2015

Report

‘Small ruminant value chain rapid assessment in Karauzyak, Karakalpakstan’

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Contents

1. Introduction

1.1 Brief description of Karakalpakstan[1]

Location and administrative division

The Republic of Karakalpakstan is located in the Northwestern part of Uzbekistan with an area of ca. 166,600 km^2, embracing the vast dry lands in the lowest reaches of the Amudarya Basin and also the Aral Sea. Most of the Karakalpak territory consists of low land (from 50 to 200 m above sea level) with small percentage of hills. The flatness is its most prominent physical feature. Most of the settlements as well as the prevailing activities, including agricultural production, are concentrated in the irrigated river plain on the delta of the Amudarya river.

As a separate administrative unit Karakalpakstan was founded on February 16th, 1925. On April 9th, 1993 the autonomous province of Karakalpakstan (within Uzbekistan) was converted to the Republic of Karakalpakstan. Administratively Karakalpakstan consists of 14 districts and includes 38 settlements (of which 12 are towns, 26 are rural settlements) and 139 village citizen councils (VCC). The capital city is Nukus.

Demographics

The population in Karakalpakstan was estimated at 1774.1 thousand as of January 1st, 2015, of which 876.7 thousand people (49.4%) reside in urban area, the remaining 50.6% live in rural settlements. Despite Karakalpakstan forms 37.1% of the total territory of Uzbekistan, only ca. 5.9% of the total population of Uzbekistan inhabit Karakalpakstan. Thus, population density is only 10.3 people per km^2, which is quite low compared to the national average population density. Average population growth is 1.5%. Infant mortality rate in Karakalpakstan is relatively higher than of the national average.

The average age of the population is 26.8 years. Total labor force stands at 1020.7 thousand people, of which able-bodied population includes 1017.1 thousand people. Currently employed in various branches of economy are 631.4 thousand people (or 4.9% of total employed in Uzbekistan).

Economic development

The main branches of industry include: light industry, electricity generating industry, food industry, fuel industry, chemical and oil-chemical industry, flour milling industry and industry of construction materials. Gross Regional Production (GRP) of Karakalpakstan in 2013 amounted to 2993.6 billion UZS, which constituted ca. only 2.3% of the GDP of Uzbekistan. GRP per capita in 2013 was 1736.4 thousand UZS. In January-June 2015 GRP of Karakalpakstan amounted to 1765.3 billion UZS. Average monthly salary (as of June 2015) was ca. 172 thousand UZS.

Agricultural production

Agriculture is the second largest sector of regional economy, contributing one fifth to Karakalpak GRP (Figure 1). The main agricultural products in Karakalpakstan are wheat, cotton vegetables, forage crops and livestock products. In 2013 agriculture of Karakalpakstan produced output worth 930 billion UZS with the main contributors shirkats (1.7%), private farms (35.1%), rural households (dehqons – 63.2%). Livestock products in 2013 were produced in the amount of: meat – 77.2 tons, cow milk – 272 tons, eggs – 164 mln. Valid for 2013 were heads of livestock: cattle – 861.1 thousand heads, including cows – 268.4 thousand heads, small ruminant (sheep and goats) 838.6 thousand heads.

[1] Most of the statistics are official statistical indicators provided by Statistics Committee of Karakalpakstan

The gross output of agriculture and livestock in Karakalpakstan indicates 52% and 48% (State Statistics Committee, 2013). Therefore, the contribution of livestock sector to Karakalpakstan economy seems to be considerably high. On the other hand, the number of cattle in Karakalpakstan as of 2013 has been around 8.3% of Uzbekistan, small ruminants – less than 5% of the national figure.

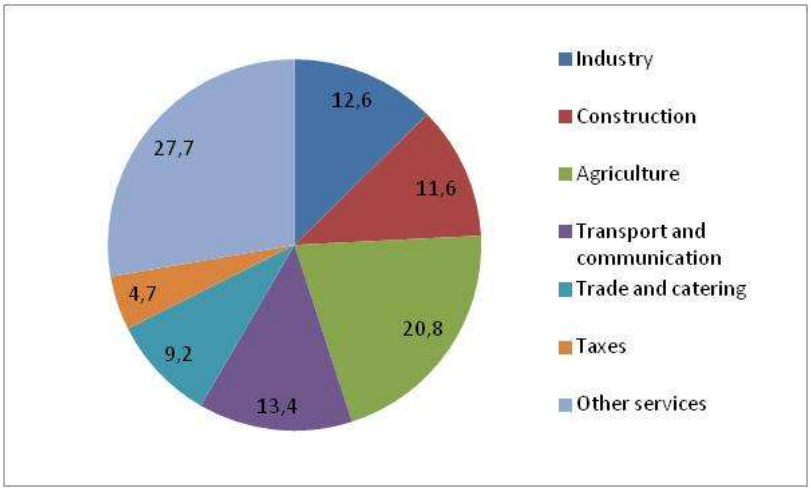


Figure 1. Composition of GRP of Karakalpakstan, 2013

Source: own compilation based in State Statistics Committee, 2013

However, according to UNDP (2010) livestock production survey, livestock performance indicators, such as meat per one cattle head, mild per cow, wool per sheep/goat, in Karakalpakstan are lowest on the territory of Uzbekistan. There is much room for improvement of Karakalpak livestock sector.

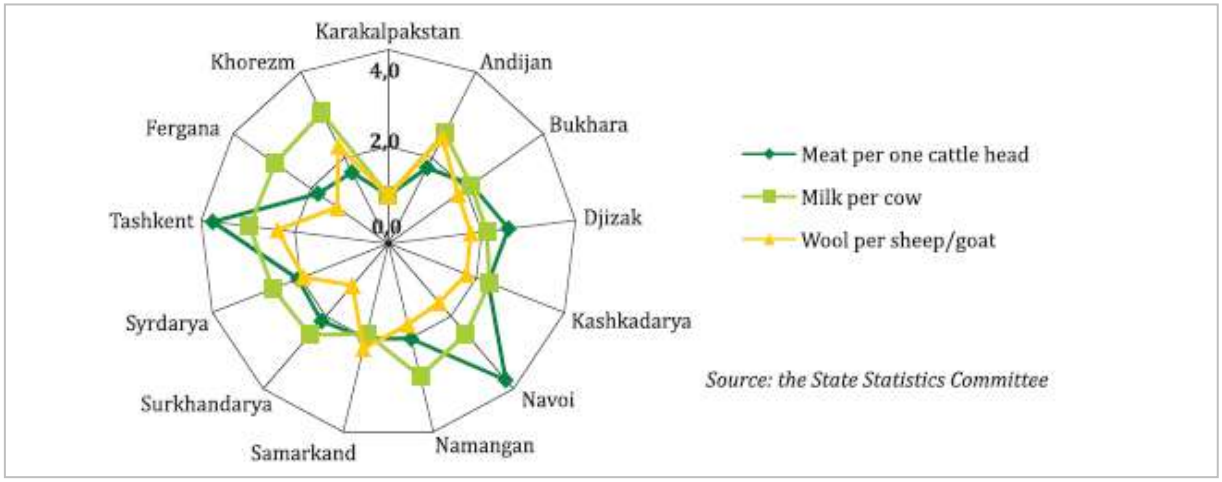


Figure 2. Livestock sector performance by provinces in Uzbekistan (the lowest index = 1)

Source: UNDP, 2010

Land use

Total arable land (suitable for cultivation and irrigation) in Karakalpakstan comprises 3,271 thousand ha, total cultivated land is 2106.5 thousand ha, rural households cultivated plots occupy 35.5 thousand ha and land under forests or other tree plantations stand at 1,129 thousand ha (State Statistics Committee, 2013). Actually annually cultivated area is lower and varies with

irrigation water availability and supply and in some years may be as low as 50-55% of the total arable land. Total area under forage crops is in the range of 24-30 thousand ha per year. The increases in the livestock herd have not been matched by corresponding increases in production of feed crops for animals. On the contrary, the livestock feed base has shrunk dramatically since 1991 (UNDP, 2008).

Under the severe climate of cold winter and hot summer, the productivity of crop, livestock and fishery in the study area is low. Reflecting such conditions, the level of livelihood in the area is considered to be low and one of the most depressed regions in the Republic of Uzbekistan.

1.2 Importance of livestock and small ruminant production

The development of livestock sector in Uzbekistan is under special attention of the state due to several reasons. Small ruminants hold a special place in the country's economy, allowing the economic utilization of rangelands and serving as an important and, often the only, livelihood option for rural people.

Firstly, the livestock sector plays an important role in the economy of Uzbekistan. It annually produces the output worth 10,215 billion UZS (in 2012) and contributes on average 42% of gross agricultural output in Uzbekistan (State Statistics Committee, 2013; UNDP, 2008).

Secondly, livestock products, in supplement to wheat and other grain products, are the pillars of the national food-security policy. One of the priorities of the state is to meet the needs of the population in food products, including livestock products, and to increase supply of meat, milk, eggs, fish and other products to local market.

Thirdly, livestock is of great social significance as it is an important source of income contributing from 10% (UNDP, 2008) to 30% (current study results) to family budget and vital food products for rural families (Khaydarov, 2015).

Fourthly, livestock represents a crucial component of the fixed capital for any rural household and is considered a highly liquid asset, which can easily be sold and converted to cash upon family necessity.

Independence period promoted the ownership of livestock and improved the facilities for agricultural producers by improving rural infrastructure, providing low interest rate loans, allowing special privileges and tax exemptions for the beginners. With a view for the development of livestock in personal subsidiary and farmer households, the government raised the question of granting the Ministry of Labor and Social Welfare, as well as commercial banks for allocating loans for cattle purchase. State support of livestock sector development resulted in over 200% increase of livestock production and around 350% increase in egg production during 2000-2013.

1.3 Brief background of the project

To be updated by Makhmud Shaumarov

1.4 Purpose of the RVCA

The small ruminant rapid value chain assessment (RVCA) in the selected Karauzyak district of Karakalpakstan was undertaken in the framework of a pilot study on Goat and Sheep value chains in Karauzyak district of Karakalpakstan under the CGIAR Research Program Dryland Systems (DS CRP) Activity "Improving the productive use of marginal lands in mixed farming and pastoral systems" in the Aral Sea Action Site.

The DS CRP has introduced the value chain approach in Karakalpakstan to address constraints along the meat and the Karakul pelt value chains. The ultimate purpose of conducting the RVCA has been to improve access to input supplies, services and markets, and thereby to achieve higher

animal productivity and incomes for rural households and other value chain actors. In particular, through RVCA it was expected:

1. to identify and get an understanding of the role/importance of the value chain and input/service agribusinesses in each of the identified value chains;
2. to get an understanding of market demand and supply of livestock products in and outside the district and suggest potential interventions based on the findings;

3. to identify opportunities for strengthening linkages between value chain actors (input suppliers, producers, traders, processors and end consumers) and including suggestions for improvement in agribusiness performance.

2. Study methodology

2.1 Study area[2]

Location

The study district – Karauzyak – is one of the 14 districts of the Republic of Karakalpakstan. It was established on 26th of September, 1975. The district is located in Northeastern part of Karkalpakstan and borders with Chimboy, Kegeliy and Nukus districts on the West, with Muynok district on the North, Takhtakupir district on the East, Beruniy district on the South-east and Amudaryo district on South-west (Figure 3).

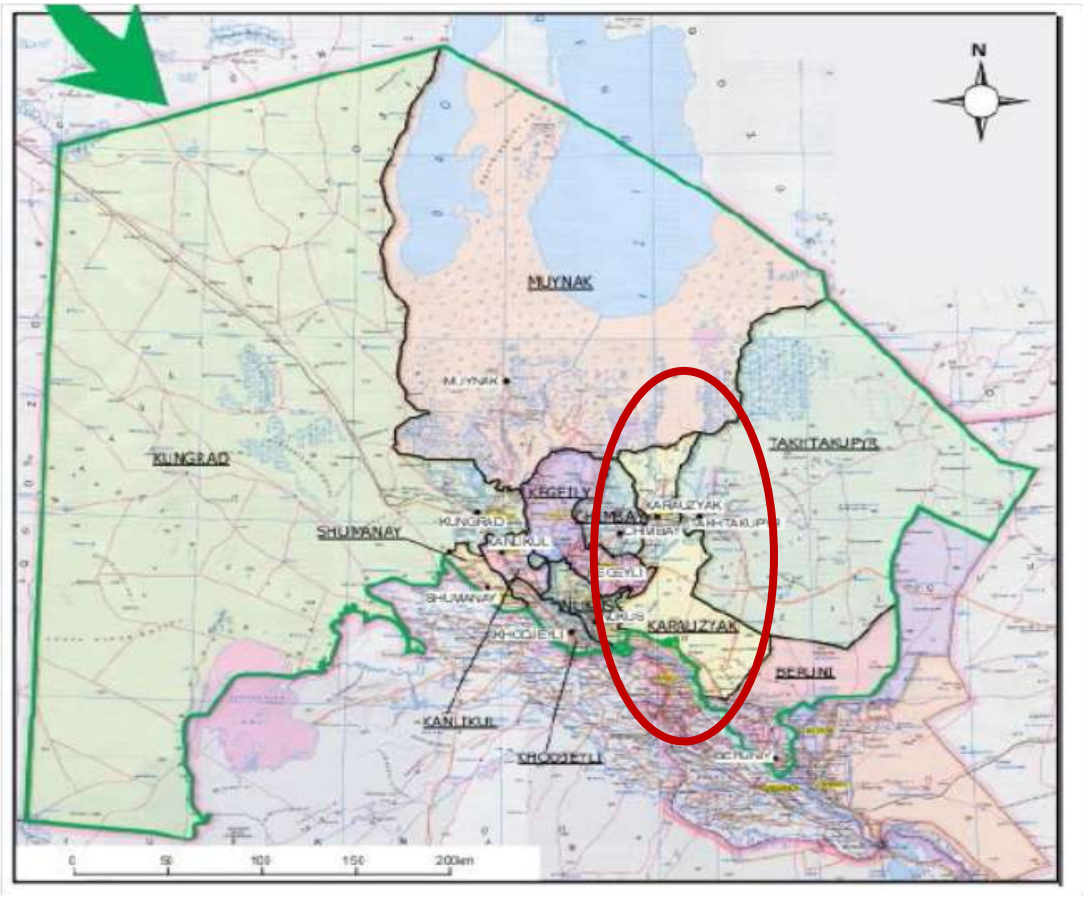


Figure 2. Location of the study region on the map of Karakalpakstan

[2] Most of the data presented in this section has been provided by the Statistical Department of Karauzyak district

The total territory of Karauzyak district is 5.9 thousand sq.km, of which agricultural arable land covers ca. 32.2 thousand ha, arable land (but not currently used for agriculture) – ca. 18 thousand ha, pastures – 380.1 thousand ha, and plots of local population (‘tamorqa’) cover 2.2 ha.

Climate is sharp continental with average air temperature in January of 6 ...8^0 C below zero, in June of 28 ...32^0 C above zero. In July-August the temperature can rise above 45^0 C.

Three Village Citizen Councils (VCC) in Karauzyak district have been selected for the study: “Karakul”, “Karabuga” and “Koybak”, all three located to the South from the district center.

The visited places, stakeholders and households in all VCCs have been geolocated using GPS tools (Figure 4, Table 1).

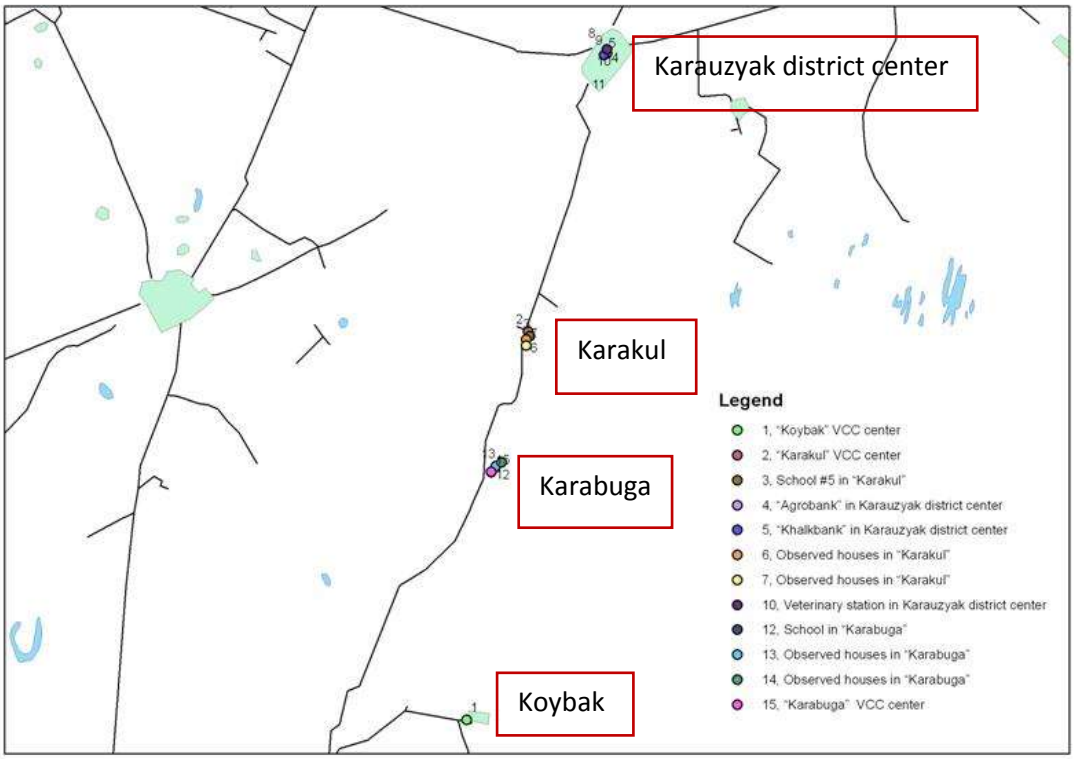


Figure 4. Geolocation of the field trip visits

Table 1. Geocoordinates of the RVCA field trip visits

GPS point	Location	Latitude (широта)	Longitude (долгота)
001	“Koybak” VCC center	42,7610582113265	59,9313050508500
002	“Karakul” VCC center	42,9178601503373	59,9726969003678
003	School #5 in “Karakul”	42,9158967733384	59,9736195802689
004	“Agrobank” in Karauzyak district center	43,0294722318650	60,0218671560288
005	“Khalkbank” in Karauzyak district center	43,0287748575211	60,0202041864396
006	Observed houses in “Karakul”	42,9146629571915	59,9714845418931
007	Observed houses in “Karakul”	42,9121202230454	59,9714684486390
008	Livestock, fodder market; transportation spot	43,0347830057145	60,0157570838929
009	Food products market, meat and dairy market	43,0318272113800	60,0158160924912
010	Veterinary station in Karauzyak district center	43,0311298370362	60,0220602750779
011	Butcher house, suburb of Karauzyak district center	43,0139958858489	60,0131070613862
012	School in “Karabuga”	42,8612494468688	59,9497157335282
013	Observed houses in “Karabuga”	42.8635936975479	59.9523603916169

014	Observed houses in “Karabuga”	42.865042090416	59.9555361270905
015	“Karabuga” VCC center	42.8613352775574	59.9497640132905

Administrative division and demographics

Administratively Karauzyak district is comprised of 1 urban settlement (SCC), 4 Mahallya Citizen Councils (MCC), 8 Village Citizen Councils (VCC) (Table 2).

Total population as of January 1, 2015 reached 50.3 thousand people, forming 7,781 households (families), of which 14.9 thousand people live in district center and 35.4 thousand people live in villages. Gender-wise, population is balanced with 0.5% overbalance of men (Table 2). Population-wise Karabuga and Karakul are almost identical, whereas Koybak is less populated with only 228 households comprised of 1,446 people.

Table 2. Households and population of the Karauzyak district

№	VCC	Households	Population	Including	
				Men	Women
1	Karakul	712	5,215	2,615	2,600
2	Berdakh	882	5,495	2,749	2,746
3	Algabas	675	5,208	2,638	2,570
4	Koybak	228	1,446	725	721
5	Madaniyat	896	5,640	2,830	2,810
6	Karauzyak	710	5,058	2,532	2,526
7	Esimozek	370	2,421	1,215	1,206
8	Karabuga	709	4,920	2,470	2,450
	Total for VCC	**5,182**	**35,403**	**17,774**	**17,629**
1	SCC	381	1,872	980	892
2	№1-MCC	510	3,391	1,782	1,609
3	№2-MCC	594	3,280	1,644	1,636
4	№3-MCC	455	3,061	1,597	1,464
5	№4-MCC	659	3,299	1,652	1,647
	Total for district	**7,781**	**50,306**	**25,429**	**24,877**
			100%	50.5%	49.5%

Annual population growth in Karauzyak district reaches 1.5%. Age-wise population of Karauzyak district is comprised of 36.2% of children (below 16 years of age), 56.9% of grown-up or able-bodied population (for women below 55 years and for men below 60 years of age) and 6.9% of elderly people (above 55 for women and 60 years of age for men).

