

From Andijan to Nukus:

A field survey of Uzbek veterinary HEIs, dairy farms and industry

BUZNet Consortium

13th to the 23rd of March 2018



Co-funded by the
Erasmus+ Programme
of the European Union

Special thank you to:

- all the farm and factory owners and people at the state veterinary laboratories that received us as and provided us the valuable information depicted in this report;
- all the colleagues at the 4 Uzbek HEI that organized the visits and provided language translation for the foreign members of the field team;
- to UPorto team in Porto for organizing travel, accommodation and administrative tasks for the field trip.

INDEX

- 1. SUMMARY**
- 2. INTRODUCTION**
- 3. THE TEAM**
- 4. THE ITINERARY**
- 5. FIELD DATA COLLECTED**
 - 5.1 HIGHER EDUCATION INSTITUTIONS (HEI)**
 - 5.2 FARMS**
 - 5.3 MILKING PROCESSING PLANTS**
 - 5.3 VETERINARY LABORATORIES AND PHARMACEUTICAL FACTORY**
- 6. MAIN CONCLUSIONS**
- 7. COMPLEMENTARY DATA**
- 8. ANNEXES**

1. SUMMARY

This report describes the main information/data collected during the BuzNet project field visit to Uzbekistan that took place from the 13 until the 22 of March 2018. The field visit was conducted by a team of Uzbek and European experts with the aim to collect direct data from HEIs where Veterinary Medicine, Zootechnical or related degrees are taught, from animal farms and milk processing plants as well as from veterinary laboratories located in Uzbekistan mainly around Andjan, Tashkent, Nukus and Samarkand.

The information obtained during this field visit, and gathered in this report, provides a clear idea of the current situation of the Uzbek livestock sector, organization of veterinary services, dairy industry and veterinary and zootechnical education, allowing to identify areas of potential intervention of the BUzNet project.

2. INTRODUCTION

The B-learning Uzbekistan Veterinary Network / BUZNet project is being implemented by a consortium of 4 European HEIs and 4 Uzbek HEIs. The general objective of the project is to increase the life standards of common Uzbek people through better veterinary and zootechnical teaching, which ultimately will result in better technical support for local herds' owners and safer animal products reaching the general society.

To do this was first needed to be sure about what we were dealing with. Thus, with the aim to get a deeper knowledge of the Uzbek situation regarding the Veterinary Medicine Education, Farm Animal Production and Dairy Products Quality Control a field work with visits to Uzbek farms, dairy industries and HEIs was conducted by a team of Uzbek and European experts in order to collect direct data and have a clear idea of the exact Uzbek situation with regard to these subjects.

The field visits took place from the 13 until the 22 of March 2018. In total four HEIs, where Veterinary Medicine or related degrees are taught, were visited: 1st - Andijan Agricultural Institute - AAI; 2nd – Tashkent State Agrarian University – TSAU; 3rd Nukus Branch of Tashkent State Agrarian University – NuTSAU; 4th - Samarkand Agricultural Institute – SamAI. In Andijan region a total of two dairy farms (one bovine the other mixed bovine and goats), one milk processing plant facility and two state veterinary laboratories, one regional and the other for a local market, were visited. In Tashkent region, we visited four farms (three dairy bovine and one mixed dairy cattle and Hisar sheep) and one milk processing plant facility. In Nukus region two farms were visited, one of cattle and the other one with dairy cattle, goats and camels. Also, in Nukus regional a veterinary state laboratory and one milk processing plant facility were visited. On the way to Samarkand, in Bukhara region, we visited a traditional Karakul sheep farm (also with goats). Finally, in Samarkand we visited a traditional cattle farm and a pharmaceutical company.

During the visits to the farms several questions were addressed to the farmer, such as for example number of animals, species, type of husbandry, bedding, area of arable land, number of working personnel, type of forages food preparation, daily milk production, type of parlour, bacteriology analysis availability, etc. A similar

questionnaire was also used for the milk processing plants visited. In HEI a special attention was given to facilities, veterinary/zootechnical equipment available for teaching the students, computer and internet availability as well as books and journals lists that available to students.

All the information gathered in this field visit report will be in the future further complemented with information from the country report as well as from the results obtained in surveys that will be carried out further ahead with inquires to farmers, factories owners, veterinarians, zootechnicians and finally teachers and students of veterinary medicine and zootechnics.

3. THE TEAM

A team of Uzbek and European experts (Table 1) conducted this field trip. This team included all Steering Commission members plus one or two more members from each partner of the project (Figure 1).

