PRODUCTIVITY IN ALCP DAIRY SUPPLIERS

IMPACT ASSESSMENT

PERTAINING TO MILK YIELD, INCREASED HERD SIZE AND UNDERLYING REASONS FOR BEHAVIOUR CHANGE

ALCP Alliances Caucasus Programme
REGIONAL MARKET ALLIANCES IN THE SOUTH CAUCASUS

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ABSTRACT

The increased productivity identified amongst ALCP dairy suppliers in this impact assessment will not be added to the programme impact tally due to the overlapping amongst interventions for which impact has already been calculated. Why then did we conduct a statistically significant impact assessment?

In 2017 at the behest of the donor SDC, a new productivity indicator and target (10%) was added to the log frame for productivity increases in milk, meat, wool and honey, against which we needed to report, in addition to other mostly economic or scale indictors. We also wanted to complete the detailed picture we had formed of the ALCP farmer dairy supplier (treatment group) over the years and to build up a more comprehensive picture of those farmers keeping dairy cows who do not supply ALCP facilitated factories (control group). We wanted to compare the difference in motivations and outlooks between the two groups. We wanted to quantify qualitative statements made by farmers and the factories they supply regarding increased production recorded during routine results measurement and further triangulate impact recorded for interventions in the inputs sectors of veterinary inputs, nutrition, breeding and agri information (Annex 1).

This study which compared treatment farmers supplying four ALCP dairies in two regions and four vastly different municipalities[1] and their respective control group farmers, has provided convincing evidence to prove the hypothesis that *farmers selling raw milk to programme facilitated dairies are more likely to purposefully improve their husbandry practices and invest more to increase their herd sizes and milk yield in comparison to farmers who do not sell raw milk to the mentioned factories*. Overall, the treatment farmers had a 13% increase in milk yield over control farmers, increasing their yield by 20% and control farmers by 7%. 22% more treatment farmers increased their number of cattle. 69% of treatment group farmers compared to 47% control farmers increased the number of milking cows, by 2.5 compared to 1.2 in the control group. Thus, the attributable difference is 1.3 milking cows at 13% more productivity, which means 2,418 liters of additional milk produced per year per beneficiary household amounting to 1,954 Gel net[2].

However, the herd numbers and yield of the control farmers has also increased albeit to a lesser extent. It seems that the 'control group' has also been impacted by the growth in the dairy SME sector in Georgia; by the subsequent demand for raw milk and by improved availability of agricultural inputs much of which are at least partly attributable to the programme. In fact, the programme was unable to find control groups to reflect the baseline situation found before 2015; that of small-scale dairy farmers who were mostly making and selling home-made

[1] Sub alpine in Khulo, grassland plateau in Tsalka, semi lowland village in Tsinskaro and lowland peri-urban in Rustavi, Gardabani.

[2] Based on an average milk price of 0.9gel/l and increased costs per beneficiary HH of 222 gel.

cheese based on a minimal inputs regime. Most farmers now have access to the sale of raw milk and most farmers now have access to quality veterinary, breeding, nutrition, machinery services and agri information, access which was severely limited or non-existent when the programme started working in the targeted regions. According to this impact assessment, 65% of control farmers interviewed are now regularly supplying raw milk in the ALCP targeted region from a combined three region baseline of around 28%[3] for all farmers. Factoring in SME factories with dedicated suppliers we can conjecture that around 70% of all small scale farmers are now selling raw milk to a third party.

The difference between treatment and control group farmers comes into sharper focus when analyzing the reasons behind herd retention and increase and application of inputs. Treatment farmers supplying to fully compliant cheese factories are focused on increasing their productivity to sell more milk and increase their income, whereas control group farmers overwhelmingly see dairy farming as the farming activity with lowest risk. Applications of inputs amongst the treatment group appear more purposeful, with more money spent on more and better nutritional inputs in the treatment group, more retention of female calves, more money spent on new milking cows and more consultations with veterinarians. Reflecting the stability and security offered by supplying to a dedicated dairy.

The study however, indicates an overall development in the dairy sector in the target regions. We can conclude that compared to the baseline in 2011, the majority of all farmers are more likely to be selling raw milk, investing in increased milk productivity and increasing their herds and the vast majority, 83% of treatment and 80% of control farmers are positive about this investment and the future of this livelihood, investing the income derived from it into improving their standard of living within their homes and into their families, mostly in terms of education.

[3] Combined for AJ, KK and SJ from this study and other ALCP surveys including impact assessments and Focus Groups.

1. Purpose of the Research

The ALCP has been working in the dairy and meat sectors in four regions of Georgia since 2008 in Samstkhe Javakheti, Kvemo Kartli and Ajara since 2011 and 2014 respectively and in Kakheti since 2019. The programme's work has generated sizeable impact in the dairy sector, reaching up to 25,000 milk supplier households who have to date generated approximately USD 6.7 million from selling raw milk to 41 ALCP facilitated enterprises. 300 decent jobs have been created (of which 121 are due to crowding-in) generating 4.3 million Gel / 1.8 million USD in salaries. The ALCP enterprises themselves have generated 17.3 million Gel / 7.2 million USD in net attributable income. This impact assessment is an attempt to capture the changes in livestock husbandry practices in dairy farmers supplying to four ALCP factories, in two regions in Georgia, measuring attribution by analyzing data of beneficiary (treatment) and non- beneficiary (control) farmer groups.

The ALCP created a model for the sustainable development of Small and Medium Enterprise (SME) dairy factories based in and equitably[4] supplied by local communities, which included the development of commercial Food Safety and Hygiene (FS&H) and Business Development Services (BDS) consulting services. The programme's systemic approach to the development of the livestock sector also made sure that the inputs and services (breeding, nutrition, veterinary inputs and agri information) to improve production were available and accessible for farmers supplying ALCP facilitated factories and more broadly across Georgia[5].

The local factories buying raw milk from regular suppliers have been exceedingly important in rural areas, providing vital income to communities. This income has allowed farmers to invest in both their livelihoods related to livestock production as well as in family, education, health and leisure[6]. Investments in livestock production and husbandry have including buying more cows, improving cattle sheds, improving cattle breeds, farm and dairy equipment, nutrition and feed production.

While it is now difficult to separate out and find farmers who have been completely unaffected by the ALCP interventions (as many of the input interventions have had a national outreach and the programmes dairy factory facilitation model has been adopted as fairly standard by both government and other development entities), the programme believed that suppliers of the fully facilitated ALCP dairy factories have been more motivated to increase production in terms of larger herd sizes and improved husbandry practices than dairy farmers not supplying to ALCP factories[7].

There was convincing evidence that farmers selling regularly and securely to programme facilitated dairy enterprises were more likely to invest more to increase their herd sizes i.e. TOTAL YIELD and to improve their husbandry practices i.e. YIELD PER COW (breeding, nutrition, veterinary inputs) than farmers not supplying to the

[4] The programme recognized that the proper inclusion and capacity development of women suppliers who predominantly milk and produce dairy products was vital to the model. 80% out of 25,000 beneficiaries of the dairy interventions are women and the benefits to families, children and communities have been profound.

[5] From 2008 the ALCP has generated more than 73 million Gel / 31 million USD additional income for 636,296 beneficiaries: 478,604 farmers benefited from the ALCP facilitated veterinary interventions reaching 96% of Georgian farmers, 4,530 from breeding, 51,675 from nutrition, 68,268 from machinery, 283,261 from agri information (61%), 24,131 from dairy, 21,464 from meat, and 5,090 from wool.

[6] For more information about the ALCP impact on the dairy sector, please see the following reports - Better Cheese Better Work: The Alliances Caucasus Programme's Impact on Informality and Working Conditions in Georgia's Dairy Sector (ILO) and Testing Tools For Assessing Systemic Change: Outcome Harvesting The ALCP Project In The Georgian Dairy Industry (USAID)

[7] This hypothesis was based on the analysis of programme data from 2008 –to date. Please, see Annex 1 a comparative study of programme sources table.

factories, based on a comparative analysis of the programme's systematic data collection from 2011 to date as shown in Annex 1. The programme believed that programme dairy suppliers were more purposeful and positive in their attitude to livestock farming going forward and more systematic in their application of inputs for further development. Figure 1 below outlines the hypothesis.

