Master Plan Azerbaijan: Dairy & Beef Sector Assessment

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Acronyms

AIM	-	Agro Information Centre
AI	-	Artificial Insemination
ANFES	-	Azerbaijan National Fund for Entrepreneurship Support
AZN	-	New Azeri Manat
BDS	-	Business Development Service
CBAR	-	Central Bank of the Republic of Azerbaijan
CF	-	Crude Fibre
CP	-	Crude Protein
DMI	-	Dry Matter Intake
FAO	-	Food and Agricultural Organization of the United Nations
FDMS	-	Farm Data Monitoring System
FSA	-	Food Safety Agency
GDP	-	Gross Domestic Product
GoA	-	Government of Azerbaijan
HF	-	Holstein Friesian
HACCP	-	Hazard Analysis and Critical Control Points
IFAD	-	International Fund for Agricultural Development
IFCN	-	International Farm Comparison Network
I&R	-	Identification and Registration
ISO	-	International Organization for Standardization
JAC	-	Janub Agribusiness Centre
LN	-	Liquid Nitrogen
LRI	-	Livestock Research Institute
MCC	-	Milk Collection Centre
MoA	-	Ministry of Agriculture
MT	-	Metric Tonne
NGO	-	Non-Governmental Organization
SAAC	-	State Agency on Agricultural Credits
SSC	-	State Statistical Committee
SVD	-	State Veterinary Department
UHT	-	Ultra Heat Treatment
UMID	-	Humanitarian and Social Support Centre
USAID	-	United States Agency for International Development
USD	-	United States Dollar
VAT	-	Value Added Tax
WB	-	World Bank

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1. Introduction

The objective of this report is to make an in-depth analysis of the dairy & beef value chain and to identify opportunities for investment. This report is a background study supporting the regional investment sheets on dairy and beef farming, which are illustrated and clarified in the Master Plan's web tool.

Next to statistical information, the report is largely based on field surveys. Meetings were arranged with the Ministry of Agriculture, milk & meat processing companies, service and input suppliers, traders and retailers. Valuable information and reports were received that formed the basis for an understanding of the conditions and opportunities to invest in livestock production and processing facilities. Subsequently visits were paid to the various regions to discuss cattle development with many relevant stakeholders.

The report describes the present conditions for dairy & beef production and assesses the options for sustainable sector development. Livestock production is an important economic activity as some 48% of the agricultural production value comes from livestock, mainly cattle and sheep. With the fairly recent investments in milk processing capacity, combined with the attention government is now giving to the agricultural sector, dairy & beef production may move towards a more commercially oriented business. This creates investment opportunities for farmers, service- and input suppliers. Although the devaluation of the manat (AZN) had a negative impact on the profitability of the sector as a whole, the cheaper manat may improve export potential of meat and dairy products.

Recommendations are formulated to enhance the competitiveness of the total value chain and to create awareness and interest amongst private sector, public sector and donor communities to make the necessary investments in sustainable and profitable sector development.

2. Structural features of the sector

Rural households on average own 2.13 cattle & buffaloes, of which 1.02 milking cows, plus 6.65 sheep & goats (SSC, 2015 data). This indicates that dairy farming is hardly more than subsistence farming, with a limited number of farms that are large enough to operate on a more commercial scale. Lack of land, equipment, farm machinery and resources forced farmers to work with a low input-low output system. Natural grazing, supplemented with crop residues, sometimes with alfalfa and small quantities of simple concentrates (e.g. wheat bran) are the main sources of feeding. In addition cattle owners lease government owned pastures, both for summer and winter grazing. These pastures are mainly used for herding larger flocks of sheep and cattle. Most farms are combining milk and beef production, but very extensively.

In recent years a growing number of medium- and large-scale dairy farms have been established all over the country. These farms work with either Holstein Friesian (HF) cows or Simmental – either focused on milk or on a combination of milk and beef. Their share in total milk production has gone up from 1% in 2009 to 3.5% in 2015: a substantial increase yet still a low share. The milk of these farms is in high demand with the processing industry as it provides volume and quality. For the large-scale farms the main problem is to find fertile land for feed production, as rural households own most of the arable land. To obtain or rent a plot of 500 ha may require an almost similar number of contracts with the owners. Sometimes pastures or abandoned land is offered for farming, but this again requires substantial investments in land preparation and development. Now many of the large farms depend on purchased feed and fodder.

Table 2.1 shows the top ten farms (in order of daily milk production) presently in operation in Azerbaijan. The production per cow/day varies as a result of difference in breed (HF or Simmental) and management. Under good management yields meet EU-averages, but with less experienced owners and/or managers milk yields are much lower.

Table 2.1: Top ten dairy farms in Azerbaijan

Location	Name of farm	# of cattle (head)	# of cows (head)	Milk production (kq/day/total)	Yield/cow (kq/day)
Barda	‘Qarabağ Aqrar-Sanaye’ LLC	4200	1680	40,000	24
Samukh	‘Boz Dağ’ FT	3341	1455	33,000	23
Agjabedi	Atropatena GSC	3600	1137	33,000	29
Gabala	‘Gilan’ Holdinq	1800	700	20,000	29
Agdash	`Türyançay’ MMC	2019	900	18,000	20
Khachmaz	‘Yalama Aqropark’ MMC	2111	968	15,000	15
Gabala	‘Aqrokompleks Qəbələ’ MMC	1607	580	11,000	19
Sheki	‘Şəki Aqro İndastris’ MMC	1327	422	10,000	24
Gusar	‘Şahdağ’ KFT	900	600	7,000	12
Barda	Farm of Muradzade Şahriyar.	923	310	7,500	24

Statistical data show that the total cattle population and milk production has increased steadily over the past 15 years as can be seen in Table 2.2. Herd growth averaged 2% per year since 2000, but in recent years the herd of adult cows remained more or less stable. Herd growth mainly comes from cows, while dairy buffaloes appear to be less in demand.

The same data show that milk and beef production have grown even faster: milk production increased with an average of 3.4% per year since 2000, while beef production grew with an average of 4.6% per year during the same period.

Table 2.2: Cattle population, milk & beef production in Azerbaijan

Year	Total herd (‘000 heads*)	Adult cows (‘000 heads*)	Milk production (‘000 t/year)	Average yield (kg/cow/year)	Beef production (‘000 t/year)
2000	1961.4	925.8	1031.1	1114	78,4
2005	2315.8	1117.0	1251.9	1121	95,9
2010	2613.7	1261.4	1535.8	1212	112,4
2015	2708.3	1303.0	1924.6	1477	129,8

Source: The State Statistical Committee (SSC) of Azerbaijan. *Including cows and buffaloes

Recent FDMS[1] data for 2015, however, provide a complete different picture for milk production. Total production in 2015 has been calculated at 1,176,247 tonnes of milk, 39% less than SSC reports. The data for meat production (all types) are more in line with each other: SSC mentions 298,600 tonnes and FDMS states 292,200 tonnes for 2015 (6.4% less). The clarification of these difference may be that the FDMS, ran by the Ministry of Agriculture, is based on a sample that is extrapolated but may not fully cover the small-scale producers. SSC, on the other hand, claims to provide records covering all farmers registered.

Table 2.3 presents a top ten of milk producing regions according to the SSC data. These data show that the central part of Azerbaijan, with its strong basis for fodder supply, is well represented. The foothills, with more attractive climatic conditions for dairy cows are also attractive areas, while Absheron near Baku shows the effect of the vicinity of a large market. The table also shows FDMS data for the same regions, and a comparison of the two sources show a complete different picture.

Table 2.3: Top ten milk producing regions (SSC data for 2015, in yellow columns)

Region	Total dairy cows (head)	Milk production (T)	Estimated kg milk cow/year	Milk production FDMS (T)	Difference in %
Sabirabad region	48,514	97,771	2,015	24,590	-75%
Jalilabad region	46,763	82,940	1,774	26,420	-68%
Barda region	36,852	69,047	1,874	25,588	-63%
Sheki city	29,618	55,692	1,880	34,703	-38%
Shamkir region	28,627	54,608	1,908	34,671	-37%
Imishly region	37,221	49,020	1,317	22,104	-55%
Masally region	35,041	49,018	1,399	45,782	-7%
Gedabey region	26,083	43,139	1,654	17,562	-59%
Absheron region	13,398	42,861	3,199	5,084	-88%
Kurdamir region	28,084	41,786	1,488	19,592	-53%

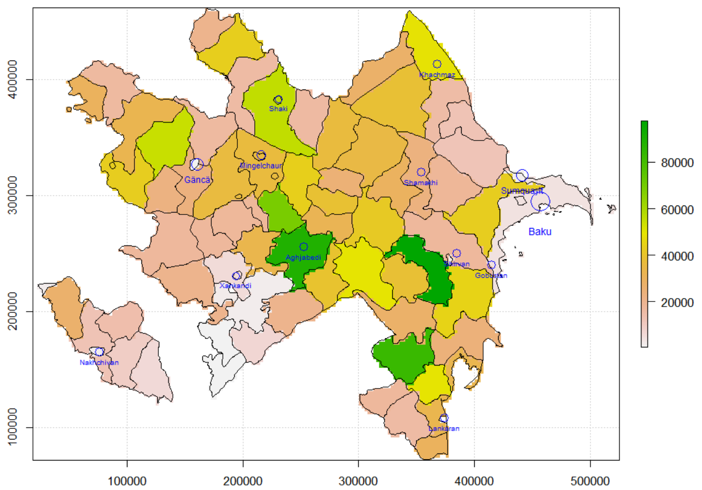


Figure 2.1 Main milk producing areas of Azerbaijan

A similar table based on SSC data has been made for meat production, where we see a strong overlap between milk and meat producing areas (Table 2.4, see also Figure 2.2). A high cattle density means

[1] Farm Data Monitoring System (FDMS): in support of national institutions, in particular the Ministry of Agriculture (MoA), the Ministry of Economic Development (MED) and the State Statistical Committee (SSC) FDMS collects, elaborates and analyzes data on farming systems, their efficiency and economic performance, so as to provide concrete elements of orientation and support to policy-makers for designing and implementing food security strategies, policies and interventions

that not only more bulls will be available for slaughter but also that the resources of culled cows are substantial. In addition there are larger stocks of small ruminants and possibly large broiler farms.

Table 2.4: Top-ten meat producing regions (SSC data for 2015, including all livestock)

Region	Total cattle & buffaloes (head)	Meat slaughter weight (MT)	As % of total herd
Jalilabad region	99,362	14,033	14%
Barda region	90,248	9,624	11%
Imishly region	93,930	9,298	10%
Neftchala region	42,428	8,850	21%
Sabirabad region	116,932	8,744	7%
Salyan region	62,820	7,190	11%
Agdash region	80,909	6,827	8%
Hajigabul region	37,819	5,984	16%
Kurdamir region	64,098	5,528	9%
Geychay region	48,442	5,488	11%

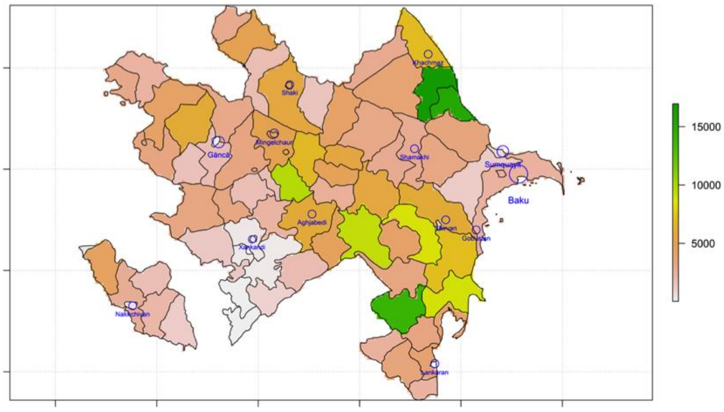


Figure 2.2 Main meat producing areas of Azerbaijan

Climatic conditions influence the choice of breed, housing and management system. Azerbaijan has 9 out of the 11 climatic zones. In general it is arid, dry and subtropical with hot summers and mild winters. Temperatures vary by season and area. In the southeast lowlands, temperatures average 6°C in the winter and 26°C in the summer – though daily maxima typically reach 32°C. In the northern and western mountain ranges, temperatures average 12°C in the summer and −9°C in the winter. The four cities shown below (Figure 2.4) give an indication of the variation in temperatures and rainfall.

Annual rainfall over most of the country varies from 200 to 400 mm and is generally lowest in the northeast. In the far southeast, however, the climate is much moister and annual rainfall can be as high as 1300 mm (the colours in Figure 2.3 indicate the rainfall, whereby the dark green areas have the highest precipitation). For most of the country, the wettest periods are in spring and autumn, with summers being the driest.

Figure 2.3: Rainfall and wind patterns

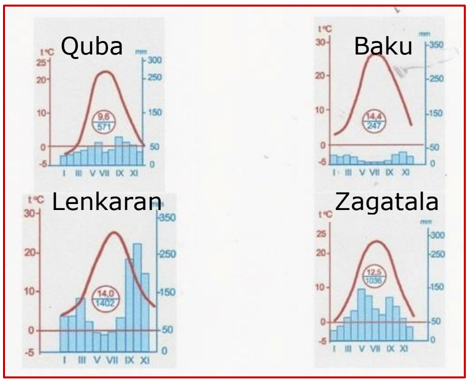
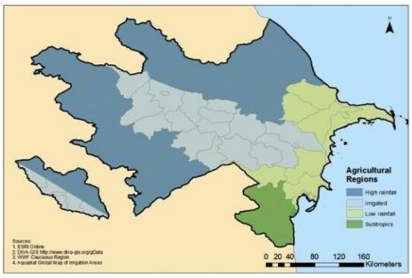


Figure 2.4: Temperatures and rainfall

According to a World Bank publication Azerbaijan can be divided into four agricultural zones based on the spatial distribution of elevation, agricultural lands, livestock pasture lands, temperature and precipitation. Figure 2.5 shows these four agricultural zones, which have significant differences in topography, temperature, humidity and precipitation from the surrounding region. The four zones are: high rainfall (dark blue), irrigated (light blue), low rainfall (light green), and subtropical (dark green). The high rainfall region encompasses the majority of western and northern Azerbaijan. The central zone is irrigated, the east has low rainfall, and the southeast is subtropical. Nakhchyvan is split between high rainfall and irrigated areas.

Figure 2.5 Agricultural Zones of Azerbaijan[2]



For high productive dairy cattle the zones that have cooler winters, which are the more mountainous areas, are more attractive than the hotter parts of the country, located in the central plains. In designing breeding goals and strategy, the climatic conditions have to be kept in mind, although through housing and management systems many of the climatic constrains can be overcome.

It is first of all the structure of the sector, with so many small farms, that makes it a real challenge to develop the dairy and beef industry. There is an urgent need for commercial farms of all sizes: farms that can meet modern standards of production and quality at competitive prices. Of course the conditions to develop such farms need to be created.

[2] *The Report of Azerbaijan: Climate change and agriculture Country Note – June 2012, World Bank*

3. Input supplying industries

When asked, a farmer replied that all his basic inputs were available. For many Azeri households keeping cattle that statement will be true: the system of cattle farming is very basic and hardly needs any inputs. Milking is done by hand, feed is cut in the fields or obtained by grazing, balers for haymaking are available, barn equipment is not needed, and medicines can be bought on the green markets.

