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Water, energy, food and environmental security in Central Asia: the benefits of cross-sectoral and regional solutions

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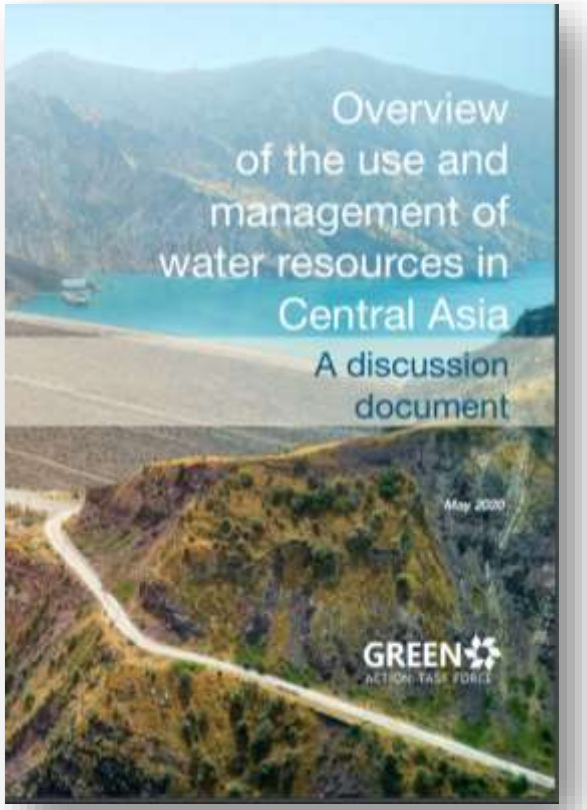
Diagnostic report on the state of use and management of water resources in 1998 to 2019



The previous DD was prepared within SPECA in 2001 as a basis for a strategy for the rational use of water and energy resources in the region

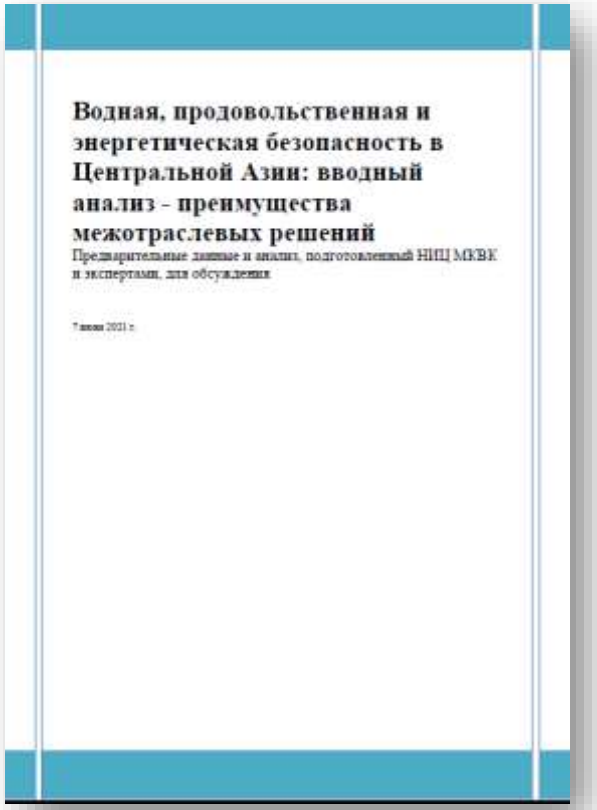
Main tasks : reflect changes over 20 years and identify future water supply and development challenges for countries

Initiated by the OECD with financial support from Germany

Implemented by the SIC with the participation of experts from the Central Asian countries

https://issuu.com/oecd.publishing/docs/final_report_eng_issuu

Water, food and energy security in Central Asia: an introductory analysis - the benefits of cross-sectoral solutions



Main task : to assess the current state of water, food and energy security and identify the factors of security destabilization in the form of dynamic indicators for the future in the Central Asian countries

Collection of statistical data on more than **110 indicators** for 5 countries

Initiated by the OECD with financial support from Germany

Implemented by the SIC with the participation of experts from the Central Asian countries

www.oecd.org/env/outreach/Water%20Food%20Security%20in%20Central%20Asia%20RUS.pdf