Table 1- Team composition per partner and area of expertise of each member

HEI	Name	Expertise	
TSAU	Sanjar Adilov	Agricultural Economics	Steering Committee
	Gayrat Mengliev	Veterinary	
	Botir Ulmasov	Veterinary	
SamIVM	Shavkat Hasanov	Agricultural Economics	Steering Committee
	Nuriddin Ruzikulov	Veterinary	
	Abduvali Khushvaktov	Animal Production	
NuTsau	Batkibay Paluanov	Journalism	Steering Committee
	Jumashev Rajapbay	Veterinary	
AAI	Ziyoydin Israilov	Economics	Steering Committee
	Ilhomjon Sobirov	Veterinary	
	Oybek Rizaev	Zootechnical	
UniPi	Alexandra Guidi	Veterinary	Steering Committee
	Roberta Morruzo	Animal Science	
	Roberta Nuvoloni	Veterinary	
UPorto	Augusto Faustino	Veterinary	Steering Committee
	Graça Lopes	Veterinary	
EMU	David Arney	Animal Science	Steering Committee
	Lilian Arriva	Study programs	
UdSdP	Stefano Romagnoli	Veterinary	Steering Committee
	Antonio Mollo	Veterinary	

HEI-Higher Education Institution; AAI- Andijan Agricultural Institute; TSAU - Tashkent State Agrarian University; NuTSAU- Nukus branch of the Tashkent State Agrarian University; SamAI - Samarkand Agricultural Institute; UiPi- University of Pisa; UPorto- University of Porto; EMU- Estonian University of Life Sciences; UdSdP- University of Padova.



Figure 1. Field visit member during the trip in Andijan, Taskent, Nukus and Samarkand regions.

4. THE ITINERARY

The field visits took place between the 13 until and the 23 of March 2018. In figure 2, the itinerary (red dashed line, with arrowhead indicating direction) and the locations (yellow tags) of the visited regions are indicated.

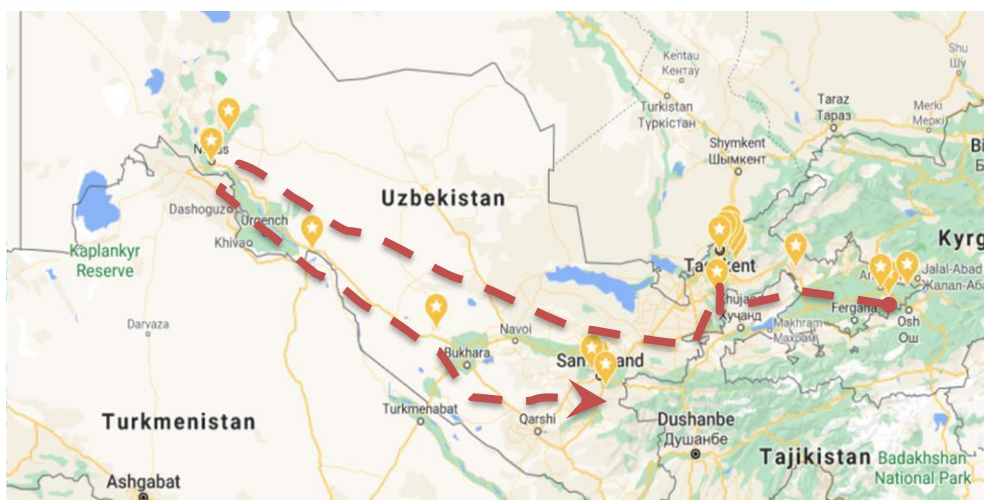


Figure 2. Itinerary (red dashed line) and locations (yellow tags) of the HEI, the farms, laboratories and the dairy factories visited.

In table 2 the detailed program of the visits to the HEI, farms, dairy factories and veterinary laboratories is depicted.

Table 2. The field trip schedule.

Day	Region	HEI	Visits		
			Farm	Industry	Veterinary Laboratories
13.03	Andijan		Baxt Imkon Rivoj Chorvasi	Inter Agro Star LPD	Regional
			Inter Agro Star LPD		
14.03	Andijan	AAI			Bazaar
15.03	Tashkent		Dairy Farm Anor		
			Dairy Farm Paradise Hirmoni		
			Dairy farm Tano		
16.03	Tashkent	BUzNet Kick of Meeting at TSAU			
17.03	Tashkent	TSAU	BUzNet Symposium		
18.03	Tashkent		Farm Oznaslelita	Bio-Sut	
19.03	Nukus	NuTSAU	Farm Burdoqichilik Kompleksi	Milk industry	Regional
20.03	Nukus		Farm Panaev		
21.03	Bukhara		Family farm – Karakul sheep		
22.03	Samarkand	SamAI			
23.03			Family farm -cattle	Biveco - Pharmaceutical	

HEI-Higher Education Institution; AAI-Andijan Agricultural Institute; TSAU-Tashkent State Agrarian University; NuTSAU-Nukus branch of the Tashkent State Agrarian University; SamAI-Samarkand Agricultural Institute.