The situation is different for those farmers who want to become professional dairy farmers. There is no functional distribution network for inputs such as farm machinery, barn equipment, milking equipment and other necessary inputs for farming and crop production. It is also difficult for farms to obtain information on modern dairy farm management: not only because there is a lack of good information material (e.g. leaflets, TV, books and magazines). Even for extension staff it is difficult to imagine what a modern dairy farm looks like, as there are not many examples in the country to draw from. Besides the lack of inputs for all kinds of equipment, there is a shortage of inputs such as high quality seeds, fertilizers, pesticides and herbicides. In addition attention is needed to irrigation as some 61% of the farming areas depends on reliable irrigation[3].

All these factors result in lower than potential yields as can be seen from Table 3.1 below where the cereal production in Azerbaijan is in line with Russia and the Ukraine, but well below what is achieved in the Netherlands. However, examples exist in Azerbaijan where high yields have been achieved under good management in combination with adequately available inputs and appropriate natural conditions.

Table 3.1: Comparison of yields for various grains (t/ha)

Crop	Russia	Ukraine	NL	AZ
Winter wheat	2.8	3.3	8.5	3.1
Spring wheat	1.4	-	7.1	
Winter barley	3.8	2.6	8.4	2.9
Spring barley	1.9	2.3	6.6	
Grain maize	4.3	5.6	9.5	5.8

Source: Statistical data for recent years compiled by the consultant.

In the next paragraphs we describe the conditions for the main inputs for dairy & beef production.

3.1 Equipment supply

For commercial dairy farms agricultural machinery for (fodder) crop production, barn equipment, milking machines and a regular supply of spare parts and consumables are essential inputs. Most of these items are available through commercial companies, but for smallholders supply is more difficult as many of these companies are based in Baku. A good network of dealers is still missing. A list of suppliers is provided in Table 3.2, although it is not sure if this list is complete.

Table 3.2 Equipment suppliers relevant for the livestock sector

1	Uğur-Bərəkət	Baku	Milking parlours and barn equipment	Turkey
2	Forte Group	Baku	Farm & barn equipment, etc. Large projects.	Various
3	AZERTEXNIKA	Baku	Farm & barn equipment for commercial farms	Mainly Turkey
4	DeLaval	Via Russia	Dairy and farming machinery	Sweden
5	Agroleasing	Regional	Agricultural equipment, based on leasing	Various
6	"Modern Agr. Technologies"	China (via AZ)	Turnkey projects for agricultural enterprises	China
7	"EMA" LLC	Baku, Khachmaz	Range of agricultural products & machinery	Unknown
8	Grand Motors	Baku	Wide range of agricultural equipment	New Holland
9	AZTEXNIKA	Baku	Tractors and combine harvesters	John Deere

Source: Consultant's survey

[3] Strategic Roadmap for Agriculture

In an attempt to reduce the supply constraints in agriculture the Government established the leasing and contracting company 'Agroleasing OJSC' in 2004. This company provides fertilizers, seeds and farm machinery. In addition imported pedigree heifers are provided (see also section Herd Improvement). Between 2005-2015, Agroleasing bought 23,641 agricultural machines, including 1,869 combine harvesters, 7,265 tractors and 14,507 other agricultural machines. Within this period 18,090 agricultural machines, including 723 combine harvesters, 6,305 tractors and 11,062 other agricultural machines, were leased by 10,644 physical and legal entities or sold via leasing. Although the intention is good, there still is room for improvement as there is a limited choice of products and substantial paperwork. Agroleasing has to identify the needs, submit the list to the Ministry of Agriculture for approval and then follow the state procedures for tendering. This means that farmers can only buy from available stocks or have to wait until the next round of tendering.

Part of the farm machinery goes to the contracting companies that belong to Agroleasing and most of the equipment is of more use to the larger farms. There are contracting units in 37 regions all over Azerbaijan, totalling 102 service points. In principle these units are self-supporting and self-financed. Their main services are soil tillage, sowing, grain-harvesting and harrowing (in order of importance). In most cases the contracting units and agro-service branches are located in the same place. Commercial contracting services hardly exist, but it is common that neighbours and relatives share equipment or provide paid services. During a recent visit to Imishly several farmers complained that they had maize for silage in the field, ready for harvesting, but the only harvester available was one belonging to Agroleasing and that one was out of order.

Table 3.3: Prices of agro-technical services provided by Agroleasing OJSC

No.	Name of the provided services	Norms	Prices of services, AZN
1	Grain Harvesting	1 ha	30,00
2	Harrowing with disc harrow	1 ha	8,00
3	Loosening the soil with rotary harrows	1 ha	16,00
4	Crop cultivation	1 ha	10,00
5	Seed (cotton) sowing	1 ha	12,00
6	Ploughing (in moderately resistant soil)	1 ha, 22-27 cm	25,00
7	Ploughing (dry (not-irrigated) and soft soils)	1 ha, 22-32 cm	24,00
8	Ploughing (irrigated and hard soil)	1 ha, 27 cm	27,00
9	Smoothing works before sowing	1 ha	7,50
10	Spraying pesticides with sprinkler	1 ha	10,00
11	Spraying pesticides with a fan sprinkler	1 ha	12,00
12	Drilling a hole	120 hole/day	60,00
13	Baling of grass and hay	1000 unit/day	100,00
14	Mowing feed crops with self-propelled mower	1 ha	22,00
15	Mowing the feed crops with rotor mower	1 ha	14,00
16	Seeding of seeds of cereals	1 ha	10,00
17	Providing mineral fertilizers	1 ha	8,00
18	Beet harvesting	1 ha	60,00
19	Potato planting	1 ha	50,00
20	Potato harvesting	1 ha	40,00

Source: http://agrolizing.gov.az/az/menu/250

The above prices (Table 3.3) for services are attractive if one considers the actual costs for labour, fuel, depreciation and maintenance of equipment plus tractor. Commercial rates would at least be twice as high and we therefore have to consider if:

- These services are available for all farmers and when needed,
- This subsidized service discourages commercial companies to enter the market for agricultural contract work.

3.2 Feed & fodder supply

Here we will focus on the feeds available on the market, while nutrition of cattle including feed & fodder production will be dealt with in the next section: 'Milk and Beef Production'.

Compound feed is produced, but hardly used for feeding dairy cows on the small farms. Only large and smaller commercial dairy farms make use of concentrates, but they often mix their own feed (TMR rations). The main feed mills are the Azeryam Feed in Balakan, Azersun Sugar beet Factory in Imishli and Golden Feed in Ganja.

Compound feed is relatively expensive as most of the oil cakes have to be imported, plus a substantial part of the grains (wheat and maize, see SSC statistics). The main suppliers of soybean cake in 2016 were Ukraine and Argentina, while the Russian federation was by far the largest supplier of wheat of various qualities. The present[4] price for soybean cake is 0.70 AZN/kg, while wheat, barley and corn average 0.37 AZN/kg on the wholesale markets (see Table 3.4). Worldwide feed prices have shown great fluctuations over the past 10 years, which had their impact on farm profitability.

Table 3.4: Wholesale prices grains (av. May-July 2017)

Product	Price (AZN)	Unit
Wheat	0.34	Kg
Barley	0.31	Kg
Corn	0.47	Kg
Average grains	0.37	Kg

Source: Market information

Market visits showed that feed ingredients and compound feed are available. Wheat bran is an affordable product for smallholders, besides their home-grown feeds (e.g. wheat and barley). Wheat bran is sold for 0.30 AZN/kg and some regions (e.g. Imishly) cottonseed cake is available for 035 – 0.40 AZN/kg. Azersun's compound feed was 0.56 AZN/kg. In comparison with the feed prices of 2011 the difference is limited and less than expected for the locally produced feeds. Imported feed ingredients have doubled in price (at least in manats). Besides ingredients for concentrates, there is a lively market in alfalfa hay, wheat straw and hay from natural grasses.

Table 3.5: Wholesale prices of haylage (averages May - July 2017)

Product	Price (AZN)	Unit	Remarks
Wheat straw	1.21	Bale	(Variation from 0.50 – 2.10)
Alfalfa hay	2.74	Bale	(Variation from 1.56 – 3.80)
Meadow grass hay	2.28	Bale	(Variation from 1.45 – 4.00)

Seasonal variation in prices is quite high and only farmers that have sufficient cash can purchase stocks during the period that the price is low. The weight of a bales and the quality of the products also varies: time of harvesting, care during haymaking and the density of the bales have a strong influence on feeding value and cost. Farm visits showed that most bales averaged around 15 kg.

Table 3.6 shows the most important crops for animal production and the regions with high production are also those from where most of the sales take place.

[4] May-August 2017, various surveys

Table 3.6: Sown area and total yields for selected crops (2015)

Economic Region	Wheat		Maize		Barley		Fodder crop
	Sown (ha)	Yield (T)	Sown (ha)	Yield (T)	Sown (ha)	Yield (T)	Sown (ha)
Absheron	664	1,044	3	8	1,107	1,598	215
Ganja-Gazakh	48,887	154,236	5437	30250	31,447	96,615	49,928
Sheki-Zagatala	78,357	230,767	17986	90875	44,700	133,920	26,461
Lenkaran	66,213	186,725	1015	5903	13104	34,952	3,632
Guba-Khachmaz	60,846	161,005	1359	6618	28,143	68,816	10,005
Aran	144,249	514,716	8648	69597	164,163	494,429	293,393
Yukhari Garabagh	53,575	176,144	800	5263	22,226	68,486	28,783
Kelbajar-Lachin	294	784	5	16	1,642	4,825	2,477
Daghlig Shirvan	59,848	183,120	574	1079	44,968	133,142	3,858
Nakhchivan AR	26,746	79,140	1082	4481	9,491	27,142	9,859
Total Republic	539,679	1,687,681	36,909	214,090	360,991	1,063,925	428,611

Source: State Statistical Committee

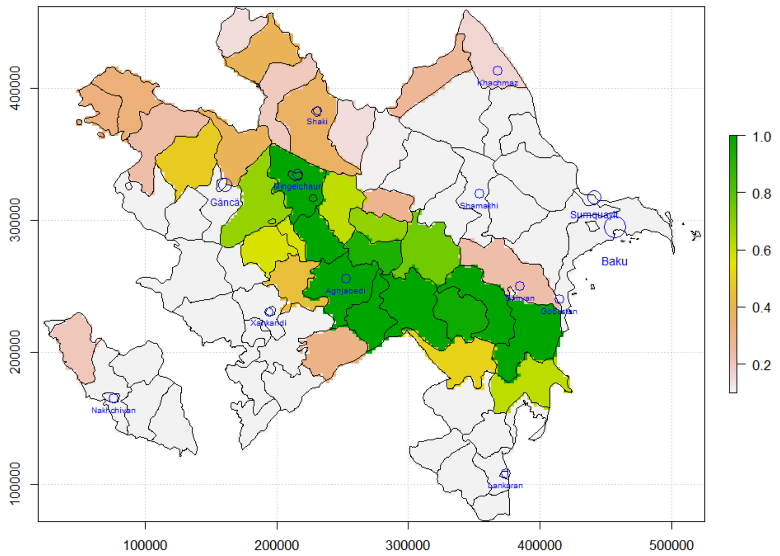


Figure 3.2 Areas with potential for feed and fodder crops

3.3 Seed supply for fodder crops

In 2016 total 354 private farms throughout the country were registered as seed and sapling producer. However according to the subsidy application information only 266 seed (sapling) producers applied to get subsidies. It can be argued that only producers who applied for subsidies are actively engaged with seed and sapling production in Azerbaijan. For dairy and beef production especially alfalfa and maize production are important, besides the cereals (although these are mainly used for human consumption).

Table 3.7: Seed producers for maize and alfalfa (2015)

Region	Number of producers	Total sown area (ha)	
		Alfalfa	Maize
Agjabedi region	1	15	
Barda region	4	82	
Bilasuvar region	1		11
Fizuli region	1		20
Imishly region	2 1	30	 8
Saatly region	2 5	30	 101
Sabirabad region	1 1	15	 4
Samukh region	1 2	5	 7
Zagatala region	1		15
Total areas		177	166

Source: State Statistical Committee

The seed producers received subsidy with a total value of 115,440 AZN for the alfalfa and 86,300 AZN for the maize, based on 1.56 or 0.78 AZN/kg alfalfa and 0.32 AZN/kg for maize. The total quantities that were harvested and sold are not quite clear, as only the subsidized volumes are mentioned in the statistical data. Alfalfa sales were around 130,000 kg seed (enough for some 4,500 ha) and maize sales were approximately 550,000 kg seed (enough for 15,000 ha). In 2015 the sown area for maize was more than 36,000 ha, while fodder crops (mainly alfalfa) were sown on more than 400,000 ha. So it seems that registered seed producers covered only a small part of the total needs.

In general the demand for all kinds of seeds is met through import. It is not clear to which extent this also applies to fodder crops, as farmers are likely to use their own harvested seeds. Grain seed production only covers 40 - 50% of the demand, of which 30-35% are certified seeds. The remaining 10-15% are regular seeds with no certificate[5]. Identified constraints for not using certified seeds include poor logistics, lack of relevant management experience, insufficient control over seed quality and certification, import and utilization of seeds with unknown origin.

3.4 Irrigation schemes

The 'Roadmap' provides a detailed description of water resources and needs for agriculture, as well as the water reservoirs and irrigation system. With 51,755 km of irrigation channels in the country it is clear that maintenance is an enormous task. Several large-scale projects have already been implemented to improve the system, resulting in an improved water supply of 266,000 ha and 43,000 ha supplied with irrigation. However, still much remains to be done according to reports of Azerbaijan Amelioration and Water Economy OJSC. The most common irrigation in farming is traditional surface irrigation. Utilization of water-saving modern techniques such as drip irrigation or sprinkler irrigation is limited.

3.5 Energy supply

Farms and milk collection centres depend on a reliable supply of electricity: milking machines have to be used twice daily and cooling tanks are essential to avoid spoilage of milk. Field visits showed that frequent disruptions in power supply take place and a generator has to be installed to ensure a smooth business operation.

[5] Source: Strategic Roadmap for Agriculture and Agricultural Products Processing Sector in the Republic of Azerbaijan, 2016

3.5 Herd improvement

Artificial Insemination (AI) services were discontinued after the privatization process, but in 2001 a new start was made with the establishment of field services for artificial insemination. Until 2015 more than 500 inseminators were trained through government and various NGOs. Official records mention that almost 100,000 cows are inseminated annually, which is 5-8% of the total cow population. The performance of many inseminators was disappointing. Some 80% of all 500 technicians did less than 25 inseminations per month and half of them even less than 8 per month. Therefore refreshment training was given to 185 persons through an FAO project[6] and those inseminators that seemed less motivated were asked to return their equipment. The distribution system for locally produced semen was organized from two locations, the AI Centre in Goygol district and a sub-centre in Baku, but meanwhile a more efficient system has been developed, whereby inseminators can obtain semen, liquid nitrogen and spare parts at regional sub-centres. This too will have a positive impact on AI service development.

A new bull station and semen production unit began its operations in 2010 with 20 bulls from different breeds and very recently an even larger bull station was established, with a capacity of 40 breeding bulls. In addition semen imports are taking place from The Netherlands, Norway and Russia. More recently, the government decided to pay a subsidy of 100 AZN for each calf born through AI. This should make it very attractive to use AI, but it will require strict monitoring. With an I&R system (Identification & Registration) in place this would be made much easier (as would the complete monitoring of animal movements and herd changes).

