Annual report 2015 for WP6 under the LaVaCCA

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The main objective of the research is to analyze best options for evaluating of land value and its change under the conditions in two research regions of Uzbekistan: Kulavat and Elliqkala districts (Khorezm and Karakalpakistan).

Methodology

The research suggests that assessment of land value is reasonable to make through the normative approach, while also taking into account factors essential to market land assessment. There is no land market in Uzbekistan as per the national legislation (the Land Code of the Republic of Uzbekistan). This combination of two approaches will give more precise assessment of land value, therefore facilitating to increase potential of agricultural production through optimization of production and also contributing to more efficient land management and use at district level. The normative approach is based on available productivity or estimated margin cost. Market value of land is characterized by: density population; land availability; distance to village or city; infrastructure; land equipment; quality of lands. Direct and non-direct benefits should also be assessed; they include net benefit plus difference between economic and financial prices of land use. It includes taxes and fees; associated benefits from crop processing. Thus, AFMAS project (2012) showed the following basic average annual financial indicators from processing of cotton fiber of 1 ton: raw cotton production – $35.2, cotton processing - $118.5, cotton seeds processing – $23.2, textile and apparel production - $3041.7.

For assessing value of abandoned, fallow and other types of lands and carrying out cost-benefit analysis to calculate gross margin as an indicator of farm production, primary data collection is proposed: using questionnaires to make surveys among farmers and other users of alternative land uses, as well as a willing-to-pay (WTP) method and semi-structured questionnaires. Due to the budget limitation, data required for cost-benefit analysis were collected under WP4 in Khorezm province within the Kulavat system as agreed during the kick-off meeting in Almaty this year.

For obtaining socio-economic data, secondary data were collected from national statistics sources. Under the WP6 in 2015, the socio-economic and agricultural assessment of Elikkala district, Republic of Karakalpakstan were carried out by using statistics, data from the State Committee for Land, Geodezy, Mapping and National Cadastre (Goskomzemgeodezcadastre), as well as expert and analytical estimations by Dr. Sh. Muminov.

For verification of LD drivers' impact on farm incomes, their sensitivity analysis will be carried out. Value chain analysis will be used for calculation of associated benefits from land use options (alternative land uses) next year.

The normative value of agricultural lands (Decree No. 235 of the Cabinet of Ministers of the Republic of Uzbekistan regarding Improvement of the system for calculation of the normative cost of agricultural lands, as of Aug. 18, 2014), that is the cost of agricultural lands, which is calculated using income approach and normative indicators, is of preference for the conditions of Uzbekistan, where there is no land market as mentioned above, while also taking into account factors essential for a market approach. When calculating the normative cost of 1 ha of agricultural lands, the following indicators are used: soil quality and natural forage lands; cropping patterns; normative yield of crops, perennial plantings and forage lands; normative productivity of agricultural lands; calculated profit of agricultural production by the main crops; annual average prices of the main agricultural products sold

at the dekhkan markets, and average purchase prices for raw cotton and cereals grain; interest of capitalization of profit. Intensity of agricultural production, soil quality, and irrigation water supply (gravity or pumped) are taken into account to differentiate the normative cost of agricultural lands. The normative cost does not include the cost of structures inseparable attached to land (irrigation and collector-drainage network, roads).

Beyond the market land value, for identifying a land value method best suitable to Uzbekistan conditions, a method for calculation of normative land value as per the Uzbek national legislation will be compared to methods existing in another country (e.g., Kazakhstan) with similar conditions (climatic, economic, social, etc.). A comparative analysis will be made using a SWOT-method.

Socio-economic analysis of Elikkala district, Karakalpakstan.

According to the socio-economic analysis, nowadays the total area in Elikkala district, Karakalpakstan, is 541,900 ha, of which 34,000 ha (6.2%) are irrigated. Whereas agricultural land area is 387,500 ha, of which 30,600 ha are irrigated. Due to the high population growth in the study area, there is a decline in irrigated areas per capita. In 2014, out of the total agricultural lands of 387,500 ha, the crop area made 28,700 ha, i.e. (7.4%), that is by 749 ha less than in 1991 (29,400 ha). The reduction of area is observed in case of perennial plantings as well (Table 1).

Table 1

Total land area and agricultural land use in Elikkala district, Republic of Karakalpakstan in 1991-2014 (ths ha)

