

Irrigated agriculture and its water consumption¹

18. Reduction of irrigation water by 7-8 km³ a year in first years of independence took place through the extension of winter cereal areas and a slight decrease in cotton area because of the change in flow regulation regime from irrigation to irrigation-energy generation and even full energy generation one. Thus, irrigated agriculture had to adapt to the established regimes of flow regulation by energy sector. **Irrigation norms in the Aral Sea basin were decreasing and amounted to the following values in 2017:** 9,700 m³/ha in South Kazakhstan; 7,400 m³/ha in Kyrgyzstan; 14,400 m³/ha in Tajikistan; 15,500 m³/ha in Turkmenistan; and, 11,700 m³/ha in Uzbekistan.

Agricultural production as a whole and irrigated agriculture in particular have underwent dramatic institutional changes at the lower level. Instead of rather large collective and state farms of different specializations on 1,500–4,000 ha, smaller farms were formed. Moreover, new farms were developed following diverse principles. Kyrgyzstan distributed all irrigated land among rural people, with the average land plot area of 0.5 ha. Kazakhstan distributed land for rent between the employees of collective and state farms, depending on the role of each employee in farm, and sizes of land plots were very different. In Uzbekistan, land was given for rent through tenders and the rent was periodically reviewed for optimization of land use. Here, farm sizes vary from 150 ha for cotton and cereals and 25 ha for fruit and vegetables. It is characteristic that the breakdown of former cooperative and socialistic farms affected the mechanization level of agriculture, stability of land use, agronomic and agrochemical services, and, mainly, productivity and financial stability of farms. Elimination of large state and collective farms – the agglomerates of multisectoral specialization – comprising big settlements with full infrastructure has turned them into unattended, while multiple former employees have become unemployed and started searching for job, also outside their homeland. This caused huge labor migration of rural people from densely populated countries (Kyrgyzstan, Tajikistan, and Uzbekistan) to Russia and Kazakhstan. In some estimates, labor migration involves from 2.5 to 4.3 million people annually or 10-15% of economically active population in CA.² This is closely linked with agricultural transformations in the countries.

Since the collapse of the Soviet Union, cropping patterns has changed radically in the countries of the Aral Sea basin. The share of food crops has started to grow fast, while the share of industrial crops in the total crop acreage in the basin has started to decrease – from 40% of the total crop acreage in the basin in 1990 to 25% in 2017. This is explained, first of all, by breakdown of the common agricultural market on the CIS scale, loss of former interregional economic ties and All-Union specialization patterns. However, the share of grain, mainly, of wheat increased rapidly in national cropping patterns from 20% of the total crop acreage in the basin in 1990 to 45% in 2017. Grain acreage has doubled. Given an abrupt drop in gross incomes of families and living standards as a whole, it was necessary to create conditions for calorie and protein supply of population and that could be reached only by increasing grain production.

Simultaneously, fodder crop acreage was reduced by half in the Aral Sea basin countries since independence. Substantial reductions were observed in Uzbekistan (more than 60% as compared to 1990) and in Tajikistan and Kazakhstan (by more than 40%). This had a destructive effect on the livestock sector that, in turn, had led to decline in meat and milk production.

¹ Materials taken from section 8.5 of the DIAGNOSTIC REPORT ON RATIONAL USE OF WATER RESOURCES IN CENTRAL ASIA AS OF 2019. Prepared by the Scientific-Information Center of the Interstate Commission for Water Coordination in Central Asia (SIC ICWC) for Commissioned by the Organization for Economic Cooperation and Development (OECD)

² Chekhovskiykh T.D. 2019. Population movement from the countries of Central Asia to Russia: problems and solutions.