With the new bull station, investments were also made in distribution of Liquid Nitrogen and suitable transport for inseminators

A quicker, but more expensive way to improve the genetic potential of cattle is the importation of pedigree heifers. During the past ten years several modern, large-scale dairy farms were established, all with imported heifers, and their performance varies from very good to reasonable according to the level of management (see Section 2 on the structure of the sector for a list of major farms).

Through Agroleasing pedigree cattle is imported and distributed, mainly among small- and medium farms, with varying results. The exact distribution pattern is not yet available, but in principle all farmers can apply.

Table 3.9: Import of breeding cattle by Agroleasing (2009 – May 2017)

№	Breeding cattle	2010	2011	2012	2013	2014	2015	2016	2017-5
	Heifers, total	900	1600	3012	2422	2918	6630	4577	1666
1	Brown Swiss	183							
2	Simmental	318			355		1762	3215	764
3	Holstein Friesian	374	1600	3012	1443	2918	4868	1362	902
4	Aberdeen Angus	25							
5	Charolais				624				

Source: Agroleasing

[6] Development of Cattle Breeding and Artificial Insemination Services in Azerbaijan (TCP/AZE/3502).

Since 2009 a total of 24,495 heifers have been supplied, 69% of which are Holstein Frisian. Beef cattle (Aberdeen Angus and Charolais) is only a very small percentage of the imports, but there is a growing interest in Simmental cows as these are easier to manage than the pure HF cows and have a higher slaughter value. Large commercial farms also arrange their own heifer imports, as they prefer to select the animals themselves. Table 3.10 (below) shows the total imports of cattle in recent years, in the categories 'pure-bred animals' (Table 3.10a) and 'other than pure-bred animals'(Table 3.10b).

Table 3.10a: Import of cattle live, pure-bred animals (2012 -2016)

Import country	2012		2013		2014		2015		2016	
	Head	US$ head	Head	US$ head	Head	US$ head	Head	US$ head	Head	US$ head
Germany	2955	4375	1662	3549	2626	3272	5190	3028	1494	2949
Austria	375	3180	221	3586	0	0	1499	2995	3035	3092
Hungary	26	3085	2231	2631	1411	2236	907	1974	148	1792
Russia	0	0	90	478	948	642	4252	1125	0	0
Sub-total	3356		4204		4985		11848		4677	
Other countries	531	2386	1399	2633	1046	1365	822	6204	122	3131
Total imports	3887		5603		6031		12670		4799	
Import organization										
Agroleasing	3012		2422		2918		6630		4577	
Others	875		3181		3113		6040		222	

Source: State Statistical Committee

A few live animals for slaughter were imported from EU countries to be used as premium beef, but since the devaluation of the manat these imports have become too costly in relation to the local beef. Many heads of cattle for meat came from Georgia and from the quoted prices it appears that these were mainly calves. Meanwhile the number of cattle imported for meat has gone down, because the supply of these cheap young animals came to an end.

Table 3.10b: Import of cattle, live, other than pure-bred animals (2012 – 2016)

Import country	2012		2013		2014		2015		2016	
	Head	US$ head	Head	US$ head	Head	US$ head	Head	US$ head	Head	US$ head
Georgia	40859	35	109435	30	54298	40	7613	322	4888	285
Russia	5568	718	11567	635	22761	553	18088	500	6381	376
Ukraine	377	658	7125	704	17995	516	6502	500	10334	373
Sub-total	46804		128127		95054		32203		21603	
Other countries	0		108		118		227		843	
Total imports	46804		128235		95172		32430		22446	

Source: State Statistical Committee

Although the farmers who obtain heifers through Agroleasing pay 50% of the official purchase price, the actual cost was approximately 2,200 AZN per animal. Commercial imports were made at around 2,500 AZN/heifer and these animals often are of a better genetic quality. An advantage is that farmers can pay in three years. The main problem is that many farmers are not able to manage these high quality cows, with disappointing results: pregnancy problems, low milk production and high culling rates[7]. HF and Simmental cows should only be distributed to farmers who have proven management qualities or who

[7] According to experts interviewed and own observations in the field.

receive sufficient guidance during the first years of operation. A proper evaluation of the Agroleasing distribution will be needed.

The topic of embryo transfer has been coming up and there is renewed interest to introduce this system of genetic improvement in Azerbaijan. If we consider the level of dairy farming and the actual needs for cattle improvement, it is clear that AI is a much better solution: much cheaper and in line with the management skills of the farmers. Embryo transfer would only be useful for a very few breeding farms and has no economic justification at present.

4. Milk and beef production

4.1 General background

The cattle population, including buffaloes, has shown a steady increase till the past few years, but now appears to remain more stable. The herd increase would be mainly caused by the natural herd growth, while farming systems and input levels have remained more or less the same for most farmers. If the SSC data for production are correct, we can conclude that the efforts to increase artificial insemination and to train farmers have contributed to the steady increase in milk yields, especially on those farms that made an effort to develop further. However, if the FDMS data are correct, there has been no progress whatsoever during the past decade. In that case we have to assess what went wrong with the development of the smallholders.

The share of the large-scale farms in the total milk production shows clear progress and these data are fairly reliable. Large-scale farms only produced 1% of the milk in 2009, while in 2015 their share had increased to 3.5%. According to sources at the Ministry of Agriculture there are now 22 large farms in Azerbaijan with 10,315 milking cows and a total daily milk production of 227.5 tonnes/day. In addition there are several farms with imported heifers, but smaller in size (less than 100 cows).

Table 4.1: The national milk & beef production figures for 2015.

Item	Quantity ('000 t)	
	Milk	Beef (*)
Total production in 2015	1924.5	231,1
Of which produced by:		
Registered enterprises	68.0	3,5
Private farms and households	1856.5	227,6
Coming from:		
Cows and buffaloes	1889.8	
Sheep and goats	34.7	

Source: State Statistical Committee of Azerbaijan. Note: * = Live weight

On average 89% of all milk is cow milk, while buffalo milk now accounts for 9% and sheep and goat milk is less than 2%. During the past 10 years the dairy buffalo population has decreased by nearly 20%, while the cow population increased by almost the same percentage. Detailed production figures and cattle numbers for each of the regions are given in Appendix 1, in combination with the regional data of FDMS.

The total meat production (all animals in live weight) in 2015 was 443,400 tonnes, with beef & veal 231,120 tonnes, mutton & goat 150,000 tonnes, poultry 54,800 tonnes and a small quantity of pork, 1,000 tonnes[8]. Households and private farms produce 98% of all beef, either as a mixed farming system near the living areas or by grazing the summer and winter pastures. Large-scale professional beef farms are rare. Enterprises would combine milk and beef, often with milk as the main objective.

With an average yield per cow of less than 1,500 kg/year, milk production is still very low and does not allow for large investments in better feed, housing and care. Government statistics show that the average cost of production was 0.29 AZN per litre of milk in 2015, with substantial differences per region (e.g. Absheron 0.21 AZN and Quba 0.40 AZN). Note that especially for those farms that depend on imported materials and purchased feed, the cost price has risen substantially due to recent devaluation of the manat.

4.2 Raw milk prices and milk collection

At present the dairy companies pay 0.60-0.70 AZN/kg for raw milk coming from the large farms. In 2011 large farms still received 0.50-0.55 AZN for their raw milk and milk production certainly was attractive, as at that time the AZN had about the same value as the euro. Now, with the devaluation of the manat, profit margins have gone down even with the higher price for raw milk. However, under good

[8] Source: State Statistical Committee

management milk production still is a profitable business. An advantage is that prices are now more in line with those paid in EU-countries (€ 0.35/kg). This may help to find new markets outside Azerbaijan or at least to compete successfully with imported dairy products. Smallholders now receive approximately 0.40-045 AZN/kg for better quality milk. As smallholders do not invest much in equipment or compound feed their actual production cost mainly consist of feed and fodder.

The dairy companies have to include collection and transport cost as part of their raw milk price. The process of milk collection is costly and time consuming. Milk collectors, either employed by the dairy plant or working independently, go from farm to farm to collect milk. One collector normally covers one village. The farmers use their own containers during milking, but then the milk is transferred to larger containers, which are used by the milk collectors. The next step is the transport of the milk to a collection centre with bulk cooling (MCC). Some dairies have one large milk collection centre that covers a number of villages; others also have smaller MCCs that are used for 1 or 2 villages. From the smaller MCCs the cooled milk is brought to a larger centre, adding one extra step in the collection process. At this stage some milk might be rejected again, and now it is the milk collector who has to take responsibility. He gets paid according to the total quantity that is accepted and the fat content of the bulk. In practice he will divide this amount over all the milk suppliers, which means that the producers all get the same price for their milk, irrespective of quality. From the large MCCs the milk is taken in large milk trucks to the dairy plant. Again quantity and quality are measured by the truck driver before acceptance and lastly after arriving at the dairy plant.

The process of milk collection means first of all the investment in establishing a MCC: a building to collect and store the milk, a bulk cooler, electricity supply (a generator is needed), milk testing equipment and basic furniture. One 1000 l unit would cost approximately € 12,000 all in, larger ones may cost three times that price. Sometimes the dairy plant makes the investment and owns the MCC, while on other occasions a village cooperative makes the investment with support from a donor organization.

The operational costs include transport and labour. Each collector is driving a car (pick-up) to collect the milk; twice per day in summer and once in winter, and in addition larger milk trucks are needed between dairy plants and cooling centres. Earlier data showed that collectors are normally paid 0.05 AZN per litre milk, depending on whether they use their own car or a company car. Total milk collection cost may be as high as 0.07 - 0.09 AZN per litre milk.

In addition we have to consider the price fluctuations between summer and winter. In summer the total milk supply may be 3 - 4 times higher than in winter. The market for dairy products does not show much variation, which means that in summer the dairy plants receive more milk than they can sell after processing and in winter they cannot meet market demand. As a result raw milk prices may not reach production cost in summer, while more attractive prices are paid in winter.

4.3 Milk quality

Milk quality is determined by its composition and its biological quality (e.g. total bacteria, somatic cells, absence of inhibitors such as antibiotics or any other substances which should not be in milk). In countries where the dairy sector is more developed, milk payment systems reflect milk quality: the milk price is based on fat and protein content, with a bonus/penalty system for biological quality. The conditions in Azerbaijan make it difficult to introduce a more advanced quality control and payment system for several reasons:

- The housing and management systems for dairy farming make it difficult to produce 1st class milk;
- There is a lack of simple testing equipment to conduct proper, but fast, high quality control (testing) at the farm gate;
- Milk collection until cooling takes too long, as all milk is collected at the farms and one collector has to cover many suppliers;
- Competition for raw milk makes high demands for quality difficult, as the suppliers will then deliver to less demanding dairy plants; and
- There is no individual testing and payment system, so farmers do not have an incentive to produce milk of a higher quality.

Milk collectors have to decide if the milk quality has an acceptable standard or should be refused. In winter all milk is accepted, as there is a severe shortage. In summer the quality demands are stricter and the higher temperatures also have a negative effect on the milk quality. The first test is the organoleptic control: visual appearance of the milk, smell and taste in case of doubt. In addition the collector may carry a device to see if water has been added to the milk and he can do the alcohol test. Once the milk has been accepted the farmer will get paid for the milk, mainly on the basis of quantity and average fat content in the bulk delivered to the collection centre. At the MCCs the milk is tested again for acceptance and quality. Here a lactoscan is used to determine milk composition (fat, protein, lactose) and again water addition (which is a common problem). Alcohol test and titration are sometimes done as well to check the "keeping" quality of the milk (acidity).

4.4 Animal nutrition

While the former state and collective farms could produce grass, alfalfa, and maize silage, this is not possible for the households as their scale of farming is too small. The most common system is to take the animals out for natural grazing from April until October and feed some wheat bran as supplement. From November until March the cows may go out for a few hours, but in this period the main source of feeding is hay coming either from natural grasses/legumes or from alfalfa. Wheat bran is supplemented in small quantities.

According to the State Statistical Committee 428,611 hectares were cultivated with fodder crops (mainly alfalfa) in 2015, most of which will be under irrigation. FDMS data show slightly lower figures (395,285 ha with alfalfa and 11,892 ha with other fodder crops), but the overall picture remains much the same (Table 4.2 on the next page). The central plains are the main alfalfa producing areas and from there the alfalfa hay is traded to other regions. Other crops such as fodder beet, corn and the legume sanfoin (Onobrychis) are only produced in small quantities.

Feed and fodder are the main constraint for cattle production and milk yields. An FAO publication on pasture and forages in Azerbaijan[9] claims that pastures and meadows satisfy two thirds of total fodder requirement of livestock and are the cheapest fodder base in the republic. Winter and summer pastures cover 2,000,000 hectares mainly in Kur-Araz lowland, Gobustan, Jeyranchol, Ajinohur mass, Alpine and Subalpine meadows of Major and Minor Caucasus, in the mountain zone of Nakgchivan Autonomous Republic and partly in Talish mountain. Important factors that lead to the shortage of fodder crops and the relatively low quality of pastures are given, such as:

- Poor soil fertility;
- Overgrazing or grazing without control;
- Lack of inputs like high quality seed, fertilizers and plant protection means; and
- Soil erosion in mountain and foothill zones.

As it is feared that the pastures on which local farms so much depend will disappear, the government works with the EU-funded 'Clima East' project. This project has linked up with local communities to stop soil erosion and give the landscape a chance to recover, while maintaining local livelihoods. An additional threat is the use of pastures for arable cropping as there is a shortage of land for the large-scale production units.

For the extensive farming systems the pastures are essential, but for the more intensive type of dairy farming, cows have to be protected from the heat in summer and be kept under conditions that allow them to produce according their genetic capacity. Fodder and feed production become essential, for which not only sufficient arable land should be available, but also all the necessary inputs to reach higher yields of good quality.

[9] Country Pasture/Forage Resource Profiles - Azerbaijan by Dr. E. Kosayev

Table 4.2: Top-ten producing regions for alfalfa (2015)

Top regions	Alfalfa (t/ha)		Alfalfa (MT)	
	SSC	FDMS	SSC	FDMS
Barda region	5.5	10.5	190,701	363,921
Beylagan region	6.3	8.7	180,807	251,353
Salyan region	5.0	11.7	103,039	242,550
Saatly region	6.2	11.3	119,356	217,963
Agjabedi region	5.6	7.6	158,790	217,781
Ujar region	13.0	11.6	180,834	160,114
Yevlakh city	15.1	6.9	320,176	147,372
Zardab region	6.3	7.9	117,580	146,848
Imishly region	9.6	7.0	195,756	141,979
Sabirabad region	7.0	4.5	163,470	104,533
Top 10 regions	8.0	8.8	1,730,509	1,994,413
Country	7.3	8.2	2,946,206	3,245,294
SHARE TOP TEN REGIONS			59%	61%

Source: State Statistical Committee

4.5 Dairy development

As mentioned earlier, there is an urgent need to develop more commercial dairy farms of different sizes, with well-trained owners and managers. A joined program implemented by Government and IFAD[10] with 69 farmers in 3 regions works in this direction – improved barns & feeding, distribution of Simmental heifers, training & guidance – and it is important to evaluate the technical and financial results. In several countries the approach with 'dairy hubs' is followed, some more successful than others. Valuable lessons can be learned and applied in future programs.