Economic and agricultural indicators

The economy of Karauzyak district is based primarily on agricultural production, i.e. on cotton and wheat cultivation.

Some industrial branches are developed with 31 enterprises, providing employment for 420 workers and producing output worth 3.8 billion UZS. Industrial branches also earned export revenue to the region worth 127.5 thousand USD.

According to official statistics, in the first half of 2015 agricultural producers provided 485 tons of meat, 1,250 tons of milk, 1,595 thousand eggs and 1,329 tons of wool. The major contributors to total animal husbandry agricultural output were local rural households (except for the wool and fish), which produced and marketed 98.8% of meat, 98% of milk, 88.9% of eggs, 71.6% of karakul (astrakhan fur). Agricultural enterprises were second large contributors and private farms contributed the least (Table 3).

Table 3. Agricultural (animal husbandry) production in Karauzyak district in January-June 2015

Agricultural (animal husbandry) products	Unit	Total	Agricultural producers	Rural households	(%)	Private farms
Meat	tons	485	3.5	479.3	98.8	2.2
Milk (cow)	tons	1,250	23	1,224.9	98.0	2.1
Eggs	thousand	1,595	160	1418	88.9	0.21
Wool	tons	1,329	356	34.1	2.6	17
Karakul	tons	1,529	356	1,095	71.6	78
Fish	tons	61	29	16	26.2	16

According to official statistics rural household possess the main amount of animals (Table 4), including cattle, cows, sheep, horses, poultry and goats (not in official statistics). The study showed that goats are preferable animals in Karakul and Karabuga, whereas Koybak population breeds sheep and camels (for dairy products, but not accounted for in official statistics). Sheep (and goats included) or in other words small ruminant are second large in quantity animals kept by rural population in Karakalpakstan after poultry.

Table 4. Number of cattle and poultry in Karauzyak district in January-June 2015

Animals	Total	Agricultural enterprises	Rural households	Private farms
Cattle	29,230	648	28,455	127
including cows	9,691	186	9,447	58
Sheep	79,135	19,850	58,410	875
Horses	1,447	59	1,364	24
Poultry	125,079	2,600	121,129	1,350

With regards to sales statistics, meat in live weight is not distinguished for beef or mutton (Table 5), milk sales stands for cow milk, since goat milk is not popular and widely used in Karauzyak. However, for all types of sold products statistics show stable growth compared to the previous year.

Table 5. Sale of livestock products in Karauzyak district in January-June 2015 by all types agricultural producers

Product	Unit	Jan-June 2015	Change, % 2015/2014
Meat (live weight)	tons	485	101,2
Milk (cow)	tons	1,250	102
Eggs	thousand	1,595	105,9
Wool	centners (100 kg)	1,329	105,8

Social development indicators

With regards to social indicators, Karauzyak district has 1 Social Support Fund, which distributes pensions to 4,914 people (as of January 2015), including age retirees and disabled persons. This fund also provides social (hardship) allowances to 414 residents of Karauzyak district.

Karauzyak population can receive medical treatment in 1 hospital with 135 beds and 1 out-patient's clinic in Karauzyak district center. There are also 11 village medical points (in VCCs and MCCs) which provide medical checks and first aid to the residents of villages. In total 64 medical doctors and 495 nurses work in the medical sector of Karauzyak district.

There are 5 libraries in Karauzyak district, 1 music school and 1 cinema theatre.

As in the rest of Uzbekistan, secondary educational sector is set up to have secondary educational institutions (colleges or lyceums) in each district. Thus, there are 3 colleges in Karauzyak district with 1,378 college students (above 15 years of age).

Primary educational institutions – schools are located in each VCC, in total there are 32 schools in Karauzyak district educating 6,084 children of school age (7 to 15 years old) with the help of 1,167 school teachers. Some VCCs and district center have kindergartens – 9 kindergartens in total for Karauzyak district with the capacity to accept 895 children of pre-school age.

2.2 Conceptual framework

A conceptual framework is a relational model, used in research to outline a working plan and possible courses of action; and to present a preferred approach for undertaking this research. In general, a framework is built from a set of concepts linked to a planned or existing system of methods, behaviours, functions, relationships, and objects.

Defining the chains

For some decades now "there have been systematic attempts in English-, German-, and French-speaking schools of thought to describe and analyse the vertical integration and disintegration of production and distribution processes" (Roduner, 2005). Many terms have appeared since then conceptualizing production systems and describing marketing, supply, commodity and the value chains. Various approaches and methodologies have been developed to conduct research and to analyse commodity chains with their inter-connected structures of economic activities.

The concept of a value chain and the way it is used seems to have changed over time. Some value chain experts consider that the basic idea started within the business-managerial framework in the 1950s with Leontief's input-output models, and in 1960s with regional economics, where the emphasis was made on industrial linkages and understanding of the dynamics of spatial economies and the contributing factors to regional lags and imbalances (FIAS, 2007). Others prefer to trace the origin of value chain analysis to Wallerstein's (1974) World Systems Theory (Raikes et al., 2000). In the mid 1980s the concept of the value chain was followed by Porter (1985, 1990), when he used it to describe how an individual enterprise would be able to create a competitive advantage and "value" by breaking down its value-adding activities. Most of the recent value chain concepts, like the global commodity chains, product chains, or the value chains, have evolved within the economic-developmental framework.

The commonly accepted definition of a chain, be it commodity chain or value chain, was stated by Kaplinsky and Morris (2002): "The value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use". Under this definition the chain can be seen as "incorporating production, exchange, distribution and consumption <…> of a given product or service" (Kaplinsky, 1998). In such a definition production is only one of a number of value added activities. The chain can also be defined as "a

sequence of organizations that are involved in consecutive production activities" (Roduner, 2005). Thus, no matter which definition is applied by contemporary value chain scholars, all definitions of value chain embrace all stages of production to consumption of a particular product: "from gate to plate" or "from cradle to grave".

One of the prominent recent contributors to the value chain analytical approach is Gary Gereffi (Duke University), who has written extensively on global commodity chains. Gereffi (1994a, b) has defined the value chains as having four basic dimensions:

- an input-output structure with the flows of raw materials, intermediate goods and finished products as well as knowledge linked together in the process of value creation;
- a map of the geographic concentration or dispersion of production and marketing networks, comprised of chain actors;
- a governance structure, understood as authority and power relationships that determine how financial, material, and human resources are distributed within a chain;
- an institutional framework that provides the national and international context for the interaction of chain segments.

The concept of value added

One of the central points or concepts in value chain analysis is the one of value added (VA). In a broad sense, applicable not only to value chain analysis, but to any analytical work in the sphere of economic growth and development, the value added refers to the creation of wealth3, the contribution of the particular production process, or particular chain, to the growth of the economy (FAO, 2006b). In macroeconomics, value added also refers to the contributions of the factors of production, such as land, labour and capital goods to raising value of a product and corresponds to the incomes received by the owners of these factors. Production factors provide "services" which raise the unit price of a product relative to the cost per unit of intermediate goods utilized in the production process.

Value added is not just an element of income, it also represents the distribution of that income amongst the four fundamental agents of the national economy: households (the recipients of the return to labour and social payments), financial institutions (interest charges), government administration (taxes), and non-financial enterprises (gross or net profit and non-budgetary funds). Value added is also partly redistributed back to the capital invested into the production process (and thus into the creation of value) in the form of depreciation.

Value added measures the increase in wealth for the nation as a whole, as represented by the sum of remuneration to labour, interest charges and taxes in addition to the net margin of the producers. From a more focused point of view value added represents the worth that has been added to a product or a service at each stage of production or distribution. An economic agent can calculate the value added as a difference between the full value of the output and the value of the purchased inputs (McCormick and Schmitz, 2001).

The role of Value Chain Analysis

Value chain analysis is important both conceptually and practically (McCormick and Schmitz, 2001), or in other words it can be used as a heuristic device – a descriptive tool, framework for the generation of data, as well as analytical tool. Value chain analysis can present a sound background for benchmarking and comparison of particular value chains performance against performance of the value chains in other regions and countries; and thus can provide insight on the areas of intervention and upgrading with the aim of value chains development.

[3] In this notion value added is more or less GDP scaled down to a particular chain or sector

Upgrading

The notion of upgrading, as used in studies on competitiveness, describes a range of activities aimed at manufacturing better products, or increasing production metrics (productivity, efficiency), or moving into more skilled activities (Porter, 1990; Kaplinsky, 2000). According to Kaplinsky and Morris (2002), upgrading is a process of adopting innovation – a process which recognizes relative endowments and the existence of rents.

A value chain approach can assist in understanding the interaction among actors involved in the chain and the scope for local upgrading strategies. One of the main tasks of upgrading is focused on exploring and employing competitive advantages. A value chain approach can help to formulate or to shape the upgrading strategies by describing and analyzing sources for competitiveness, such as local competitors, infrastructure, customers, inter-firm cooperation and coordination, given industrial policies, and governance structures (Schmitz, 1999).

According to Humphrey and Schmitz (2002), the typology of upgrading distinguishes three main upgrading possibilities: functional; product; and process upgrading.

Benchmarking

Value chain analysis can define competitiveness of a particular value chain and justify the distribution of resources across a value chain via benchmarking against similar operations within and outside the country.

Benchmarking is a process of comparing own performance parameters with the performance parameters of respective businesses or the value chains considered to have leading positions on the international arena. Parameters for benchmarking can include various aspects. Some important benchmark parameters are productivity, cost of production or product quality; on a broader scale these would include critical success factors confronting producers along the chains. Benchmarking of such key chain characteristics facilitates the process of detecting performance gaps and identifying constraints to competitiveness, and also in assigning priorities to constraints that influence performance (FIAS, 2007). Thus, benchmarking is used to: (1) identify gaps in the performance of the value chain of interest; (2) assess the relative importance of these performance gaps; (3) prioritize the most binding constraints; and (4) develop upgrading strategies – targeted action plans.

VCA: a descriptive and an analytical tool

Conceptually, the value chain approach gives a good representation of the process of creating value. A dominant idea here is to "map" the flows of the chain with overall activities of all the actors who contribute to the production, processing, or transformation of products along the chain. A thoroughly demarcated value chain portrays not only all the actors of the chain, but also their relationships, all economic activities carried out at each stage of production, and physical and financial flows along the chain.

Value chain analysis, when used as an analytical tool helps to understand how individual producers, especially from developing countries, can participate and increase their share of the gains from participating in global economy; to understand the policy environment in the boundaries of which a particular value chain operates (McCormick and Schmitz, 2001). By comparing the advantages and disadvantages of firms and countries specializing in certain production sectors or services, value chain analysis can prove or disprove the efficiency of allocation of resources within the domestic economy.

The value chain is an important construct that gives a snapshot of the distribution of costs across an entire production process. Understanding the distribution of returns arising from design, production, marketing, coordination and/or why distribution of resources across a value chain is

disproportionate, immediately signals need for further investigation (Kaplinsky and Morris, 2002).

A value chain approach describes the micro-economy in a more realistic way and captures real economic structures, and is thus useful in guiding development interventions (Meyer-Stamer, 2004). This approach has proven useful for the identification and formulation of development projects and facilitating development strategies for improved agricultural and rural development (Bammann, 2007). At the local level, value chain analysis describes the activities that take place in a business and relates them to an analysis of the competitive strength of the business, which is one way of identifying those activities that are best undertaken by a business and those that are best provided by others ("out sourced") (FAO, 2006a). By applying the value chain approach, actors of the chains gain insight into issues like market access, acquiring production capability, finding leverage points for policy and organizing initiatives, identifying funnels for technical assistance and others (McCormick and Schmitz, 2001).

Value chain analysis was applied in the current research within the framework of economic studies undertaken as background for economic policy analysis at a sectoral level (in particular for the agriculture and agro-processing sectors) with the aim of understanding and quantifying the impact of proposed measures on the agriculture sector.

The analysis of the chain starts with its construction or demarcation, the process of identification of the product flows, the chain actors and type of interaction between the actors.

Demarcating of the chain according to FAO

Suggested methodology envisions the step-by-step approach for developing the value chain. The starting point is the so called chain mapping. To do so the data on all the involved agents, their activities, interactions among each other and flows of the product through the production stages are determined. It is usual to start from the primary activity of agricultural production of the commodity which gives its name to the commodity chain under analysis, and then proceed on the one hand, to follow the product downstream, through various marketing and processing channels to the final market, and on the other hand, to identify, upstream, the principal providers of inputs and services which feed into production. This will ensure that the commodity is followed through its successive transformations.

All the data sufficient for constructing the value chain is then either presented in a functional analysis table or consequently represented in the form of a commodity flow chart. The functional analysis table preferably should include:

- the principal functions in the chain, as well as any activities associated with the supply of inputs which have been included as part of the chain;
- the agents, (or groups of agents) carrying out these functions;
- the products concerned in the chain: i.e. the principal product of the chain, the various forms into which it is transformed throughout the chain.

The commodity flow chart is sometimes an easier way to present the sequence of flows, as well as actors within the chain. The flow chart visually highlights the complexity of the interactions and flows between agents. It can also be a useful tool in achieving clarity in the subsequent stages of analysis, ensuring that no part of the chain is left out.

In the next step this simple commodity chart with the clarified nature of the flows between the different agents can be enriched by the inclusion of more variables, both in physical and in monetary terms. This allows the analyst to assess the relative importance of the different segments or sub-chains of the chain (FAO, 2006a, b, c).

Two types of analysis can be applied to the chain at this descriptive stage: institutional and functional analyses.

Institutional analysis includes capturing of the flows and identification of the agents at work in the existing productive system, analysis of the locations for decisions and collaboration amongst agents; in other words, institutional analysis gives a detailed description of all agents (institutions) involved in a particular chain.

Functional analysis demarcates the chain, explains the principal functions in the chain, i.e. the stages of primary production, processing and transport, as well as any activities associated with the supply of inputs which have been included as part of the chain. Functional analysis also helps in identifying of bottlenecks within the chain.

Chain mapping by Kaplinsky and Morris; McCormick and Schmitz

The general ideas in the methodology for constructing the value chain as suggested by these authors are basically the same, except for differing terminology.

Value Chain Analysis, according to this methodology, starts with mapping the chain in question. Mapping the chain means giving a visual representation of the connections between actors and tracing a product flow through an entire channel from the point of product concept to the point of consumption. It is an ideal tool for measuring and quantifying the cost of administrative distortions that hinder competitiveness of products and industries. In its simplest form, the value chain is merely a flow diagram.

The process of chain mapping in turn consists of two stages. The first stage includes drawing an initial map which gives the contours of the chain: the main activities carried out locally, their connections to activities elsewhere, the connections to the final market, some initial indications of size and importance. The initial map after crosschecking is considered a preliminary map of the value chain. In order to draw the preliminary map it is important based on secondary data to properly breakdown and categorize activities associated with the value chain in question.

The second stage consists of elaborating the final map via quantification of key variables, identification of strategic and non-strategic activities, identifying leverage points for action. Such a refined map can be understood as a framework for showing the chain statistics. It might happen that in order to avoid overloading, not one final map, but several maps will be produced, for example one map showing the number of enterprises in each stage and another map giving the average earnings in various parts of the chain (McCormick and Schmitz, 2001).

2.3 Data collection

Activities of the RVCA were conducted stepwise and included selection of households and conducting focus group discussions (FDG), interviewing of key informants, observing small ruminants breeding and marketing process and collection of secondary statistical data on district and province levels (Table 6).

Semi-structured questionnaires have been elaborated separately for various involved stakeholders based on the provided guidelines for conducting the RVCA study. The letter of support (Annex 1) from ICARDA-CAC to Khokim of Karauzyak district was of great help to set up contacts with key informants and for collection of secondary data.

Table 6. Summary of the studied small ruminant value chain actors in Karauzyak district of Karakalpakstan

Small ruminant value chain actor	Data collection tool	Sample size

Sheep breeding cooperative "Koybak", members	Interview, observation	5
Sheep and goats keeping households	focus group discussion, observation	approx. 30 male and 30 female respondents
Traders/livestock market	key informant interview, observation	3- 5 live animal traders, milk and meat sellers
Processors/butchers	key informant interview	3
Credit providers (local commercial banks)	key informant interview	2
Fodder processors and suppliers	key informant interview	5
Veterinary service providers	key informant interview	2
Experts on small ruminant breeding	key informant interview	2

Focus group discussions

The method of FDG has been selected in order to generate data on important issues based on the communal wisdom of the group members who are believed to represent the broader interest group. The rural households, which keep sheep and goats (and thus possess the knowledge on sheep and goat related issues) from two selected VCCs have been identified and formed into focus groups for the discussions. Identified respondents were not very heterogeneous in terms of key variables such as age, experience of sheep and/or goat farming, sheep and/or flock size, etc. However, the formation of groups followed gender based approach – i.e. discussions were held separately for male groups and female groups, each consisting of around 8 people.

Key informant interviews

Key informants (the purposively selected individuals who have first-hand knowledge about the community, its residents, and issues or problems related to sheep/goat production, marketing, and consumption) have been identified and selected from various value chain stakeholders, including traders, processors, credit providers, feed processors and suppliers, veterinary service providers, and agricultural livestock experts for getting the overview info and maps concerning small ruminant value chains.

Key informants of diverse backgrounds have been very helpful in providing the necessary data, looking at varying perspectives, and underlying issues, concerns and problems along the value chain in focus. The consultants of the Village Citizen Councils (females) helped to find interviewees, set contacts with local population and provide some local statistics.

Observation of small ruminant production and marketing

Observational method has been applied for studying and recording the general features of the selected villages, such as the quality of housing, condition of roads, conditions of buildings, land use patterns, breeds of livestock. Observing the 'every day' life of several households in the villages helped to identify issues that have direct or indirect influence on the production, marketing and consumption of sheep and goats.

Similarly, one village market was visited and the profile of market actors and their interactions were documented.

Collection of secondary statistical data

Secondary data collection took place at Karauzyak District Statistics Office, as well as at Karakalpakstan Republican Statistical Department in Nukus.

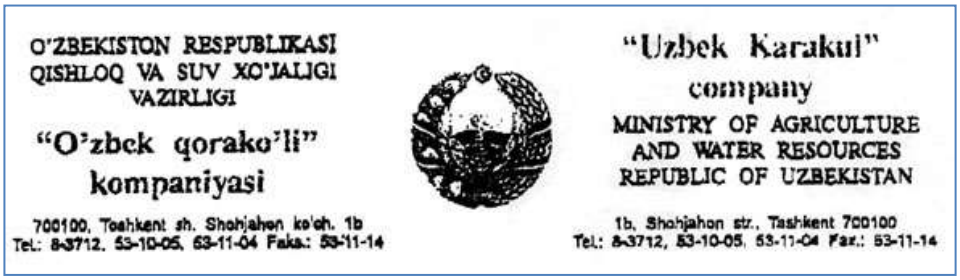
3. Characterization of the study sites and communities

3.1 Brief description of the study sites

VCC Koybak and the livestock cooperative "40 let Karakalpakstana"

The livestock cooperative "40 let Karakalpakstana" was first established as a collective farm (sovkhoz) in 1964, restructured to kolkhoz in 1995, and then to shirkat in 1998. Currently the cooperative structurally belongs to "Uzbek Karakul" Nukus branch. There are 10 such Karakul breeding cooperatives in Uzbekistan, including 3 in Karakalpakstan (in Karauzyak, Tohtakupir, and Turtkul districts).

Box 1.



The Company "Uzbek Karakul" has been established according to the decision of the Government under the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan. The main objectives of "Uzbek Karakul" are to: (1) control and monitor preservation in the country of the elite pedigree livestock (genofund of Karakul sheep); (2) realize single technological and investment policy in the sphere of improvement of pasture conditions; (3) implement progressive production technologies; (4) collect and process Karakul pelts; (5) maintain and help managing Karakul breeding cooperative farms and enterprises in the Uzbekistan.

