 survey, we also asked our respondents to recall the number of cows they owned in February 2020 (i.e., just before the COVID-19 pandemic began). Comparing the reported numbers to the situation in June-2021, we do not see large changes in the number of dairy cows owned by the farmers (Figure 3.1).

[3] It is possible that some dairy farmers that had quit by June 2021 had restarted their operations in September 2021.

Figure 3.1: Mean number of dairy cows owned, by survey round and cow type



Note: Own calculation from February 2018, June 2021, and September 2021 dairy value chain surveys. Local refers to local-breed cows, Cross to cross-bred cows. * = based on respondent recall in June-2021 survey. Feb-2018 and June-2021 data are restricted to farmers who were interviewed in the September 2021 survey. Source: Own calculation based on the dairy value chain survey data.

3.4. Dairy production

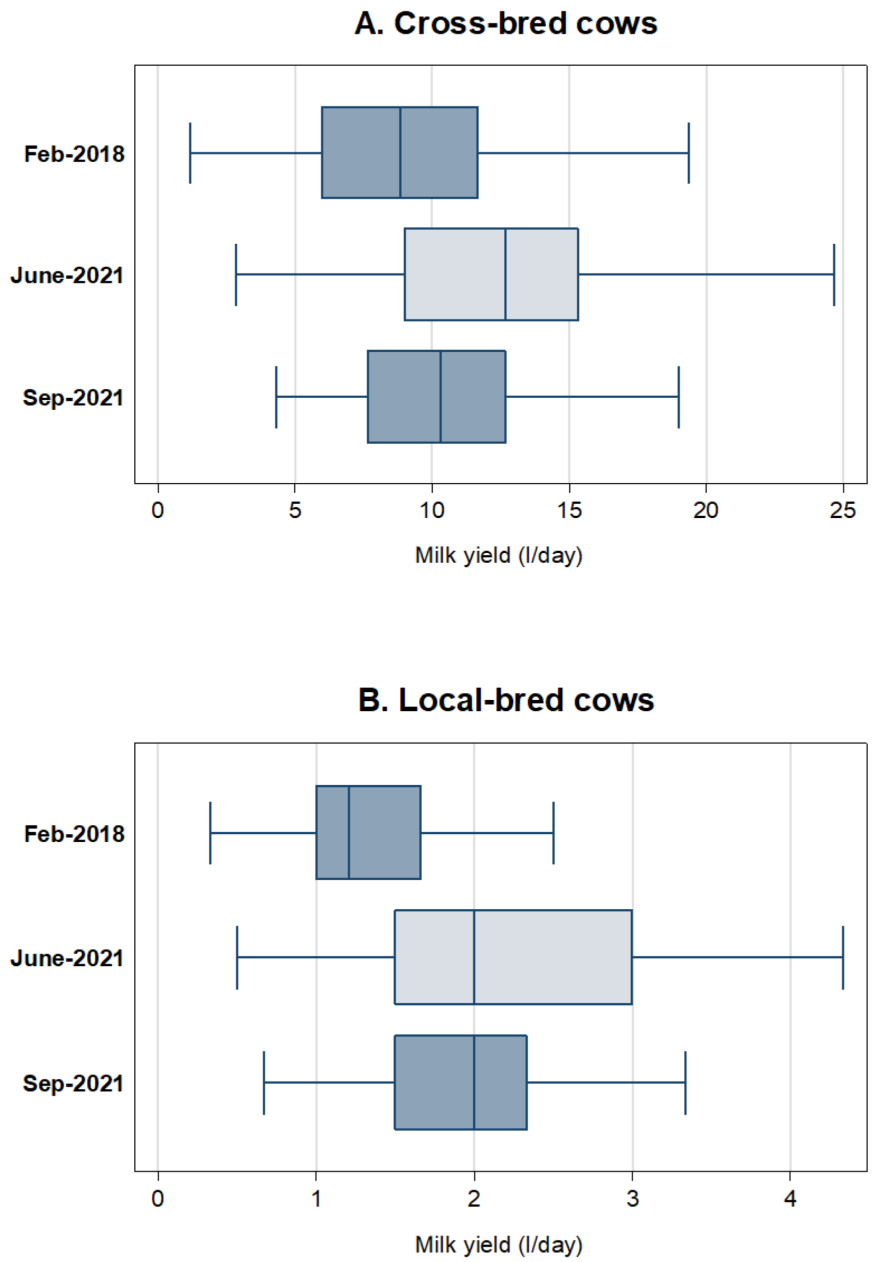
In all survey rounds, we asked farmers to estimate the average yield of their dairy cows during different lactation periods: early lactation (birth to 3 months); mid-lactation (4-6 months); and late lactation (7-9 months). Using these responses, we calculated the average yield over the whole lactation period.

The average yield over cow's lactation period varies strongly across breeding types. In 2018, cross-bred cows produced on average 9.2 litres of milk per day (median 8.8 litres per day) over the lactation period while local-bred cows only 1.5 litres per day (median 1.2 litres per day). These average reported yields in June 2021 increased to 12.8 litres per day (median 12.7 litres per day) for crossbred cows and 2.1 litres per day for local cows (median 2 litres per day). In September 2021, the average reported yield was about 11 litres per day (median 10.3 litres per day) for crossbred and 2 litres per day for local cows (median 2 litres per day).

However, as shown in Figure 3.2, these averages mask considerable variation in milk yields across farmers within survey rounds. In these box-and-whiskers diagrams, the size of the box indicates the difference between the 25th percentile (the left-hand side of the box) and the 75th percentile (the right-hand side of the box) of the yield distribution. The bottom and top rule marks the bottom 5th and top 5th percentiles of the full distribution, respectively, and the vertical bar rule inside the box marks the median value. For example, the interquartile range (i.e., the difference between 75th and 25th percentile) for cross-bred cow yields in June 2021 is 7.3 litres per day and for local-bred cows 1.5 litres per day.

The large differences in daily yields between cow types compound to enormous differences in annual yields.[4] For example, in June 2021, the average cross-bred cow in our sample was reported to produce 2,855 litres per year while the corresponding amount among local-bred cows was 342 litres per year.

Figure 3.2: Variation in reported milk yields, by survey round and cow type

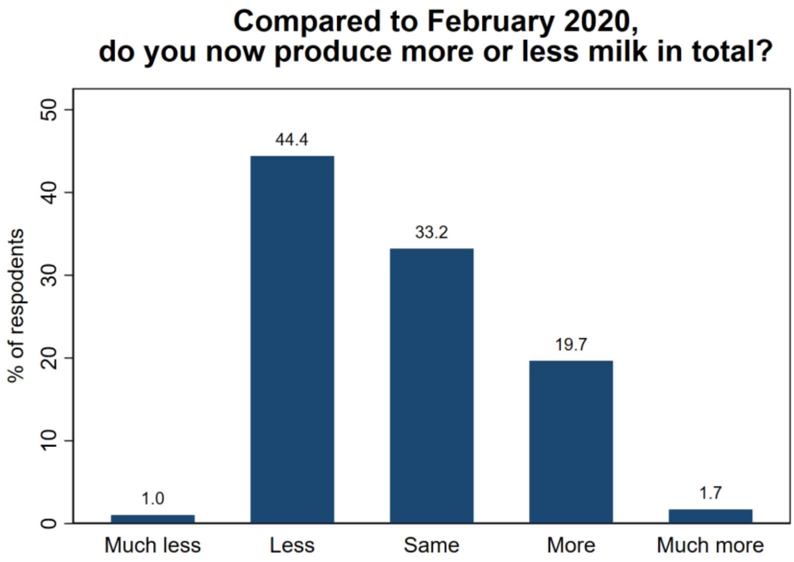


Note: Own calculation from February 2018, June 2021, and September 2021 dairy value chain surveys. Local refers to local-bred cows, Cross to cross-bred cows. Box-and-whiskers diagram. The size of the box indicates the difference between the 25th percentile (the left-hand side of the box) and the 75th percentile (the right-hand side of the box) of the yield distribution. The bottom and top rule marks the bottom 5th and top 5th percentiles of the full distribution, respectively, and the vertical bar rule inside the box marks the median value. Feb-2018 and June 2021 data are restricted to farmers who were interviewed in the September-2021 survey. Note that the horizontal axes have different scales. Source: Own calculation based on the dairy value chain survey data.

[4] We calculated the annual yield by taking into account the length of dry periods, i.e., the number of dry months before calving. The questionnaire included a question on the average length of the dry period for each cow breed. Annual yield was then computed as (daily_yield*270)/(9*30+dry_months*30)*365, where ‘daily_yield’ is the average daily yield over the whole lactation period, ‘dry_months’ is the estimated number of dry months. We assume a 9-month lactation period.

In the June-2021 survey, we asked the respondents to compare their current milk production levels to the situation in February 2020 (i.e., the month before the pandemic was declared). Figure 3.3. summarizes the responses. About 45 percent of the respondents said that their production levels are now lower or much lower than in February 2020. One-third of the respondents reported that the produced amounts had not changed, and 21 percent reported an increase in the amount of milk they produce. Those farmers who reported that their production amounts went down, attributed this change to a smaller number of cows or grazing land (38 %), poorer weather (31 %) or poorer availability of supplementary feed or other inputs (26 %). We also asked the farmers who reported lower production levels in 2021 whether they thought this was due to the COVID-19 pandemic. More than 80 percent of the respondents said that the pandemic had no role while 18 percent said that the decline in production levels was attributable to the pandemic.

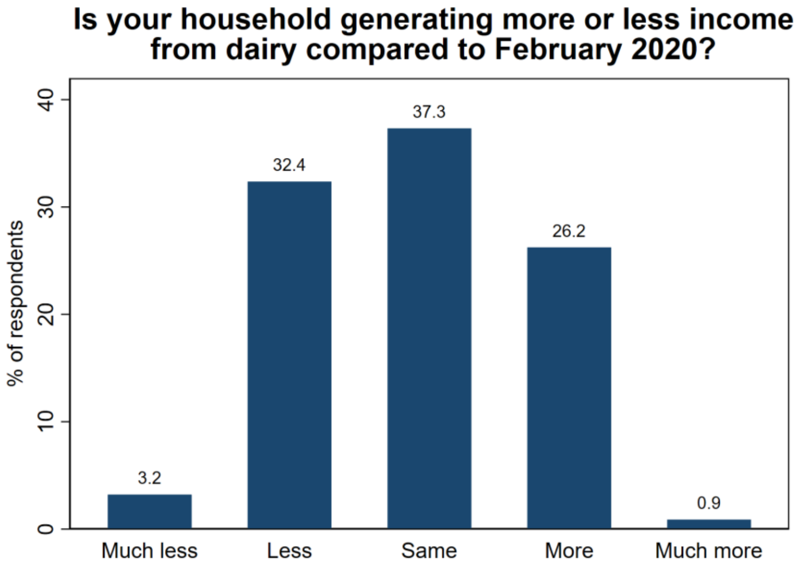
Figure 3.3: Self-reported changes in production levels in June 2021 compared to February 2020



N = 343 households. Source: Own calculation based on the June-2021 dairy value chain survey data.

Figure 3.4 summarizes the responses to the question “Considering all the income you generate from dairy farming, would you say that your household is generating more or less income from dairy production compared to February 2020?”. About 37 percent of the farmers responded that they are generating the same amount of income now compared to February 2020 while 36 percent reported to have receive less income and 27 percent more income. Those farmers who reported less income, attributed this change to changes in the number of milking cows, lower yields, high input prices, and lower demand. Those who reported income increases, attributed it to (favorable) changes in liquid milk and processed milk prices.

Figure 3.4: Self-reported changes in dairy income in June 2021 compared to February 2020



N = 343 households. Source: Own calculation based on the June-2021 dairy value chain survey data.

3.5. Input use and prices

In all survey rounds, we asked farmers whether they had bought supplementary feed, such as wheat bran, oilseeds, or commercial pre-mixes (Table 3.2). In February 2018, about half of the farmers reported to have purchased wheat bran for their cattle. In June 2021, the share of farmers who purchased wheat bran increased to 66 percent. About one-third of the farmers reported to have bought oilseed cakes with little change across survey round. Commercial pre-mixes have become slightly more popular with 34 percent of the farmers reporting to purchase those (up from 12 % in 2018). The September-2021 figures show the percentage of farmers that reported to have bought feed in the past three months before the survey (between June and September 2021). Given the difference in recall periods, we should not directly compare the shares reported for September-2021 to the shares reported for the other survey rounds. The former is based on 3-month recall while the latter are based on 12-month recall.

Table 3.2: Share of dairy farmers purchasing commercial feed in the last 12 months, by survey round

Feed type	Feb-2018	June-2021	Sep-2021*
Wheat Bran	49.5	65.8	54.3
Oilseed cakes	35.0	36.2	23.0
Commercial pre-mix	11.9	34.2	23.0
Hay	n.a.	n.a.	40.8
Other organic feed	n.a	n.a.	19.0

N=303 dairy farmers in February 2018, 304 in June and September 2021. ***** Note that the September-2021 figures show the percentage of farmers that purchased commercial feed in the last three months (between June and September 2021). n.a. = not applicable, data were not collected in these survey rounds. Source: Own calculation based on the dairy value chain survey data.

In June 2021 survey, nearly half of the farmers thought that the availability of commercial feed worsened since the onset of the pandemic in February 2020 while 48 percent said that there has not been a change in feed availability during this period (Table 3.3).

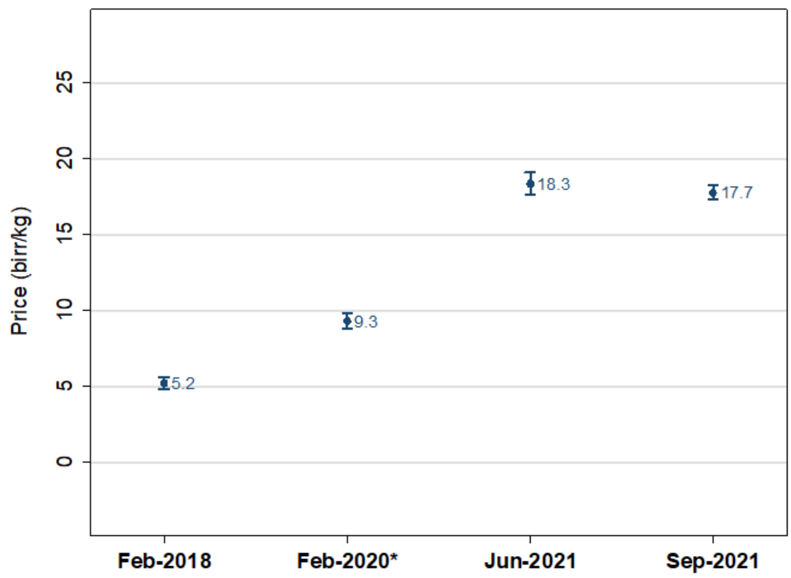
Table 3.3: Self-reported change in the availability of commercial feed over the past 12 months

	%
Worsened a lot	8.2
Worsened a little bit	39.3
Remained the same	48.5
Improved	3.9
Total	**100**

Note: N=305 farmers in June-2021 round (farmers who responded 'don't know' were omitted). Source: Own calculation based on the June-2021 dairy value chain survey data.