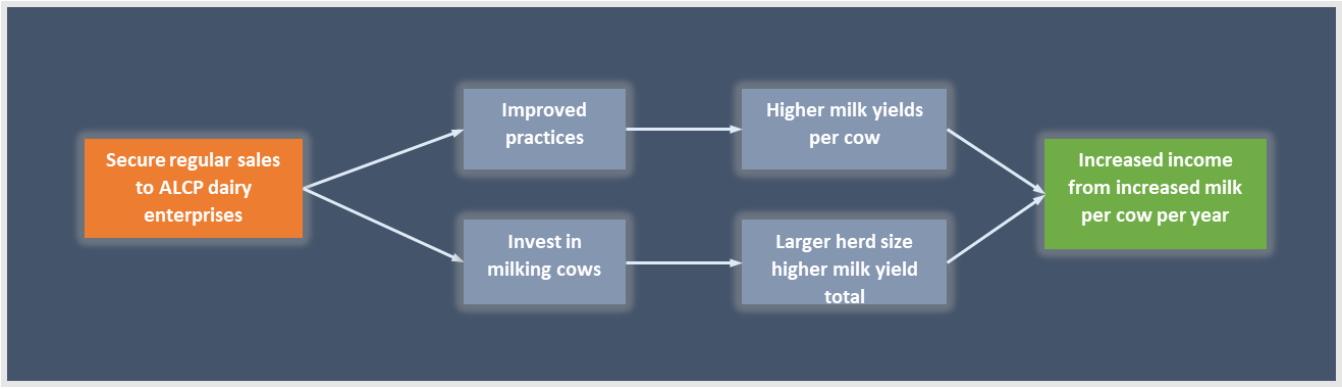

Figure 1 Milk Yield Survey Hypothesis

2. METHODOLOGY

In total, 130 interviews were conducted with treatment and control group farmers using a semi-structured questionnaire with quantitative and qualitative questions including their level of positivity towards livestock production (Please see Annex 2). The selected treatment group farmers were suppliers to four ALCP facilitated dairy enterprises, Tsezari, Tsinskaro Plus and Milkeni in Kvemo Kartli region, and Natural Produktsia in Ajara. The following factories were selected purposefully as they are current clients of the programme and the ALCP had better access to their beneficiaries.[8] The control group farmers were selected as those with a similar baseline situation[9] before the intervention started; in herd size, breed and husbandry practices, who were not regularly selling milk to programme dairy enterprises and were either selling raw milk to other dairies/intermediaries or producing dairy products for sale.

2.1 SAMPLING

In total, 65 treatment group farmers were selected randomly from supplier lists provided by the programme dairies (Table 1 below). 65 control group farmers[10] were selected using snowballing technique in the villages in which the enterprises' dairy suppliers were based. The baseline was retrospective, set for treatment and control group farmers by asking them to recall information about their husbandry practices, production and sales before the interventions started. The assessment has a 90% confidence level and 10% margin of error. The baseline years were assigned respectively to the enterprise starting year and end-line year as 2019[11].

[8] Otherwise, there is no significant difference between these and other ALCP supported dairy factories in Kvemo Kartli and Samstkhe Javakheti. All programme-supported factories have the same business model and results can be generalized.

[9] 65% selling home-made dairy products (35%) selling milk irregularly

10 Control group farmers have similar baseline situation in herd size, breed and husbandry practices and who are not selling to the dairy enterprises supported by the program.

[11] Treatment and control group had the same baseline for each factory/village. However, the baseline year varies across factories, which creates slight inconsistency in sampling methodology.

Table 1 Sampling per Enterprise

Table 1	Name of the Enterprise	Existing # of farmers	Treatment sample	Treatment farmers	Control farmers	Intervention starting date / Baseline
KK	Tsezari	250	24%	15	15	2011
KK	Milkeni	251	24%	16	16	2014
KK	Tsintskaro plus	246	23%	15	15	2016
AJ	Natural Productsia	304	29%	19	19	2015
Total		1,294	65	65	65	

2.2. ANALYSIS

We assessed the attributable changes in yields and herd size by using the difference in difference calculation as in Table 2.

Table 2 Attribution Calculation

Table 2: Difference in Difference Calculation	Retrospective Baseline	End-line (2019)
Treatment - Avg. Milk Yields	B1	E1
Control - Avg. Milk Yields	B2	E2
Treatment - Avg. No. of Cow	B3	E3
Control - Avg. No. of Cow	B4	E4
Attributable Increase in Milk Yields	(E1-B1) -(E2-B2)	
Attributable Increase in No. of Cows	(E3-B3)-(E4-B4)	

3. MAIN FINDINGS

The study identified that both groups had increased herd size and improved the productivity of their milking cows. The treatment group farmers increased more in both components than the control group farmers did. Compared to the control group farmers, they have made decisions that are more purposeful when it comes to nutrition, breeding and veterinary practices. As the result, they have stable source of income from livestock and are more hopeful towards future. However, the attributable difference is not as significant as was expected by the programme as it seems that both treatment and control group farmers have benefited from the overall development of the dairy sector with both groups having access to opportunities to sell raw milk, and increased availability of quality inputs including ALCP facilitated nationwide veterinary, information and increasingly nutrition.

The majority of treatment and control group farmers (83% and 80%, respectively) were positive about the idea that investing more in livestock is a worthy and profitable activity. They reported that they have spent income from selling milk mostly for their family to improve their living conditions and to pay study fees for children.

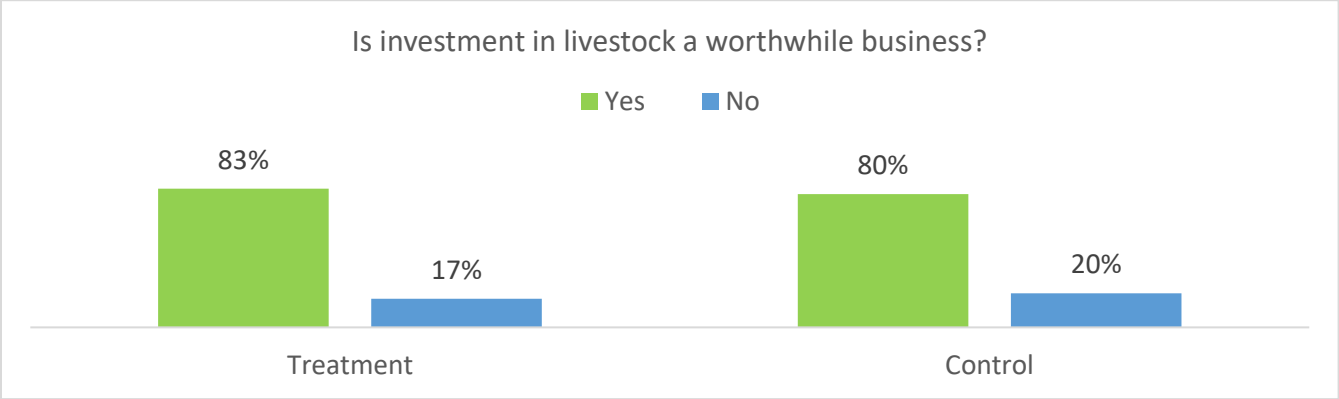

Figure 2 Perceptions regarding Investments in livestock

According to the respondent's narratives from both groups, they regarded livestock husbandry and selling milk as the best way to get income compared to other agricultural activities in the village. Both groups, but especially treatment group farmers, were positive about their future plans. They stated that they are going to stay and continue doing this business namely selling raw milk to the factories, keeping livestock and investing in increased production.

3.1 INCREASE IN HERD SIZE

The majority of treatment group farmers have increased their herd size.

Answers to the question *have you increased the number of milking cows since the baseline year or not* significantly differed between interviewed treatment and control farmer groups: 69% of the treatment farmers had increased their number of milking cows compared to 48% of control group farmers.

