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BASIN PLAN FOR ASPARA RIVER

Kyrgyzstani part

THE USAID-CAREC PROJECT

STAKEHOLDERS' PARTNERSHIP IN COLLABORATIVE POLICY-MAKING: FOSTERING TRANSBOUNDARY COOPERATION ON SMALL WATERSHEDS IN CENTRAL ASIA

THE ASPARA RIVER BASIN PLAN

(Kyrgyzstani part)

The City of Bishkek, 2015

THE ASPARA RIVER BASIN PLAN
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Aspara riverbed after water intake of Kazakhstan and Kyrgyzstan .

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PREFACE

The proposed draft Aspara River Basin Plan has been elaborated within the framework of the USAID-CAREC Project «Stakeholder Partnership in Joint Policy-Making: Strengthening Transboundary Cooperation in Small Watersheds of Central Asia».

While working on the draft, the authors have utilized available materials on various aspects of economic activities affecting qualitative and quantitative condition of water resources in the Aspara River Basin. Reports on the actual environmental situation in the Aspara Basin as well as the socio-economic situations in the riparian parts of the Kyrgyz Republic (KR) and the Republic of Kazakhstan (RK) have been prepared also. Likewise, the authors referred to the materials of the Aspara River Small Basin Council (SBC) meetings. The register of major issues and challenges within the Aspara River Basin had been developed during the SBC meeting in October 2013 after their careful assessment and prioritizing.

The draft plan is based on, but not limited to, the mentioned above materials.

Water intake of Kyrgyz Respublic.

SECTION 1. BASELINE & PROSPECTIVE ANALYSES (WATERSHED DESCRIPTION)

1.1. PHYSICAL & GEOGRAPHIC CONDITIONS

1.1.1. Climate

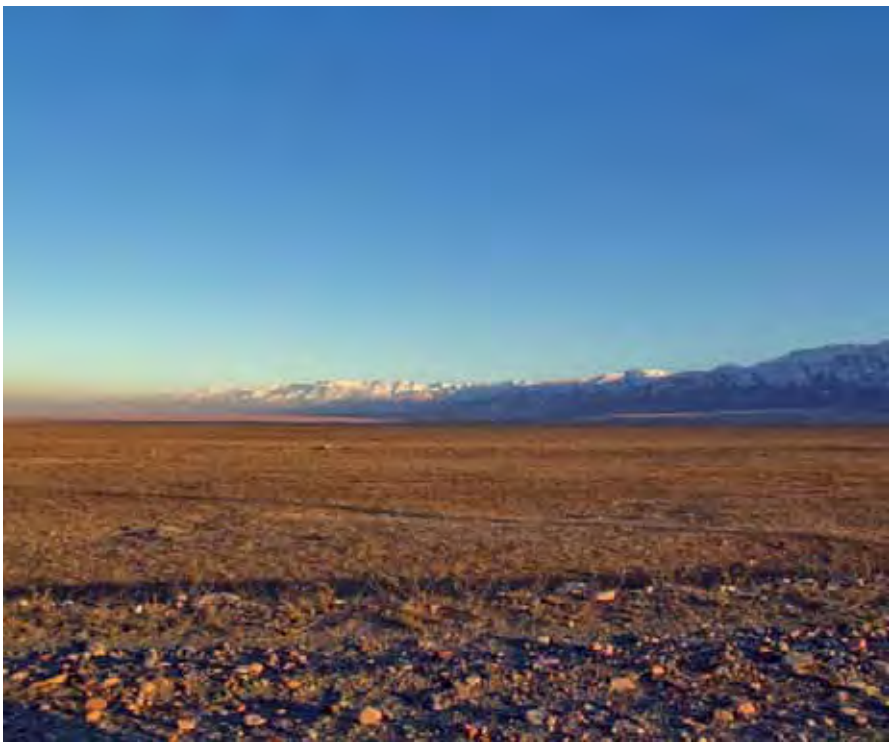
The climate of the Aspara Basin is moderate continental featured by sharp annual and daily temperature fluctuations. For the latitudes, the summer is hot, and the winter is cold. The area is characterized by small overcast, scarce precipitation distributed unevenly throughout the year, and insignificant snow cover, as the result. The approximately equal duration of cold and warm seasons is an essential feature of local climate.

The average annual air temperature is +10,7°C. The lowest temperature is ob-served in January (monthly average of -7°C), and the highest – in July (monthly average of +24,1°C). The absolute maximum is +24,1°C, whereas the absolute minimum is -40°C.

The climate conditions of the Kyrgyz Ridge are determined by its location on the border between moderate and subtropical climatic zones. Climatic regime reflects the nat-ural changes depending on elevation ASL. For example, at 1000m ASL the average annual air temperature usually exceeds +10°C, varies from 1°C to 0°C at 1000-2500m, and is negative above 2500 m.

The winter – which lasts from mid-November to mid-March – is cold with predomi-nantly cloudy weather. Severe winter frost may reach -40°C. Winter precipitation in the form of snow may generate a 1-2m (in lowlands) and >2m (in highlands) snow cover.

The spring – from mid-March until May – brings unstable and primarily



Aspara river valley.

The road from the Bishkek-Merke rout to Cholok Aryk village.

cloudy weather. The temperature fluctuates between 6°C and 25°C. Spring is also the period of the most generous rainfall.