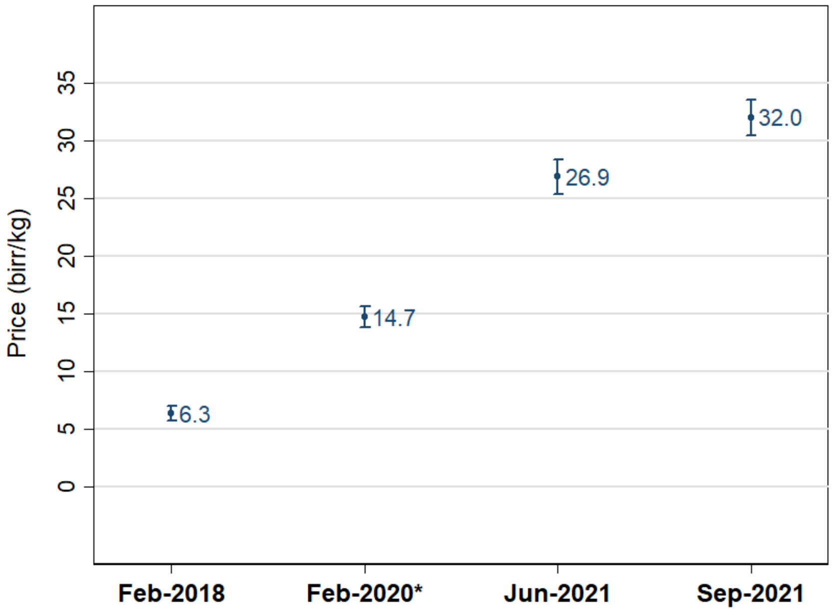
In all rounds, we asked farmers to report the prices of the most used feed types: wheat bran and oilseeds/oilcake. In June 2021, we also asked farmers to recall the price in February 2020 (i.e., the month just before the pandemic was declared). Figures 3.5 and 3.6 report large increases in feed prices. In February 2018, one kg of wheat bran cost 5.2 birr, on average (Figure 3.5). In February 2020, the price had increased to 9.4 birr/kg and in June 2021 to 18.3 birr/kg. Relatively it remains stable between June and September 2021 at 17.7 birr/kg. Put differently, the price of wheat bran nearly doubled between February 2020 and September 2021. During the same period, the price of oilseed/oilcake increased by 118 percent (from 14.7 birr/kg to 32 birr/kg) (Figure 3.6).

Figure 3.5: Average wheat bran prices (birr/kg) in February-2018, February-2020, June-2021 and September 2021



Note: N = 98 farmers in February-2018 survey; 161 farmers in June-2021 survey and 151 farmers in September 2021. * = based on respondent recall in June-2021 survey. Capped lines represent 95% confidence intervals. Source: Own calculation based on the dairy value chain survey data.

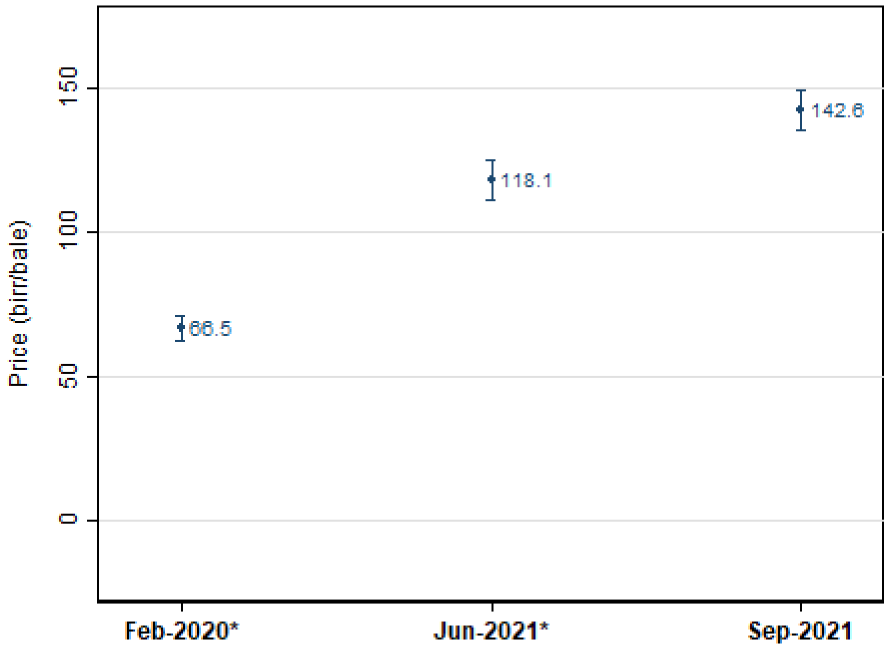
Figure 3.6: Average oil seed/cake prices (birr/kg) in February-2018, February-2020, June-2021 and September 2021



Note: N = 60 farmers in February-2018 survey; 21 farmers in June-2021 survey and 101 farmers in September 2021. * = based on respondent recall in June-2021 survey. Capped lines represent 95% confidence intervals. Source: Own calculation based on the dairy value chain survey data.

The September-2021 survey round included questions on the price of hay, which is an important feed in the study area. We also asked the farmer to recall the prices of hay in February 2020 (i.e., just before the pandemic was declared) and June 2021 (the first round of the phone survey). These recall data indicate that the price of hay increased by about 114 percent (from 66.5 to 142.6 birr/bale) between February 2020 and September 2021 (Figure 3.7).

Figure 3.7: Average hay prices (birr/bale) in February-2020, June-2021 and September 2021



Note: N = 101 farmers in September 2021. * = based on respondent recall in September-2021 survey. Capped lines represent 95% confidence intervals. Source: Own calculation based on the dairy value chain survey data.

In the February-2018 and June-2021 survey rounds, more than 80 percent of the farmers reported that their cows have been vaccinated. However, the availability of livestock medicines had declined since our in-person visit in February 2018 (Table 3.4). In February 2018, two-thirds of the farmers said that livestock medicines are mostly available at their nearest clinic or pharmacy (Table 3.4). In June 2021, only one-fourth of the farmers said the same.

Table 3.4: Share of farmers with vaccinated cows and self-reported change in the availability of medicines at nearest clinic/pharmacy

	Feb-2018	Jun-2021
% of farmers whose cows are vaccinated	82.3	84.1
Availability of medicines at the nearest clinic/pharmacy:		
Mostly available	68.1	25.8
Sometimes available	30.3	63.8
Not available	1.6	10.5
Total	**100**	**100**

Source: Own calculation based on the February 2018 and June-2021 dairy value chain survey data.

3.6. Dairy marketing and sales

In all survey rounds, we asked the farmers to report the number of times they sold milk in the 30—day period preceding the interview. Table 3.5 shows that the average dairy farmer in our sample sold dairy more than 35 times, with little change across survey rounds (median in all rounds is 30). The average quantity sold in a single transaction was 22.5 liters (median 14 liters) in February 2018. In June 2021 round, this had increased to 28.1 liters (median 20 liters). In September 2021, the average quantity per a transaction was about 24 liters (median 20 liters).

Table 3.5: Number of milk sales and average quantity sold in single transaction in the last 30 days, by survey round

	Feb-2020		Jun-2021		Sep-2021	
	Mean	**Median**	**Mean**	**Median**	**Mean**	**Median**
Number of sales	36.1	30	38.5	30	39.5	30
Typical average quantity sold	22.5	14	28.1	20	23.9	20

Note: 128 farmers in February-2018,129 farmers in June-2021 and 131 farmers in September 2021. Source: Own calculation based on the dairy value chain survey data.

We also asked about the type of milk that the farmers mostly sold in the last 30 days (Table 3.6). In February 2018, about 10 percent of the farmers said to have sold only milk produced in the morning. This had increased to 15 and 12 percent in June and September 2021, respectively. Mixing morning and evening milk was prevalent in 2018. Back then, about 44 percent of the farmers said that this was the main type of milk that they were selling. This is less common in June 2021 with only about 16 percent of the farmers reporting that mixed milk was the most common type of milk that they sold in the past 30 days. However, this figure is increased to about 30 percent in September 2021. In all survey rounds, selling morning and evening milk separately was reported by most farmers; 45 percent in 2018, 70 percent in June 2021 and 58 percent in September 2021.

Table 3.6: Type of milk mostly sold in the last 30 days, by survey round

Milk type sold	Feb-2018	Jun-2021	Sep-2021
% only morning	10.4	14.9	12.2
% only evening	0.7	0.0	0.0
% both mixed	43.8	15.5	29.8
% both separately	45.1	69.6	58.0
Total	**100.0**	**100.0**	**100.0**

Note: 128 farmers in February-2018, 129 farmers in June-2021 and 131 farmers in September 2021. Source: Own calculation based on the dairy value chain survey data.

We see little changes in the sales locations over the survey rounds (Table 3.7). Milk is mostly sold at the farm gate (47 % in all rounds), at the roadside (24-26 %) or at the collection center (19-24 %). Other sales locations are relatively less important.

Table 3.7: Place where milk was mostly sold at the past 30 days, by survey round

Place sold	Feb-2018	Jun-2021	Sep-2021
% sold on farm or home	46.5	47.3	46.6
% sold at collection center	19.4	21.0	23.7
% sold at market	0.0	0.0	0.0
% sold at roadside	25.7	25.0	24.4
% sold to retail shop	1.4	0.7	3.8
% sold at own retail shop	0.0	0.7	0.0
% sold to yoghurt shop	0.7	2.7	0.0
% sold to school-institution	0.0	0.0	0.0
% to cafés/ restaurants/ hotels	2.1	2.7	0.8
% sold to private consumer	2.1	0.0	0.8
% sold at other places	2.1	0.0	0.0
Total	**100.0**	**100.0**	**100.0**

Note: 128 farmers in February-2018, 129 farmers in June-2021 and 131 farmers in September 2021. Source: Own calculation based on the dairy value chain survey data.

In February 2018, milk was mostly sold to independent traders who collect milk from individual farmers (29 %), directly to consumers (neighbor or other private consumer) (32.6%) or to a processing company, either directly or via an agent (19.5%) (Table 3.8). No meaningful changes are observed in the June- and September-2021 survey rounds concerning clients' composition.

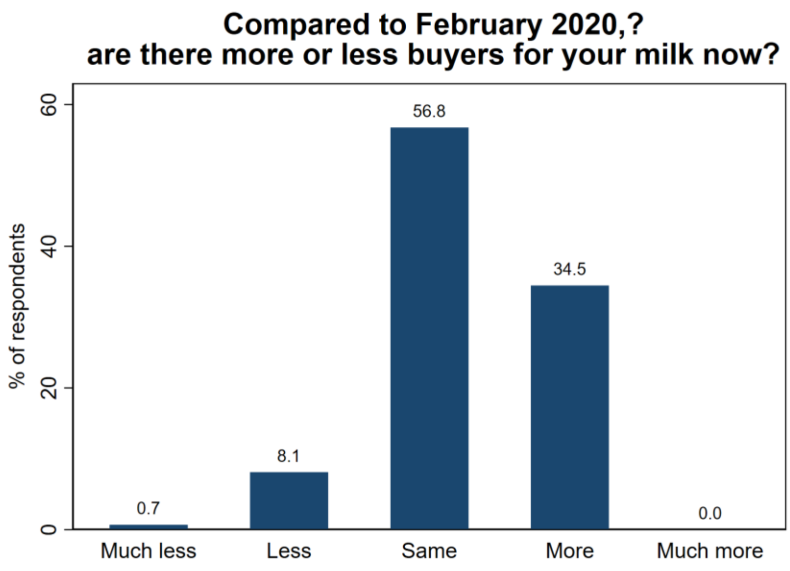
Table 3.8: Client type to whom milk is mostly sold to, by survey round

Client type	Feb-2018	June-2021	Sep-2021
% sold to consumer – neighbor	27.0	20.3	18.3
% sold to another private consumer	5.6	8.1	13.0
% sold to agent/collector for processing company	14.6	9.5	17.6
% sold to processing company directly	4.9	4.1	1.5
% sold to agent of cooperative	5.6	11.5	6.9
% sold to cooperative directly	2.8	7.4	6.9
% sold to independent trader/collector	29.2	30.4	30.5
% sold to retail shop	0.7	4.7	0.8
% sold to yoghurt shop	2.6	0.0	0.0
% sold to school-institution-cafés/restaurants/hotels	5.6	4.1	4.6
% sold to other	1.4	0.0	0.0
Total	**100.0**	**100.0**	**100.0**

Note: 128 farmers in February-2018, 129 farmers in June-2021 and 131 farmers in September 2021. Source: Own calculation based on the dairy value chain survey data.

In June 2021, we asked the dairy farmers to compare their current situation to the situation in February 2020 (just before the pandemic was declared). More than 90 percent of the farmers reported that the number of buyers for their milk had either remained the same (57 %) or increased (35 %) while less than 9 percent of the farmers reported a decline in the number of buyers (Figure 3.8).

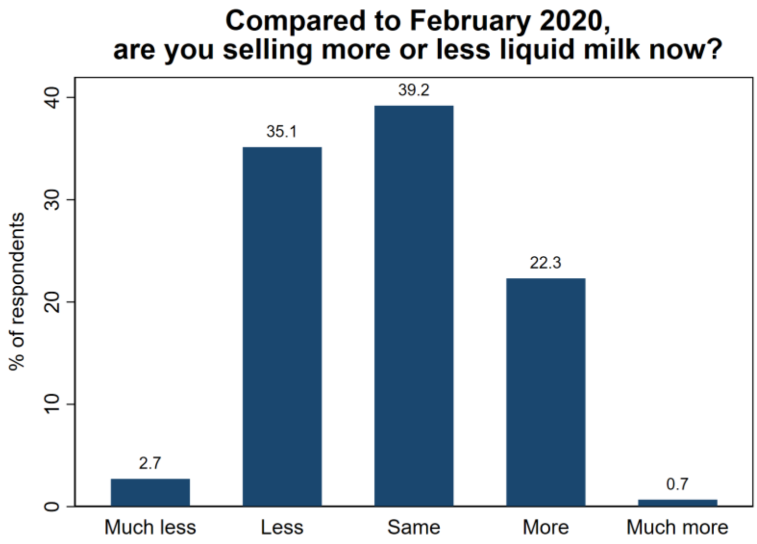
Figure 3.8: Self-reported changes in number of milk buyers in June 2021 compared February 2020



Source: Own calculation based on the June-2021 dairy value chain survey data.

The responses with respect to changes in quantities sold were more mixed (Figure 3.9). Nearly 40 percent said that that the quantity of milk sold has remained the same. Meanwhile, 37 percent said that they sell less milk in June 2021 than in February 2020 and 23 percent reported that they now sell more milk. Both positive and negative changes in sold milk quantities were largely attributed to changes in milk yields or the number of cows.