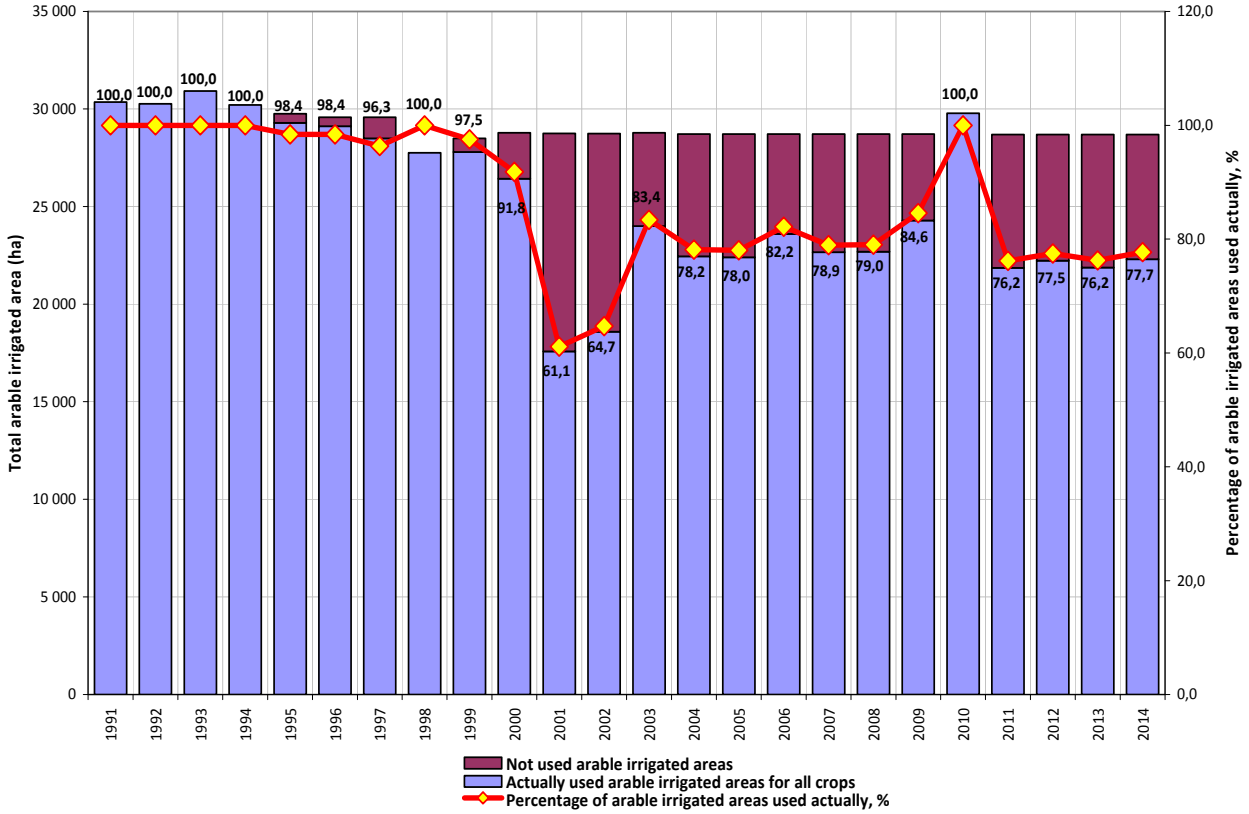
Year	Total land area		Agricultural land		Including:								
					Arable land			Perennial plantings		Hayfields and pastures		Other land use	
						including:							
	Total	of which: irrigated	Total	of which: irrigated	Total	irrigated	rainfed	Total	of which: irrigated	Total	of which: irrigated	Total	of which: irrigated
1991	541.9	33.8	388.5	30.9	30.3	30.3	0.0	4.4	4.4	357.6	0.0	0.0	0.0
1992	541.9	33.8	388.5	30.9	30.3	30.3	0.0	4.4	4.4	357.6	0.0	0.0	0.0
1993	541.9	33.8	388.5	30.9	30.9	30.9	0.0	4.3	4.3	357.6	0.0	0.0	0.0
1994	541.9	34.3	388.9	31.3	30.2	30.2	0.0	4.4	4.4	357.6	0.0	0.0	0.0
1995	541.9	34.3	388.7	31.2	29.8	29.8	0.0	4.4	4.4	357.5	0.0	0.0	0.0
1996	541.9	34.2	388.6	31.0	29.6	29.6	0.0	4.4	4.4	357.5	0.0	0.0	0.0
1997	541.9	34.2	388.6	31.0	29.6	29.6	0.0	4.4	4.4	357.5	0.0	0.0	0.0
1998	541.9	32.9	386.5	29.6	27.8	27.8	0.0	4.5	4.5	357.5	0.6	0.4	0.4
1999	541.9	34.0	387.6	30.7	28.5	28.5	0.0	4.3	4.3	357.5	0.6	0.4	0.4
2000	541.9	34.0	387.6	30.7	28.8	28.8	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2001	541.9	34.0	387.6	30.7	28.7	28.7	0.0	4.0	4.0	357.5	0.6	0.4	0.4
2002	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2003	541.9	34.0	387.5	30.6	28.8	28.8	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2004	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2005	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2006	541.9	34.1	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2007	541.9	34.1	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2008	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2009	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4

2010	541.9	34.0	387.5	30.6	29.8	29.8	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2011	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2012	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2013	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4
2014	541.9	34.0	387.5	30.6	28.7	28.7	0.0	0.9	0.9	357.5	0.6	0.4	0.4

Source: Data of the Uzbek State Statistical Committee

Figure 1

Dynamics of arable irrigated area in Elikkala district, Republic of Karakalpakstan in 1991-2014



Source: estimated on the basis of statistics from the Uzbek State Statistical Committee