A visit to the project in Imishly already gave a good indication of the challenges and achievements to develop more productive farms. The project started in 2015 by forming a cooperative of 17 farms, of which 5 farmers worked together as one farm unit. Each farmer obtained between 5-10 pregnant Simmental heifers, with a total of 149 animals. Soon after the start it was evident that the group of 5 farmers did not meet expectations and their heifers were replaced in another region (50 heifers total). At present there are still 92 animals left from the original group. The heifers calved in 2016. A few heifers aborted, but 90 calves were born. Of these 60 heads are still on the farms (54 females and 6 bulls). Most of the bull calves were sold. In 2017 already 70 cows calved for a 2nd time, 16 are pregnant and 6 are still empty. The cows were all inseminated by the president of the coop, who is a qualified veterinarian and responsible for project monitoring and supervision. It appears that reproduction is quite satisfactory.

The milk is delivered at the MCC that belongs to the coop. Non-project farmers are also welcome to deliver their milk to this MCC. The daily volume varies from 1.3 – 1.8 tonne and is collected every other day by AER, a company that makes ice cream. The coop managed to obtain a fixed price throughout the year of 0.55 AZN/kg, which is better than average for smallholders. The farmers are paid according to the fat content of the milk (measured with a simple Bulgarian lactoscan). The administration showed that many farmers delivered milk with a fat content of 3% or even less and thus received a lower price for their milk (0.50 AZN/kg) than those who managed to supply milk with > 3.5% fat. The reason for this fairly low fat content was not clear: nutrition, skimming milk, standardization of the tester? Under good management Simmental cows would have a better milk composition. AER does test the tank milk on antibiotics and farmers that are not careful risk to be excluded from further supply.

Nutrition is of course the key to production and health and on the farms visited hay from natural grass and alfalfa was fed to the animals. Some farmers had planted maize for silage, but could not harvest the crop, as there was no chopper. A serious concern, that needs to be solved. With a milk production of 15-

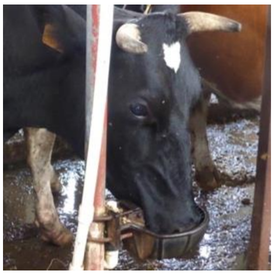
[10] 'Integrated Rural Development Project'

20 kg/cow day, an adult Simmental cow would need 10-12 kg DM (dry matter) of fodder per day, plus 6 -8 kg concentrate depending on the various feeding values. In Imishly the farmers were feeding alfalfa hay and hay from natural grass (ratio 1: 2) plus various concentrates, depending on availability. With the current prices such a ration would cost 4.5 – 5.0 AZN/cow/day – the equivalent of 9-10 kg milk. In addition there are the dry cows and young stock to feed, costs for health care, reproduction and perhaps hired labour. On top of that loans for housing and heifers have to be repaid. It is clear that a raw milk price of 0.50 AZN is no luxury and that efficient management is a must.

Although the general impression of the farms was positive and the farmers seemed to be happy with the results, there was one fundamental mistake that needs to be avoided in future: the design of the barns. An attempt was made to build a free housing system with cubicles, but all dimensions were wrong. Moreover, instead of open sides, windows were so high that any fresh air would go over the cows. A cheaper and more animal friendly barn has to be introduced for this type of farms.

The barn with extra air inlets made by the owner.

Inside: cubicles were removed



Water pressure was not enough, so cows could not drink enough. A bathtub solved the problem. Cubicles that had no use and a walking area that was far too narrow…

Although improvements in implementation are needed, this approach of concentrating areas with potential for dairy development and bringing farms to a scale where the returns provide an attractive family income, should be expanded further. Basic criteria are for achieving good results are:

- Careful selection of farmers (proven ability to manage cows and eager to become fulltime dairy farmer);
- Farmer has sufficient resources to manage his business: land availability for fodder crops, funds to purchase all feeds in time and to avoid shortages, able to make the necessary investments for all required inputs;
- Reliable outlet for raw milk and realistic prices for good quality milk;
- Training and guidance during the first years of establishment on all aspects of modern dairy farm management, in combination with good veterinary care and AI services;
- Housing systems that are adapted to the environment, with attention to animal welfare and good working conditions for the farmer. Cost effective!
- Animals that match the management capacity of the farmer: HF cows more difficult to manage than Simmental or Brown Swiss.

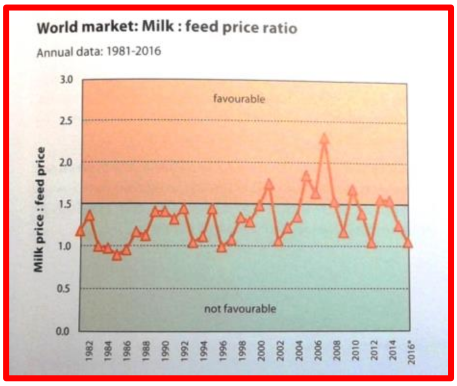
Large-scale dairy farms are even more complex to manage and require substantial investments before becoming operational and profitable. Substantial differences in performance can be seen from the available data and farm visits made as part of this study. The present raw milk price large farms obtain vary from 0.60 – 0.70 AZN/kg. This should be enough to cover all direct costs and repay for the investments made within 7-10 years (depending on performance). Here too staff training is an essential part of the task of the management. Clear SOPs (Standard Operational Procedures) are helpful to achieve the correct standards of work.

Large-scale dairy farm with Simmental cows

A choice has to be made again for the best breed for a specific farm: is milk the main objective or is milk & beef a better combination; is the management level high enough to let the HF cows achieve their genetic potential? Detailed feasibility studies would be needed to determine the best option for a specific farm, but no doubt both options are feasible for Azerbaijan.

The International Farm Comparison Network (IFCN) does detailed studies on milk production costs and dairy development in a very large range of countries. Azerbaijan is just taking part in IFCN, but has not yet reached the stage of making cost price calculations for specific farm types according to the IFCN approach. It would certainly be interesting if this can be done on a routine base for the future. Meanwhile we can look at a simpler approach to determine farm profitability: the feed price ratio. If the milk is more than 1.5 times the price of feed, the balance is positive. The graph below shows that during the past 35 years the ratio fluctuated enormously, most of the time below the desired 1.5 ratio and sometimes much higher.

In Azerbaijan the cost of grain is 0.37 AZN/kg and the cost of soybean cake (as the supplier of proteins) is 0.70 AZM/kg. A good dairy mix contains 70% grain and 30% soybean cake or similar product. The concentrate cost would thus be 46.9 AZN/kg against 0.70 AZN/kg for raw milk: feed: milk price ratio of 1.49. Just on the correct side of the line! With a slightly lower milk price, the situation would be less attractive.



Although this calculation is just indicative, it is clear that dairy farming is only attractive if the business is properly managed. One farm manager informed us that his cost price was 0.42 AZN/kg milk. If this covers all direct costs, than there is enough surplus for repaying loans and making a margin. It must be said that this was a well-managed farm with high yielding cows. Of course, the devaluation of the manat has increased production costs, especially for the large farms that depend more on imports (e.g. spare parts for farm equipment and milking parlours, feed ingredients, consumables). All farms visited were looking at ways to reduce costs and saw producing their own feed and fodder as one of the best options. Now much feed is still purchased, as the farms do not have enough land to grow their own crops. This means that farms are now in need of arable land, which is not easy to find.

The statistical yearbook of 2017 for 'Main economic indicators of agricultural enterprises and private owner farms' gives the following data for cost and sales (Table 4.3A and B):

Table 4.3A Agricultural Enterprises – milk production cost and sales prices

Item/Year	2000	2011	2012	2013	2014	2015	2016
Cost price	21.12	33.77	33.80	36.45	35.21	33.20	34.67
Sales price	20.41	43.2	46.34	52.30	47.40	49.66	49.84
Margin	-0.71	9.43	12.54	15.85	12.19	16.46	15.17

Table 4.3B Private owner farms – milk and dairy products cost and sales prices

Item/Year	2000	2011	2012	2013	2014	2015	2016
Cost price	10.18	27.70	27.50	27.45	28.30	29.26	31.25
Sales price	19.72	45.80	45.50	48.90	50.66	51.09	53.36
Margin	9.54	18.10	18.00	21.45	22.36	21.83	22.11

Source: State Statistical Committee. Note: the yearbook mentions 'milk' for the enterprises, but refers to 'milk & dairy products' for the private farms. This may indicate that on the farms more home processing is taking place.

The SSC-data differ from the field observations, where large farms are obtaining higher prices for their raw milk after the devaluation of the manat and the cost-price of milk production is now more than 42 AZN/100 kg. For smaller and medium-sized farms the costs- and revenues will be different, as they work with more local products and have less bargaining power with the dairy plants. In all situations there seems to be a realistic profit margin under good management.

4.6 Beef production

Beef production is not so much a specialised sector, but most local cattle can be considered dual purpose: if there is an outlet for milk, the dairy side develops and otherwise milk is for local use and the bulls are kept for beef. Milk gives a regular income, while beef is a good way of saving money that can be used when needed. When the focus is more on beef, extensive grazing is practised on winter- and summer pastures.

The dominant cattle breed in Azerbaijan is the Caucasian Brown. This breed has been developed in the period 1930 –1960 by crossing the local Caucasian breeds with the Brown Swiss breed from Switzerland, the Kostroma breed from Russia and the Lebedin breed from Ukraine. These last two breeds are also crosses between original local breeds and the Brown Swiss and Ayrshire. The Caucasian Brown has been officially approved as a separate breed in 1960. Within the breed three production types could be distinguished: the dairy type animal, the dairy-beef type and the beef-dairy type. Herd-book cows have a shoulder height of 123-130 cm. The bulls weigh 760-800 kg. The breed is further characterised by a relatively short body and strong legs and feet. The milk production of these herd-book animals can be as high as 3200-4000 kg with 3.8-3.9 % of butterfat. Presently the pure Brown Caucasian is difficult to find as for the past years there has not been any controlled breeding and their milk production potential has gone down.

The Black and White cattle breed was quite common during Soviet times, especially on the larger farms, but with the disappearance of these farms their number has been reduced too. The production potential of the Caucasian Brown or the Black and White breed is not fully exploited with quoted production levels of 1000–2000 kg of milk annually and some improvement can be achieved through better feeding and management. However, years of uncontrolled breeding have reduced the genetic potential of all cattle and breeding programs are essential to achieve substantial changes in both meat and milk production.

The same happened to the Red Gazakh cattle: this local breed was developed through national selection and was mainly found in the regions of Agstafa, Tofuz, Gazakh and Gedebey. The adult cows reach a live weight of 380-400 kg and their milk potential is 1900-2000 kg/year. The breed is known for its hardiness and resistance to diseases but these days there are very few pure Red Gazakh cattle left in the country.

The Azerbaijan Buffalo became a recognized breed in 1970. An adult female can produce 1300-1500 kg/year, with 8% fat. The adult live weight of a buffalo-cow is 400-500 kg. The Azeri buffalo can be found in all parts of the country and had a total population of 137,200 buffalo-cows in 2009 (11% of the total cattle population).

Cows at a market in Azerbaijan; in front a local Black & White cow, all others belonging to the Caucasian brown type of animals. None of them was looking very productive.

Domestic meat production has gradually increased over the years, except for pork, as shown in the table below.

Table 4.3: Meat production in Azerbaijan, live weight, 1000 tonnes

Product/Year	2000	2005	2010	2015
Beef & veal	125.8	159.8	191.4	227.6
Mutton & goat	98.2	108.7	145.3	150.0
Pork	1.8	2.6	1.1	1.0
Poultry	30.9	40.0	55.8	54.8
Total	256.7	311.1	393.6	433.5

Source: State Statistical Committee

Expressed in slaughtered weight (including the bones of the animal) the local production shows the following picture:

Table 4.4: Meat production in Azerbaijan, slaughtered weight (*), 1000 tonnes

Product/Year	2000	2005	2010	2015
Beef & veal	78.4	95.9	112.4	129.8
Mutton & goat	49.5	53.7	70	70.9
Pork	1.4	2.2	0.8	0.7
Poultry	29.3	46.3	61.7	97.2
Total	153.6	198	244.9	298.6

Source: State Statistical Committee (*) similar to carcass weight

The difference between live weight and carcass weight (slaughtered weight) generally is 55-65% for cattle, 50% for sheep, 75-80% for pigs and 75% for broilers. With exception of the broilers (poultry) the ratio between live weight and carcass weight looks fairly realistic. For some unknown reason the carcass weight of poultry is much higher than their live weight. The pure meat is again some 50% of the carcass weight but in most countries the consumption per capita is calculated according to carcass weight and Azerbaijan is not different in that respect.

On wholesale markets cattle were sold in 2015 for prices that varied from 290 AZN to 424 AZN per 100 kg live weight, depending on the region. The average price, as quoted by the State Statistical Committee, was 322 AZN/100 kg in 2015. There is no differentiation for cows and bulls, but we may assume that bull fetch a better price as consumers have a preference for bull meat.

Over the past 15 years beef prices doubled, but in recent years there was hardly any increase as shown below in Table 4.5:

Table 4.5 Sales prices for beef (AZ overall) AZN/100kg (2000, 2005, 2010-2015)

Year	2000	2005	2010	2011	2012	2013	2014	2015
Price per 100kg	84.56	159.99	266.20	296.10	320.00	322.60	322.50	322.00

Source: State Statistical Committee

The statistical yearbook of 2017 for 'Main economic indicators of agricultural enterprises and private owner farms' gives the following data for cost and sales:

Table 4.6 Agricultural Enterprises – cost and sales prices beef (2000, 2011-2016 – AZN/100 kg)

Item/Year	2000	2011	2012	2013	2014	2015	2016
Cost price	155.27	237.14	228.74	276.25	261.69	283.72	342.30
Sales price	89.57	289.6	339.78	349.7	319.08	303.4	338.21
Margin	-65.7	52.46	111.04	73.45	57.39	19.68	-4.09

Source: State Statistical Committee

In 2016 there were 1592 registered agricultural enterprises, employing a total of 14,639 persons: overall average 9.2 persons per enterprise. It appears that these enterprises are generally fairly small, or that they work with contract labour, which is not listed in the statistics. As the useful land area was quoted as 135.4 ha on average, non-registered labour seems the more likely option.

Table 4.7 Privately owned farms – cost and sales prices beef (2000, 2011-2016 – AZN/100 kg)

Item/Year	2000	2011	2012	2013	2014	2015	2016
Cost price	74.52	199.57	209.72	211.69	220.16	223.65	233.16
Sales price	84.56	296.10	320.00	322.60	322.50	322.00	341.18
Margin	10.04	96.53	110.28	110.91	102.34	98.35	108.02

Source: State Statistical Committee

Registered privately owned farms numbered 1,468 in 2016, with 5,666 family members working on the farm plus 1,461 employees. Thus on average 4.8 persons were actively involved per farm. The useful area per farm averaged 20.3 ha.

If we compare the profitability of the agricultural enterprises with the private farms, there are some striking differences:

- Cost prices are substantially lower on the private farms, while
- Sales prices show much less difference, resulting in
- Higher margins for the private farms.
- In 2016 the private farms managed to increase their margin, as their cost price did not increase as much as on the agricultural enterprises.

Productivity in terms of labour requirements in relation to production output is low on both types of farms. Per 100 kg live weight gain, both the agricultural enterprise and the private farm need on average 260 hours. In 2016 both farming types managed to reduce the labour needs slightly to almost 250 hours/100 kg live weight. A full-time job would be 2000 hours/year (40 week, 50 weeks/year). This means that 1 person would be needed to rear 3-4 local bulls per year.