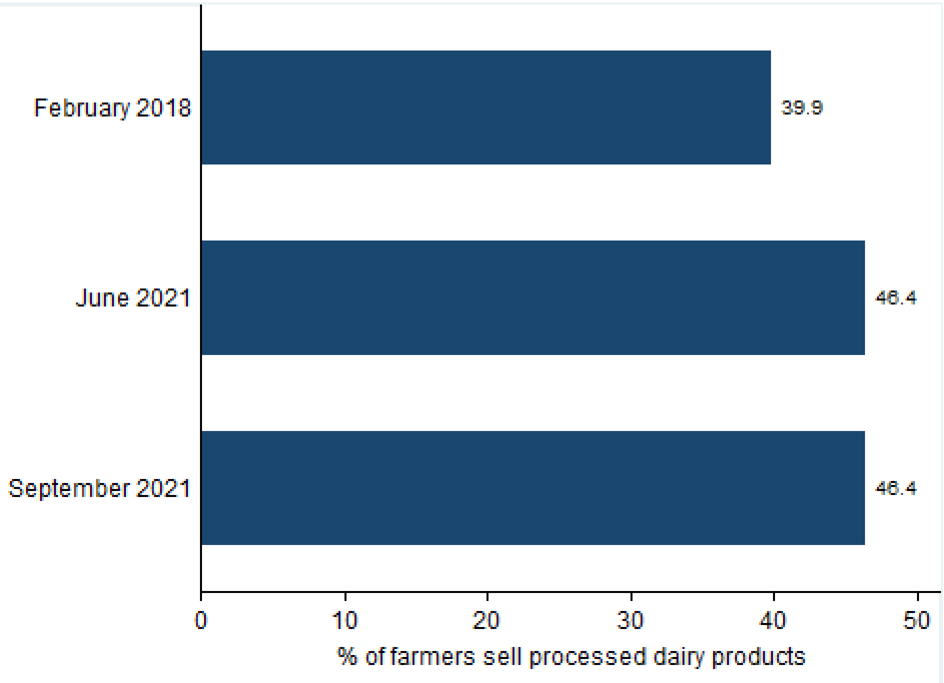
Figure 3.9: Self-reported changes in quantity of milk sold in June 2021 compared February 2020



Source: Own calculation based on the June-2021 dairy value chain survey data.

Processing the liquid milk into butter or cheese for sale has become more common among farmers in 2021 than in 2018 (Figure 3.10). In 2018, about 40 percent the farmers reported to had sold at least one type of processed dairy products in the last 30 days. In 2021, this had increased to about 46 percent.

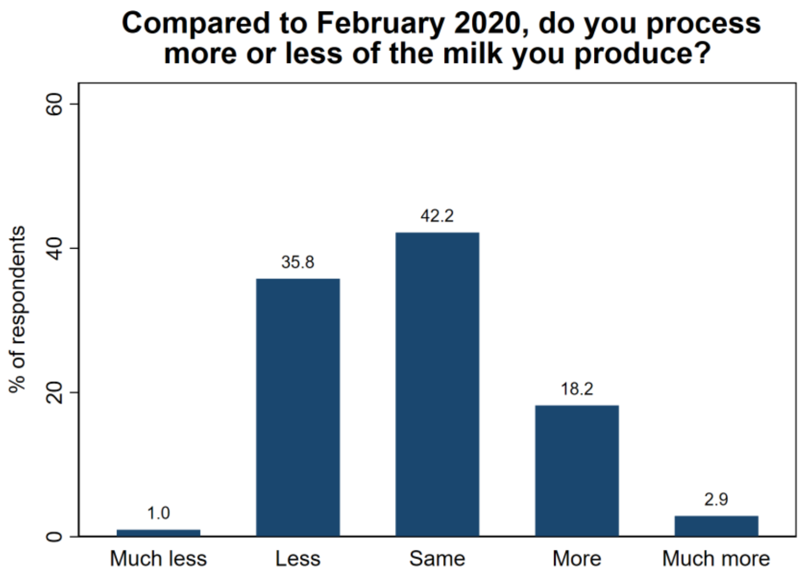
Figure 3.10: Share of farmers sell at least one processed dairy product over the surveys



Note: N=276 in all survey rounds. Source: Own calculation based on the dairy value chain survey data.

However, the story is more mixed when we look at self-reported changes in the quantity of processed dairy products produced since the onset of the pandemic. About 37 percent of farmers reported to produce less processed products in June 2021 than in February 2020 while 21 percent reported producing more (Figure 3.11). About 42 percent of the respondents reported that the quantity of processed dairy products has remained the same. Both positive and negative changes in processed dairy quantities were largely attributed to changes in milk yields or the number of cows. In addition, prices of liquid milk and processed dairy products were also reported to affect the decisions to process or not.

Figure 3.11: Change in the share of dairy processing in June 2021 compared February 2020



N = 313 farmers (farmers who never processed were not considered). Source: Own calculation based on the June-2021 dairy value chain survey data.

3.7. Access to credit, extension services and labor

The farmers' responses to our questions regarding credit suggest that credit has become less available over time – or that farmers have less incentives to borrow. In February 2018, 15 percent of the households reported to had taken out a loan of at least 1,000 birr (Table 3.9). In June 2021, this share had fallen to 8 percent (despite the considerable erosion in the value of birr during this period due to high inflation). We also asked farmers assess the change in credit availability over the past 12 months (Table 3.10). Nearly 20 percent said that the availability had worsened while two-thirds reported that it had remained the same. Meanwhile, 12 percent said that credit availability had improved during this period.

Table 3.9: Share of households taking out a loan of at least 1000 birr over the past 12 months, by survey round

	2018	2021
% of households taking out a loan of at least 1,000 birr over the last 12 months	15.2	8.3

Note: N=302 farmers in both survey rounds. Source: Own calculation based on the February-2021 and June-2021 dairy value chain survey data.

Table 3.10: Over the past 12 months, self-reported change in credit availability

Response	percent
Worsened a lot	3.4
Worsened a little bit	15.8
Remained the same	68.4
Improved	11.0
Improved a lot	1.4
Total	**100**

Note: N=209 farmers in June 2021 (farmers who responded don't know have been omitted). Source: Own calculation based on the June-2021 dairy value chain survey data.

We also see a decline in the availability of veterinary and animal health extension workers (Table 3.11). In February 2018, about 57 percent of the farmers in our sample said that veterinary or animal health extension worker are mostly available. In June 2021, only 28 percent said that they were mostly available. Similarly, in February 2018, only 4 percent said these workers are not available, in 2021, more than 15 percent reported that the workers are not available. In September 2021, respondents were asked to assess the availability of veterinary and animal health extension workers in the past three months (not in the past 12 months as we did in the previous two survey rounds). About 35 percent of them said that veterinary or animal health extension workers are mostly available. As in June 2021, about 15 percent responded that the workers are not available.

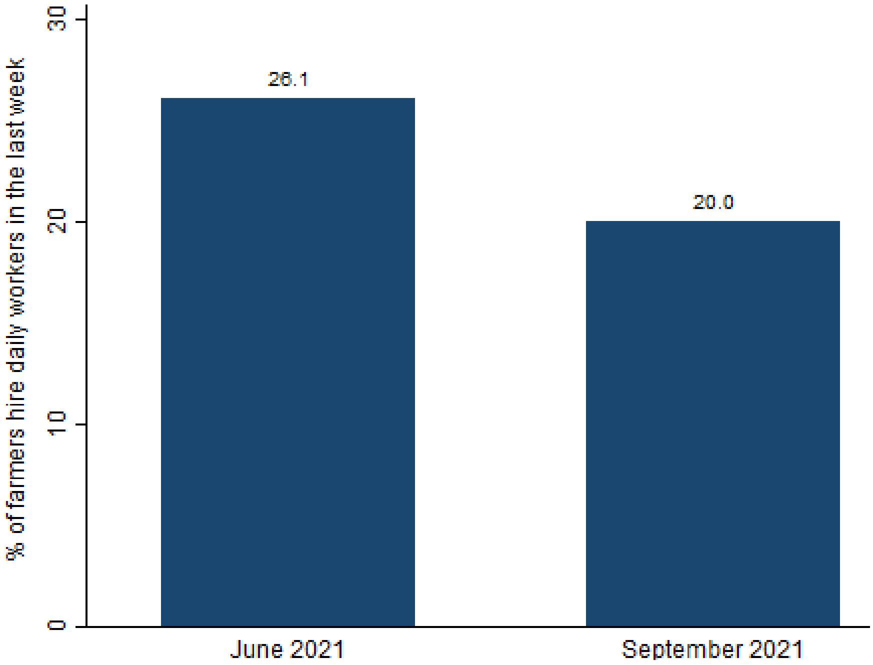
Table 3.11: Availability of veterinary or animal health extension workers during the past 12 months

Response	Feb-2018	Jun-2021	Sep-2021
Mostly available	56.7	27.6	35.2
Sometimes available	39.3	57.6	50.3
Not available	4.0	15.8	14.5
Total	**100**	**100**	**100**

Note: 298 farmers in February-2018, 304 farmers in June-2021 and 304 farmers in September 2021. The September 2021 question asked about the availability of veterinary or animal health extension workers during the past 3 months. Source: Own calculation based on the dairy value chain survey data.

In June 2021, 26 percent of the farmers reported to have hired daily laborers in the last week. This share had declined to 20 percent in September 2021 (Figure 3.12). In June 2021, more than 70 percent of the farmers reported that the availability of daily laborers had remained the same over the past 12 months while 24 percent reported that the availability had worsened (Table 3.12). More than half of those farmers who reported a worsening of the availability of workers, attributed this change to the worsening security situation in the country.

Figure 3.12: Share of farmers that hire daily workers in the last week over survey rounds



Note: N=310 farmers in both rounds. Source: Own calculation based on the dairy value chain survey data.

Table 3.12: Self-reported change in the availability of daily workers during the past 12 months

Response	Percent
Worsened a lot	3.1
Worsened a little bit	21.3
Remained the same	71.7
Improved	3.5
Improved a lot	0.4
Total	**100**

Note: N=258 farmers in June 2021 (farmers who responded don't know have been omitted). Source: Own calculation based on the June-2021 dairy value chain survey data.

3.8. Farmers' concerns regarding dairy farming

In the September-2021 survey, farmers were given the opportunity to state their main concern regarding their dairy farming activities. Table 3.12 shows that high feed prices were the main concern for about 58 percent of the farmers, while 15 percent of them reported limited availability of feed as the main concern. This means for 3 out of 4 interviewed farmers, the main concern was related to either high feed prices or their limited availability. This is consistent with the discussion in Section 3.3, which shows that the prices of major commercial feeds had doubled between February 2020 and September 2021. About 15 percent of the farmers reported no concerns regarding their dairy farming activities. We also note that, in September 2021, very few farmers report instability in the country as their main concern despite the ongoing conflict in Ethiopia.

Table 3.13: Farmers' main concern regarding their dairy farming activities

	N	Percent
What is your main concern regarding your dairy farming activities currently?		
High prices of feed	180	57.9
Limited availability of feed	47	15.1
Shortage of grazing land	9	2.9
Limited availability of veterinary medicine and services	8	2.6
Poor weather condition	6	1.9
Uncertainty about the sales price of dairy products	4	1.3
Cow diseases	3	1.0
Instability in the country	2	0.6
Other	4	1.3
Do not know	3	1.0
No concerns	45	14.5
Total	**311**	**100**

Source: Own calculation based on the September 2021 dairy value chain survey data.

We asked a series of follow-up questions to further understand the perceived impact of the feed price increases. These questions were in the form of statements and the farmers were asked to tell whether they agreed or disagreed with the statement. First, more than 90 percent of the farmers agreed with the statement that feed prices had increased over the last 12 months (Table 3.14).

Next, we asked farmers who agreed with the previous statement to tell whether they agreed or disagreed with the statement "because of these feed prices increases, they are now purchasing less feed than before". More than two-thirds of the respondents either agreed or strongly agreed with this statement (Table 3.14). About 22 percent of the respondent disagreed or strongly disagreed with the same statement. Next, we asked the farmers' views about the statement that because of these feed price increases, they are now producing less milk. More than two-thirds assessed that the feed price rises had led them to reduce their milk production (Table 3.14). About 20 percent of the farmers disagreed with this statement.

To understand the perceived impact of the feed price increment on profitability, farmers were asked if the feed price increases reduced their profits. As before, 76 percent of the respondents either agreed or strongly agreed with the statement that the feed price increases had led to lower profits (Table 3.14).

We then asked the farmers' views regarding the statement 'if these higher feed prices persist or they increase further, they will have to quit dairy farming". More than 73 percent of the farmers disagreed with this statement while 27 percent of the farmers agreed with it (Table 3.14). In informal discussions with the farmers, we asked why they decided to remain in the business despite plummeting profitability. Most responded that they did not have experience in other businesses or activities, indicating that they would have to remain in dairy farming, despite the multiple challenges.

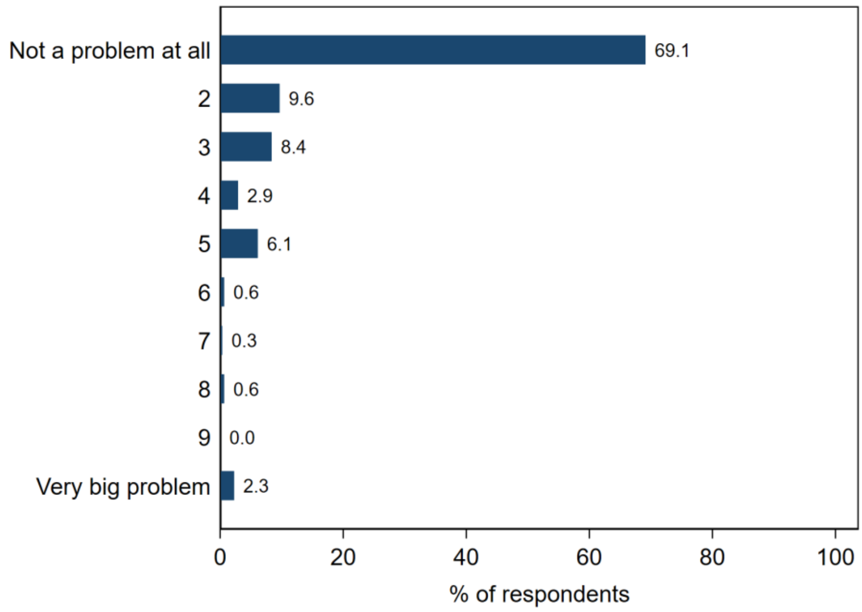
Table 3.14: Farmers' views regarding selected statements about feed prices

Statement	Strongly disagree	Disagree	Neither agree, nor disagree	Agree	Strongly Agree	Total
"Feed prices have substantially increased over the past 12 months" (N=311)	0.0	0.3	9.0	18.3	72.3	**100**
If 'Agree' or 'Strongly agree' (N=282):						
"Because of the feed price increases, you are purchasing less feed for your livestock than you otherwise would"	8.9	13.5	11.0	50.0	16.7	**100**
"Because of the feed price increases, you are producing less milk"	6.7	13.1	11.3	53.9	14.9	**100**
"Because of the feed price increases, you are making less profit"	5.7	7.8	10.6	50.4	25.5	**100**
"If feed prices continue to increase or stay high, you will have to stop dairy farming"	23.0	39.7	10.3	17.7	9.2	**100**

Note: N=311 farmers. Source: Own calculation based on the September-2021 dairy value chain survey data.

Finally, we asked the farmers to use a scale between 1 and 10 to indicate their level of concern regarding the COVID-19 pandemic. In this response scale, value 1 indicated that the pandemic is not a problem at all to their dairy farming activities and value 10 that the pandemic posed a very big problem. Figure 3.13 shows the distribution of the farmers responses. The mean value among 311 farmers was 1.9 with close to 70 percent reporting value 1, indicating that the pandemic does not currently pose any problems to their dairy farming activities.

Figure 3.13: "On a scale of 1 (not a problem at all) and 10 (very big problem), how big of a problem is the COVID-19 pandemic to your dairy farming activities currently?"



Note: N = 311 farmers. Source: Own calculation based on the September 2021 dairy value chain survey data.