The whole crop area in Elikkala district is irrigated. Dynamics of irrigated crop area during the period of 1991-2014 indicates decreasing of used crop areas for the recent two decades since 1995 (Fig. 1). The lowest values fall on the low-water years - 1998, 2001 (and the consequent 2002, with the lower reaches severely affected), and 2011. Thus, since 1998 the total area of irrigated lands reduced by 1.8 thousand ha throughout the district; in 2001, out of almost 29 thousand ha of arable lands, 17.5 thousand ha (61.1%) (and 65% in 2002) were actually used; in 2011 – 76.2%. This reduction was caused by the low-water years mentioned. Low water content and water losses did not allow for required volume supply for the Priaralie (water availability was of 20–25 %) (SIC ICWC Bulletin No. 57). Other reasons for the decreasing tendency were water shortage observed in the Central Asian region, climate change, and diminishing of soil fertility, high efficient competitive water user. Thus,for the conditions of Central Asia, the direct impact of temperature and precipitation due to climate change would contribute to decrease in yield of such crops as cotton, wheat, tomato, potato by 6...10% in a decade, meanwhile productivity of pastures would increase by 9-17% (SIC ICWC Bulletin No. 57, pp. 56-57). 2009 and 2010 being of high-water were an exception here, when irrigated lands were almost

completely used for cultivating crops (84.6% and 100% respectively). Thus, due to the good weather conditions and the good state of irrigated lands in the northern ares of the Republic of Kazakhstan, wide-scale washing irrigation was carried out in the Republic of Kazakhstan, partially in Khorezm and Dashoguz provinces (SIC ICWC Bulletin No. 58).

Over the reviewed period, the total area of planted forests was 29,200 ha. Irrigated forest area increased by 344.4 % from 1991 to 2014, i.e. from 18 ha to 80 ha, respectively.

The similar picture can be observed for Karakalpakstan as whole (Table 2). The dynamics of using crop areas shows decrease, especially evident since 2000. For the period of 1991-1999, crop areas were used for almost 100% (93 to 97%), in 2000 it was 79%. The dynamics of sharp decrease started after 2000, with not exceeding 66% in using arable areas. For the recent 25 years, the lowest values were observed in low-water 2001 and 2002, when out of the total arable area of 246.7 and 246.2 ths ha, respectively, 169 and 172.9 ths ha were actually used, i.e. 40% and 41%. In low-water 2011, 216.7 ths ha were actually used out of 419 ths ha, i.e. 52%. However, for the same period, in high-water 2010 the pick in using arable areas was also not so high, with the value of 62% (259,3 ths ha out of 419,1 available).

Table 2

Dynamics of arable irrigated area in the Republic of Karakalpakstan in 1991-2014 (ha)

	Total agricultural area		Total arable area			Actual used arable area *	
	Total	of which irrigated	Total	of which: irrigated	rainfed	Total	%
1991	16,659,095	501,993	427,852	427,852		412,916	97
1992	16,659,095	501,993	427,852	427,852		416,311	97
1993	16,659,095	505,867	430,953	430,953		414,390	96
1994	16,659,095	510,177	432,407	432,407		418,725	97
1995	16,659,095	502,515	424,653	424,653		394,285	93
1996	16,659,095	512,778	431,015	431,015		408,346	95
1997	16,659,095	512,778	431,015	431,015		403,228	94
1998	16,659,095	500,838	416,421	416,421		394,580	95
1999	16,659,095	503,257	418,256	418,256		383,602	92
2000	16,659,095	509,463	418,833	418,833		331,611	79
2001	16,659,095	509,551	418,717	418,717		169,046	40
2002	16,659,095	511,119	419,117	419,117		172,923	41
2003	16,659,095	509,579	418,984	418,984		277,480	66
2004	16,659,095	509,538	418,798	418,798		240,923	58
2005	16,659,095	509,495	418,680	418,680		230,971	55
2006	16,659,095	509,797	418,496	418,496		248,139	59
2007	16,659,095	509,830	418,560	418,560		231,989	55
2008	16,659,095	510,354	419,064	419,064		225,346	54
2009	16,659,095	510,413	419,117	419,117		199,541	48
2010	16,659,095	510,655	419,095	419,095		259,254	62
2011	16,659,095	510,586	419,032	419,032		216,689	52
2012	16,659,095	510,584	419,030	419,030		252,536	60
2013	16,659,095	510,499	418,927	418,927		229,003	55
2014	16,659,095	510,359	418,664	418,664		225,649	54

Source: Goskomzemgeodezcadastre

** estimated on the basis of statistics from the Uzbek State Statistical Committee*

The total contribution of agricultural sector in Elikkala district was US$ 57.5 M in 2014 that is four times more than in 1994. The share of crop production is 43.6% or US $25.1 M in the total agricultural sector, whereas the share of livestock farming is 56.4% or US $32.4 M. Gross agricultural output in the Republic of Karakalpakstan was US $474 M in 2014, of which crop production accounted for 48.6% or US $230.3 M and livestock production – 54.1% or US $243.7 M (Fig. 2). The statistic analysis shows that livestock farming is a prevailing direction of agricultural sector not only in Elikkala district but also in the Republic of Karakalpakstan (Fig. 3).