The summer is cool and dry with the air temperature fluctuating between 18°C and 32°C. Summer rainfall is seldom.

The fall is mainly dry with precipitation in the form of both snow and rain, and tem-peratures falling down to -12°C. Annual winds are mainly northern and northwestern with the speed of up to 3 mps. During fall and winter the western winds intensify up to 15 mps.

1.1.2. Hydrology & Hydrography

The Aspara River is a tributary of the Chu River and is included in the group of riv-ers of the northern slope of the Kyrgyz Ridge. The river originates in the Western Tien Shan in the northwest of Kyrgyzstan and flows northwards crossing the border of Southern Kazakhstan towards the Kuragata River. The Merke River Watershed is located on the left-hand side, whereas the Kainda River Watershed finds itself on the right-hand side of the Aspara watercourse. In its natural condition, the Aspara was a tributary of the Kuragata (the Chu tributary). It runs for 108km. The river catchment area is about 1,210 km^2. In its current state, the Aspara Basin may be divided into two areas, i.e.:

- catchment area – going approximately down to Granitogorsk (average catchment elevation 2,890m ASL), and
- dispersion area – below Granitogorsk – also divided into two zones: (i) water intake from the Aspara, (ii) mixed water intake from the Aspara and the Big Chu Canal (BCC) downstream of it.

The riverbed is partially pebble and/or sandy-pebble. The banks are generally flat with meadow and/or shrubby flood plain. As a rule, the Aspara does not freeze during cold season. The highest water levels are observed in April-June due to intensive melting of snow. The total river length is 108km (prior to joining the Kuragata). Further, the latter falls into the Chu. The river basin includes 5 lakes with the total area of 0,07 km^2 and 10 ponds and other water bodies with the total volume of 6,57 mln m^3.

The river is glacier-fed, has multiple tributaries with the total length of about 100 km. The annual river discharge at 75% dryness amounts to 91,8 mln m^3.

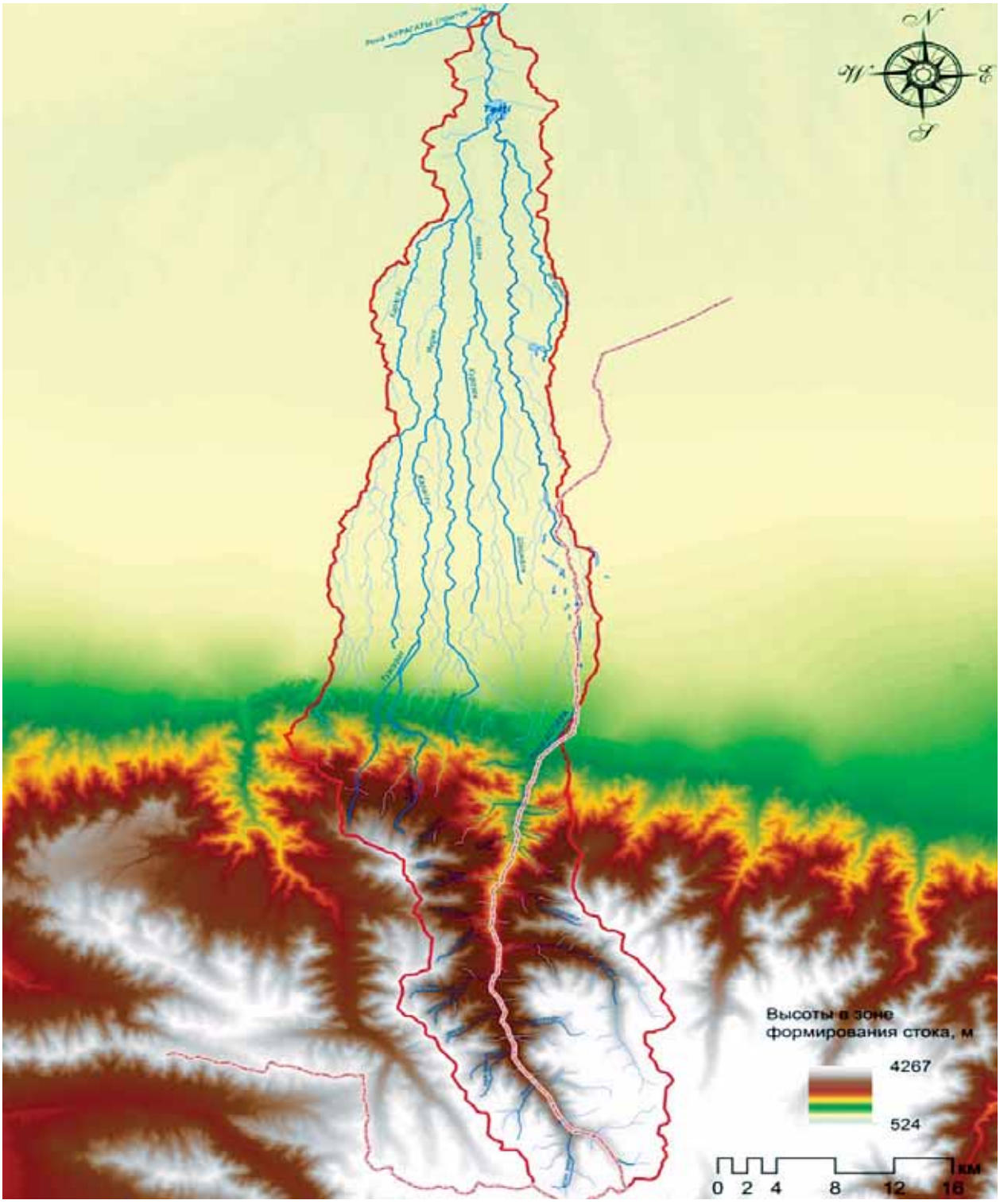
The total area of the Aspara River Basin is 1,318 km^2, including 876 km^2 on the ter-ritory of Kazakhstan and 442 km^2 on the territory of Kyrgyzstan. The river's catchment ar-ea is 458 km^2, including 216 km^2 in the RK and 242 km^2 in the KR. The basin lower reaches cover 860 km^2, including 660 km^2 in Kazakhstan and 200 km^2 in Kyrgyzstan.