The cooperative is located in "Koybak" village citizen council (VCC) of Karauzyak district of Karakalpakstan. Koybak VCC includes 1,446 people living in 228 rural households. This village used to have around 500 families, but many local Kazakh families have moved to Kazakhstan.

Total area of the cooperative used to be 410 thousand ha, of which arable irrigated land comprises over 800 ha, the rest is pasture land, located in Karakum desert. In autumn 2015 250 thousand ha (more of mountainous area to the South all the way to the Beruniy district) have been released from the cooperative and reallocated to the so called Khokim's reserve land. This was a necessary procedure since the cooperative does not have the capacities (human, technical and financial) to look after and to maintain these vast territories. The cooperative and "Uzbek Karakul" Nukus branch are now exempted from the land tax for the released land.

The cooperative employs 33 people, including administrative staff, veterinary specialist, 15 shepherds and support staff (cleaner). They are paid on contractual basis from "Uzbek Karakul", or in kind, or graze their own sheep on cooperative's pastures.

The number of sheep bred at the cooperative is questionable as different sources reported different figures (from 5,000 to 12,000 sheep and 290 goats). According to the official statistics provided by "Uzbek Karakul" Nukus branch the cooperative's flock of sheep was as large as 15,702 sheep as of November 1st 2015, whereas according to the district statistics department there were 19,879 sheep and goats, 1,847 cattle heads, 201 horses, 74 camels and over 13 thousand poultry in Koybak in August 2015.

The cooperative "40 let Karakalpakstana" depends on "Uzbek Karakul" Nukus branch for all activities and decision making along the small ruminant value chain, including the provision of fodder for the flock (or inputs for own fodder production), production and marketing of karakul pelts, etc.

Around 200 live sheep from the cooperative are sold at local livestock markets according to the cooperative staff.

Usually, the cooperative issues the certificate of origin for the wholesale traders, but does not provide the certificates of health or quality.

Karabuga

Karabuga is one of the eight VCCs in Karauzyak district. Total population of the village comprises 4,920 people (as of January 1st 2015), living in 709 rural households.

According to Karauzyak Khokim, Karabuga is a well-to-do village with rather wealthy households. The village is favorably located in the upstream of an irrigation channel. Moreover, villagers have pumps and can easily cope with water shortages during agricultural season. There is enough land, even more than villagers can handle. There is a possibility to add some land to agricultural production upon sufficient labor for agricultural production.

The houses in Karabuga are well constructed with households' land plots located close to the house and in many occasions with additional land plots (*tamorka)* within farmers' fields. There are several big orchards with various fruit trees, including the newly established. There are some plans to develop fruit processing capacities in the near future in Karabuga.

According to official statistics as of August 1st 2015 there were 3,293 heads of cattle, 6,857 small ruminants (mostly goats) and over 13 thousand poultry in Karabuga.

The villagers are hard-working and experienced agricultural producers, easily managing subsistence production. The number of private farms is low. There is 1 one prominent cattle breeding farmer, who produces and sells milk in Nukus, both for consumers and processors.

With regards to social infrastructure, there are 4 schools, 1 kindergarten, and a newly built restaurant for celebrating local feasts, weddings. There is 1 medical point, providing first aid and medical treatment and awareness campaigns against diseases, including animal transmitting diseases. A vet station provides veterinary services to the villagers, such as vaccination of animals, curing of animals and treatment against pests and parasites.

Karakul

Karakul VCC is closest from the surveyed villages to the Karauzyak district center. Total population stands at 5,215 people forming 712 rural households (as of January 1st 2015). Able-bodied population of Karakul are employed seasonally by local farmers for agricultural (hand) field activities, those with education work for governmental organizations (educational, administration, etc.) either in Karauzyak district or rarely in Nukus.

According to official statistics Karakul villagers breed 3,562 cattle heads, 7,742 sheep and goats, 277 horses, 74 camels and around 15 thousand poultry.

Karakul VCC is also a well-to-do village with resembling social and agricultural infrastructure. Experienced agricultural producers, Karakul dwellers produce crops for subsistence purposes, fodder crops for animals, meat and milk for own consumption.

In contrast to other surveyed villages, a few Karakul villagers reported to consume goat milk for tea and local cuisine (jarma), preparing yoghurt. Goats provide little milk, which hardly covers the demand of the households, very rarely goat milk can be marketed at Karauzyak district market (in fact no goat milk was observed during market survey).

With regards to social infrastructure, there are 5 schools, 1 kindergarten, 1 café, 3 retail shops, 1 bath-house.

With regards to drinking water supply, most villages have installed tap water system, which is under repairs. So, rural households rely on pumps and wells near their houses for drinking water.

All villages are connected to electricity and gas supplying grids. For both energy sources there are often cuts, the supply of especially gas is erratic. Nevertheless, in rural houses there is a heating system, including water (gas) boiler and heating pipes and radiators in the rooms. Due to insufficient gas supply, especially in the heating season, which in Karakalpakstan starts earlier than in other provinces of Uzbekistan (October-end March) and lasts longer, for 6 months. For backstopping heating options, many rural houses have alternative heating stoves, operating on fuelwood and coal, but heating limited rooms in the house.

3.2 Main livelihood strategies

There are several livelihood strategies available and prominent in rural areas of Uzbeksitan and Karakalpakstan. Basically, households in rural areas survive on subsistence agriculture, i.e. produce crops, keep livestock and poultry for subsistence purposes and to a less extent to generate cash and in-kind income. Thus, agricultural production (both growing crops and keeping livestock) on household plots is a dominant livelihood strategy for the majority of rural households in Uzbekistan (Conliffe, 2014). Surveyed households in Koybak and Karabuga indicated equal importance of livestock and crop growing, whereas Karakul dwellers rely more on crop production rather than on livestock, since for keeping livestock forage production is also needed. Importance of either agricultural production type depends on climatic condition, in particular water availability and accessibility. During drought or water scarce seasons the priority is given to livestock rearing and the more so to small ruminant breeding.

In the surveyed villages of Karakalpakstan *dehqons* cultivate food crops for themselves (vegetables, potato, watermelons, wheat, beans, etc.) and fodder crops for livestock (sorghum, maize). Small (up to 0.24 ha) private land plots are used for producing output either for personal consumption or trade in rural districts providing up to 30% of household income. This is a significant share of rural income, especially for poor and middle income rural families. There are also few large farmers who cultivate cotton and wheat under state order. These large farmers are usually the most prosperous members of the community.

Livestock plays an important role in the subsistence of rural households. Households breed mostly cows, goats, and poultry. The relative importance of livestock breeding compared to other activities in the surveyed villages has not changed for the last 10 years, according to local residents. Karakul sheep are the main source of livelihood for numerous rural households in the surveyed village Koybak in Karakalpakstan and provide employment where there are no sources of income. The whole family is involved in sheep raising; children for herding, women for processing milk, wool and pelts and men for lambing, slaughtering, shearing and protecting sheep from predators. In the last decade a number of people and even the whole families are leaving the villages like Koybak village for the city and even other countries (Kazakhstan), so Karakul rearing has ceased in some areas. Sheep heads are declining rapidly and problems such as soil erosion have increased.

Benefits from the livestock are usually consumed within the households themselves in the form of meat and milk, sometimes wool. Minor share of households breeds livestock to gain monetary profit, which is then used for covering the costs of education for kids, or making winter stocks of some products, or for celebrating important events. Karakul sheep are the family's savings, sold when cash is needed and exchanged for other goods. Usually, a typical household sells its goats, cows or sheep at the end of summer to receive cash for some important family events like wedding, or to cover education costs (school appliances, cloth) for its children. Household in the

surveyed villages consume of 10-15 kg of own produced lamb, goat meat and poultry, and sometimes purchased beef.

Another important livelihood strategy in rural areas is engagement in seasonal labor migration to Russia and Kazakhstan mainly to provide unskilled labor to the construction industry, but also working in the trade and market sector. Remittances from labor migrants are considered one of the main and important sources of cash income for rural families.

Rural families, which manage to support and provide education for family members may rely on the salaries from official jobs at state-funded or budget organizations, such as schools, kindergartens, medical units, local governance offices. This strategy is however more of a 'prestige' character, rather than a major income source.

Some entrepreneurial activities are common in the villages, including traditional activities such as sewing, hairdressing, and construction. These activities do not require much education or highly qualified skills, but can provide stable albeit moderate income for rural households.

3.3 The main agricultural production systems

The main agricultural production systems in Uzbekistan are plant growing and livestock rearing. Both agricultural production systems are equally important for the country and for the population in terms of providing food security, employment and cash source for rural inhabitants as well as serving a resource base for the subsequent agro-processing industry.

Plant growing covers production of various agricultural crops from cotton for export earnings; grains, vegetables and fruits for feeding the population to the production of forage crops for livestock.

Livestock production in Uzbekistan is distinguished by its richness and variety. Each animal type is dominating in its own agro-ecological zone. Thus, milk cattle are mainly found in irrigated croplands near industrial centers; beef cattle in mountain zone pasture areas; Karakul sheep production systems are mainly in deserts; meat-wool and ram production systems and horse breeding are concentrated in pre-and mountain zones of the Fergana valley, while pig and poultry production industries are near large cities and industrial centers (JICA, 2011).

The main types of agricultural producers in Uzbekistan are: (1) private farms, (2) rural households (*dehqons*) engaged in both plant growing and livestock rearing, but basically for own subsistence; (3) few remaining agricultural cooperatives engaged in certain agricultural activities such as for example Karakul breeding cooperatives; and (4) agrifirms, established by certain industrial (agro-processing) businesses for producing and processing certain products, such as for example licorice roots for pharmaceutical industry.

The combination of large private farms and rural households can provide considerable benefits in terms of rural employment, income and food security and of the adoption of new agricultural technologies and maintenance of desired levels of cotton production (Djanibekov et al., 2014).

Private farms

A private farm is a legal entity established for agricultural production purposes, is generally operated by family members and employed seasonal labor during the vegetation season. Private farms lease agricultural land from the state at zero rent with long-term usufruct rights (for a period of up to 50 years). This implies that farmers cannot use their leased land, for instance, as collateral for accessing credit (Djanibekov et al., 2014). In light of the recent 'consolidation' wave, which will be completed in December 2015, the average private farm size in Uzbekistan will lie in the range of 30-50 ha, whereas in Karakalpakstan, with excess land resources, private farms may lease 50-70 ha of land.

Concurrently legislation defines three types of private farms based on their production specialization: (1) cotton and wheat farms (the largest and dominant farm type) that also produce rice and vegetables on a small share of their farmland, (2) horticultural and gardening farms (specialized in fruits, grapes and vegetables production), and (3) livestock-rearing and poultry farms. The latter two farm types are not part of the state procurement system (Djanibekov et al., 2014).

Private farms are considered to have advantages regarding access to markets, infrastructure, and technology.

Rural households - dehqons

Dehqons - small family facilities with or without the legal status, carrying out small scale agricultural production and its marketing on the basis of personal work of the members of family on the allocated land plot (DCMRU №300, 1998). *Dehqons* can be simply referred to as rural households. Considering the population, it was estimated that about 95% of the total rural households in Karakalpakstan can be categorized as *dehqons* (JICA, 2011).

During the former Soviet-era, workers of *kolkhoz* and *sovkhoz*, consisting not only of farm-labors but also of workers having various kinds of jobs, received a small plot to grow crops for self-consumption. After independence the Uzbek agriculture related legislation intended to provide equal access to land by rural households to prevent an increase in the number of rural, landless poor and to contribute to an increase in food and cotton production. Beginning in 1991, the state started to take land from former collectives and divide it into additional household plots. Every household received official rights of lifelong inheritable tenure of a plot which is called *tamorka*. *Tamorka*s may be often located within walking distance of a household's village.

According to the land legislation *dehqon*s may lease land of the maximum size of 0.12 ha for house buildings/dwellings and additional 0.12 ha for cultivating agricultural crops, which however depends on the availability of 'free' land in the given district or region. Households mainly use land plots as backyard kitchen gardens or a specified area within the main farmland of the farmers, and are free to choose their crops to plant and to sell at their own discretion. Still, *tamorkas* are too small in size to generate profits at a scale that would negate the need to generate additional income via other means.

The numerous *dehqons* play an important role in the livestock breeding in Karakalpakstan, despite their small farm size. They own few livestock heads per household, but as a whole the total number of livestock owned by *dehqons* as well as the production of livestock products (meat, milk, eggs, wool, etc.) represent much larger shares in national and regional agricultural statistics. Despite their important role in food security and poverty alleviation, rural households lack the ability to cope with an increasing variability of commodity prices and increasing input prices for which they do not have sufficient capital (Conliffe, 2014).

In Uzbekistan, rural households heavily depend on earnings from employment in private farms in addition to the income from the non-agricultural sector. In this respect, the economic performance of the private farms is essential in providing not only rural employment, but also in securing the rural sources of income and the food situation in rural households (Conliffe, 2014).

4. Characterization of sheep and goats production

The climate of Karakalpakstan is considered sharp continental, with severe conditions for rearing cattle/cows. There are certain limiting factors for rearing livestock, such as intense heat, sharp winter, water shortage for forage production, saline soil and low carrying capacity of grazing

lands, which cause insufficient supply of feeds not only in quality but also quantity (JICA, 2011).

Normally rural households in the surveyed villages keep small flocks of up to 20 sheep and goats. These are kept as an easy-to-sell asset and for own consumption. Sheep provide pelts and meat, goats are kept also for meat and wool. Furthermore, fat is processed into tallow. Wool and pelts are used for pullovers, carpets and ropes. Dung is used for heating and cooking. Goat milk and dairy products (cheese for example) are not produced and consumed by rural households in the surveyed villages.

Interviews with rural households conducted during observations revealed the main pattern of keeping/breeding of small ruminants.

Karakul sheep production

According to the survey, ewes and rams mate at the end of October and give progeny after 5 months, in March once a year. Weaning is practiced after a 4-5 months lactation period, i.e. in July-August. Sharing is planned twice a year – in May and in August. With regards to grazing in pastures, the regular practice is to graze ruminants all year round. Stall feeding is practiced during winter months, when pastures have very scarce vegetation cover. Drenching also takes place twice a year – in May and in August. Animals for breeding purposes are kept for 5-10 years, rams are substituted more often.

Goats production

In the conditions of Karakalpakstan mating usually takes place in October and kidding comes in 5-month period, i.e. in March. Ewes with kids are kept separately from the flock in better conditions such as warmer clay-made constructions. Kids are kept and lactated for about 3 months, then weaning takes place in July. Sharing is done usually in May. Intensive grazing starts from middle March to end of November. After that, animals are kept in housing to avoid sharp frost, though they are out during daytime even in winter. Stall feeding is practiced during winter months, when pastures have very scarce vegetation cover. In winter, livestock are fed with dried sorghum, alfalfa hay, reed and cotton meal, etc. Fattening of goats with the purpose of further sales is conducted for 2 months (November-December). Animals (mostly rams) for fattening are selected from the flock based on their appearance, health, thick tail, good wool, healthy teeth and eyes. Drenching (skin and wool treatment of animals) as well as vaccination is conducted twice a year in spring and autumn by veterinary specialists.

Rural households prefer to keep goats due to lower fodder demand and their resistance to harsh climatic conditions. Goats die seldom – 1 per household per year due to a spread of certain disease like in very cold winter of 2013, when goats in the surveyed villages had lung problems. Dead or ill animals are not consumed, but burnt in the suburb of the village. Elderly and experienced goat breeders can treat/cure goats with traditional methods such as hanging a red cloth on the goat tail, feeding goats with yoghurt and vegetable oil in case of digestion problems; sometimes add vitamins to fodder mix; provide more grazing.

Milking of goats is very rare for Karakalpakstan. New coming to the flock goats are trained to find the new house when returning from the pasture for about 3 weeks.

5. Breeds and breeding of sheep and goats

Karakul sheep is bred in desert and sandy areas of the country, and native fat-tailed, the Jaidara and the Gissar sheep, are bred in foothills and on highland ranges. Karakul sheep supply meat

and valuable pelts, while fat-tailed sheep supply meat and fat. Synthetic sheep breeds based on native fat-tailed sheep have also been developed in different provinces of Uzbekistan to improve the production of certain outputs and to adapt to local conditions.

Goats are bred all over the country. Goats supply cashmere, mohair, skins, milk, and meat. Three types of goats can be distinguished: cashmere-producing goats, mohair-producing goats, and a variety of native goats (Iñiguez, Luis and Joaquín Mueller, 2008).

5.1 Karakul breed

Karakul is a breed of domestic sheep which originated in Central Asia (Bravenboer, 2007). It was received in the Bukhara ("the black lake," a village in Bukhara Province in Uzbekistan[4]) oasis due to centuries-long selection and is very well adapted to the rough conditions of desert and semi-desert zones. The karakul may be the oldest of all domesticated sheep breeds. Some archeological evidence indicates the existence of karakul pelts back in 1400 B.C.[5]

Bukhara Province is an old oasis in the middle of the desert with scant desert vegetation and a scarce water supply. The breeding of sheep inhabiting this oasis formed the basis of development for the "fur-bearing" Karakul sheep breed.

Karakul sheep are known for their ability to forage and thrive under extremely harsh living conditions. Karakul sheep are able to survive great extremes of heat and cold, from +46 to -36°C, and can drink the highly saline water found in most of the pastures in Uzbekistan. They can also survive severe droughts because of a special quality to store fat in their tails. They are resistant to internal parasites and Foot rot. According to FAO publication, Karakul sheep are '…exceptional foragers in arid and semi-arid zones and will go through a season of scarce food or graze marginal land where ordinary sheep would not survive. They contribute to weed control and fire suppression and recycle nutrients into the soil through hoof action' (Ibragimov et al., n/a).

Karakul sheep are a multi-purpose breed, which provides the population with an ecologically pure mutton, lamb's meat, as well as Karakul, sheepskins and wool. As a fat-tailed breed, they have a distinctive and highly valued meat. Adult Karakul ewes weigh 40-45 kg and adult rams 60-70 kg. Ewes mature more quickly than rams, as at 1.5 years of age they weigh about 87% of their adult weight while rams weigh only 69% of their adult weight (Ibragimov et al., n/a).

Many adult Karakul are double-coated; in this case, people separate the coarse guard hair from the undercoat. Karakul is relatively coarse fiber used for outer garment, carpets and for felting.

The strategy of Karakul production is based on the sustainable use of pastures. To reduce the impact on the vegetation, one part of the newly born animals – usually, small rams – must be sent to the slaughterhouse within a few days of being born. Very young or even fetal Karakul lambs are prized for pelts. The newborn lambs have a tight, curly pattern of hair. Texture is the most important characteristic of broadtail and karakul pelts. Bukhara sur is basically brown, but comes in about 10 different tints, from silver-bronze to golden, platinum and amber. The most valued qualities, such as durability, silkiness, and shape of curls are all concentrated in black karakul sheep.

Out of the aggregate revenue received from the Karakul production 65 – 67% constitutes meat, 20–24% Karakul skins, the rest falls on wool and sheepskins (http://furcommission.com/translated-statement-from-uzbek-karakul-company-feb-22-2001). People use the Karakul pelts to create various clothing items, such as Karakul hat. Well known

[4] Agnes C. Laut, "Fur farming for broadtail, Persian lamb, Astrakhan and Krimmer," The Fur Trade of America (New York: Macmillan Co., 1921), 70.

[5] Department of Animal Science , Oklahoma State University, Breeds of Livestock: Karakul, <http://www.ansi.okstate.edu/BREEDS/SHEEP/> 1996.

in the world market is fur coat made of Karakul for its color variety, lightweight and reversible use of both fur side and suede leather side. The Karakul lamb coat retails from around USD 1,500 to USD 3,000 in the world market.

Over time, Karakul shepherding spread to other parts of Central Asia, including Kazakhstan, Turkmenistan, and Afghanistan. In the 20th century, Karakul sheep were sold for breeding to Russia, the Ukraine, and Moldova, as well as South West Africa and Argentina and the United States.

At present the major areas of Karakul and broadtail pelt production are Central Asia, Afghanistan, and Namibia. Major consumers in the world market are France, Italy, Germany, Scandinavia and the United States. Karakul pelts are sold at auctions around the world, including Frankfurt Karakul Sales, Deutsche Auktions- und Handelsgesellschaft (Leipzig), Copenhagen Fur Centre, Finnish Fur Sales and MEXA (Moscow). Uzbek Karakul pelts are also traded worldwide at an average (FOB) price of USD 35-65 per piece (http://wk925292.company.weiku.com/item/Karakul-and-Karakulcha-14515944.html).