Sustainable development of agriculture has marked the turning point in both Elikkala district and in the Republic of Karakalpakstan since 2002.

Value of gross crop production per capita and per 1 ha of irrigated area both in Elikkala district and in the Republic of Karakalpakstan sharply varied and was unstable in the period from 1994 to 2002[1]. But there has been a rapid increase in these indicators since 2002.

These indicators were critical during dry years (1998, 2000-2002). As a result of climatic changes, the value of gross crop production was US $ 35.7 per capita and US $ 121.4 per 1 ha of irrigated area in 2002. At the same time, these indicators of unit value in Elikkala district were higher than those for the Republic of Karakalpakstan) (Fig. 4 and Fig. 5).

Figure 2. Dynamics of gross agricultural output in Republic of Karakalpakstan in 1991-2014

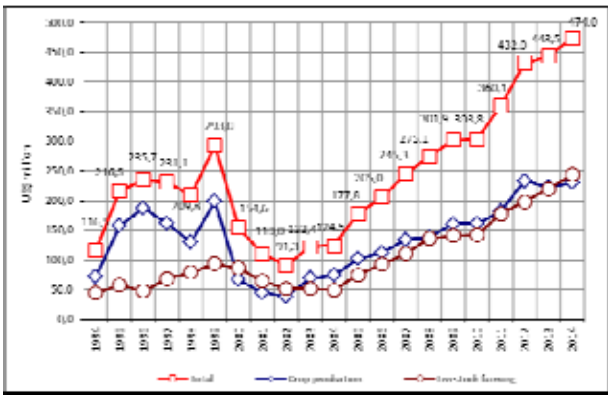
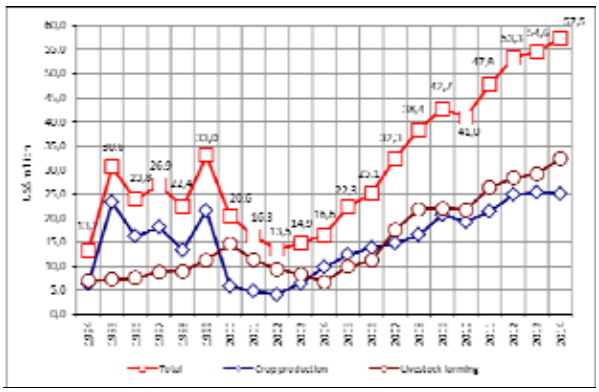


Figure 3. Dynamics of gross agricultural output in Elikkala district in 1991-2014



Source: estimated on the basis of statistics from the Uzbek State Statistical Committee

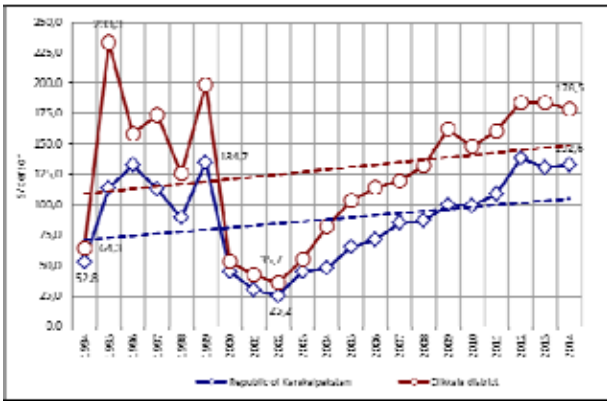
During the years of Independence there is growth in wheat area in both Elikkala district and in the Republic of Karakalpakstan. Wheat area in Elikkala district grew 3.2 times in 2014 compared to 1991. This growth was achieved essentially through the reduction of areas under cotton (33.8 %), rice (92.3 %) and corn (58.4 %) (Fig. 6). Despite an increase in the wheat area, the share of Elikkala district in the Republic of Karakalpakstan sufficiently decreased: from 18.1 % in 1991 to 7 % in 2014.

Figure 4. Dynamics of value of gross crop

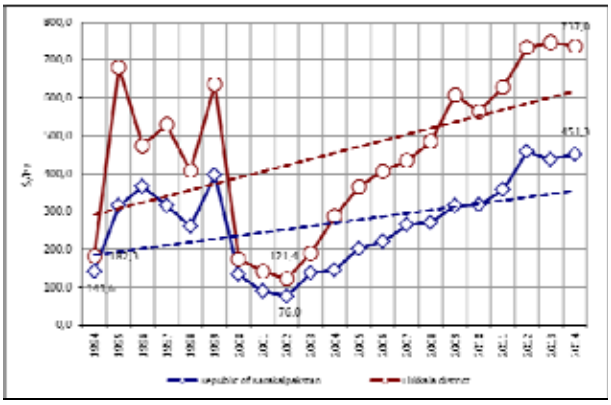
Figure 5. Dynamics of value of gross crop