4. FINDINGS – WHOLESALE LEVEL

4.1. Introduction

In this chapter, we report on our findings regarding the wholesale sector. As before, the chapter is organized by themes. In Section 4.2 we assess wholesaler turnover; how many milk and butter traders left the business since February 2018 and the reasons associated with these departures. In Section 4.3 we report on trading activities and in Section 4.4 we focus on sales patterns. In Section 4.5 we study services delivered and received by the traders. In Section 4.6 we assess changes in the number of people employed by the traders. In Section 4.7. we report about the concerns of the traders regarding their trading activities. Section 4.8 concludes with a brief overview of the various preventive measures that traders were taking to minimize the COVID-19 infection risk in June 2021.

In all sections, as much as possible, we compare the data collected in February 2018 to the data collected in June and September 2021. However, the phone survey methodology puts a limit on interview length and therefore, we could not always administer exactly the same modules as we did in the in-person survey in February 2018. The other limitation of these data relates to the small sample size of wholesale traders. Thus, the results should be interpreted with caution.

4.2. Wholesaler turnover

Since our first visit in January-February 2018, 36 percent (12 out of 33) of the liquid milk wholesaler traders had stopped trading dairy products by June 2021. Meanwhile, only 1 (out of 30) butter wholesaler had quit butter trading but was now trading yoghurt. Between June and September 2021, additional 3 butter traders left the market, while no additional milk traders had quit during the same period.

Out of the 12 liquid milk wholesalers that had quit, 4 quit before 2020 and 8 in 2020-21. Table 4.1 shows that the reasons for quitting the liquid milk wholesale activity since 2018 were mostly related to business not being profitable (58 % of the responses). We also specifically asked if the reason to quit was linked to the COVID-19 pandemic. Out of the eight traders that had quit during the pandemic (i.e., during or after March 2020), three said that the COVID-19 pandemic was a factor for quitting while five said that it was not a factor at all. Four out of the 12 liquid milk traders that had quit (33 %), reported that they plan to restart their liquid milk trading business within the next 12 months. Regarding butter traders, 3 of the 4 traders that left their business between February 2018 and September 2021 stated that personal reason as the cause for their departure, while the remaining one related to business not being profitable. None of the butter traders that quit during the COVID-19 pandemic said the pandemic contributed to their departure.

Table 4.1: Reasons for quitting dairy wholesale trading between February 2018 and September 2021

	Feb. 2018 to June 2021		June to September 2021		Total	
Reason	**N**	**%**	**N**	**%**	**N**	**%**
Milk traders:						
Business was not profitable	7	58	0	0	7	58
Found a better business opportunity	1	8	0	0	1	8
Could not find good quality milk	1	8	0	0	1	8
COVID-19 pandemic	1	8	0	0	1	8
Illness in the family	1	8	0	0	1	8
Other personal reasons	1	8	0	0	1	8
Total number of milk traders that quit	**12**	**100.0**	**0**	**0**	**12**	**100.0**
Butter traders:						
Other personal reasons	1	100	2	67	3	75
Business was not profitable	0	0	1	33	1	25
Total number of butter traders that quit	**1**	**100.0**	**3**	**100.0**	**4**	**100.0**

Source: Own calculation based on June-2021 and September-2021 dairy phone survey data.

4.3. Trading activities

In the February-2018 and June-2021 survey rounds, about two-thirds of the milk wholesale traders were independent milk collectors while 20-30 percent were agents of an independent milk collector (Table 4.2). In February 2018, half of the traders were working for a dairy processing company. By June 2021, this share had dropped to 19 percent. However, in September 2021, the share of traders working to dairy processing companies bounced back to 62 percent. During the same period, the share of wholesalers that acted as independent milk collectors dropped to one-third from about two-thirds in the previous survey rounds. Meanwhile, most butter traders in our sample were traders selling butter directly to urban retailers or wholesalers (Table 4.3).

In February 2018, 57 percent of the wholesale traders in our sample reported to collect milk directly from villages where milk was produced and 52 percent from milk collection centers (Table 4.2). In June and September 2021, we see that the role of the collection centers has declined with only 14 and 19 percent of the traders procuring from this source, respectively. Meanwhile, 76 and 100 percent of the traders in June and September 2021 procured directly from the milk producing villages, respectively. Comparing the responses of the butter traders across the survey rounds reveals that compared to February 2018, butter is less likely to be collected directly from the farmers in June 2021 (Table 4.3). However, butter is more likely to be collected from the farmers directly in September 2021 than in February 2018. In all survey rounds, most wholesale traders in our sample reported to source their butter from weekly markets. In contrast, buying at own fixed sales location was an important means of procurement in February 2018 and June 2021, less so in September 2021.

Table 4.2: Liquid milk procurement locations and trader types, by survey round

	Milk traders		
	Feb-2018	**Jun-2021**	**Sep-2021**
Trader type:			
An independent milk collector	61.9	66.7	28.6
An agent of an independent milk collector	19.1	28.6	14.3
An agent/employee of a dairy processing companies	50.0	19.1	61.9
Procurement method:			
Collecting milk in the villages where milk is produced	57.1	76.2	100
Buying milk from collection centers	52.4	14.3	19.0

Note: N=21 milk traders in each survey round. Source: Own calculation based on the dairy value chain survey data.

Table 4.3: Butter procurement locations and trader types, by survey round

	Butter traders		
	Feb-2018	**Jun-2021**	**Sep-2021**
Trader type:			
A trader selling butter directly to urban retailers/wholesalers	85.7	90.5	95.2
A trader selling butter through brokers in urban areas	14.3	4.8	0.0
A trader/agent selling directly to dairy processing companies	0.0	9.5	0.0
Procurement method:			
Collecting butter in the villages from the residences of farmers	57.1	4.8	95.2
Based on a temporary (e.g., weekly) market in rural zones	76.2	80.1	90.5
With a fixed location (e.g., town) where butter is purchased	61.9	95.2	19.0

Note: N=24 butter traders in each survey round. Source: Own calculation based on the dairy value chain survey data.

For most milk (butter) wholesale traders, milk (butter) is the only dairy product they trade in (Table 4.4 and 4.5). In February 2018, the mean amount of milk traded was 1,730 liters per day while this figure increased to 2,552 liters per day in June 2021 and further increased to 3,433 liters per day in September 2021(Table 4.4 and 4.5). These mean values are influenced by a small number of traders that trade very large amounts. If we look at the median values that are less sensitive to extreme values, we see an initial decline in the average amount of milk traded per day from 650 liters per day in February-2018 to 500 liters per day in June-2021 but then an increase to 1,000 liters per day in September 2021. As for butter, the mean amount traded in February 2018 was about 9 kg per day (median: 2 kg per day), 11 kg per day (median: 6 kg per day) in June 2021 and 15 kg per day (median: 8 kg per day) in September 2021

In all survey rounds, we asked the wholesale traders to estimate the number of other traders operating in the same woreda that they were operating in. In February 2018, the mean number of other milk traders was 46 (median: 21 traders). The number of reported milk traders in the same woreda declined to 26 (median 10.5) in June 2021 and further to 18 (median 13) in September 2021, indicating a reduction in competition. For butter, the corresponding numbers are 36 (median: 10) in February 2018, 30 (median: 20) in June 2021 and 46 (median 50) in September 2021.

Table 4.4: Share and quantity of milk traded, and number of traders, by survey round

	unit	Mean	Median
February-2018			
Value-wise, share of milk in total trade over the last month	%	86	100
Amount of milk traded per day (over the last 7 days)	l/day	1,730	650
In your opinion, how many milk traders are there in this woreda?	number	46.2	21
June-2021			
Value-wise, share of milk in total trade over the last month	%	93.1	100
Amount of milk traded per day (over the last 7 days)	l/day	2,552	500
In your opinion, how many milk traders are there in this woreda?	number	25.9	10.5
September-2021			
Value-wise, share of milk in total trade over the last month	%	90.2	100
Amount of milk traded per day (over the last 7 days)	l/day	3,433	1000
In your opinion, how many milk traders are there in this woreda?	number	17.6	13

Source: Own calculation based on the dairy value chain survey data.

Table 4.5: Share and quantity of butter traded, and number of traders, by survey round

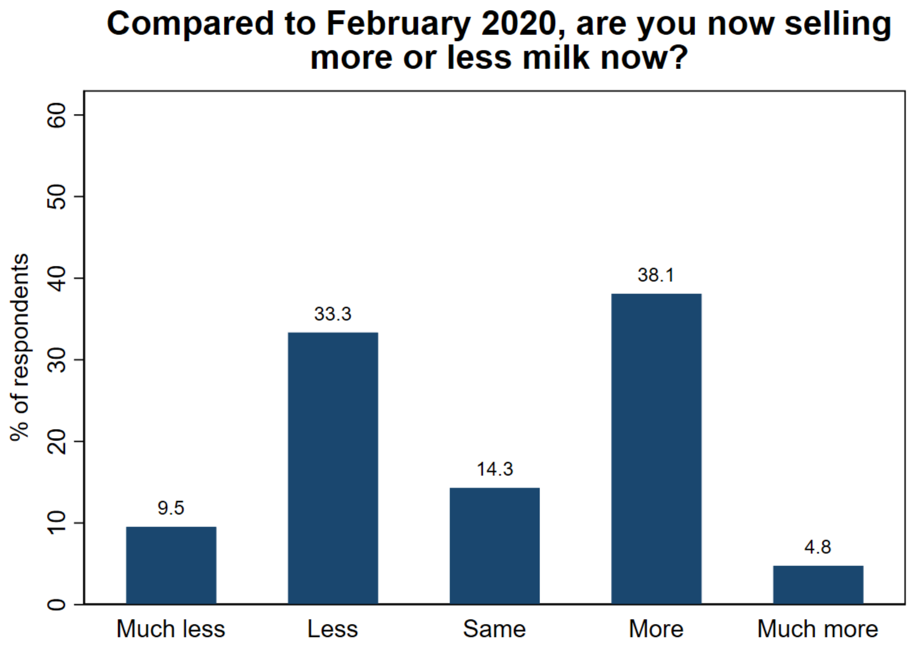
	unit	Mean	Median
February-2018			
Value-wise, share of butter in total trade over the last month	%	63.3	60
Amount of butter traded per day (over the last 7 days)	kg/day	8.9	2
In your opinion, how many butter traders are there in this woreda?	number	36.3	10
June-2021			
Value-wise, share of butter in total trade over the last month	%	81.4	90
Amount of butter traded per day (over the last 7 days)	kg/day	11.1	6
In your opinion, how many butter traders are there in this woreda?	number	30.1	20
September-2021			
Value-wise, share of butter in total trade over the last month	%	83.1	90
Amount of butter traded per day (over the last 7 days)	kg/day	15.2	8
In your opinion, how many butter traders are there in this woreda?	number	45.7	50

Source: Own calculation based on the dairy value chain survey data.

In June 2021, we asked the wholesalers to compare the amounts they currently sell to the amounts that they were selling in February 2020. The responses to this question among the milk traders were highly mixed (Figure 4.1). About 43 percent of the milk traders reported that they sell more milk than in February 2020. The same share of milk traders (43%) reported that they are selling less milk in June 2021 than in February 2020. About 14 percent of the milk traders said that the amount of milk traded has remained the same over the 16-month period. In contrast, more than 80 percent of the butter traders said that they are now selling less butter in June 2021 than in February 2020 (Figure 4.2).

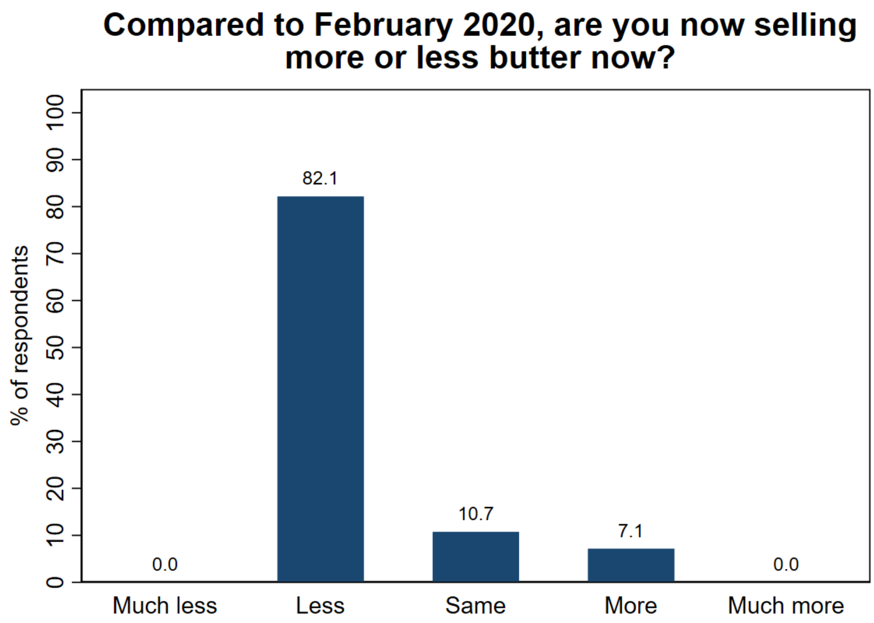
Milk traders that reported that they are now selling less milk than in February 2020 attributed this to the COVID-19 pandemic (3 out of 9 traders), changes in demand from urban areas (2 out of 9), changes in weather (2 out of 9) or other reasons (2 out of 9). The reasons for declines in traded butter quantities were mostly related to changes in butter supply (48 % of the respondents) or changes in demand for butter (39 %).

Figure 4.1: Self-reported change in traded milk amounts in June 2021 compared to February 2020



Source: Own calculation based on the June-2021 dairy value chain survey data.

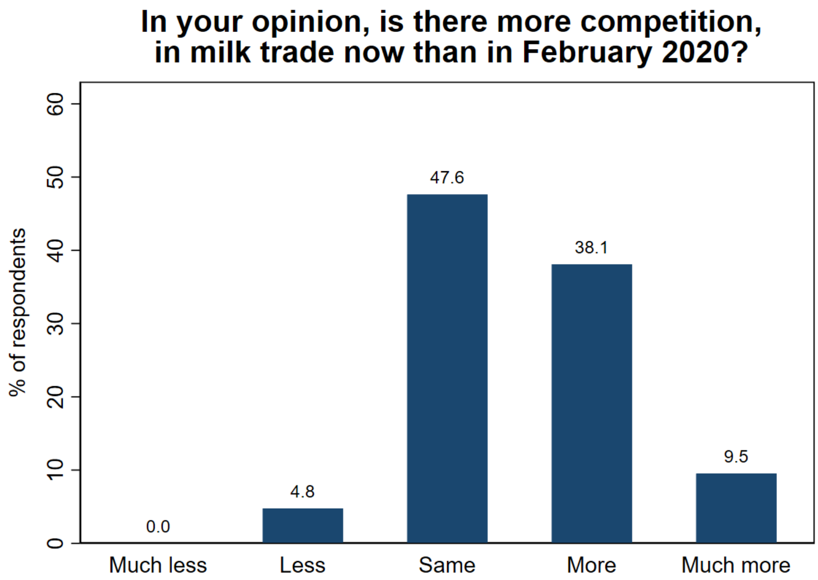
Figure 4.2: Self-reported change in traded butter amounts in June 2021 compared to February 2020



Source: Own calculation based on the June-2021 dairy value chain survey data.