In Uzbekistan Karakul sheep breed is popular in Karakalpakstan, Navoi, Kashkadarya, Djizzakh, Samarkand, Bukhara and Surkhandarya provinces. Before the breakdown of the Soviet Union most pelts were sold to the Army. After decollectivization there were no marketing structures and thereafter not even 6% of pelts were exported. With the country's shift to a market economy, production, processing and marketing of pelts was privatized and reorganized; new companies specialized in processing high-quality pelts have since entered the market, which still is not well developed.

5.2 Gissar sheep breed

Fat-tailed sheep are distributed from the Don River and the lower Volga to Mongolia, from the Caspian Sea to the Himalayas, and from Siberia to Arabia (Iñiguez, Luis and Joaquín Mueller, 2008). Fat-tailed sheep are believed to have originated in Central and Northern Asia. Archeological findings suggest that this type of sheep was being bred in Central Asia as early as 4,000 to 5,000 years ago.

Gissar sheep was brought to Uzbekistan from Tajikistan. The Gissar breed can be mainly found in the Surkhandarya and Kashkadarya provinces or in highland areas, where conditions are appropriate, as well as on the plains, where there is abundant pasture, but is slowly being introduced in Karakalpakstan as well. In general, these animals are not exposed to extreme heat or cold. Different varieties of this breed exist. The largest type, particularly with regard to its fat tail, is found in the Surkhandarya region.

The sheep are characterized by large body constitution with strongly pronounced fat tail and are considered largest in size in the world. The animals have strong and high extremities, with the lengthened trunk. Color is black.

The animals of this group are meat producers, and their meat and fat are in great demand in Uzbekistan. These animals also exhibit high levels of fertility. Average weight of ewes is 60-75 kg, rams 85-115 kg but in special conditions ones can be 160-180 kg. Wool is coarse, wool productivity is 0.8-1.2 kg per animal per year (ftp://ftp.fao.org/docrep/fao/011/a1250f/annexes/CountryReports/Uzbekistan_E.pdf).

Meat and fat are main products of Gissar sheep. Gissar sheep mature early, and Gissar lambs grow quickly during the lactation period. The rapid growth and fast rate of fattening observed in lambs during the lactation period results from the high milk output of the ewes and the fact that the lambs are not weaned until 5-6 months of age, though this late weaning still occurs before lactation.

Gissar sheep are grazed year-round on natural rangelands. Whenever possible, sheep are moved to different grazing areas according to the season. This grazing system has been used since ancient times in areas where rangeland is available, and where the land is not suitable for agricultural production. According to Abulgazi, a sixteenth-century historian from Khiva, Uzbek tribes over-wintered around the lower reaches of the Syr-Darya river and spent their summers around the upper reaches of the Ural river, taking their flocks with them (Iñiguez, Luis and Joaquín Mueller, 2008).

5.3 Goat breeds

Goats are kept on all the different types of rangeland, and under all the climatic conditions found in Uzbekistan. In general, goats are able to graze on shrubs and on poor rangeland where edible grass is scarce and feed is insufficient for other animals. Before 1937, only native goats, mostly black, were kept as multipurpose animals.

Two types of goats –local or native breeds are widely distributed mainly in mountain and foothills areas of Uzbekistan. Native breed of goats is notable for good adaptability to poor feeding conditions and dry hot climate of the region. It is bred for meat, milk, wool and leather production. Mohair- and cashmere-producing goat breeds were developed using the country's native goat populations as a base (Iñiguez, Luis and Joaquín Mueller, 2008). They are bred at specific breeding farms in genetically pure state as well as for improvement of useful and characteristics of local goat breeds. Wool productivity makes 2.5-3.5 kg, while down production varies from 0.5 to 0.7 kg. The body weight ranges from 35 to 60 kg (ftp://ftp.fao.org/docrep/fao/011/a1250f/annexes/CountryReports/Uzbekistan_E.pdf).

A very small number of goats which produce outstanding amounts of milk are raised on private farming units in the Tashkent region. This type of goat is large and has a well-developed, bowl-shaped udder. Its lactation period lasts for 6-7 months, and milk yields can reach 300-400 liters. Unfortunately, there are no goat-breeding farms in Uzbekistan that specialize in milk-production, and mechanized milking systems are not used (Iñiguez, Luis and Joaquín Mueller, 2008).

In Uzbekistan, goats and sheep are raised separately only on rare specialized goat farms (not in Karakalpakstan). The remaining goats are raised in mixed flocks alongside Karakul, Jaidara, and Gissar sheep. While on average goats account for about 5-8% of the animals in these mixed flocks in some provinces of Uzbekistan, in some villages of Karakalpakstan, including the surveyed villages many flocks of only goats are raised due to goat's higher resistance and adaptability to local harsh conditions. Very often goats are the leaders of mixed flocks.

5.4 Sheep and goats breeds in selected villages

Respondents in the surveyed villages couldn't give the names of the specific breeds of small ruminants they own. All of them call the breeds of sheep and goats as "local". Though, few households in surveyed sites purchased "Gissar" sheep mainly through credit lines. During FGD respondents listed several pros of the local breed of goats, such as quality meat, good breeding, could gain 40-45 kg of weight within a year, doesn't require much care.

Table 7. Average livestock units per household

Livestock types	Karakul village, Units per household	Karabuga village, Units per household
Goat	10	3-4
Sheep	1	1
Cow	1-2	1-2
Poultry	5-6	5-6

Source: FGD, respondents survey

Households prefer goat breeding much more to sheep breeding. The main logic of respondents that supports this preference is that goats are more fit to the local environment conditions than sheep. Sheep breeding requires more care and time than that of goats. The approximate distribution of livestock units per household in the villages is given in Table 7. Goat flock is considered big to have 20-30 heads, middle size – 10-20 heads and small – 2-4 heads of goats.

However, participants of FGD pointed out that within the past 5 years, the number of goats per household has declined due to outbreak of diseases of goat's lungs and liver. More details on the livestock diseases are described in the corresponding section of this report.

With regards to the possibility of switching to a new breed, surveyed households tended to refuse than accept this option. They consider local breeds to be already well adapted to local conditions, whereas it will take long for introduced breeds to get assimilated and used to local conditions and local flocks/herds.

5.5 Breeding practices on sheep and goats

FGD participants reported that nobody applies artificial insemination of livestock and usually they don't control the process of sheep and goat mating. According to their observation mating takes place during autumn and lambing time comes in spring. However, few households in the villages try to control the period of the usage of one ram and goat male for insemination, which is not more than 3-4 years. Single lambs are the rule, although twins do occur. Ewes are very protective and attentive, resulting in high lamb survival (Ibragimov et al., n/a).

Some respondents pointed at selection of good and healthy animals with the purpose of multiplication. Thus, 3-4 years old rams can be specifically kept for mating for some years (and then they have to be changed), whereas good ewes are kept for longer periods, sometimes until their natural death. Good ewes are considered 'the wealth' of the family, they are respected and well treated as family members, their horns are also left in the house as a luck charm.

5.6 Housing of sheep and goats

Photos from observation in villages

Households keep small ruminants in semi-open stalls, which means that there is an area of open space for pasturing and a smaller area with shelter or cover. Depending on the number of small ruminants the area of stalls varies from household to household. Small ruminants spend most of the year in pastures. During severe cold days in winter small ruminants are kept in stalls.

5.7 Challenges faced by sheep and goats producers' vis-à-vis breeding

The main challenges for small ruminants breeding are diseases availability of feed during winter and spring seasons.

6. Feeds and feeding

The country is divided into four belts: the foothill plains, the moderately high mountains, the high mountains and the desert. The distribution of animal production systems is dictated by feed availability and climate. For example, cattle are located in different pasture areas, poultry production is common where there is good production of forage crops, perennial grass and some grains. The desert arid zones are the habitat for Karakul sheep and horse production. Annual precipitation in desert zones varies between 100 and 250 mm and average annual temperature is about 15°C. The desert is mostly natural grazing (Ibragimov et al., n/a).

6.1 Types of feed for sheep and goats in surveyed villages

The fodder base for small ruminant in Karakalpakstan comes from three main sources:

1. natural grazing lands of deserts and foothills;
2. sown and improved pastures;
3. fodder saved or purchased for additional feeding in critical periods

Small ruminants owners mostly practice grazing in pastures, since it is free and available during most of the year. In addition, they use stall-feeding.

With considerable expansion of the cereal (wheat, barley) areas a decrease of the areas of the main fodder crops in irrigated areas has been observed. Now the required bulk fodder is provided by straw and other residues of cereals as well as coarse and rich fodder (barley, brassicas, oats, triticale and, in summer, sorghum) grown after harvesting cereals.

Reports by livestock researchers state that the feed for sheep in shrub-grass grazing is as follows: spring - period of rapid growth and eating of *ephemerals* and *ephemeroids*; animals are provided with vitamin-rich green fodder. By summer due to cessation of growth of the grass layer, dry fodder from *ephemerals*, kinds of *calligonums*, and dry annual salty grass vegetation are the main components of feed for the sheep. In autumn the available feed is slightly better owing to their eating shrub-subshrub fodder, dry *Carex physodes*, and small grasses. Shrub-subshrub pastures accumulate a stock of phytomass in summer; *ephemeras* and *ephemeroids* in spring; and annual halophytes by the autumn Iñiguez, Luis and Joaquín Mueller, 2008).

6.2 Sources of feed for sheep and goats in surveyed villages

In general for Karauzyak district of Karakalpaksan, public (in some occasions farmers owned) pastures are the primary source of feeds for small ruminants. Other sources of feed include cultivated fodder crops (jugara, maize, sorghum, etc.), cereal brans, purchased cotton cake (oilseed cake), collected green forage (grass, weeds, etc.), and straw (rice, wheat).

Koybak village

Shepherds from the Karakul sheep breeding cooperative in Koybak village graze sheep on Karakum desert pastures from late March to late August when the desert is covered with green foliage of *Alhagi* (jantak), *Saxaul*, various annual grass. In autumn and winter seasons shepherds return to the village and use fodder to feed animals. Provision of fodder relies on several sources:

- collected and dried wild grass (jantak, licorice biomass (not roots);
- produced fodder crops (sorghum, maize, lucerne);
- produced by-products of agricultural crops (wheat and rice straw, husk);
- purchased dry wild grass;
- purchased fodder (cotton cake and meal, husk, grain fodder mix, feed compound (mixed feeds).

Production of own fodder is problematic despite of vast agricultural lands due to unreliable irrigation water supply. There is an irrigation channel in the village, but numerous pumps (electric or diesel) are required to convey the water to the fields. Thus in the times of electricity cuts or high prices for diesel, irrigation of fields becomes expensive or just not possible.

"Uzbek Karakul" sets contracts for fodder supply with several organizations such as 'Khojeli Turan', 'Tohiatash Don', 'Beruni Eggor', 'Karakalpakdon'. The amount of purchased fodder depends on the availability of own fodder and on the requirements of the flock, calculated as the product of sheep head and feeding rates.

Karakul and Karabuga

Rural households in Karakul and Karabuga use various feeding strategies depending on the purpose, the season, fodder type and availability in the field and at the fodder market.

For fast fattening of sheep (for sales or own consumption at New Year holidays) villagers feed the animals with maize corn for 1-1.5 months in the beginning of winter at the rate of 100g x 3 times x animal x day.

Photos of fodder types at rural households

For fast fattening of goats, households feed the animals with cotton meal and husk also for 1-2 months in the beginning of the winter.

There is a small retail shop of the cotton industry in each village providing rural households with cotton meal, cake and husk.

Hay of agricultural crops is prepared by the households themselves. Compound fodder can be purchased only at fodder market. Maize and jugara grain (both for feeding animals and family consumption) can be either produced at *tamorkas* by households, or purchased at fodder markets.

6.3 Quality of feeds for sheep and goats in surveyed villages

Real assessment (through labs) of feed quality for nutritional value and other parameters was out of scope of the current value chain study. However, surveyed households reported the quality of available feeds in pasture to be satisfactory, though depending a lot on the season, precipitation or irrigation water availability and weather conditions. Quality of other sources of feeds (mostly purchased through fodder markets) depends on the sort and its price.

6.4 Knowledge and utilization of feeds

Local people know that they should rely not only on grazing, but also purchase or use of other feed sources outlined above. Respondents said that they use mixed feed as a combination of green forage, cotton cake and jugara for small ruminants. In most cases, households' usage of effective feeds depends on their financial capacities and their willingness to buy good fodder. Usually, they don't save on feeds when they need to quickly fatten up a sheep or goat to sell or use it for some special event. Also during lambing period small ruminants receive more feed than usual.

6.5 Availability/Scarcity of feed over seasons

During FGD in Karakul participants were asked to assess availability of the feeds across four seasons of the year as well rainfall relative amount.

Table 8. Feed and rainfall availability across seasons

Name of the season	Spring Lambing	Summer Pasture	Autumn Stall-feeding	Winter
What percentage of the annual rainfall is received in the season?	40%	10%	15%	35%
Feed availability in the season (Score 1 – 5; 1= Low & 5= High)	3	5	3	3

Source: FGD during the survey

Seasonal availability of feed is negatively correlated with seasonal rainfall. It is because during summer, pasture is the primary source of livestock feed and this season is very dry. In other seasons, availability of feed sources is regarded as satisfactory.

Another table, filled also by FGD participants, gives an approximate estimate of the share of feeds in each season.

During spring or lambing time (as named by FGD participants) green forage (own or purchased) share accounts for half of the livestock feed, whereas grazing and concentrates shares equal to 20 and 30% respectively. In summer, small ruminants mostly graze and receive concentrates in small amount. Pastures still remain the main source of feed in autumn as well, though their share

reduced up to 50%. In that season livestock owners have to use green forage in addition to concentrates and conserved feeds. During winter time green forage regains its position as a main source of feed.

Table 9. Share of feeds across seasons

	Spring	Summer	Autumn	Winter
SEASON NAME	Lambing	Pasture	Stall-feeding	
Crop residues (a) cereals: e.g. rice straw, maize stover) (b) legume crop residues				
Green forage (e.g. grass, weeds, trees/ shrubs, fodder crops)	50%		30%	60%
Grazing on permanent grass cropland or waste area	20%	90%	50%	10%
Concentrates (e.g. compounded feeds, feed ingredients e.g. brans, grains, oilseed cakes)	30%	10%	10%	20%
Conserved feeds (hay and silage)			10%	10%
Other (e.g. tree leaves, refused vegetables and fruits and kitchen waste)				

Source: FGD during the survey

Two conclusions could be drawn from Tables 8 and 9:

- Livestock owners have to buy (thus spend cash) feed during winter and spring. During these seasons they spend about 40,000-50,000 UZS per month per sheep/goat;
- Pastureland availability is crucial, though the usage is rather chaotic.

It has to be noted that these tables give an approximate estimate by FGD participants of feed availability during seasons, though the pattern of usage remains valid.

Both sheep and goats get water for drinking either from channels/ditches when grazing, or from pumps/wells when kept in stables.

6.6 Marketing of feeds

The main fodder market is located in Karauzyak district center and is in operation on Wednesdays. It brings together sellers of various fodder types from hay to grain and husk. Prices vary depending on the season. Prices valid at the end of summer – beginning of autumn are shown in Table 10.

Table 10. Prices for fodder in Karauzyak and Nukus markets

Fodder type	Market	Unit	Price per unit, UZS	Price per kg, UZS
Alhagi or camel's thorn	Karauzyak	cart (weight n/a, enough to feed 1 sheep for 15 days)	30,000	

Dried *licorice* biomass	Karauzyak	bundle cart (weight n/a, enough to feed 1 sheep for 21 days)	600 27,000	
Sorghum grain	Karauzyak	kg		1,300
Maize grain	Karauzyak	kg		1,600
Compound feed	Karauzyak	kg		1,300
Cotton meal	Karauzyak	kg		1,300
Wheat husk	Karauzyak	kg		900
Jugara grain	Nukus	kg		2,000
Compound feed	Nukus	kg		1,500
Rise husk	Nukus	kg		1,000

Photos from fodder market

6.7 Challenges related to feed and feeding

Low fodder availability and supply. Insufficient feed availability is one of the key issues of livestock production development in Karakalpakstan. As per results of the survey, modest sizes of rural household plots restrain provision of feeds for livestock, which is bred *dehqons*. The majority of the surveyed households have to buy additional feeds in the winter-spring seasons. Moreover, some of households deals with collecting feeds for their livestock - mow grass, collect food waste. Grazing livestock along roadsides and ditches is widespread. Grazing livestock on community pastures, including by hired shepherds, is not common due to a lack of rangelands (UNDP, 2010). According to the surveyed villagers, in case of own produced fodder deficit, additional fodder has to be purchased from local markets (Karauzyk, Chimboy, or even Nukus) or from neighbors. Borrowing of fodder from the neighbors is never practiced in Karauzyak.

Lack of pastures. The situation with pastures is rather complex. Around 92% of all pastures in the country were under the management of the MAWR in 1991. Gradually, their area shrank by 40% due to intensive and unlimited grazing, abolishment of pasture rotation and lack of their

reclamaion practices. Some part of the degraded pastures was transferred to the State Land Reserve, and some part to the Forest Fund (UNDP 2010). Nowadays, there are almost 13 million ha of pastures available for the national livestock breeding. Most of them are located in the Republic of Karakalpakstan, Bukhara and Navoi regions, where the most remote grazing livestock breeding is practiced (sheep breeding).

Low status of pastures. The existing pastures are overgrazed, on farmer land plots as well. More than a half of cattle breeding farmers stressed lack of community pastures for grazing. Lack of own feed resources makes cattle breeders buy feeds elsewhere.

Lack of forage harvesters (combines).

Lack of irrigation possibilities. Even if there are irrigation channels in rural villages, numerous pumps (electric or diesel) are required to convey the water to the fields or pastures. Thus, in the times of electricity cuts or high prices for diesel, irrigation of fields becomes expensive or just not possible.

6.8 Potential interventions to address the challenges

Potential interventions to address the challenges related to fodder are:

- provision of access of rural households to the pastures;
- improvement of pastures (alternative crops, alternative irrigation methods, crop rotations, etc.);
- improvement of feeding base for small ruminants.

7. Diseases and animal health care for sheep and goat

7.1 Major sheep and goat diseases and pests

Goats are less often affected by lung and intestinal helminthes than sheep. Even when infection does occur, the mortality rate is not high, and the problem is usually overcome with veterinary treatment. Contagious pleuropneumonia is the biggest problem for goat breeders, as it results in a high mortality rate if preventive treatment is not given. Necrobacillosis causes a certain amount of economic losses, and affects the udders and faces of kids (Iñiguez, Luis and Joaquín Mueller, 2008).

Household respondents indicated that major diseases of sheep and goats are those that infect liver and lungs of animals. They couldn't name the disease, but Karauzyak veterinary service head called it "Fatsillioz" or helminthic disease of liver and described conditions of its occurrence. The risk of getting infected by this disease is very high when an animal is 6-7 years old. Usually, this disease infects sheep and goats in summer. There are two sources of the disease:

- pasture – larva gets into animal via green mass;
- water – larva gets into animal via mollusk in the channel, pond.

Veterinary service sells a drug called "Albindazon" to cure this disease. Though, interviewed households couldn't tell the name of the drug or vaccination and their effectiveness. They simply trust veterinary service in dealing with livestock diseases.

7.2 Availability (informal and formal) of veterinary services (for producers, processors, and traders)

State veterinary service exists in Karauzyak and its branch office is located in the centre of the district. Interviewed household respondents didn't indicate the availability of the private

veterinary services. However, the head of the state veterinary service said that there was one private medical unit in Karabuga village, which provides veterinary services too. None of informal veterinary services are available in Karauzyak.

The head of the state veterinary service in Karauzyak outlined general requirements for opening a private veterinary service and getting a license from the State veterinary service, which is located in Tashkent:

- The head of the private veterinary service must have a veterinary education;
- Office of the private veterinary service must consist of at least three rooms;
- There must be equipment for artificial insemination.

As there is almost no demand for artificial insemination in Karauzyak, then naturally, no incentive for investing in necessary equipment to open a private veterinary service.

Surveyed households pointed at self coping strategies in case of lack of or late veterinary services. These strategies include purchasing vet drugs and medicine in special vet drugstores (in Karauzyak or Nukus) and curing animals by own means. Generally, vet drugs are of Uzbek production and trademark with sufficient quality. Imported vet medicine is rare.

7.3 Adequacy and affordability of veterinary services

According to JICA, 2011 survey various paid veterinary services are available in rural Karakalpakstan. These veterinary services are provided at a veterinary points located at VCCs under the district veterinary office, though the conditions vary among districts.