The Aspara River's zigzagging bed may reach 7m in width and 0,5-1m in depth. The speed of the current varies in 0,5-8 mps range. According to cartographic data, after crossing the Kazakh border the riverbed per se disappears, fills only with snowmelt water and rain, and falls into the Tatty Reservoir.

The maximum flood conditions are observed in June-July reaching 50 m^3/sec. Flood acceleration is fast depending on the intensity of snow/ice thawing in the mountains (in the spring) and rainfall (in the summer). The river is subject to mudflows. During certain years mud flood torrents generate up to 60,000 m^3 of deposits.

The average long-term water discharge reaches 2,37-4,74 m^3/sec. The river stream speed and depth for low-water (drought) and high-water (flood) conditions range from 1-2 mps and 0,1-1,2m, respectively. The water intake installation is located in the area with the 0,029 inclination in boulder and pebble-boulder deposits with the average size of 55 mm and the maximum – of 500 mm. The annual suspended sediment load is 39,000 m^3, while the bed sediment load comes up to 16,000 m^3.

Formation of landfast ice, anchor ice and sludge may be observed on the river during a short period of time in winter. Water intake from the Aspara River takes place all year round.



The map of the Aspara River Watershed.

1.1.3. Ecosystems & Biodiversity

The whole basin territory demonstrates a steady trend of decreasing natural biodiversity caused by deterioration of flora and fauna habitat conditions. The reasons for that include intensive economic development of land and water resources coupled with the inadequacy of legal, administrative and environmental regulatory measures related to ecosystems' state. To a certain extent, the forest administration in the Aspara upstream area has been attempting to curb the process.

The woods and light forest are presented by shrubbery, mainly of juniper, cade, dogrose, honeysuckle, and hawthorn. Willow and sea-buckthorn shrubs are widely present in the river valleys along with individual elms and poplars.

Significant areas are occupied by gramineous & herb-bunchgrass and gramineous & shrubby dry steppe vegetation, mainly consisting of shrubs and sub-shrubs (ex.: eurotia, tansy, wormwood) and gramineous plants (ex.: meadow grass, sheep fescue, feather grass). The upper zones of slopes are covered with green meadows of columbine, speedwell, violet, etc. Vegetation above 3,100 m is rather scarce represented by saxifrage, lion's pad and other cold-tolerant plants.

1.1.3.1. Soils & Vegetation

Altitudinal zonality is the main principle of highland soil & vegetation cover distribution. Natural vegetation cover is represented by sagebrush-ephemeral semi-desert, wormwood-gramineous and fescue-wormwood steppes, marshy meadows, cane and shrubby thickets (ex.: sea-buckthorn, barberry, dogrose). The foothills, low and medium mountain slopes are occupied by steppe and woodland-meadow-steppe belts with prevailing brownearth, blackearth, blackearth-like, brown, meadow and other soils. The foothills are mostly occupied by sheep fescue steppes, wheat grass and/or herb steppes with grasslands and tall grass meadows following them further up. The soil & vegetation cover is represented by ordinary gray and light brown soils under desert and dry steppe vegetation. At this elevation, the soil & vegetation cover is common and extends down to 0,1-0.3 m below surface. The sunlit mountain slopes are covered with steppe vegetation, whereas shaded slopes are occupied by shrubbery and light forest vegetation. North-exposed slopes (above 1,300 m) usually host shrubbery thickets (ex.: dogrose, meadowsweet, barberry, etc.) and woods. The vegetation here is semi-desert combined with wormwood and wormwood-gramineous associations with ephemeral inclusions. Predominant vegetation background is composed of wormwood-ephemeral and wormwood-saltwort associations. Tall grass is prevailed by sheep fescue, feather grass and wormwood met by ephemerals like awn, barley, leguminous and ephemeroids, such as meadow grass bulbous and sedge. Hollow bottoms and dry beds have sections of meadow gramineous-sedge-grass vegetation and shrubbery. Sublime sections are covered by ephemeroid-wormwood-feather grass

Water intake of Kyrgyz Respublic.

Inter-governmental hydro post .

The head of one of the irrigation canals from Aspara River.

vegetation, including artemisias and common cypress at times combined with petrophyte shrub-wormwood communities. The soil and vegetation cover at this elevation goes down to about 0,1-0,2m deep.

