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Regional Technical Assistance: Improved Management of Water Resources in Central Asia

Prepared by

For Asian Development Bank

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Asian Development Bank



ADB RETA 6486-REG

**Improved Management of Water
Resources in Central Asia**

**Report on Improved Management of Water Resources in
Central Asia Project**

Under Activity 3: Support of Chu-Talas Water Commission

Bishkek-Taraz 2013

ABBREVIATIONS

ADB	Asian Development Bank
WUA	Water Users Association
AMP	Administrative- Management Personnel
ARNM	Agency on Regulation of Natural Monopolies (Kazakhstan)
BWI	Basin Water Inspection
BWMA	Basin Water Management Authority (Kyrgyzstan)
BWRA	Basin Water Resources Authority (Kyrgyzstan, Kazakhstan)
BWA	Basin Water Authority (Kazakhstan)
BWC	Basin Water Council
WB	World Bank
GWP	Global Water Partnership
HPP	Hydro-Power Plant
SAEPF	State Agency of Environmental Protection and Forestry (Kyrgyzstan)
DWRA	Department of Water Resources and Amelioration (Kyrgyzstan)
UNECE	Economic Commission for Europe
EU	European Union
PU	Public Utility
IMS	Information Management System
IWRM	Integrated Water Resources Management
CWR	Committee for Water Resources (Kazakhstan)
KR	Kyrgyz Republic / Kyrgyzstan
MFA	Ministry of Foreign Affairs (Kyrgyzstan, Kazakhstan)
ME	Ministry of Emergency (Kyrgyzstan, Kazakhstan)
MA	Ministry of Agriculture (Kazakhstan)
MAA	Ministry of Agriculture and Amelioration (Kyrgyzstan)
MEPWR	Ministry of Environment Protection and Water Resources (Kazakhstan)
MES	Ministry of Education and Science (Kyrgyzstan)
NGO	Non-Governmental Organization
OSCE	Organization for Security and Cooperation in Europe
SPNR	Specially Protected Natural Reservation
ISF	Irrigation Service Fees
IWRMP	WB Improved of Water Resources Management Project
RK	Republic of Kazakhstan/ Kazakhstan
DWMA	District Water Management Administration
RECCA	Regional Ecologic Center of Central Asia
SDC	Swiss Agency for Development and Cooperation
AWUC	Agricultural Water Users Cooperative
MM	Mass Media
SES	Sanitary and Epidemiological Station
ToR	Terms of Reference
CHP	Combined Heat and Power Plant
ISA	Irrigation System Authority
MOM	Management, Operation and Maintenance
CAR	Central Asian Region
FAO	Food and Agriculture Organization
FWUA	Federation of Water Users Associations
CTWC	Chu-Talas Water Commission

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INTRODUCTION

Joint water resources use of transboundary basins is one of the key directions of regional cooperation of Central Asian countries. This is predicated by dependence of most sectors of economy and environment on availability of proper fresh water supply in the natural sources and their rational use. During the last decade, there were trends of water ecosystems' degradation, increase in water resources deficit, their irrational use and pollution in the region. Risks of strengthening of these threats due to further growth in water use require adequate reaction of the national water and conservation bodies of Central Asian countries, including better coordination of cooperation between them. Experience in international water partnership witnesses that establishment of the joint basin institutions, for instance, multilateral commissions might be an efficient mechanism of such cooperation.

«Agreement between Governments of Kazakhstan and Kyrgyzstan on use of interstate water structures in the Chu and Talas Rivers» signed in 2000 provided a legal basis for establishment of bilateral Commission to regulate joint water activity in the stated basins.

This Commission was successfully established in 2006, to a large extent, thanks to assistance of international agencies. Particularly, during the period from 2003 to 2013 considerable organizational, financial and methodical help was provided by Economic Commission for Europe (UNECE), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), European Union and Organization for Security and Cooperation in Europe (OSCE), Swiss Agency for Development and Cooperation (SDC) and other donors. Asian Development Bank (ADB) in the course of 2005-2007 under RETA 6163 Improved Management of Shared Water Resources in Central Asia Project had considerably contributed to establishment of the Commission, operation of its permanent Secretariat and expert working groups at initial stage. After 2007, support to the Commission's activity continued as a part of ADB RETA 6486-REG Improved Management of Water Resources in Central Asia Project.

This report provides main outcomes under Component 3: «Support of Chu-Talas Water Commission» of the Project and directed at implementation of the following key tasks:

- (i) Improvement of institutional-legal basis;
- (ii) Improvement of technologies of accounting and planning of water resources use;
- (iii) Elaboration of IWRM plan for the Chu and Talas Rivers basin;
- (iv) Improvement of cooperation in conservation, monitoring and data exchange

Final materials of stated tasks are provided in more detail in reports on activity of Commission's Secretariat and 4 expert working groups with representatives of both countries. This fruitful experience in uniting efforts of the executive agencies of Kazakhstan and Kyrgyzstan, international organizations and donors on development of Commission's activity is an example of efficient cooperation and might be interesting for neighboring countries for contagion to other transboundary basins.

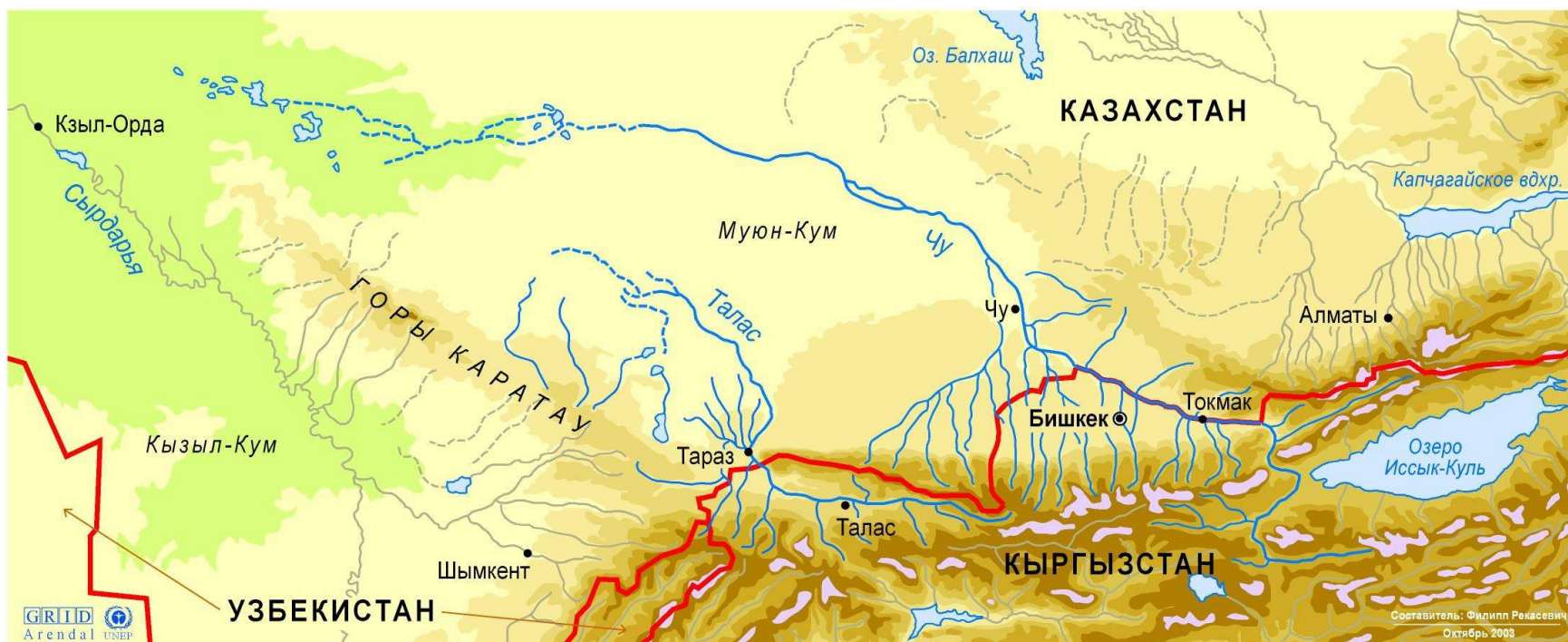


Figure 1. Map of Chu and Talas basins

1. Review of state and development prospects of water use in the Chu and Talas Rivers basins

A. Characteristics of basins

1. The Chu and Talas Rivers basins are located in the northern part of Tien Shan mountain and the east edge of Turan lowland (Figure 1), on Kyrgyzstan's border (further – Kyrgyzstan) and Kazakhstan (further - Kazakhstan). Climate in basins is continental and as elevation lowers changes from 2400 to 600 m in Kyrgyzstan and 600 to 500 m in Kazakhstan. For both basins variety of natural conditions is common typical to high-mountains and mountain-steppes (Kyrgyzstan), mountain-steppes, and desert-steppes and deserts (Kazakhstan).

2. In Jambyl oblast of Kazakhstan, over 1009 thousand people live in both basins. In Kyrgyzstan in 3 oblasts of Chu River basin population is over 800 thousand, in Talas oblast – more than 200 thousand. Density of population in Chu basin is considerably high in comparison with Talas basin.

Urban population in Chu basin and in Kazakh part of Talas basin is more than a half of total number, in Talas oblast of Kyrgyzstan – about 25% of total number. There is an excess in labor force everywhere owing to subemployment, including in rural area. In recent years, trends in population stabilization in Jambyl and Talas oblasts and increase in migration inflow in Chu oblast were observed.

3. Total area of the Chu River basin is 62.5 thousand km², including 26.6 thousand km² (42.5%) within Kyrgyzstan and 35.9 thousand km² (57.5%) within Kazakhstan. Length of the Chu River is 1067 km, including 336 km – in Kyrgyzstan. Total area of the Talas River basin is 52.7 thousand km², including 11.43 thousand km² (21.7%) within Kyrgyzstan and 41.27 thousand km² – within Kazakhstan. Length of the Talas River is 661 km, including 217 km – in Kyrgyzstan. Long-term average annual water rate of the Talas River is about 27.5 m³/s, the Chu River – about 70 m³/s.

4. Irrigated area within Kyrgyz basin of the Chu River is about 330 thousand ha in Chu oblast and about 33 thousand ha – within Naryn and Issyk-Kul oblasts, within Kyrgyz basin of the Talas River- 115 thousand ha. Total irrigated area in Kazakhstan in both basins is about 231.4 thousand ha within Jambyl oblast and 1.3 thousand ha within South-Kazakhstan oblast.

5. Agricultural sector has a leading position in the economy of both countries within basins. Products of crop farming from irrigated area, waterlogged pastures, water meadows and haylands in last years have been consistently more than 2/3 of total agricultural production. However, after 1991 new irrigated and bogharic arable and irrigable lands have not been developed, part of previously reclaimed land was not annually used.

6. Sector of industry in both basins is represented mainly by mining, processing of agricultural products and enterprises of construction industry. In Jambyl oblast, chemical and fertilizer enterprises also play significant role. Chu oblast is most developed industrial region of Kyrgyzstan with relatively high production of food, construction and other products. After long depression, there were a slight growth of industrial production and intense development of service sector in recent years.

7. Total water power in Chu basin is 360 thousand kW, in Talas basin – 354.3 thousand kW and is used in quite small portion, mainly, as part of cascade of small HPPs in Chu valley of Kyrgyzstan. In even lands of Kazakhstan, there are no conditions for construction of hydropower objects; therefore, power is supplied mainly from Jambyl SDPP. Power supply to Chu and Talas oblasts of Kyrgyzstan is based on Lower-Naryn HPP cascade, as well as Bishkek CHP.

8. State of environment in both basins is predicated by particularities of the natural-climatic conditions, anthropogenic impact and in the last decade is characterized by the relative stability. Moreover, there is general reduction in natural biodiversity due to worsening of flora and fauna habitation. Detailed analysis of environment state is given in Section 3.D of this report.

9. Main problems related to adverse water impact in Kyrgyz part of basins are intense water erosion of lands with considerable slope, mudflow and landslides in piedmont valleys, deformation of riverbed during the flood, as well as impoundment of the objects of subsistence infrastructure in the area of ground water seepage.

10. In Kazakh part of basin, there is reduction in ecologic discharges into the lower reaches of the Chu and Talas Rivers causing degradation of lake-pond systems, alluvial land, meadow and hayland. Lands unfavorable in terms of reclamation and exposed to desertisation in the northern even land amount to more than a half of land resources suitable for economic development.

11. Current quality of surface and ground water resources in basins, in whole, is considered as satisfactory. At the same time there is a minor excess of various components of pollutants in the natural water sources in comparison with limits. In surface flow, there are previously outward constituents – phenol, zinc, copper, fluoride, petroleum, etc. Main sources of water pollution are the domestic and livestock flows, mining and processing enterprises, as well as vehicles. Wastes of mining industry, especially with radioactive and toxic substances constitute a major hazard.

12. Over the last years, trends in growth in population morbidity depended on deterioration of drinking water quality have not been traced up. Nevertheless, maintenance of protective area of drinking water has deteriorated everywhere.

B. Water resources

13. Water resources of Chu and Talas basins are formed from the surface, ground and return waters. According to the surveys conducted in 1960-80th, long-term average annual water resources of the Chu River basin amount to 6.64 km³, the Talas River basin – 1.62 km³. Recent estimates confirm their accuracy with annual deviations not exceeding $\pm 6\%$. Opinions of water agencies of Kyrgyzstan and Kazakhstan are in harmony with each other on necessity to clarify this estimation basis for planning of interstate water apportioning.

14. Total resources of seepage flow sources of «Karasu» type in Kyrgyzstan in the Chu River basin are about 1.29 km³/year, in the Talas River basin – about 0.1 km³/year. Annual average return water in Kyrgyzstan in the Chu River basin is about 0.81 km³, in the Talas River basin – 0.26 km³. Return water in Kazakh side of the Talas River is about 1-1.2 km³/year, in of the Chu River basin – not credibly identified and is subject to updating.

15. Fresh ground water within both basins is also explored insufficiently. Its resources in 4 deposits in Talas oblast amount to about 228 thousand m³/d, though predicted indicators exceed 925 thousand m³/d. Similar resources of Talas-Assa deposit in Jambyl oblast estimate at 381 thousand m³/d. In Chu artesian basin in Kyrgyzstan, fresh ground water amounts to 3255 thousand m³/d, predicted indicators estimate at about 5900 thousand m³/d. In Kazakh part of the Chu River basin, approved ground water resources are less considerable and account for 100 thousand m³/d. At present, at least 15% of forecast ground water resources are used.

16. Current assessment of surface water resources in both basins might be admitted, in whole, as valid but fresh ground and return water resources are subject to updating.

17. Water resources between Kyrgyzstan and Kazakhstan are distributed:

- In the Talas River region, in accordance with «Regulation on flow division in the Talas River basin» dated 31.01.1983 and additional Protocol of 18.07.1983. According to these documents, water resources of this basin amounting to 1.616 km³/year in section of Kirov reservoir are subject to division between the both Parties on parity basis - 50% to 50%;
- In the Chu River region, in accordance with «Regulation on flow division in basin of the Chu River» dated 24.02.1983 and additional Protocol dated 18.02.1985. According to these documents, water resources of basin amounting to 6.64 km³/year, are subject to division in ratio of 58% for Kyrgyzstan and 42% for Kazakhstan. Additional Protocol specifies conditions of water use by both countries in the Chu River, starting from its head, i.e. upstream Orto-Tokoi reservoir, up to the border section.

18. Both countries adhere to official position witnessing that mentioned conditions of water apportioning meet the interests of the both parties and should be followed in the near future.

19. Water use in irrigated agriculture in both basins mainly depends on annual precipitation and irrigated land use. For Talas oblast of Kyrgyzstan, it is characterized by reduction of irrigation water supply from 0.82 to 0.61 km³/year from 1990 to 1995, with subsequent slight growth up to 0.636 km³ in 2009.