5. FIELD DATA

5.1 HIGHER EDUCATION INSTITUTIONS (HEI)

Four HEIs, where Veterinary Medicine, Zootechnical Engineer or related degrees are taught, were visited. The four institutions are partners in the BUzNet project. Visits were done in the following order:

- 1st - Andijan Agricultural Institute - AAI;
- 2nd - Tashkent State Agrarian University – TSAU;
- 3rd - Nukus Branch of Tashkent State Agrarian University – NuTSAU;
- 4th - Samarkand Agricultural Institute – SamAI.

In these institutions the team of experts had the opportunity to visit the teaching classrooms, teaching and research laboratories, library and computer rooms for students (when existed), clinical facilities for small and large animals (TSAU and SamIVM), animal facilities (when existing) and, in one case (TSAU) it was also possible to visit the dormitories/residency for students.



Figure 3. Teaching laboratory, surgical room and equipment at TSAU. Anatomical museum room, teaching laboratory, large animal examination and surgical room, and animal facilities at SamAI.

Moreover, in each institution, the experts had the chance to meet and talk with teaching and technical staff as well as with some students of the zootechnical and veterinary degrees (see figures 3-5). This direct observation of the facilities and equipment present in classrooms, laboratories, libraries (online publications available were also checked) , clinical facilities and computer rooms (see figures 3-5)

as well as the face-to-face interaction with teaching/technical staff and students allowed us to have a more real idea about the main necessities in equipment and books in these institutions, which was of paramount importance to prepare the list of equipment to be purchased by the project.



Figure 4. Some of the books and technical publications that exist in the HEI libraries (A-D) and student's computer room at SamVMI with some online scientific journals available (E-F).



Figure 5 - Meeting with teaching and technical staff as well as with veterinary students in the HEI visited.

5.2 THE FARMS

A total of ten farms some of which breeding more than one species, were visited, with the following distribution among regions (Table 3). In Andijan province two dairy farms (1 bovine and the other a mixed of bovine and goats) were visited. In Tashkent area, three dairy (bovine) and one mixed dairy-beef (bovine and sheep) farms were visited; In Nukus region two farms were visited, one mainly with beef cattle (few dairy) and another one with dairy-beef cattle, dairy goats and camels. On the way to Samarkand, in Bukhara province, we visited a traditional Karakul sheep farm (also with some autochthonous goat breed). Finally, in Samarkand we visited a small traditional cattle farm.

Table 3. General husbandry characteristics of the 10 farms visited.

Farm	Region	System	Species	Staff	Vet	Zoot
Baxt Imkon Rivoj Chorvasi	Andijan	Intensive	Bovine, Goat	NK	NK	NK
Inter Agro Star LPD	Andijan	Intensive	Bovine	12	1	0
Anor	Tashkent	Intensive	Bovine	10	NK	NK
Paradise Hirmoni	Tashkent	Intensive	Bovine	12	NK	Nk
Tano NFX	Tashkent	Intensive	Bovine	40*	2	2
Oznaslelita	Tashkent	Intensive	Bovine, Sheep	41	2	2
Burdoqichilik Kompleksi	Nukus	Intensive	Bovine	10	1	1
Panaev	Nukus	Intensive	Bovine, Goat, Camel	9	1	1
Family farm (Sheep)	Bukhara	Tradiconal	Sheep, goat	0	0	0
Family farm (Bovine)	Samarkand	Tradiconal	Bovine	0	0	0

* only 5 directly in dairy farm

During the visits to the farms several questions (full questionnaire in Annexe I) were addressed to the farmer, such as for example number of animals, species, type of husbandry, bedding, number of working personnel, daily milk production, type of parlour, bacteriology analysis availability, etc. The main data obtained from these questionnaires are summarized in tables 2 to 5 whereas in figures 4 to 9 several photos of the different farms illustrate the information provided in the tables.

All farms were privately owned except one, that was owned by the state although some shares of the farm-company were owned by private companies (Oznaslelita, in Nukus). Farmers also informed that the government provides farms subventions/subsidies.