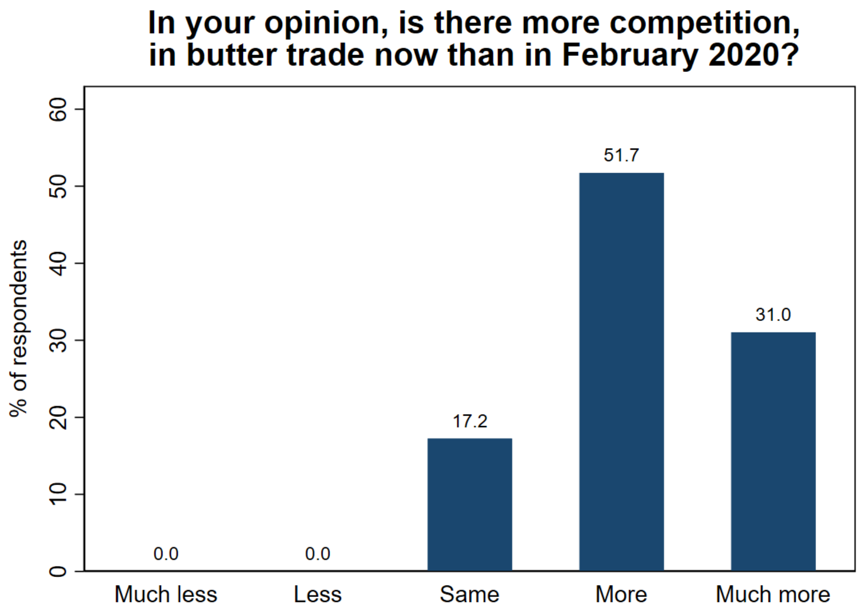
We also asked the traders to assess whether in June 2021, there was more (or less) competition in milk/butter trade than in February 2020. Figures 4.3 and 4.4 summarize these responses. In general, most respondents reported that, compared to February 2020, there is now more competition in their business.

Figure 4.3: Change in the milk trade competition in June 2021 compared to February 2020



Source: Own calculation based on the June-2021 dairy value chain survey data.

Figure 4.4: Change in the butter trade competition in June 2021 compared to February 2020



Source: Own calculation based on the June-2021 dairy value chain survey data.

4.4. Sales patterns

Traders were asked to report the share of their milk or butter procured from different sources over the 7-day period before the interview. A corresponding question was asked also about the sales destinations. Milk is largely procured directly from dairy farmers and sold to dairy processing companies, consumers, or other wholesalers (Table 4.6). Similarly, butter is also mostly sourced from farmers directly and sold to other wholesalers or directly to consumers (Table 4.7). Changes in these procurement and sales destinations across survey years are relatively small. As for geographical location, most of the traded milk and butter ends up in the market in Addis Ababa (Table 4.8).

Table 4.6: Procurement and sales destinations of milk, by survey round

	Feb-2018	June-2021	Sep-2021
Procurement destinations (%):			
Individual farmers	72.3	59.5	94.5
Farmer-traders or rural assemblers	16.7	0.0	1.9
Cooperatives union	10.7	16.7	2.4
Other sources *	0.2	23.8	1.2
Total	**100**	**100**	**100**
Sales destinations (%):			
Wholesalers	16.3	10	0.0
Dairy processing companies	51.6	60.1	59.5
Consumers	29.5	24	24.5
Others	2.6	5.9	16.0
Total	**100**	**100**	**100**

Note: * = from own production or an industrial milk producer. Source: Own calculation based on the dairy value chain survey data.

Table 4.7: Procurement and sales destinations of butter, by survey round

	Feb-2018	Jun-2021	Sep-2021
Procurement destinations (%):			
Individual farmers	73.0	77.8	71.9
Farmer-traders or rural assemblers	22.0	19.8	23.3
Cooperatives union	5.0	0.0	0.0
Other sources	0.0	2.5	4.8
Total	**100**	**100**	**100**
Sales destinations (%):			
Wholesalers	49.7	59.5	40.0
Retail shops	14.5	0.0	6.2
Consumers	27.5	35.3	48.8
Restaurants/hotels	8.3	5.3	4.5
Mini markets/supermarkets	0.0	0.0	0.5
Total	**100**	**100**	**100**

Source: Own calculation based on the dairy value chain survey data.

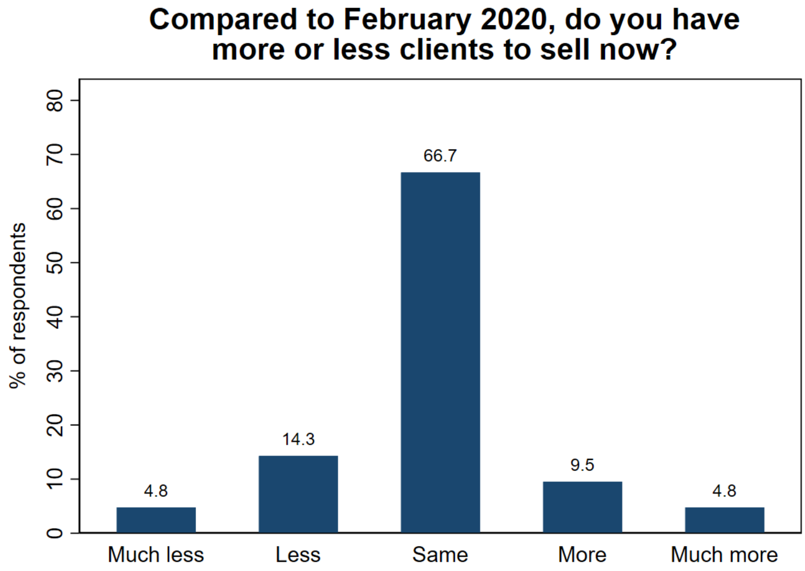
Table 4.8: Location of the final consumption destination

	Milk			Butter		
Location	**Feb-2018**	**Jun-2021**	**Sep-2021**	**Feb-2018**	**Jun-2021**	**Sep-2021**
Addis +suburban	81.8	92.1	97.6	74.8	76.5	73.8
Other Towns	18.3	6.4	1.2	25.3	23.0	19.1
Rural area	0.0	1.4	1.2	0.0	0.5	7.1

Note: N=20 milk traders and 28 butter traders. Source: Own calculation based on the dairy value chain survey data.

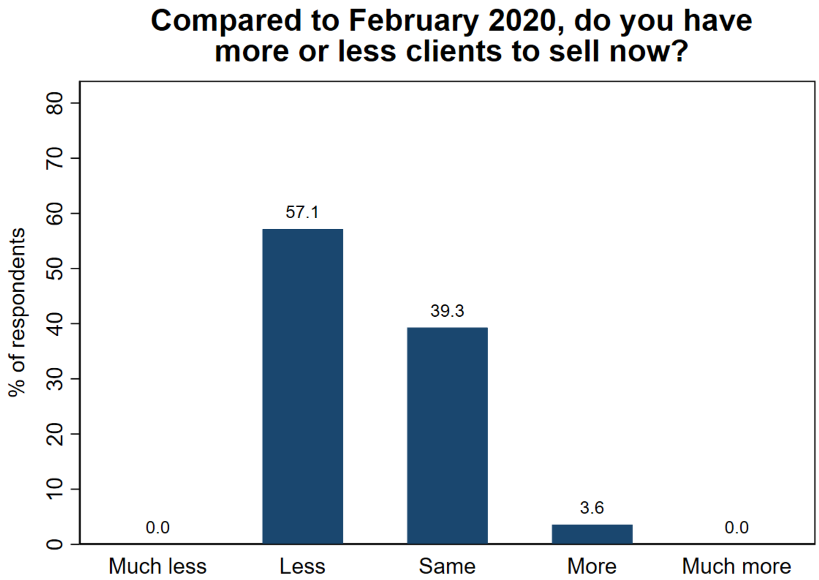
We asked traders to evaluate how the number of clients had changed between February 2020 and June 2021. Two-thirds of the milk traders reported that the number of clients had more or less remained the same. In contrast, more than half of the butter traders said that they now have fewer clients to sell than in February 2020. This decline in the number of clients among butter traders were largely attributed to changes in butter demand (8 out of 15 traders).

Figure 4.5: Change in the number of clients since February 2020 (milk traders)



Source: Own calculation based on the June-2021 dairy value chain survey data.

Figure 4.6: Change in the number of clients since February 2020 (butter traders)



Source: Own calculation based on the June-2021 dairy value chain survey data.

4.5. Services delivered and received

Providing advance payments to milk/butter suppliers was not common in 2021 (Table 4.9). Similarly, not many traders received advance payments from their clients. However, paying milk suppliers late happens frequently. In the June- and September-2021 survey rounds we also asked traders to report the share of suppliers they paid late (on credit). The mean share among milk traders was 57 percent (median 50 %) in June 2021 and 33 percent (median 50 %) in September 2021, indicating that paying suppliers after the milk transaction is relatively common. However, this was less common among butter traders. Receiving payments on credit *from clients* was less common among both trader types (Table 4.10).

Table 4.9: Percent of traders providing or receiving advance payments, by survey round and trader type

	Milk traders			Butter traders		
	Feb-2018	Jun-2021	Sep-2021	Feb-2018	Jun-2021	Sep-2021
Provided advance payments to suppliers in the last month	23.8	4.8	0	5.0	10.0	9.5
Received advance payments from clients in the last month	4.8	19.1	0	5.0	15.0	4.8

Note: N=20 milk traders and 28 butter traders. Source: Own calculation based on the dairy value chain survey data.

Table 4.10: Prevalence of paying on credit in June and September 2021, by trader type

	Milk traders		Butter traders	
	Mean	Median	Mean	Median
June 2021				
% of suppliers to which paid late/on credit in the last month	57.4	50.0	6.5	0.0
% of clients that paid late/on credit in the last month	24.3	0.0	3.0	0.0
September 2021				
% of suppliers to which paid late/on credit in the last month	33.3	50	10.2	0.0
% of clients that paid late/on credit in the last month	0	0	11.4	0.0

Source: Own calculation based on the dairy value chain survey data.

Wholesale traders provide a wide range of services to their suppliers. For example, most milk traders reported to have given training or advice for improved milk production to their suppliers in the last 12 months. In February 2018 and June 2021 survey rounds, at least one-third of the milk traders said to have provided credit or loans to their suppliers. Many traders also reported to have provided equipment such as feed or cans to their suppliers and almost all kept buying milk during the fasting periods when milk consumption drops dramatically.[5] The butter traders seem less likely to provide similar services to their suppliers (Table 4.11), possibly because of limited demand for such services among their suppliers.

Table 4.11: Services provided to suppliers, by survey round and trader type

	Milk traders		Butter traders	
	Feb-2018	June-2021	Feb-2018	June-2021
% provided training or advice on improved milk/butter production	66.7	76.2	53.6	14.3
% provided credit or loans	33.3	42.9	14.3	14.3
% provided equipment or feed	42.9	57.1	7.1	7.1
% provided bags or cans	19.1	33.3	7.1	7.1
% kept buying milk/butter during fasting periods	85.7	81.0	85.7	89.3
% picked up milk/butter in their own or rented truck	42.9	42.9	25.0	0.0
% tested the quality of milk/butter when buying	100.0	81.0	92.9	92.9

Source: Own calculation based on the dairy value chain survey data.

4.6. Labor

In all rounds, at least 80 percent of the milk traders and 20 percent of the butter traders reported that they normally employ workers. Average wholesale milk trading business in our sample employs 10-11 people in February 2018 and June 2021 (Table 4.12).[6] In September 2021, the average wholesale milk trading business employs 6 people, indicating a reduction in the number of people employed at this level of the value chain. However, the median values are stable at 3-4

[5] See D'Haene et al. (2020) for more details on how Orthodox fasting in Ethiopia shapes the dairy sector.

[6] The corresponding question in the butter wholesale trader questionnaire is not comparable across survey rounds and therefore not reported here.

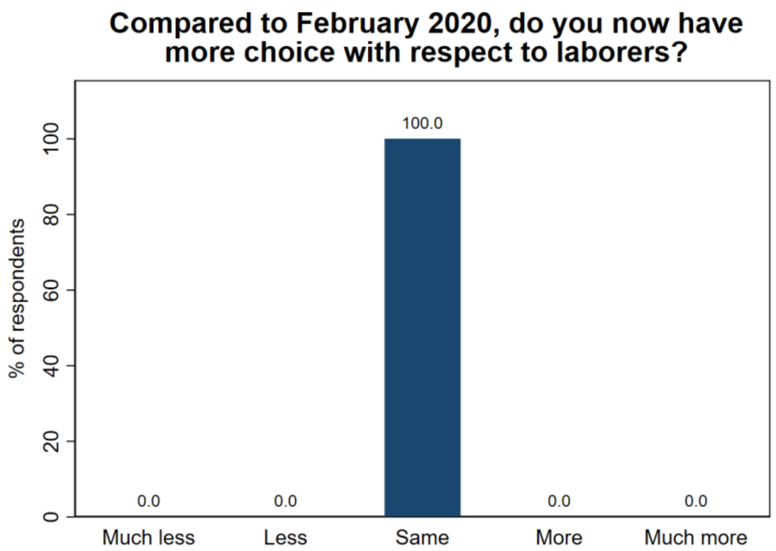
workers over the survey rounds. Of note is that also the medians are considerably lower at 3-4 workers in all rounds suggesting that the mean is influenced by a small number of larger firms. Most traders assessed that the choice with respect to laborers did not change between February 2020 and June 2021 (Figures 4.7 and 4.8).

Table 4.12: Number of people working in the milk trading business during last month, by survey round

Survey round	Mean	Median
February 2018	11.1	4.0
June 2021	9.9	3.0
September 2021	6.1	4.0

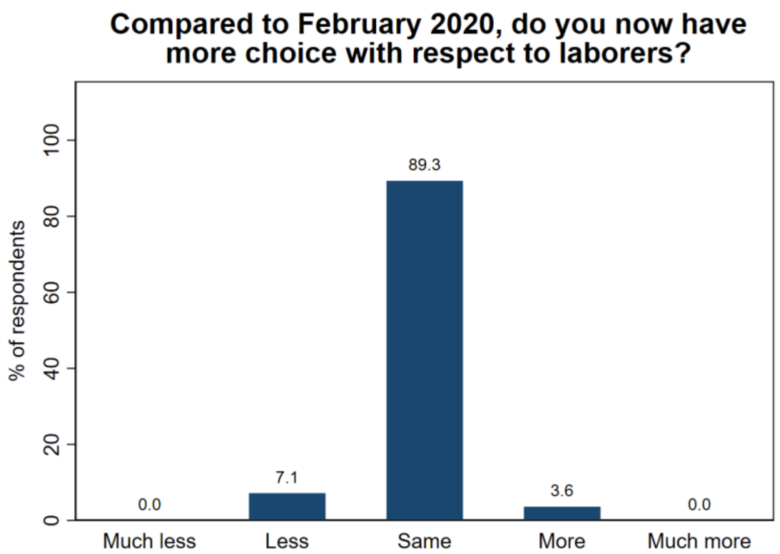
Source: Own calculation based on the dairy value chain survey data.

Figure 4.7: Change in the choice of laborers in June 2021 compared to February 2020 (milk traders)



Source: Own calculation based on the June-2021 dairy value chain survey data.

Figure 4.8: Change in the choice of laborers in June 2021 compared to February 2020 (butter traders)



Source: Own calculation based on the June-2021 dairy value chain survey data.

4.7. Wholesale traders' concerns regarding their business

In the September-2021 survey, we asked the wholesale traders to report their main concern regarding their milk (butter) trading activities. As Table 4.13 shows, more than 70 percent of milk traders reported their concern either on milk supply shortage or milk price fluctuations. In contrast, butter traders were mainly concerned about the low price of butter (43 %). In September 2021, very few traders report instability in the country as their main concern despite the ongoing conflict in Ethiopia.