1 The analysis was made for data since 1994 as before 1994 another national currency with different nominal value was used. Exchange rates were downloaded on 02.10.2015 from the web-site of the Central Bank of RUz: http://cbu.uz/uzc/section/rates.

production per capita in 1991-2014



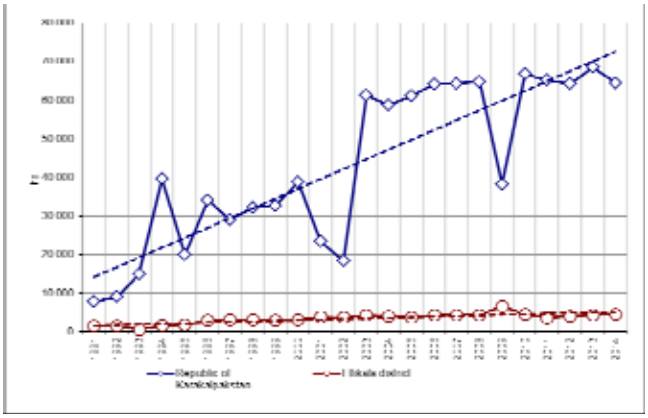
production per 1 ha of irrigated area in 1991-2014



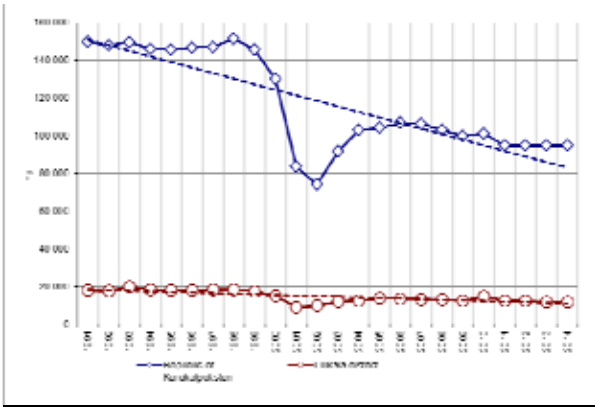
Source: estimated by the author on the basis of statistics from the Uzbek State Statistical Committee

Figure 6. Dynamics of areas under main crops in 1991-2014

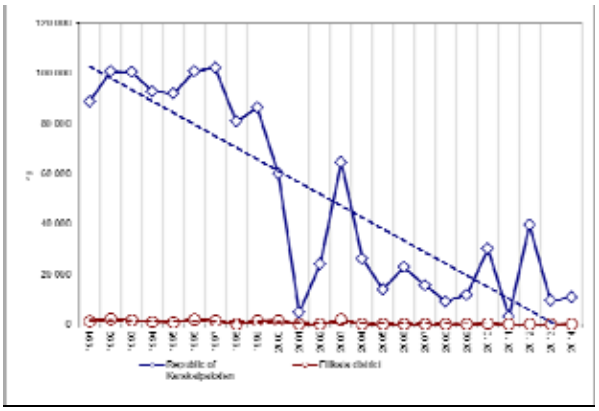
Wheat



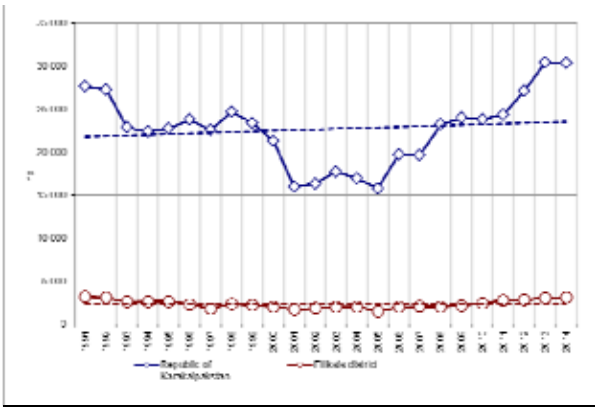
Cotton

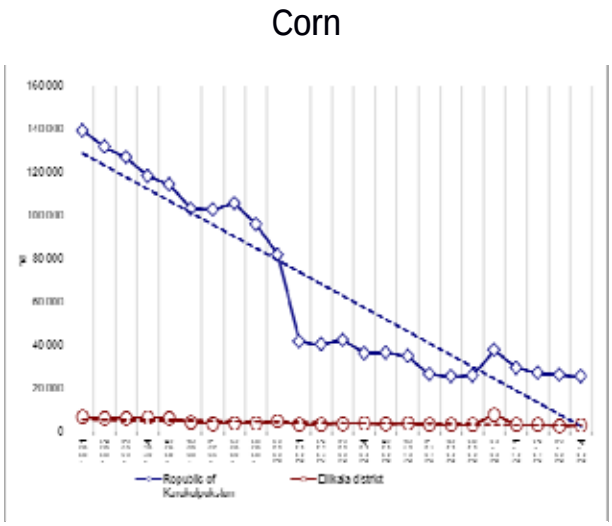


Rice



Fruits and vegetables





The data show sharp reduction of the areas under main crops in both Elikkala district and in the Republic of Karakalpakstan during the dry years (2001-2002). From 2005 there is moderate growth of areas under potato, fruits and vegetables, cucurbits, and grapes in both Elikkala district and in the Republic of Karakalpakstan. In terms of cotton area, the share of Elikkala district in the Republic of Karakalpakstan moderately increases: from 12% in 1991 to 12.5 % in 2014 (Table 3). As to corn, the district's share in the Republic grew substantially from 4.7% in 1991 to 10.8% in 2014. Elikkala district plays an important role in agricultural production in the Republic of Karakalpakstan. Since independence, the district has increased production of main crops: wheat - 11 times; potato, fruits, vegetables, cucurbits, and grapes - 2.5 times; and, corn - by 21.4%. Production of rice and raw cotton has decreased by 37.0% and 32.4%, respectively.