In Nukus city, the veterinary and sanitary inspection for livestock and agricultural products are conducted in two points: Nukus Central Bazaar and Nukus railway stations. The veterinary and sanitary laboratory in Nukus Central Bazaar has its own sanitary check plan to check meat, vegetables, fruits, fish and dairy products. However, products are not entirely tested in accordance with the check items due to lack of test equipment.

State veterinary service has a calendar plan of activities, of which households in villages are informed at respective village community offices. This plan includes free of charge vaccination of all households livestock against anthrax. Small ruminants are vaccinated twice a year, whereas cattle are once a year. According to the respondents, veterinary specialists do not provide/distribute vaccination calendars.

State veterinary service provides various services, including drug and clinical treatment of animals, artificial insemination, consulting local people on animal diseases, issuance of animal health certificate before its sale etc. (refer to Annexes 2-5). The office has about 20 employees, which is enough to meet the needs of livestock owners in the district, as per the words of the head of the veterinary service office.

Respondents shared generally positive views on the quality and affordability of the veterinary services provided. However, they have no other choice and have to deal with whatever service the state veterinary office provides them.

7.4 Challenges related to animal health care

Stable vet specialists visits. The head of state veterinary service in Karauzyak didn't complain about anything concerning livestock health care in the district. He said, that people were satisfied with veterinary services they provide and they have no issues at all. However, during FGD some local residents in surveyed villages pointed out that they had to go to the centre of Karauzyak and spend time and money to get veterinary service. On the contrary, other respondents said that they could phone call and summon veterinary service specialist to the village, though it remains unclear who covers round-trip transportation costs.

Efficient treatment of diseases. Mostly, local livestock owners are concerned with a timely identification and effective treatment of the animal diseases.

Efficient treatment of diseases.

Survey of veterinary service provision in Uzbekistan by UNDP (2010) revealed the following key issues, which may apply to RVCA of small ruminant in Karauzyak. The analysis has revealed the following issues related to vet service and pedigree animal breeding in the country.

- lack of understanding among population of vet service importance;
- low level of solvent demand for vet services, primarily by farmers;
- low level of equipment availability in ZVSs and lack of premises;
- shortage of vaccines and incomplete animal vaccination;
- rather low quality of available vet drugs and materials for vaccination and insemination;
- weak development of private entrepreneurship in vet service sub-sector;
- insufficient advocacy among population about necessity of vaccination and AI;
- lack of qualified specialists and their low motivation.

7.5 Potential interventions to address the challenges

Interviewed respondents didn't indicate special measures to address the challenges since mostly the current state of the art satisfies all concerned parties.

According to UNDP report (2010) vet service of Uzbekistan nowadays is the most developed sub-sector of the livestock infrastructure, considering its regional and district branches and set of services provided to dehkan and private farms. There are the Regional Vet Departments in all regions and accordingly District Vet stations in the districts.

At the lower level, the Vet Service is represented by public and private Zoo-Vet stations (ZVS). The state ZVSs practice animal vaccination, treatment and AI services for cattle belonging to dehkan and private farms, while private ZVSs deal with animal health and also, upon agreements with the state Vet Services, make animal vaccination and AI. The private ZVSs operate on the base of licenses, which they obtain from the Regional Vet Departments. Their establishment supposes allocation them with buildings and provision with all needed equipment. However, this process is not progressing successfully everywhere. Sometimes, the buildings are not allocated, so the ZVSs are not functioning. Many of ZVSs opened in recent years do not have appropriate buildings and equipment, so their activity is just formal. Apparently, the state budget funds are not sufficient, and not so many private ZVSs are emerging. It is also rather difficult to get access to a bank loan for purchasing equipment supply due to high interest rates and bureaucratic barriers on the way of document processing.

Cattle vaccination as well as of other livestock is made to prevent foot and mouth disease, anthrax, brucellosis, emphysematous carbuncle, bradzot, cattle-plague, hydrophobia and lettostrazm. Special attention is paid to animal vaccination in those farms, which are located along the borderline with other states.

Vaccines are being distributed to the ZVSs on the free of charge basis under thestate budget support, which is targeted to the Regional Vet Departments according to their provisional applications with indication of cattle number. Vaccination can be practiced once or twice a year depending on the disease, and is to cover the entire livestock herd bred in the attached area. Livestock owners pay for syringes and services only.

According to vets, the provided quantity of vaccines is not sufficient for all animals due to their unreliable livestock recording in *dehqons* farms, which is managed by VCCs. As a result, some

part of livestock is left without vaccination that weakens animal immune system and cause diseases. Also, according to the experts, the vaccine itself is ineffective in many cases or insufficiently effective – probably due to poor drug packaging. Most of *dehqons* and livestock breeding farms do not face any difficulties with getting vet services, except for several respondents mentioned lack of needed vet drugs and their high cost.

8. Credit

8.1 Types and sources (formal and informal) of rural credit

There are only two branches of commercial banks located in the centre of Karauzyak district: Agro Bank and Halk Bank (People's Bank). None of formal credit organizations are present at any of the villages in Karauzyak district. Interviewed respondents didn't indicate any primary informal credit source they could get large amount of funds from, based on interest rate. Nevertheless, local people in both villages borrow from each other small amounts of money, but not on a regular basis. However, there exist couple of retail shops in both villages where people get food or other products on "credit", which means that they repay the costs later at the end of that month when they have cash or funds on their plastic (debit) cards. In general, a district bank is the primary source where local people seek money to borrow.

The client base of these two banks in Karauzyak differs in that Agro Bank serves farmers among other clients, meanwhile Halk Bank doesn't have farmers among its clients. The reasoning behind this phenomenon is that traditionally Agro Bank was established to serve agricultural sector and Halk Bank mostly attracts deposits from ordinary citizens.

Both banks have several credit lines, including: (1) a 3-year soft (micro)credit for livestock breeding at 9-10% annual interest rate; (2) youth credit at 14% annual interest rate; (3) consumer credit at 17% annual interest rate; and (4) commercial credit at 18-19% interest rate. Soft credit lines (1-3 above) do not require business plans, whereas commercial credit can be issued only upon a well-structured business plan.

Bank staff conducts propaganda or awareness creation campaigns on the availability of crediting options at schools, institutions, state organizations and VCC offices in rural areas. Halk bank has prepared special brochures devoted to soft credit lines, which bank staff distributes to the interested people.

Some years ago, VCCs helped the poor and underprovided households by providing live sheep and goat.

8.2 Credit lines for sheep and goat producers

Central Bank of Uzbekistan (CBU) adopted the Statue "On the Issue of Microcredits to rural households for supporting agricultural production", #2344 from March 20th, 2012. This Statue was designed to regulate the issuance of small loans by commercial banks to rural households for crop cultivation, livestock breeding (cattle, small ruminants), poultry breeding, rabbit breeding, beekeeping, purchase of seeds and plants.

The maximum amount of microloans is set equaled to 100 units of minimal wage, which is determined by the Government of Uzbekistan each year. As of date, the minimal wage is equal to 130,240. UZS or about 47.9 USD as per official exchange rate (1 USD = 2,721.12 as of 17.11.2015)[6]. So, the maximum amount a rural household could get is 13,024,000 UZS or 4,786 USD. It should be noted that official exchange rate is revised each week by CBU in the direction of further devaluation of the national currency.

[6] http://www.cbu.uz/eng/section/rates

So, the Statue stipulates that microcredits for sheep and goat breeding are issued for up to 3 years with 6 months of privileged period (preferences), during which a rural household is obliged to make payments only on accumulated interest. Interest rate on microloans differs between commercial banks. Agro Bank has set an annual interest rate of 9%, whereas Halk Bank – 7%. Interestingly, these two banks don't have their own resources to issue microloans: local Agro Bank branch draws funds from its head bank office in Nukus (capital of Karakalpakstan), and Halk Bank attracts resources from another commercial bank "Asaka Bank".

However, a rural household can't get microloans from commercial banks in cash in order to buy a sheep in a local market, for instance. The necessary requirement is that a loan recipient should have a contract with an organization that sells sheep or goats. Also, as Halk Bank representative said, microloans for livestock are issued to persons officially employed, because they can prove their source of income.

The data on households in two villages that received microloan for buying sheep is given in the following Table.

Table 10. Data on Households (HH) that received microloan for sheep purchase from Halk Bank

HH	Village	Amount of microloan, UZS	Sheep heads	Seller
1	Karakul	2,000,000	2	Farm "Kholik Hoji"
2	Karakul	2,000,000	2	Farm "Kholik Hoji"
3	Karakul	1,000,000	1	Farm "Kholik Hoji"
4	Karakul	1,000,000	1	LLC "Terbenbes"
5	Karakul	1,000,000	1	LLC "Terbenbes"
6	Karakul	3,000,000	3	LLC "Terbenbes"
7	Karakul	2,000,000	2	LLC "Terbenbes"
8	Karakul	2,000,000	2	LLC "Terbenbes"
9	Karakul	1,000,000	1	LLC "Terbenbes"
10	Karakul	1,000,000	1	LLC "Terbenbes"
11	Karakul	1,000,000	1	LLC "Terbenbes"
12	Karabuga	2,000,000	2	LLC "Terbenbes"
13	Karabuga	2,000,000	2	LLC "Terbenbes"
Total		21,000,000	21	

Source: Halk Bank branch, Karauzyak

Agro bank didn't issue microloans for these two village residents. As we can see from the table, there are two organizations that sell sheep in the district: one is a farm entity and another one is an agrofirm "Terbenbes" that sells "Gissar" breed of sheep. Halk bank started issuing these microloans in the 1st half of 2015 and since then only 13 households have taken advantage of this opportunity. These households purchased 21 units of sheep at the price of 1,000,000 UZS (or 367.5 USD) each.

There are no specific loan programs for feed suppliers, transporters, processors, and traders. These participants of small ruminants supply chain can obtain a loan on general terms with commercial interest rate at least of 14-16%.

8.3 General features of credit terms and conditions

All banking loans are required to be issued under conditions of return, solvency, provision, timeliness, and purpose, as per instructions of CBU. These general conditions mean that, before issuing a loan, a bank must duly check and verify that a recipient meets all requirements for a specific loan. As of rule, a bank must ensure that a recipient is able to repay a loan in full amount with interest payments and in due time. In addition to relying upon recipient's solvency, a bank secures its loan by requiring that a recipient must provide either a collateral/mortgage or warrantor(s), who will be responsible for repayment of the loan in case of the applicant's insolvency. Specifically, conditions differ depending on the amount of the loan and its purpose in each case. The higher the amounts of a loan, the stricter are the terms and conditions for a recipient. As an example, below are outlined terms and conditions for getting a microloan for livestock purchase in Karauzyak banks.

Table 11. Terms and conditions for getting a loan for livestock

General terms and conditions	Agro Bank	Halk Bank
Duration	3 years or 36 months	
Maximal amount	13, 024,000 UZS	
Interest rate	9%	7%
Source of microloans	Head Office in Karakalpakstan	JS Commercial Bank "Asaka Bank"
Preferences	Initial 6 months for interest payments only	
Guarantee		Up to 3 mln. UZS – 1 warrantor From 3 mln. to 5 mln. UZS – 2 warrantors More than 5 mln. UZS – collateral
Initial payment		Deposit 10% of the microloan amount

The list of documents required for application for a microloan was obtained from Halk Bank. Since commercial banks in their activities follow the same instructions from CBU, we may assume that this list is also valid for Agro Bank procedure. So, a member (loan recipient) of a rural household should provide the following documents (if applicable) for microloan application:

1. Copy of the passport.
2. Reference from a local community office (*mahalla* or VCC*)* on the residence certification.
3. Income reference from employment place.
4. Copy of the Tax ID.
5. Copy of the pension book.
6. Warranty letter from the employment place.
7. Warranty depending on the amount of the microloan:

   7.1 Up to 3 mln. UZS – 1 warrantor (passport copy, income reference, reference from local community office, pension book copy, TAX ID copy);

   7.2 3 to 5 mln. UZS – 2 warrantors (passport copy, income reference, reference from local community office, pension book copy, TAX ID copy);

   7.3 More than 5 mln. UZS – collateral by the recipient.

8. Contract between a loan recipient and an agrofirm, which sells sheep or goat.
9. Open an account and deposit 10% of the microloan amount to the bank.

The whole process of receiving a microloan takes up to 10 working days according to interviewed bank respondents.

8.4 Rules and regulations that influence availability and access to credit

Banking system of Uzbekistan is a strictly regulated field. The main body responsible for supervision of banking system is a Central Bank of Uzbekistan. There are two key laws that form the ground for establishment and functioning of the credit-banking system in Uzbekistan: "On Central Bank of Uzbekistan" (1995) and "On Banks and Banking system" (1996). In addition to these laws each year numerous legal acts of all levels were and are issued to regulate the banking field. This field is even more bureaucratized by instructions issued by CBU for banks and internal instructions issued by banks themselves.

As an example, the respondent from Halk Bank in Karauzyak said that they have to send each applicant's documents for approval to their head office in capital city, Tashkent, even for small amounts such as microloans for livestock. That's why it takes 10 working days to issue a microloan for livestock, as was above-mentioned, otherwise the number of days for decision-making would have been reduced.

And this is true for all bank branches in the country: local banks (branches) have no real decision power in formulating and implementing their crediting policy.

8.5 Challenges in credit provision and access

In general the main challenge in accessing credits lies in burdensome application procedure, which requires many documents, the time and efforts to collect these papers.

There are two requirements that limit the access to credit resources for livestock in Karauzyak:

1. In order to receive a loan from a bank, a recipient must have an official job and submit a reference on his income. Unemployment is rather high in rural areas and if an unemployed wants to start a small business with livestock, he just can't get a credit for that initiative. That's why all of recipients of above-mentioned microloans for livestock do work at public organizations (i.e., school, kindergarten, hospital).
2. Households cannot receive bank microloans in cash so that they would have choice to buy any kind of livestock they want from local or other market, and not the one offered via a specialized agrofirm that promotes single breed of sheep, Gissar. This leads us to the countrywide scourge, which has infected all banks: shortage of cash. Some local people, who work at public organizations, such as schools and hospitals, and who receive pensions, complained that they are forced to get their wages in noncash on plastic cards. It wouldn't be an issue since formally current laws guarantee that anyone can withdraw cash from bank in full amount available on his/her plastic card. However, in practice it is not always feasible. Banks always refer to the shortage of cash and plastic cardholder can withdraw only a small amount of cash per visit to a bank. This issue leads to two negative consequences for all people, who have plastic cards:

    2.1 Sometimes it is simply impossible to buy some products non-cash. For instance, in Karauzyak livestock market, one can purchase, i.e., a sheep only for cash. The same is true for other agricultural products such as vegetables, potatoes, beans, etc.: local households don't sell it for noncash.

    2.2 Second outcome arises when the product could be purchased both for cash and noncash. But, if a seller in a market agrees to sell a sheep, i.e., for noncash then the price will be

undesirably higher than that for cash. In general, the average spread between cash price and noncash price is between 10-20%. So, we can assume that the value of income accumulated in plastic card decreases automatically by 10% at least.

These consequences are especially acute in rural areas where local markets mostly accept cash payments.

Banks do not conduct surveys of the population as to identify their demand in credits, preferred credit types and requirements (documentation) burden.

9. Marketing and value chains for small ruminant products

9.1 General features

Market is the main transaction place for most commodities in Karakalpakstan, and retail shops have been scarcely developed particularly in rural area. Nukus Central Bazaar (so called *Dehqon* Bazar) is the largest bazaar in Karakalpakstan, and most districts have central and local (satellite) bazaars, in order to give producers and local residents better access. In recent years, the number of retailers at major District Central Bazars are increasing due to the lack of employment opportunities in rural areas, resulting in congestion of retail sections.

There is one market in Karauzyk district, open every Wednesday and located in the district center (15 km from "Karakul", 25 km from "Karabuga" and 47 km from "Koybak"). The market has separate divisions for food products, clothing and livestock market.

Most *dehqons* dealing with marketing of their livestock products, mainly sell them at the market or to their neighbors and friends or to resellers. *Dehqons* transport their livestock products to local livestock markets themselves while the neighbors and resellers usually collect them from the farm gates (UNDP, 2010).

There are several neighboring markets where rural households from Koybak, Karabuga and Karakul VCCs can sell their live small ruminants, meat, milk, pelt or wool.

Table 12. Target markets and transportation costs for Koybak VCC

Location of the market	Distance from Koybak VCC, km	Working days	Transportation costs, UZS per animal
Nukus city	50	Sundays and Wednesdays	10 000
Karauzyak	47	Wednesdays	5 000
Takhtakupir	70	Sundays	10 000
Khalkabad	22	Sundays	5 000

Second closest market (after Karauzyak) is in Chimboy district, operating on Sundays and located 25 km from Karabuga village (actually the same distance from Karabuga to Karauzyak district market). Thus, live animals from Karabuga can be marketed at both markets.

The general feature for all surveyed households is the absence of stable, long time clientele. They sell their small ruminant products chaotically to any buyer, offering a reasonable price. In some occasions rural households may have long time trading relationship with for example vet drugstore, or rarely with fodder supplier (basically for cotton meal and cake). Furthermore, surveyed households reported to be using income from sales of small ruminant products (and

especially live animals) on food products, which cannot be home produced (sugar, oil, etc.), clothing, hygiene items, educational fees of the children, and finally on some household (electric) appliances.

Photos from livestock market

9.2 Prices for small ruminant products

Trade at livestock markets is subject to seasonality resulting in variations in number of animals traded and prices paid. Peak months for slaughter animals coincide with festivities (religious, cultural and weddings) in January, February, April and September.

Market prices of most agricultural products are determined by direct transaction. Prices for live ruminants and meat are influenced by the number of resellers and butchers in a given market day. They increase demand and push prices up.

Prices for sheep and goat meat vary depending on the market location – in district market prices would be lower, whereas at the market in Nukus prices would be a bit higher. Likewise, sheep meat in Karauzyak market costs 20,000 UZS per kg (in villages, such as Koybak one can purchase sheep meat for 18,000 UZS, but not always, only when a household slaughters the animal and wants to sell to the neighbors excess meat), sheep meat in Nukus market costs 23,000

UZS per kg. Goat meat is sold seldom at a price of 18,000 UZS per kg at Karauzyak market and at a price of 20,000 UZS per kg in Nukus.

Table 13. Prices for small ruminant products in Karauzyak and Nukus

Product	Market	Unit	Price, UZS per unit
Live sheep (4-5 months old)	Karauzyak	animal (head)	300,000 – 350,000
Live sheep (1 year old)	Karauzyak	animal (head)	
Live sheep (2 years old)	Karauzyak	animal (head)	
Gissar sheep breed	Karauzyak	animal (head)	700,000 – 1,000,000
Live goat	Karauzyak	animal (head)	
Live goat	Karauzyak	animal (head)	
Sheep meat	Karauzyak	kg	18,000 – 20,000
Goat meat	Karauzyak	kg	18 000
Sheep meat	Nukus	kg	23,000
Goat meat	Nukus	kg	20,000
Karakul pelt	Uzbekistan	item	10,000 – 50,000
Karakul pelt	Caucuses or other export	item	300,000 – 500,000 depending on the quality (ca. 100 USD)
Goat wool	Karauzyak	kg	10,000
Goat milk (rare)	Karauzyak	liter	800 – 1,000

Prices for small ruminant products have been steadily increasing in the last 5 years in reaction/reflection to overall inflation and in response to each raising of the minimum wage rate (usually twice a year). Prices for meat fluctuate also in reaction to availability and prices for beef in a given market over a given period of time.

10. Marketing of live sheep and goats

10.1 General features

Live sheep and goats in the study Karauzyak district of Karakalpakstan are usually marketed at special livestock market in Karauzyk district, open every Wednesday.

Live small ruminants are usually transported in mini trucks, 10 animals per truck. Closed/tented trucks and hay on the floor are preferable for transportation of live animals especially in winter time. Sometimes local wholesalers/resellers buy sheep from rural households for subsequent sale at local markets. Rural households wishing to sell their live animals have to pay a market tax/fee of 3,400 UZS per 1 ruminant head.

Seldom wholesalers come to VCC from Tashkent or Khorezm and purchase live animals, usually in winter or early spring.

Prices for live sheep and goat have the tendency to increase in November due to the growing demand. Rural households tend to purchase live animals in early November for fattening (intensive breeding) for 1-2 months just before the New Year holidays. These fattened animals are then slaughtered for home consumption or also marketed in search of cash in January-February of the following year.