Endemic and natural wood vegetation is not observed on the basin territory. Rare and disappearing as well as natural food and medicinal plants are absent in the impact zone.

1.1.3.2. Wildlife

According to zoogeographic zoning, the basin's territory belongs to the Eastern Tien Shan Zoogeographic Site of the Central Asian Plainland of the Chu-Talas Province. Based on its geographic location and landscape, the Chu-Talas Province is classified as the northern temperate desert zone.

Its fauna is represented mainly by small rodents, birds, reptiles, fish, and insects. The production-affected zone may potentially serve habitat for the following species:

a) **Mammals:** *Rodentia* (field mouse, common mouse, vole, gopher, jerboa, long-eared hedgehog);

b) **Birds**: English sparrow, lark, jackdaw, gray crow, common myna, wagtail, roller, common bee-eater;

c) **Reptiles**: sand lizard, grass snake, steppe viper, copperhead;

d) **Amphibia**: toad, lake frog;

e) **Fish**: Ili marinka, osman

f) **Insects**: locust, mantis, mosquito, common fly, dragonfly.

The table below lists animal/bird species common for the Chu Valley habitats.


Viper usual


A sparrow is a goblin


Locust


Field mouse


Lark


Ground squirrel


Mantes

Types of animals and birds typical for Chui valley

Species	Mid-Mountain Meadow	Mid-Mountain Steppe	Mid-Mountain Dessert	Mid-Mountain Dessert
Mammals	1. Shrewmouse (Tian Shan, lesser shrew, Kyrgyz shrew); 2. Marrow-sculled vole; 3. Mole lemming; 4. Gray hamster; 5. Mice; 6. Tolai hare; 7. Fox; 8. Weasle; 9. Wolf; 10. Common stout; 11. Badger.	1. Fox; 2. Weasle; 3. Field mouse; 4. Wood mouse.	1. Field mouse; 2. 2) Gray hamster.	1. Field mouse; 2. House mouse; 3. Gray hamster.
Birds	1. Gallinaceous (Daurian partridge, chukar); 2. Corncrake; 3. Wagtails (Citrine wagtail, mountain wagtail); 4. Wheatear; 5. Bushchat; 6. Rock thrush; 7. Grasshopper warbler; 8. Sedge warbler; 9. Buntings (pine bunting, rock bunting, long-tailed bunting, red-headed bunting); 10. Linnets.	1. Rock pigeon; 2. Nighthawk; 3. Roller; 4. Hoopoe; 5. Larks (skylark, Indian lark); 6. Nine-killers (Turkestan nine-killer, long-tailed nine-killer, black-headed nine-killer); 7. Stonechat; 8. Wheatears; 9. Rock thrush; 10. Giant rock nuthatch; 11. Buntings (pine bunting, rock bunting, red-headed bunting); 12. Linnet; 13. Rock sparrow.	1. Wheatears; 2. Rock sparrow; 3. Rock pigeon.	1. Larks (skylark, crested lark); 2. Quail; 3. Rock pigeon; 4. Hoopoe; 5. Black-headed nine-killer.

The majority of the listed above species belong to so-called common species that adapted to the anthropogenous zone and maintain stable populations. No seasonal migration routes and/or resting places and, likewise, migrating birds and mammals have been observed on the basin territory. No endemic, rare and/or endangered animals, including these listed in the Red Book of the RK, are present in the basin.

1.1.4. Soil & Land Resources & Changes They Undergo

The land in the Aspara River Basin is irrigated using the water coming from the river and the BCC also originating in the Chu River and crossing the Chu Valley from east to west. The canal begins on the Kyrgyz territory and crosses over to Kazakhstan. The Kyrgyz part of the Aspara River system includes 5,255 ha of allotted irrigated land, including 3,326 + 319 ha of private household gardens of Frunze A/D[1] and 1,610 ha in Kurama A/D. The length of system canals is 32,04 km, including 26,79 km in Frunze A/D and 5,25 km in Kurama A/D (Feed Canal – 1,15km & R-4 Canal – 4,1km). The number of Hydraulic-Engineering Facilities (HEF) amounts to 26, including 24 in Frunze A/D and 2 in Kurama A/D. The number of Hydro Posts (HP) is 24, including 23 in Frunze A/D and 1 in Kurama A/D. The system also feeds two reservoirs: RESERVOIR № 2

1 Translator's note: Ajyl (rural) District.

in Kurama A/D and the Kayin Daily Runoff Pond in Frunze A/D.

Currently, the total area of irrigated land in the Aspara River Basin (excluding the irrigated land below the BCC) is about 9,000 ha, including on the territory of Kyrgyzstan – 3,700 ha, and on the territory of Kazakhstan – 5,300 ha.

The 5,300 hectares in the RK are shared by two irrigation systems: the Aspara Feeding Canal – about 1,000 ha and the Maylybay Canal System – about 4,300 ha.

Moreover, the Kazakhstan part of reclaimed land in the Aspara River Basin includes another 2,500 ha fed by the BCC water. Some land in the Kyrgyz part of the basin is also irrigated using the water from the BCC.

Based on different sources, the land in the Kazakhstan and Kyrgyzstan parts of the Aspara River Basin should be classified as follows:

- irrigated land which may be reclaimed (potential),
- irrigated land which had been reclaimed, and
- irrigated land which is actually irrigated.