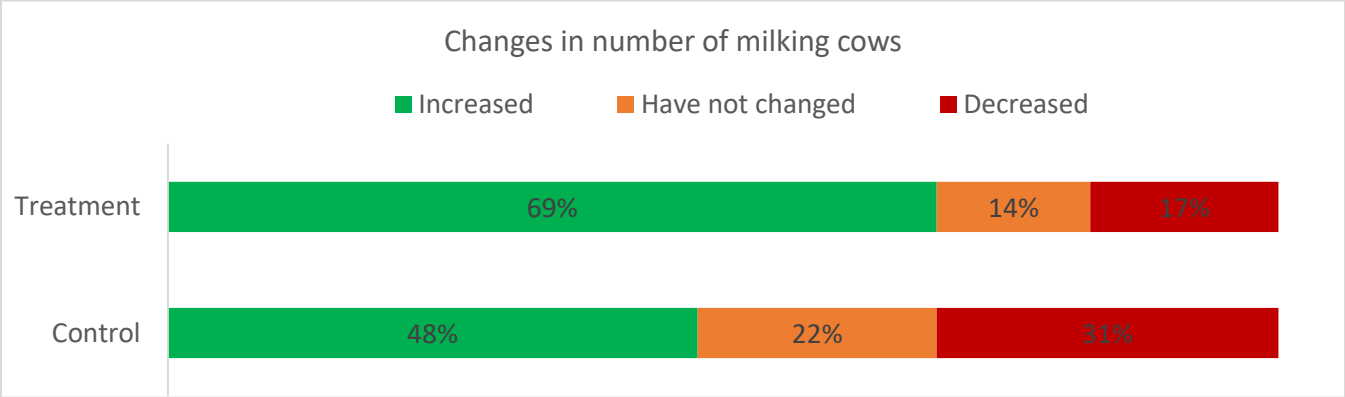

Figure 3 Changes in number of milking cows

An increase in the number of cattle and cows was evident in both groups. Treatment group farmers have increased their cattle and cows on average by 2.5 cattle (from 9.4 to 11.9) and 1.8 cows (from 3.9 to 5.7) since the baseline year. Control group farmers increased the number of cattle by 1.2 cattle (from 8.1 to 9.3) and the number of cows

by 0.5 (from 4.2 to 4.7). The difference in difference approach[12] was then applied, comparing the increase in the number of cattle/ cows between treatment and treatment and control farmers. As a result, we get the difference 1.3 for cattle and cows, attributable to the program.

Table 3 Increase in the Number of Livestock

Table 3	# of Cattle		# of Milking cows		#Cattle	#Cows
	Baseline	Endline	Baseline	Endline	Increase	
Treatment	9.4	11.9	3.9	5.7	2.5	1.8
Control	8.1	9.3	4.2	4.7	1.2	0.5
Attributable to the program					1.3	1.3

Additionally, the study tried to find out the reasons behind, increasing, keeping the same or decreasing the number of milking cows since the baseline year. It seems that treatment farmers are prioritizing milk sales and income compared to control. 21% percent more treatment farmers (40%) quoted the opportunity to sell milk regularly as their prime motivation for increasing the number of milking cows, the second (34%) being to gain more income. The highest percentage of control farmers (31%) prioritized the perceived reduced risk of dairy farming as opposed to 16% treatment. Only control farmers mentioned making cheese for an improved market and increased family demand.

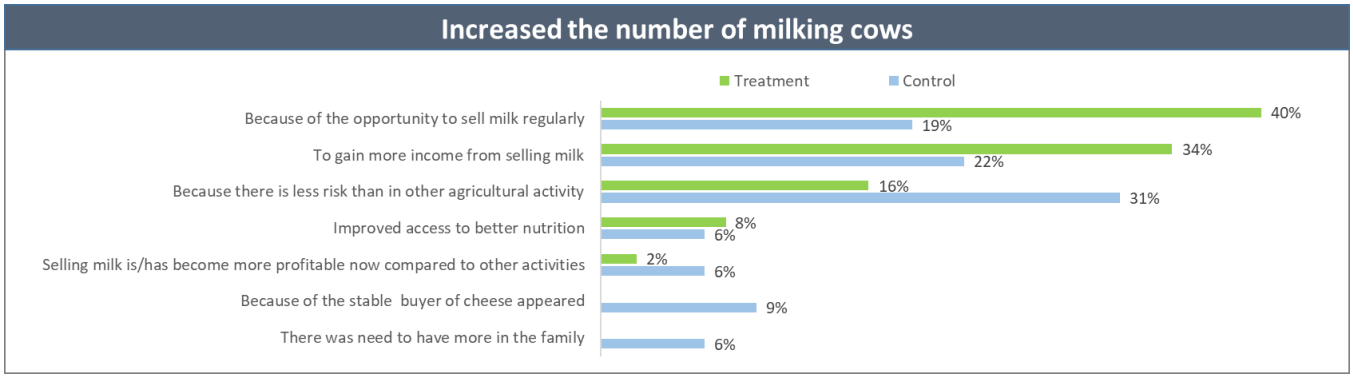

Figure 4 Reasons for increasing the number of milking cows

14% of treatment and 22% of control farmers maintained the same number of cattle. Of these 67% of control farmers and 50% of treatment farmers reported that they could not take care of more cattle due to health problems/old age or having no one to assist with the farm duties. The remaining treatment farmers and 20% of control farmers stated other business/tasks/work as the reason. 17% of treatment and 31% control had reduced the number of their milking cows. Selling a cow due to need for money was the main reason for both treatment (75%) and control (50%) farmers. Highlighting the role of livestock as a form of capital to be utilized in times of need. It is interesting that 13% of control farmers mentioned that they were orientated on fattening calves for selling meat presumably showing a diversification to meat rather than dairy in lieu of regular sales of milk.

[12] The mentioned method tries to exclude the counterfactual, i.e. what would have happened anyway, if the programme facilitated dairy enterprises have not created access to market for the farmers. In our case the counterfactual was control group data.

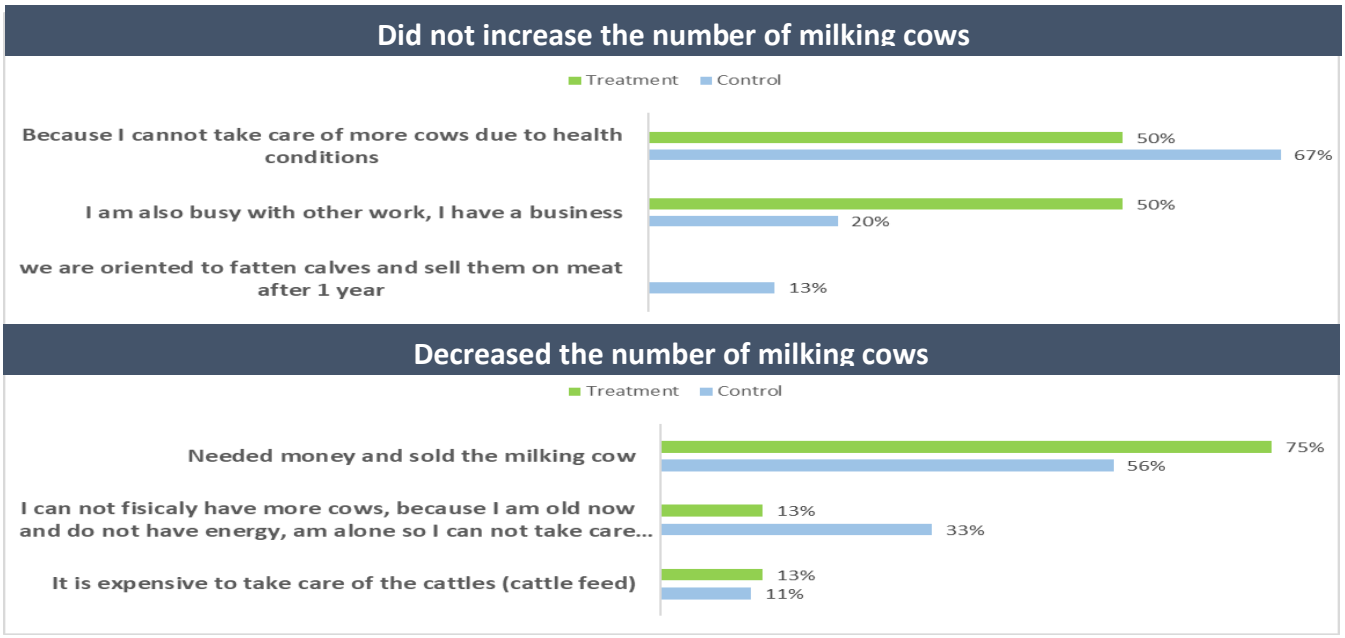

Figure 5 Reasons for not increasing/decreasing the number of milking cows

3.2 INCREASE IN MILK YIELD

The study indicated that both groups slightly increased milk yield. The treatment group farmers had a higher increase than the control group farmers; increasing their cow's daily milk yield during both high and low milking seasons[13] by 1.7 and 0.9 liters respectively, which equals a 20% increase. Control farmers increased by 0.6 and 0.3 liters' a 7% increase. Based on the difference in difference approach of measuring attribution, 1.1 liters (high milking season) and 0.6 liters (low milking season) per day increase to the suppliers of ALCP dairies is attributable to the programme.