With regards to the preferences of the live animals' buyers, respondents pointed at such characteristics as weight of the animal, healthy teeth, shining eyes, good wool, age.

In order to sell a live animal at the market, one has to obtain a certificate of origin from local VCC office and a health statement for animals from veterinary station based in the market.

10.2 Value chain for live sheep and goats

Rural households have the options to sell their live animals themselves or to resellers, who have bargaining power and more time to spend in the market to speculate on prices or to find wholesalers exporting live animals to other provinces of Uzbekistan (mostly to Tashkent and Khorezm). Seldom butchers may purchase live animals from the households, close to the district, for further meat retail sales (Figure 5).

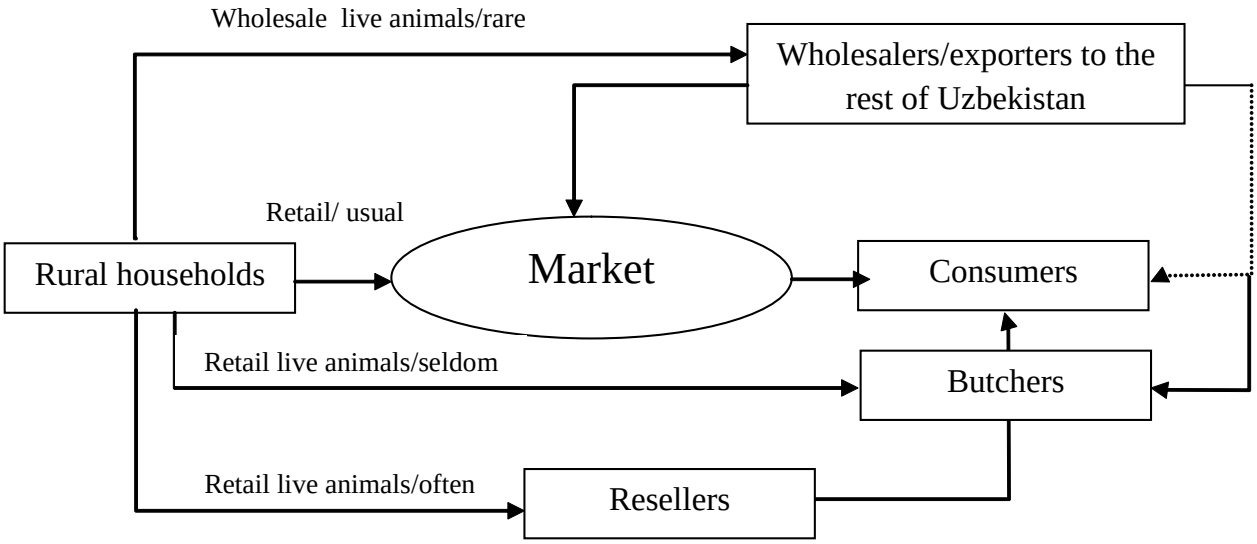


Figure 5. Live animals flow map

10.3 Challenges in marketing

Development of the marketing network for livestock products and addressing many relevant issues is an important area to increase commercialization of livestock production. Lack or underdevelopment of such network makes any effort to commercialize the sector meaningless, because any product must have its buyer to cover costs and to get profit (UNDP, 2010).

Frequency of market days (which is once a week in a given district) is not sufficient for rural population, they would prefer to have marketing options more than once a week.

Rather high transportation costs and absence of stable transportation service providers (except some neighbors, possessing a car/truck) also present a drawback. Rural households have to get on the road well beforehand of the market opening hour in order to find transportation means.

Extreme weather events such as droughts for example also have an impact on marketing of small ruminants. In the absence or decreased feed production due to droughts, households tend to get rid of live animals, pushing the prices down.

10.4 Options for improvement

Occasional dependence on sales to the neighbors and friends indicates presence of difficulties with transportation and wholesale relations in livestock markets. Some specific measures should be taken to facilitate access to market for *dehqons* in order to realize their market capacity and to

supply their products to urban population. These measures could include establishment of reseller networks, transport operators and wholesale traders, which would facilitate *dehqon* products flow to the market. The resellers play an important role in establishment of market channels and their activities should be supported (UNDP, 2010).

11. Marketing of sheep and goats meat, milk and pelts

11.1 Meat marketing

Sheep and goat meat in all surveyed villages is home consumed and a small proportion can be occasionally sold at district market.

There are no butchers in villages, since households' male representatives can slaughter the animals themselves. Nor are there meat shops because of low local demand in meat – all households have own meat. They usually cover their meat demand by slaughtering 1 sheep or goat per month, and 1 chicken per week. In case of celebrations households of course consume more sheep or goat meat. In few occasions, beef can be purchased at the district market as an alternative to own produced meat.

Photos of meat market in Karauzyak

According to the surveyed households the quality of meat is higher in winter (after fattening on good feed). Buyers pay attention to the color, grease content, smell, humidity level, identified by pressing with finger and observing the fingerprint when selecting and purchasing meat. The better the quality, the higher the price and demand for particular meat lot.

In order to improve the quality of meat, households try to improve feed and feeding patterns, and rarely to castrate the rams.

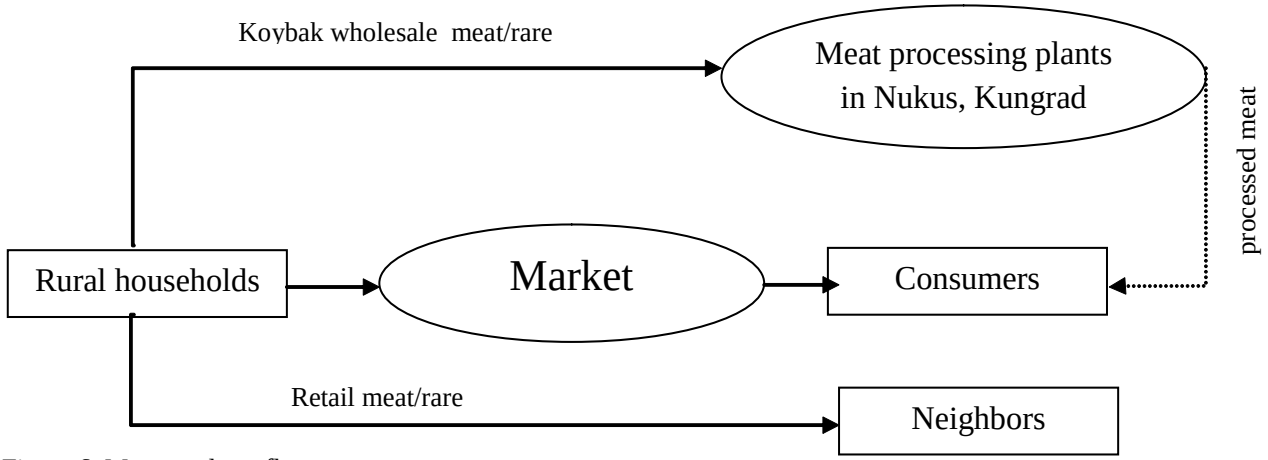


Figure 6. Meat products flow map

The main products of sheep in the surveyed village Kouybak are considered wool and karakul pelts. Meat is not considered the main product, since it is not currently traded (lack of meat processing facilities in Karakalpakstan and proper storage and transportation facilities). Meat however used to be sold to meat processing plants in Kungrad or Nukus previously. This however has become rare. Average rural households from the surveyed villages try to sell meat at district markets themselves directly to consumers (Figure 6) or to the neighbors given big festivities (wedding for example). Currently meat is consumed locally or occasionally sold at local markets (Figure 6).

11.2 Milk marketing

In none of the surveyed villages sheep milk was reported to be produced or consumed. In villages where camels are kept, camel milk and yoghurt constitute a very important dietary item for rural households. In few occasions such as in Karakul rural households reported to consume goat milk for tea and local cuisine (jarma), preparing yoghurt. Thus, sheep milk value chain does not exist, and goat milk value chain is scarce in the first place and is short, involving rural households as producers and neighboring households as consumers.

Milk value chain as such does not exist. Goat milk is rarely consumed by households themselves or to neighbors under certain circumstances (for feeding infant babies for example).

In general existing value chains in the surveyed villages for all livestock products can be characterized as short, not well established, intermittent, not stable, without stable, long-term relationships between households/sellers and consumers/buyers.

11.3 Pelt marketing

The main products of the cooperative in Koybak are considered wool and karakul pelts, for which the cooperative used to have a production quota, not any more due to unstable marketing channels. The cooperative manages to produce around 3,000 karakul pelts per year. The main buyers of karakul pelts (of 3-days old sheep) are processors in Navoi and Bukhara in Uzbekistan, which provide primary processing (cleaning, trimming) and then forward either to sewing industry inside Uzbekistan, or export (Figure 7).

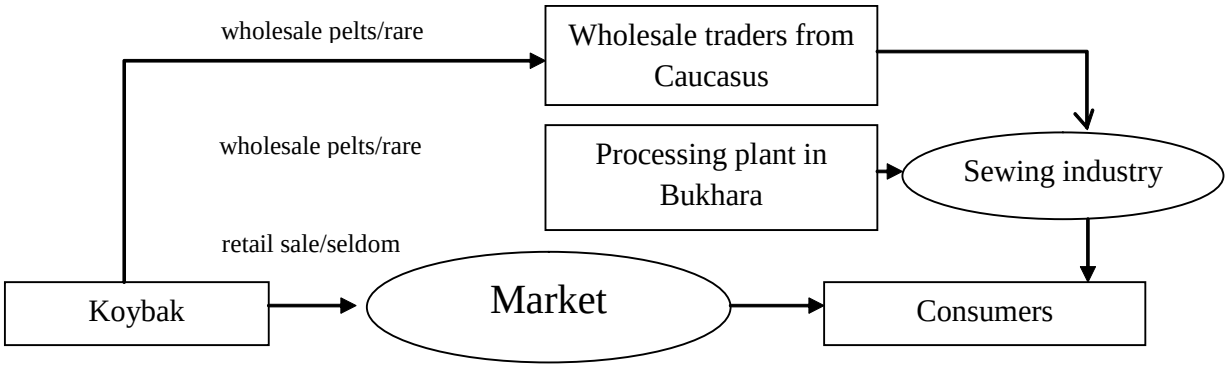


Figure 7. Pelt flow map

Furthermore, one sheep provides on average 1 kg of wool per year. The cooperative manages to prepare 12,000 - 15,000 kg of wool per year, depending on sheep head. The main buyers of the wool are some enterprises of the light (textile) industry in Uzbekistan (Tashkent, Bukhara) or exporters to Russia. Wool prices used to be high – over 1,000 UZS per kg, but have dropped this year to 400 UZS per kg.

Karakul pelts prices at local markets vary from 10,000 to 50,000 UZS per pelt depending on many factors such as age, color, etc. Unofficial marketing channels for karakul pelts were reported during the survey. These are occasional and random sales at local markets or structured wholesale to exporters from the Caucasus at attractive prices of up to 300,000 UZS per pelt. In some instances pre-processed (cleaned) karakul pelts of good quality are found at local markets at USD 100-200 per pelt.

11.4 Challenges in marketing

The major challenges for marketing of small ruminant products are:

absence of stable, long time clientele and established connections/marketing channels;

collapse of the former (state supported) marketing channels (for meat and pelts for examples);

no or underdeveloped pre-processing, storage, packaging facilities and capacities;

lack or limited bargaining power in doing business with wholesalers;

lack of quality measuring facilities.

Again, frequency of market days (which is once a week in a given district) is not sufficient for rural population, they would prefer to have marketing options more than once a week.

11.5 Options for improvement

Occasional dependence on sales to the neighbors and friends indicates presence of difficulties with transportation and wholesale relations in livestock markets. Some specific measures should be taken to facilitate access to market for *dehqons* in order to realize their market capacity and to supply their products to urban population. These measures could include establishment of reseller networks, transport operators and wholesale traders, which would facilitate *dehqon* products flow to the market.

12. Extension Services, Regulations and Other Institutions

Extension advisory and consultative services in agriculture and veterinary are mainly provided by governmental institutions: Business Centres, Resource Centres, agricultural Vocational and Training schools, Chamber of Commerce, Ministry of Agriculture and other players on the ground. This area requires support to further develop the services provision on a structured network basis, including the modernization of the information channels on market requirements.

Outside wheat and cotton production, there is no extension service in Uzbekistan (UNDP, 2010). This was previously provided as one of the functions of the state and collective farms but was lost with their break up. A number of demonstration plots have been established, often with development assistance, as have some Rural Development Centres. There are also service providers in Uzbekistan which meet part of the demand from different sub-sets of the farming community. They typically offer advice and guidance at demonstration plots. Farmers are invited to visit the demonstration plots either on an ad hoc basis and/or on open days on which groups of farmers are invited. There are also a number of crop specific agricultural research institutes, many with branches in provinces experimental plant biology, plant protection, forestry; vegetables, melons and gourds; vine growing and wine making, natural fibres; Karakul sheep breeding; and sericulture. There are also branches of agricultural research institutes in the provinces.

12.1 Research and development organizations in livestock sector of Uzbekistan

In the development of policy, information, and livestock-farming in Uzbekistan the leading role belongs to the adjusted management system: livestock-farming central boards, veterinary and scientific-production centre of the Ministry of Agriculture and Water Resources and their regional and district networks, institutions and companies of meat and milk production, poultry production, "Uzbekistan karakul", pedigree stock breeding associations of the republic, scientific-research institutions of livestock raising, Karakul (astrakhan) sheep-breeding and veterinary (UzSRILSF, UzSRIASBDE, UzSIV).

The scientific development of livestock raising - selection and genetic development of livestock, problems of forage reserves, development forecast of methods of animal treatment, implementation of advanced experience, scientific achievements - is carried out by research institutions and their experimental farms. Agricultural science of the republic is managed and coordinated by the Uzbek Agricultural Scientific Production Centre (UzASPC) with 19 scientific research institutes.

The Uzbek Scientific Research Institute of Astrakhan Sheep-Breeding and Desert Ecology (UzSRIASBDE) is the scientific headquarters for the development of desert livestock raising and arid fodder production. While the UzSRILSR is a leading scientific organization for general livestock raising and irrigated fodder production, the universities of the republic, Institute of Cotton Growing and Plant Growing deal to some extent with scientific developments in fodder production and pasture management. The institute has priority in developing an effective system of arid land radical improvement, selection, seed-growing of prospective fodder plants (phyto-reclaimers), and resource-saving zonal systems of improvement of natural fodder production.

As for the livestock supporting system, the Animal Husbandry Department under the Ministry of Agriculture and Water Resources of Karakalpakstan provides general technical assistances for livestock management and feed production, while the Veterinary Department provides mainly veterinary services such as artificial insemination and medical treatment.

12.2 Profiling the main institutions with bearings on sheep and goats production and marketing

The higher body of control is a local Khokimiyat, which has a final say over every key aspect of socio-economic life in Karauzyak. Khokimiyat is a state local governing body with a Khokim (head) appointed by a higher state body, which is, in this case, Karakalpakstan Republic Cabinet of Ministers. All state organizations, such as veterinary service, in the district are under supervision of local Khokimiyat (Figure 8).

Department on agriculture and veterinary service are two primary organizations that among other functions deal with small ruminants' production. The role of veterinary service office in small ruminants' production was outlined in a corresponding section of the report. Department on agriculture functions as a supervision body that controls overall agricultural activities in the district, including livestock farming. According to their official data, there is only one large farm entity that specializes in sheep production in Karauzyak. This department collects all data regarding livestock production in the district per village. For example, department initiates a plan on feed provision per village and supervises its implementation. Sometimes department serves as a mediator in the disputes between shepherds over pasture land.

Regulations on sale and purchase of animals in the market are supervised by local market head.

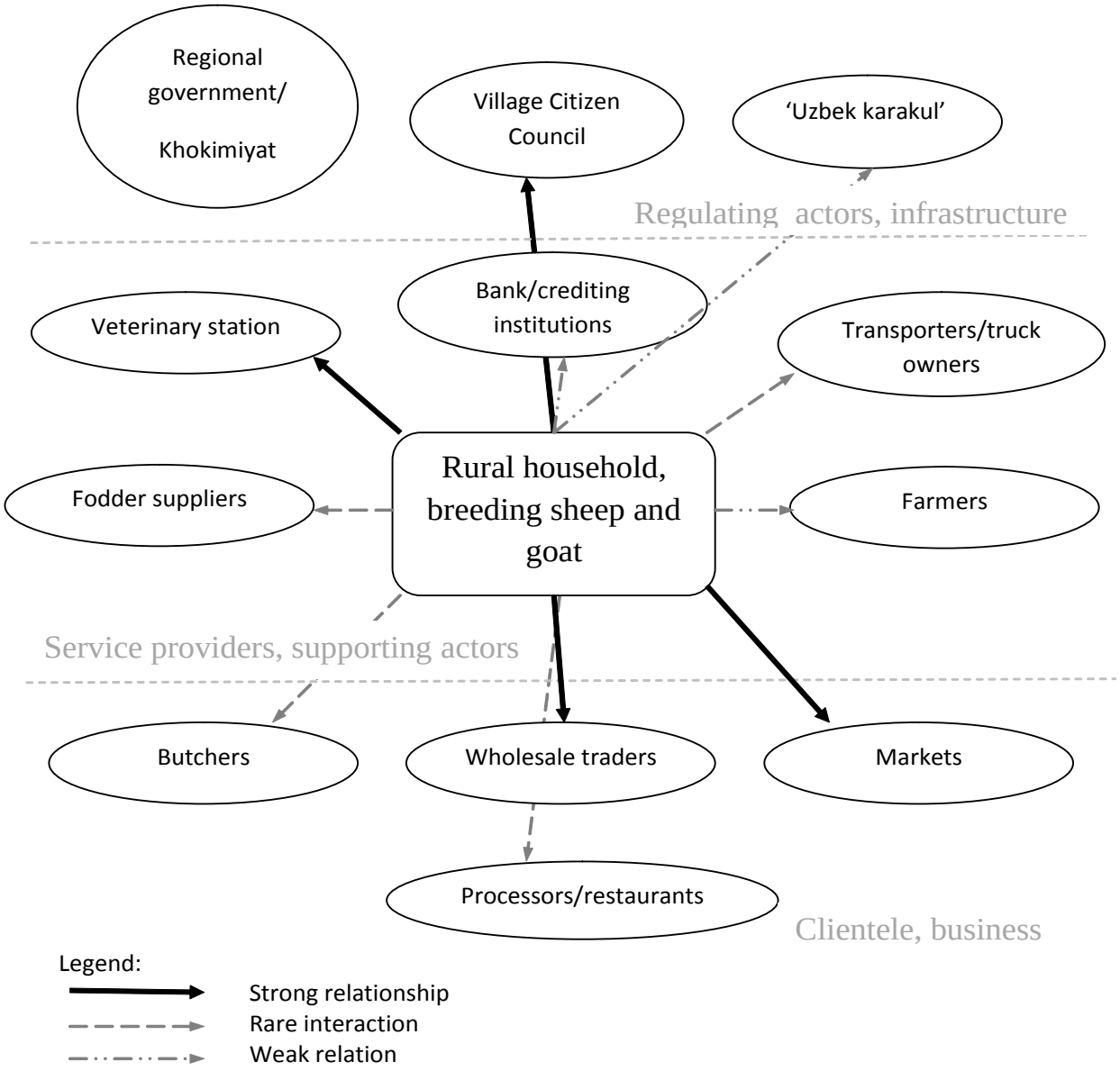


Figure 8. Overview map of involved stakeholders

12.3 Sources of information on sheep and goats production and marketing

There are no extension service providers specifically for small ruminants' owners. Mostly households rely upon their accumulated experience, own and shared community knowledge, and intuition in managing their livestock production, i.e., on breeding, feeding. Of course, for specific issues households seek to get consultation from specialized organizations, i.e. veterinary service consults on disease prevention and cure, state-owned feed unit may give recommendations on the characteristics of the particular type of feed. Community citizens' council offices inform about all initiatives and regulations from district authorities such as Khokimiyat, and hold necessary meetings for local residents in each village. Rural households get Information about prices, demand and supply for animals directly from local livestock market observations and from each other.

12.4 Training types and sources for sheep and goats producers and marketers

Specifically, no trainings/seminars on small ruminants' management were hold for residents of Karakul and Karabuga villages, at least interviewed respondents could not recall occurrence of such an event in the past. However, expert of Karauzyak agriculture office said that couple of years ago there came a specialist from Tashkent on milk and milk processing and hold some meetings with cow owners in Karabuga and Koybak villages.