In Chu oblast of Kyrgyzstan, irrigation water supply reduced from 2.3 to 1.6 km³/year during 1990-95, and in 2009 were 0.77 km³/year. In Jambyl oblast of Kazakhstan, related to both basins, irrigation water supply had also reduced in this period 2.00 to 1.79 km³/year. Decrease in water use might be explained not only by climate change and reduction of agricultural production, but by inadequacy of official statistics.

20. Based on various predictive estimates, considering the national programs of social-economic development, recovery of water use to the level of 1990 is expected in the Chu and Talas rivers basins in between 2015 and 2020. Further gradual increase in water resources deficit is expected owing to increase in water demand. Therefore, today it is reasonable to plan and take preventive measures on protection and rational use of surface and ground waters in both basins.

C. Irrigation infrastructure

21. In both basins in the course of more than 70 years, branchy irrigation and drainage network was formed. In Jambyl oblast of Kazakhstan, list of main irrigation objects includes

35 reservoirs, including 3 large, with capacity over 30 mil m³, 11 water intakes, 34 state irrigation systems, with inter-farm canals of 1330 km total length, on-farm canals - 4710km. At the same time, in the lower reaches of the Chu River in South-Kazakhstan oblast, there are 8 small reservoirs with total capacity of more than 13 mil m³. In Kyrgyz part of the Chu River basin, there are 3434 water intakes and distribution structures, inter-farm canals of 1629 km total length and 52306 km on-farm canals. In Talas oblast of Kyrgyzstan, Kirov reservoir, more than 640 water intake and distribution structures, inter-farm canals of 721km total length and 2208km on-farm canals are located. Collector-drainage network (KDS) is formed in Jambyl oblast on 35.87 thousand ha of irrigated land, in Chu oblast - on 118.3 thousand ha, in Talas oblast - on 6.2 thousand ha.

22. Technical state of water objects, especially on-farm I&D network is considered as unsatisfactory. This is predicated mainly by induced deficit of investments allocated by both countries for repairs and upgrade of infrastructure after 1991. Moreover, in the recent years gradual increase of annual investments for rehabilitation of irrigation systems, mainly at the expense of external credits and donor support have been traced up.

23. Strategic interstate objects are located in Kyrgyzstan and include:

(a) in the Chu River basin:

- 470 mil m³ Orto-Tokoi reservoir of 275 m³/s capacity, serving 120 thousand ha of irrigated area;
- Bypass Chu canals of 40 km total length with 70 m³/s capacity, serving 88 thousand ha of irrigated area;
- Western Big Chu Canal of 147 km length of 55 m³/s capacity, serving 85 thousand ha of area;
- East Big Chu Canal of 97 km length, of 55m³/s capacity, serving irrigated area of 41 thousand ha;
- Chumysh control structure with 665 m³/s capacity, serving 41 thousand ha of irrigated area;

(b) in the Talas River basin:

- 550 mil m³ Kirov reservoir of 390m³/s capacity, serving 197 thousand ha of irrigated area.

24. Agreement of operation of irrigation objects given in Item 23, as well as equitable participation in their O&M is a matter of bilateral interstate cooperation. Therefore, rehabilitation of technical state and efficient safe functioning is priority for the both countries.

D. Regulatory basis

25. Key enactments on water relations at national level are:

- (a) Water Code of Kazakhstan adopted on 9 July 2003;
- (b) Water Code of Kyrgyzstan adopted on 5 January 2005.

26. For Water Laws of Kazakhstan and Kyrgyzstan experience in similarity of regulations on ownership of water resources and water fixed funds, paid water use, adherence to Integrated Water Resources Management principles, etc. is common. This circumstance promotes successful development of bilateral water relations. At the same time, in Kazakhstan, in comparison with Kyrgyzstan, regulatory basis and other bylaws, as well as institutional transformation envisaged by the law are being quickly reformed. Detailed

comparative analysis of regulatory basis of the both countries' water relations is given in Section C.2.1 of this report.

27. International act on bilateral water relations in both basins is «Agreement between governments of Kyrgyzstan and Kazakhstan on use of interstate water structures in the Chu and Talas Rivers» of 21.01.2000. This agreement:

- (a) recognizes procedures on use of water resources and interstate water structures in the transboundary basins for achievement of mutual benefit on fair and reasonable basis (article 1);
- (b) refers to water structures mentioned in Item 23 to interstate objects (article 2);
- (c) recognizes the rights of country-owner to reimburse O&M costs (article 3);
- (d) fixes commitment of the Parties to equitable participation in reimbursement of O&M costs proportionally with the water use (article 4) and annually allocate required funds (article 6);
- (e) recognizes procedures on standing joint commissions establishment for security and reliable operation of water structures (article 5);
- (f) fixes commitment of parties to quickly notify about emergencies in interstate water structures (article 8) and joint measures on their protection (article 7).

28. During effectiveness of Agreement 2000 to 2013 its conditions, in general, had been strictly followed by the both Parties. Agreed water resources distribution between the countries was also carried out with minor deviations. In 2006, article 5 of the Agreement was implemented contemplating establishment of the bilateral parity Commission. Starting from 2003, preparatory measures were taken which resulted in approval of «Regulation on the Commission». Inauguration of this new interstate structure was held on 26 July 2006.

E. Management of water resources and water activity

29. State management in use and protection of water resources in Kazakhstan is centered in the Committee on Water Resources of MEPWR of RK. The Committee has 8 basin water inspections (BI) including Chu-Talas BI regulating water relations in Kazakhstan's territory of both basins. Water activity in these areas is directly managed by «Tarazvodhoz» State Enterprise.

30. In Kyrgyzstan, DWRA of MAA of KR fulfils main functions on water resources management. A number of other national ministries and agencies have also functions and powers in this sphere. DWRA in the near future intends to establish a basin authority of water management and water resources (BWMA and BWRA), district water authority, control bodies of large control structures and reservoirs, including in Talas and Chu basins. More detailed comparative analysis of water sector management of the both countries is given in Section C.2.2 of this report.

F. Monitoring of water resources

31. During the period from 1992 to 2013, monitoring systems of the water resources' state and use in both basins had been considerably degraded and now organizational and technical base of monitoring is considered as unsatisfactory. In area of water flow formation in Kyrgyzstan, the number of hydro meteorological posts has sharply reduced.

Closing of «Alabel» and «Tuya-Ashu-severnaya» large observation stations has led to deterioration of quality of river flow forecast. Systematic observations on glaciers, snowfields

and lakes in mountain-piedmont and even lands were fully stopped. Exploring and evaluation of fresh ground water was stopped, a number of wells' observation network in ground water deposits and areas with unfavorable reclamation conditions of irrigating land has reduced by more than a half.

32. Number of water meters in inter-farm irrigation network is kept at the level of early 1990th, but most of them require rehabilitation and upgrade. Pressing challenge is equipping with water-meters of on-farm irrigation network and water supply points to independent water users.

33. There is no systematic monitoring of surface and ground waters' quality in both basins. Only periodic water sampling and its qualitative analysis in limited sections are carried out. This does not allow defining the objective dynamics of water resources pollution.

34. For equitable water resources distribution between Kyrgyzstan and Kazakhstan and sustainable water use, priority measures on improvement of monitoring should include:

- Recovery of the number and upgrade equipment of observation posts network, firstly, hydroposts in main water sources and hydroposts in inter-farm water apportioning;
- Recovery of regular glaciers and snowfields observations for credible forecast of river flow;
- Revision and unification of monitoring standards for achievement of identical measurement of water resources parameters in the both countries;
- Upgrading of technical base, standards and procedures on accounting of water resources water use by the users, statistical reporting on water use and water cadastres;
- Improvement of estimation methodology on water resources in the both basins for the next year, as well as operative forecast on hydrologic observations data;
- Revision of system of collection, transfer, processing and dissemination of water resources monitoring data as part of advanced technologies, communication and equipment;
- Formation of single database on water resources use, provision of its transparency;
- Formation of sustainable system of alerting on emergency in the water objects and water systems of basins based on monitoring data.

35. From 2004, especially within 2005-2013, in both basins recovery of water resources monitoring was stirred up owing to investments of Kazakhstan and Kyrgyzstan and various international projects like: (a) development and introduction of software for planning of water resources distribution and accounting in Talas River basin (first version of software was developed under European Union Project ASREWAM Aral SEA TESIS 30560 and then improved under ADB RETA 6163); (b) considerable progress in development of similar software for Chu River basin under financial support of ADB RETA Project 6163; (c) development and introduction of automated equipment water distribution, accounting of water and communication in Chumysh control structure of Chu River basin under financial support of OSCE, UNECE and UNDP; (d) development and launching of Information management system for distribution structure of Kirov dam under ADB RETA Project 6163; (e) rehabilitation of the head hydroposts in Georgi and At-Bashi main canals of Chumysh waterworks with the both countries' financing.

36. Along with given projects, starting from 2004, in Jambyl oblast the national program on rehabilitation of hydroposts and «Kazgidromet» weather stations have been implemented. Under this program, 5 posts were rehabilitated; it is intended to commission 14 posts, transfer and upgrade 4 existing and 2 new weather stations. In Kyrgyzstan, similar programs are being

not implemented due to lack of financing. Attraction of additional external donor aid for re-establishment and development of the water resources monitoring is urgent.

G. Maintenance of the interstate objects

37. Mechanism of shared Kazakhstan's participation in maintenance of similar objects was actually developed before execution of bilateral Agreement of 2000 based on joint CWR and DWR Protocol of 11.03.1998.

38. Maintenance costs for interstate objects in the Chu and Talas rivers basin 2003 to 2013 are given in the following chart:

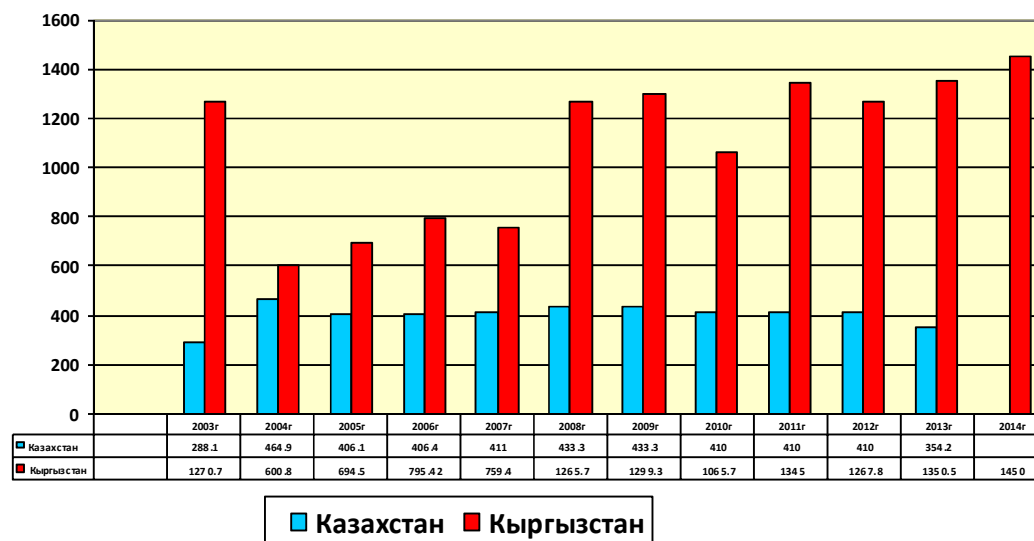


Chart of actual maintenance costs for interstate objects in the Chu and Talas Rivers basin 2003 to 2013 (Kyrgyzstan-Kazakhstan)

2. Mechanisms of bilateral Commission's activity

39. Kazakhstan and Kyrgyzstan's Commission on use of interstate water structures in the Chu and Talas Rivers acts on basis of «Regulation on the Commission» approved on 26.07.2006 by the heads of CWR of MA of Kazakhstan and DWR of MAWR of Kyrgyzstan on behalf of the both countries' governments.

40. The Commission was established on parity conditions under leadership of the 2 co chairpersons appointed by Governments of Kazakhstan and Kyrgyzstan (further – the Parties). The co chairpersons and Commission members have equal rights. The Commission is formed on basis of equal representation principle.

41. Present functions and powers of the Commission are as follows:

- (a) coordination and review of the Parties' activity on fulfillment of the Agreement;
- (b) elaboration and implementation of joint measures on protection and rational use of water resources;
- (c) full assessment and forecast the state of water objects, regulation of water resources use;

- (d) agreement of water use and water discharge indicators, accounting and measurement of water supply, as well as methods of hydrologic monitoring;
- (e) agreement of documents on operation of interstate water objects and participation in MOM financing;
- (f) agreement of reservoirs' operation and updating modes and water use limits depending on actual water content of sources and requirements of the water users;
- (g) arrangement of joint actions in emergency, coordination of flood passing and management of flood, mudflow and other natural events;
- (h) sharing hydrologic estimations, data on water, ecologic situation in the Chu and Talas Rivers basins and other current and operative information;
- (i) agreement and coordination of water objects monitoring, accounting of water and hydraulic structures, water cadastre for formation of monitoring system and water accounting in the Chu and Talas Rivers basins;
- (j) joint surveys and researches on operation, maintenance and security of water objects, as well as regulation and rational use of water resources of the Chu and Talas Rivers

42. Main activity of the Commission is meetings to be held at least twice a year. Meetings of the Commission are held by turns in Kazakhstan and Kyrgyzstan. Costs related to meetings of the Commission, as well as experts are covered by the country where mentioned events are held. Secondment, travel and accommodation costs of the Commission's members, its permanent Secretariat, working groups and additionally hired experts are covered by the each Party.

43. Activity of the Secretariat and expert working groups in 2005-2013 was appreciably financed by ADB RETA 6163 and ADB RETA 6486-REG projects. Moreover, the co chairpersons of the Commission have raised an issue on financing of activity of the Commission's Secretariat from the budgets of the both countries.

44. The Commission at its meetings reviews issues proposed by the Parties or the Commission itself. The Commission acts in accordance with approved work plan for the current year. Upon proposal of the co chairpersons of the Commission, work plans may be revised.

45. Decision on place and time of the regular meeting of the Commission is taken collectively at the previous meeting or in between meetings, upon written proposal of one of the co chairpersons. The Commission's meeting is chaired by the co chairperson of the Commission from the country where meeting is held. Official languages of the Commission are Kazakh, Kyrgyz and Russian. Working language at meetings of the Commission is Russian.

46. The Commission takes decisions on agenda of the regular meetings on basis of consensus. In case of disputes on any issue, the co chairpersons of Kazakh and Kyrgyz parts of the Commission organize additional consultations and review disputable issues at the next meeting.

47. Based on the results of the Commission's meeting, 2 copies of protocol should be prepared which fixes the issues discussed, decisions made, decisions fulfilled, concrete executors and deadlines. After collective approval of Protocol by the Commission, it is subject to approval by the co chairpersons of the Commission.

48. In agenda of the Commission's meetings, regular discussions on fulfillment of previous decisions of the Commission are envisaged. Annually the Commission reviews activity and reflects it in the annual report.

49. The Commission implements its powers with the state and local authorities, self-governing authorities, enterprises, NGOs, citizens of Kazakhstan and Kyrgyzstan. The Commission follows enactments, list and content of which agreed by Governments of the Parties. If applicable, the Commission initiates and develops new or revises the applicable enactments.

50. Executive body of the Commission is a Permanent Secretariat that prepares and monitors implementation of its decisions, coordinates cooperation of the Parties in between meetings, implements business correspondence, collection, filing and archiving of original materials, etc. Regulation on Secretariat of the Commission regulates functions, powers and its work.

51. The Commission has the right to hire experts from the national research, design, technological, operational and other organizations, establish temporary or permanent working groups.