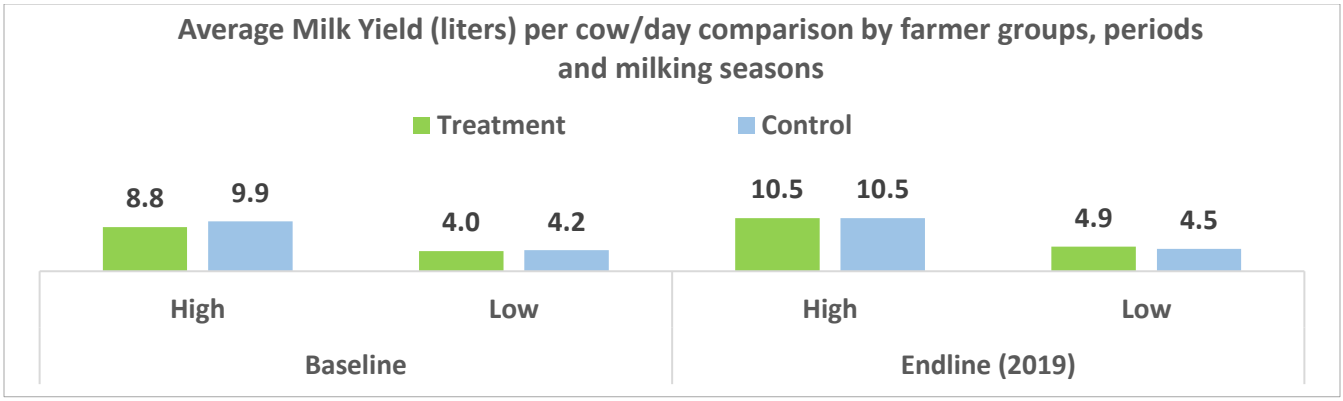

Figure 6 Average Milk Yield (liters) per cow/day comparison by farmer groups, periods and milking seasons

[13] 7 months was determined as milking period of single cow from which high milking season continues on average for 4 months, while low milking season lasts for 3 months

We tried to examine whether the variation could be explained by differences in the application of inputs in treatment and control group farmers. The data shows that one treatment group farmer has used on average four agricultural practices, while the control group farmer has used three: the main difference is in applied nutrition practices: 74% of the treatment group farmers mentioned to have applied at least one of the nutritional practices against 53% of the control farmers. There was a little difference in other two categories, applying breeding (72% treatment, 75% control) and veterinary (75% treatment, 80% control) practices.

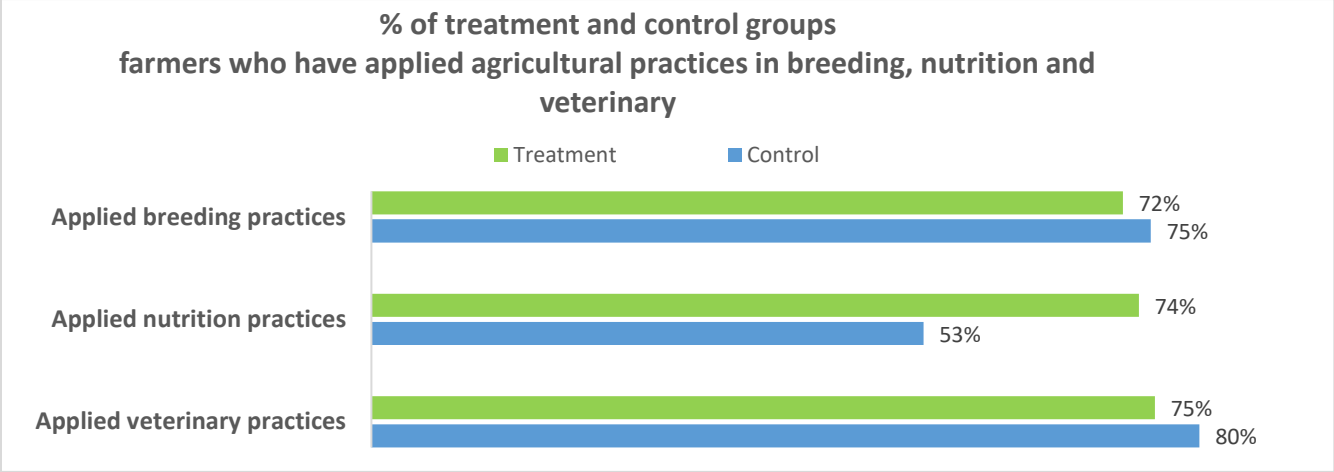

Figure 7 Comparison between treatment and control group farmers usage of three main applied inputs

The data allowed us to look in-depth at each of these components to find out what farmers mean by applying improved livestock husbandry practices. In terms of nutrition, the difference is apparent: the treatment group farmers used more improved nutrition than control group farmers did in every component. They reported that they feed more of existing feeds (e.g. hay, bran, maize stover) and they also added new feeds (e.g. brewers grain, alfalfa, combined feed, milled grains) to their livestock's diet to improve its productivity.

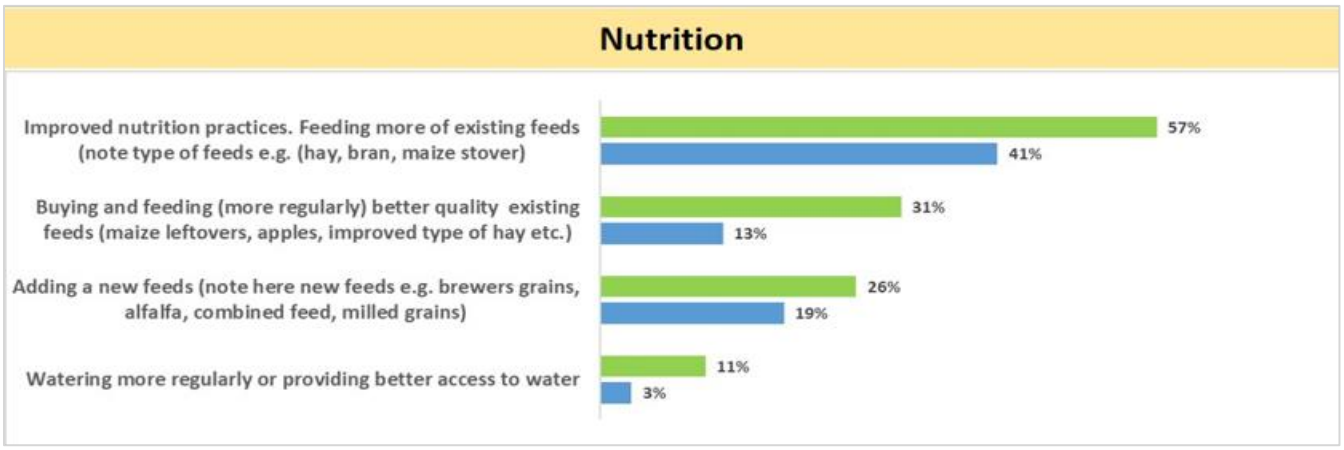

Figure 8 Improved practices in nutrition

Improved breeding and veterinary practices are used by the same percentage of farmers in both groups. However, it seems that the treatment group farmers choose more productive and efficient improved breed and veterinary services than the control group farmers. Selecting and retaining female calves for milking was the most frequently named activity (52%) among treatment farmers. Managing breeding cycles to ensure milk production all year round was most commonly named by control farmers (33%). Around 1 in 4 farmers in both farmer groups had bought better quality milking cows for improved milk productivity. However, the treatment group farmers pay more for better quality cows, which means that they buy higher quality breeds. Also, more treatment group farmers had used improved bull services (18%) than control (6%), with slightly more control group farmers having used AI (%). The ALCP has experience working in both areas and programme data shows that the AI services are not well developed and efficient in Georgia for small farmers, compared to the improved bull services. Hence, it is more likely that treatment group farmers would benefit more from improved bull services than the control group farmers with AI.