Table 4.13: Dairy traders' main concern regarding their trading activities

	Milk trader		Butter trader	
	N	Percent	N	Percent
What is your main concern regarding your trading activities currently?				
Supply shortage	8	38.1	2	9.5
Prices fluctuating a lot	7	33.3	0	0.0
Prices too high	2	9.5	3	14.3
Prices too low	2	9.5	9	42.9
Limited demand in Addis	0	0.0	2	9.5
Instability in the country	0	0.0	2	9.5
Limited availability of workers	1	4.8	0	0.0
Poor road condition	1	4.8	0	0.0
Other	0	0.0	1	4.8
No concerns	0	0	2	9.5
Total	**21**	**100**	**21**	**100**

Source: Own calculation based on the September-2021 dairy value chain survey data.

We asked a series of follow-up questions to further understand the perceived impact of the reported supply shortages. These questions were in the form of statements and the traders were asked to indicate whether they agreed or disagreed with the statement.

First, all traders agreed with the statement that "over the past 6 months, there has been a shortage of milk in the area where they procure milk from" (Table 4.14). Next, we asked traders to indicate whether they agreed or disagreed with the statement that "because of the shortage of milk supply, they are receiving less income". All milk traders agreed with this statement (Table 4.14). We then asked milk traders' agreement with the statement "If the shortage of milk supply continues, you will have to stop milk trading". More than half of the traders agreed with this statement, 19 percent disagreed and 29 percent neither agreed nor disagreed (Table 4.14).

Table 4.14: Milk traders' views regarding selected statements about supply shortages

Statement	Strongly disagree	Disagree	Neither agree, nor disagree	Agree	Strongly Agree	Total
"Over the past 6 months, there has been a shortage of milk in the area where you procure milk from"	0.0	0.0	0.0	95.2	4.8	**100**
If 'Agreed' or 'Strongly agreed':						
"Because of the shortage of milk supply, you are receiving less income"	0.0	0.0	0.0	81.0	19.0	**100**
"If the shortage of milk supply continues, you will have to stop milk trading"	0.0	19.0	28.6	52.4	0.0	**100**

Note: N=21 milk traders. Source: Own calculation based on the September-2021 dairy value chain survey data.

These same questions were asked from the butter traders and the results are reported in Table 4.15. Supply shortages were observed also in this business with two-thirds of the butter traders agreeing with the statement about the butter shortage over the past 6 months. All butter traders that agreed with the aforementioned statement, also agreed with the statement “Because of the shortage of butter supply, they are receiving less income”. About 35 percent of the traders that were concerned about butter shortages agreed with the statement “If the shortage of butter supply continues, you will have to stop milk trading”. More than 40 percent disagreed with this statement and 21 percent neither agreed, nor disagreed.

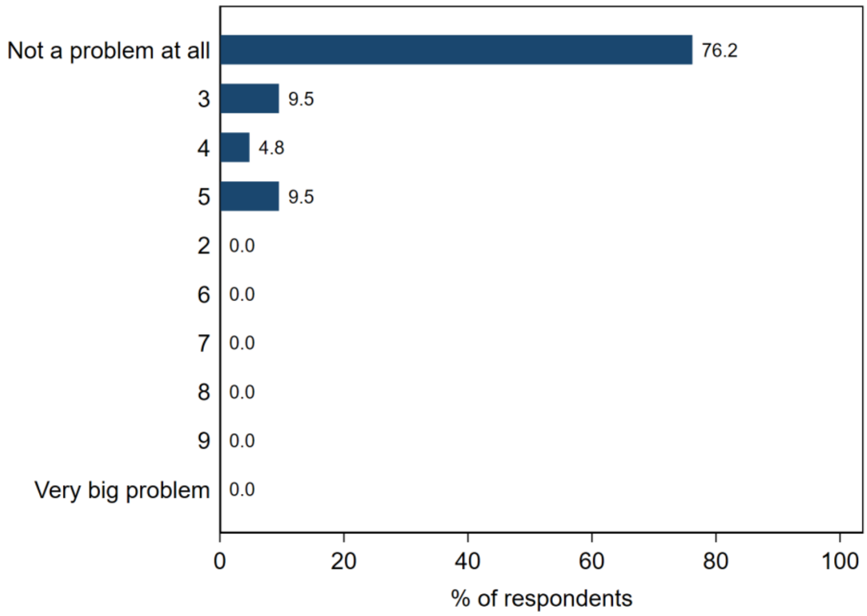
Table 4.15: Butter traders’ views regarding selected statements about supply shortages

Statement	Strongly disagree	Disagree	Neither agree, nor disagree	Agree	Strongly Agree	Total
“Over the past 6 months, there has been a shortage of butter in the area where you procure butter from” (N=21)	4.8	19	9.5	66.7	0	**100**
If ‘Agreed’ or ‘Strongly agreed’ (N=14):						
“Because of the shortage of butter supply, you are receiving less income”	0	0	0	92.9	7.1	**100**
“If the shortage of butter supply continues, you will have to stop milk trading”	0	42.9	21.4	35.7	0	**100**

N=21 butter traders. Source: Own calculation based on the September-2021 dairy value chain survey data.

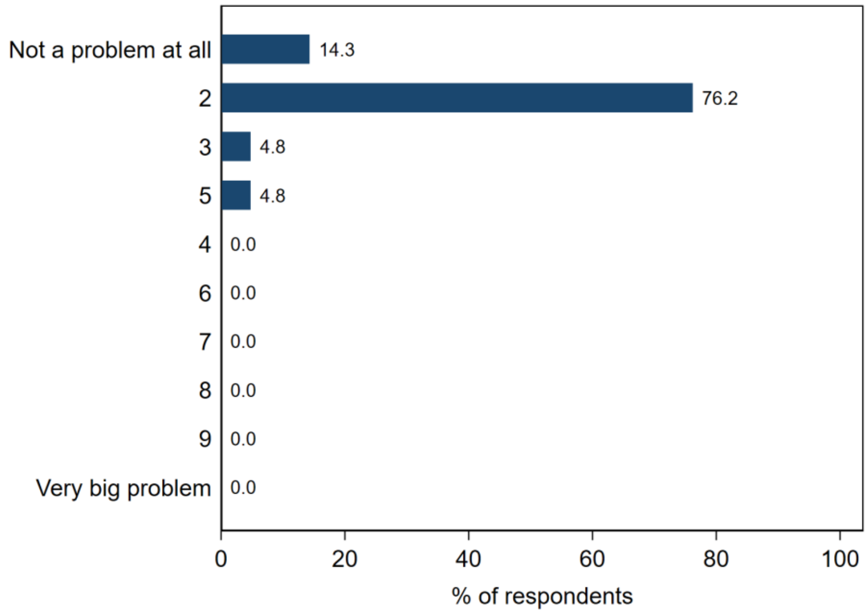
Finally, we asked both the milk and butter traders to use a scale between 1 and 10 to measure the impact of the ongoing COVID-19 pandemic to their trading activities. As before, value 1 indicated that the pandemic is not a problem at all to their dairy trading activities and value 10 that the pandemic posed a very big problem. On average, the milk traders and butter traders responded 1.7 and 2 out of 10, implying that the pandemic is perceived to have negligible impact on their trading activities (Figures 4.9 and 4.10). About 76 percent of milk traders and 14 percent of the butter traders reported that the COVID-19 pandemic does not pose any problems to their trading activities.

Figure 4.9: “On a scale of 1 (not a problem at all) and 10 (very big problem), how big of a problem is the COVID-19 pandemic to your milk trading activities currently?”



N=21 milk traders. Source: Own calculation based on the September-2021 dairy value chain survey data.

Figure 4.10: "On a scale of 1 (not a problem at all) and 10 (very big problem), how big of a problem is the COVID-19 pandemic to your butter trading activities currently?"



N=21 butter traders. Source: Own calculation based on the September-2021 dairy value chain survey data.

4.8. COVID-19 precautionary measures

In the June-2021 survey round, traders were asked about the precautions taken to minimize the risk of contracting COVID-19. Most traders reported to have worn facemasks when conducting business in the previous 30 days. Interestingly, other types of protective measures and practices were common among milk traders but not among butter traders (Table 4.16).

Table 4.16: COVID-19 precautionary measures taken in the past 30 days

	Milk traders	Butter traders
Wore facemasks when conducting business?	95.2	78.6
Wore gloves when conducting business?	71.4	3.6
Was actively avoiding contacts with other traders because of the COVID-19 risk	57.1	3.6
Was actively avoiding contacts with clients because of the COVID-19 risk	76.2	3.6
Was conducting business only with suppliers and clients that were masks	100.0	0.0

Note: N=21 milk traders and 28 butter traders. Source: Own calculation based on the June-2021 dairy value chain survey data.

5. FINDINGS – RETAIL LEVEL

5.1. Introduction

The in-person survey conducted in February 2018 included interviews with more than 254 dairy retail outlets. As noted in Sections 2.2 and 2.3, the survey team successfully interviewed 168 and 109 retail outlets in June and September 2021. In this chapter, we report on our findings from these interviews. As much as possible, we compare the phone survey data collected in June and September 2021 to the in-person data collected in February 2018. We do so by restricting the February-2018 sample to the retailers that were interviewed in September 2021.

In Section 5.2, we report on the number of retailers who had stopped trading dairy since the February-2018 survey. In Section 5.3, we report on the number of workers employed by the retailers. In Section 5.4, we assess how retailers procure their products and report on key sales numbers. In Section 5.5, we use the June 2021 to discuss how the retail sector had changed since the pandemic began. In Section 5.6, we report about the main concerns of dairy retailers regarding their business activities. Finally, we assess the precautions taken by the retailers to minimize the spread of the COVID-19 virus in Section 5.7.

5.2. Retailer turnover

Since our first visit in February 2018, 29 percent (49 out of 168) of the dairy retailers had stopped trading dairy products by June 2021. Further analysis (not reported here) suggests that retail traders selling fresh milk in 2018 were more likely to have quit compared to specialized dairy shops. An additional 6 dairy retailers quit the business between June and September 2021. Out of the 55 dairy retailers that had quit since February 2018, 21 did so after February 2020. Table 5.1 shows that the reasons for quitting the liquid dairy retail activity since February 2018 were mostly related to business not being profitable (18 responses), personal reasons (10 responses), illness in the family (6), and limited supply of dairy products (7). We also specifically asked if the reason to quit was linked to the COVID-19 pandemic. Out of the 21 traders that had quit during the pandemic (i.e., during or after March 2020), five said that the COVID-19 pandemic was the main factor for quitting while three said it was a factor. Thirteen (62 %) responded that the pandemic did not play a role in their decision to quit. Seven out of the 55 retail traders that had quit (13 %), reported that they plan to restart their dairy trading business in the next 12 months. Nineteen respondents were not sure and 29 indicated that they do not plan to restart in the next 12 months.

Table 5.1: Reasons for quitting dairy retail trading since February 2018

Reason	Between Feb-2018 and June-2021		Between June and Oct-2021	
	N	**%**	**N**	**%**
Business was not profitable	17	35	1	17
Other personal reasons	8	16	2	33
Illness in the family	6	12	0	0
Limited supply of dairy products	5	10	2	33
Limited demand for dairy products	4	8	0	0
COVID-19 pandemic	4	8	0	0
Retired	1	2	0	0
Found a better business opportunity	1	2	1	17
Other reason	3	6	0	0
Total	**49**	**100**	**6**	**100**

Source: Own calculation based on the June-2021 dairy value chain survey data.

5.3. Labor

An average dairy retail outlet in our sample employs 2-3 full time workers (the use of part time staff is not common) with little change over time (Table 5.2).

Table 5.2: Number of people working in the retailer store

Survey round	Type	Mean	Median
February 2018	full-time	2.5	2.0
	part-time	0.2	0.0
February 2020 *	full-time	2.7	2.0
	part-time	0.4	0.0
June 2021	full-time	2.3	2.0
	part-time	0.4	0.0
September 2021	full-time	2.5	2.0
	part-time	0.5	0.0

* = based on respondent recall in June-2021 survey. Source: Own calculation based on the dairy value chain survey data.

5.4. Procurement and sales

In all survey rounds, more than 80 percent of the dairy retail outlets in our sample sold liquid milk. In February 2018 and June 2021, more than half of the retail outlets sold yoghurt and close to three-quarters of them did so in September 2021 (Table 5.3). Other types of dairy products were sold by one-third or fewer outlets.

Table 5.3: Types of dairy products sold in the previous week, by survey round

	Feb-2018	June-2021	Sep-2021
Liquid milk, %	83.5	80.6	86.4
Powder milk, %	45.6	31.0	21.4
Yoghurt, %	56.3	58.3	71.8
Butter, %	28.2	24.3	30.1
Cheese, %	22.3	21.4	26.2

Source: Own calculation based on the dairy value chain survey data.

All survey rounds included a question about the location from which the retailers mainly sourced their milk and dairy products in the past week (Table 5.4). In February 2018, the retailers mostly sourced their products from independent distributors (23 %), processing companies (27 %) or independent milk traders (30 %). In June and September 2021, independent traders have become more important with more than 60 percent of the retailers mainly sourcing from them. Meanwhile, sourcing milk or dairy products from dairy processing companies or directly from farms is less common in June and September 2021 than it was in 2018. Most of the milk was sold to individual consumers in the retail outlets (Table 5.5).

Table 5.4: Procurement locations of the dairy products sold in the previous week, by survey round

	Feb-2018	June-2021	Sep-2021
Delivered by in independent distributor	23.3	60.2	64.0
Delivered by dairy processing companies	26.7	12.1	4.5
Delivered by independent trader/milk collector	30.2	20.5	21.4
Bought on wholesale market	0.0	1.2	0.0
Collector collects in rural areas & also owns this shop	2.3	2.4	2.3
Obtained from own farm	5.8	3.6	6.7
Obtained from others' dairy farm	9.3	0.0	1.1
Others	2.3	0.0	0.0
Total	**100**	**100**	**100**

Source: Own calculation based on the dairy value chain survey data.

Table 5.5. Customer types of the milk sold in the previous week, by survey round

What percentage of the milk was sold to:	Feb-2018	June-2021	Sep-2021
Individual consumers	96.6	94.7	95.7
Cafés, hotels, or restaurants	1.2	3.6	3.2
Others	2.2	1.7	1.1
Total	**100**	**100**	**100**

Source: Own calculation based on the dairy value chain survey data.

We also asked the retail outlets to report on the amounts sold in the last 7-days prior to the survey. Table 5.6 shows the mean and median values. Focusing on the medians, that are less sensitive to outliers, we see that compared to February 2018, the traded amounts had considerably increased in 2021. The median quantity of milk sale increased to 70 liters/day in September 2021 from its level of 58 liter/day in February 2018.