If we look at feed cost, we can make the following calculations: a farmer rearing a local bull for meat, reaching 400 kg live weight in 18-20 months, will have to feed roughage at a level of 1.5-2.0% dry matter of the body weight, plus some additional concentrates. Assuming that half of the roughage comes from grazing, at little cost and the other half of the fodder has to be purchased (natural grass hay and/or alfalfa hay), the roughage costs would be around 250 AZN. Additional concentrates at 0.40 AZN/kg could amount to 400 AZN and the milk supplied till the moment of weaning would have a value of 140 AZN. Thus, total feed cost will reach almost 800 AZN. His bull may sell for 1,400 AZN, leaving a margin of 600 AZN to cover all other costs and his own family income.

The revenue for a culled cow would be lower, but then that cow may have given an income for milk and a few calves. A healthy breeding cow, pregnant or with calf will fetch a higher price if she looks promising.

For the commercial farmer with Simmental cows, fattening of the bulls can also be attractive. Simmental bulls can reach a weight of 450 kg in 12-13 months and sell at 4.8 AZN/kg live weight or 2,160 AZN. Of course the feed intake will be higher than for a local bull, but as the rearing period is shorter this is partly compensated. A ration with maize and alfalfa silage, complemented with sufficient concentrates will cost some 2.0 AZN/day average. That totals around 800 AZN for the whole rearing period, including milk replacer or fresh milk. Even with higher costs for housing and management, the margin is attractive enough to invest in beef production. The demand for premium beef comes from the better supermarkets in Baku and the restaurants: a market that is far from satisfied.

5. Processing industry

5.1 Milk processing

For a number of years there were only two major private milk-processing plants, the Azerbaijan Dairy Corporation (ADC) and Milk-Pro Limited. Meanwhile ADC has gone out of business, but Milk-Pro developed its capacity to more than 100 tonnes per day. Then two new dairy plants became operational: Pal Sud in Lankaran with a processing capacity of 150 tonnes per day and Belisuvar-Agro in Belisuvar with a processing capacity of 100 tonnes per day. Shortly after four new players entered the field: Atena, Azersun, Gilan and Milla, with a combined capacity of more than 600 tonnes per day. In addition there are some 80 smaller processing units, most of them with a capacity of less than 3 tonnes per day.

Table 5.1: The main formal processing companies are listed below.

No	Name	Product range	Installed capacity (one shift)	Actual use (Approximate)
1	Milk-Pro	Complete range	100 t/day	40-60 t/day
2	Pal-Sud	Complete range	150 t/day	60-80 t/day
3	B-Agro	Milk powder, butter & qatig	100 t/day	50-60 t/ day
4	Atena	Complete range	250 t/day	25-35 t/day
5	Azersun	Complete range	100 t/day	40-50 t/day
6	Milla	Complete range	150 t/day	50-60 t/day
7	Gilan Terter	No production at present	10 t/day	Closed since 2010, will start soon
8	Gilan Gebele	No production at present	10 t/day, expanding	Temporarily closed since 2013
9	Gilan Zaqatala	No production	20 t/day	Closed since 2012
10	Gilan Agjabedi	No production	20 t/day	Closed since 2011
11	Gilan Tovuz	No production at present	10 t/day	Closed since 2011, will start soon.
12	Barda Dairy	Cheese, yoghurt, cream, butter	40 t/day	10 t/day

Within a very short period the total formal processing capacity increased from less than 200 t/day to more than 950 t/day in one shift, which means that at full use even 2000 t/day could be processed. In 2015 the total annual raw milk production was estimated at 1.9 million tonne or just over 5,000 tonnes per day. Of all this milk the formal dairy plants collect some 300-350 tonnes daily. Small milk processing units, operating at 1-3 tonnes per day, may collect another 100 tonnes per day. Based on these data, we may assume that 90% of the total milk production is either used for home consumption or processed at home and sold on the open market. Or, if we take the FDMS data for total milk production, 1,176 million tonnes (39% less than the official statistics!), then home consumption is likely to be far less than assumed.

The formal dairy plants all meet HACCP and ISO standards. These are all modern and relatively new facilities. They all aim at producing a high-quality product, which is easier with milk that meets international standards. Smallholders cannot reach these standards, but the major dairy farms can and are therefore the more attractive suppliers.

Display of dairy products in a Baku supermarket

Some samples of the product range of the main processing plants, plus the retail prices at the supermarkets are shown in the table below. Dairy products are well displayed in the supermarkets.

Table 5.2: Retail prices 2017 (average of several supermarkets in Baku)

Suppliers	UHT 3.4% fat	White cheese*	Smetana 25%	Butter	Yoghurt fruit	Yellow cheese	Qatig (**)
	AZN/kg	AZN/kg	AZN/kg	AZN/kg	AZN/kg	AZN/kg	AZN/kg
M-Pro	1.52	8.20	7.35	-	-	13.70	??
PalSud	1.74	??	??	-	-	-	1.96
B-Agro	-	-	-	14.60	-	-	??
Milla	1.68	6.64	4.63	18.72	3.48	-	1.81
Atena	1.68	7.84	6.60	-	-	-	1.97
Azersun	1.72	7.70	6.26	-	-	-	2.29

*packed cheese (**) qatig is the same as plain yoghurt

B-Agro earlier only produced milk powder and butter, mainly for industrial purpose (e.g. bakeries). Nowadays qatig (plain yoghurt) has been added to their products. The powder production provides an opportunity to utilize the surplus milk in summer in an effective way and at the same time reduces the imports of milk powder and butter.

Dairy products in Baku are well presented and take a substantial part of the shelves. Many brands, including foreign, are available with a large variety in products. Outside Baku, in the regional cities and towns, the supply is much smaller, but some of the leading local brands are always available. Supermarkets also offer a wide variety of fresh, local white cheese from a wide range of suppliers. This is one of the products that is in high demand and which might have export potential.

If we compare the prices of local products with those imported from various other countries, we can see substantial differences. The range of products, however, differs as well: fruit yoghurts are mainly imported, as are the various kinds of hard cheese. Butter, mainly Anchor from New Zealand, is also an important product. In the Section 6 on Marketing we will see more about volumes and origin of imported products.

Pro-milk (Sevimli Dad) next to Russian and Turkish UHT-milk (left) and butter of different origin and price (right).

Since 2015 the State Statistical Committee presents retail prices separately for local and imported dairy products. Until then there was just an average price per product. The new system gives a good insight in price development and differences (see Table 5.3). Imported UHT-milk ('sterilised'), cream and brinza are clearly more expensive than the local brands and all products have shown substantial price increases in recent years as a result of the devaluation of the manat. Sterilized milk remains more or less the same, but this may also be caused by a shift towards cheaper foreign suppliers. The higher price for imported products does create new opportunities for the local dairy companies. Hard cheese and fruit yoghurt are luxury products that now mainly come from abroad.

The prices are all per kilo, but packing is in various quantities. Fruit yoghurts normally are 115 gram cups, while butter is available in packs of 200, 250, and 500 gram or cut from 5 kg blocks. Similar types of packaging are used for other products. In general we can say that the smaller the package, the higher the price per kilo.

Table 5.3: Average retail prices for a few selected dairy products (in AZN)

Locally produced dairy products	Unit	2015	2016	2017
Non-pasteurized milk	1 liter	0.73	0.85	0.79
Sterilized whole milk	1 liter	1.33	1.42	1.55
Butter	1 kg	6.16	5.89	10.09
Brinza (special type of cheese)	1 kg	4.82	5.06	5.42
Cream (xama)	1 kg	3.73	4.10	5.03
Imported dairy products	**Unit**	**2015**	**2016**	**2017**
Sterilized whole milk	1 liter	2.11	2.38	2.21
Butter	1 kg		9.10	11.91
Brinza	1 kg		7.33	7.17
Cream (xama)	1 kg	6.25	7.83	8.26
Solid and soft cheese, with rennet yeast	1 kg	7.48	9.26	11.87
Curd cheese	1 kg	7.82	10.26	12.69
Dry milk mixture for baby food	1 kg	19.65	24.66	29.22

Source: State Statistical Committee

The above products and prices are just meant as an indication of what is available on the market. The prices for butter in the picture on the previous page are substantially higher than those mention in table 5.3 as there are two quality types of butter: the cheap one is used for baking, while the more expensive one is used on bread. In hard cheese there also is quite some difference in quality: in high-end supermarkets quality cheeses can be bought for up to 25 AZN/kg. Price differences for the same product are a matter of pricing and marketing by the various shop owners.

We can conclude that none of the formal dairy plants is working at full capacity, as good quality milk supply is limited and there is too much seasonal variation to cope with. This means that the indirect costs (e.g. depreciation, interest, labour) per kg product are high. A lower cost price for dairy products can only be achieved if the costs for raw milk go down (more productive cows, more milk per farm, and better distribution throughout the year) and installed capacity can be used more effectively. This is the main challenge for all existing and new dairy plants.

The Azeri consumer still has a preference for fresh dairy products and this offers good opportunities for local producers and small traders. If a farmer can sell the milk in the village or at a nearby market, he/she can obtain 0.60-0.80 AZN/litre in winter. Butter and white cheese production are attractive if sufficient milk is available for home processing and marketing. In various green markets that were visited some 8 to 10 farmers were trading on a daily basis. They used their own milk plus that of some of their neighbours. Prices obtained depended largely on quality and fat content of the white cheese. Assuming that 7 litres of milk is needed for 1 kg full cream cheese, which sells at 6-8 AZN/kg, these farmers can make a substantial margin on their production costs.


Cheese producer and seller at a green market in Khachmaz

However, the majority of milk producers are not in a position to create this extra income. Partly because they produce their milk at a time when there is a surplus (spring and early summer) and prices are low, and partly because milk collection systems are not developed yet and local markets are too far to be attractive.

5.2 Beef processing

Most of the beef that is produced in Azerbaijan goes to the local butchers for slaughter and direct consumption. Only a limited part is used for further processing at one of the meat processing companies. Most of these companies are located in or around Baku, where they also have access to the main markets. The main meat processing companies are listed below in Table 5.4.

The annual processing volumes vary from 4606 to 8056 tonnes, which is only a small percentage of the available processing capacity (10-15%). Part of the processed meat comes from imported frozen meat (see Section 6), while the other part is purchased locally. For sausage production 3rd quality beef is good enough and considerably cheaper than 1st grade beef. Culled cows are the main source for sausages, while most bulls are used by the local butchers for direct sales of beef or by the processing companies for making prime cuts of beef and veal.

Two of the larger meat processing companies that were visited had their own facilities for housing the cattle during a short period. There the animals were checked on health, kept without feed for 24 hours to empty the rumen and after slaughter the carcasses were directly moved to the cold store. Then, after another 24 hours at least, the meat will be processed in steaks or sausages. One of the companies used to import live animals from the EU for premium beef. After the devaluation of the manat this became too expensive and import duties and taxes are 36% on top of the higher costs. Good bulls are difficult to find locally, so production decreased. In addition the demand for premium beef went down as well as the purchasing power of the population also went down. Now production focuses more on sausage production.

Table 5.4: Meat processing companies

Region	Name of company or physical persons (brand names)	Actual production (tonne/year)	Processing capacity, tonne/year
Absheron region	"Səhliyalı kiçik müəssisəsi"	300-800	3000-5000
Absheron region	"AY-MİN MMC" (Flagman)	300-400	3000-4000
Absheron region	"Halal dad" MMC	300-500	3000
Absheron region	Nuriyev Emil Nizami oğlu	200	4000
Absheron region	"Zəhmət Ruzi" MMC (SAB)	300-500	3000-5000
Baku city	«İlahə - 96» İ KM	300-500	3000-5000
Baku city	Şərifov Ruslan İsmayıl	100-150	1000-2000
Baku city	«M/T» LTD	500-1000	5000-10000
Baku city	«Avrora» firması	400-600	3000-5000
Baku city	«Orxan SS» firması	300-400	5000-8000
Baku city	«Ovçular» MK	400-500	4000-5000
Baku city	«Al Sema» firması	200-350	4000-5000
Baku city	«Hakan Food» Az.Tic.	350-500	3500-4500
Baku city	Tahirov Malik Ağaşirin	400-600	3000-5000
Baku city	Orxan-SS	100-800	2000-5000
Baku city	Bakkol ət məhsulları istehsalı	50-100	1000-2000
Baku city	Əli-Əkbəroğlu şirkəti	100-150	1000-2000
Goygol region	"Turan-Sənan" şirkəti	3	5
Ganja city	Elba' MMC	3	10

Source: Ministry of Agriculture

The slaughterhouses were modern, ISO-certified and halal certified. The premises looked well maintained and would meet international standards. This type of slaughterhouse and processing facility would also qualify for export of the products.

Modern slaughterhouse, visited during the sector assessment. The design and maintenance meet international standards.

Unfortunately not all slaughterhouses meet the above standards, especially among the smaller ones unsanitary premises and poor hygiene can be found, as presented in an article published by Axar.az, with the pictures that are shown below.

Not all slaughterhouses meet modern standards

Those processing companies that wish to develop their market share already invested in good processing and packaging facilities and make sure that they meet all modern standards. This will also make it easier to develop their export markets.

With the further development of the supermarkets, urban consumers will gradually purchase more and more packed meat. A similar development took place in West-European countries and signs in Baku already point in that direction.

Besides the various cuts of meat for the dinner table, the market for sausages is attractive. The procedures are still based on Russian technologies and even today the imported sausages from the Russian Federation are much appreciated by the consumer. As for sausages cheaper meat can be used, the local producers should be able to compete successfully.

In all supermarkets sausages take plenty of space on the shelves

6. Markets and marketing

6.1 Milk marketing

Milk and dairy products are an essential part of the local diet and this is clearly visible in the shops: every shop has at least a variety of milk, cheese, butter, yoghurt and yoghurt drinks. If the shop is larger, the variety in brands as well as the product ranges increases. Supermarkets will also have a range of hard cheeses, which is less common in the small and regional shops. In addition to packed and branded products, it is also common to find white cheese, yoghurt and cream in bulk in the smaller shops and supermarkets.

Table 6.1: Resources and utilization of milk and dairy products (in milk equivalents)

	2010	2012	2014	2015	2016
Stocks beginning year	172,641	119,739	158,195	164,815	22,115
Production	1,535,753	1,695,588	1,855,838	1.924,542	2,009,901
Import	647,229	642,255	581,753	366,035	288,488
Total resources	2,355,623	2,457,582	2,595,786	2,455,392	2,320,504
Animal feed	47,112	46,248	48,848	46,206	23,668
Consumed	2,099,713	2,206,834	2,321,031	2,345,715	2,276,938
Export	-	47	6,019	6,262	5,753
Losses	37,210	52,140	55,073	35,094	9,232
Stocks end of year	171,588	152,313	164,815	22,115	4,913
Total utilization	2,355,623	2,457,582	2,595,786	2,455,392	2,320,504
Population ('000)	8,997.6	9,235.1	9,477.1	9,593.0	
Per capita consumption	233.4	239.0	244.9	244.5	205.0 (*)

Source: State Statistical Committee of Azerbaijan and consultants' calculation of 'per capita', except for 2016 (MoA data).

Milk used for animal feed is less than 50,000 t/year. With a cow population of 1.3 million heads we may assume that the number of calves born each year is around one million. For calf rearing some 250-300 kg milk would be needed, which would add up to 250.000 – 300.000 t/year. Perhaps here only bucket fed milk is included and suckling calves are left out of the calculation.

The total imports in 2015 are estimated at 16% of the total consumption. Between 2010-2012 this was around 30% and in 2013-2014 the imports went already down to 25%. As consumption per capita remained more or less stable, this would indicate a clear substitution of imports by local production. In 2016 the figure comes close to a 10% import volume.