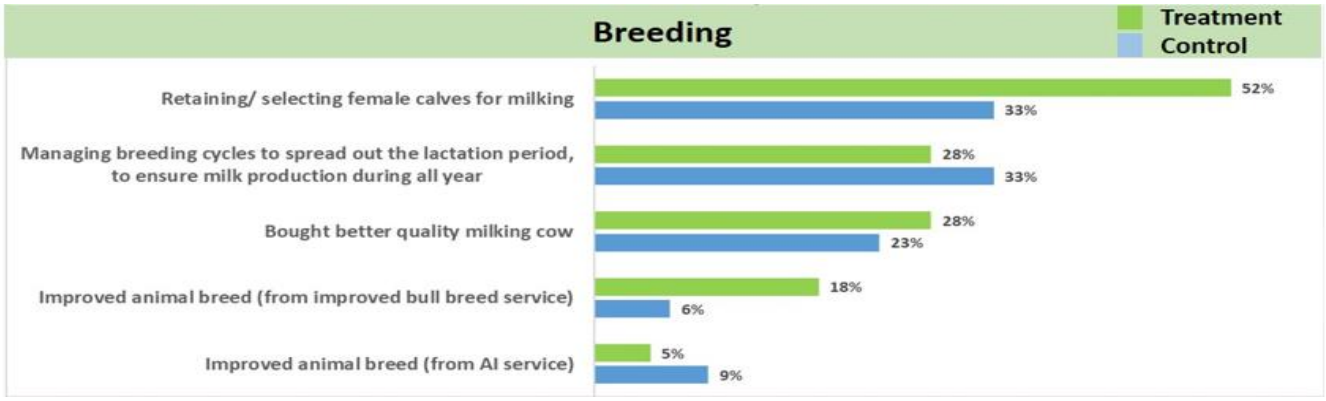

Figure 9 Improved practices in breeding

The majority of farmers in both groups used regular anthelmintic treatment. However, the treatment farmers use veterinary consultation more frequently (51%) compared to the control farmers (27%) which indicates treatment or inputs for other conditions or general health/productivity other than parasites. In most cases, veterinary consultation services are available for free at the ALCP supported ROKI vet pharmacies which are distributed across Georgia.

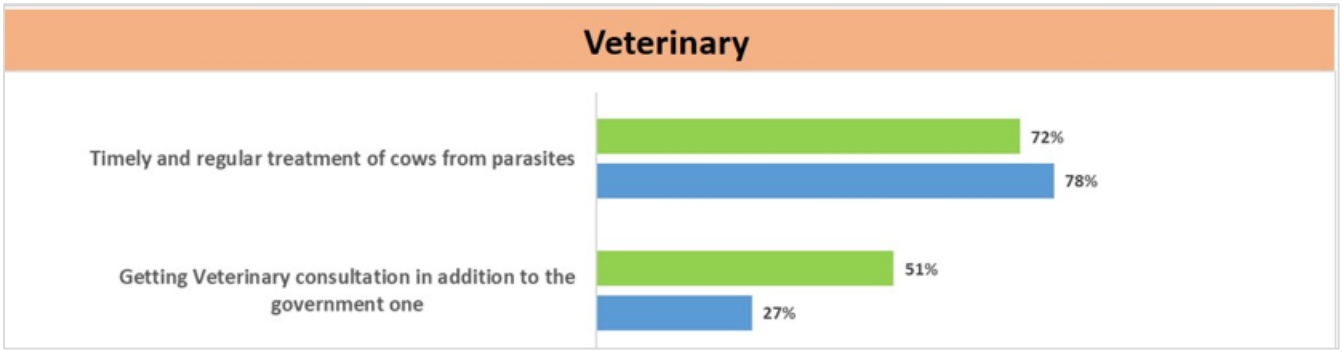

Figure 10 Improved practices in veterinary

3.3 LIVESTOCK HUSBANDRY EXPENSES

In terms of the average costs of taking care of one milking cow per year, one treatment farmer spends 24% more per year compared to the control farmer. In total, treatment farmers spend 171 Gel more on one milking cow annually than the control farmers. The major difference comes from the breeding component where treatment farmers have bought a new better breed milking cow more often than the control farmers. Feeding and veterinary costa are almost identical.

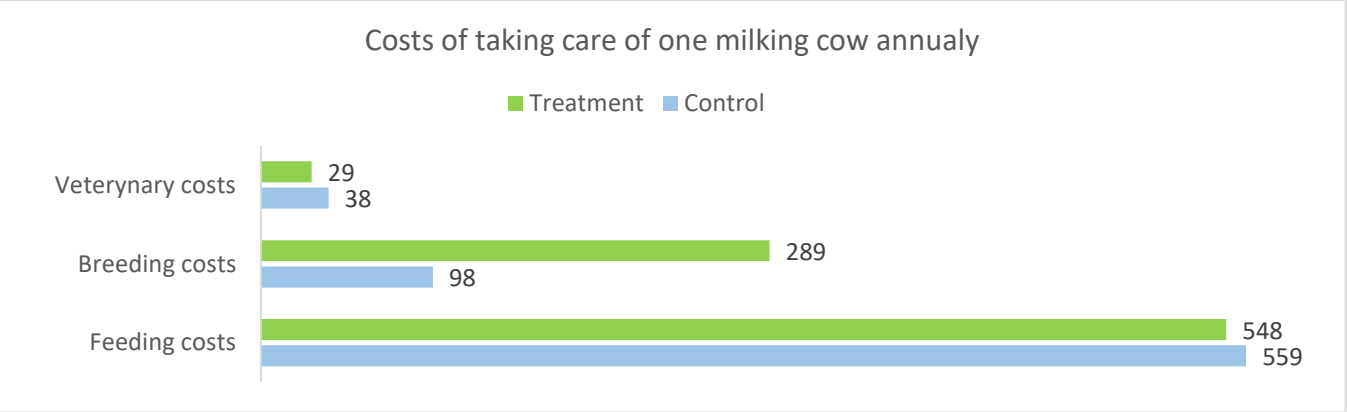

Figure 11 Costs of taking care of one milking cow annually

3.4 SUMMARY FINDINGS

Overall, the treatment farmers have had a 20% increase in milk yield per milking cow and control farmers 7%. 69% of treatment group farmers have increased the number of milking cows since the regular sale of raw milk to ALCP dairies compared to 48% of control group farmers, with 14% fewer treatment farmers decreasing their number of cows.Thus as the dairy sector currently stands, regularly selling milk to an ALCP facilitated factory rather than selling milk to another type of entity or making cheese results in 1.3 more milking cows per household producing 2,418 liters of additional milk produced per year per beneficiary farmer[14].

The average price of raw milk is 0.9 Gel, which means that on average treatment farmers generate 2176 Gel from increased milk production[15], however they have increased costs as well (171 Gel per milking cow) amounting to 222 Gel per beneficiary household per year. Hence, the net attributable income amounts to 1,954 Gel.

[14] This was calculated as indicated in the methodology of the study, using difference in difference approach which in this case analyzed average increase in annual milk produced by cows per household comparing baseline and end line years both for treatment and control farmer groups; The difference between the increase made 2,418 liters of milk to the favor of beneficiary farmer attributable to the program. However, in terms of reporting results, the treatment farmers are probably 100% overlapped with other interventions and some of the control farmers could also be the ALCP beneficiaries of other interventions. Hence, the scale and NAIC from increased productivity and increased milk yields are already captured and reported in the previous impact assessments. Thus, to avoid double counting the programme will not report NAIC from the increased milk yield.