Despite all negative consequences from the destruction of the former land use system and agricultural sector as a whole (accompanied by complete loss of large-scale agricultural engineering industry base that ensured mechanized land treatment with local machines), **all countries in the region have managed to mobilize financial and material resources to boost agricultural production under new economic conditions and radically improve productivity over 2005-2008**. Exactly in these years, the average productivity of irrigated hectare and water productivity in irrigated agriculture reached the level that was before independence and, since 2012, exceeded this level, with gradual increase in absolute values. The governmental efforts that legalized dekhkan farms using homestead plots – *tamarka* in Uzbekistan, *melek* in Turkmenistan, etc., and, since 2001, organization of Water User or Consumer Associations as a voluntary alliance of peasant farms contributed to such an increase. According to our findings, substantial portion of food basket was formed by dekhkan farms.³

19. As a result of taken measures, all countries in the region but Afghanistan have maintained their food security. Kazakhstan reaches its security through the higher share of grain export and, accordingly, import, at gained revenue, of lacking foodstuff. Moreover, export and import are approximately the same. Other countries are self-sufficient for the most part but still depend on import of some components of the food basket (10-20%). For example, food import was substantial - \$1.27 billion – in Uzbekistan in 2017. Typically, since independence, all the countries have managed to reduce quantity of malnourished people to less than 5% of population, except for Tajikistan, where this indicator is 33.2%.⁴

20. Currently, the agrarian sector shows new tendencies to formation of larger forms of business patterns. In Kyrgyzstan, this was manifested in the revival of collective business pattern. A brand new and, to a certain extent, revolutionary approach is shaped in Uzbekistan, where since 2017 the cluster-based farming has been developed. At present, such form is also developed in Kyrgyzstan and Turkmenistan. This approach consists in transfer of agricultural production management to leading companies – producers of final product - that sign contracts with farms for supply of raw material and, in turn, provide fertilizers, agronomic and agrochemical services and even loans. Their main objective is boosting production of final products. Here, mobilization of external funds is welcome. Examples of such cooperation can be found in Japan, which shows highly effective production of final products. Cotton, grain and horticultural clusters have been established already.

21. Agriculture plays a critical role in the economies of the basin countries. It is often said that irrigated agriculture is significant to the economies of downstream states, with Uzbekistan as a top-ten global exporter of cotton and Kazakhstan a major wheat exporter. In fact, agricultural sector continues playing a key role in economies of all other countries too, with the highest rate of share in GDP in Afghanistan (21%), Tajikistan (21.1%), Uzbekistan (17.3%) and Kyrgyzstan (12.9% but as much as 22.3% in the areas belonging to the Aral Sea basin). Agriculture also accounts for significant share of employment in the region, with the highest rate in Afghanistan (62%) and Tajikistan (52%). It is important to note that agricultural development boosts development of other sectors, which process crops and livestock products and which provide fertilizers, agricultural machines, marketing, delivery and storage of agricultural products. In general, for example, agriculture and associated sectors account for almost 45% of GDP in Uzbekistan.

³ Dukhovniy, V.A., Stulina, G.V., Mukhamedzhanov, Sh.Sh., Degtyaryova, A.S. 2016. The Problems of Food Security in Central Asia in “Land Resources and Food Security in Central Asia and Southern Caucasus”. Editors Pavel Krasilnikov, Maria Konyushkova, Ronald Vargas. FAO, Rome.

⁴ <https://tj.sputniknews.ru/asia/20180418/1025338192/oon-uzbekistan-dva-milliona-chelovek-nedoedayut.html>