THREE TYPES OF SECURITY

Water

Indicators

- Water supply
- Municipal drinking water supply
- Reservoirs (volume per capita, risks)

Relationships and Environment Wednesday

- Water use in irrigated agriculture (efficiency, crop structure)
- virtual water
- Pollution
- ecosystems

food

Indicators

- Food security (production, coverage through exports)
- Energy value of the diet
- Share of spending on prod . products

Relationships and Environment Wednesday

- Land availability and degradation
- Energy consumption in agriculture

Energy

Indicators

- Availability and access to energy (reserves, production, export-import)
- Access to electricity
- Energy intensity and energy efficiency

Relationships and Environment Wednesday

- Hydropower and RES
- Energy consumption in the water sector, s / x
- Land for energy (location of reservoirs, biofuels)

Water resources in Central Asia

- Over the past 20 years, the **water resources** of the formation zone, determined by the annual inflow to the upper regulating reservoirs, the flow of the **Amudarya, Syrdarya, Chu-Talas, Saryzhaz, Issyk-Kul rivers have not changed** significantly .
- With a general slight decrease in the total water resources of the Amudarya basin, in the basin of the **river. Vakhsh** (a tributary of the Amu Darya) there was a **slight increase in** runoff.
- Increased water withdrawal in the upper reaches of the river. **Or, the Irtysh and the Urals,** especially in China and Russia, although the natural inflow of the **Irtysh** has **increased slightly** .
- While maintaining the total reserves of **groundwater, the** degree of mineralization of individual artesian basins has increased to unacceptable limits for use.
- **Return waters** in the Aral Sea basin amounted to 31-32% of the water intake, decreasing by 4-5% in dry years.
- **The impact of climate change** . In many regions of Central Asia, the variability and intensity of precipitation has increased, but the annual river runoff has not undergone major changes over the indicated period. Runoff fluctuations from normative (average long-term) values have increased.

Change in water withdrawal in CA countries by types of use (comparison of 2002 and 2018)

State	TOTAL*		Irrigation		CBH		Industrial		Energy	
	2002	2018	2002	2018	2002	2018	2002	2018	2002	2018
Kazakhstan	13830	18732	10294	12301	600	895	2937	5536	65430	66650
Kyrgyzstan	4469	5526	4264	5240	128	204	77	82	3186	2739
Tajikistan	12691	12301	9623	10215	619	760	392	348	n.a.	n.a.
Turkmenistan	28334	25380	24990	22385	623	558	1700	1523	2860	n.a.
Uzbekistan	60554	5 1642	47434	42306	3002	2200	4727	5454	64	130
TOTAL	119878	113581	96605	9 2447	4972	4617	9833	12 943		

In 1990-2000 the **water intake** of countries in the BAM **has decreased** due to the fall of the economy and the disruption of economic ties.

Since 2000, water withdrawal has **not significantly decreased** (120 km3 in 2002 and 114 km3 in 2018) and averaged **106** ^{km3}, including 90.1 km3 for ^{irrigation}.

Specific indicators of the use of water, land and energy resources in the countries of Central Asia and Northern Afghanistan, million m^3 (2018)