Table 5.6: Quantity of dairy products sold in the previous week, by survey round

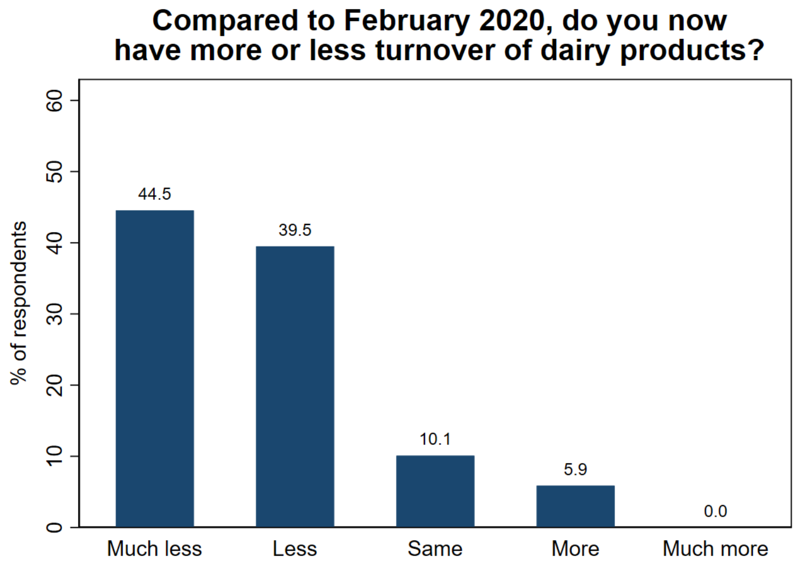
Quantity sold during last week	unit	Feb-2018			June-2021			Sep-2021		
		N	mean	median	N	mean	median	N	mean	median
Liquid milk	liter	86	57.8	35.0	83	91.2	52.0	89	88.7	70.0
Powder milk	kg	47	9.9	1.2	32	3.4	2.0	22	3.0	2.2
Yoghurt	liter	58	37.5	20.0	60	49.5	32.0	74	42.0	32.5
Butter	kg	29	8.51	3.5	25	9.2	8.0	31	9.6	7.0
Cheese	kg	23	17.0	5.0	22	11.4	9.5	27	19.6	15.0

Source: Own calculation based on the dairy value chain survey data.

5.5. Change in the dairy retail business in June 2021 vs February 2020

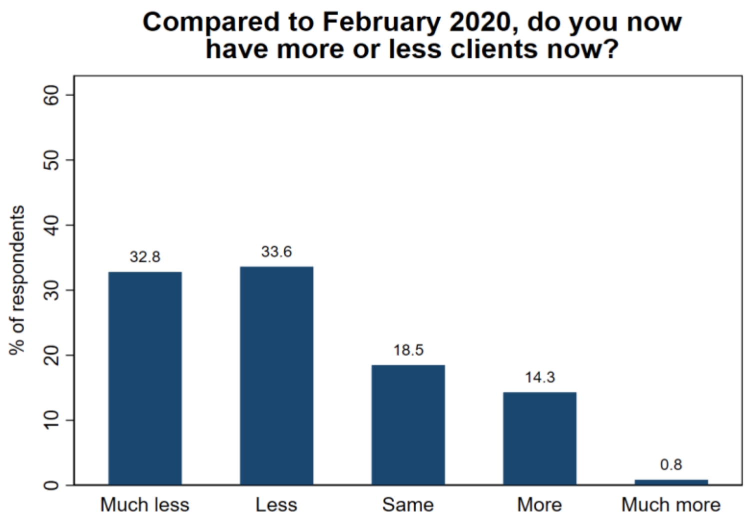
In our June-2021 survey, we asked the retailers to compare their current situation to the situation in February 2020 (i.e., just before the pandemic was declared). More than 80 percent of the retailers said that in terms of quantity, they now sell less or much less than in February 2020 (Figure 5.1). Similarly, two-thirds reported that the number of clients went down since February 2020 (Figure 5.2).

Figure 5.1: Change in retail sales turnover in June 2021 compared to February 2020



Note: N=119 retailers. Source: Own calculation based on the June 2021 dairy value chain survey data.

Figure 5.2: Change in the number of clients in June 2021 compared to February 2020



Note: N=119 retailers. Source: Own calculation based on the June 2021 dairy value chain survey data.

5.6. Dairy retailers' concerns regarding their business

In the September-2021 survey, retailers were asked to state their main concern in their dairy retail business. The shortage of dairy products was identified as the main concern by more than one-third of the respondents (Table 5.7). As reported in Section 4.7, shortage of milk supply was too a source of concern for 38 percent of milk wholesale traders. High dairy prices were the main concern to about 20 percent while the limited demand for dairy products in Addis Ababa was reported by about 15 percent of the dairy retailers. In September 2021, only 3 percent of the retailers report instability as their main concern despite the ongoing conflict in Ethiopia.

Table 5.7: Dairy traders' main concern regarding their trading activities

What is your main concern regarding your dairy retailing activities currently?	N	Percent
Dairy products supply shortage	37	35.9
Dairy product prices are too high	21	20.4
Limited demand for dairy products in Addis Ababa	15	14.6
Dairy product prices fluctuating a lot	8	7.8
Perishability of dairy products	4	3.9
Instability in the city	3	2.9
Other	8	7.8
No concerns	7	6.8
Total	**103**	**100.0**

Source: Own calculation based on the September-2021 dairy value chain survey data.

We asked a series of follow-up questions to further understand the perceived impact of the supply shortages at the retail level. As before, these questions were in the form of statements and the retailers were asked to indicate whether they agreed or disagreed with the statement. First, 54 percent of the retailers agreed with the statement that "over the past 6 months, there has been a shortage of dairy coming into Addis Ababa from rural and urban producers" (Table 5.8).

Next, we asked the retailers who agreed with the previous statement to tell whether they agreed or disagreed with the statement that "because of the shortage of dairy supply, they are receiving less income". Almost all retailers (95 %) who were concerned about the supply shortages agreed with this statement. We then asked dairy retailers' agreement with the statement "if the shortage of dairy continues, they will have to stop trading dairy". More 21 percent of the retailers agreed with this statement, 59 percent disagreed and 20 percent neither agreed nor disagreed (Table 5.8).

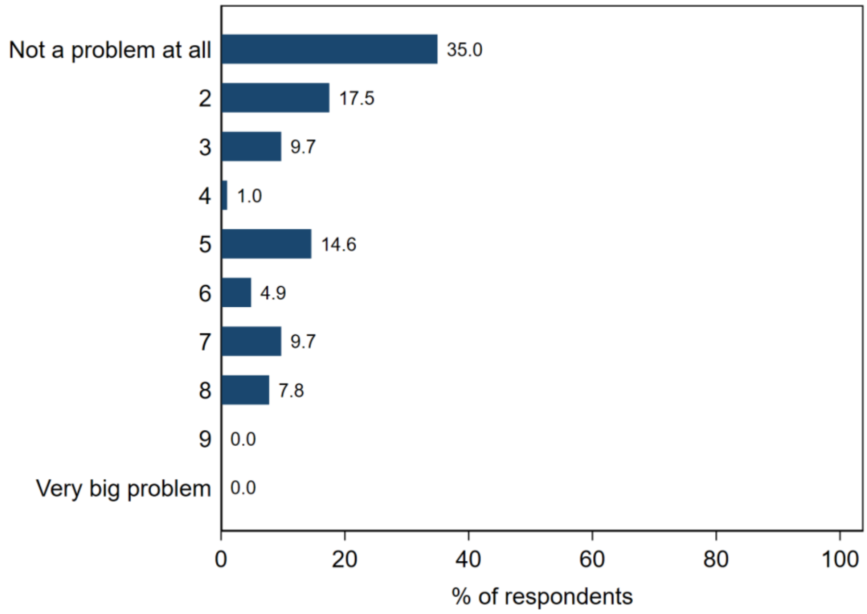
Table 5.8: Retailers' views regarding selected statements about dairy supply shortages

Statement	Strongly disagree	Disagree	Neither agree, nor disagree	Agree	Strongly Agree	Total
"Over the past 6 months, there has been a shortage of dairy coming into Addis Ababa from rural and urban producers"	4.9	24.3	16.5	35	19.4	**100**
If 'Agreed' or 'Strongly agreed':						
"Because of the shortage of dairy supply, you are receiving less income"	0	3.6	1.8	67.9	26.8	**100**
"If the shortage of dairy continues, you will have to stop trading dairy"	8.9	50	19.6	16.1	5.4	**100**

Note: N=103 dairy retailers for the first statement and N=56 for the other two statements. Source: Own calculation based on the September-2021 dairy value chain survey data.

Finally, retailers were asked to use a scale between 1 and 10 to indicate the impact of the ongoing COVID-19 pandemic on their trading activities. As before, in this response scale value 1 indicated that the pandemic is not a problem at all to their retail activities and value 10 that the pandemic posed a very big problem. On average, retailers responded 3.4 out of 10, implying that the pandemic is perceived to have a relatively small negative impact on their retailing activities (Figure 5.3). However, when compared to farmers and wholesale trader, it seems that the pandemic is somewhat more affected by the pandemic. The average response to the same question among farmers and wholesale traders was less than 2 (out of 10).

Figure 5.3: On a scale of 1 (not a problem at all) and 10 (very big problem), how big of a problem is the COVID-19 pandemic to dairy retailing activities currently?"



Note: N=103 retail traders. Source: Own calculation based on the September 2021 dairy value chain survey data.

5.7. COVID-19 precautionary measures

In June 2021, almost all retailers reported to have worn facemasks when conducting business in the previous 30 days (Table 5.9). Nearly half reported to have actively disinfected their shop and more than half said that they were actively avoiding contacts to minimize the COVID-19 infection risk. About 30 percent of the traders restricted the number of customers allowed in the retail shop and 20 percent said that they only sold to customers wearing a facemask.

Home delivery of dairy products had not taken off during the pandemic; only two retailers out of 119 reported to have done home delivery in the past 30 days. Finally, 10 percent of the retailers said to believe that the consumption and/or contact with raw milk is associated with a greater risk of contracting COVID-19.

Table 5.9: COVID-19 precautionary measures taken in the past 30 days

Pre-cautionary measure	%
Worn facemasks when conducting business	94.1
Wore gloves when conducting business	11.8
Was actively disinfecting the retail shop with chemical spray because of the COVID-19 risk	47.1
Was actively avoiding contacts with other traders/retailers because of the COVID-19 risk	54.6
Was actively avoiding contacts with clients because of the COVID-19 risk	58.0
Was selling only to customers that were mask	20.2
Reduced the number of people allowed in the retail shop because of the COVID-19 risk	30.3
Reduced the number of hours of operation of the shop because of the COVID-19 risk	10.1
Contacted customers more by phone to arrange sales because of the COVID-19 risk	5.9

Note: N=119 retailers. Source: Own calculation based on the June 2021 dairy value chain survey data.

6. FINDINGS – ENTIRE VALUE CHAIN

6.1. Introduction

The cascading survey approach that collects simultaneous data across the main actors of value chain permits us to assess how prices and marketing margins are formed along the value chain and how they have changed before and during the pandemic. The results from this analysis are reported in Section 6.2. Moreover, the June and September 2021 survey instrument asked dairy farmers, wholesalers, and retailers to estimate the share of produce lost at the farmgate and during trading. In Section 6.3, we pool these data together to assess the share of produce lost in the value chain before reaching consumers. In addition, we report on the milk quality testing conducted along the value chain.

6.2. Dairy price formation

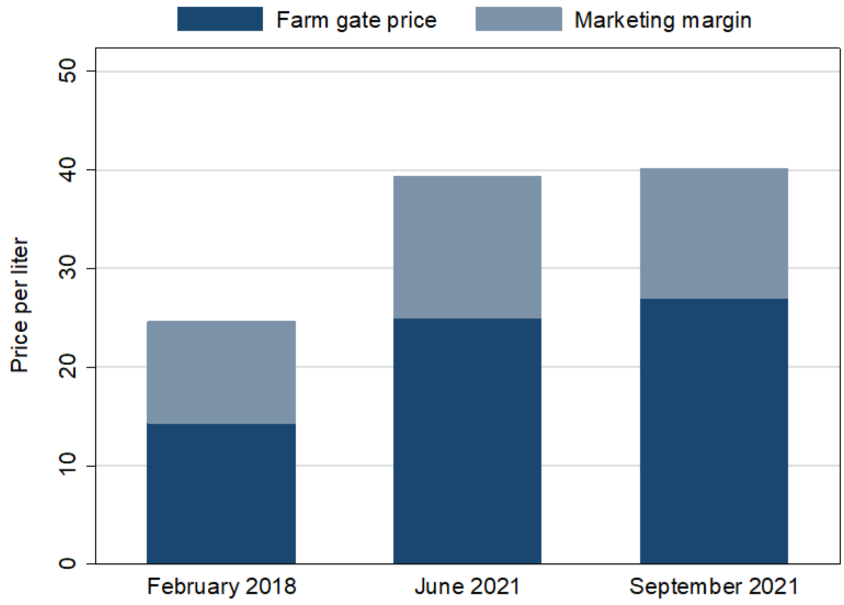
In agricultural economics, the marketing bill is defined as the portion of every birr consumers spend on food that goes to the farmer and to the other actors in the value chain. Farm share is the share of the final retail price that is received by the farmer and the marketing share is the share received by the marketing channel; actors that (collectively) bring the food from the farm to the consumers. It is important to note that the marketing channel provides a wide range of services to the final consumer. Using milk as an example, the marketing channel performs quality testing, pasteurizes the milk (almost all fresh milk sold in Addis Ababa is pasteurized), adds packaging, and so on. The consumers in Addis Ababa then pay for the fresh milk produced by the farmer as well as for the services provided by the marketing channel. The marketing channel causes a wedge in price between the farmgate price, and the price paid by the consumers.

In this section, we study how these shares in the dairy value chain have changed before and during the pandemic. To do so, we compare liquid milk prices at the farmgate to the prices paid by the consumers in Addis Ababa (i.e., retail prices).[7] Figure 6.1 shows the farm gate prices and marketing share for liquid milk in the three rounds in terms of birr per liter (Figure 6.1a) and in terms of percentages of the final price paid by the consumers in Addis Ababa (Figure 6.1b). Of note is that the farm gate prices, and marketing shares are in gross terms and therefore, they do not inform us about the net-revenues that the value chain actors received. In Figure 6.1a, the total length of the bar gives the final price of the milk paid by the consumers in Addis Ababa at the time of the survey. In February 2018, the average farmgate price was 14.3 birr per liter and the retail price in Addis Ababa was 24.6 birr per liter (Figure 6.1a). As a result, the farm share was 58 percent and marketing share 42 percent (Figure 6.1b). In June 2021, farmgate and retail prices had increased to 24.9 birr per liter and 39.3 birr per liter (Figure 6.1a). Now the farm share is estimated at 63 percent and marketing share at 37 percent. In other words, the farm share increased by about 5 percentage points between February 2018 and June 2021. In September 2021, the farmgate and the retail prices further increased to 27 and 40.2 birr per liter, respectively. This implies that the farm share was 67.5 percent, while the marketing share stood at 32.5 percent. Between June and September 2021, the farm share further increased by about 5 percentage points. Finally, while prices of milk have increased in birr terms, they have stayed surprisingly stable in USD terms (e.g., 0.92 USD/liter in 2018 and 0.91 USD/liter in June 2021).

[7] At each level of the value chain, we asked the respondents to estimate the price of different dairy products at the time of the survey. However, at the wholesale level in the February 2018 and June 2021 survey, the price question mistakenly referred to procurement prices instead of sales price. Consequently, we settle for analyzing farmgate and retail prices only.