[15] Based on the attributable impact of 1.3 cows and 2418 litres.

4. CONCLUSION

To conclude, the impact assessment showed that the increase in the number of milking cows and milk yield has been higher in dairy beneficiary farmers compared to non-beneficiary farmer. It was observed, that treatment group farmers are more likely to purposefully improve their husbandry practices: they invest more money in nutritional inputs and milking cows; they have more consultations with veterinarians and they have a more secure and stable source of income from selling raw milk, than the control group farmers.

Another important finding is that both groups have improved their husbandry practices and invested more to increase their herd sizes and milk yield. If we compare the current situation with the baseline in 2011, it is obvious that both, treatment and control groups have benefited from the overall development in the livestock sector, because all of them are using improved agricultural inputs, most of them are supplying raw milk, have more cattle and have regular, safeguarded income. This makes it difficult to isolate ALCP attributable impact, but its contribution to the overall development is apparent.

At this point, the trajectory of dairy sector development is promising. Currently, the majority of farmers are investing in dairy and they have access to the means to do so, most farmers have the opportunity to sell raw milk and have access to inputs. For poorer rural inhabitants too dairy farming still provides food security and the lowest risk method of income generation. Cattle are still used as a form of capital that can be liquidized in times of need. All of the above indicates that the formalization of the dairy sector is developing in the right direction.

ANNEX 1: ALCP BENEFICIARY DATA REVIEW 2011-2019 CATTLE NUMBERS AND MILK YIELD

Average Figures Per Enterprise Based on Figures as Recorded in Table 1 Below	Tsezari Ltd	Tsalka + Kakhadze	Milkeni	Natural Productsia	Tsinskaro Plus
Increase In Number of Cattle %	5.6 to 9.5 Change: **+3.9, 70%**	5.6 to 9.5 Change: **+3.9, 70%**	4.5 to 9.5 Change: **5.0, 110%**	6.2 to 9.9 Change: **3.7, 59%**	6 to 9.5 Change: **3.5, 58%**
Increase In Number of Cattle % **(Non-beneficiaries)**	5.1 to 3.8 [16]Change:**-1.3, -26%**			2.9 to 2.7 Change:**-0.2, -7%**[17]	5.1 to 3.8 Change:**-1.3, -26%**
Increase In Number of Cows, %	1.5 to 4.8 cows; Change: **+3.3, 217%**	1.5 to 5.8 cows; Change: **+4.3, 283%**	2.2 to 5.3 cows; Change**: +3.1, 139%**	2.8 to 4.2 cows; Change**: +1.4, 48%**	4 to 4.8 Change**: +0.8, 19%**
Increase In Number of Cows, % **(Non-beneficiaries)**	2.3 to 3.6 Change:**-1.3, -37%**[18]			1.7 to 1.6 Change:**-0.1, -8%**[19]	2.3 to 3.6 Change:**-1.3, -37%**
Increase In Milk Yield, %	6.5 to 7.8 liters; Change: **+1.3, 21%**		6.5 to 8.3 liters Change: **+1.8, 27%**	6.5 to 6.7 liters Change: **+0.2, 3%**	7.8 to 7.8 liters Change: **+0, 0%**
High season	8 to 9.3 liters; Change: **+ 1.3, 16%**		8 to 10.3 liters Change: **+2.3, 28%**	8 to 9.0 liters Change: **+1.0, 12%**	9.3 to 9.3 liters Change: **+0, 0%**
Low season	5 to 6.3 liters; Change: **+1.3, 25%**		5 to 6.3 liters Change: **+1.3, 25%**	5 to 6.0 liters Change: **+1.0, 19%**	6.3 to 6.3 liters Change: **+0, 0%**

[16] Data from Impact Assessments conducted by the programme in 2014, 2016 in Kvemo Kartli; 2011 and 2016 years' data is compared
[17] Impact Assessment in Ajara 2016, includes comparison of data of 2014 and 2016 years with a recall to 2014 year
[18] Data from Impact Assessments conducted by the programme in 2014, 2016 in Kvemo Kartli; 2011 and 2016 years' data is compared
[19] Impact Assessment in Ajara 2016, includes comparison of data of 2014 and 2016 years with a recall to 2014 year

Table 1 review of all repetitive monitoring data from 2011-2019 for respective enterprises

Data review of MP1+2's for all listed **dairy** enterprises plus for **veterinary, combined feed, machinery** and **breeding**	**Tsezari Ltd**	**Tsalka + Kakhadze**	**Milkeni**	**Natural Productsia**	**Tsinskaro Plus**
Intervention dates and measuring period	5/2012 – 4/2017	04/2013- to date	09/2015-to date	09/2015-12/2017	12/2016- to date
Baseline (insert date)	**2011**	**2012**	**2014**	**2015**	**2016**
No of interviewees	35 (30% women)	32 (50% women)	31 (50% women)	6 (50% women)	12 (50% women)
Baseline Statement (inc ref to investment in/increase in number of cattle and milking cows plus use of/investment in inputs that would increase milk yield i.e. feed, veterinary inputs, breed)	No veterinary service nearby		Limited veterinary service nearby		Vet service available
	- Do not use veterinary inputs - Can't afford extra feed - Make hay by hand - Breed is unimproved				- The enterprise collects limited amount of milk Milk supply is higher than demand
	- The enterprise collects limited amount of milk and there are problems with hygiene - Milk supply is higher than demand			- No dairies within the municipality - Farmers do not have access to the raw milk market	
No of cattle	69% - 4; 25% - 8; 6% - 14[20]		72% - 2; 20% - 7; 7% - 24[21]	65% - 4; 26% - 8; 9% - 17[22]	6[23]
No of milking cow	1-2	1-2	2.2	2.8 [24]	4[23]
Amount of milk/cow/day	5 - low milking season	5 - low milking season 8- peak milking season[25]	5 - low milking season 8– peak milking season[25]	5 - low milking season 8 – peak milking season[25]	52%-5.5[26] 14% - 8.5[27]

[20] Focus Group Survey Kvemo Kartli 2011

[21] Focus Group Survey Kvemo Kartli 2014

[22] Focus Group Survey Ajara 2014

[23] MP1&MP2 Tsintskaro Plus. The baseline data is high as *ROKI*, nutrition and breeding interventions had already influenced No of cattle, cows and milk yield in the area where *Tsintskaro* plus has been collecting milk.

[24]MP1, randomly selected 61 farmers from Khulo

[26] The % calculation was taken from *ALCP* Impact Assessment 2016 Kvemo Kartli. As of the milk yield, it was calculated based on *ROKI*'s MP2 intervention result in increased milk yield by 5-15%. The average was taken 10%-0.5 litre/day/cow and added to 5 litre/day/cow baseline data

[27] The % calculation was taken from *ALCP* Impact Assessment 2016 Kvemo Kartli covering those who used veterinary and nutrition. The milk yield data were summed up from results of *ROKI*'s and nutrition's interventions M2s. Those who used veterinary and nutrition together got increased milk yield by 3.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

	8– peak milking season[25]				2% - 9.5[28] low milking season. 52%-8.5 14% - 11.5 2% - 13.5 peak milking season[29]
Measurement 1	**2014**		**No intervention**		
No of interviewees	30 (30% women)	12 (50% women)			
Statement	- Veterinary service exists nearby - Farmers use veterinary inputs - Farmers afford and invest in extra animal feed to increase milk yield and to supply more milk - Make hay by machinery equipment - Breed is improved - SSLP farmers try to keep female new born improved breed calves to increase milk yield - The enterprise collects more amount of milk. - Farmers have motivation to buy milking cows. - Livestock husbandry became more profitable. - Milk suppliers save and collect some money - Anthelmintics used and preventive measures against external parasites increased resulting in Milking and live weight increase by 5–15 %[30] - 40% of farmers learned about mastitis and other cattle diseases to avoid milk yield decrease.[30]				
No of cattle	Increased by 15%[31] 6.44 on average (+15% increase in cattle) 69% - 4.6 25% - 9.2 6% - 16. 1#				
No of milking cows	6.53[31] (+335%)				
Amount of milk/cow/day	7 on average (+8%)				