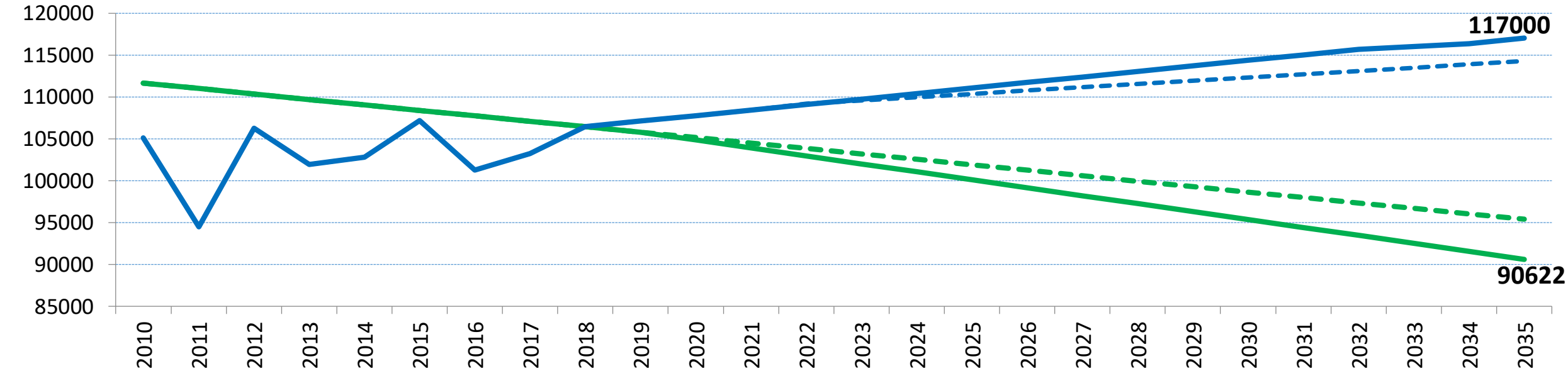
Country	Irrigated area per day , ha/person	GDP per day , $/person	Water use per day , m^3 / person	Water intake in the CBH per day , m^3 / person	per day , kWh / person
Kazakhstan	0.073	9268.54	1018.27	48.63	5822.1
Kyrgyzstan	0.164	1270.11	883.21	32.60	2493.3
Tajikistan	0.083	823.97	1348.79	83.27	2158.5
Turkmenistan	0.265	696 6 , 64	4337.77	95.43	3623.4
Uzbekistan	0.129	1518.47	1552 , 88	6 6, 17	1888.4
Total for CA	0.14	3969.54	1828 , 18	6 5 ,2 2	3197.1
Afghanistan	0.010	551.83	94.16	-	26.3 4

Indicators of water availability of the Central Asian countries

	Kazakhstan		Kyrgyzstan		Tajikistan		Turkmenistan		Uzbekistan	
	2020	2030	2020	2030	2020	2030	2020	2030	2020	2030
Natural water supply , %										
average	304	228	835	451	402	386	6	8.3	19	15.2
min.	214		628		292		four		fourteen	
Max.	443		1328		526		12		26	
Water supply , taking into account the interstate . liabilities , %										
average	235	152	443	216	160	102.3	112	100 *	94	90*
min.	164		346				84		70	
Water use efficiency , %	55-60		55-58		48-57		n.a.		50-55	
Cost of 1 m3 of water saving, USD							2.01		0.04-0.6	

Scenario of the water situation in the BAM until 2035

Water demand and water availability in ASB, Mm3 up to 2035



Water trend

Water trend considering climate change

Country water requirements considering population growth

Country water requirements considering population growth and Afghanistan's demands

By 2035, water demand will increase, requiring another 17.3 - 20 km ^{3} for drinking water supply, non- irrigation use, technological needs for flow control, increased water abstraction in Afghanistan.

Source: OEDC/SIC-ICWC, 2020

Irrigation

- Irrigated agriculture remains **the largest water user**
- **Irrigation norms in the BAM decreased and reached in 2017** in South Kazakhstan - 10.0 thousand m ^{3} /ha, in Kyrgyzstan - 7.4 thousand m ^{3} /ha, in Tajikistan - 13.0 thousand m ^{3} /ha, in Turkmenistan 12.7 thousand. m ^{3} / ha and in Uzbekistan 11.9 thousand m ^{3} / ha.
- Due to the change in the structure of crops, a sharp increase in the production of grain, vegetables, fruits and a reduction in cotton production, by 2019 all countries of the region, except Afghanistan, have achieved **food security .**

food safety

	Kaz	Kyrgyz	taj	Turkm	Uzbek
The degree of general food security, %	100	100	92.5	100	100
Self-sufficiency , %	73.3	58	87.7	93.0	85
Export share, %	39.3	31.2	50.3	15.8	10.6
Undernourished, %	2.5	6.4	26	<4.0	2.6
Financial opportunity, %	fifty	44.7	53.4	46	47

Future accents in food security until 2030 (Prof. Ibatullin S.R.)

- The rate of reduction of malnutrition in Central Asia is much **higher than the world average** . Significant efforts are needed to prevent the positive trends emerging in Central Asia from reversing the impact of the pandemic and other risks (climate, economy, health).
- By 2030, health-related spending to improve diets is estimated to be $69 billion . USA. To move towards **healthy diets** , countries need appropriate food security strategies.
- necessary to consider the feasibility of creating conditions for **an integrated food balance market in Central Asia** , not limited to bilateral agreements. These actions should outstrip the process of population growth in the CA countries and contribute to the development of national programs for the elimination of malnutrition in all its forms within the framework of SDG target 2.2.