A growing share of local products on the shelves of the supermarkets

The FDMS data for milk production give a complete different picture. If we assume that the other SSC data are correct and we only replace the production values, the consumption of milk and dairy products would be much lower than assumed, while the share of imports would increase substantially as shown in Table 6.2 on the next page. Reliable data are essential to obtain a clear understanding of the sector and to make policy decisions for the development of the dairy sector.

Table 6.2: Comparison between SSC and FDMS 2015 data on resources and utilization

Item	FDMS	SSC
Stocks beginning year	164,815	164,815
Production (FDMS & SSC)	1,176,297	1.924,542
Import	366,035	366,035
Total resources	1,707,147	2,455,392
Animal feed	46,206	46,206
Consumed	1,597,470	2,345,715
Export	6,262	6,262
Losses	35,094	35,094
Stocks end of year	22,115	22,115
Total utilization	1,707,147	2,455,392
Population ('000)	9,593.0	9,593.0
Per capita consumption	166.5	244.5

Source: FDMS and State Statistical Committee

The per capita consumption would be 78kg lower than expected, while the share of imported dairy products would be 24% instead of 16% in 2015.

The Baku market with almost half the population of Azerbaijan differs from the rural areas in consumption and purchasing power. Until 2010 the premium segment of the market, about 10% of the total market, was almost completely supplied by imported products, mainly from Russia, Germany and Turkey and a growing demand for premium quality dairy products was expected at that time. Now we have a period with low oil prices and a manat that is almost half the value it had before devaluation (against the US$). In addition we have more professional local dairy companies that can successfully compete on the market with a wide range of high quality, well-packed and branded products. Available data for 2016 show a further downward trend for most imported dairy products. Consumption of butter and cheese also went down in a similar range.

Table 6.3: Import of various dairy products 2010 - 2016 (MT)

	2010	2011	2012	2013	2014	2015	2016
Milk & cream 1-6%	12,961	16,694	10,980	11,878	9,783	8,668	
Milk & cream > 6 %	592	562	282	240	178	168	
Milk powder		2,265	2,220	2,402	2,504	1,635	
Butter	20,890	20,923	21,469	21,644	21,776	10,906	8,357
Cheese	7,204	6,890	6,037	11,465	11,717	9,102	6,540
Kefir, yoghurt, smetana ..	9,242	16,003	12,533	9,463	9,543	8,778	

Source: State Statistical Committee of Azerbaijan.

The sourcing of dairy products differs: UHT-milk mainly comes from Belarus, Russian Federation, Turkey and the Ukraine, while milk powder is mainly supplied by New Zealand and more recently by the Ukraine. New Zealand still is by large (60% of total volume) the main supplier of butter, followed by Germany, Belarus, Finland and France. Cheese is coming from Germany, Denmark, Lithuania, Russian Federation, Finland and Belarus, listed in order of volumes supplied.

It appears that with the development of the local processing industry since 2011, competition with imports of milk & cream, as well as the various types of yoghurt, was already successful. Hard cheese production in Azerbaijan is very limited - at present only M-Pro produces packed slices of yellow cheese - so imports remained high until 2015. Self-sufficiency in butter was less than 70% in 2015 and still many foreign brands are available in the supermarkets. Dairy statistics do not show a sharp increase in local butter production in 2015, but only a sharp drop in imports. Therefore consumption must have gone down; most likely butter has been replaced by margarines.

Even with the new dairy plants in place, we see that in the rural areas the population still follows the traditional ways. Home processing is very common and part of the processed home products is sold on the market, in addition to the milk directly sold to neighbours or at the local bazaars. Only where the dairy plants have established milk collection systems, the pattern of sales and consumption changes.

Part of the white cheese and butter, the main products of home processing, are finding their way to the markets again and according to FDMS 34.4% of all milk is used for home consumption, while 65.6% is sold as raw milk or processed.

At the green markets that were visited, both in Baku and the regions, there was a good supply of local dairy products. Both farmers and traders come to these daily markets and find consumers that strongly believe in the natural quality of the various types of white cheese, yoghurt, butter and fresh milk.

Table 6.4: Prices per kg at local bazaars and green markets for fresh dairy products

Bazaar		2011	2017
Product	Description	Price (AZN)	Price (AZN)
White cheese	Cow milk full fat	8.00 - 10.00	9.00 – 11.00
White cheese	Cow milk medium fat	4.00 - 6.00	6.00 – 7.00
White cheese	Cow milk low fat	3.00 - 5.00	4.00 – 5.00
White cheese	Sheep milk, full fat	10.00	12.00
Fresh Milk		0.60	0.70
Butter		6.00	10.00
Cheese (shor)	Very young, not solid	2.00	2.00
Yoghurt	Cow milk, standard	1.00 - 1.30	1.00

Note: Plain yoghurt is mostly referred to as ‘qatig’.

Prices of white cheese vary substantially, mainly depending on the fat percentage in the cheese. According to the traders there is no need to be afraid of competition from the new dairies as buyers like to come to the bazaar. If they can afford it, they will buy the best quality. In summer the above-mentioned prices may drop by 30% as during that period there is a surplus of milk. The difference in prices for 2011 and 2017 is less than expected. The devaluation of the manat did not affect the production costs for the smallholders as much as it did for the large-scale farms. Butter is the main exception, with a substantial increase in retail prices. It is remarkable that in general there is a preference for Azeri products and that many people like to buy at the green markets, with the idea that the quality of those products is ’pure and natural’. In reality these products are made from the same milk, often without pasteurization and without any food inspection or quality control. While most milk is produced during the summer period, the demand for dairy products is highest in the winter period. Especially in Baku, the largest market for dairy products, this pattern in demand is most noticeable.

Research by FAO in Baku together with local experts related to retail channels of agriculture products, showed that the traditional "collective farm markets" still have a strong position in retail (Table 6.5).

Table 6.5: Structure of agricultural products purchase channels of the population

Product name	Traditional markets	Super-markets	Small local shops	Traveling salesperson	Gifts, fairs, home, etc.	Does not buy
Milk (industrial)	0,0%	44,1%	5,4%	0,0%	0,2%	51,2%
Milk (rural)	8,7%	0,7%	5,4%	47,4%	17,8%	25,1%
Dairy products (industrial)	1,1%	62,0%	9,6%	0,0%	0,4%	29,7%
Dairy products (rural)	16,0%	0,7%	4,1%	29,6%	25,2%	32,1%
Beef	22,1%	12,5%	62,8%	2,5%	7,0%	2,6%

Source: FAO Office, Baku/Roadmap.

What we see is that urban consumers – mainly in Baku - buy their milk in the supermarket, while the people in the rural areas either produce their own, or buy from a local shop or salesman. The same we see for dairy products, but here we see that the rural people are not all processing their own milk and have to obtain the products from nearby suppliers. Beef is mainly sold from local butchers and supermarkets only play a limited role.

6.2 Beef marketing

Wholesale trade of live animals and animal meat happens in 28 markets across 23 cities and districts of the country. The largest wholesale markets of live animals are in Agjabadi, Sumgait and Imishli, followed by Barda and Goygol regions. From here many heads of cattle is transported to Baku, which is the largest market for beef. In Sumgait city there are also many meat cutting and selling centres. As the Veterinary Service does need maintain weekly records, numbers vary according to season and from market to market. The most recent data are presented in Table 6.6.

Table 6.6: Wholesale markets of live animals (2017)

Region	Name of the Market	Weekly volume (heads)	
		Cattle	Sheep
Agjabedi region	Xəlilov Rizvan Haqverdi oğlu	2500	4000
Sumgait city	Mərcan firması	800	250
Goygol region	Göygöl diri mal bazarı	350	800
Imishly region	"Market- Sell" ASC	300	500
Geychay region	Həsənov Həsənağa	200	500
Agdash region	Əzizov Məhəmməd	200	300
	Sub-total	4350	6350
	Total all 28 open markets	5509	10417
	Share top 6 markets	79%	61%

Source: Veterinary Services of MoA

Cattle and sheep market in Imishly

The markets are an important source of trading animals, but in addition farmers sell sheep and cattle old directly to butchers. Information from MoA and supporting interviews resulted in a detailed list of 2062 butchers, 461 shops that only sell meat and 17 slaughterhouses. Together these meat processors slaughter and sell 8,504 heads of cattle and 17,403 heads of sheep weekly.

If we look at the data for beef production, we see a steady, but limited growth of total production. Imports increased sharply after 2010, but went down in recent years. In 2017 another sharp increase in imports took place, for which there is no clear explanation yet.

Table 6.7: Production and imports of beef (tonnes, production as carcass weight)

Indicators / Years	2007	2011	2012	2013	2014	2015	2016
Beef production and imports							
Production	98,444	115,471	118,410	120,799	122,370	129,753	130,984
Import	5,620	16,972	11,355	20,703	18,398	12,404	9,245
Import (as % of production)	6%	15%	10%	17%	15%	10%	7%

Source: State Statistical Committee of Azerbaijan.

With weekly some 8,500 head of cattle slaughtered, the total number per year would be around 425,000 head. Not enough to reach the production volume as mentioned above for 2016, as the average local cow does not weigh much more than 400-450 kg and only 55-65% of that is carcass weight. Of course it is well possible that more animals are slaughtered than officially registered.

Most of the imported meat is frozen and to be processed further as sausages or types of salami. Prime cuts of chilled and fresh meat are mainly used for restaurants and supermarkets.

Prime cuts of beef for restaurants and high-end supermarkets

Table 6.8: Import volumes and values for beef (2006, 20011-2016)

	Fresh or Chilled				Frozen		
	Tonne	Value ('000 US$)	Value US$/tonne		Tonne	Value ('000 US$)	Value US$/tonne
2006	1813	1717	947.2	2006	4338	4706	1085.0
2011	35	192	5518.7	2011	5499	8560	1556.7
2012	13	134	10421.7	2012	3849	6540	1699.2
2013	17	190	11230.0	2013	5106	12034	2356.9
2014	87	622	7144.8	2014	4335	9235	2130.3
2015	16	125	8027.5	2015	5043	10773	2136.3
2016	11	245	23045.2	2016	5225	13370	2559.0

Source: State Statistical Committee of Azerbaijan.

Fresh or chilled meat was mainly imported from India until 2006, then the imports dropped drastically. Various countries, including France, Uruguay, UAE and Australia, supplied small quantities of beef. More recently beef is also imported from the Russian Federation.

Frozen meat is mainly obtained from India, although here too a shift has taken place towards imports from the Ukraine. All other countries play a small role in imports of boneless meat or meat with bones, but not carcass.

Table 6.9: Imported frozen meat (tonnes, 2006, 2011-2016)

Year	Frozen, boneless				Frozen, with bones, but no carcass			
	India	Ukraine	Others	Total	India	Ukraine	Others	Total
2006	3165		65	3230	759		224	983
2011	5367		92	5459			35	35
2012	3477		260	3737			0	0
2013	3188		16	3204			0	0
2014	2976	133	273	3382		99	7	106
2015	721	191	299	1211	1926	1119	0	3045
2016	287	1290	362	1939		3054	7	3061
Totals	19181	1614	1367	22162	2685	4272	273	7230
Share	86.5%	7.3%	6.2%	100%	37.1%	59.1%	3.8%	100%

Source: State Statistical Committee of Azerbaijan.

The share of frozen, carcass and half-carcass beef was only 12% of all frozen meat that was imported during the above period. Here Ukraine controls the market with a share of almost 91%.

Table 6.10: Import of frozen meat (tonnes, 2006, 2011-2016)

Frozen, carcass and half-carcass (tonnes)						
Year	India	Ukraine	Hungary	Moldova	Others	Total
2006	100				38	138
2011					24	24
2012					0	0
2013		1802	100		0	1902
2014		848			0	848
2015		694		92	0	786
2016		222			2	224
Total	100	3566	100	92	64	3922
%	2.5%	90.9%	2.5%	2.3%	1.6%	100%

Source: State Statistical Committee of Azerbaijan.

Frozen meat is important for the production of sausages: it can be easily stored and used when needed. In Section 5 we saw that the meat processing companies produce from 4,606 - 8,056 tonnes of salami and sausages per year. That would be a major share of the total imports of frozen meat (around 5,000 t/year), with just a limited need for local beef if production would be in the lower range.

Consumers have a strong preference for meat that is fresh and of a known source. They need to have confidence in the butcher and/or supplier and point out the cut from the carcass that they need. Most meat is sold to consumers at the same day the animal is slaughtered, so there is no time for ripening of the meat. Boiling meat is therefore common practice in many households, as otherwise the meat is not tender enough. In Baku the modern supermarkets are making efforts to change this attitude and to install confidence in the consumers that packed meat is safe and healthy. A gradual change is indeed taking place

A disadvantage of the present system is that small neighbourhood shops having a significant market, do not meet food safety requirements. Meat inspection and handling would need improvement and at government level the development of a network of retail channels of agricultural products is being discussed. Locations have already been defined for 3 such trade centres in Baku and relevant design work has been carried out for their construction. In addition to improve the sales infrastructure of agricultural products there is a need to step up efforts to establish to create meat cutting and selling centres conforming to relevant requirements. Establishing wholesale markets specializing in agricultural products in various regions of the country is considered particularly relevant.

Official statistical data on meat prices show a steady increase over the years, with a stronger increase for most products in 2017. Bony beef and mutton are almost similar in price, with boneless meat as a premium product. Poultry is the cheapest source of meat and this might explain the sharp increase of poultry consumption in recent years. For many Azeri families meat is a luxury product.

Table 6.11: Meat prices of various products (in AZN – period 2013 – 2017)

Name of the product	Unit	2013	2014	2015	2016	2017
Bony beef (chopped, weighted)	1 kg	7.61	x	x	x	9.62
Boneless meat (steak)	1 kg	9.96	10.19	9.76	10.09	12.00
Bony mutton	1 kg	9.03	9.24	9.15	8.93	9.91
Chicken	1 kg	3.35	3.33	x	x	4.19
Chicken leg	1 kg	2.55	2.81	2.94	3.03	3.09
Additional chicken products	1 kg	3.39	3.26	3.18	3.36	4.94

Source: SSC, types of meat varied during previous years in the statistics.

Prices of the products sold in the supermarkets network is higher than average market prices due to relevant taxation, but so are the prices at small shops in the yards of residential buildings due to their small turnover. In general the prices for beef vary from 10- 12 AZN/kg, with little difference between the various cuts. The customer points out which part he wishes to buy and settles the price. Examples of various types of beef and poultry at the Bravo supermarket give an indication of prices of packed meat.

Table 6.12: Meat prices at 'Bravo' supermarket for various products (2017)

Name of the product	English name	Unit	Price (AZN)
Lamb:			
Quzu langet	Lamb fillet	1 kg	16.50
Quzu qabirga premium	Lamb ribs premium	1 kg	13.85
Quzu bel	Lamb loin	1 kg	14.85
Quzu fars	Lamb minced meat	1 kg	11.49
Beef:			
Langet	Roast steak	1 kg	14.50
Dans bud eti	Veal leg	1 kg	13.75
Mal etinden	Beef minced meat	1 kg	8.89
Dana	Veal	1 kg	12.49
Chicken:			
Fresh chicken		1 kg	3.77
Packed Saba chicken (halal)		1 kg	4.39
Packed Tamli chicken		1 kg	3.99

Consultant's survey

Lamb and beef at the 'Bravo' supermarket

Based on the official data for consumption of meat, we can estimate the consumption per capita and make a comparison with other countries.