[25] Dairy Productivity Measurement of Improved Cows in First Lactation Period- *IAAD*. 2015

[28] The % calculation was taken from *ALCP* Impact Assessment 2016 Kvemo Kartli covering those who used veterinary, nutrition and improved breeds. The milk yield data were summed up from results of *ROKI*'s, nutrition's and improved breed's interventions M2s. Those who used veterinary, nutrition and improved breeds together got increased milk yield by 4.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

[29] The % and milk yield calculation is made in the same way as mentioned above with the only difference of considering increase in milking yield due to high milking seasons based on Dairy Productivity Measurement of Improved Cows in First Lactation Period- *IAAD*. 2015

[30] 15 respondents, 30% female, *ROKI* MP2 KK

[31] *ALCP* Impact Assessment 2014 Kvemo Kartli

	5.5[32] low milking season (+10%) 8.5[33] peak milking season (+16%) 10% [34] -9 low milking season 10% - 12 peak milking season				
Measurement 2	**2016**				**No intervention**
No of interviewees	12 (50% women)	12 (50% women)	12 (50% women)	12 (50% women)	
Statement	- As above - An increased orientation towards livestock husbandry by households is indicated by investments in herd size and facilities, such as cattle sheds in Kvemo Kartli.[35] - Farmers renovated their cattle sheds to make room for new cows.				
No of cattle	10.84[35] (+94%)	10.84[35] (+94%)	-	-	
No of milking cows	5.92[35] (+295%)	5.92[35] (+295%)	-	-	
Amount of milk/cow/day	low milking season. (+25%) 52%-5.5[36] 14% - 8.5[37] 2% - 9.5[38] peak milking season [39] (+16%) 52%-8.5 14% - 11.5		low milking season (+25%) 52%-5.5 14% - 8.5 2% - 9.5 peak milking season[41] (+28%)	5.5[42](-15%)	

[32] The calculation of the milk yield is based on MP2 of *ROKI*'s intervention resulted in increased milk yield by 5-15%. The average was taken 10%-0.5 litre/day/cow and added to 5 litre/day/cow baseline data

[33] Dairy Productivity Measurement of Improved Cows in First Lactation Period- *IAAD*. 2015

[34] The % calculation was taken from CF MP1, covering those who used nutrition and veterinary. The milk yield data were summed up from results of ROKI's and nutrition's interventions MP2s. Those who used veterinary and nutrition together got increased milk yield by 3.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

[35] Testing Tools for Assessing Systemic Change: Outcome Harvesting. The *ALCP* Project in the Georgian Dairy Industry 2016

[36] The % calculation was taken from *ALCP* Impact Assessment 2016 Kvemo Kartli. As of the milk yield, it was calculated based on *ROKI*'s MP2 intervention result in increased milk yield by 5-15%. The average was taken 10%-0.5 litre/day/cow and added to 5 litre/day/cow baseline data

[37] The % calculation was taken from *ALCP* Impact Assessment 2016 Kvemo Kartli covering those who used nutrition and veterinary. The milk yield data were summed up from results of *ROKI*'s and nutrition's interventions MP2s. Those who used veterinary and nutrition together got increased milk yield by 3.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

[38] The % calculation was taken from *ALCP* Impact Assessment 2016 Kvemo Kartli covering those who used nutrition, veterinary and improved breeds. The milk yield data were summed up from results of *ROKI*'s, nutrition's and improved breed's interventions MP2s. Those who used veterinary, nutrition and improved breeds together, got increased milk yield by 4.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

[39] The % and milk yield calculation is made in the same way as mentioned above with the only difference of considering increase in milking yield due to high milking seasons based on Dairy Productivity Measurement of Improved Cows in First Lactation Period- *IAAD*. 2015

[41] The data is the same for *Tsezari Ltd*. and *Tsalka* + , because this data was sourced from IA 2016 and veterinary, nutrition and breeding interventions' impact, which is common for all three enterprises. The OH average data was not added here as OH was conducted only in Tsalka and Milkeni does not supply milk from Tsalka.

[42] The calculation methodology: based on *ROKI* MP2, ROKI's intervention resulted in increased milk yield by 5-15%. The average was taken 10%-0.5 litre/day/cow and added to 5 litre/day/cow baseline data

	2% - 13.5 Average 7.9[40] (+22%)		52%-9.5 14% - 11.5 2% - 13.5		
Final	**2018-2019**				
No of interviewees	12 (50% women)	12 (50% women)	12 (50% women)	32 44% women)	12 (50% women)
Latest Statement	- As above - Farmers use veterinary inputs; Veterinary services are more developed, vets do vaccinations on time and the risk of animal diseases is decreased - 53% of the interviewed farmers in Khulo have bought 30-40% more bran after starting to supply milk. [43] - Demand for milk is high				
No of cattle	Average 9.5 [44]	Average 9.544[44]	Average 9.544[44]	Average 9.9 [45]	Average 9.5[4444]
No of milking cows	4 [46] Average 5.5[44]	6[46] Average 5.544[44]	5[46] Average 5.5 [4444]	4 [46] Average 4.3 [44]	4[46] Average 5.5[4444]
Amount of milk/cow/day	52%-5.5 14% - 8.5 2% - 9.5 low milking season. 52%-8.5 14% - 11.5 2% - 13.5 peak milking season Average 7.9		52%-5.5 14% - 8.5 2% - 9.5 low milking season 52%-9.5 14% - 12.5 2% - 13.5 peak milking season	44% - 5.5[47] 7% - 8.5[48] 1% - 9.5[49] low milking season 44% - 8.5[50] 7% - 11.5[50] 1% - 13.5[50] peak milking season Average 5.9[44]45	52%-5.5 14% - 8.5 2% - 9.5 low milking season. 52%-8.5 14% - 11.5 2% - 13.5 peak milking season Average 7.9

[40] Testing Tools for Assessing Systemic Change: Outcome Harvesting. The *ALCP* Project in the Georgian Dairy Industry 2016

[43] Impact in The Livestock Sector In Khulo 2014-2018

[44] Farmers' baseline survey GMM 2018. For Tsintskaro Plus we took the same figures as for Tsalka + and Tsezari as the enterprise started collecting milk from Tsalka.

[45] Impact in The Livestock Sector In Khulo 2014-2018

[46] Dairies' MP1

[47] The % calculation was taken from *ALCP* Impact Assessment 2017 Ajara covering those who used veterinary inputs. The milk yield data were taken from results of *ROKI*'s MP2. Those who used veterinary got increased milk yield by 0.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

[48] The % calculation was taken from *Natural Produktsia* and CF MP1s covering those who used veterinary and nutrition. The milk yield data were summed up from results of *ROKI*'s and nutrition's interventions MP2s. Those who used veterinary and nutrition together, got increased milk yield by 3.5 litres/day/cow and it was added to 5 litres/day/cow baseline.

[49]. The % calculation was taken from *ALCP* Impact Assessment 2017 Ajara covering those who used veterinary and improved breeds. The milk yield data were summed up from results of *ROKI*'s and improved breed's interventions MP2s. Those who used veterinary and improved breeds together, got increased milk yield by 4.5 litres/day/cow and it was added to 5 litres/day/cow baseline

[50] Dairy Productivity Measurement of Improved Cows in First Lactation Period- *IAAD*. 2015

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ANNEX 2: QUESTIONNAIRE

To the interviewer: read the text below out to every respondent

Hello, I am ……. and represent the Alliances Caucasus Programme. Our programme is implemented by Mercy Corps Georgia and works in Kvemo Kartli, Samtskhe-Javakheti, Ajara and Kakheti regions in Georgia and Armenia and Azerbaijan in order to strengthen livestock sector for the economic benefit of families engaged in animal husbandry. Today we are interested in finding out about farmers who produce and sell milk. Your family has been selected from the farmers' database who supply milk to . . . . . /general database of population. Your participation in the survey will help us generate an accurate picture of the dairy sector in Georgia and help shape the development of the sector.
Please be kind enough and participate in the survey.
Information provided by you is confidential and it will be used solely for generalization.
Thank you in advance for cooperation!