Energy security

	Kazakhstan	Kyrgyzstan	Tajikistan	Turkmenistan	Uzbekistan
Energy supply , % at the level of 2018	100	100	100	100	100
at the level of 2030	100	100	100	100	100*
Cases of non-supply of electricity	restricted zones	Winter shutdowns	Winter shutdowns	interruptions in 2020	period. blackouts
Idle dumps	-	-	2 weeks a year	-	-
Network loss	12 %	13 %	thirty %	12 %	12.7%
Transmission Loss	19.45%	12.5%	fifteen %	3.5%	2.72%

* due to the commissioning of nuclear power plants, Pskenskaya hydroelectric power station, renewable energy s

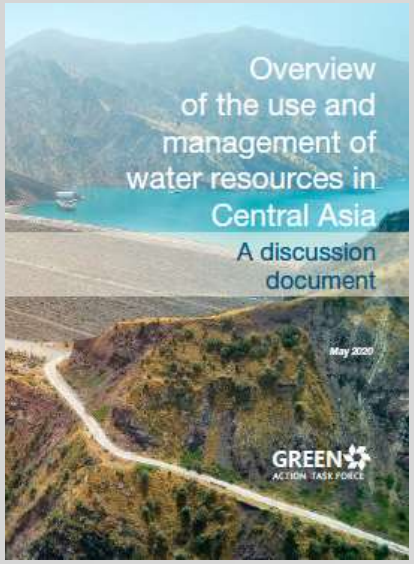
Basic prerequisites for the future

(Shamsiev Kh.A., CDC "Energy")

- In recent years, all power systems of IPS CA have become **energy redundant** and declare positive balances for electricity, incl . until 2030 - a good basis **for the development of the electricity market** , which should lead to lower prices.
- At the same time, there are countries that are **unbalanced in terms of capacity** during peak hours - an indicator for **the development of a capacity market** with the participation of regulating hydropower plants.
- The massive **introduction of renewable energy sources** in Kaz and Uzbekistan will lead to: (a) a sharp increase in the problem with the **regulation of imbalances** and the necessary **power reserves for this** (it is necessary to **build** energy **storage devices); ** (b) to the huge **surpluses of energy** generated by **solar stations** in the summer; (c) to the need to solve the problem with **excess gas during the daytime.**
- Along with the development of the power grid economy in the countries, it is necessary **to expand the coverage areas of the** energy interconnection (reintegration of the Taj and Turkm power systems into the CA IPS, expansion of the market in South Asia).

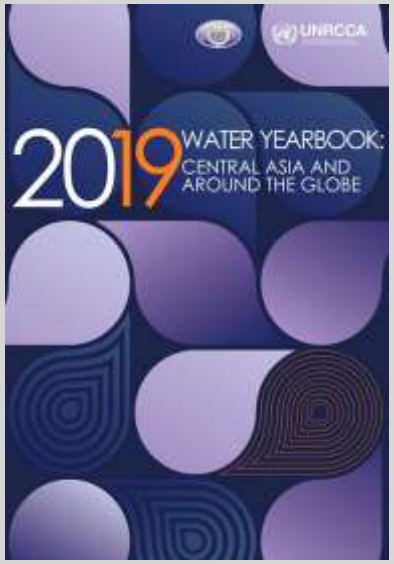
General conclusions

- In Central Asia, in general, there are enough resources to ensure water, energy, food and environmental security today and in the future, subject to well- **coordinated work and cooperation between countries** .
- Achieving each aspect of security requires **coordinated and intersectoral approaches** in the use of water, energy and land resources both within and between countries.
- **Specificity matters** . The uneven distribution of arable land, food potential, water resources, fossil fuels, hydropower potential, climate and topography makes **it impossible to develop unified measures** in the context of energy, water and land interrelations for all countries. It is important to take into account the specifics of each country in order to find the most effective solutions for intersectoral linkages within countries and within the region.
- **Practical tools in action are important** so that opportunities and potential are not missed.



CAWater -Info

www.cawater-info.net/



Thanks to