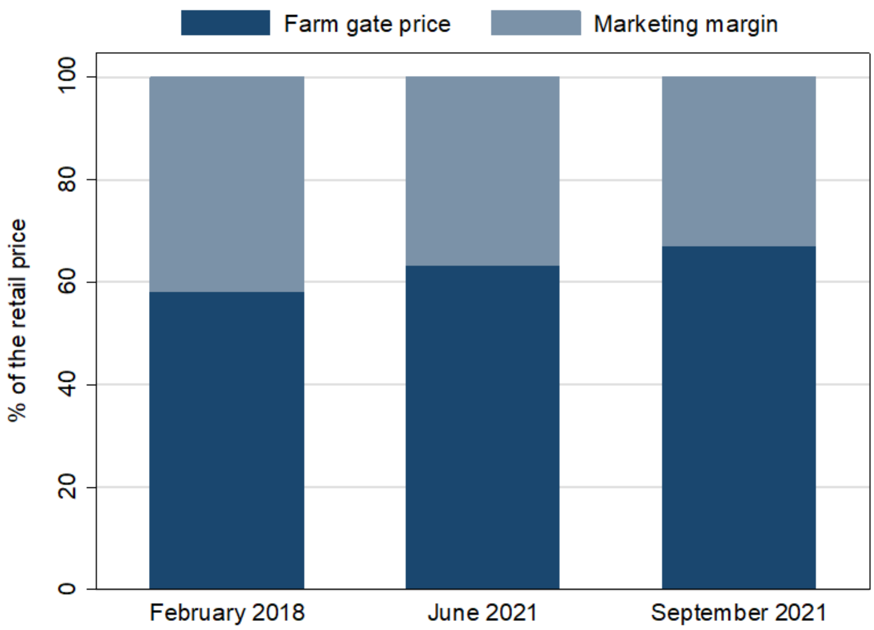
Figure 6.1: Liquid milk price structure before and during the pandemic

(a) Farmgate prices and marketing margin in birr/liter



Source: Own calculation based on the dairy value chain survey data.

(b) Farmgate prices and marketing margin as percentages of the final retail price



Source: Own calculation based on the dairy value chain survey data.

6.3. Quality testing and wastage along the value chain

Milk quality is tested throughout the value chain. The most common tests conducted are alcohol and lactose tests. As described in Minten, Habte, et al. (2020), an alcohol test is used to detect sour milk; that is if milk has an elevated level of acidity caused by bacteria. The lack of refrigeration or long transportation of milk in ambient temperatures increases the risk of elevated acidity in milk.

A lactose test is performed with a lactometer that tests the density of the milk. This is used to detect adulteration of milk with water.

These quality tests are conducted when milk changes hands in the supply chain. Rural traders test the milk when they purchase it from the dairy farmers. Urban wholesalers and retailers test the milk when they purchase the milk from rural traders or from urban traders. One of the most common reasons why milk could not be sold is because the milk did not meet the quality standards set by the trader. The rejected milk is either consumed by the farmer, processed to cheese or butter, given to animals, or thrown away (Minten, Tamru, et al., 2020).

Minten, Tamru, et al. (2020) provide a careful estimation of post-harvest losses (PHL) in the dairy value chain using the data collected in February 2018. The authors estimate PHL separately for fresh and pasteurized milk considering different PHL calculation methods. Depending on the method and type of milk, the total post-harvest losses in the value chain range between 2 and 4.5 percent. Large part of these losses occurs at the rural trader and retail level. The survey questionnaire in February 2018 contained a series of questions that facilitated these calculations. However, repeating the full battery of these questions in a phone survey setup was not feasible. Therefore, we settle for reporting on the quality testing done at the different levels of the value chain and comparing the milk wastage across the survey rounds to gain an understanding whether these losses may have increased or decreased during the pandemic. We do not attempt to replicate the comprehensive PHL calculations reported in Minten, Tamru, et al. (2020).

Upstream (farmgate)

We begin with farmers. In all survey rounds, we asked farmers whether any of the milk they sold in the past 30 days was quality tested. About 60-63 percent responded that their milk was tested (at least occasionally) by lactometer and 57-60 percent said that an alcohol test was conducted (Table 6.1). We see little meaningful changes in this regard across survey rounds. Of note is that farmers can sell milk to consumers, individual traders or to processing companies. The quality testing numbers reported at the top part of Table 6.1 do not distinguish between the types of buyers. When we asked the traders in our sample if they test the milk when they buy from farmers, 76-90 percent of the traders reported to use lactometers and 76-95 percent used alcohol tests to test the quality of the milk they buy. This indicates milk quality test by rural traders is common when they procure from the farmers.

Table 6.1: Quality testing of the milk sold by the farmers

	Feb-2018	June-2021	Sep-2021
(1) Milk sold by the farmers:			
By lactometer	62.5	60.1	60.3
By alcohol test	59.8	56.8	59.5
(2) Milk bought from the farmers by rural traders:			
By lactometer	90	88.2	76.2
By alcohol test	95.0	94.1	76.2

Note: The data originate the dairy farmer questionnaire (1) or rural trader questionnaire (2). The former asked about the milk testing in the past 30 days, the latter asked whether traders typically carry out these tests. Source: Own calculation based on the dairy value chain survey data.

We then asked the farmers if at any point in the last 30 days they tried to sell milk but were not able to do so. In February 2018, five percent of the farmers responded positively to this question (Table 6.2). In June and September 2021, eight and seven percent responded positively, respectively. In February 2018, the reason why the farmers were unable to sell their milk was mainly due to difficulty in finding a buyer (44 % of the farmers who were not able to sell milk). In contrast, in June and September 2021, the most common reason was rejection by a potential buyer with 60 and 67 percent, respectively. As before, these estimates mask differences between milk buyers. Therefore, we also asked the traders in our sample to estimate the average rejection rate of liquid milk when they buy from farmers. In February 2018, the average estimate was 7 percent. In June and September 2021, traders said that only 0.5 and 0.2 percent of the milk from farmers is rejected.

Table 6.2: Share of farmers unable to sell their milk and average rejection rate of milk, by survey round

	Feb-2018	Jun-2021	Sep-2021
(1) Farmers:			
Share of farmers unable to sell their milk (%)	5.3	7.8	6.9
(2) Milk bought from the farmers by rural traders:			
Average rejection rate of liquid milk (%)	7.1	0.5	0.2

The data originate from the dairy farmer questionnaire (1) or rural trader questionnaire (2). The reference period in the former was the past 30 days, the latter asked about the typical rejection rate. Source: Own calculation based on dairy value chain survey data.

Midstream (rural traders)

We asked the rural traders in our sample if their clients tested the milk during purchase in the last 12 months. We see that quality testing at this level of the value chain has become more common (Table 6.3). In February 2018, about two-thirds of the traders reported that their milk was tested with a lactometer and 75 percent said that their milk was tested with an alcohol test. In June 2021, virtually all rural milk traders reported that their client checked the quality of the milk that they were selling with a lactometer and an alcohol test. In September 2021, traders reported that more than three-quarters of their clients used alcohol and lactometer to test the quality of the milk.

Table 6.3: Quality testing of the milk sold by the traders

	Feb-2018	Jun-2021	Sep-2021
Client checked the quality of the milk with lactometer, %	60.0	94.1	76.2
Client checked the quality of the milk with an alcohol test, %	75.0	94.1	76.2

Source: Own calculation based on the dairy value chain survey data.

We hypothesized that the milk rejection rates vary depending on who is buying the milk. Therefore, we asked the average rejection rates the traders face when they sell to processing companies and when they sell to other buyers. In February 2018, the average rejection rate when milk was sold to dairy processing companies was 5.6 percent and this had declined to 1.4 percent in September 2021. The rejection rate when selling to other types of buyers was 2.7 percent in February 2018 and 3.1 in September 2021. If milk was rejected by the buyer, the most typical reason for this was because the milk had gone sour, or the lactose content was too low.

We then asked traders to estimate the percent of the milk that they typically waste. In 2018, 67 percent of the traders reported zero percent and in June and September 2021, more than half of the traders reported zero wastage in each round. As a result, the mean wastage at this level is only 1-2 percent (median: 0 percent) in all survey rounds (Table 6.4). In June and September 2021, problems with milk quality were the most common reasons for wastage among those traders that reported wastage.[8]

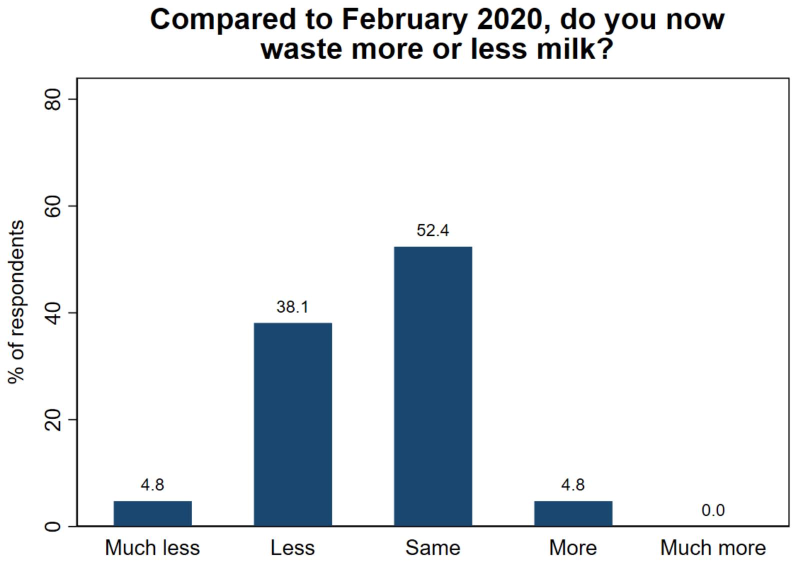
Table 6.4: Milk rejection and wastage rates reported by rural traders

	Feb-2018	Jun-2021	Sep-2021
Average milk rejection rate when selling to dairy processing companies, %	5.6	1.2	1.4
Average milk rejection rate when selling to other buyers, %	2.7	1.4	3.1
Of all the milk that you purchase, how much is typically wasted, %	2.3	1.7	1.3

Source: Own calculation based on the dairy value chain survey data.

Subjective responses on how milk wastage has changed since February 2020 suggest that if anything, rural traders are wasting less milk now than they were just before the pandemic began (Figure 6.2).

Figure 6.2: Subjective assessment on the change in wastage rate since February 2020



Note: N=21 milk traders in June-2021 survey round. Source: Own calculation based on the June-2021 dairy value chain survey data.

Downstream

Finally, we asked the retailers in our sample to estimate the share of milk that was wasted in the 7-day period before the interview (Table 6.5). In February 2018, more than 90 percent of the traders reported zero wastage and in June and September 2021 the corresponding share was 77 and 89 percent, respectively. Consequently, the average wastage rate at the retail level was very low; 0.5 percent in February 2018, 1.8 in percent in June 2021 and 0.4 percent in September 2021. The main reason for why milk was wasted was related to quality problems (80 % in June 2021 and 70 % in September 2021).

Table 6.5: Milk wastage rates reported by retailers

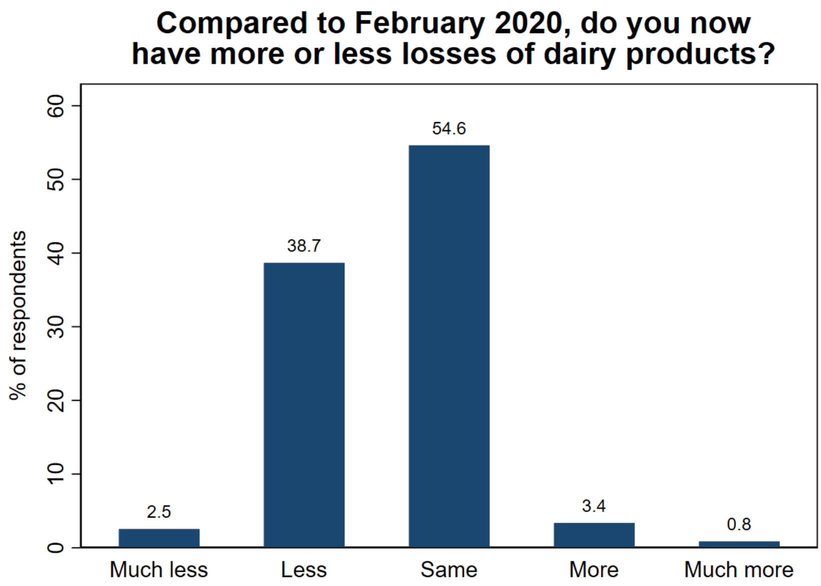
	Feb-2018	Jun-2021	Sep-2021
What is the percentage of milk that was wasted in the last week? %	0.5	1.8	0.4

Source: Own calculation based on the dairy value chain survey data.

[8] This question was not asked in 2018 survey.

Subjective responses on how milk wastage has changed at the retail level since February 2020 suggest that milk wastage have either gone down or remained the same between February 2020 and June-2021 (Figure 6.3).

Figure 6.3: Change in wastage since February 2020



Note: N=119 retailers in June-2021 survey round. Source: Own calculation based on the June-2021 dairy value chain survey data.

7. SUMMARY OF THE KEY FINDINGS

7.1. Short term findings

Our rapid assessment two months into the pandemic suggested that negative impacts of the pandemic on the dairy value chain were small to moderate (Tesfaye, Habte, & Minten, 2020). Our interviewees noted decline in urban demand for liquid milk, partly driven by the misperceptions that milk consumption was associated with increased COVID-19 infection risk. Retailers reported an increase in powdered milk sales as consumers believed that the processed product was less risky than raw milk.

7.2. Longer term findings

More than one year since the first recorded COVID-19 case in Ethiopia, our extensive phone survey data suggest that the disruption caused by the pandemic is, at best, minimal to the major urban dairy value chain in Ethiopia. In 2021, sales patterns and sales destinations among dairy farmers have remained similar to those documented in 2018. We see suggestive evidence of modest declines in credit availability and access to extension services. The same is true for the availability of daily workers, although hiring external help is relatively uncommon among dairy farmers. The main concern for the dairy farmers is the soaring feed prices that nearly doubled between February 2020 and June/September 2021.

At the wholesale level, we see no dramatic changes in dairy procurement and sales destinations between 2018 and 2021. Traders report that the competition in their sector has increased since February 2020. Availability of labor at the midstream segment of the value chain has remained similar over time. Comparison of the data collected in 2018 and 2021 reveals that the traded quantities have increased in the dairy retail sector. However, when asked to compare to the situation just before the pandemic was declared, most traders reported selling less and having fewer clients now. We see little change in labor use at the retail level across the survey years.

In line with high general inflation in Ethiopia over the past years, prices of liquid milk have increased considerably in the last three years. However, when expressed in USD terms, prices of milk have remained surprisingly stable (0.92 USD/liter in 2018 and 0.91 USD/liter in 2021). Comparing the farmgate and retail prices reveal that the farm share (i.e., the share of the final retail price that is received by the farmer) increased slightly between 2018 and 2021.

The physical quantities wasted in the value chain seem very low, which is in line with the more careful analysis conducted by Minten, Tamru, et al. (2020). If anything, the losses at the wholesale and retail level have gone down during the pandemic. However, it is important to note that we did not assess losses in terms of value or quality. On the latter, it is encouraging to see that testing the milk quality with lactometers and alcohol tests have become more common since 2018, particularly at the mid and downstream segments of the dairy value chain.

In the light of these findings, it seems that the pandemic is having negligible direct impact on the functioning of the dairy value chain. When asked to use 1 to 10 scale to rate the seriousness of the COVID-19 pandemic on their businesses, the actors in dairy value chains responded, on average less than 4 with farmers being among the least concerned about the pandemic. However, the value chain may have been indirectly affected by pandemic-related changes, because of disruptions in regional and international trade due to COVID-19, possibly contributing to the observed increases in input costs.

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