52. The Commission's activity, on behalf of Kazakhstan and Kyrgyzstan governments, is monitored by the national executive agencies – CWR of Kazakhstan and DWRA of Kyrgyzstan. Efficiency of the Commission is assessed based on reports of its Secretariat and approved at joint meeting of the Commission.

53. Main indicators of the Commission's efficiency are:

- (a) actual implementation of measures envisaged in the annual work plans of the Commission in terms of volume and money;
- (b) adequacy of the planned and actual water resources distribution between the Parties in the both transboundary basins;
- (c) provision of the sustainable safe maintenance of objects of interstate water infrastructure;
- (d) amount of investment annually allocated by the Parties under scheme of participation in joint financing of MOM activity on interstate infrastructure and its actual disbursement as intended;
- (e) ensuring sustainable conflict-free water use in the transboundary basins

Further, as the Commission's status is revised and of its activity is widened, list of efficiency indicators might be significantly expanded.

54. During the period from 2006 to 2013 the Commission has held 17 meetings, 12 of which in the reporting period.

55. The fifth meeting of the Commission was held in Bishkek on 30 April 2008. At meeting, issues on shared participation in repair and maintenance of interstate objects and prospects of increase in fund allocation for O&M of this water infrastructure as identified on basis of the joint inspection of these objects by the water specialists of the both countries were reviewed.

56. At the sixth meeting of CTWC held on 15-16 December 2008 in Taraz town, decision on amending Agreement was made to improve the Commission's work and expand list of

water structures being within its the jurisdiction. 50% of rehabilitation thanks to Kazakhstan's co financing was decided to implement by the Kyrgyz contractors. Besides, the Commission has recommended using up to 70% of funds for rehabilitation before vegetation.

57. International organizations have actively participated in the seventh meeting of the Commission held in Bishkek on 6-7 February 2009. At meeting, main targets and tasks of a number of projects of international organizations and donors were approved, including:

- UNECE/OSCE Development of cooperation in the Chu and Talas rivers Project (Chu-Talas II);
- ADB Project «Improvement of management of water resources in Central Asia»;
- SDC Promotion of interstate cooperation on water resources management of Chu River Project;
- UNECE establishment of national dialogue on water policy Project, EU-TACIS Project «Management of water resources in Central Asia in the Chu and Talas Rivers basins»;
- World Bank Improved Water Resources Management Project (IWRMP);

For further improvement of support coordination of international community to the Commission, it was decided to create advisory group of the donors and contributory organizations.

58. At the eighth meeting of the Commission held on 6-7 October 2009 in Bishkek decisions on amending Agreement of 21 January 2000 and on holding in 2010 regional conference on the 10th anniversary of signing of this Agreement were taken.

59. The ninth meeting of the Commission was held on 7-8 April 2010 in Taraz town with the representatives of international organizations. It reviewed and approved reports on previous work of the Commission's Secretariat and preparation to International conference on the 10th anniversary of 2000 Agreement.

At the same meeting, support to the Commission by the international organizations and development prospects were discussed. The Commission has also agreed upon the wording of «Protocol on amending of Agreement between Kazakhstan and Kyrgyzstan governments on use of interstate water structures in the Chu and Talas Rivers of 21 January 2000».

60. At the tenth (17 September 2010 in Bishkek) and eleventh (6 December 2010 in Almaty) working meetings of the Commission, issues on security of Kirov reservoir dam were reviewed. Following the results of meetings, decision on setting of the expert working group from the specialists of water and design organizations, security experts of hydraulic structures of Kazakhstan and Kyrgyzstan was made to inspect the state of these hydraulic structures.

61. The twelfth meeting of the Commission was held on 24 May 2011 in Bishkek under International conference on the 10th anniversary of Agreement between Governments of Kyrgyzstan and Kazakhstan on use of interstate water structures in the Chu and Talas Rivers. At meeting, results of inspection of dam of Kirov reservoir conducted jointly by the experts of Kazakhstan, Kyrgyzstan and Russia were reported. It was decided to include the joint expert group on hydraulic structures security into the expert group of CTWC. Participants of meeting were happy to hear about extension of ADB RETA-6486 Project until the end of 2012.

62. The fourteenth meeting of the Commission was held in Bishkek on 15 September 2012. It approved reports on activity of the Commission's Secretariat and co financing of the parties of interstate objects in the Chu and Talas Rivers in 2012.

Kyrgyz side was instructed to agree upon with Kyrgyzstan customs of the Kazakh side's previous formulation of article 11 of «Protocol on amending Agreement of 21 January 2000». Issue on possibility of construction of reservoir in the Aspara River was considered.

63. The fifteenth meeting of CTWC was held 19 December 2012 in Taraz. It approved reports of the Commission's Secretariat and on allocated funds and repairs of Kyrgyz side of interstate objects in the Chu and Talas Rivers during 2008-2012 and Kazakh side in 2012. Commission decided to instruct authorities of the Parties to carry out procedures on local agreement of the draft Protocol on amending Agreement dated 21 January 2000 and submit for approval to the Governments. At meeting, support of the Commission's activity by international organizations was also discussed.

64. The sixteenth meeting of the Commission was held in Bishkek on 31 May 2013. At meeting, report on the joint inspection of Orto-Tokoi reservoir dam was reviewed. Conclusion - dam is in sustainable, safe and operable state and suitable for further operation. The Commission has approved report on engineering design for rehabilitation of control and measuring equipment of Kirov reservoir dam in the Talas River. Under the Project for adaptation to climate change, progress in simulation and assessment of vulnerability, as well as next steps of the Project implementation was discussed.

65. At the 17th meeting of CTWC held in Almaty on 19 December 2013, vegetation of 2013 was summarized, as well as current issues on joint maintenance of interstate structures and further improvement of cooperation of the Parties were discussed. The Commission has decided to consider amendments in Agreement of 21 January 2000 with regard to monitoring and control of water quality in the Chu and Talas Rivers basins for fulfilment of the Agreement dated 8 April 1997 between governments of Kazakhstan and Kyrgyzstan on cooperation in environment protection.

3. Support of development of bilateral water cooperation under ADB RETA 6486-REG Project

66. Program of implementation of ADB RETA 6486-REG Project foresees assistance of the National executive agencies of Kazakhstan and Kyrgyzstan in the following joint activities:

- a) Improvement of institutional-legal basis;
- b) Improvement of technologies of accounting and planning of water resources use;
- c) Elaboration of IWRM plan for the Chu and Talas Rivers basin
- d) Improvement of cooperation in conservation, monitoring and data exchange.
- e) Study of water resources of Chu and Talas basins in conditions of climate change
- f) Information support of the Commission's activity and development of cooperation.

Main outcomes of support of these measures are as follows:

A. Improvement of the institutional-legal basis

67. Experts of the working groups in 2007, at the 4th meeting of the Commission had prepared and reviewed proposals on revision of Agreement of 2000 under the draft «Protocol on amending Agreement between governments of Kazakhstan and Kyrgyzstan on interstate water structures use in the Chu and Talas Rivers».

In 2008-2009, these proposals were repeatedly discussed and updated during working meetings of the Commission's Secretariat.

68. At the eighth meeting of the Commission held in October 2009, the wording of stated Protocol was reviewed and accepted envisaging:

- amending article 2 of the Agreement expanding the list of the following interstate structures:

- a) Koj canal with structures in the Talas River;
- b) Karataki canal with structures in the Kurkureusu River;
- c) Tomentamga canal with structures in the Kurkureusu River;
- d) Akmolda canal;

- amending article 5 of the Agreement contemplating financing of the Commission's Secretariat thanks to national budgets of the Parties;

- amending article 11 of the Agreement contemplating easement of passing of the Parties' personnel of interstate objects through the state border, as well as exemption of goods and vehicles from customs payments and taxes. Names and amount of these goods are subject to approval by the Commission.

69. At the sixth, seventh, eighth meetings of the Commission in 2008-2009, issues on agreement of some formulations of Protocol on amending Agreement were reviewed. At the 9th meeting of the Commission held on 7-8 April 2010 in Taraz, the Kazak version of Protocol was agreed, full text of which is presented in Annex 1 to this report.

70. Review of Protocol on amending Agreement 2000 by the Governments was suspended in 2010 due to known political events in Kyrgyzstan. In 2011, this work was resumed.

71. Work on Protocol on amending Agreement 2000 was continued and its outcomes were reviewed at the 14-17th meetings of the Commission. By the time of preparation of this report, Protocol adopted on 31 May 2013 was agreed at the 16th meeting of the Commission (Annex 1).

B. Improvement of accounting and planning of technologies on water resources use

72. Under implementation of the ADB RETA 6486-REG Project, in accordance with approved ToRs the following works were implemented:

B.1. Development, upgrade and introduction of automated software package for accounting and planning of water resources distribution in the Talas River basin

73. Software package on planning of distribution and accounting of interstate water apportioning in the Talas River basin has been created and improved since 2004. During ADB RETA 6163 Project, initial version of software was developed which was further finalized and developed under this Project.

74. Software package has a simulation model of formation and distribution of water resources of the Talas River basin. Main parameters of the model are based on Regulation on flow division in the Talas River adopted in 1983 and being effective under agreement between Kazakhstan and Kyrgyzstan at present.

Model includes current estimation and accounting practice of water resources at hydroposts controlled by the national hydro meteorological bodies.

75. Scheme of formation and distribution of water resources in the Talas River basin is presented in Figure 2. Model is based on accounting of water resources for 4 main surface sources of basin – the Talas, Besh-Tash, Ur-Maral, Komuysh-Too rivers (Kumyshtag), as well as «unmeasured water resources» from the local sources, seepage water from sources of «Karasu» type, bed losses, etc.
76. Plans on water apportioning are calculated on basis of the following data:
- Forecast of water content in rivers that forms basin flow. Indicators are elaborated by Main Hydrometeorology Department of ME of KR for 4 above rivers. Total flow of remaining sources is taken at the level of long-term average annual indicators as identified by statistical processing of data on basin's water resources balance.
 - Water in reservoir at the beginning of vegetation.
 - Schedules of ten-day water supply prepared based on applications of the consumers of Kazakhstan and Kyrgyzstan.
77. Water in reservoir at the end of each ten-day's vegetation is estimated as difference between arrival of water resources and water intake by the consumers. Water balance in Kirov reservoir is calculated separately for water resources of the Kazakh and Kyrgyz sides.
78. On basis of this model, software for the following tasks was developed:
- Estimate of plans on water resources distribution between Kazakhstan and Kyrgyzstan in the Talas River basin.
 - Accounting and control of actual water resources use by the both parties.
79. Mechanism of original data formation used in software allows quickly calculating the numerous options and select most pertinent to the water users needs of the both parties. Estimates are provided in hard copy (as spreadsheets and schedules) or in electronic form to be forwarded by e-mail to the stakeholders of the both countries.

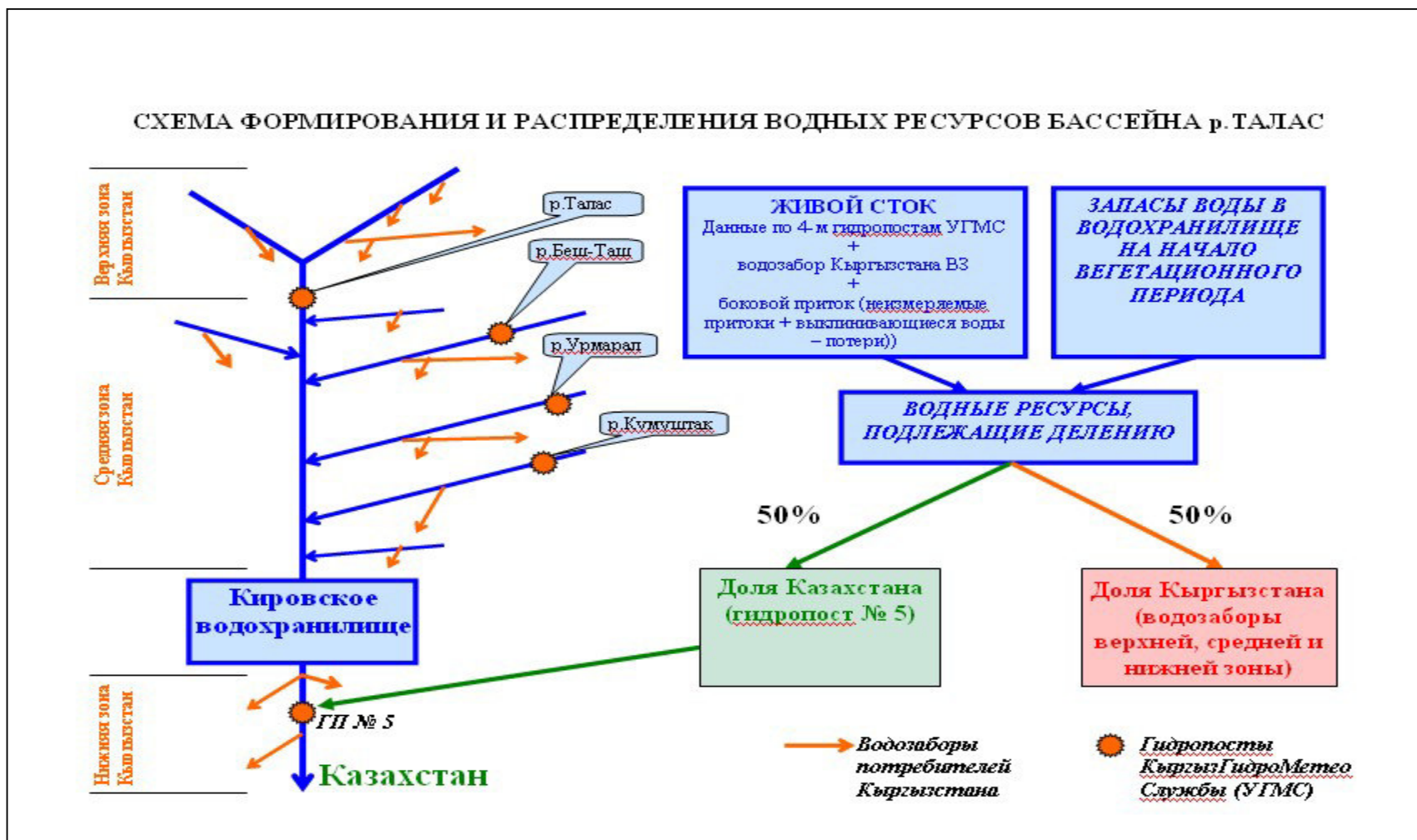


Figure 2. Scheme of formation and water resources distribution of the Talas River basin

80. Software package functions developed for Talas River basin were directed at creating additional modules facilitating procedures on operative simulation of various conditions for formation and distribution of the water resources. Expediency of widening of these functions was predicated by repeatedly occurring situations when during vegetation weather conditions were considerably changing, thereby water content of of irrigation sources have deviated from previously predicted indicators.

These changes have caused necessity in recurring estimations, quick implementation of which by the personnel of control organs manually was hampered. Introduction of new software modules allowed resolving of this problem.

81. Upgraded software, developed for the Talas River basin, was built in such a manner that all original data required for estimates are divided into groups combining data similar in functions. For instance, group of data with actual values of average ten-day costs for all irrigation sources; group of data with actual measured values of reservoir's reserves at the beginning of each ten-day, etc.

These data were entered before conduction of estimates. For estimating of formation of planned or accounting indicators, it is sufficed to state what from previously prepared data participates in the concrete estimate. Such preparation of data allows easily carrying out of multiversion estimates, allowing the user to choose optimum decisions.

82. Indicators, values of which should be formed automatically on the users' requests were revealed. For estimation of a schedule of water apportioning, list of formed indicators is given in Table 1.

Table 1. Indicators formed for estimation of a schedule of water apportioning.