Table 6.13: Consumption of meat and per capita consumption (2007, 2011-2016)

Indicators / Years	2007	2011	2012	2013	2014	2015	2016
Beef	103,558	131,297	126,321	139,345	139,353	143,014	139,742
Mutton & goat	58,702	70,216	70,538	72,086	70,176	71,901	75,834
Pork	5,257	4,841	2,917	2,072	3,931	4,029	6,617
Poultry	82,535	85,627	97,351	95,445	100,741	100,130	119,899
Total meat consumption	250,052	291,981	297,127	308,948	314,201	319,074	342,092
Population ('000)	8666.1	9111.1	9235.1	9356.5	9477.1	9593.0	9705.6
Consumption per capita	28.9	32.0	32.2	33.0	33.2	33.3	35.2

Source: State Statistical Committee of Azerbaijan.

The consumption in Azerbaijan was 35.2 kg/year of meat in 2016, including the imports (7% of total consumption in 2016) (Table 6.14). If we compare that to some of the neighbouring countries, we see similar consumption levels, except for Russia and the 28 EU countries.

Table 6.14: Comparison of meat consumption (carcass weight, 2015)

Type of meat	Azerbaijan	Ukraine	Turkey	Russia	Iran	EU 28	World
Beef & veal	14.9	6.6	8.3	12.1	2.9	10.8	6.4
Pork	0.4	13.6	0.0	18.3	0.0	33.0	12.5
Poultry	10.4	22.8	16.5	26.4	23.1	22.7	13.5
Sheep	7.5	0.4	4.1	1.1	3.2	1.8	1.7
Total consumption	33.2	43.4	28.9	57.9	29.2	68.3	34.1

Source: OECD-FAO Agricultural Outlook (Edition 2016)

An article by the "Turan" independent news agency on 'Meat Shortage in Azerbaijan' dated March 2017, explains the concerns and possible reasons for the rising meat prices. The Turan IA survey showed that '… families of 4 people with average income consume about 4 kg of meat a month or 12 kg per person per year, which is 2.5 times less than the MCB requirements and 7 times less than WHO standards. Then what kind of self-sufficiency is in question?'.

The survey may not be fully accurate (meat consumption is measured in carcass weight and the survey may have recorded boneless meat, which would then have to be doubled: 24 kg instead of 12 kg per capita per year), but even in that case the question of self-sufficiency remains interesting:

- Is Azerbaijan for 90% self-sufficient with an official consumption of 35 kg meat per capita, or
- Would demand be much higher if the disposable income of the population would be higher?

The author of the article questions the reliability of the statistical data – meat production would be substantially lower than indicated – and identifies possible causes for increased meat prices: pastures turned in arable land, increased cost of meat imports and wholesale transport cause a reduced supply and thus higher production costs.

Without an Identification & Registration (I&R) system it is extremely difficult to obtain and process reliable information. Statistical data will have to be treated with care and surveys will help to obtain a fairly realistic picture of a sector. There is no doubt that disposable incomes are relatively low in Azerbaijan for the average family. One of the supermarkets conducted a survey on this topic and came to the conclusion that an average family has an income of 1300 AZN per month, of which 350 AZN is available for food purchases at supermarkets. This limits the spending to 3 AZN per person/day, which means that priorities have to be made on what is needed. Meat may not always have the highest priority.

7. Policy and business environment

7.1 Government policy

On 6 December 2016, the President signed Decree No 1138 approving the Strategic Roadmaps for National Economy and Main Economic Sectors. The roadmaps include the developmental prospects of the national economy (a national economic outlook) and focus on eleven major sectors of the economy, including the manufacture and processing of agricultural products. The outlook includes a detailed short-term action plan for 2017-2020, a long-term strategy for the period covering years until 2025, and a vision for the post 2025 period.

For agriculture the main objectives that have been listed are:

- Strengthen sustainability of food security;
- Increase production potential of agricultural products along the value chain;
- Develop agricultural production;
- Enhance science and an information-consulting services system;
- Develop market infrastructure and facilitate access of producers to the market;
- Form mechanisms of sustainable utilization of natural resources;
- Improve business climate in the agrarian field; and
- Enhance welfare in rural areas.

For all objectives, targets and priority areas have been established. Several areas are directly related to animal production and are mentioned here:

- Form a food safety system that covers all stages of the value chain and is based on a risk assessment approach, as there is a need to bring the food safety system into line with the standards of the European Union and the relevant international organizations and to increase the safety and quality of products.
- Enhance agricultural production capacity along the value chain to substitute import products in the domestic market and develop export markets (e.g. beef & dairy). Here reference is made to the IFAD-project to develop dairy clusters in Imishli, Barda and Agjabadi.
- The provision of financial resources for producers, the present insurance system and the risk management mechanism should all be improved and made more functional.
- Improve access and quality of production means and services, including:
  - Development of the land market;
  - Facilitation of access to irrigation water;
  - Improved provision of production technology, machinery and equipment;
  - Development of the seed and seedling market;
  - Improvement of the supply of fertilizers and plant protection means;
  - Development of the production of compound feed and fodder;
  - Development of livestock breeding and veterinary services.
- Improve the quality of agricultural education, conduct scientific research in agriculture and improve the mechanisms for application of the findings, and form an information and consultancy services network that meets the needs of the agricultural sector.
- Develop the market infrastructure in order to reduce losses in post-harvesting phases, enhance product quality and most importantly, improve access of producers to the market. This would include support to create a network of slaughterhouses that comply with relevant veterinary and sanitary standards.
- Environmental protection: readjust the mechanisms for management of water resources in agriculture and apply appropriate control mechanisms and standards to avoid a negative impact on water, land and other natural resources as a result of the expansion of agricultural activities.
- In addition to improving governance in the agrarian sector, it is also important to improve the policy of state support to agricultural producers based on the development goals and to adapt it to new circumstances and WTO standards. A system for monitoring and assessment of the results of agrarian policy will be needed, as well as a regulatory system that meets the requirements of the market economy. The creation of the "Electronic agriculture" information system is important in terms of increasing transparency and effectiveness in governance.

The above issues are all very relevant to the development of the dairy & beef sector. We already mentioned that the small scale of farming is a serious constraint in the formation of a competitive agricultural sector and it is encouraging to see that this point also has been addressed. Reducing the share of employment in agriculture and increasing income of farmers and employees is essential to attract young motivated people. At present, average nominal monthly wage in agriculture is twice less than average nominal monthly wage in the country. It is also extremely important to develop alternative fields of activity and stimulate employment in non-agricultural fields with a view to raise employment rate of the rural population.

Commercial dairy farms need a scale that can give an attractive family income. That means enough cows with acceptable production levels and enough land to feed them and their offspring properly. Work of establishing an Electronic System of Cadastral Registration of Land Plots has started and the system will improve the state mechanism for land resources management, and state control will be implemented more effectively. It will also serve as a database on issues such as stimulation of the land market, transparency of the market, and bringing non-agricultural lands to agricultural use.

The Electronic agriculture" information system can be used for many purposes, all extremely useful. Directly related to the dairy & beef sector are reliable statistical information on farms and cow performance, an animal identification system that gives full control of the movement of livestock and their diseases, a database of information on implementation of veterinary control and services.

State support to develop dairy farming will be needed, as mentioned in the Roadmap, but more information on the results of the present support programs is needed. Importing high-grade livestock and selling them to local producers on preferential terms is not always successful. Many farmers do not have the skill to manage these cows, which results in poor performance of the cow and loss to the farmer. The subsidy for each calf born by way of artificial insemination is far more attractive, but needs careful recording and monitoring.

7.2 Access to finance and financial planning

Without investments there is no development and for many years after independence the investments in agriculture were very limited. In recent years the interest in agricultural development has grown and government now plays a more active role. However, if we look at Table 7.1, it is clear that loans for agriculture are still a small – and decreasing - percentage of the total amount.

A steady growth in loans took place until 2014, but in 2016 the total amount went down to almost half of 2014. This may have been caused by a lower demand for loans, as margins went down due to the devaluation of the manat, or less funds are available for lending.

Table 7.1: Sectoral breakdown of loans (end of period)

Years	Loans to Agriculture and Processing Sector, (Million Manats)	Share in total loans (%)
2005	97.6	6.8
2006	136.5	5.8
2007	197.2	4.2
2008	261.5	3.6
2009	394.8	4.7
2010	441.3	4.8
2011	466.7	4.7
2012	546.2	4.5
2013	733.3	4.8
2014	847.3	4.6
2015	508.1	2.3
2016	441.3	2.7

Source: CBAR

7.2.1 Smallholders and micro-credits

Investments are needed to reach higher levels of production and to reach acceptable quality standards. However, for the small farmers with an average milk price of 0.35 – 0.45 AZN and production levels below 1500 kg/cow it is difficult to make enough profit to make these necessary investments.

For the smallholder credits are expensive (>25% interest rate) if available at all and therefore returns on investment should be clear and safe. Milk processing is seen as a way to create added value to the raw milk, but this does not change anything with regard to the basic production problems. There are several micro credit suppliers that are alo involved in the agricultural sector, some of these are Agrarkredit, Access bank, and Cred Agro. Business Development Services (BDS) help applicants with a business plan, of which the main purpose is to obtain the loan. Most of these BDS organizations were established through earlier projects and are now working as independent companies (see the section below for more details on BDS).

The micro-credit system is generally seen as a very positive tool towards development, but where companies in western countries can borrow at interest rates of less than 6%, small farmers in Azerbaijan have to pay three to four times more for their loan. This is partly because the management of small loans is more expensive, but another important factor is that each of the fund suppliers has to make a margin. Often there are several banks and organizations involved before the credit reaches the farmer. Bankers may also consider agriculture as a high-risk sector to lend to, although there is evidence that nearly all loans are repaid. Loans for seeds or fertilizers, with a short repayment period, are still manageable for the farmer. Loans for investments in cattle production need more time for repayment and therefore become very expensive.

Agroleasing can also be considered a credit supplier through its leasing system. Other commercial lease-companies do exist, but none of them is involved in agricultural production.

7.2.2 Commercial and soft loans

For the agricultural sector we can distinguish two types of loans:

- General commercial loans by various banks, and
- Soft loans, provided by
  - The State Agency on Agricultural Credits under the Azerbaijan Ministry of Agriculture or
  - The Azerbaijan National Fund for Entrepreneurship Support

Commercial loans: these loans are available under various terms and conditions and are not specified by any concession for the agricultural sector. In May 2017 32 commercial banks and 47 non-bank credit institutions provided commercial loans. The annual interest rates generally are 19%-25% and based on real estate as collateral.

Soft loans:

A. The State Agency on Agricultural Credits (SAAC) under the Azerbaijan Ministry of Agriculture gives loans for:

- Production and processing;
- Reclamation of irrigated lands;
- Modernization and development of the food sector (including storage);
- Agricultural machinery and chemicals;
- Pilot projects; and
- Breeding farms, etc.

Table 7.2 Soft loan types

Type	Amount (AZN)	Repayment Period	Grace period month
Micro	<1000	Up to 2 years	12
Small	1000-20 000	Up to 3 years	18
Medium	20 000 -50 000	Up to 3 years	18
Large	50 000 -200 000	Up to 5 years	24

These loans are issued to the clients by agent banks. The Agency issues loans for agent banks with <2% annual interest rate. Agent banks have the right to add 5% maximum. Thus, entrepreneurs and farmers get loans at an annual interest rate of 7% or less.

Table 7.3: Approved loans for investments by SAAC (Million AZN)

Year	Number of projects	Total Amount
2011	205	16.5
2012	227	15.0
2013	302	17.7
2014	426	14.8
2015	540	15.7
2016	233	11.4

Source: State Agency on Agricultural Credits

B. The Azerbaijan National Fund for Entrepreneurship Support (ANFES) gives loans for:

- Livestock complexes for the production of meat and milk;
- Green supermarkets (farm shops);
- Agro-parks;
- Enterprises for processing of fruits and vegetables;
- Large farms;
- Feed production facilities;
- Greenhouses;
- Farms producing fruits and/or cultivation of seedlings;

Table 7.4 Loan types provided by ANFES

Type	Amount (AZN)	Repayment Period	Grace period month
Small sized loans	5 000 - 50 000	Up to 3 years	Max 18 months
Medium sized loans	50 001 - 500 000	Up to 5 years	Max 30 months
Large sized loans	500 001- 100 million	Up to 10 years	Max 60 months

Interest rates of ANFES loans are 1%. Agent banks issue the loans and have the right to add 5% maximum.

Table 7.5: Approved loans for investment projects by ANFES (Million AZN)

Years	Agricultural sector	Various industrial and other fields	Total Amount
2011	101	51	152
2012	164	79	243
2013	170	81	250
2014	253	57	309
2015	252	54	305
2016	151	39	190

Source: Azerbaijan National Fund for Entrepreneurship Support

Interest subsidies are an effective tool to stimulate investments in agriculture and dairy development. Households that wish to make the move from subsistence farming to professional farming have to make substantial investments. They can only do this if the risks are minimized (e.g. through supply contracts) and the costs are justified. larger companies may have eaiser access to finance, but also have to make substantial investments that can only be justified if interest rates are acceptable. As in livestock investments come 1-2 years before sufficient revenues can be expected, it is crucial that there is enough time for loan repayment, with a realistic grace period.

7.3 Advisory- and support services

Donor organizations and NGOs have been working on agricultural development for quite some years and part of these activities was the establishment of so-called centres for 'Business Development Services'. The service-suppliers assist farmers with business plans and obtaining credits, they provide extension services and try to link input suppliers with potential clients.

When the projects come to an end, these BDSs are expected to continue on a commercial basis. As farmers do not have much cash income and often are not willing to pay for advice, this is not an easy task. Most of the income from the BDSs comes from contracts with donor organizations: a client based relationship with clearly described tasks and results. Some examples of BDS involved in livestock production are Agro Information Center (AIM), Humanitarian and Social Support Center (UMID) and Janub Agribusiness Center (JAC).

If we look at support services in relation to dairy & beef development, we can conclude without any doubt that there is a need for information and advice. Most households received a few cows during the process of privatization, but that did not make them dairy farmers and managers. Their production system is based on tradition and minimizing risks. If the dairy sector is to develop further, there will be a need for more professional and larger dairy farms. The new generation is not eager to get involved in subsistence farming, but might be attracted if dairy farming is seen as a business.

There are limited government extension services, but there are government veterinarians. However, most of these field-based veterinarians get their main income from providing private services. This means that in practice there is no effective government service in support of dairy & beef development.

A survey carried out by Qabus among 987 farmers all over Azerbaijan gave some interesting results and largely confirms what is presented in various reports and statistical data:

<u>Herd and basic management</u>

- 81.3% of the participants own 1-5 milking cows and 51.1% have less than 3 ha of land, while 32.5% own 3-10 ha.
- 95.5% of the farmers use their own land for feeding the cows. In addition 47.8% is purchasing additional fodder, mainly alfalfa hay. 75.8% of the farmers take their animals out for grazing, mainly in the neighbourhood of the farm or in the own yard.
- Compound feed is not common, but grain (wheat, barley) is fed by 89% of the farmers, while wheat bran is used by 43%. Part of the grain is produced on the farms.
- Milk production averaged 5.1 litre/day with a lactation period of 215 days. That would total less than 1,100 litre/cow/year. There was hardly any difference between farm sizes (5 groups).