There is Agricultural college in Karauzyak with a separate veterinary faculty. Youngsters study there to obtain secondary vet education and become veterinary specialists.

12.5 Availability and adequacy of information on sheep and goats production and marketing

As was mentioned before, in most cases people get relevant information on their own. In the absence of private extension service provides it is hard to speak about adequacy and availability of necessary and up-to-date information on small ruminants' production and marketing for local households. Though, respondents didn't complain much about this situation and said that mostly they were concerned on getting information and help on animals' diseases.

Households pointed at some strategies or options to get information, news concerning small ruminant production and breeding. These are advises from elderly and experience community members, neighbors, local 'consultations' in groups of people during festivities discussing current problems and possible ways out.

12.6 Key rules and regulations with strong implications on sheep and goats production and marketing

During interview no specific rules and regulations were mentioned both by small ruminants' owners and experts from veterinary service and agriculture department. Respondents from households simply are not aware of such official rules, and state experts are simply satisfied with what they currently have. No one suggested that a specific normative rule be adopted to improve small ruminants' production. The following regulations are extracted from the respective reports and not based on the survey results.

Phytosanitary and Veterinary Regulations

Uzbekistan's Plant Quarantine Act (PQA) is based on the old Soviet model and generally conforms to the recommendations of the FAO International Plant Protection Convention (IPPC), as well as the rules and regulations of neighboring countries. Uzbekistan revises its PQA periodically to conform to developments in Plant Protection and Plant Quarantine (PPPQ). Uzbekistan bans the import of certain seeds and planting materials to protect domestic agriculture from exotic pests and diseases. Seed imports must comply with minimum international quality standards. U.S. phytosanitary certificates are accepted by Uzbekistan for wheat, rice, soybeans, and other bulk commodities.

The GOU issues veterinary certificates for export, import, and transit of commodities under control of the State Veterinary Department. These regulations are based on requirements of the World Organization for Animal Health (OIE). In accordance with these new regulations, the following documentation is necessary for importing and exporting agricultural commodities:

- A veterinary certificate issued by district/city veterinary departments for exported goods and by the Frontier Veterinary Control Post for importing goods; A veterinary certificate issued by the Frontier Veterinary Control Post for exported products and the veterinary service of the exporting country for imported goods;
- A permit for import, export, or transit is issued by the General Veterinary Inspector of Uzbekistan or by his/her deputy.

Food Labeling[7]

Uzbekistan has no uniform system of labeling. However, in accordance with Uzbek legislation on protection of consumer's rights, all products sold in the country must contain the following information in the Uzbek language:

- Name of the product;
- Manufacturer's name and contact information;
- Ingredients and 'best before' date (if applicable);
- User's manual (if needed); and warnings (if any).

In addition, it should be noted that these labels cannot be added to the product in Uzbekistan and must instead be affixed at the point of manufacture/processing.

Import regulations (requirements and documentation)[15]

The Ministry for Foreign Economic Relations, Investment, and Trade (MFERIT) requires all Uzbek enterprises engaged in export/import operations to be registered as participants in international trade relations. Uzbek companies or individuals are allowed to conduct trade with foreign enterprises directly or through foreign trade agents.

On October 1, 2003, preliminary registration of import contracts by MFERIT was abolished. However, the following import contracts shall still be subject to examination by the Ministry:

- Those funded from the state budget;
- Those funded from credits (loans) attracted by the GOU or under its guarantee; and
- Those concluded by economic sectors in whose authorized capital the public share constitutes over 50 percent and which are not secured by their own currency resources.

An importer must prepare and provide to the proper authorities the following documents:

- Contract;
- Certificate of conformity for certain products, the list of which is defined by the Cabinet of Ministers;
- Certificate of origin;
- Certificate of registration of the contract with MFERIT and/or contract with the seal indicating registration with an authorized bank;
- Passport of an import deal (a document describing a contract on import and its terms, signed by the importer, a bank, and a customs officer);
- Certificate of the availability of funds in either foreign or domestic currency that would have no liabilities or a guarantee of an authorized bank, according to the established form, which confirms an importer's ability to pay for a contract;
- Cargo customs declaration;
- Commercial invoice;
- Phytosanitary and veterinary certificates (issued in required cases by authorized bodies according to the established procedure);
- License (for goods subject to licensing) and, in necessary cases, permission from authorized

[7] Yuldashev N. (2014). Uzbekistan exporter guide. GAIN Report. USDA Foreign Agricultural Service

Customs Regulations and Contact Information[15]

Customs clearance is a difficult bureaucratic process. Even capital equipment imports sometimes are subject to substantial processing delays. Delays affect all imports as there is no procedure for releasing goods under bond. To avoid these problems, many firms contract for pre-shipment inspections (PSI), which reduces delays. Excessive documentation requirements make customs clearance a costly and time-consuming process. In the absence of a system of pre-arrival clearing and systematic risk analysis, customs clearance is only possible after physical inspection of the consignment.

The customs clearance process normally occurs in the territory where the customs authority is located. However, if requested by the party concerned, customs clearances can be conducted in other locations. The Customs Code of Uzbekistan stipulates that customs formalities are to be performed within ten days after receipt of the customs declaration and other necessary documents. Goods may be declared by a person/legal entity moving/transferring the goods or a customs broker. The person/entity that declares the goods must fulfill all obligations and carries full responsibility provided under legislation regardless of whether this person/entity is the importer or a customs broker. A customs broker is a legal entity in Uzbekistan that conducts customs clearing operations on behalf of the person/entity that he represents. Customs brokers register themselves with the Customs Committee of Uzbekistan by submitting required documents and an application form.

Soft loans for farmers and household farming[8]

Farmers, food producers and households have an access to preferential lending, tranche loans and privileged banking services for agricultural machinery, technologies, fertilizers and seeds fully guaranteed by the government. In 2013, 365 billion and in 2014, 412 billion UZS were presented as a preferential and tranche lending for farming.

Leasing for agricultural machinery and technology[16]

Leasing is a novice term for post-communist societies because of its existence after independence in post-Soviet states. Lease relations introduced to Uzbek business sector in 1997. Leasing volume for agricultural production reached 302 billion UZS which made up 37.6% of total lease provided by 75 leasing companies and 24 commercial banks.

New agricultural insurance[16]

Climate change, Aral Sea disaster and seasonal water shortages derived from transboundary water supply problems make national agricultural sector vulnerable to potential natural risks. In order to protect the farmers from hidden natural and systematic economic risks Uzbekistan launched a special agricultural insurance scheme for farmers and households involved in small size family farming. Nowadays subscribers of agro-insurance scheme reached 66,000 farmers joined under UzAgroInsurance Insurance Company.

As a result of the agrarian reform in agriculture and other agro-industries, Uzbekistan underwent significant socio-economic changes. Transition from administrative planning and distribution system to market-oriented economy transformed the economic, financial and legal conditions of agricultural sector management. Their outcomes can be seen in food production capacity, high level of food market saturation, export oriented and competitive production facilities, agricultural foreign and domestic investments and improvement in life quality of population.

[8] Khaydarov Nizamiddin (2015). Agricultural Development in Uzbekistan: Agricultural Reforms versus Transboundary Water Issues. Developing Country Studies. Vol.5, No.10, 2015. ISSN 2224-607X (Paper) ISSN 2225-0565 (Online www.iiste.org)

12.7 Main challenges related to information, rules and regulations in sheep production and marketing

Small ruminants' production is largely done by households in small amounts. As such, there is no compelling incentive for private information providers to be created in these rural areas, simply because households won't pay for the services. Though, local authorities could organize meetings for small ruminants' owners on the legislative and other institutional aspects of livestock production, in general.

Overall, it is possible to conclude that on the one hand there is enough research in agriculture and livestock carried out in the country, but the knowledge and skills transmitting path to farming community has not yet been developed and practiced. Nevertheless, today, the professional agricultural knowledge and experience of operation in the form of independent farming entity, i.e. the knowledge and skills in farming practice are the main constituents of human capital quality in the livestock sector. This knowledge and experience may enable farmers to manage cattle better, to apply modern technologies and behave proactively in the market.

Therefore, capacity building in terms of acquiring new knowledge and skills in agriculture and also in such areas as management, including finance and human resource management, marketing and economy legislation would facilitate livestock sector efficiency increase. Consequently, large-scale introduction of state training programs, training projects with support of non-governmental and international institutions should be encouraged in every possible way. Another area for livestock sector efficiency increase is strengthening human capital capacity – development of advisory services for livestock breeders, including livestock management, modern technology transfer and agricultural businesses.

12.8 Requested type of knowledge/information transfer

Since rural households do not have much free/leisure time, they would prefer to participate in short (half or 1-day) trainings or seminars. Very practical trainings such as demonstration plots/technologies, field days will be most beneficial for rural households.

13. Social division of labor

13.1 Patterns in the division of labor (men, women, children) in sheep and goats production and marketing

Men play a primary role in sheep and goat production. The following Table outlines general responsibility share between men, women and children in a household.

It is undeniable that men are key decision-makers regarding livestock production, in general. They decide on the breed and quantity of small ruminants a household should rear. Also they are responsible for marketing of animals and consequently control proceeds from small ruminants. Men also decide on what kind of feeds should be given to animals, though in the house, women and children mostly feed animals. Herding is done by men, but in some very rare cases children are involved too. Cleaning of animals is a prerogative of women and children. Women also solely do goat milking and process milks. Though, very few households take advantage of goat milking.

Table 14. Responsibility and labor division among household members

#	SR-related Activities	Men	Women	Children

1	Breed selection and quantity	X		
2	Feeding	X	X	X
3	Fetching of fodder	X		
4	Herding	X		
5	Cleaning		X	X
6	Health care	X	X	
7	Milking and milk processing		X	
8	Marketing	X		
9	Income control	X		

Source: FGD

13.2 Key gender issues in ownership and decision making in sheep and goats production and marketing

It is a rule that in rural households, where men are present, mostly men control income from the sale of livestock, including small ruminants. The fact is that in Uzbek traditional families, men play a key role in the family and most women accept this as an undisputable fact. This situation raises some issues in some families, but it is a mentality factor, which can't be changed overnight.

13.3 Important gender issues that need to be addressed for improved sheep and goats production and management

One thing that could be done is to organize and hold trainings/seminars for both men and women in selected rural areas on the role of women in households. So that men should appreciate women's contribution more than they do now.

14. Challenges and opportunities in sheep and goats

14.1 Summary of challenges

According to the results from FGDs, challenges in breeding small ruminants lie in shortage of good pastures in close vicinity to the villages; sometimes insufficient own fodder production due to water shortages, deterioration of land, and distribution and use of available agricultural arable land by private farms for prioritized production of cotton and wheat; diseases; transportation services; accessibility to credit lines/loans; lack of own family funds for increasing or improving small ruminant flocks; lack of new knowledge; impossibility to order preferred small ruminant breeds – specially assigned state organization/firm disseminates and provides breeds, which are not liked by local population (for example Gissar sheep); sometimes insufficient vet services supply.

With regards to marketing challenges, rural households reported on: having weak bargaining power and using resellers services; low accessibility to markets (seldom market days); lack of good transportation service providers; lack of technology on food safety; superficial quality and sanitary checks.

More general challenges include:

- low productive capacity of livestock, small ruminants;

- lack of livestock products processing facilities (absence of local butchers in villages, restricted number of local restaurants or cafes, lack of good slaughter house);
- lack of innovative, science based, contemporary knowledge on small ruminant production, breeding, disease treatment, optimal feeding practices
- concentration of agricultural production in *dehqon* farms (except wheat and cotton) limits the potential of rural households to increase income thus narrowing their opportunities to overcome poverty;
- small agricultural producers are more vulnerable to environmental and economic shocks and require better market access. Lack of specialized trade and financial institutions and inadequate infrastructure in rural area limit opportunities of small farms to modernize and diversify production;
- marketing, contracts with processing plants for pelt, low prices for meat or live sheep on local markets due to tough competition with imported sheep of Gissarskiy breed from other provinces of Uzbekistan, the cleanliness of local breed, lack of superior genetics (seedstock), lack of specialists and good administrators-managers;
- small size of the majority of livestock producers poses significant challenges for the application of innovative technologies and limits potential economies of scale effects, resulting in relatively low levels of the sector's efficiency;
- feed shortage. low fodder availability and supply, lack and low status of pastures, lack of forage harversters (combines), lack of irrigation possibilities;
- lack of adequate service infrastructure;
- short and poorly developed value chains;
- lack of or underdevelopment of marketing network, which makes any effort to commercialize the sector meaningless, because any product must have its buyer to cover costs and to get profit herewith (UNDP, 2010);
- challenge in accessing credits lies in burdensome application procedure, which requires many documents, the time and efforts to collect these papers;
- banks do not conduct surveys of the population as to identify their demand in credits, preferred credit types and requirements (documentation) burden;
- frequency of market days (which is once a week in a given district) is not sufficient for rural population, they would prefer to have marketing options more than once a week;
- rather high transportation costs and absence of stable transportation service providers (except some neighbors, possessing a car/truck) also present a drawback. Rural households have to get on the road well beforehand of the market opening hour in order to find transportation means.

14.2 Summary of opportunities

With regards to opportunities, surveyed households mentioned the long term experience and local knowledge they have in keeping small ruminants, stable demand of the population in the region in small ruminant products, climatic conditions, and availability of land which can potentially be used as pastures and graze land, although sometimes in remote location from the villages.

Accordingly, the state should encourage *dehqon* farm commercialization not only with a view of increasing their marketability and saturation of consumer market but also as the opportunity to

improve living standards in the rural area. This can be achieved through assisting *dehqon* farms and increasing flocks.

15. Conclusions and Recommendations

15.1 Conclusions

There are several livelihood strategies available and prominent in rural areas of Uzbekistan and Karakalpakstan. First, and a dominant livelihood strategy, is agricultural subsistence production (both growing crops and keeping livestock being equally important) on household plots. Another important livelihood strategy in rural areas is engagement in seasonal labor migration to Russia and Kazakhstan. Next strategy rests on the salaries from official jobs of educated family members at state-funded or budget organizations, such as schools, kindergartens, medical units, local governance offices. Last, but not least option for small amount of rural households lies in engaging in some entrepreneurial activities, including traditional activities such as sewing, hairdressing, and construction.

The main agricultural production systems in Uzbekistan are plant growing and livestock rearing. Both agricultural production systems are equally important for the country and for the population in terms of providing food security, employment and cash source for rural inhabitants as well as serving a resource base for the subsequent agro-processing industry. The main types of agricultural producers in Uzbekistan are: (1) private farms, (2) rural households (*dehqons*) engaged in both plant growing and livestock rearing, but basically for own subsistence; (3) few remaining agricultural cooperatives engaged in certain agricultural activities such as for example Karakul breeding cooperatives; and (4) agrifirms, established by certain industrial (agro-processing) businesses for producing and processing certain products, such as for example licorice roots for pharmaceutical industry.

Livestock plays quite an important role in the subsistence of rural households. Households breed mostly cows, goats, and poultry. The whole family is involved in sheep raising; children for herding, women for processing milk, wool and pelts and men for lambing, slaughtering, shearing and protecting sheep from predators.

Minor share of households breeds livestock to gain monetary profit, which is then used for covering the costs of education for kids, or making winter stocks of some products, or for celebrating important events. Karakul sheep are the family's savings, sold when cash is needed and exchanged for other goods. Usually, a typical household sells its goats, cows or sheep at the end of summer to receive cash for some important family events like wedding, or to cover education costs (school appliances, cloth) for its children.

Normally rural households in the surveyed villages keep flocks of up to 20 sheep and goats. Sheep provide pelts and meat, goats are kept also for meat and wool. Wool and pelts are used for pullovers, carpets and ropes. Dung is used for heating and cooking. Goat milk and dairy products (cheese for example) are not produced and consumed by rural households in the surveyed villages.

Rural households prefer to keep goats due to lower fodder demand and their resistance to harsh climatic conditions. Local households in general do not know their breeds of small ruminants and are reluctant to switching to a new breed, since they consider local breeds to be already well adapted to local conditions.

Small ruminants spend most of the year in pastures. During severe cold days in winter small ruminants are kept in stalls semi-open stalls.

FGD participants reported that nobody applies artificial insemination of livestock and usually they don't control the process of sheep and goat mating.

Rural households use various feeding strategies for their small ruminants depending on the purpose, the season, fodder type and availability in the field and at the fodder market. The fodder base for small ruminant in Karakalpakstan comes from three main sources: natural grazing lands of deserts and foothills; sown and improved pastures; fodder saved or purchased for additional feeding in critical periods, including cultivated fodder crops (jugara, maize, sorghum, etc.), cereal brans, purchased cotton cake (oilseed cake), collected green forage (grass, weeds, etc.), and straw (rice, wheat). Production of own fodder is problematic despite of vast agricultural lands due to unreliable irrigation water supply. The main challenges for small ruminants breeding is availability of feed during winter and spring seasons.

Men are key decision-makers regarding livestock production with regards to the breed and quantity of small ruminants a household should rear, marketing of animals, feeding patterns. Herding is done by men, whereas cleaning of animals is a prerogative of women, as well as milking (though in rare households).

Household respondents indicated that major diseases of sheep and goats are those that infect liver and lungs of animals. Goats are less often affected by lung and intestinal helminthes than sheep. Even when infection does occur, the mortality rate is not high, and the problem is usually overcome with veterinary treatment from state veterinary service established in Karauzyak district. None of informal or private veterinary services are available in Karauzyak. In case provided vet services are insufficient some households practice self coping strategies including purchasing vet drugs and medicine in special vet drugstores (in Karauzyak or Nukus) and curing animals by own means. Generally, vet drugs are of Uzbek production and trademark with sufficient quality. Imported vet medicine is rare.

There are two branches of commercial banks located in the centre of Karauzyak district: Agro Bank and Halk Bank (People's Bank). None of formal credit organizations are present. However, a rural household can't get microloans from commercial banks in cash in order to buy a sheep in a local market, for instance. The necessary requirement is that a loan recipient should have a contract with an organization that sells sheep or goats. In general the main challenge in accessing credits lies in burdensome application procedure, which requires many documents, the time and efforts to collect these papers. Furthermore, in order to receive a loan from a bank, a recipient must have an official job.

In general, existing value chains in the surveyed villages for all livestock products can be characterized as short, not well established, intermittent, not stable, without stable, long-term relationships between households/sellers and consumers/buyers. Trade is subject to seasonality resulting in variations in number of animals traded and prices paid. Peak months for slaughter animals coincide with festivities (religious, cultural and weddings) in January, February, April and September. Market prices for most agricultural products are determined by direct transaction. Prices for live ruminants and meat are influenced by the number of resellers and butchers in a given market day. There is one market in Karauzyk district, open every Wednesday and located in the district center. The market has separate divisions for food products market, clothing market and livestock market. Most *dehqons* dealing with marketing of their livestock products, mainly sell them at the market or to their neighbors and friends or to resellers. The general feature for all surveyed households is the absence of stable, long time clientele. They sell their small ruminant products chaotically to any buyer, offering a reasonable price. In some occasions rural households may have long time trading relationship with for example vet drugstore, or rarely with fodder supplier (basically for cotton meal and cake). Prices for small ruminant products have been steadily increasing in the last 5 years in reaction/reflection to overall inflation and in response to each raising of the minimum wage rate (usually twice a year).

Prices for meat fluctuate also in reaction to availability and prices for beef in a given market over a given period of time.

Live small ruminants are usually transported in mini trucks, 10 animals per truck. Rural households have the options to sell their live animals themselves or to resellers, who have bargaining power and more time to spend in the market to speculate on prices or to find wholesalers exporting live animals to other provinces of Uzbekistan (mostly to Tashkent and Khorezm). Seldom butchers may purchase live animals from the households, close to the district, for further meat retail sales. Sheep and goat meat is home consumed and a small proportion can be occasionally sold at district market. There are no butchers in villages, since households' male representatives can slaughter the animals themselves. Nor are there meat shops because of low local demand in meat – all households have own meat. Average rural households from the surveyed villages try to sell meat at district markets themselves directly to consumers, or to the neighbors given big festivities (wedding for example). In none of the surveyed villages sheep milk was reported to be produced or consumed. Thus, sheep milk value chain does not exist, and goat milk value chain is scarce in the first place and is short, involving rural households as producers and neighboring households as consumers. Frequency of market days transportation costs and absence of stable transportation service providers, weak bargaining power, lack of technology on food safety, superficial quality and sanitary checks are the main marketing challenges in rural areas of Karakalpakstan.