In addition to irrigated land the watershed also has non-irrigated (bogharic) land, which is also included in the total registered irrigated farmland.

According to the data of Merke District Statistics Department, in 2012 the farmland area of the Republic of Kazakhstan above the BCC amounted to 7,100 ha of which 5,300 ha were irrigated (and only 4,100 ha of which had been reclaimed) plus the 1,800 ha of bogharic land. In the same year, the farmland area of the Kyrgyz Republic in the Aspara Basin was estimated at 10,600 ha of which about 5,300 ha were irrigated (of which only 3,700 ha had been reclaimed).

Distribution of irrigated land and the Aspara River discharge

Indicator	Units	Kyrgyzstan	Kazakhstan	Total
Aspara River allotted irrigated land	ra	3700	5300	9000
Distribution of Aspara River allotted irrigated land	%	41	59	100
Distribution of Aspara River allotted irrigated land as per 1948 Provision	%	38	62	100

2012 GIS-Specification of Land Irrigation in the Aspara River Basin

Aspara River Basin Zones	GIS-Specification [9] (thousand ha)	Irrigation Area According to Available Data (thousand ha)
Aspara right bank above BCC (Kyrgyzstan)	3,06	Based on data of Tarazvodkhoz*, reclaimed area 3.7, irrigated area is smaller
Aspara right bank below BCC (Kyrgyzstan)	2,34	No data but there are Muminov's general data on reclaimed land area in the Kyrgyz part of the basin (5,3); if so, the area below BCC is 5,3 – 3,06 = 2,24
Aspara left bank above BCC (Kazakhstan), including:	5,25	According to zone linear chart, design area above BCC is 5,3; according to Muminov's data it is 5,31
• Maylybay Canal System	4,36	According to zone linear chart, design area above BCC is 4,3
• APT System	0,89	According to zone linear chart, design area above BCC is 1,0
Aspara left bank below BCC (Kazakhstan)	2,41	According to zone linear chart, design area below BCC is 2,5

** Translator's note: Taraz Water Management Administration.*

1.1.5. Analyses of water resources availability & demand and the potential shift in water use by sectors, including on the interstate level

Complete data on water resources of the Aspara River Basin are not available. There are data on water consumption during the last 5-10 years, but the total discharge data are missing. Discharge data may be collected using the equipment installed under the project in May, 2014. The overall situation may be described as irrigation water deficiency during dry years.

1.1.6. Water management infrastructure, management bodies and stakeholders

Panfilov District Water Management Department (Aspara Hydro District) – the subordinate division of *Chu Water Management Basin Department* – is responsible for operating the existing water management infrastructure. The following table lists existing water management facilities in the Aspara Hydro District.

STATE IRRIGATION FUND for Panfilov WMD as of January 1, 2014

№	Title of canal & respective facilities	Feed. source	Alloc. area, ha	Year of com-mis.	Canal leng., km	incl. lined, km	Capac., m^3/sec	Technical condition			Funds required for repair, som
								Sa-tisf.	Unsa-fisf.	Re-quires cap. rep.	
	ASPARA HYDRO DISTRICT										
	DRP in the Kayin Narrow Aspara		1	1974		нал-н			1	1	2000,0
9	**Kenzhebay (canal)**	**T-Bulak**		**1972**	**0,44**	**0,44**	**1**		**0,44**	**0,44**	**3820,5**
	Hydro facilities								2	2	300,0
	Hydro posts								2	2	300,0
	Bridges and passages							1			
10	**Chon (canal)**	**Aspara**		**1931**	**1,1**	**1,1**	**7**	**0,9**	**0,2**	**0,2**	**150,0**
	Hydro facilities		3					3			
	Hydro posts		2					2			
	Bridges and passages		0								
11	**Verkhniy (canal)**	**Aspara**	**2071**	**1949**	**16,2**	**16,2**	**4,0**	**13,0**	**3,2**	**3,2**	**50,0**
	Hydro facilities		15					13	2	2	200,0
	Hydro posts		15					10	5	5	200,0
	Bridges and passages		5					5			
12	**Vyselskoy (canal)**	**Aspara**	**843**	**1985**	**6,7**	**6,7**	**2,8**	**5,2**	**1,5**	**1,5**	**150,0**
	Hydro facilities		3					3			
	Hydro posts		3					3			
	Bridges and passages		2					2			
13	**Novo Mamaysky (canal)**	**Aspara**	**412**	**1985**	**2,786**	**2,79**	**0,7**	**1,8**	**0,986**	**0,986**	**60,0**
	Hydro facilities		3					3			
	Hydro posts		3					3			
	Bridges and passages		0								
	Aspara Hydro District TOTAL:		**3326**		**27,226**			**20,9**	**6,326**	**6,326**	**4230,5**
	HEF TOTAL:				**24**			**22**	**4**	**4**	**500,0**
	HP TOTAL:				**23**			**18**	**7**	**7**	**500,0**
	Bridges TOTAL:				**7**			**8**	**0**	**0**	**0**
	Water Bodies TOTAL:				**1**			**0**	**1**	**1**	**2000,0**

On the opening of the inter-governmental water measuring system on Aspara River.

1.1.7. River water pollution sources & changing trend

Water quality monitoring in the Aspara River Basin is ongoing. There are single-time data on joint analysis with the Kazakhstan side executed in 2013, however, their use cannot be valid.