<u>Services</u>

- 93.4% of the farmers were satisfied with the veterinary services.
- 40.6% of the farmers know about artificial insemination (AI), 52.6 have some information and 6.8% do not know about AI. 57.9% claimed to have used AI in the past, but 30% was not satisfied and stopped. 411 respondents were satisfied.
- 22.1% of the farmers make use of some form of extension services, mainly through the local veterinarians.
- The 77.9% of farmers that do not use extension services claim they do not need advice, as they already 'know enough'.

Market

- 46.7% of all milk is either consumed at home or sold as raw milk. The remaining 53.3% is processed at home –either for home use or sales.
- ± 25% of the production is sold (61.1% as raw milk, 39.7% processed), which means that ± 75% of the milk is used for home consumption.
- Traders and dairy companies purchase 48% of the milk, while direct sales in the village and local markets count for 41%. The remaining 11% milk finds various other routes to the market.
- More than 50% of the farmers mentioned that there was no nearby milk collection point.
- 88% of the meat is sold in the form of live animals, while 12% of the meat is from animals that are slaughtered at home, with or without help of a butcher.

With an average of 2 cows per family and 5 kg/cow/day (if both are in milk) it is not surprising that 75% is used for home consumption – butter, cheese, yoghurt and drinking milk. Data from SSC indicate that about half the processed milk is sold (37–54% depending on product), which would be 10% more than the survey showed.

7.4 Association building

Individual farmers are difficult to reach for any service provider or donor organization. They are also weak partners in marketing their products and for purchasing inputs at better rates. This combination of factors makes it interesting for them to form associations.

Often the word 'association' is until recently connected with the idea of "collective" and has a negative sound. In many countries farmers have united in cooperative systems, which proved to be very effective. In those cases production is the responsibility of the individual farmer, while the group takes care of marketing and inputs.

In Azerbaijan the forming of associations has been attempted by a number of NGOs, with varying degrees of success. Failures may have several reasons, such as:

- Formal registration of associations is problematic, which does not encourage farmers to participate;
- There is no clearly defined goal which the farmers bind together;
- Some large farmers have all the benefits, while others hardly see any advantage; and
- Lack of management skills and transparency in financial issues.

In many cases a simple form of cooperation, without formal registration, but with a few clear goals can be very effective such as: marketing raw milk as a group (offering a larger quantity and of better quality), purchasing inputs in sufficient quantities to obtain discounts, attracting AI services and/or extension services.

7.5 Animal health and disease control

The State Veterinary Control Service under the Ministry of Agriculture is the main state agency responsible for animal health in the country as regulated by the Law of Azerbaijan Republic on Veterinary (May 31, 2005).

The Veterinary Service has a Central Unit of 36 persons and 5 divisions:

- The veterinary offices (regional, local, laboratories and cabinets) with a total staff of more than 2600 persons;
- The veterinary laboratories (1 central and12 regional laboratories plus the veterinary inspection department (1), control points near Absheron (3) and the borders (42). Total staff 385 persons.
- The Republican Epizootic and Zoonotic Disease Expedition with 33 staff members;
- The State Veterinary Service of Nakhichevan AR, with various departments and more than 400 staff members. The majority of these persons work at the 8 regional and 168 local veterinary stations;
- The Veterinary Scientific Research Institute and the Azerbaijan Biological Plant-Economically based enterprise together have a staff of almost 170 persons.

In the cities and towns of the country, 60 persons are engaged in private veterinary activity and 440 are officially engaged in purchase and sale of veterinary medicines. In addition it is known that most of the government vets and veterinary assistants also provide private services to farmers.

Important tasks in disease control are the preventive and compulsory vaccinations against anthrax, foot-and-mouth disease, brucellosis, rabies and other infectious diseases. The costs of these vaccinations are carried by the State.

Reportedly[11] the present, measures for improvement of public policy on veterinary field continue in two directions:

i) Focus on eradication of epizootic and zoonotic diseases and strengthening of effective control in this field in frames of food safety and risk management as a direct task of the state in the veterinary area;
ii) Transfer the work on providing farms with relevant veterinary services to private sector and expansion of the private veterinary network to this end.

A study and Masterplan on the privatization of veterinary services was prepared through a World Bank program, but implementation was delayed by the Ministry of Agriculture, most likely as it is difficult to hand over responsibilities and loose control. Change is always difficult!

In general, an integrated action plan on creation of an effective system on monitoring and control over health of animals and plants in line with OIE Terrestrial Animal Health Code needs to be prepared and implemented with a view to improve risk management with respect to animal in the country.

7.6 Food safety control

Animal disease control and food inspection are not only important for health protection of the Azeri population, but also influence the export potential of animal products.

An article in the Azerbaijan Economic Reforms Review gives a detailed description of the present and future role of Food Inspection[12]. The article starts with the following statement: 'The food safety control system of the Republic of Azerbaijan significantly differs from international requirements and best practices. This system does not ensure complete food safety in the country. Food safety system of Azerbaijan needs to meet the requirements of the European Union and respective international organizations. It is also necessary to increase quality and safety of products and remove duplication in activities of different bodies involved in control of food safety in the country.

At present there are various organisations in Azerbaijan involved to food inspection activities. However, on 10/02/2017 the President signed a decree on additional measures to improve the food safety system in Azerbaijan. To ensure the implementation of state control for all stages of food production in Azerbaijan, the 'Food Safety Agency' will be created. The Agency will start its activities by 1st of January 2018. The organizations presently involved in the process are listed below:

- State Committee for Standardization, Metrology and Patent - control over compliance of production of certified products with relevant standards;
- Ministry of Economy (State Service for Antimonopoly Policy and Consumer Rights' Protection) - control over compliance of products in the market with requirements of standards;
- State Phyto-sanitary Service - control of plants and plant products;
- State Veterinary Control Service - control over live animals and animal products, and the
- Ministry of Health - control over health of workers (in production)

It is expected that the Food Safety Agency, which will exercise single control function, will improve the food safety control system and its transparency, while duplication and ineffective organization will be removed.

[11] Roadmap for Agriculture Production and Processing
[12] Center for Analysis of Economic Reforms and Communication, Dr Vusal Musayev, Editor-in-chief, February 2017

7.7 Identification and registration (I&R)

Already in 2007 it was agreed during a meeting led by ICAR in which 18 countries in the Caucasus region participated that there was a need for an I&R system as there is a risk of spreading animal disease through the movement of animals within and between countries. Such an animal identification and traceability scheme was necessary to:

- To secure a favourable animal health status through the facilitation of disease control and eradication;
- To strengthen livestock breeding and production, including improved farm management;
- To enable proof of ownership and identification for insurance purposes;
- To meet sanitary requirements in order to facilitate national and international trade; and
- To promote food safety and consumer confidence

It was also agreed that 'the competent authority for animal identification and traceability is the veterinary administration. The maintenance of databases and application of identification devices can be done according to the specific needs and requirements of individual countries'. While the government was to: 'provide for the legislative framework (laws and regulations) for identification and traceability conducive to the implementation of effective identification and traceability schemes'.

Based on the Order of the Ministry of Agriculture on "Measures for establishment of identification and registration system of cattle", a working group has been set up and started to realise the action plan developed for this purpose. Along with this, technical support works have been started within the "Agricultural Competitiveness Improvement" project for the identification and registration system of cattle.

The Terms of Reference were developed for the selection of international consultant to be involved for developing the terms of reference on establishment and application of identification and registration system of cattle and necessary works are being done in this direction.

At present all is ready to start actual implementation of the I&R system. The possible approaches have been worked out and presented to the Ministry, but a final decision still has to be made. Not all key-players are familiar with the modern systems of I&R and this means that acceptance of change is more difficult.

Further delay of implementing the I&R system will have a negative impact on livestock development: the above mentioned reasons clearly indicate the need for such a system, certainly now the focus is more on developing the export potential for livestock products. Without proper health control and traceability system other countries will not allow imports from Azerbaijan.

8. Conclusions and suggestions for investment opportunities

We can distinguish two major objectives to invest in the dairy & beef value chain:

- Government investments in order to improve the sector's business environment, and
- Commercial investments with the aim to develop a sustainable and profitable business.

With the recent investments in milk processing, there is a strong impulse to develop dairy farming further. The demand for raw milk increases and assuming that farmers will receive an attractive price for their milk, they will be motivated to invest in improved breeds, better nutrition, higher milk quality and more animals per farm.

At present approximately 39% of the working population is involved in agriculture, but the contribution of agriculture is only 6% of the GDP. Young people tend to move away from the rural areas and prefer working outside agriculture. The household-type of farming does not offer enough perspective for the future, but good alternatives are difficult to find in the countryside. The government has a social responsibility and should find ways to create employment for the rural population, but not necessarily in agriculture.

The continued support of the government will be needed, as facilitator and creator of a conductive environment for private sector development. This will require regular meetings between government and dairy sector key-players to set priorities for solving specific issues, discuss trade barriers and to reach agreement on approach (tasks private sector and government). A subsidy system that stimulates investments is required. Agroleasing was a first step, but their prices are still too high to be really attractive. Land availability is another important issue: too many small plots and not enough land available for commercial farm development.

The new developments in dairy production also require technical advice and support. This can be provided by existing service providers, veterinarians and advisors hired by the dairy plants. A constraint is that extension staff has not been able to obtain much experience on modern dairy farming, as there are only very few high productive farms in the country and no practical training centres to develop new skills. Training of trainers will be needed to meet the requirements in skills and know-how in the field.

The marketing of dairy products is limited by the lack of raw milk and the relatively high costs for raw milk: the modern dairies already know which products are in demand and how to compete with the imported products, but the next target is export of typical Azeri products such as white cheese. This opens the road for commercial investments in dairy farming. At the same time there is a shortage of good quality beef, so both markets can be served by the same enterprise.

With a raw milk price of 0.70 AZN/kg it will be possible to have a good return on investment. A detailed feasibility study will be required to determine the margins that can be made under the present conditions, and the investments needed to improve access to feed and fodder of high quality, improve housing and management, and the supporting services such as veterinary and extension services. Another important calculation to be made is the balance between milk & beef for the various breeds: will Holstein Frisian be more profitable than Simmental under Azeri conditions or is a dual-purpose type of animal more attractive?

Much is still to be done to develop the dairy & beef sector, but it is very encouraging to see the investments made in expanding the processing capacity and the growing attention that is given by the Government to agricultural development in general. In many countries the processing industry is the engine for dairy & beef development. Through them trade barriers can be addressed, quality standards can be developed and technical support can be provided to milk suppliers.

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Appendix 1: Acknowledgements

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Appendix 2: Regional milk production data (in tonnes) from SSC and FDMS, 2015

HASC	Region	SSC Milk production	FDMS Milk production	Production difference	Difference in %
AZ.BA	Baku city	4.058			
AZ.XI	Khyzy region	12.080	3.356	-8.724	-72%
AZ.AR	Absheron region	42.861	5.084	-37.777	-88%
AZ.SQ	Sumgait city	1.121			
AZ.GA	Ganja city	588			
AZ.QZ	Gazakh region	30.009	4.239	-25.770	-86%
AZ.AF	Agstafa region	16.642	6.883	-9.759	-59%
AZ.TO	Tovuz region	32.453	30.201	-2.252	-7%
AZ.SM	Shamkir region	54.608	34.671	-19.938	-37%
AZ.GD	Gedabey region	43.139	17.562	-25.577	-59%
AZ.DS	Dashkesen region	22.713	2.992	-19.722	-87%
AZ.SX	Samukh region	16.737	13.185	-3.552	-21%
AZ.XR	Goygol region	23.540	13.813	-9.727	-41%
AZ.GR	Goranboy region	36.114	33.525	-2.589	-7%
AZ.NA	Naftalan city	305			
AZ.BL	Balaken region	20.556	8.963	-11.593	-56%
AZ.ZQ	Zagatala region	43.179	15.690	-27.489	-64%
AZ.QX	Gakh region	15.857	6.515	-9.342	-59%
AZ.SK	Sheki city	55.692	34.703	-20.989	-38%
AZ.OG	Oghuz region	16.084	4.655	-11.429	-71%
AZ.QA	Gabala region	36.591	42.586	5.995	16%
AZ.AA	Astara region	30.126	4.080	-26.046	-86%
AZ.LN	Lenkaran city	32.885	29.459	-3.427	-10%
AZ.LE	Lerik region	15.644	14.953	-691	-4%
AZ.YR	Yardymly region	17.332	11.058	-6.274	-36%
AZ.MA	Masally region	49.018	45.782	-3.236	-7%
AZ.CL	Jalilabad region	82.940	26.420	-56.521	-68%
AZ.QR	Gusar region	27.755	34.730	6.975	25%
AZ.XZ	Khachmaz region	48.640	19.140	-29.500	-61%
AZ.QB	Guba region	38.277	21.340	-16.937	-44%
AZ.DV	Shabran region	15.485	7.032	-8.453	-55%
AZ.SY	Siyazan region	12.199	3.855	-8.344	-68%
AZ.GY	Geychay region	24.935	33.638	8.703	35%
AZ.BQ	Beylagan region	39.457	22.241	-17.216	-44%
AZ.AC	Agjabedi region	89.088	70.862	-18.226	-20%
AZ.BR	Barda region	69.047	25.588	-43.459	-63%
AZ.NE	Neftchala region	24.325	9.713	-14.613	-60%
AZ.BS	Bilasuvar region	27.693	22.889	-4.804	-17%
AZ.SL	Salyan region	45.000	16.397	-28.603	-64%

AZ.YV	Yevlakh city	36.534	20.985	-15.549	-43%
AZ.MI	Mingechevir city	1.167			
AZ.AS	Agdash region	43.761	48.780	5.019	11%
AZ.UC	Ujar region	38.781	34.038	-4.743	-12%
AZ.ZR	Zardab region	31.871	40.721	8.850	28%
AZ.KU	Kurdamir region	41.786	19.592	-22.194	-53%
AZ.IM	Imishly region	49.020	22.104	-26.916	-55%
AZ.ST	Saatly region	38.253	57.577	19.324	51%
AZ.SB	Sabirabad region	97.771	24.590	-73.181	-75%
AZ.HA	Hajigabul region	17.217	2.581	-14.636	-85%
AZ.AB	Shirvan city	1.892			
AZ.CB	Jebrayil region	6.704			
AZ.FU	Fizuli region	20.321	21.898	1.577	8%
AZ.AM	Agdam region	33.312	17.989	-15.323	-46%
AZ.TA	Terter region	17.742	20.114	2.372	13%
AZ.XC	Khojaly region	5.560			
AZ.SU	Shusha region	1.835			
AZ.XD	Khojavend region	1.680	999	-681	-41%
AZ.KA	Kelbajar region	17.396			
AZ.LC	Lachin region	20.350			
AZ.QD	Gubadly region	638			
AZ.ZG	Zangilan region	459			
AZ.QO	Gobustan region	18.042	8.028	-10.014	-56%
AZ.IS	Ismayilly region	34.868	39.616	4.748	14%
AZ.AU	Agsu region	29.419	7.125	-22.294	-76%
AZ.SI	Shamakhy region	23.146	11.470	-11.676	-50%
	Nakhchivan AR	80.244	80.244	0	0%
AZ.NX	Nakhchivan city	1.360			
AZ.SR	Sherur region	26.854			
AZ.BB	Babek region	12.504			
AZ.OR	Ordubad region	5.634			
AZ.CF	Julfa region	9.321			
AZ.BB	Kengerli region	8.564			
AZ.SH	Shakhbuz region	14.265			
AZ.SD	Sadarek region	1.742			
		2.004.786	1.176.247	-828.540	-41%