Simulated indicator	Method of indicators' formation
Water supply by countries	1. Deviation percent from all indicators values for mentioned data 2. Deviation percent from indicators values for mentioned data
Water content of irrigation sources	1. Deviation percent from all indicators values for mentioned data 2. Deviation percent from long-term average annual indicators.

83. In accounting and control of actual water resources distribution during vegetation, software for the Talas River basin envisages estimates on the following scheme:

- on completion of each ten-day vegetation, data on actual water content of irrigation sources for the past ten-days and actual water intakes of the consumers of both countries are entered.

- predicted final indicators of water apportioning at the end of vegetation are calculated based on actual indicators of water content of irrigation sources and actual water intakes of the consumers for all ten-days, including the estimated ten-day, and planned values of indicators of water content of irrigation sources and water intakes of the consumers for of the following estimated ten-day until the end of vegetation. Total water intakes of the countries and reservoir's reserves at the end of vegetation allow estimating quality of adopted management strategy in preset conditions.

84. Taking account of above conditions, list of simulated indicators was formed to estimate the planned indicators considering possible conditions during ten-days remaining until the end of vegetation (Table 2).

Table 2. Indicators formed for accounting and control of actual water resources distribution.

Simulated indicator	Method of indicator's formation
Forecast of water content of irrigation sources from mentioned ten-day until the end of vegetation	<ol style="list-style-type: none"> 1. Entering average ten-day data 2. Deviation percent from defined values 3. Deviation percent from planned values
Water supply by countries	<ol style="list-style-type: none"> 1. Deviation percent from all indicators values for mentioned data 2. Deviation percent from indicators values for mentioned data

85. In accordance with of formed indicators listed in tables 1 and 2, simulation was developed allowing estimating water apportioning between the countries for various conditions.

86. Important indicator of model's adequacy to real formation and distribution of water resources of the Talas River basin is the correlation of estimated and actual water in Kirov reservoir. On Figure 3, the designed and actual values of water in Kirov reservoir at the end of vegetation 2009 are given. Comparison witnesses close adequacy of the estimated and actual water in reservoir and, therefore, adequacy of model to real formation and distribution of water resources.

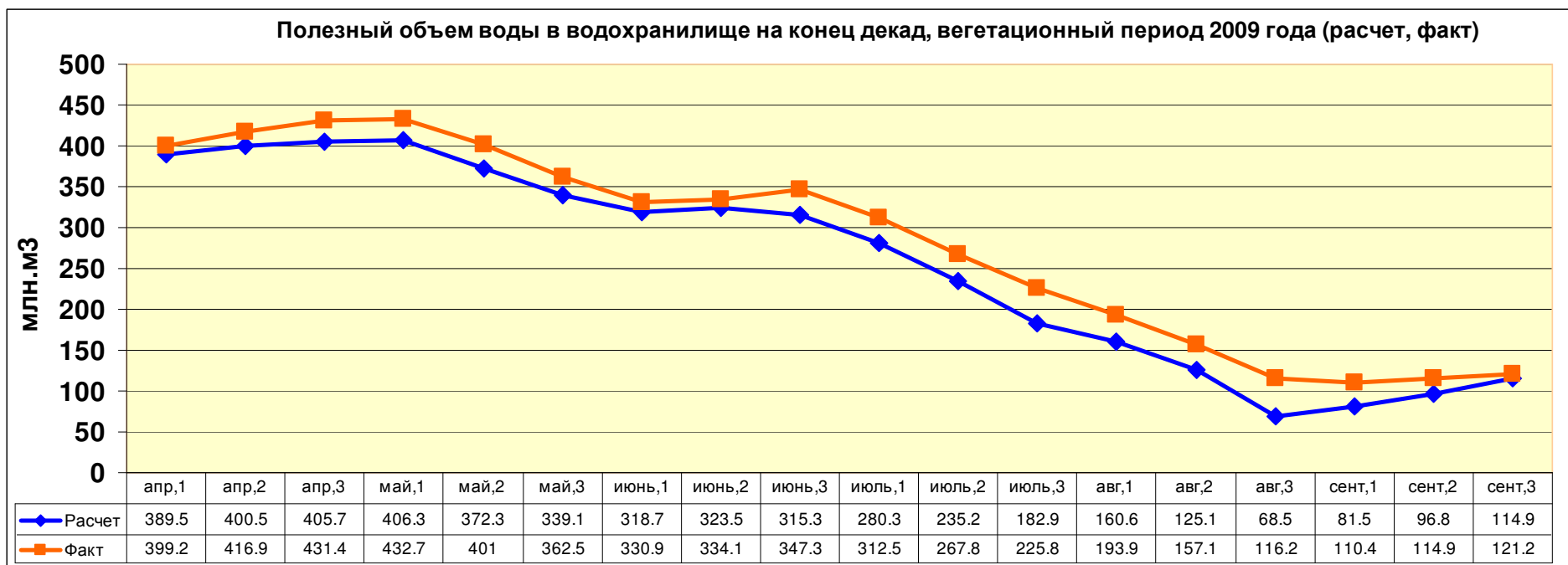


Figure 3. Comparison of forecast and actual water resources subject to division between Countries, for 2009

B.2. Operation and development of the software package functions for the Talas River basin

87. During reporting period, progress is characterized by the following indicators:

- Indicators of initial documents for various reports were chosen.
- Original data were prepared and water apportioning for various conditions of water intake in both states were estimated. Options agreed with the Kazakh and Kyrgyz sides were approved as a schedule of interstate water apportioning on Talas River basin for 2009-2013.
- In vegetation during these years, ten-day indicators of water apportioning schedule were regularly estimated. Estimates were analyzed and proved.
- Seminars in application of software for the Kazakhstan and Kyrgyzstan representatives were held.
- Software package was constantly tested. Based on analysis of calculated indicators, some software modules were finalized allowing selecting channel of water resources transportation with minimum losses.
- In vegetation, ten-day indicators of water apportioning schedule were regularly estimated, estimates have been shared with Kazakhstan, water apportioning between countries have been analyzed and discussed.
- For the further development of software package functions, simulated indicators water apportioning schedule were identified, scheme of water apportioning simulation, algorithm and means of estimation of indicators of adjusted water apportioning schedule taking account of updated water content of sources forecast for coming period and actual water content in the past vegetation were developed.

88. Regular estimates of water resources distribution indicators in the Talas River basin showed that introduction of software package has provided transparency of water distribution system between the countries, reduction of distrust and conflicts between both parties. Use of additional simulation of water apportioning for various conditions allowed more adequately forecast water apportioning and planning of managing impact in advance. Use of means provides validity of indicators of water supply schedules by the countries. Thereby losses at transportation of water resources and waste have decreased. Application of means in low water years was especially efficient.

B.3. Development, upgrade and introduction of software package for accounting and planning of water resources distribution in the Chu River basin

89. Particularity of planning of water resources distribution in the Chu River basin is as follows:

- Availability of several loopbacks with various channels of water transportation with various losses and additional sources of water.
- Availability of the various water users belonging to the agrarian, industrial, energy sectors of economy and with various requirements of satisfaction of applications for water supply.
- Another direction of water balance within a year and in some parts of the Chu River basin.
- Insufficient study of water balance of this basin.

90. Listed factors predicate, in contrast to estimates procedures developed for the Talas River basin, necessity in accounting of model of water resources transportation in the process of planning of distribution and accounting of water resources in the Chu River basin.

91. Simulation model of the Chu River flow distribution between Kazakhstan and Kyrgyzstan uses the Regulation on flow division in the Chu River basin of 24.02 1983, Supplements to Regulation on procedures and conditions of annual water resources distribution of the Chu River basin dated 14.12 1985, and considers the planning practice.

92. Given that bed of the Chu River is divided into balance sections, for which «Regulation on flow division» sets various percentage of flow distribution, model of water resources distribution is also divided into blocks describing water apportioning to each balance section. Link between blocks is identified based on conditions of supply–admission of water resources within the plots.

93. In the head of the Chu River main resources are formed and water is taken to canals of the Kyrgyzstan and Kazakhstan consumers, in the end sections there are only water intakes of Kazakhstan.

Therefore, planning and accounting of water apportioning is essential on the following sections of Chu River as specified in Regulation on flow division in the Chu River basin (1983).

- Section upstream Orto-Tokoi reservoir;
- Section of Orto-Tokoi reservoir up to Djilaryk hydropost;
- Section of Djilaryk hydropost up to Tokmok city;
- Section of Tokmok city up to Chumysh control structure.

Scheme of formation and intake of the water resources in the Chu River basin is given in Figure 4.

94. In 2006, according to scheme on Figure 4, planning and accounting of the water resources of the Chu River basin and software for water apportioning schedule and schedule parameters on ten-day vegetation were developed.

For testing of software, water apportioning schedule and data on execution of water apportioning schedule by ten-days for 2006–2010 vegetation were estimated.

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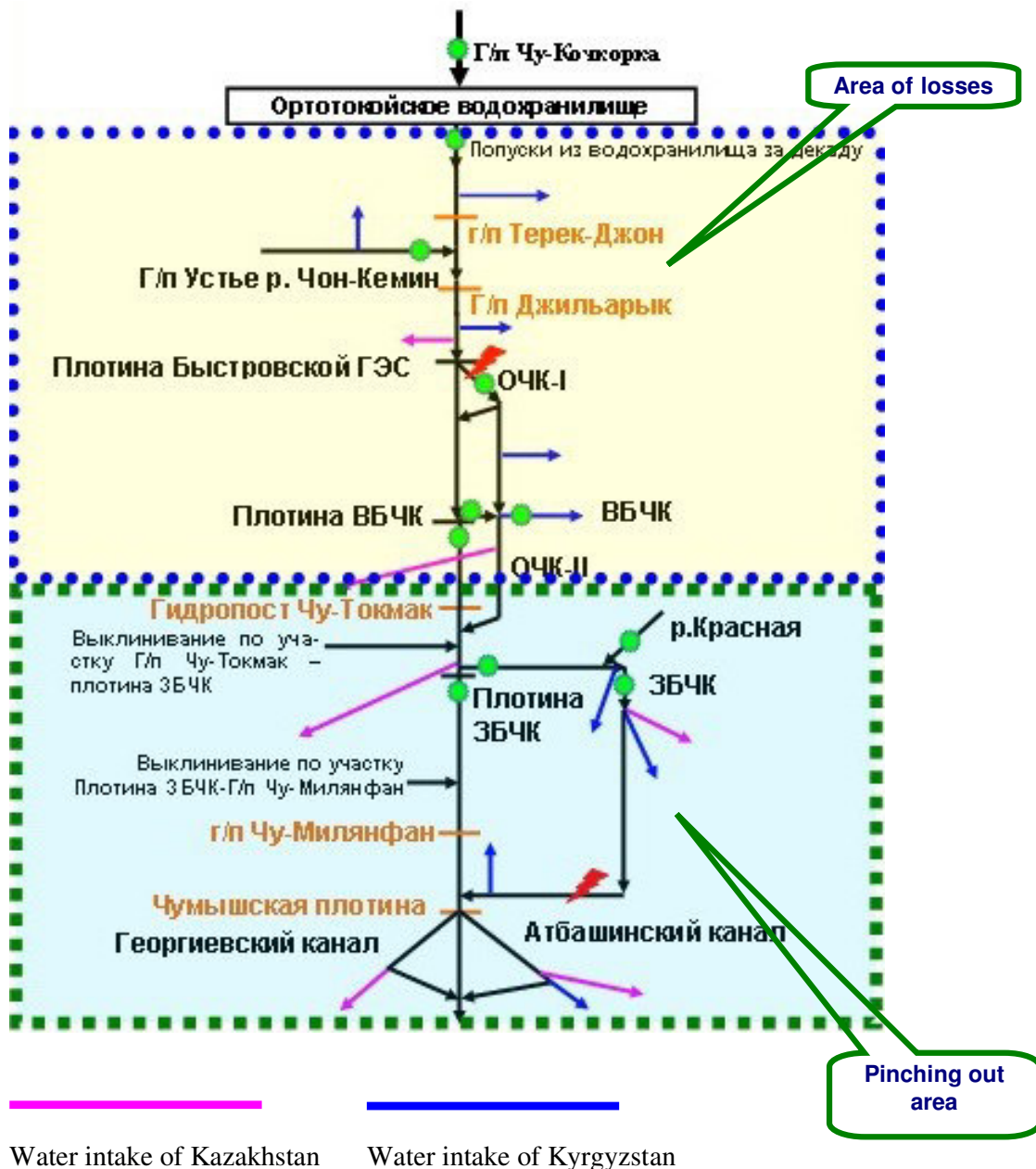


Figure 4. Scheme of formation and distribution of water resources in the Chu River basin

95. During implementation of this Project, software package developed for the Chu River basin and each ten days estimate of control indicators of actual water resources distribution between the countries were tested in trial operation. On basis of estimates, an adequacy of the design and measured values of costs on main points of water apportioning was analyzed; parameters of water transportation on some sections of irrigation systems were updated.

96. Comparative assessment of estimates has revealed the possibility of emerging situation when required for the water users ten-day water supply is relatively small, and preset for meeting requirements of the electric energy costs exceed requirements in water intakes of the downstream consumers.

This has led to a huge discharge downstream Chumysh control structure. Such situations are not pertinent to main designation of water systems of the Chu River basin – meeting requirements of

the irrigated agriculture, in provision of which requirements of energy sector should be considered as the secondary. Irrational planned decisions are also revealed in situations when for recharge of Ala-Archa reservoir as original data for planning unbalanced costs were defined from limited resources of Orto-Tokoi reservoir.

Therefore, it is more rational to recharge Ala-Archa reservoir from additional water sources which cannot be accumulated in Orto-Tokoi reservoir, e.g., from the Chon-Kemin River, Krasnya River or seepage water.

97. For elimination of similar irrational management decisions the following works were additionally executed:

- Inspection of Bystrov HPP and Alamedin HPP cascade for definition of water supply to these objects which do not lead to necessity of taking additional resources from Orto-Tokoi reservoir.

- Elaboration of algorithm of water supply planning for the non-agricultural consumers (Ala-Archa reservoir, hydropower objects) preventing from wastewater discharge and inefficient use of resources of Orto-Tokoi reservoir.

- Finalization of software modules of water apportioning planning taking account of adjusted planning algorithm.

98. On Figure 5, schedules of planned water supply for ten-day vegetation of 2009 are given calculated by improved software package. Final indicators of total water supply during vegetation witnessed that possible water supply during vegetation might be increased with the help of above methods of water supply planning to the consumers not related to agrarian sector. Thanks to decrease of wastewater, planned water supply to the consumers of agrarian sector during vegetation was increased to 122.6 mil m³ (about 10% of planned water supply).

99. Adequacy of improved model of water resources distribution for the Chu River basin is confirmed by close convergence of values of release from reservoir which is required for actual water supply to the consumers as measured and calculated by software.

On Figure 6, values of measured and design values of release from Orto-Tokoi reservoir are given, pertinent to data of 2009.