Extension advisory and consultative services in agriculture and veterinary are mainly provided by governmental institutions. Outside wheat and cotton production, there is no extension service in Uzbekistan. Mostly households rely upon their accumulated experience, own and shared community knowledge, and intuition in managing their livestock production, i.e., on breeding, feeding. In the absence of private extension service provides it is hard to speak about adequacy and availability of necessary and up-to-date information on small ruminants' production and marketing for local households.

Small ruminant production in Karakalpakstan faces certain challenges in small ruminant value chains in Karakalpakstan, which lie in shortage of good pastures in close vicinity to the villages; sometimes insufficient own fodder production due to water shortages, deterioration of land, and distribution and use of available agricultural arable land by private farms for prioritized production of cotton and wheat; diseases; transportation services; accessibility to credit lines/loans; lack of own family funds for increasing or improving small ruminant flocks; lack of new knowledge; impossibility to order preferred small ruminant breeds – specially assigned state organization/firm disseminates and provides breeds, which are not liked by local population (for example Gissar sheep); sometimes insufficient vet services supply.

At the same time small ruminant value chains have some opportunities. Surveyed households mentioned the long term experience and local knowledge they have in keeping small ruminants, stable demand of the population in the region in small ruminant products, climatic conditions, and availability of land to be used as pastures and graze land, although sometimes in remote location from the villages.

Accordingly, the state should encourage *dehqon* farm commercialization not only with a view of increasing their marketability and saturation of consumer market but also as the opportunity to improve living standards in the rural area. This can be achieved through assisting *dehqon* farms and increasing flocks.

Some specific measures should be taken to facilitate access to market for *dehqons* in order to realize their market capacity and to supply their products to urban population. These measures could include establishment of reseller networks, transport operators and wholesale traders, which would facilitate *dehqon* products flow to the market.

Despite receiving little support, small ruminant production will remain, for the next decades an important aspect of Uzbekistan's agricultural production systems due to continuous population growth, increase in demand for meat and milk products. This increase in demand should be met, through the use of effective production techniques, by rural households, as this group owns most of the country's small ruminants.

15.2 Recommendations

The main recommendation of this survey is to improve the infrastructure of the livestock sector, including feed quality, feed distribution, artificial insemination, animal health. It is not sufficient to create service points for the physical factors of production: it is additionally essential to train and deploy extension agents and livestock specialists that will teach and encourage rural households to adopt better production practices in the interest of increasing yields and incomes.

Since rural households do not have much free/leisure time, they would prefer to participate in short (half or 1-day) trainings or seminars. Very practical trainings such as demonstration plots/technologies, field days will be most beneficial for rural households. Such areas as farm and business management, including finance and human resource management, marketing and economy legislation would facilitate livestock sector efficiency increase. Consequently, large-scale introduction of state training programs, training projects with support of non-governmental and international institutions should be encouraged in every possible way. Another area for livestock sector efficiency increase is strengthening human capacity – development of advisory services for livestock breeders, including livestock management, modern technology transfer and agricultural businesses.

Longer-term plans should aim at improving the overall production, marketing efficiency and availability of various service providing stakeholders to small ruminant breeding households by correcting its skewed structure. Furthermore, conditions (soft credits) have to be supported for enabling the rural households to gradually increase their flock, until they reach the limits of their managerial capacity and skills.

UNDP (2008) study has shown that allocating more land to feed crops will raise the family incomes and improve the wellbeing of the rural population. Furthermore, both the state and rural households – small ruminant owners have to recognize their roles and importance. UNDP (2008) has proposed "High productivity and stable production/supply of livestock products" as the basic approach and the following 6 strategies have been identified to achieve the approach, and which go in line with the findings of the current RVCA:

- increase of forage production and nutrition improvement;
- breed improvement of livestock;
- improvement of veterinary services;
- improve animal products processing and marketing services;
- capacity building of rural households;
- capacity building of Livestock experts and extension workers.

ICARDA (Ibragimov et al., n/a) promotes the Karakul sheep breed, and especially its products, in Uzbekistan and abroad and suggests:

- to build up regional networks among the stakeholders involved in Karakul sheep production to: (1) facilitate development of conservation strategies based on sound cooperation; (2) discuss in situ and ex situ conservation options and study their feasibility, including the possibility of establishing an open nucleus; (3) establish

sustainable monitoring systems to keep records of the status of domestic animal populations in the region.

- to consider investments in capacity building and training to strengthen human resources, particularly in breeding strategies.
- enhance coordination among the various organizations in Central Asia that currently develop and implement subregional projects and programmes related to animal genetic resources.

Availability of reliable statistics on small ruminant number and breeds has to be ensured to determine trends in goat populations in the future. Such information will allow more efficient regional production and planning. Current livestock markets have to be carefully studied and market opportunities and drawbacks identified. This should go in line with developing of markets and increasing livestock producers access to market information. Unfair market intermediaries will always be present. However, policy action should regulate and eventually control the operation of such traders without jeopardizing the effectiveness of marketing channels.

The issue of Karakul pelt production should be carefully assessed, as should the available Karakul lines. Efforts should be taken to avoid the mismanagement of these lines. Policy makers need to implement careful market studies. The information gathered should then be provided, in a clear form, to farmers and researchers to help them orientate production appropriately. Because they lack information and are not adequately exposed to international trends, most researchers in Central Asia in general, and Uzbekistan in particular, mistakenly believe that the market for traditional products remains unchanged (Iñiguez, Luis and Joaquín Mueller, 2008).

A very important aspect is proper management of pastures in Karakalpakstan, which provide a large proportion of the feed consumed by small ruminants. More work is needed to develop different feed-production and range-utilization systems, which are appropriate for each season of the year.

Management of health of sheep and goats is also an urgent priority, especially with regard to epidemiological issues.

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Annexes

Annex 1. Letter of support from ICARDA

ICARDA Международный центр сельскохозяйственных исследований в засушливых регионах
ПРОГРАММА КГМСХИ ДЛЯ ЦЕНТРАЛЬНОЙ АЗИИ И ЮЖНОГО КАВКАЗА
САС ЦАК

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Хокимият Караузякского района
Республики Каракалпакстан

Региональное представительство Международного центра сельскохозяйственных исследований в засушливых регионах по Центральной Азии и Южному Кавказу (ИКАРДА-ЦАК) свидетельствует свое высокое уважение Хокимияту Караузякского района Республики Каракалпакстан и имеет честь сообщить, что в рамках совместной исследовательской программы "Засушливые системы" в Республике Узбекистан проводится долгосрочное исследование в области сельскохозяйственных инноваций и внедрения новых технологий для улучшения продуктивности животноводства в Республике Каракалпакстан.

Данное исследование имеет следующие цели:

1. Содействие в реализации Государственной программы продовольственной безопасности путем внедрения научно-обоснованных инновационных методов для улучшения продуктивности животноводства и увеличения дохода для сельских домохозяйств в условиях глобальных климатических рисков.
2. Обеспечение надежными эмпирическими данными о взаимосвязи между производством животноводческой продукции в Караузякском районе Республики Каракалпакстан, использованием пастбищ и местным рынком сбыта.

В рамках исследования планируется визит д-ра Инны Руденко – консультанта ИКАРДА и Даврона Пиязметова – экономиста, для изучения производственного процесса и рынка сбыта животноводческой продукции в вышеуказанную проектную территорию с 5 по 31 октября 2015 г. Методы исследования будут основаны на опросах с сотрудниками ширкатного хозяйства «Койбак» Караузякского района, полевых наблюдениях, дискуссиях с целевыми группами лиц, которые задействованы в разной степени в производстве, переработке, транспортировке и реализации животноводческой продукции.

В связи с этим, региональное представительство Международного центра ИКАРДА-ЦАК любезно просит Хокимият Караузякского района Республики Каракалпакстан оказать содействие в согласовании данного визита с соответствующими структурами и хозяйствами района.

Региональное представительство Международного центра ИКАРДА-ЦАК пользуется случаем, чтобы возобновить заверения в своем высоком уважении Хокимияту Караузякского района Республики Каракалпакстан, и надеется на дальнейшее плодотворное сотрудничество.

С уважением,

Джозеф Турок
Региональный Координатор ИКАРДА
Глава отдела по реализации Программы КГМСХИ
для Центральной Азии и Южного Кавказа

Региональный Офис по Центральной Азии и Южному Кавказу. А/Я 4375, Ташкент, 100000, Узбекистан
Тел.: (+998-71) 237-21-01/30/69; Факс: (+998 71) 120-71-25. Email: icarda-tashkent@cgiar.org

Annex 2. Veterinary Certificate

РЕСПУБЛИКА УЗБЕКИСТАН
ГОСУДАРСТВЕННЫЙ ВЕТЕРИНАРНЫЙ НАДЗОР

ВЕТЕРИНАРНОЕ СВИДЕТЕЛЬСТВО

№

От"___"______________201__г.

Я, нижеподписавшийся ветеринарный врач, выдал настоящее ветеринарное свидетельство

____

в том, что при ветеринарном осмотре, подлежащих отправке ________________

________________в количестве ____________ голов (мест, штук) больных и подозрительных по заболеванию заразными болезнями не обнаружено и они выходят (вывозятся) из

____

благополучного по особо опасным и карантинным болезням животных.
При отправке на экспорт указывают благополучие хозяйства и местности согласно требованиям страны-импортера и срок их благополучия(мес., лет.).

Животные находились в Республике Узбекистан:1) с рождения, 2) не менее 6 месяцев (нужное подчеркнуть) или________________месяцев.

Животные перед отправкой карантинировались____________________

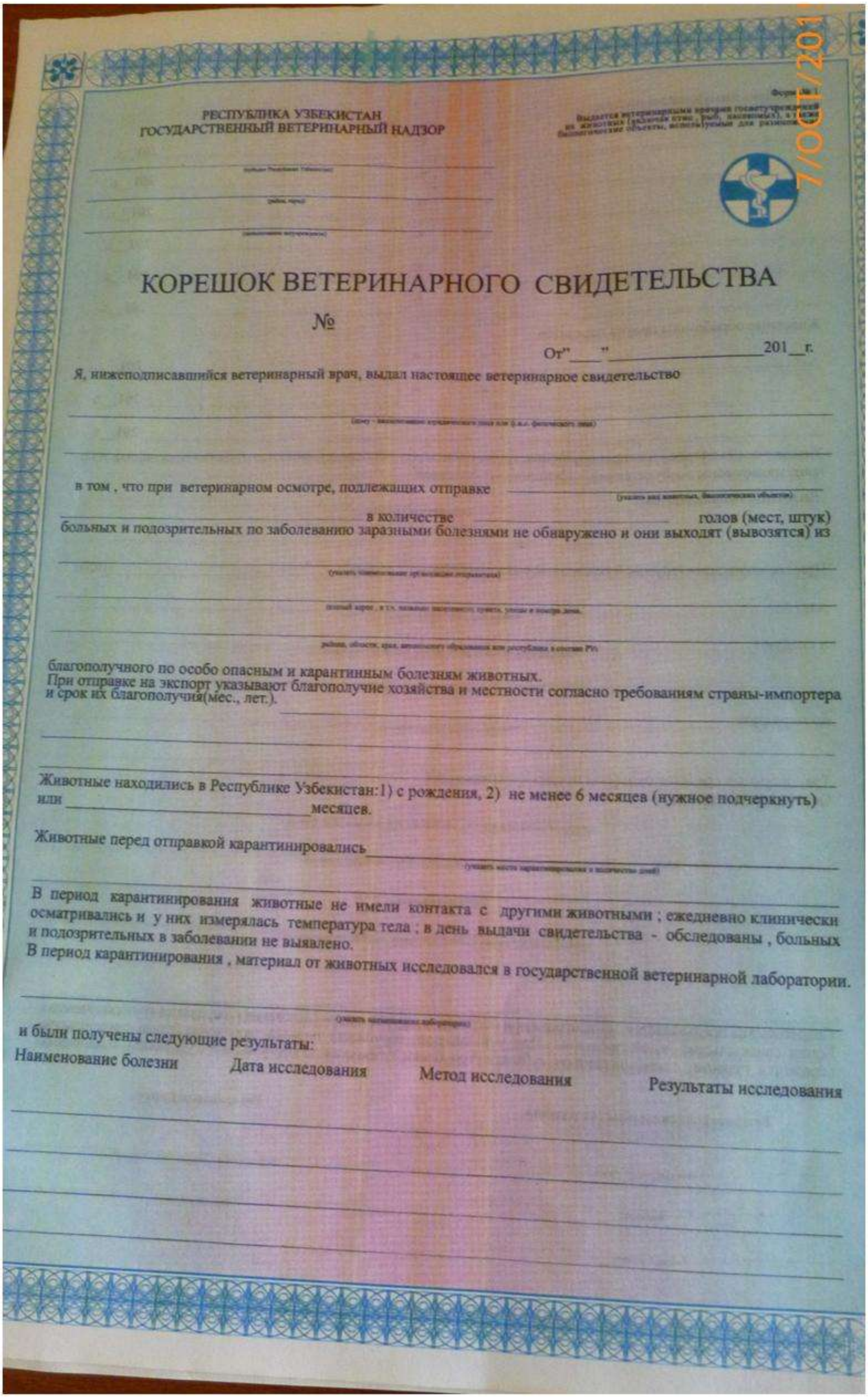
В период карантинирования животные не имели контакта с другими животными ; ежедневно клинически осматривались и у них измерялась температура тела ; в день выдачи свидетельства - обследованы , больных и подозрительных в заболевании не выявлено.
В период карантинирования , материал от животных исследовался в государственной ветеринарной лаборатории.

____

и были получены следующие результаты:

Наименование болезни	Дата исследования	Метод исследования	Результаты исследования

Annex 3. Stub of the Veterinary Certificate



РЕСПУБЛИКА УЗБЕКИСТАН
ГОСУДАРСТВЕННЫЙ ВЕТЕРИНАРНЫЙ НАДЗОР

КОРЕШОК ВЕТЕРИНАРНОГО СВИДЕТЕЛЬСТВА

№

От"___"________________201__г.

Я, нижеподписавшийся ветеринарный врач, выдал настоящее ветеринарное свидетельство

в том , что при ветеринарном осмотре, подлежащих отправке

________________ в количестве ________________ голов (мест, штук)
больных и подозрительных по заболеванию заразными болезнями не обнаружено и они выходят (вывозятся) из

благополучного по особо опасным и карантинным болезням животных.
При отправке на экспорт указывают благополучие хозяйства и местности согласно требованиям страны-импортера и срок их благополучия(мес., лет.).

Животные находились в Республике Узбекистан:1) с рождения, 2) не менее 6 месяцев (нужное подчеркнуть) или ________________ месяцев.

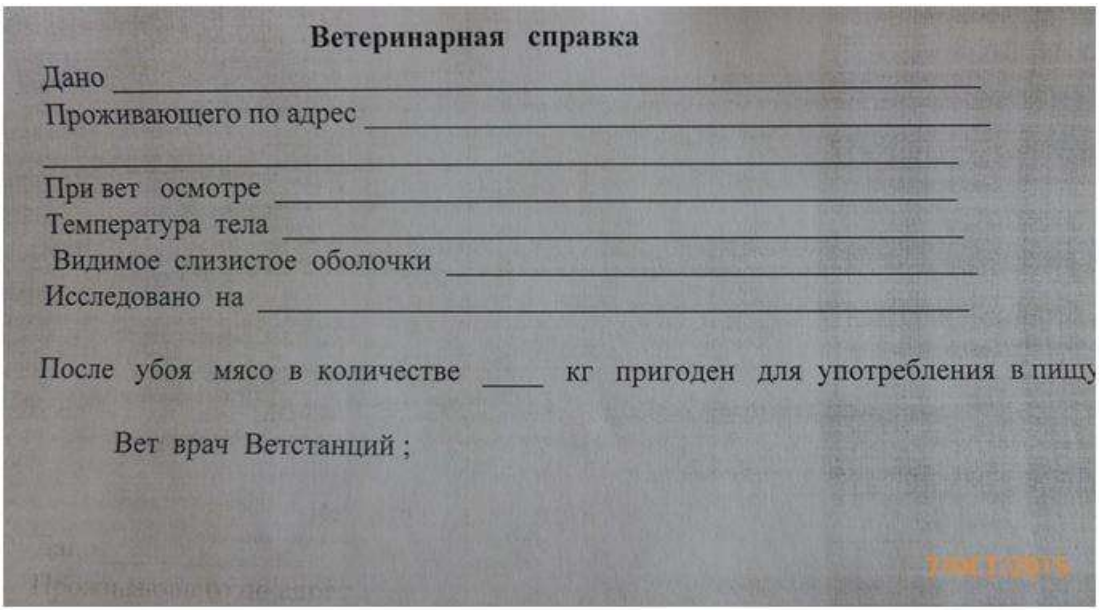
Животные перед отправкой карантинировались

В период карантинирования животные не имели контакта с другими животными ; ежедневно клинически осматривались и у них измерялась температура тела ; в день выдачи свидетельства - обследованы , больных и подозрительных в заболевании не выявлено.
В период карантинирования , материал от животных исследовался в государственной ветеринарной лаборатории.

и были получены следующие результаты:

Наименование болезни	Дата исследования	Метод исследования	Результаты исследования

Annex 4. Veterinary Inquiry/Information (for trading of livestock outside the region)



Ветеринарная справка

Дано _____

Проживающего по адрес _____

_____

При вет осмотре _____

Температура тела _____

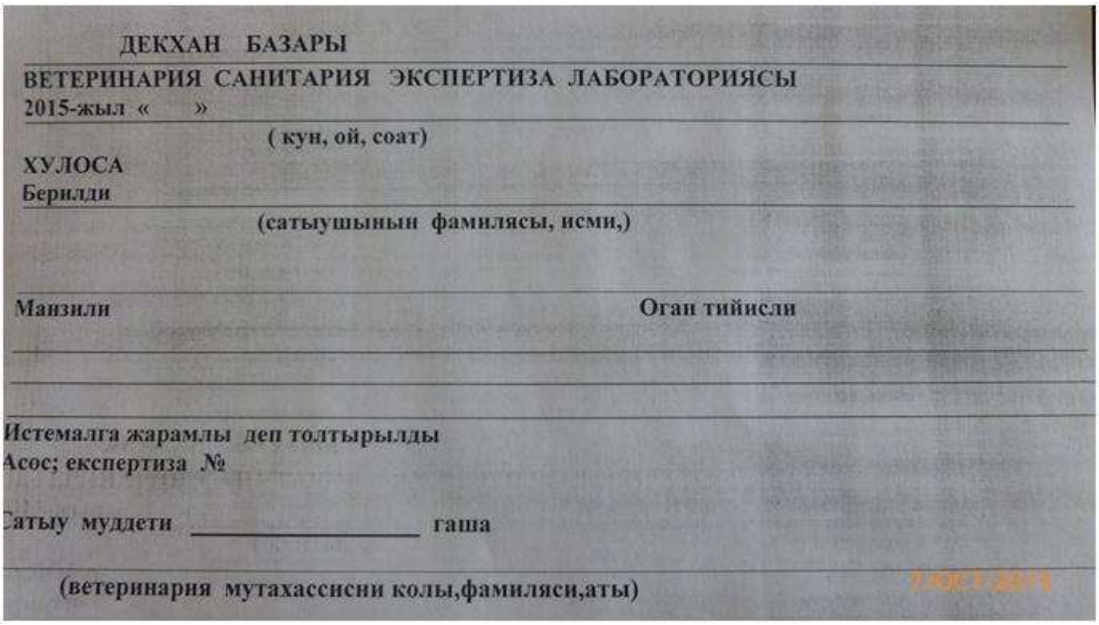
Видимое слизистое оболочки _____

Исследовано на _____

После убоя мясо в количестве ____ кг пригоден для употребления в пищу

Вет врач Ветстанций ;

Annex 5. Veterinary Sanitary Examination Certificate



ДЕКХАН БАЗАРЫ

ВЕТЕРИНАРИЯ САНИТАРИЯ ЭКСПЕРТИЗА ЛАБОРАТОРИЯСЫ

2015-жыл « »

(кун, ой, соат)

ХУЛОСА

Берилди

(сатыушынын фамилясы, исми,)

Манзили **Оган тийисли**

Истемалга жарамлы деп толтырылды

Асос; експертиза №

Сатыу муддети _____ гаша

(ветеринария мутахассисни колы,фамиляси,аты)