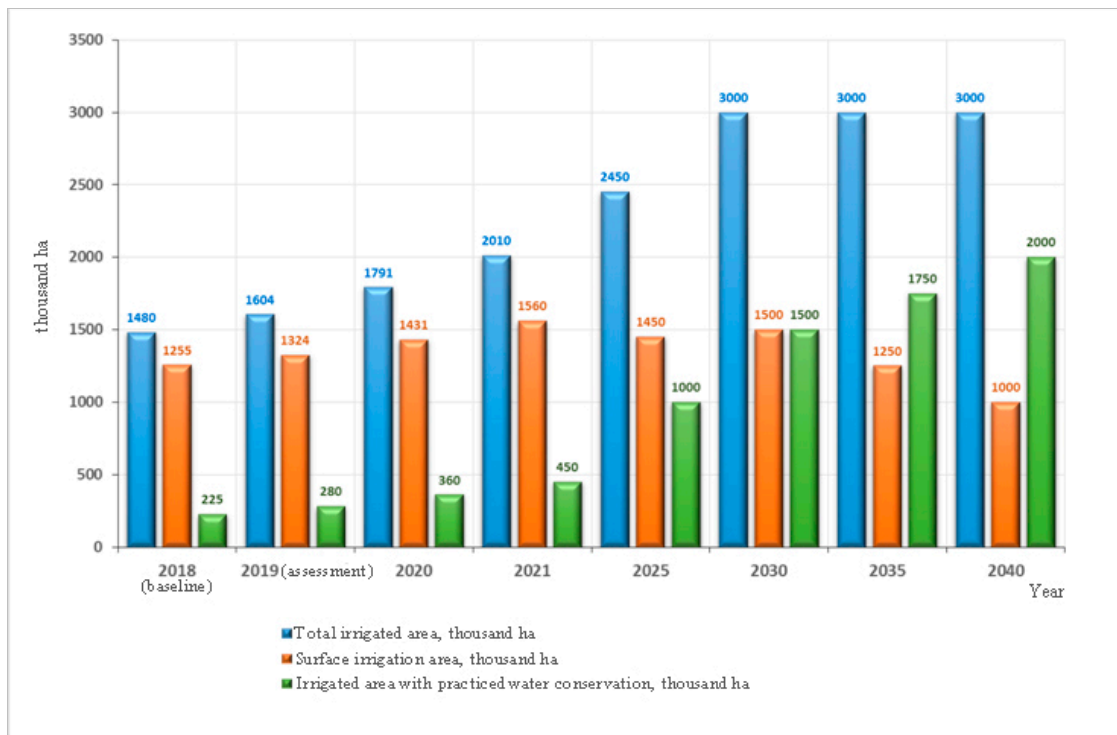


Figure 3-1. Planned increase in irrigated area in Kazakhstan (outside ASB) by 2040

22. Diversification from cotton to other crops is ongoing in all the countries in the region.

Kazakhstan is among the world's largest producers and exporters of grain and takes solid positions in the world market of barley (FAO, 2019). However, wheat area has been decreasing in recent years. According to USDA, in 2017/18 the harvested wheat area was reduced to 11.8 Mha against 12.4 Mha in the year before. This is related to national crop diversification policy in Kazakhstan. In the last few years, the Kazakh government supports and encourages production of oil crops by subsidizing farmers and, consequently, the interest in production of wheat and other cereals declines.⁵ Moreover, one should take into account that most crops are rainfed in Kazakhstan.

Recently, Uzbekistan has also shifted from cotton dominance to more than 500,000 tons of grain export. It also exports large quantities of horticultural products, including fruits. Turkmenistan relies on crop export to a lesser degree thanks to its relatively large oil and gas reserves. Kyrgyzstan and Tajikistan have diversified agricultural sector but limited export of livestock and horticultural crops. Until recently, all the countries held back from irrigation development. Nevertheless, in 2019, Kazakhstan adopted a program for irrigation expansion and rehabilitation of irrigated areas that existed before independence (2,150,000 ha), with following extension to 3 Mha, mainly, in steppe zones (Fig. 3-5). Kyrgyzstan also plans irrigation expansion by 66,500 ha by 2026 on the base of the Government Decree No. 440 of 21 July 2017. The need for additional irrigated area exists in Tajikistan and Uzbekistan as well; however, this could be done only through the improvement water use.

⁵ APK-Inform (2019). AgroProfile: Kazakhstan <https://www.apk-inform.com/ru/exclusive/file/1089362> (in Russian)