[Please talk to the most informed person in the family about selling raw milk to the dairy enterprise]

General information (to be fill in at the end):

Interviewee's name and last Name	
Town/district/district center	
Village	
Address/or indication	
Contact telephone*(In case respondent is willing to)*	
Respondent's name, last name *(In case respondent is willing to)*	
Dairy enterprise name the respondent sells raw milk to	

Filter questions:

[TREATMENT FARMERS]

T1. Do you sell milk to (underline the milk collector)

1.1 Tsezari or its milk collectors: Jumber Abuladze, Jemal Abuladze

1.2 Tsintskaro plus or its milk collectors: Temuri Shavadze, Jaba Khimshiashvili, Elizbari Badirovi, Azat Julphievi(MCC in Algeti)

1.3 Milkeni or its milk collectors: Arif (Afonia) Sadikovi, Badri Phachkatashvili, Giorgi Mikadze, Giorgi Kvelashvili

1.4 Natural Produktsia or its milk collectors: Roin Artmeladze, Malkhaz Kakhadze, Mindia Shavadze, Gocha Kakhadze, . .. Abuladze

2. No ***(stop the interview)***

T2. When did you start selling raw milk to this dairy enterprise/ client's milk collector . . . . . .?

[**Interviewer:** should be minimum 2 years to be selling milk to this dairy]

T3. What did you mainly do in [insert baseline year of the relevant programme dairy enterprise] ? *(several answers are possible)*

a. Produce and sell cheese and other dairy products for sale in an agri market
b. Produce and sell cheese and other dairy products to owners of kiosks shops, local restaurants, café's

c. Produce cheese and other dairy products and sell to neighbours, other local HH's
d. Produce cheese and other dairy products and sell to other buyers (resellers, supermarkets and other)
e. Use milk for home consumption (make cheese, butter, matsoni, etc.)
f. Produce and sell raw milk to the other enterprise milk collectors regularly over time [Stop the interview]
g. Other _____

T4. Please name the % for what purpose you use (d) raw milk for (if the respondent struggles to answer %, ask about liters and its usage?

	Baseline:	**2019**
M9.1 Use for family consumption		
M9.2 Selling Cheese/ dairy products		
M9.3 Selling raw milk		

[CONTROL FARMERS]

C1. Are you and your family involved in dairy production?

1. Yes
2. No, (stop the interview)

C1.1 Do you sell milk?

1. Yes (indicate dairy enterprise or/and milk collector)
2. No, (stop the interview)

C2. From the following what did you mainly do in [insert baseline year same as for the relevant program dairy enterprise? Produce and sell cheese and other dairy products for sale in an agri market

a. Produce and sell cheese and other dairy products to owners of kiosks shops, local restaurants, café's
b. Produce cheese and other dairy products and sell to neighbours, other local HH's
c. Produce cheese and other dairy products and sell to other buyers (resellers, supermarkets and other)
d. Use milk for home consumption (make cheese, butter, matsoni, etc.)
e. Produce and sell raw milk to the client or other enterprise milk collectors regularly over time. When did you start selling milk to a dairy enterprise/ other enterprise milk collector (ask the name)? (should be about the same number of years as the treatment farmers)
f. Other _____

C3. How many milking cows did you have then? _____ *(should be the same as average treatment farmers # of cows)*

C4. Please name the % for what purpose you use (d) raw milk for?

	Baseline:	**2019**
M9.1 Use for family consumption		
M9.2 Selling Cheese/ dairy products		
M9.3 Selling raw milk		

[If the answer on C2 was *e* then stop the interview]

MAIN QUESTIONS BLOCK:

M1.1 Have you increased the number of cattle since you started selling raw milk to the dairy enterprise (treatment)?

1. Yes
2. No
99. Don't know/ refuse to answer

M1.2 Have you increased the number of milking cows since you started selling raw milk to the dairy enterprise?

1. Yes
2. No
99. Don't know/ refuse to answer

M2. Fill the table

	1.Baseline Year:	**2. 2019**
M2.1 Number of cattle		
M2.2 Number of Milking cows		

M3. Please name the reasons why you increased or decreased the number of milking cows?

M3.1 *Increased the number*

a. Because of the opportunity to sell milk regularly
b. To gain more income from selling milk
c. Improved access to better nutrition
d. Because there is less risk than in other agricultural activity
e. Other _____

M3.2 *Left the same*

f. Because I cannot take care of more cows due to health conditions
g. I am also busy with other work, I have a business
h. Other (there is water problem in the village, no pastures) _____

M3.2 *Decreased the number*

i. Because of replacing breed with better breed milking cows
j. Needed money (if sold the milking cow)
k. Because of the disease outbreak (if decreased)
l. Other_____
_____

M4. Has the number of milking cows:

a. always gone up and why? _____
b. always gone down and why? _____

c. always stayed the same and why? _____

M5. What was your milk yield before you started selling to the factory? What is it now? In High and Low seasons.

	1. Baseline:	2. 2019
M5.1 Daily in High milking season (liters/cow)		
M5.2 Daily in Low milking season (liters/cow)		
M5.3 Annual Milk Yield (liters/cow, if can recall)		

M6. Has the milk yield:

a. gone up, has it always gone up and why? _____
b. gone down, has it always gone down and why? _____
c. stayed the same, has it always stayed the same? If no, why? _____

M7. Have you applied any of the following animal husbandry practices to increase milk yield since selling to the enterprise?

(Interviewer: Read out the possible answers to the respondent)

(more than one answer is possible)

Breeding	
1. Managing breeding cycles to spread out the lactation period, to ensure milk production during all year	-
2. Improved animal breed (from improved bull breed service)	-
3. Improved animal breed (from AI service)	-
4. Bought better quality milking cow	-
5. Retaining/ selecting female calves for milking	-
Feeding	
6. Improved nutrition practices. Feeding more of existing feeds (note type of feeds e.g. (hay, bran, maize stover)	-
7. Buying and feeding (more regularly) better quality existing feeds (maize leftovers, apples, improved type of hay etc.)	-
8. Adding a new feeds (note here new feeds e.g. brewers grains, alfalfa, combined feed, milled grains) 9. Watering more regularly or providing better access to water	-
Veterinary	
10. Timely and regular treatment of cows from parasites	-

11. Getting Veterinary consultation in addition to the government one	-
12. Other _____	-
13. Not applied any of the practices	-
99. Don't know/ Refuse to answer	-

M8. How much do you spend/milking cow/year? (Including veterinary expenses, nutrition, other. If they cannot recall the costs related to feeding, ask how many kg, tonnes, or sacks they bought/year.

	Type of cost	Unit	Periods Day/month/year	Value (GEL)	Since the baseline
Breeding					
1.	Breeding Costs				
2.	AI				
3.	Bull service/ herd fee etc				
Feeding					
4.	Hay				
5.	Bran				
6.	Maize				
7.	Alfalfa				
8.	Milled grains				
9.	Combined feed				
10.	Additional feed				
Veterinary					
11.	Preventative, planned measures against external/ internal parasites				
12.	Preventative, planned measures -vet service				
13.	Preventative, planned measures-consultation				

14.	Other costs (specify)_____				

M9. If you spend more is the investment worth it?

1. Yes. Why is it worth it? What does it allow you to do? (future profit/good return on money of investment?) _____
_____
2. No

M10. What is your vision for your production of milk over the next 5 years?

- _____
_____
- Follow up questions, if required.

M11. What would you do if you did not have the chance to sell raw milk to the particular enterprise?

1. Produce and sell cheese and other dairy products for sale in an agri market
2. Produce and sell cheese and other dairy products to owners of kiosks shops, local restaurants, café's
3. Produce cheese and other dairy products and sell to neighbours, other local HH's
4. Produce cheese and other dairy products and sell to other buyers (resellers, supermarkets and other)
5. Use milk for home consumption (make cheese, butter, matsoni, etc.)
6. Produce and sell raw milk to the other enterprise milk collectors regularly over time
7. Other _____
8. Don't know/ Refuse to answer

- [several answers are possible]
- If you spent more is it worth more?