Some of the farms visited, received students from the veterinary and zootechnical faculties of that region. In particular in Nukus region the Burdoqichilik Kompleksi, usually received 20 to 25 students, from the TSAU branch in Nukus, every day in the farm during a specific time of the year to practice transrectal palpation and also have one-week courses.

All intensive farms (N=8) had mainly bovine dairy/beef production as prime activity, but three also combined it with intensive dairy goat (Sanaan) or extensive sheep (Hisar) productions. The two traditional family farms primarily raised bovine (mixed breed) or sheep (Karakul), but they also kept other species (goats) for own consumption.

The number of working personal in farm varied a lot but was in general related to the number of species and animals present in the farm as well as the dimension of arable land. Most of the intensive farms had at least 1 veterinary and 1 zootechnical engineer working for them. In one of the farms the veterinarian working there had been trained in Germany after graduation and he also worked part-time at the University. The two traditional farms, one of bovine and the other of Karakul sheep, where both smallholder farms and family based. In particular with the Karakul sheep farm, that was located in the Kyzyl-Kum desert near Bukhara region, it was owned by two brothers that would take turns of 10 days each to stay

in the farm that was located far from the village and in the middle of the desert. In these two farms veterinaries would only be called when a sick animal was present.

Arable land per farm was quite variable. In Andijan one of the farms indicated 150 ha, while in Tashkent the indicated value varied between 30 ha and 586 ha (Tano farm where it was produced 800 ton of wheat and corn for cow feeding). In Nukus area the visited farms had between 100 ha to 260ha of arable land, however in this region soil salinization is a visibly dramatic problem.

As seen in table 4, the majority of the bovine farms visited were intensive bovine production systems either for dairy (5) or mixed production for beef and dairy (3) products. These farms had in general good animal housing facilities, usually spacious open barns, with good ventilation (some with fan systems and water sprinklers and even music!) and good cleaning conditions (three farms had an automatic cleaning mechanism) and in one farm cows were even identified by a collar transponder. In half of these farms there were also some animals that were kept in tie stalls, well ventilated and clean. Two farm owners from Tashkent (farms located side by side, owners were brothers) also indicated that occasionally they allow the cows to go into pasture. The bedding consisted generally of concrete floors (some with automatic cleaning systems) or concrete plus straw or locally also soil. Nonetheless, for whelping cows, the farms had generally a separate cubicle with a straw bedding.

Table 4. Specific bovine husbandry characteristics in the nine farms visited.

Farm	Breeds	Origin	Nº Animals	Product	Husbandry	Bedding
Baxt Imkon Rivoj Chorvasi	Holstein, Brown Swiss	Germany	2200	Milk	Open barn/cubicles	Concrete/straw
Inter Agro Star LPD	Holstein	Germany	400	Milk	Tie Stall	Brick/straw
Anor	Holstein	Germany	200	Milk	Open barn/cubicles	Concrete*/straw
Paradise Hirmoni	Holstein	Germany	150*	Milk	Open barn/cubicles	Concrete/Straw
Tano NFX	Holstein	Germany	900†	Milk	Open barn/cubicles	Concrete*
Oznaslelita	Holstein, Simmental	Germany Austria	275	Milk/Meat	Open barns/ Tie stall/dry lot	Concrete/Straw
Burdoqichilik	Holstein,	Germany	80	Milk/Meat	Open barns/	Concrete/Soil

Kompleksi	Simmental Mixed breed, Kyzyl-kum				Tie stall/dry lot	
Panaev#	Holstein, Simmental	Germany	131††	Milk/Meat	Open barns/ Tie stall/dry lot	Concrete/Soil
Family farm (bovine)	Mixed breed, Kyzyl-kum	Local	20	Milk/Meat	Tie stall	Concrete

* Automatic cleaning; # with music in barns for animals. * lactating, † 400 in lactation; ††63 in lactation.

Also as observed in table 4 all bovine farms had Holstein, or mixed breed of Holstein. The second most common breed observed was Simmental that was at least half of the total cows in the two bovine farms in Nukus region. The majority of the pure-bred Holstein and Simmental animals in all farms had been imported from Germany, which according to the farmers was a 7-8 day's journey by truck to arrive to Uzbekistan. These imported animals were either pregnant cows, or young animals. Subsequently these animals were then breed in Uzbekistan using frozen semen and in many farms it was possible to see the frozen semen liquid nitrogen containers (Figure 7) and insemination equipment.