**Плановые декадные показатели водоподачи потребителям, рассчитанные
с помощью усовершенствованного программного комплекса**

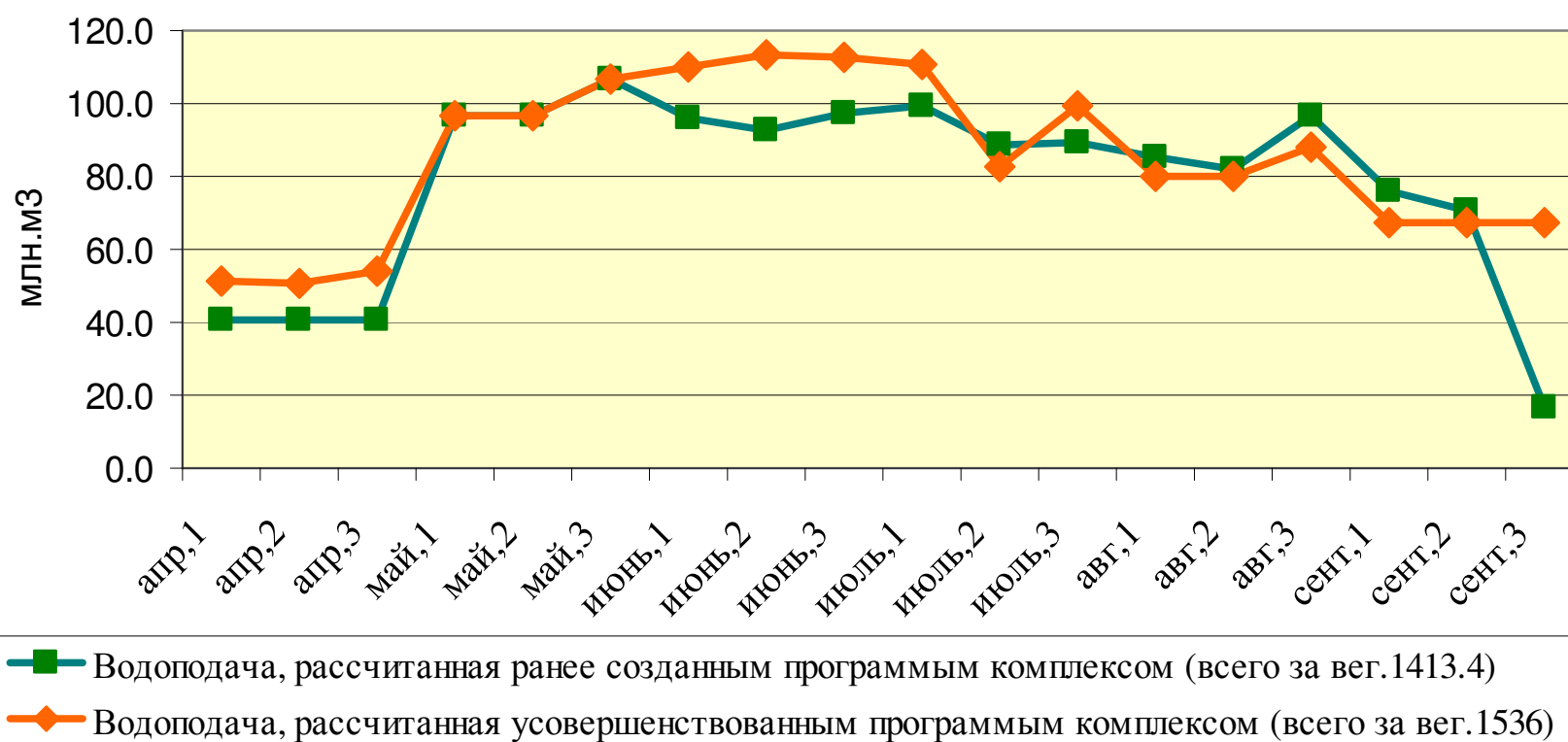


Figure5. Estimates of Schedule of inter-republic water apportioning for 2009 on the Chu River basin

Сравнение измеренных и расчетных декадных значений попусков из Ортокойского водохранилища

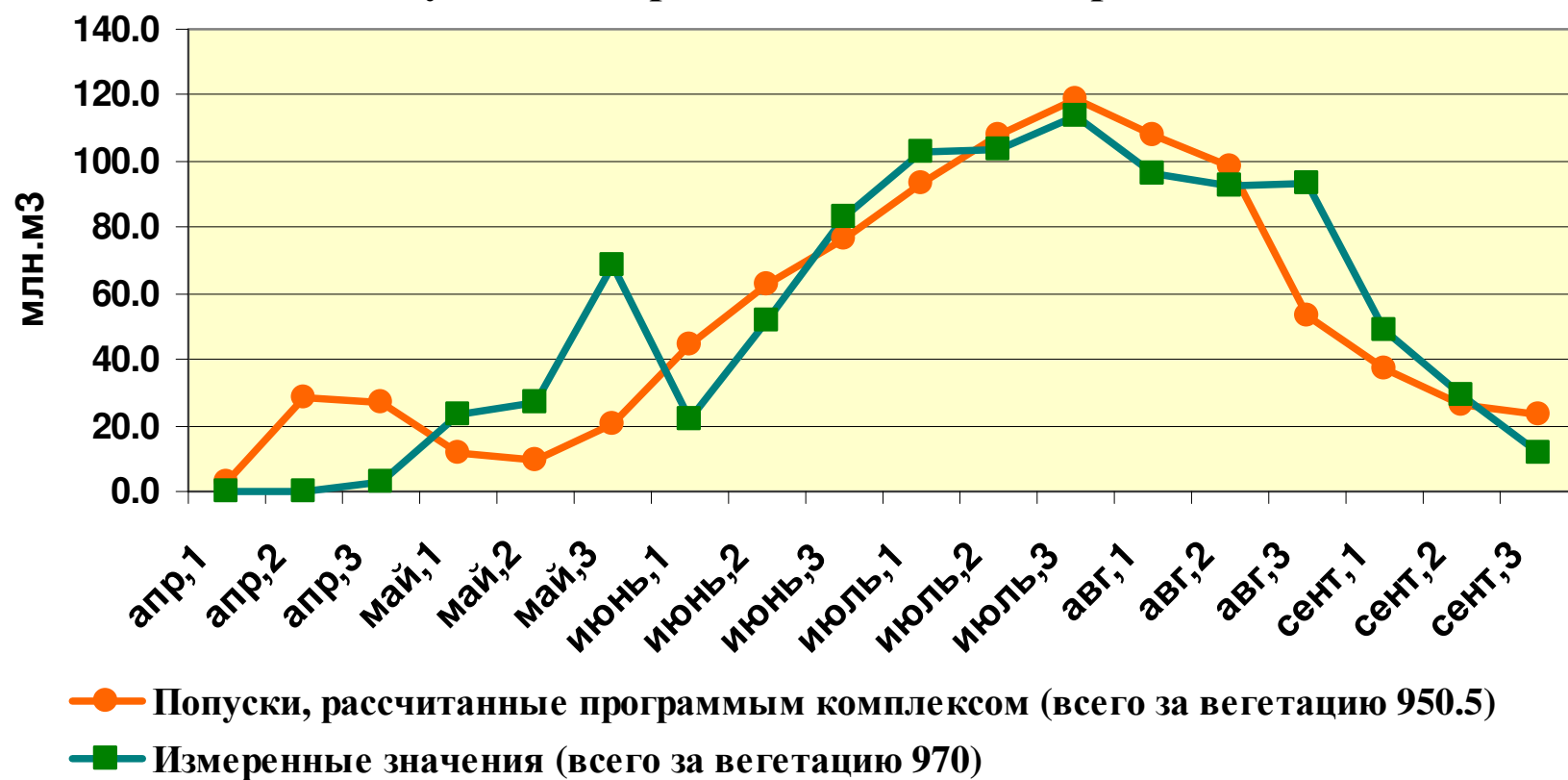


Figure6. Design and measured values of ten-day release from Orto-Tokoi reservoir for 2009

B.4. Summary of software package operation for the Chu River basin

100. In the period under review progress, in this task is characterized by the following indicators:

- Indicators of initial documents for various reports were justified and agreed.
- Original data were prepared and estimates of schedules water apportioning were conducted in the Chu River basin for 2009-2013.
- During vegetation of these years, carried out regular estimates of ten-day indicators of water apportioning schedule have been carried out, estimates result were analysis and provided.
- Seminar in methods of work with software for representatives of Kazakhstan and Kyrgyzstan in accordance with developed software was held.
- Software package has been constantly tested. On basis of indicators analysis, some software modules were finalized which allowed choosing channel of water resources transportation with minimum losses.

101. Experience in operation of software package for the Chu River basin showed that its application also ensures a validity of indicators of water supply schedules in the countries, thereat, losses in water resources transportation and waste discharges significantly decrease. Application of developed software in low water years is especially useful.

Moreover, experience in introduction of this package has revealed a need in further improvement of inter-republic water apportioning in the following directions:

- Rising of quality of water accounting by recovery of balance hydroposts network, hydrometric works, metrological certification of all hydroposts, provision of regular measurement and improvement of reporting quality on water intakes in canals;
- Equipping of key water intake structures with automated water-meters for objective measurement and its record with a preset frequency.
- Stirring up of works on clarification of seepage and evaluation of loss factor ratio in sections of the Chu River with the use of design and instrumental control.
- Introduction of software for automated planning and accounting of water resources in the Chu River basin

C. Elaboration of IWRM plan for the Chu and Talas Rivers basin

102. In this direction, Terms of Reference of RETA 6468-REG Project have envisaged implementation of the following activity:

- a) Assistance to control bodies of water resources of Kazakhstan and Kyrgyzstan in drafting of the IWRM plan for the Chu and Talas Rivers basins and its initial implementation;
- b) Assistance in assessment of requirements in financing from the state budget for implementation of the IWRM plan in the Chu and Talas Rivers basins;
- c) Preparation of final report on the Project with description of activity and progress of implementation of the IWRM plan in the Chu and Talas Rivers basins.

Summary of this activity is given below.

C.1. Outline of current IWRM ideology

103. Symptoms of a deficit and pollution of water resources have started to perceptibly appear at the end of XIX – in the beginning of XX century owing to growth of population, development of technologies of industrial and agricultural production in most regions of planet.

These threats significantly have raised in the second half of XX century owing to globalization of world economy and extensive contagion of intense technologies of production related to water use growth. At present, there is about 750m³/ year of fresh water for each inhabitant of planet. By 2050, this value is expected to be decreased, even without taking account of climate change impact, on average up to 450 m³/s. This means that more than 80 % of countries worldwide will soon face a water deficit.

104. Therefore, more countries have to take urgent measures on guaranteed access of population and water-using sectors of economy to quality water resources. These measures often had a reactive nature, i.e. they were directed to remedy accidents, disasters, or rehabilitate water objects. Such actions could not prevent from new water problems on retention of archaic management system.

Therefore, notion on necessity of coordinated actions in use and protection of water resources, integration of all water users for joint fulfillment of general tasks has started to be gradually formed. For implementation of these ideas, most countries have worked out their own approaches to institutional reforming of the water sector.

105. During existence of USSR, centralized management and protection of water resources had been persisting. Regulatory, planning and controlling functions and powers were at the central ministries (ministries of water resources), and executive functions – at regional organizations of these ministries formed on an administrative-territorial feature. Moreover, in 1970th in Soviet Union, long-term planning of water and water protection activity was had begun under «Schemes of integrated use and protection of water resources» which were prepared for all large rivers, lakes or sea basins. Though these schemes from the current point of view did not sufficiently consider ecologic requirements, did not envisage an adequate participation of the public in management and application of market mechanisms of water use, all the while they have already had a number of positive aspects in the context of IWRM ideology.

106. In France, on the contrary, integrated water resources management is based on decentralization according to which all key functions and powers in regulation of water use and protection are centered at the autonomous basin organizations formed on hydrographic feature.

French institutional model in most literary sources on IWRM is regarded as the most perfect one. This conclusion is predicated by achievement of a high level development of organization, technologies and equipment management, economic mechanisms of paid water use, covering the maintenance and infrastructure development costs. In France, efficient procedures on prevention of conflicts of interest between water users is also created, close attention is paid at water quality and environment protection.

107. Based on FAO data at www.fao.org/ag/agl/aglw/aquastat/countries/, more than 20 various national management structures of water sector dependant on state system of the concrete countries, developed by centuries of water use traditions, local natural-climatic conditions, etc., including subjective factors were revealed. Most of these structures are more or less based on IWRM principles. Particularly:

- Experience of Spain in establishment of basin water councils;

- Experience of Mexico in establishment of public water users associations;
- Experience of Australia in resolving of ecologic problems, formation of water markets and creation of original management structure in Murray-Darling basin, etc.

Not less didactic is a negative experience in institutional transformation of water sector in a number of countries of Asia, Africa and Latin America.

108. Considering of integration processes and general threats related to water impact actively developing in recent decades, the world community inevitably had to generalize experience in various regions of planet and work out single approach to coping with global water problems.

109. First attempt to elaborate Integrated Water Resources Management concept was taken in 1992 at international conference on water resources and environment in Dublin, Ireland. In final Statement of this conference the following 4 base principles were formulated:

1. Fresh water is an exhaustible and vulnerable resource, paramount for support of maintain life and development of environment;
2. Development and rational use of water resources should base on overall participation with involvement of the users, planners and political decision-makers at all levels;
3. Women play central role in provision, rational use and protection of water resources;
4. Water in all competing types of its use has economic value and should be recognized as economic welfare.

110. At World Summit in Johannesburg, RSA, program on poverty management and raising of living standards in the form of «Millennium Development Goals» has been accepted most tasks of which were intended to be implemented until 2015. In this program, visible role is assigned to water resources, particularly, to the following purposes of IWRM introduction:

- promote assigned, interactive and diversified approach to water resources management, including detection and protection of potential fresh water sources, i.e. approach combining the processing, social-economic, ecologic and health aspects;
- plan sustainable and rational use, protection, saving and management of water resources on basis of the public priorities under the national social-economic development policy;
- design, implement and assess the projects and programs which economically efficient and socially required under explicit strategies and based on approach of full public participation, including women, youth, local people in implementing of policy and making decisions in water resources management;
- identify and strengthen or develop, if necessary, particularly, in developing countries, the appropriate organizational, legal and financial mechanisms guaranteeing that water policy and its embodiment are catalyst of social progress and economic growth.

111. At Johannesburg World Summit «Declaration of strategic partnership of European Union and EECCA countries in water issues for sustainable development», Kyrgyzstan, Kazakhstan and other Central Asian countries have taken concrete commitments «...to contribute to IWRM preparation and plans on efficient water resources management by 2005».

112. According to widespread definition of technical committee of international organization «Global Water Partnership» (GWP), IWRM is «a process promoting agreed development and management of the water, land and other resources for achievement of maximum social-economic wellbeing on fair basis harmlessly for vital ecosystems sustainability». Significantly text, in italics, implies that water resources management should be in close relation with other natural resources (land, biological, etc.). It is also required to consider different views of reputed international experts in publications, list of which is given in this report, that IWRM should be regarded *not as a process, but as a system of water resources management*. IWRM does not imply introduction of any concrete structure of water resources management, on the contrary, underlines that these structures may significantly differ for the poor, developing and developed countries also depending on local conditions being intrinsic to each country. Thus, it is arguable that IWRM is not an institutional scheme of management, but a management policy based on the following basic principles:

- Water resources should be managed not on administrative-territorial feature, but on hydrographic feature, i.e. within the water basins and water systems;
- Management should foresee accounting, integrated use and protection of surface, ground and return waters to be considered in close relation within each water basin, as well as take into account climatic particularities of the regions;
- Management should be implemented with mandatory linkage (coordination) of all types of water use and all ministries, agencies, enterprises and organizations participating in management. Coordination should be horizontal (between the water-using sectors of economy and executive agencies) and vertical (between the national, basin, system levels of management and up to the persons–water users);
- Mandatory participation of the public and water users should be provided in planning and implementation of decisions on water resources management and water activity, in financial and other support in development of these types of activities;
- Sustainable condition of water ecosystems and land water resources by prevention of pollution and depletion of natural water objects should be provided in regulation of water use;
- Priority of measures on water saving and unproductive losses of water resources in water systems managed by water the suppliers and water users, taking account of water demand;
- Achievement of transparency of the planned and implemented measures on water resources management, distribution and use of water by organization of the national, regional and institutional communication systems;
- Achievement of economic sustainability of water resources management using market mechanisms of water use and public's financial participation in maintenance and development of national water resources.