1.1.8. Basin databases & land use maps

The effort to create the river basin and land use maps is the primary step in developing the basin plan. The corresponding GIS-maps had been executed within the framework of the project and will be transferred to operator organizations and SBCs.

«Verhniy» irrigational canal .

Hydro post for water flow and water quality measurement .

SECTION 2. ANALYSES OUTCOMES, RISK ANALYSES & PROSPECTS

2.1. THE IMPACT OF CLIMATE CHANGE ON RIVER WATER RESOURCES & EMERGENCY RISKS

The observations and the analysis of the Aspara River hydrological dynamics carried out by the ICWC SIC at the Granitogorsk Post in the course of several years point to the downward trend of average annual, vegetation and intra-vegetation water discharge as well as changes of its intra-annual distribution. Based on the Granitogorsk Post data, up to 1960 the average discharge in the Aspara amounted to 3,41 m^3/sec. During 1960-2012, it fell by 12% down to 2,99 m^3/sec. Before 1960, the estimated average discharge during vegetation period (April-September) was 5,46 m^3/sec; after 1960 – 4,9 m^3/sec (10% reduction). The greatest decrease of 19% was observed during the intra-vegetation period (October-March). After 1960, the mean October-March discharge amounted to 1,09 m^3/sec. It should be highlighted that water discharge for 1989-1991 had not been taken into account during this evaluation due to lack of data.

Comparison of high-water (1927-1936) and low-water (2003-2012) decades revealed a flood peak shift from July to June with the maximum monthly discharge drop of 20%. At the same time, the July-August discharge fell considerably against the insignificant growth in April-May. The annual discharge dropped from 3,64 m^3/sec (1927-1936 mean) to 3,05 m^3/sec (2003-2012 mean). The depth of average monthly discharge drops compared to annual discharge reduction during dry years increased also.

It may be assumed that the overall water discharge reduction, the shift in intra-annual records, and the discharge drop during low-water years observed in the Aspara during the 83 years of monitoring are the aftermath of the climate change.

Taking this hypothesis as a basis, it may be possible to calculate the climate change related losses of the vegetation discharge, which is almost completely utilized for drinking and irrigation purposes. For dry years (90% dryness) vegetation discharge losses amount to 13.9 mln m^3; for medium-dry years they come up to 15,0 mln m^3; and for abundant years (10% dryness) – they are 27,5 mln m^3. The intra-vegetation losses – which are used for drinking and can be additionally used for irrigation in case of storing in reservoirs – amount to 4,3 mln m^3 for low-water years (90% dryness), 3,8 mln m^3 for medium-dry years, and 6,5 mln m^3 for high-water years (10% dryness). While comparing the periods of 1927-1936 and 2003-2012, the significant delta shift between losses during especially dry and medium-dry years – which may be considered the reason for (or the risk of) recently increasing severity of water deficit during especially shallow years – beats the drum.

2.2. THE IMPACT OF CLIMATE CHANGE ON WATER USE IN DIFFERENT SECTORS OF ECONOMY

Based on ICWC SIC calculations, the estimated fall in water supply to the fields caused by climate change during shallow (90% dryness) years amounts to 9,8 mln m^3, 10,5 mln m^3 – for medium-dry years, and 19,3 mln m^3 – for water-abundant (10% dryness) years. This means that 1,950 ha of irrigated land will not get water in a shallow year, 2,100 ha – in a medium-dry year, and 3,850 ha – in a high-water year (with the 0.7 standard irrigation systems OIR, 5,000 m^3/ha standard supply, and data comparison for 1927-1937 and 2003-2012 periods).