The total number of cows per farm varied a lot among bovine intensive farms (80-2200, see table 3), while the traditional family farm only had about 20 cows. In this family farm, the majority of the cows were mixed breed and there were also some cows of a local breed named Kyzyl-kum (also in Nukus we saw some examples of this breed in the Burdoqichilik Kompleksi farm).

The most common type of animal feed (forages) available in the farms was corn silage, but farmers also mentioned alfafa, weat and ryegrass. Farmers also use some subproducts as supplements in particular cotton and sun flowers seeds (not for pregnant cows and only a specific percentage of the TMR) as well as whey, but also some commercial supplements like fish flower, soya, vitamins/minerals complexes that were used to make the pre-mix.



Figure 6. Dairy farm in Andijan region Baxt Imkon Rivoj Chorvasi. Kumakay village, Oltinko'1 District.



Figure 7. Dairy farms in Tashkent area, Yukori Chirchik District: Anor (A, B) and Paradise Hirmoni (C-F).



Figure 8. Dairy farm visited in Taskent region, Yukori Chirchik District, Tano NFX.



Figure 9. Dairy and meat farm visited in Taskent region, Krasnyi Vodopad district: Oznaslelita.



Figure 10. Dairy and meat farm visited in Nukus region, Burdoqichilik Kompleksi.



Figure 11. Dairy, meat and tourism farm visited in Nukus region, Chimbay Karauzyak District, Paneave.



Figure 12. Traditional small cattle farm in Samarkand region -“family farm”.

The number of milking's a day, generally for 300-305 days, varied between 2-3 but the great majority (6 out of the 8) performed 2 milking's per day, and only two farms would do it 3 times a day but only until the 6th month of lactation afterword's they would change to 2 times a day. With regard to the type of parlour present in the farms (Table 5, figure 13), in four of the intensive bovine farms there was either a swing herringbone or a double low milking line herringbone parlour with 10 to 15 milking units each and in other two of these farms a mobile milking system was used as stationary with 4 to 6 milking units. In the remaining farms no data was obtained with regard to the milking parlour.

Table 5. Type of milking parlour (when existed) and milk production characteristics in the nine dairy cow farms visited.

Farm	Parlour	Milk/day/cow	Milk/day	Buyer	Bacteriology
Baxt Imkon Rivoj Chorvasi	Swing 15 Herringbone	NK	2300 ton	Factory Local shops	NK
Agro Star LPD	Mobile used stationary, 6 each time	15-20 L	1400 L	Factory (own)	No
Anor	Double 10 herringbone low milking line	20-30 L	200-300 L	Local shops	No
Paradise Hirmoni	Double 12 herringbone low milking line	20-30 L	2300 L	Factory Local shops	No
Tano NFX	NK - 40	25-35 L	9-10 tons	Factory Local shops	No
Oznaslelita	Double 14 herringbone low milking line	20-25 L	2-2,5 tons	Factory	No

Burdoqichilik Kompleksi	Mobile used stationary, 4 each time	15-20 L	600 L	Factory	No
Panaev	NK	10-30 L	1 ton	Factory	No
Family farm (bovine)	None	3 L	20L	Own consumption	No

In intensive bovine farms the mean daily production of milk per cow varied between 10 and 35L, and the total daily production varied between 200 L and 2300 ton. Most of this daily production was sold to milk processing factories (Bio-Sut, Nestlé), although some of these farms also sold milk to local shops (table 4). The bovine family farm presented an average milk production of 3L/cow/day that was used only for own consumption. Noteworthy is the fact that no bacteriologic analysis, or any other for that matter, was performed in any farm (Table 5).





Figure 13. Types of milking parlour visited in cow farms located in Andijan (A), Taskent- Djalair (B, C, D), and in Nukus (E) farms. Two examples of milk tanks in Tashkent farms (F, G).

In two of the intensive farms visited (one from Andijan and the other from Nukus region) apart from bovine, also goats were raised. (Table 6). These were Sanaan goats, for milk production, that had been imported from Austria and Germany and travelled by truck to Uzbekistan. Another of these bovine intensive farms visited, that was located in Tashkent region, also had a flock of 150 Hissar sheep, a local breed raised for meat production.

In the largest farm visited in Nukus region, along with the bovine and goat species, there were also camels (Figure 15). According to the person responsible for this farm (a zootechnical engineer that had some post-graduation education in Germany) these camels were raised for milk production but also for touristic proposes.

Table 6. Goat, sheep and camel main husbandry characteristics observed in the visited farms.