The high growth rate of vegetable production fully meets the standard rates of consumption that are recommended by the Uzbek Ministry of Health. However, despite quick growth of main crop production per capita, the current actual consumption of agricultural products remains low as compared to recommended standards.

Table 3

Dynamics of Elikkala district's share in cropping patterns in the Republic of Karakalpakstan in %

Crop	1991	1995	2000	2005	2010	2014
Wheat	18.1	9.0	7.8	6.1	6.7	7.0
Cotton	12.0	4.4	11.6	13.1	14.7	12.5
Rice	4.4	0.9	2.5	0.0	0.9	0.9
Fruits and vegetables	4.7	11.6	9.5	9.7	10.2	10.2
Corn	4.7	5.3	5.8	9.6	20.7	10.8

Source: estimated by Dr. Muminov on the basis of statistics from the Uzbek State Statistical Committee

Crop yield is the main factor that governs the volume of agricultural output. Yield is a qualitative and integrated indicator, which depends on many factors.

Nature-climatic conditions, particularly relief, soil fertility, water availability, air temperature, and rainfall are weighty in the study area. In this context, crop yields widely vary in Elikkala district and in the Republic of Karakalpakstan in general. Analysis of crop yields in Elikkala district showed that since independence yields of all crops have increased, except for those of cotton and potato. Thus, wheat yield grew 3.2 times from 1991 to 2014 and amounted to 36.2 centner/ha, and even was higher in humid years. The highest yield (45.9 centner/ha) was observed in 2010.

The data analysis shows significant variations of cotton yield. This means that this crop is highly sensitive to climatic changes. Cotton yield decreased by 16.1% over the study period, i.e. from 28 to

23.5 centner/ha. The lowest yield (10 centner/ha) in the district was recorded in 2003.

Another climate sensitive crop is rice. Rice was grown in Elikkala district even in some dry years. Moreover, rice yield grew 2.3 times in 2014 as compared to 1991 and equaled 17.2 centner/ha. The highest yield (25.3 centner/ha) was recorded in 2000.

The study period shows rapid growth of corn yields and moderate growth of potato, vegetable, fruits, cucurbits, and grape yields in both Elikkala district and generally in the Republic of Karakalpakstan. Despite this evidence, potato yields remain low as compared to 1991.

The livestock product value per capita has grown in Elikkala district and in Karakalpakstan in general until 2000. In dry years and the consequent four years the livestock sector suffered strong damage in this region and the critical tendencies continued until 2004.

The lowest livestock product value in Elikkala district was recorded at 57 US$/person in 2004, while in Karakalpakstan in general this indicator was estimated as 32.1 US$/person only. In addition, this indicator shows rapid growth in Elikkala district: from 71.7 US$/person in 1991 to 230.6 US$/person in 2014 or 3.2 times. Currently (2014) the livestock product value per capita is 90.3 US$/person in Elikkala district. This is well above the average indicator for the Republic of Karakalpakstan.

The nature-climatic conditions of Elikkala district and the Republic of Karakalpakstan in general create opportunities for development of livestock farming. The analysis shows that the livestock development program in Uzbekistan had a positive effect on livestock sector in the Republic in Karakalpakstan, particularly in the study zone. Until 2000-2001, there was time of decline in cattle, small ruminants, horse, and poultry population that was followed by the period of rapid growth.

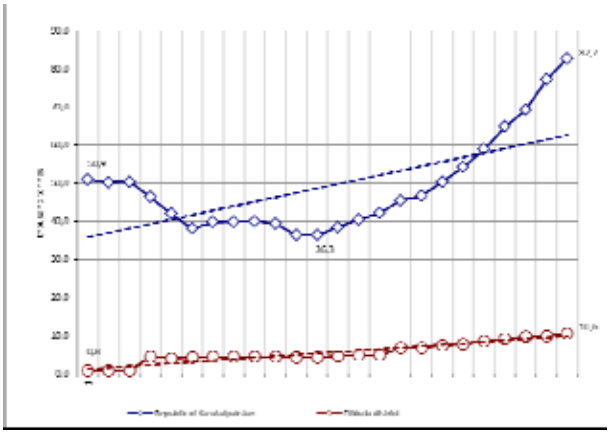
The main products of livestock farming in Elikkala district and generally in the Republic of Karakalpakstan includes cattle and poultry meat, milk, egg, wool, honey, and fish.