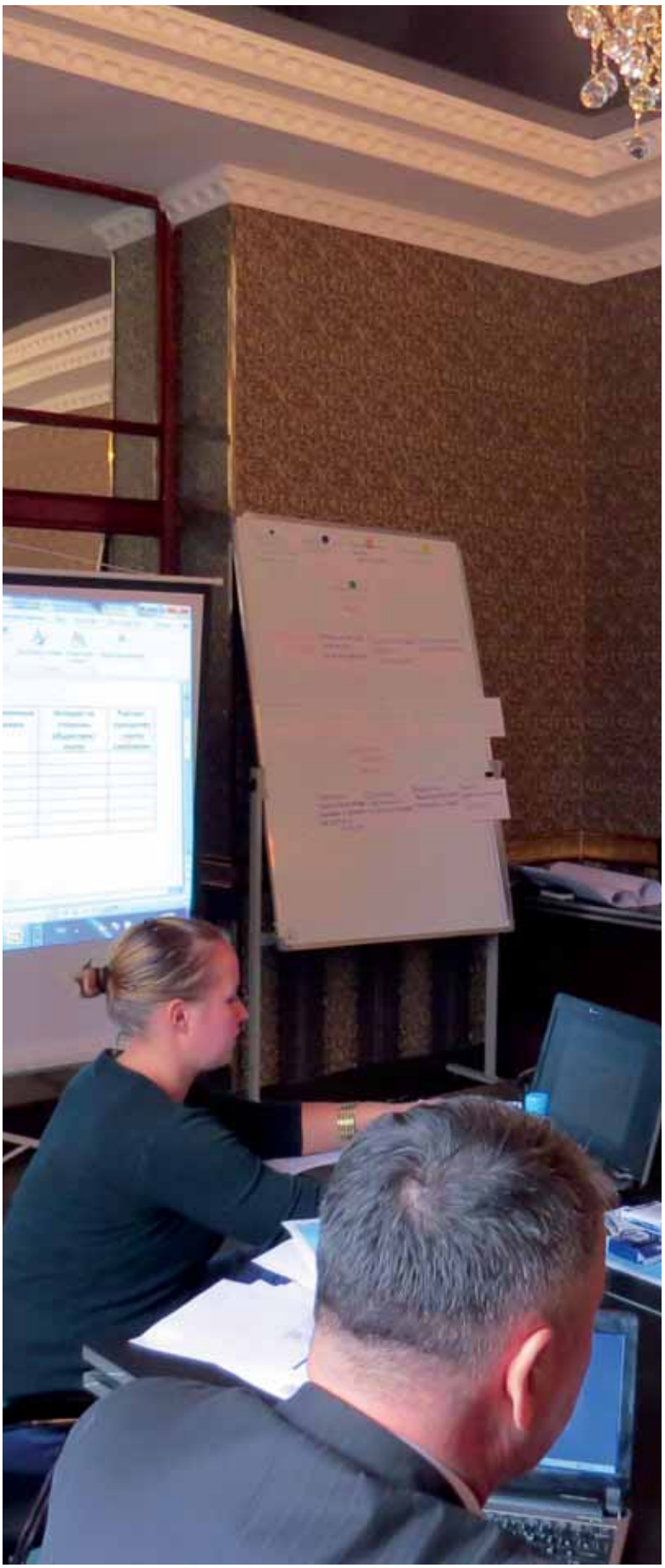
2.3. IDENTIFICATION OF PRIORITY ISSUES

In October, 2013 in Bishkek, during the last (2nd) meeting held to identify most urgent basin issues the members of the Small Basin Council (Kyrgyz side) emphasized the utmost importance of addressing the following issues:

1. Lack of drinking water – 14;
2. Shortage of irrigation water – 15;
3. Pollution of the riverbed – 10;
4. SBC institutional development – 10.

As can be seen from the rating above, the issues of irrigation and potable water shortage have the highest priority. Absence of water and water management balance for the Aspara River in the reports serves ground for doubting the reliability of priority rating. There are sufficient reasons to believe that priority rating was biased by environmental status-quo (ex.: lack of water, drought) as well as artificial issues related to poor irrigation infrastructure operational indicators and interventions' inconsistency.

To some extent, the inclusion of the issue of building the capacity of the SBC – the body working towards adopting water resources management recommendations with the account of all water users' interests – in the top priority list is justified. The issue of the riverbed pollution was rated as the fourth most significant one.



Small Basin Council meeting on problems prioritization in Kyrgyzstani part of Aspara river basin.

SECTION 3. THE ASPARA RIVER BASIN DEVELOPMENT SCENARIOS

3.1. BASIN VISION

70-80% of the river basin population are supplied with quality potable water.

The automated water accounting is in place.

The forecasts re dryness for crops and land planning purposes for each vegetation period are made based on collected river water discharge data.

Irrigation norms are being observed. New irrigation water-efficient technologies (ex.: drip and sprinkling irrigation, etc.) are being introduced.

Environmental awareness-raising and educational efforts are ongoing.

Inter- and intra-farm irrigation canals/ networks are being rehabilitated and maintained. The overall irrigation system OIR has increased by 30-40%.

3.2. WATER ISSUES WITHIN POTENTIAL DEVELOPMENT SCENARIOS IN THE CONTEXT OF CHANGE

In order to cover irrigation water deficit during vegetation period in the Aspara Basin it is planned (initiative of Kazakhstan) to build the *Aspara Seasonal & Daily Run-Off Reservoir* with the 25-30 mln m^3 (according to different sources) capacity.

The purpose of the reservoir would be to accumulate river water in the fall and winter periods and then release it during vegetation. The reservoir is planned to have the status of interstate significance. It should be noted that, according to Kazakh experts – whose opinion is also supported by Kyrgyz specialists – the decision to build the reservoir is premature and lacks rationale, as there is no real need for it. The strongest argument against the project is that, considering the water resources available in the basin, the designed reservoir bowl will not be filled.

The SIC calculations show that in order to be able to dam intra-vegetation discharge of the Aspara River the reservoir useful capacity should be 21 mln m^3. In case of seasonal damming and filling during the vegetation period this capacity would be utilized 100% during high-water years, 85% – during medium-dry years, 70% – in shallow years. Thus, the damming volume would amount to 21 mln m^3 in high-water years, 18 mln m^3 – in medium-dry years, and 14 mln m3 in low-water years. These are the respective volumes of potential water intake increase from the river during vegetation.

Thus, the fields could be supplied with additional 14,7 mln m^3 in high-water years, 12,6 mln m^3 – in medium-dry years, and 10 mln m^3 – in low-water years. Based on the irrigation norm of 5,000 m3 per 1 ha, in terms of irrigated land these figures correspond to 2,900, 2,500, and 2,000 ha, respectively.

Because of climate change observed in the Central Asian region, the reporting decade is characterized by snowpack decrease in the Aspara River Basin. Due to increased water discharge, the areas that lost their snow cover were substituted with bare rock and bed eroded land. The same reason caused water surface of mountain lakes to increase.