Farm	Region	Type	Species	Breed	Number	Origin	Product	Husbandry
Baxt Imkon Rivoj Chorvasi	Andijan	Intensive	Goats	Sanaan	800	Germany	Milk	Open Barn
Oznaslelita	Tashkent	Extensive	Sheep	Hissar	150	Local	Meat	NK

						breed		
Panaev	Nukus	Intensive	Goats	Sanaan	80	Austria	Milk	Open barn
		#	Camel	#	10	Local	Tourism Milk	Open Barn
Family Farm Sheep	Bukhara	Traditional	Sheep	Karakul	50	Local breed	Meat Wool	Pasture/Open barn



Figura 14. Sanaan goat farms in Andijan (A) and in Nukus (B).

In some Uzbek regions, foot and mouth disease had been widespread in the past, and in some of the intensive farms visited vaccination was performed (Chimbay Karauzyak Distric). In addition, also vaccination for tuberculosis and brucellosis – that was provided for free by Uzbek government - was also done. Other farms also vaccinated for Theileriosis, and the vaccine was obtained via Iran. Big part of the medication, veterinary preparation, vaccines and diagnose were imported.



Figure 15. Camels raised for tourism and milk production in a farm in Nukus region, , Chimbay Karauzyak District.

Finally, on the way to Samarkand, in Bukhara region, we visited a traditional Karakul sheep farm (table 5 and Figure 16). This farm was owned by two brothers, that were also the working personnel of the farm, and that would shift every 10 days living in the desert where the farm was located (Figure 16), while their families lived in a nearby village. The flock was mainly in a free ranging pasture system in desert areas around the farm, and there was also an open barn made with dry mud walls. We visited this farm in the early spring (22 March) and as it can be seen in Figure 16 there were a very sparse green grass coverage, which according to the farm owner was a very good pasture. Noteworthy is also the fact that in this region soil salinization is also visibly a dramatic problem, and even the animals drinking water is salty (Figure c) and this problem was highlighted by the farm owner.



Figure 16. Karakul traditional sheep farm in Bukhara region.

To summarize we list below the main characteristics of the:

- Intensive dairy and dairy-meat farms:

- Only bovine or bovine and goat species.
 - Number of cows varied between 150-2000, while in goats between 80-800;
 - Mainly exotic breeds, imported from abroad, of the two species are used: Holstein and Simmental for bovine and Sanaan for goats.
 - Usually with modern facilities (sprinkles, fans, music, automatic cleaning, etc.).
 - The number of workers in each farm varied from 5-40, and usually included 1-2 veterinarians and 1-2 Zootechnician/inseminators.
 - Cow milk production per day varied between 10-35L;
 - All of these farms had their one milking parlour (even if mobile used as stationary);
 - Milk was mostly sold to factories but also to local shops;
 - No bacteriologic or SCC analysis was done in any of the farms.
- Traditional family farms:
 - Usually animals from several species are present though in few numbers (chicken, goat, sheep, cow)
 - In bovine farms usually have 10-20 mixed breed (Holstein, Kzyk-kum/red desert) cow/bulls used for milk and meat production;
 - Cows produce 3 L of milk per day and no analysis is performed to the milk;
 - Other animal species usually from local breeds that a very well adapted to the environment, e.g.: Karakul sheep (wool & meat)
 - Family workforce
 - Production mostly for own consumption

3.3 MILKING PROCESSING PLANTS

A total of three private milking processing plants were visited by the team with the following geographic distribution. In Andijan region one milk processing plant facility (cheesery) that was owned by the same company of the dairy farm visited. In Tashkent region we visited one milk processing plant, from the company Bio-Sut that exists in Uzbekistan for more than 18 years and owns several factories. In addition, data was also obtained about a second milk processing plant in Tashkent region since the owner was the same of one of the visited farms. Finally, in Nukus one milk processing plant facility was visited. A small questionnaire about the factory facilities and production was done to the owners on site (full questionnaire in Annex II) and results are presented in table 7.

Table 7. Milk processing plants main characteristics

	Milk	Processing	Transport	Milk	Final products
--	------	------------	-----------	------	----------------

Factory name and type		capacity/day		Control	
Inter Agro Star LPD , Kurgantepa district Cheesery,	Cow	10 ton	Factory truck	Visual pH	Pizza Cheese ricotta
Bio-Sut , Djalair Milk processing Cheesery, Fermented milk	Cow	15 ton	Factory truck	pH fat protein	Pasteurized milk Yogurts Kefir hard cheese cottage cheese
Tano* , Yukori Chirchik District Milk processing Fermented milk	Cow	NK	NK	pH fat protein	Pasteurized milk Yoghurts Kefir Milk deserts
Nukus factory Milk processing Fermented milk	Cow	5 ton	By farmer	pH fat protein	Pasteurized milk Yoghurts Kefir