Since independence, the volume of products from livestock farming in Elikkala district has substantially grown, except for honey. As compared to 1991, in 2014 production of meat increased 13.3 times, milk - 2 times, egg – 2.4 times, wool – 1.4 times, and karakul – 2.8 times. Against this growth, production of honey decreased by 71.7% (Fig. 7).

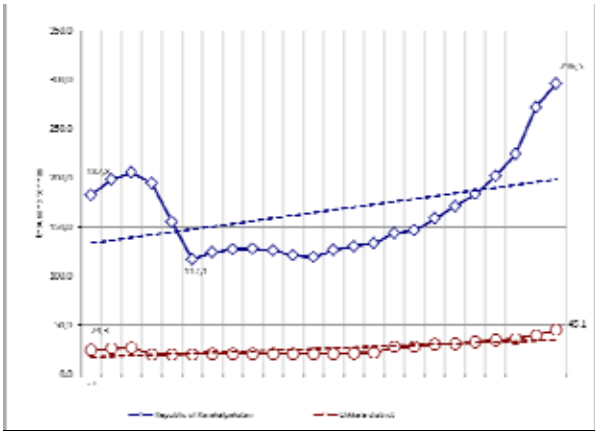
Rapid growth started in 2002 for production of meat, in 2005 for milk, in 2002 for eggs, in 2000 for wool, in 1995 for karakul, in 2008 for honey, and in 2011 for fish catch.