The warming also resulted in the reduction of Alpine vegetation replaced by subalpine herbal belt. Fir and juniper groves in the upper zone of the belt were substituted with subalpine herbs. The lower sections of the belt are being increasingly occupied by deciduous trees and bushes whose growth is stimulated by decreased cattle grazing load, in its turn, caused by the considerable drop in livestock population.

The belt of deciduous trees and bushes has significantly expanded due to extensive introduction of juniper in the upper zone of the belt. Juniper has also absorbed the lower zone of the belt previously inhabited by semi-bush, meadow herbs and dense steppe herbage.

3.3. SHORT-, MEDIUM- & LONG-TERM ACTION PLAN & MEASURES

Objectives	Measures	Executor	Deadline	Funding source
Improving access to potable water for basin population	*Repair of potable water supply system in the village of Cholok Aryk*	Ajyl Okmotu[1], SBC, population, RPWUA[2], Ajyl Kenesh[3]	2014-2015	International donors, population, local budget, national budget
	Installation of disinfection units to ensure supply of quality potable water to Cholok Aryk and Chaldovar communities	RPWUA, Ajyl Okmotu	2014-2015	International donors, population, local budget, national budget, local Kenesh
	Rehabilitation of 7 deep wells in the village of Chaldovar to improve access to potable water	RPWUA, Ajyl Okmotu	2014-2017	International donors, population, local budget, national budget, local Kenesh
	Replacement of water distribution infrastructure in the village of Chaldovar	RPWUA, Ajyl Okmotu	2014-2017	International donors, population, local budget, national budget, local Kenesh
Enhancing water use efficiency and condition of irrigation systems	*Scheduled and capital repair of intra- and inter-farm canals (Chon, Verkhny, Vyselskoy)*	WMD, WMO, Regional Water Administration, Ajyl Okmotu, farms and household farms	2014-2024	International donors, population, local budget, national budget, local Kenesh
	Creating a database for water use calculation	PDWMD, Vita Ltd.	2014-2015	PDWMD[4], international donors, national budget
	Fitting irrigation system with automatic water accounting equipment	PDWMD, Vita Ltd.	2014-2015	PDWMD, international donors, national budget
	Development of water use plans	PDWMD	2015-2016	PDWMD, Ajyl Okmotu
	Building local population capacity on water-efficient irrigation technologies	Ajyl Okmotu, PDWMD, WMO, Agrarian Development Department, TAIC[5]	2014-2024	Local budget, donors
	Creating a pilot site to demonstrate modern irrigation technologies and train farmers	Ajyl Okmotu, PDWMD, BWMD[6], Ministry of Agriculture	2015-2020	International donors, national budget

1 Translator's note: local governance body.
2 Ibid: Rural Public Water User Association.
3 Ibid: Representative local governance body.
4 Ibid: Panfilov District Water Management Department.
5 Ibid: Public Foundation "Training, Advice and Innovations Center".
6 Ibid: Basin Water Management Department.

Improving socio-economic wellbeing of the population and curbing population urban migration	*Creating new workplaces (agricultural produce processing shop)*	Ajyl Okmotu, District State Administration, Agrarian Development Department	2015-2020	International donors, local budget
	Enhancing local leisure opportunities (installation of children playgrounds, opening a kindergarten/outdoor sport grounds)	Ajyl Okmotu	2014-2016	Local budget, sponsors, local population, national budget
	Setting up and expanding ecotourism along river upper stream	Ajyl Okmotu, local population, hunting farms	2015-2020	Local budget, international donors
Improving public environmental awareness	*Carrying out educational and informational seminars on environmental issues for local population*	Ajyl Okmotu, District State Administration, Sanitary Epidemiological Service, EcoTech-Inspection, Ministry of Emergencies, District Department of Internal Affairs	2014-2024	Nature Protection Fund, local budget
	Visual propaganda	Ajyl Okmotu	2014-2024	Local budget
	Engaging school students and young people in environmental issues: holding open workshops, extra-curricular classes, organizing "green patrols"	Ajyl Okmotu, District Education Department, District State Administration	2014-2024	Local budget, Nature Protection Fund
Enhancing overall environmental situation in the Aspara River Basin	*Purchasing special vehicles for garbage collection*	Ajyl Okmotu	2015-2020	Nature Protection Fund, international donors
	Installation of garbage containers	Ajyl Okmotu	2015-2020	Nature Protection Fund, international donors

SECTION 4. BASIN PLAN IMPLEMENTATION & MONITORING MECHANISMS

It appears necessary to include this issue in the authority of the Aspara River Small Basin Council. The SBC resolution may be executed within the framework of corresponding assignment to responsible body (its territorial division).

Likewise, it appears expedient to include the Aspara River SBC in the Chu river Basin Council. This will allow addressing potential issues with the account of local (region-level) needs as well as responding to potential financial challenges using regional budget funds.

In the future, it is also necessary to ensure sufficient financial support of activities planned for execution by the SBC. To some extent, the necessary means may be allocated from the budgets of concerned territorial executive authorities of local as well as national levels. Attraction of financial resources from the private sector, international organizations and donors also appears expedient.

Chairman of Kyrgyzstani part of Small Basin council, Mr. Davletov Kanat .

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