*Info provided by owner, but facilities not visited

As seen in table 7 the mean processing capacity in each factory varied from 5 to 15 ton a day and final products produced varied a lot in each factory and were sold mostly in Uzbekistan and also in Russia. Milk collection was done usually by factory trucks, which collected the milk at least once a day (in spring when there is usually more milk trucks would collect twice a day) in different dairy farms, and the milk tanks would be cleaned at the end of the day. Factory owners indicated that generally most of the milk is obtained from big dairy farms, as buying milk from small local farmers was considered always a risk since no SCC/bacteriologic analysis was performed and there was a higher risk of potentially ruin all the milk in the collection truck. However, according to the answer to our questionnaire, none of the large farms as well as the processing plants visited performed, at any time, a bacteriologic analysis to the raw milk. The only analysis reported to be done at factory entrance, were visual inspection, pH (minimum 6.5), fat and protein content. Thus, some owners said that in emergency they would sometimes use H₂O₂, and also that the quality of the final products was very heterogenous.

In one of the dairy factories the responsible person indicated that they had a laboratory with a technician but no veterinarian. In fact, the company had been looking for one veterinary to work with them for the past 5 years and could not find one. Furthermore, it was the owner opinion that presently vet schools did not prepare students for the current needs in milk production in Uzbekistan. In addition, also according to this factory owner, the main problem they face is that there is no

implementation of hygiene protocols in farms and at the factory it is difficult to maintain a homogenous quality of the product as they do not have a good technical support, even from the companies (most Italian and Spanish) that sold the machinery for the dairy factory.



Figure 17. Milk processing plants in Andijan (Dardağ village Osquv massiv, Kurgantepa district), Nukus and Tashkent region (A-E, respectively) and some of the dairy products produced there.

To summarize we list below the main characteristics of milk processing plants:

- Type of milk: cow
- Final products: pasteurized milk, kefir, several types of cheese, fermented milk, yogurt;
- For national consumption and some to export to Russia;
- No implementation of hygiene protocols in farms;
- Difficult to maintain a homogenous quality of the product;
- Quality control: visual inspection, pH, fat and protein (no bacteriologic control/SCC);

- No veterinarian.

5.4 VETERINARY LABORATORIES AND PHARMACEUTICAL INDUSTRY

In Andijan region two state veterinary laboratories were visited, one was the regional veterinary laboratory (Figure z-y) and the other one was in the local market in Andijan. Another state regional veterinary laboratory was visited in Nukus (Figure 18-19). These visits allowed for the team of experts of the BuzNet project to have a better understanding of the veterinary laboratory services provided by the state for animal health surveillance, food security and public health and to know the main professional activities performed by veterinarians and zootechnicians in these labs in order to assess what are the main areas to have in consideration in the veterinary and zootechnical curricula to provide students with competencies to work in these areas.

Finally, in Samarkand region we also visited a private pharmaceutical factory (Biveco) that cooperated with the SamAI. This is an Afghan-English-Uzbek venture for the production of humans and veterinary medicines. Veterinarians only worked at the vivarium, but it was not possible to visit that day. Photos were not allowed.





Figure 18. Photos A to E are from the Andijan Regional Veterinary Laboratory (entrance, necropsy room, laboratories and vivarium). Photos F-G are from the veterinary laboratory for food inspection of animal products at the local market in Andijan.



Figure 19. Photos of the Karakalpakstan Regional Veterinary Laboratory.

7. Main outcomes

This field visit allowed for the BUZNet team to form a detailed and factual image of the state of the art of the animal production sector, milk processing industry and also of the veterinary state laboratories involved in the control of animal and public health in Uzbekistan.

One of the main impressions from this field visit is that there is a great effort by Uzbekistan to try to renew the entire animal production system. This improvement is mainly focused on large industrial type of farms, fundamentally based on imported animals (no-local breeds) as well as in western intensive production systems (like in Germany, Austria, EUA, etc.). On the other hand, little importance is given to local breeds and to traditional farming practices that are generally more suitable for the environmental, geographic and climatic characteristics that exist in Uzbekistan as well as more ecologically sustainable, in particular with regard to energy and water resources.

An example is the (frequently) importation of high yield dairy Holstein cows and dairy Sanaan goats from Germany and Austria for milk production in Uzbekistan. These breeds, adapted mainly to cold temperate climates of northern/central Europe, require a high quantity of water consumption for milk production. Additionally, the intensive dairy production systems associated with these breeds, also have a high quantity water demand for daily farm management activities (we saw water sprinkles in farms to cold down cows but there was no canalized water source in the state veterinary laboratories...).