113. In most literary sources on IWRM, these 8 principles are recognized as essential ones. As for definition of GWP, main mechanisms of IWRM should be:

- Political decisions, e.g., national water strategy approved by governments;
- Legal basis, i.e. enactments specifying IWRM procedures;
- Economic base, i.e. mechanisms of funding and incentives for water protection.

114. In the global practice of the last decade, IWRM principles have been implemented in the following directions:

- Decentralization of management ensuring transfer of considerable part of the management and executive functions from the central to basin or system level;
- Widening of participation of local authorities and NGOs in water resources management;
- Water users become partners for government bodies, and not beneficiaries;
- Stirring up of actions in rational use and protection of water resources;
- Strengthening of intersectoral relations;
- Intense development of interstate water relations.

115. Concrete mechanisms of IWRM implementation were reflected in International Water Law, e.g., in directive of European Parliament and Council of European Union No. 2000/60/EU «Basics of community's activity in water policy» dated 23.10.2000.

116. Data of literary sources reveal the following potential benefits from IWRM introduction:

- IWRM promotes higher effectiveness of investments allocated by the various sectors of national economy generating huge income rather than at their use in some sectors of economy owing to «synergistic effect»;
- IWRM helps to avoid inefficient investment and costly mistakes due to risks of generating unstable income, unexpected consequences or lost possibilities at taking management decisions often occurring in short sectoral approach to the planning and management of water resources;
- IWRM encourages more rational water resources distribution on «general picture» of the social, economic and ecologic purposes, instead of former system of water use based on serving the interests of some sectors of economy;
- IWRM promotes preventing conflicts at regulation of water relations owing to introduction of mechanisms on corporate water resources management with all stakeholders' participation;
- IWRM contributes to risks reduction of negative consequences of unstable social-economic development caused by a need in huge investment for liquidation of ecologic damage;
- IWRM allows eliminating excessive and overlapping functions and powers of the executive agencies involved in water resources management. Hence, funds from the government budget might be reduced or more efficiently reallocated that previously were covering an upkeep of personnel which had overlapping functions.

117. Ultimately, IWRM introduction promotes increase of employment and incomes of the population engaged in water-using sectors of economy, improvement of population's health by creating sustainable system of drinking water supply, rehabilitation and preservation of environment, preservation and rational use of land, water-energy and other natural resources. Besides, involvement of great number of people in IWRM processes will promote education and total growth in labor force.

C.2. Assessment of Kyrgyzstan and Kazakhstan's capacity for IWRM introduction

C.2.1. Regulatory basis

118. Adoption of Water Code of Kyrgyzstan in 2005 had allowed creating a legal basis for IWRM introduction. In Water Code, from formal point of view, there is no mentioning

of IWRM, even definition of IWRM's notion. Moreover, most provisions of this enactment are indirectly pertinent to IWRM principles considering procedures of management as «integrated system of measures, rules for development, rational use, protection of water resources and environment, protection of people's health, as well as protection from dangerous water impact». Analysis of Water Code allows revealing its coincidences with IWRM principles as follows:

- Observance of integrated approach to water resources management (article 5);
- Observance of basin approach on hydrographic principle in use and protection of water (article 5);
- Coordination of the executive agencies and other organizations' activity in national water resources management (articles 9 and 10);
- Participation of all stakeholders in planning, making and implementation of management decisions (article 6);
- Equal and guaranteed access of the water users to water resources (article 6);
- Economic value of the water resources and introduction of paid water use (articles 6, 40, 48, etc.);
- Formation of democratic institutions of water resources management (articles 5, 9, 10, 77, 79, etc.);
- Planning of use and protection of water resources on basis of national water strategy and basins' water plans (articles 18, 19 and 20);
- Transparency and accessibility of information on water resources use (article 6);
- Integrated regulation of water protection (chapter 9);
- Use of «pollutant pays» principle (article 6);
- Regulating water resources use on basis of licensing of water use (chapter 4), etc.

119. It should be noted that Water Code of KR is a framework enactment and does not specify mechanisms and procedures on implementation of regulations. This circumstance causes necessity in elaboration of additional enactments regulating such issues. However, to date, Kyrgyzstan has been using numerous documents regulating water relations implemented as far back as in Soviet era and often contradicting Water Code and IWRM principles. Besides, in Water Code, it is not difficult to find a number of shortages and contradictions. Most significant of them is a disputable article 11 contemplating combination of the regulatory, control and economic functions for key control body of water resources - State Water Administration (SWA). In total, to date the foreign and national experts have revealed more than 40 contradictions, incorrect formulations and disputable provisions in Water Code. This witnesses necessity in considerable revision of regulatory basis for its adaptation to conditions of Kyrgyzstan and advanced global trends of development of water law. Proposals in this respect prepared, for example, under implementation of World Bank IWRM Project, include development or updating of a package of 92 enactments regulating water policy.

120. National base of Kazakhstan's water law to date appears to be more developed, in comparison with Kyrgyzstan and includes:

- Constitution of Kazakhstan;
- 6 national codes including key enactment – Water Code of RK adopted on 09.07. 2003 No.481-II and revised under Law of RK dated 12.02. 2009 No.132-4 On Amendment of Water Code of RK;
- 36 laws of RK;
- 21 decrees of the President of RK;
- 98 special decrees of Government of RK;

- 65 edicts of the President, Premier, as well as enactments of ministries and agencies of RK;
- 21 international enactments on interstate water relations.

121. Article 6 of Constitution of RK declares that land and its resources, water supply, plant and animal life, other natural resources are owned by the state. In Kazakhstan, the state and private ownership are recognized and equally protected. Ownership should concurrently serve for the public benefit. Subjects and objects of ownership, scope and limits of the owners' rights, guarantees of their protection are governed by the law.

122. Water Law of Kazakhstan is based on the following principles:

- 1) Acknowledgement of the national standing of water being a base of population's life and activity;
- 2) Immediate drinking water supply to population in required quantities and guaranteed quality;
- 3) Fair and equal access of population to water;
- 4) Integrated and rational water use with application of modern technologies to reduce water intake and adverse water impact;
- 5) Use of water objects along with their protection;
- 6) Serviceability of special water use;
- 7) Compensation of damage caused by violation of Water Law of RK;
- 8) Inevitability of responsibility for violation of Water Law of RK;
- 9) Publicity and public involvement in use and protection of water resources;
- 10) Accessibility of information on water resources state in RK;
- 11) Use of transboundary water on basis of international norms and agreements ratified by RK.

123. Objectives of Water Law of Kazakhstan:

- 1) Carrying out of the state policy in use and protection of water resources;
- 2) Regulating water relations;
- 3) Provision of legal basis for support and development of sustainable water use and protection of water resources;
- 4) Definition of main principles and directions of use and protection of water resources;
- 5) Management of relations in study, exploring, rational and integrated use and protection of the water resources and water structures.

124. Key provisions of Water Code of RK:

- Article 4 states that water resources of RK include summation of all water objects within Kazakhstan incorporated or subject to incorporation in the state water cadastre;
- Article 5 states that water objects of Kazakhstan cover water concentrations in land surface irregularities and bowels of the earth having borders, volume and water regime. They are: seas, rivers, equated with them canals, lakes, glaciers and other surface water objects, part of resources containing ground water;
- Article 7 states that water resources of Kazakhstan present surface and ground waters concentrated in water objects which are being used or might be used;
- Article 8 regulates ownership as follows:
 - a) Water resources of Kazakhstan are owned solely by the state.
 - b) Water resources are owned, used and possessed by Government of RK.

c) Actions of the persons and corporate entities violating state ownership for water objects are illegal and imply responsibility stipulated by the laws of RK.

125. Comparative analysis of water laws of both countries witnesses that current Water Law and bylaws of Kazakhstan, in general, does not contradict to introduction of IWRM principles, though requires additional revision and development. While Water Law of Kyrgyzstan requires considerable update taking account of recent cardinal political and institutional reforms and in IWRM context.

C.2.2. Government bodies

126. After 1993, Government of KR including central bodies participating in water resources management has been repeatedly reformed. Despite this, management of water resources and water infrastructure existing until 2013, even after several stages of reforms and enforcement of progressive water law, still has features of institutional policy of Soviet Era. This system had foreseen authorization of a number of central executive agencies with water resources management, at weak development of horizontal links and inadequate coordination of cooperation between them, excessive centralization of management at which most decisions are taken at the national level. Vertical structure of the power has included the national, oblast, district and local (municipal or systemic) level of management, i.e. did not use a hydrographic principle.

127. In late 2009, measures on radical reforming of management system of water sector in KR were taken. These measures have envisaged:

- Establishment of Ministry of Natural Resources (MNR of KR) responsible for management of land, water resources and mineral resources;
- Transformation of former Department of Water Management into «Irrigatsiya» State Enterprise responsible for MOM objects of irrigation infrastructure and irrigation water supply, as well as its transfer from former MAWR of KR to MNR of KR;
- Establishment of new Agency of Water Resources (AWR) responsible for the national water resources management at MNR of KR.

128. However, mentioned measures have not been not implemented, as after known political events in April 2010 in Kyrgyzstan, Temporary Government of KR took decision (Decree No. 41 dated 5 May 2010) on setting of independent State Committee on water management and reclamation as part of «Irrigatsiya» State Enterprise and AWR which were removed from MNR of KR. Later, as a result of reforming of Government of KR, Department of Water Management and Reclamation under Ministry of Agriculture and Reclamation was established.

129. Thus, at present, key control organs of water resources of KR are:

- Department of Water Management and Reclamation of Ministry of Agriculture and Reclamation is authorized with management of water resources and objects of irrigation infrastructure;
- State Agency of Environment Protection and Forestry under Government of KR (SAEPF) is authorized with environment protection including water resources and rational natural management;
- ME of KR is authorized with population protection from emergencies of natural and human character, including adverse water impact. Main Department of Hydro

meteorological Service in ME of KR monitors natural surface water objects and water resources;

- MFA of KR is authorized with regulation of interstate water relations;
- Department of State Disease Control in Ministry of Health of KR is authorized, inter alia, with regulating water resources use for drinking, utility needs of population, as well as for stockbreeding and processing sectors of agricultural products.

130. Apart from above key executive agencies, sectoral water-using ministries participate in water resources management of KR, e.g., Ministry of Energy of KR, local and self-governing authorities, water utilities and sewer enterprises, including «Bishkekvodokanal», «Kyrgyzjilkommunsoyuz», special state enterprises on standardization, metrology, state statistic reporting, control of civil works and others.

131. Generalizing of current management practice and regulations on executive agencies of KR allows revealing overlapping of executive functions, especially in regulatory, monitoring and supervision spheres. Besides, insufficiently developed integrated approach to issues of management, there are no effective mechanisms of responsibility for proper fulfillment of power. Inefficient current system of water sector management in KR is explained by the following:

- Weak personnel and technical capacity of the control organs, especially, their regional units;
- Shortage of investment allocated for upkeep of control organs and personnel's salary;
- Lack of single national information system and database on state and use of water resources for guaranteed access of all stakeholders to data;
- Unordered division of activity and weak coordination of the control organs cooperation.

132. Therefore, scheme of water sector management of KR in whole appears to be insufficiently structured and not adapted to IWRM, thereby each executive agency separately does not have capacity for efficient fulfillment of functions and powers. During preparation of this report, temporary structure of water sector management of KR had not been finalised. It is expected that at this stage reforms, above shortages in institutional structure will be as far as possible eliminated.

133. In contrast to Kyrgyzstan, water sector management of Kazakhstan is more adapted to IWRM and is more sustainable. In Kazakhstan, hydrographic principle of water resources management has been already introduced envisaging 5 levels of management:

- Interstate level covering all transboundary water objects;
- State level covering objects of strategic water infrastructure or being in national ownership based on Decree of the President of RK dated 01.11.2004 No.1466 and Decree of Government of RK dated 21.12.2004 No.1344;
- Basin level covering objects within approved borders of water basins;
- Local level covering objects of water infrastructure in utilities ownership;
- Water users covering objects of water enterprises and on-farm I&D systems and structures.

134. Key executive agency in regulation of water resources use and protection is Committee on Water Resources in Ministry of Environment Protection and Water

Resources. Regional bodies of Committee are basin water inspections, e.g., Chu-Talas BI, state enterprises responsible for state water systems management, e.g., Tarazvodhoz enterprise, basin water inspections (BWI), regional hydrologic expeditions, design and other organizations. Apart from stated Committee, in the national water resources management of RK participates:

- Committee of Forestry and Hunting Industry of MA of RK regulating water zones and protection stripes;
- Committee of Fishery of MA of RK regulating water fauna protection in water objects and water structures;
- Committee on Rural Area of MA of RK regulating organization of drinking water supply to rural area;
- Ministry of Energy and Mineral Resources of RK regulating use of reservoirs of the integrated and energy designation, as well as ground water;
- Ministry of Environment Protection of RK regulating water resources protection;
- Ministry of Transport and Communication of RK regulating water objects use for transportation;
- Ministry of Industry and Trade of RK regulating water objects use for industry;
- Ministry of Health of RK - sanitary and epidemiological control of water objects;
- Ministry of Emergency of RK taking preventive measures on security of water structures, prevention and management of adverse natural and human impact on water;
- Ministry of Foreign Affairs of RK jointly with CWR of RK regulating interstate water relations;
- Agency of RK on Land Resources Management regulating land relations on lands of water resources;
- Agency of RK on Natural Monopolies regulating tariff policy for water supply services.

135. Apart from above national executive agencies, , local administrations (akimats of oblasts and cities), water utilities and sewer enterprises, special state enterprises on standardization, metrology, state statistic reporting, control of civil works, and others also participate in water resources management of RK within their competences.

136. Assessment of existing management of water sector of RK allows concluding that it, in whole, does not contradict IWRM principles, but implies necessity to further strengthen coordination of the parties' cooperation involved in management.

C.2.3. Non-Governmental Organizations

137. Water Code of KR contemplates participation of a number of coordinating, consultancy and other organizations in water sector management of Kyrgyzstan, including:

- National Water Council;
- Basin water councils;
- National Commission on Dams' Security;
- Commissions on I&D at the national, basin and district levels.

138. Water Code of KR also attributes the body corporate of water users–WUAs to NGOs. From this list, WUAs are the most developed to date supplying irrigation water to the independent manufacturers of agricultural products. After adopting of Law of KR «On Water Users Associations» in 2002, over 470 WUAs covering more than 70% of

country's total irrigated land have been established and are operational, including over 100 WUAs in Chu oblast and more than 60 WUAs in Talas oblast. Having said that, implementation of programs on WUAs development is still not completed. Establishment of enlarged body corporate of water users in rural area – unions and federations of WUAs is being established slowly. Totally, at present in Kyrgyzstan, 14 unions and federations of WUAs are established, including 8 in Talas oblast and 1 in Chu oblast. Not all WUAs have fully taken the fixed funds on-farm irrigation network on their balances, this process is still not completed in nearly 50 WUAs.

139. One of first real steps in the IWRM context was establishment of the local public water councils with participation of WUAs, self-governing authorities, state water bodies under DWR and other stakeholders. Now, more than 40 such councils are already established in the country. Intense development of WUAs and water councils in Kyrgyzstan was predicated by the financial and organizational support of external donors – WB, ADB, USAID, Japan, Switzerland and other countries. Significant organizational and methodical aid in establishment and capacity building of this structure are also provided by the Central and 7 Regional Divisions of WUA Support in DWRA of KR. Assertion that WUAs, unions and federations of WUAs activity in Kyrgyzstan still has not sustained nature due to weakness of economic, technical and human resources is appropriate. Therefore, it can be implied that WUAs and FWUAs will need an overall support in years to come.