Fig. 7. Dynamics of production of livestock products in 1991-2014

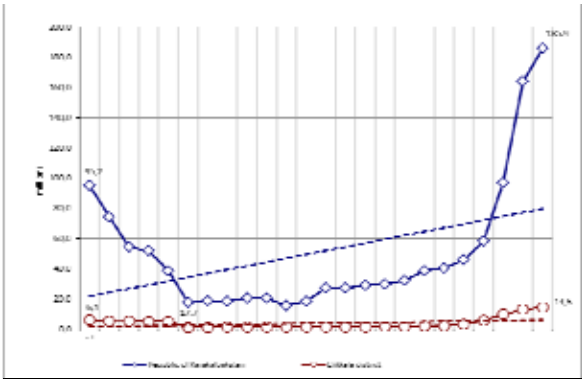
Meat **Milk**



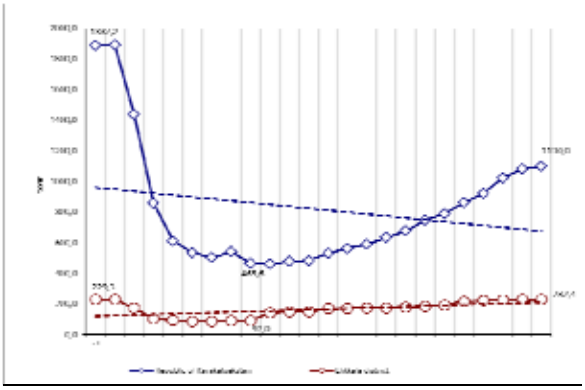
Egg



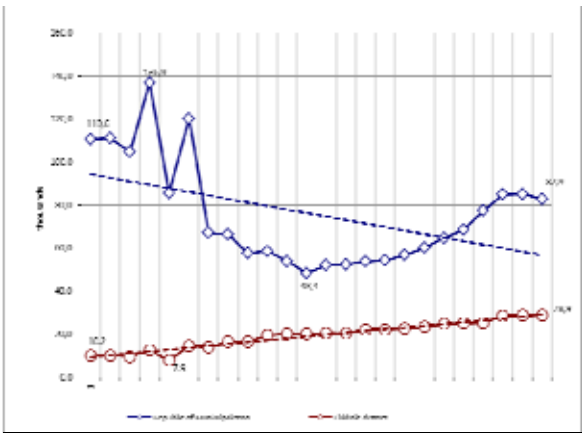
Wool

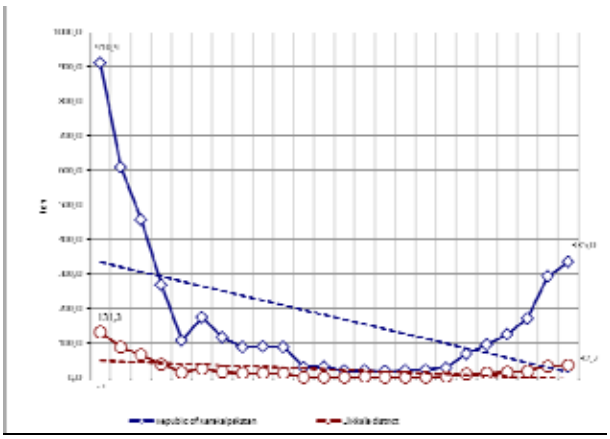


Karakul

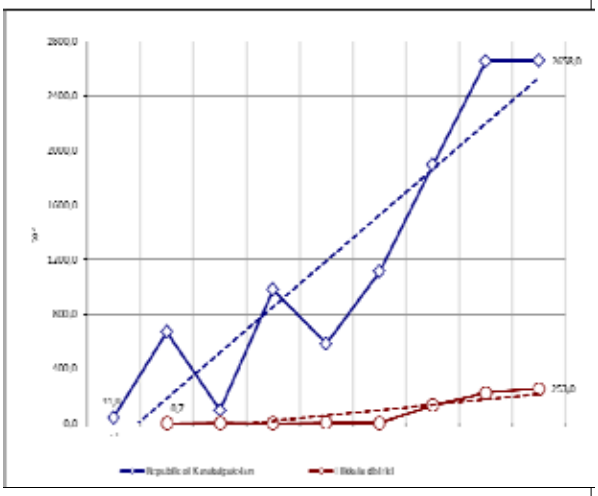


Honey





Fish catch



Source: estimated on the basis of statistics from the Uzbek State Statistical Committee.

Thanks to the efforts of local authorities and farmers, they managed to achieve relative growth in animal population. However, it is hardly surprising that production of milk is higher, while that of meat and egg is still below the standard level required for adequate diet (Fig. 7).

Conclusion

1. Like in other regions throughout Uzbekistan, rapid growth of population has been recorded in the Republic of Karakalpakstan since independence.

2. The analyzed period shows significant changes in migration processes, and there is a negative migration balance. The internal migration growth in Elikkala district is connected with place of education or permanent employment of the population in Nukus and Tashkent cities mainly. External migration growth is related to inhabitants, who left their permanent residence in Elikkala district, in search for jobs, mainly to Russia and Kazakhstan.

3. The whole arable area in Elikkala district is irrigated. Over the period of 1991-2014, dynamics of arable irrigated area reveals decreasing of used arable areas since 1995. The reasons for the decreasing tendency include low-water years, water shortage in the Central Asian region, and diminishing of soil fertility. This all leads to land degradation causing financial losses, and Karakalpakstan has the highest of them in the republic.

The similar picture can be observed for Karakalpakstan on whole. The dynamics of using crop areas shows decrease, especially evident since 2000. For the period of 1991-1999, crop areas were used for almost 100% (93 to 97%), in 2000 it was 79%. The dynamics of sharp decrease started after 2000, with not exceeding 66% in using arable areas. For the recent 25 years, the lowest values of 40-41% were observed in low-water 2001 and 2002, and the highest value of 62% - in high-water 2010.

4. The unit values of gross crop production both in Elikkala district and in the Republic of Karakalpakstan sharply varied and were unstable in the period from 1994 to 2002. But there has been a rapid increase in these indicators since 2002. These indicators were critical during dry years (1998, 2000-2002). The livestock product value per capita has grown in Elikkala district and in Karakalpakstan in general until 2000. In dry years and the consequent four years the livestock sector suffered strong damage in this region and the critical tendencies continued until 2004. Thereafter rapid growth has begun. Currently (2014) the livestock product value per capita is 90.3 US$/person in Elikkala district. This is well above the average indicator for the Republic of Karakalpakstan. All of

this illustrates that livestock farming is a prevailing direction of agricultural sector not only in Elikkala district but also in the Republic of Karakalpakstan.

5. Wheat area in Elikkala district grew 3.2 times in 2014 compared to 1991. This growth was achieved essentially through the reduction of areas under cotton (33.8 %), rice (92.3 %) and corn (58.4 %). Sharp reduction of the areas under main crops was recorded during the dry years. From 2005 there is moderate growth of areas under potato, fruits and vegetables, cucurbits, and grapes in both Elikkala district and in the Republic of Karakalpakstan At the meantime, from 2005 there has been observed a moderate growth of areas under potato, fruits and vegetables, cucurbits, and grapes.

6. Over the analyzed period high growth is recorded in production of the following crops: wheat - 11 times; potato, fruits, vegetables, cucurbits, and grapes - 2.5 times; and, corn - by 21.4%. Production of rice and raw cotton has decreased by 37.0% and 32.4%, respectively. The high growth rate of vegetable production fully meets the standard rates of consumption. However, despite quick growth in per capita production of main crops (excluding vegetables), the current actual consumption of these agricultural products remains low as compared to recommended standards.

7. Since independence yields of all crops have increased, except for those of cotton and potato. Thus, as compared to 1991, in 2014 wheat yield grew 3.2 times and amounted to 36.2 centner/ha, and even was higher in humid years. The highest yield (45.9 centner/ha) was observed in 2010. Rice and cotton are among highly sensitive crops to climatic changes.

8. Animal population shows positive tendencies of growth in the Republic of Karakalpakstan as a whole. Over the same period of time, in Elikkala district the stock of cattle increased 2.8 times, cows – 1.8 times, goats and sheep – 2.1 times, horses – 2.1 times, and poultry – 1.9 times.

9. The main outputs of livestock farming in Elikkala district and generally in the Republic of Karakalpakstan include cattle and poultry meat, milk, egg, wool, honey, and fish. Over the analyzed period, the volume of outputs from livestock farming in Elikkala district has substantially grown, except for honey. By present, only production of milk is higher than the standard level required for adequate diet, while that of meat and egg is below the required level.