Uzbekistan is a semi-arid country, with less than 10 percent arable lands, that are concentrated in river valleys and oases, mostly of glacier origin, while the rest is covered by deserts and mountains. It is among the top countries in water withdrawal per capita and has few internal freshwater resources. Furthermore, land use and crop production, in particular in western Uzbekistan, is adversely affected by the excessive, non-sustainable use of irrigation water on one hand, repeated droughts on the other hand, and by soil degradation by secondary salinization (Figure 20) (Sommer et al., 2010). This is in particular relevant for areas such as the ones seen around Nukus, Karakalpakistan and also around Buhkara (sheep farm).

As such, it is not difficult to see that these breeds and production systems might aggravate the impending water and arable land crisis in Uzbekistan, as well as not being sustainable by itself, as milk production with this breeds will be reduce in this type of environment and maintenance cost of the farms will be greater (water, energy, etc.). On the contrary, traditional cow family farms use local and mixed breed animals of cows that though having a much lower milk production, are more adapted to the environmental Uzbek characteristics such as heat stress and water scarcity. Off course that the milk yielding in these farms are not at all competitive regarding milk production in particular for the dairy industry. However, a program for improving the general yielding capacity of these local breeds and developing more sustainable farm practices should be in the research priorities of the Uzbek HEIs.



Figure 20. Landscape images in Nukus region showing soil degradation by secondary salinization.

In general, the control systems of animals and animal products for human consumption, at the level of direct support in the farms, in processing industries and in state control laboratories services (both regional and market), are very outdated, not clearly regulated and with mixed intervention by veterinarians and zootechnicians. With this regard, it should also be stressed the imperative need of well-trained veterinarians to implement hygiene control protocols in farms and in animal products industries as well as to implement diagnose and control actions in veterinary state laboratories dealing with public health issues. Furthermore, there is the need to increase relationships between the HEIs, the farmers, the dairy industries and the state veterinary laboratories.

Finally with regard to the HEIs, apart from the need of a curricular update, it was also noticed the need of an up-to-date list of books/journals and of equipment that would increase the hands-on teaching of practical aspects in veterinary medicine and zootechnic especially with subjects related to food safety and food control.

In summary, a direct knowledge of the real needs of each Uzbek HEI involved in veterinary and animal science teaching by all the members of the project was possible due to the visit to their facilities as well as to the interaction with academic staff and students. This information will be of paramount importance for guidance with the Curricular update for veterinary medicine and Animal production (Zootechnical), for the drafting of a list of priorities for the equipment, instruments, books and computers that need to be acquired as well as for the planning and organization of activities for the Training of Trainees. Another positive aspect of the field visit was the exchange of ideas and information between EU and Uzbek teaching staff, together with other relevant stakeholders and professionals of the animal production sector.

7. Complementary data

This was an intensive and very informative field visit for the BUzNet project not only due to the visits to HEIs, farms, dairy farms and veterinary official laboratories but also to the great opportunity to visit historical places, monuments and museums, that tell the history of Uzbekistan. In particular, the Andijan Regional Museum, the Karakalpakstan State Museum of Art (Savitsky Museum) and the Afrasiab Museum of Samarkand (Figure 25). These places gave the foreigners team members a glimpse of the Uzbekistan history, and to many of the Uzbek team members it was also the opportunity to see for the first-time places and regions where they had never been. Likewise, things as ordinary as visiting local markets (Figure 22), or eating the local food (Figure 23), the journeys within the country (in taxi, train, plane and minibus) and interacting with ordinary Uzbek people were also moments that allowed, especially the foreign team members, a better understanding of the Uzbek reality.



Figure 21. Daily life in the different regions: Andijan, Tashkent, Nukus, Buhkara, Samarkand





Figure 22. Local Market in Andijan, Samarkand and Tashkent.



Figure 23. Navruz festivities in Andijan and Nukus.



Figure 24. Typical Uzbek food. Fresh water Fish soup, Plov and Sumalek.



Figure 25. Andijan Museum, Tashkent Religious Complex, Savitsky Museum (museum of Modern Art Nukus), and the Registan in Samarkand.



Figure 25. Uzbek landscapes, respectively from top to bottom left to right, Fergana Valley (first 2 photos), Pskem Mountain Range west section of Tien Shan, north of Tashkent, Karakalpakstan, Amu Darya River; Kyzyl Kum desert.