140. Other democratic institutions, participation of which in water sector management is contemplated by Water Code, are not established yet or only started to be organized. For example, National Water Council was formally established as far back as in 2006. In 2013, its first meeting was held. In the middle of 2008, Talas basin council was the first one formed in the country which included also the representatives of the control organs of Kazakhstan. Several meetings of this council have been already held and plans of its work for current year were elaborated. Program on implementation of World Bank IWRM Project foresees establishment of the second Water Council in the nearest time, supposedly in the south of the country. To date, such public consultancies as Commission on Dams' Security and Commission on Irrigation and Drainage are not created, though proposals on establishment of these organizations have been already prepared.

141. Water Law of Kazakhstan envisages limited participation of public organizations in national water resources management, in comparison with the Kyrgyz Law. For example, article 43 of Water Code of RK contemplates establishment of basin councils (BC) which are assigned a role of advisory and consultative bodies on rational use and protection of water resources at the basin level. Based on this norms in Kazakhstan, with UNDP support, 8 basin councils were established, e.g., Chu-Talas BC consisting of 34 representatives of the state and public organizations, including 4 representatives of Kyrgyzstan. Moreover, it should be admitted that many decisions of basin councils are non-regulatory and are often not followed. Therefore, it is required to raise a legal status and broaden powers of the basin councils, allocate additional staff and find additional funding for their efficient activity.

142. In Kazakhstan, there are still no any national advisory and consultative bodies similar to the National Water Council in Kyrgyzstan. However, proposals on establishment of such NGOs like Water Partnership Council and Commission on Water and Sanitation were elaborated.

143. Water Code of RK refers to public organizations also the water conservation condominiums with total shared ownership of water conservation systems as the single assets. To date, various subjects related to this category of NGOs are operating in Kazakhstan, e.g., cooperatives, partnerships of various types, farmers, water users associations, agricultural water users' cooperatives (AWUCs).

Total number of them in Jambyl oblast is over 15 000. At present, more AWUCs are founded to supply irrigation water to the independent manufacturers of agricultural products. After adopting Water Code of RK and Law of RK «On Water Users of AWUCs», presently 64 AWUCs are already established in Chu-Talas basin. Moreover, article 97 of Water Code of Kazakhstan contemplates formation of water conservation condominium - special form of property ownership as a single asset. At present, they yet have to be formed in Chu-Talas basin.

144. In Kazakhstan in recent years, research and ecologic type of NGOs are becoming active, advocating sustainable development of water ecosystems and rational water use. Summary assessment of trends of NGOs development in water sectors of both countries allows concluding that appreciable progress was achieved only at establishment of body corporate of independent water users at the local level, i.e. WUAs, FWUAs, AWUCs and water councils. While the national public advisory and consultative bodies are still not operating, and similar bodies at the regional level (basin water councils) in Kyrgyzstan are in process of establishment, and in Kazakhstan already created, but their role in making and controlling of fulfillment of management decisions is still minor. Therefore, current NGOs capacity in both countries is considered as inadequate from IWRM introduction point of view.

C.2.4. Economic capacity

145. Norms of legal basis of regulating water-economic policy in Kyrgyzstan and Kazakhstan do not significantly differ from each other. Particularly, laws of both countries admit the priority of market relations; contemplate user pays principle of any water works and services, including water supply services and payments for wastewater and pollutants discharge into the natural water objects. Water codes of KR and RK also specify payments for water resources use but these norms were implemented in Kazakhstan only in 2009, and in Kyrgyzstan to date are not introduced.

146. Kyrgyzstan was the first among Central Asian countries which back in 1994 has legally introduced paid services for irrigation water supply to the farmers. However, owing to long difficult macroeconomic situation in the country, base rates of irrigation service fees remain practically invariable from 1999 to 2010, despite dynamics of inflation, national exchange rate and prices for goods, works and services. Similar situation is in the water utilities sectors. In late 2009, former Government of KR had tried to sharply raise tariffs for the most services but those decisions were annulled in May 2010.

147. Base rate for irrigation water supply to most districts of KR during vegetation is 0.03 som/m³, to mountain and economically unfavorable districts – 0.01 som/m³, to the water users of industrial sector – 0.1 som/m³. For non-vegetation, tariff rate for all rural water users is lowered up to 0.01 som/m³. In 2010, new tariff for water users of health, science, culture, and other sectors was approved as 0.01 som/m³.

148. Payment of water service fees is not over burdensome for the water users of agrarian sector of KR as its share of costs for agricultural products is less than 2-5%. Nevertheless, current tariff for irrigation services appears to be inadequately low and not stimulate extensive introduction of rational water use.

149. Total ISF collection 1996 to 2008 was raised nearly thrice but in 2009-2010 has sharply decreased owing to worsening of political and economic situation in Kyrgyzstan. Therefore, specific ISF input in total annual financing of irrigation sector from the national sources remain small, on average about 20%. Current input of the ecologic resources, being formed from collection of environment pollution fees, in financing of water resources protection is also insignificant. It is apparent that in these conditions main internal source of financing on management and protection of the national water resources, maintenance, operation and development of water infrastructure is still the government budget. However, limited government budget of KR does not allow fully satisfy growing financial requirements of the national water sector that leads to degradation of water ecosystems and infrastructure. This circumstance objectively forces Government of KR to regularly use support of the international organizations, financial institutions and agencies of development of countries with advanced economy.

150. Paid water use in Kazakhstan was introduced starting from 1991. Introduction of water fee is predicated by market economy principles that are reflected in new Water Code of RK. Payment for the water resources use, water supply and discharge in the irrigated agriculture includes:

- a) payment for water resources use;
- b) payment for water supply services.

151. Payment for water resources use comprise payments for the right of water objects use and payments for water reproduction and protection. First ones in them present a water tax. Payment for water reproduction and protection includes costs for all economic activities in water sources and water courses directed at general water site improvements. Listed payments until 2008 had been charged under a single but differentiated on river basins rates for surface water resources use approved by Decree of Government of RK at 3.31 tyyn/1 m³, but according to Decision of 2008 Jambyl Oblast Maslihat they amount to 0.43 tyyn/1m³ of water supply. Payers for water are the persons and corporate entities using surface water resources (primary water users). Payment to the budget is made at the place of special water use as mentioned in licence. After receiving of these funds in budget, the local authorities allocate them at their own discretion.

C.2.5. Technologies of management and water use

152. After obtaining of their sovereignty, Kyrgyzstan and Kazakhstan have implemented tens of international projects which more or less envisaged rising of knowledge of the local specialists and widening of access to progressive management technologies, natural management and water complexes' operation. Hence, there are already appreciable positive results, e.g. related to broad distribution of computers and office equipment, modern mobile communication, technologies of information processing and dissemination, less – with distribution of new devices, mechanisms and equipment. Moreover, statement that technologies and management procedures applied in water sector of the both countries have slightly changed in comparison with Soviet Era is relevant.

This situation might be explained by 3 main reasons: deficit of investment limiting large-scale application of new ideas and equipment, lack of moral and economic incentives for active introduction of progressive achievements of the world engineering science, inadequate awareness of the control organs' personnel, water enterprises and other organizations related to use and protection of water resources. Therefore, programs on application of new technologies in water sector are often initiated not by the national bodies, but by international projects, scales of introduction are limited by one or few pilot objects. Exception are programs on rehabilitation and upgrade of communication, objects of irrigation infrastructure, water supply systems in rural area implemented under World Bank, ADB, other external donors' projects, and national investment plans. Work in this direction continues in many regions of the country.

153. One important circumstance should be noted— delivered to Kyrgyzstan and Kazakhstan with support of external donors costly facilities are often used inefficiently if favorable institutional conditions for their introduction are not preliminarily created, personnel is not trained and other measures are not taken. Therefore, tasks of dissemination of information and creation of incentives for active introduction of new technologies are now the most critical. For objective assessment of capacity of Kyrgyzstan and Kazakhstan's water sector, from the prospects of IWRM introduction point of view, it is required also to consider the following factors:

- In Kyrgyzstan, in 1997 basic mechanism of state regulating of water resources use – licensing of water use implying procedures on getting licenses for water intakes from natural water objects or water, wastewater and pollutants discharge into the natural water objects was unduly dismantled. Re-establishment of licensing of water use at completely new level as contemplated in Water Code of KR should be most essential task;

- National monitoring system and estimation of water resources have significantly degraded in recent years in both countries. Number of observation stations and posts has sharply reduced, especially in hydro meteorological service network and on-farm irrigation network, equipment and communication monitoring have deteriorated. Control of water resources quality has minimized and is occasional, e.g., in cases of receiving of data on unit pollutants discharge. Generally, obsolete technologies of collection, processing and dissemination of hydrologic data are used. Improvement of water sector monitoring is mainly carried out under international projects and in limited pilot objects. If absence in Kyrgyzstan and Kazakhstan of single national database on water resources, isolation of institutional information systems, incompleteness and inadequate validity of operative data is taken into account, then it is more relevant to conclude not about some shortages, but about system crisis covering all monitoring aspects;

- State and institutional statistics reporting on most issues of water relations has also slightly changed in comparison with Soviet Era. Analysis of existing procedures and forms of reporting allows revealing the following fundamental shortages in this system:

- a) Most types of reporting do not imply their use for making operative management decisions, but only for statement of situation of reporting subject in its responsibility zones for the previous period;

- b) Most reporting data are not structured by importance and immediacy of information, have overlapping or excessive indicators not used for practical purposes;

- c) Institutional reporting used by the national executive agencies often applies various indicators, do not marry each other and with the state reporting and do not provide free access for all stakeholders to database;

- d) Procedures on reporting are poorly adapted to the modern IT based on use of computers, products and possibilities of Internet;

e) There are no efficient administrative and economic mechanisms of responsibility of reporting subjects for validity and timeliness of data provision. Consequently, the control bodies often have to take decisions based on incorrect information.

- Due to decline of industrial and agricultural production and rather moderate development of other water-using sectors of economy, Kyrgyzstan, in contrast to Kazakhstan, does not acutely suffer water resources deficit. But in both countries inadequate attention is paid to preventive introduction of water saving and disposable technologies, prevention of natural water objects' depletion, sustainability and development of water ecosystems. Taking account of development prospects of demographic situation in Central Asian region, expected recovery and further development of production and negative global climate change, such short-sighted policy may lead to aggravation of situation in water sector in the near future.

154. Along with above stated, weak capacity of organizations on water systems O&M, water protection and liquidation of adverse water impact, using water objects for recreation, cultural-health and other purposes evoke anxiety.

155. Summation of above facts allows assessing current water sector capacity of Kyrgyzstan and more stable capacity of Kazakhstan as insufficient for quick learning of IWRM mechanisms.

C.2.6. General problems and risks of IWRM application in Kyrgyzstan and Kazakhstan

156. At formal comparison of IWRM based on principles stated in Section C.1 of report with an ideology of water sector management previously adopted in USSR and to a large extent remained to date in Kyrgyzstan and Kazakhstan, it can be implied that IWRM ideas are not essentially new for the both countries. They add in water relations practice developed in Soviet era only 2 additional elements:

- Participation of public in water resources management;
- Regulating economic relations in water sector on basis of market models.

157. Following this logic, for the countries with certain experience in establishment of independent water users associations, basins and water councils, introduction of paid water use, implementation of institutional, economic and process transformations envisaged by the national laws should not cause serious problems. However, for achievement of IWRM purposes at reforming of water sector management, the following cardinal changes in traditional mechanisms and stereotypes of management are required:

- Transfer from management of water resources and water infrastructure objects within administrative-territorial borders to management on hydrographic principle, i.e. within water basins and water systems;
- Transfer from administrative-command methods of management to corporate methods of management of distribution type, with participation of the water users and public in discussions and making decisions;
- Transfer from authoritarian «top-down» type management to democratic management with «bottom-up and top-down» feedback. This means that technologies of regulating water use should be based on needs of the water consumers and their participation in elaboration of management solutions («bottom»), as well as on mainly legal, economic and licensing regulation of water use and supporting the water users («up»);
- Transfer from institutional management to coordinated interagency management;

- Transfer from administrative regulation of water intake and water resources use to regulating water demand by the legal and economic mechanisms;
- Delimitation of resources management, supervision and service provision in the control organs.

158. With decent base might be implied that mentioned measures on radical transformation of management mechanisms will require revision of many enactments, relations between the control organs and water users, preventive training, not to say about adequate financial and logistical support. Kazakhstan having stronger economic capacity and, thereto, long sustainable political situation in the country has achieved considerable progress in institutional reforms.

159. Whereas in Kyrgyzstan, delays in carrying out of reforms are typically reasoned by repeated aggravation of internal political situation, lack of funds, less often – technical or human resources weakness. Acknowledging objectivity of similar reasons, at the same time it is impossible to explain lack of any transformations in water sector for a long time only by them. For instance, for implementation of such tasks like revision of regulatory basis, establishment of public control organs or improvement of executive agencies functions, additional big investments are not required, it is necessary merely to be proactive, take decisions and control the further fulfillment of these decisions. Lack of similar initiatives can be explained only by subjective reasons: lack of motivation, hidden conflicts of interest among executive agencies involved in water sector management, prevalence of corporate or personal interest of decision-makers over the state interests. If this statement is convincing, then priority tasks cannot be referred only to overall capacity building of water sector, but also to special actions to change behavioral motives of all stakeholders.

160. But benefits might fully show up only after new institutional system is reformed and have ample sustainability. Accordingly, 2 alternative consequences of implementation of measures on IWRM introduction in Kyrgyzstan might be foreseen – either these measures will serve as strong incentive for development of the national water sector, or will be limited with another bureaucratic campaign on restructuring of the state management system which have been held in Kyrgyzstan repeatedly and inconsequently in recent decades. Ultimately, it is relevant to state that success of reforms in both countries will depend on:

- Making political decisions and commitments at the government level;
- Support of reforms (or, at least, absence of obvious or latent opposition to these reforms) by the stakeholders;
- Active participation of the beneficiaries (water users), NGOs and public in planning and implementation of reform;
- Upgrade and strengthening of organizational structure in the context of IWRM principles.

C.3. Preparation of joint IWRM plan for the Chu and Talas rivers basins

161. The next phase has covered updated list of tasks for Kyrgyzstan and Kazakhstan depending on their priority. For that, the following 5 categories of tasks' urgency on IWRM introduction were set:

- I – Key task of IWRM introduction requiring implementation as a matter of priority;

II – Urgent task previously not implemented in KR and RK and requiring starting implementation in the short term;

III - Urgent task already being implemented in KR and RK and requiring further active implementation;

IV – Urgent task implementation of which in KR or RK in the short term is unfeasible due to limited financial support, weak infrastructure and other objective reasons;

V – Task not being urgent for current conditions in KR or RK, e.g., due to limited effect of implementation

162. Based on these provisional categories, the experts during joint working meetings have justified and agreed the list of priority measures required for successful IWRM introduction in water sector of Kyrgyzstan and Kazakhstan and format of joint IWRM plan. In this format draft plans on IWRM introduction were prepared mainly considering the national interests of Kyrgyzstan and Kazakhstan. Then, during mutual consultations draft joint IWRM plan was elaborated, repeatedly discussed at working meetings of the Commission's Secretariat, then at regular meeting of the Commission held in April 2010.

163. Final joint IWRM plan for the Chu and Talas Rivers basin is presented in Annex 2 to this report.

164. It should be highlighted that during preparation of joint IWRM plan the experts, especially, representatives of Kyrgyz side, have faced objective challenges conditioned by instability of political and economic situation in the country. Particularly, in view of prospects of yet another reforming of the state bodies after amending Constitution of KR, it was impossible to assess required funding for implementation of IWRM plan. This owes, for instance, to regular revision of base parameters of government budget related to financing of the water sector and control organs, and previously approved long-term programs on development of water protection measures also require adequate revision.

165. Preparatory works for IWRM introduction in Kyrgyzstan may include:

- Development and revision of enactments regulating activity of the new state and regional control bodies of water resources;
- Development of proposals on transfer to water resources management on basis of hydrographic principle;
- Development of proposals on revision of the water, conservation and other laws of KR in the context of IWRM;
- Development of proposals on formation of single national information system in water sector of KR, improvement of procedures and indicators of the state and institutional statistics reporting, processing and provision of transparency databases;
- Development of proposals on establishment of the public institutions involved in water resources management, like national water councils, basin councils, etc;
- Proposals on further establishment and capacity building of WUAs and FWUAs, transfer part of objects of the state water infrastructure to them for management;
- Preparation of plans and training programs for the control organs' personnel and independent water users in advanced management technologies in the context of IWRM.

D. Improvement of cooperation in conservation, monitoring and data exchange

166. Urgency of bilateral conservation cooperation in the Chu and Talas Rivers basins is predicated by the following ecologic problems of the both countries:

- Consequences of mudflow, flood, landslide, soil erosion, etc. often having transboundary impact;
- Potential threat for deterioration of water resources quality owing to water use growth, intensification of economic activity and inadequacy of water resources protection;
- Degradation of water ecosystems in zones of formation and dispersion of flow in Transboundary Rivers, including owing to water use growth and unordered water use.

167. For successful resolving of these problems in the short term, at least, strengthening of coordination of actions taken the by both countries at the national level is required. Further cooperation in water protection is recommended to be developed on basis of long-term programs, gradually covering spheres of mutual interest. They may include water resources protection from depletion, development and introduction of new technologies of waste water treatment, recovery of water ecosystems biodiversity, prevention of epidemics caused by the chemical and bacteriological pollution of drinking water sources, etc. of ADB RETA 6486-REG Project may contribute to formation of similar programs by conducting of survey on current ecologic situation in the Chu and Talas Rivers basins, summary of which is presented below.

D.1. Assessment of natural ecosystems

168. Current state of environment in both basins is predicated by particularities of the geographic and climatic conditions, anthropogenic impact and considerably depends on water. Chu River basin includes Chu valley and intermountain Chon-Kemin and Suusamyr depressions with slopes edging their ridges: Ile, Kyrgyz, Kungei, Talas Ala-Too, Suusamyr and Djungal. Datum level varies 550 to 4895m (Alamedin peak of Kyrgyz Ala-Too). Mountain slopes of Kyrgyz Ala-Too by their structure are asymmetric: southern spurs are short and high, northern - wide, some spurs reach 20 km, many river valleys and gorges, large ones: Karabalta, Ak-Su, Sokuluk, Ala-Archa, Alamedin, Issyk-Ata, Kegeti, Shamsi, North and East Karskol. Above 3500 m elevation, cliff, snow and glacier belt start. In the east, Chu valley transfers to Kichi-Kemin valley. Between Ile and Kungei Ala-Too mountains, in the east, Chon-Kemin valley is located. Southern part of basin occupied by Suusamyr valley located at 2000 - 3200m height.

169. Vegetative ground cover is spread over altitudinal zonality. Even area of Chu, Kichi-Kemin and Chon-Kemin valleys, and piedmont stripe is covered by semi desert-dry steppe belt where sierozem and bright-chestnut soils prevail. From natural vegetative cover, vermuth-ephemeral semi desert, vermuth-grasses, sheep fescue-vermuth steppes, marshy meadows, reeds and scrubs are met (sea-buckthorn, barberry, and brier). Foothills, low and middle slopes of mountains are occupied by steppe and forest-meadow-steppe belt in which prevail: chestnut, chernozem, chernozem-like, brown, meadow and other soils. In foothills, sheep fescue steppes, couch grass, mixed herbs steppes are mainly spread; above – meadow steppes and tallgrass meadows.

170. On bright slopes, steppe vegetation is located; on shaded - meadows, scrubs and sparse forests. In the northern slopes (above 1300 m), scrubs (brier, ipecac, barberry, etc.) and forests grow. On gorges of Kyrgyz Ala-Too, in Chon-Kemin valley sparse forest from fir, juniper, birch, maple, rowan, etc. are met. Most of Suusamyr valley is covered by chestnut and bright-chestnut soil common to mountain steppe landscape (stipa, couch grass, vermuth, etc.). Subalpine meadows and meadow steppes start at 2400 m height and distinguished by vegetative cover diversity. Alpine meadows are located at more than 2800 m height, there usually grow kobresia and motley grass. In herbage of alpine

steppes, sheep fescues prevail; from scrubs only dwarf rowan, some species of brier, humifuse juniper are met. Above 3600 m elevation, glacial-nival belt is located.

171. Within Talas valley and mountain fringe the following geomorphologic complexes can be highlighted: mountain, piedmont-plain and plain. Topsoil is composed of mainly sierozem and chestnut soil with minor impregnation of chernozem. Desert-steppe and desert part of basin is presented by gray-brown takyric soil and sand massifs. Soil in these zones is low-humic, often saline and used mainly under pasture.

172. In foothills of Talas Ala-Too on neogene and paleogene rock, tectonic, erosion and accumulative types of terrain are formed. In even land on alluvial proluvial quaternary rock, steep and sloping plain is formed. Topsoil changes in plains on latitudinal, in mountain slopes on altitudinal zoning. In plains (at 700-1100m height) common sierozem is formed; in semi desert (1100-600m), in low-hill terrains and foothills, mountain-valley chestnut soil is spread. In slopes of mountains soil is: bright-chestnut and dark-chestnut (at 1400—2100 m height), chernozem (2200-2600m).

Mountain chernozem developed in forest massifs. In the south-west and eastern slopes meadow-subalpine soil is met (at 2800-3100m height), subalpine meadow-steppe soil (2700-3400m). Alpine-meadow soil is spread at 3100 - 4300m height.

173. Vegetative cover spreading is subject to the vertical zonality law. Desert vegetation is met at 700-1200 m datum level. In vegetative cover, vermuth prevails. In spring, ephemeroids and ephemeroids prevail, and summer background is a vermuth. Steppe vegetation is spread in the low and middle altitude at 1300-2300 m heights. Within valley more than 40 steppe plants species are met. Of them stipa, sheep fescue, sedge, beard grass prevail. In some places, scrubs are wide spread. Meadow-steppe vegetation grows at of 2300-2800 m heights. More than 70 plant species are met. In steep slopes of mountains at 2200-3200 m height juniper and fir forests are met (Besh-Tash, Nyurmaralldi, Kalba). Among fir forest rowan, haw, ipecac, brier are met. In floodplain of the Talas River and gorges of Kenkol willow-birch, scrub forests are spread. Meadow forms small massifs (Besh-Tash, Kyumyshtag, Nyldi, and Uch-Koshoi). Subalpine meadows are met in the northern slopes of mountains at 2600-3100 m datum level. Following plant formations prevail: bluegrass, hedgehog, lady's mantle. Geranium, globeflower altaica are also wide spread. Alpine meadows are developed at 3300-3800 m heights. Basic background is presented by kobresia formations. Silverweed, bluegrass, geranium, sedge, primula are also met. High-mountain steppes are met in the southern slope of Kyrgyz Ala-Too. Base is constituted with fatuoid, vermuth-fatuoid, fatuoid-kobresia, bluegrass-fatuoid formations.

D.2. Assessment of surface water resources

174. The Chu River is the biggest water object of Chu valley. According to data of Main Hydrometeorology Department of ME of KR, the Chu River basin is most exposed to pollution. Qualitative composition of the Chu River basin is formed in zone of flow formation (Naryn oblast) under natural impact, in zone of flow transit and dispersion (Chu oblast) - under anthropogenic impact.

By chemical composition, river water belongs to hydrocarbonate class, calcium group, in middle and downstream, increase of sulfate-ion is observed. Water salinity of the Chu River throughout the year depending on hydrologic mode varies 192 mg/l to 468 mg/l.

Water pollution index (WPI) of the Chu River gradually increases from upper reaches downstream and has its highest values near Vasilyevka village, nearby wastewater discharge from treatment plants of Bishkek where WPI is 0.97. On average, water pollution index of the Chu River in 2008 was 0.47 that conforms to II class of water quality «Clean».

175. Water quality in the Talas River basin depends on pollution dynamics of glaciers, lakes, surface water and ground water and is mainly characterized by anthropogenic impact. Surface water quality of the Talas River basin has not been monitored since 1995. Occasional surveys are carried out by Environment Protection Analytical Service and labs on assessment of environmental impact by mining enterprises.

176. Summarizing lab surveys' data the following can be concluded:

- Physics of surveyed water courses (temperature, pH, turbidity, specific electrical conduction, redox capacity, dissolved substances) change slightly within their natural variation and not exceed MAC. Exception is content of suspended particles, exceeding MAC by several times during high water. In general, suspensions content in water is relatively low: 2-9 mg/l in low water up to 35-275 mg/l – during flood.

- Physical and chemical composition of water in surveyed rivers is currently little exposed to human impact and depends mainly on natural composition of rock in catch area, conditions of ground and surface flows formation.

D.3. Assessment of ground water resources

177. In the Chu River basin, 2 hydrogeologic basins are located which are interrelated directly with the Chu River and its tributaries:

- Kochkor hydrogeologic basin of ground water is limited to the like depression located in upper part of the Chu River basin. In Kochkor depression, predicted renewable ground water amounts to 18 m³/s. Approved reserves of Shams deposit estimate at 0.32 m³/s. In this basin, 277 wells of 0.85 m³/s total rate are now operating;

- Chu artesian basin, in which predicted renewable ground water amounts to about 71 m³/s. In this basin 2148 wells of 24.37 m³/s total rate are now operating.

178. Anthropogenic pollution by nitrate in settlements of Kochkor depression is less than MAC. Natural pollution is related to salinastone from which sulfate and chloride salt is desalinated.

179. In Chu artesian basin, maximum anthropogenic pollution by nitrate is observed in settlements. This is mainly related to large settlements with comparatively developed industry - Bishkek, Karabalta, Tokmok cities and location of mining enterprises where local pollution of ground water is observed.

Most enterprises - water users discharge untreated and insufficiently treated wastewater into terrain area, dry ravines and riverbeds, for watering plantations, as a result, local pollution of ground water is observed.

180. Water to Bishkek is supplied from Ala-Archa and Orto-Alysh deposits. Systematic inspection of ground water state conducted near Bishkek allowed revealing sustainable ground water pollution by nitrate as far back as from beginning of 1980 which to date has an areal nature.

Pollution by hex-Cr has a local nature. Discovered sources of water supply by this pollution are suspended.

181. Natural pollution of ground water in Chu depression is related to desalination of salinastone with formation of high sulfate and chloride concentration, high content of fluorine is occasionally observed.

182. Salinity of shallow ground water has a dualistic origin (natural and anthropogenic). This event is widespread in the northern part of Chu depression where soil and ground water salinity occurs due to evaporation at WT less than 1-2 m, at non-observance of irrigation rates and poor condition of collector-drainage systems. In these cases, high salinity of ground water with mainly sulfate and chloride composition up to 10 g/l is observed.

183. Fresh ground water of Talas valley is centered in sedimentary sheath of Talas intermountain depression with quaternary deposit of 300 m and more. Fresh ground water to date is explored insufficiently, and according to data of 2000, in 4 major deposits amounted to about 228 thousand m^3/d of which about 170 thousand m^3/d are used (74%). Predicted fresh ground water, which after approval might be moved to the industrial category, estimates at 925 thousand m^3/d , and needs to be clarified. Natural transit of ground water in Talas and Chu basins is generally directed towards Kazakhstan. On 2 sections with 51 km total length, ground water intensity is 5 m^3/s .

184. Generalizing materials of surveys on ground water quality being conducted from 1976 to date, the following can be concluded:

- Ground water of morainic, glacifluvial, alluvial-proluvial and alluvial macrofragmental deposits of quaternary age (100-270 mg/l) has a minimal salinity. By chemical composition, it is hydrocarbonate with variable composition of calcium cation and sodium.

- in view of favorable conditions for interaction of surface, rain and melted waters, as well as owing to repeated transformation of surface flow into ground and back, qualitative indicators of background state of ground water of quaternary deposits and surface water differentiate slightly. General state of ground water in Talas basin might be assessed as satisfactory.

D.4. Assessment of population access to tap water

185. According to data of Department of Sanitary and Epidemiological Supervision of Ministry of Health of KR, in Chu oblast drinking water supply is 97.6 %, in Bishkek – 99%. Out of 320 villages, there is no tap water only in 2 villages. Out of 2708 samples on microbiologic indicators, 14.5% deviations from the norm were uncovered. Out of 1829 samples on physical-chemical indicators, 2.5 % deviations from norms were uncovered.

186. In Talas oblast, drinking water supply is 89%, 11% of population uses drinking water from surface sources. Out of 89 inspected villages, there is no tap water in 11 villages.

Out of 956 samples on microbiologic indicators, 7% deviations from norms were uncovered. Out of 775 samples on physical-chemical indicators, 0.21 % deviations from norms were uncovered.

D. 5. Assessment of anthropogenic impact on water objects

187. Most danger for sustainable state of natural water objects constitutes mining wastes. As a rule, mining waste continue to be stocked in floodplain of rivers. For instance, in Chu oblast, near village Ak-Tyuz, 4 tailing dumps are located of which 2 are not suspended.

In 2 other tailing dumps which are on Ministry of Emergency's balance 1.7 mil m³ waste of processing of polymetallic ore accumulated (thorium elements, salt of heavy metals). In case of failure of these tailing dumps, there is a possibility of tail material subtraction and radioactive pollution of the Kichi-Kemin and the Chu Rivers valleys.

188. Near Karabalta town, Karabalta mining combine is located which specializes in processing of ore and uranium concentrations of ground desalination, tin-wolfram-molybdenum concentrations and waste, processing and parting production. Waste is stored in special tailing dump of 244 ha total area. Most plots of tailing dump are suspended.

During the last 10 years, considerable decline of production, reduction processing, decrease of tail water and filtration have been observed. Furthermore, there is a high contamination of ground water in zone of combine.

189. Wastewater discharged into water objects of the Chu River basin amounts to 11.9 mil m³/year. Wastewater discharged into Talas oblast is comparatively small amounting 0.1 mil m³/year.

190. In Chu oblast at present, there are 35 municipal and institutional complexes on grey wastewater treatment. Efficiency of 23 treatment plants on objective indicators is satisfactory; operation of remaining treatment plants does not meet requirements of biological treatment plants.

All treatment plants were built in Soviet era and deterioration of economic state has caused grave problems in operation of treatment and sewerage plants.

191. Lack of funds for widening of these systems, their repair and rehabilitation leads to deterioration of treatment quality. Most large of them are:

- Treatment plants of Bishkek of design capacity 350 thousand m³/d. At present, about 280 thousand m³/d are processed. Mechanical and biological treatment amounts to over 90% of total treatment. Wastewater from these plants is discharged into the Chu River;

- Treatment plants of Karabalta utilities' department of 245 thousand m³/d design capacity. Over the last years discharge of wastewater has reduced to 70% owing to stopping or reduction of production enterprises. Wastewater from these plants is discharged into Tok-Tash ravine;

- Treatment plants of Kant settlement - at present receive flow mainly from dwellings which in month amounts to 3 thousand m³/d. In these plants, biological and mechanical treatment of waste water and their discharge into collector are executed;

- Treatment plants with mainly mechanical treatment of landscaping combine of Shopokov town, of total annual wastewater about 208.0 thousand m³/d. Of them 158.3 thousand m³/d are taken from population, from institutions, enterprises and organizations – 49.7 thousand m³/d,

- Treatment plants of Pivo-Belogodskoe JSC with mechanical and biological treatment of 4.2 m³/d design capacity and annual load of about 311 thousand m³/d,

- Treatment plants of Ekolog enterprise with mechanical and biological treatment of 22 m³/d design capacity. Main problem of these plants is mixing of ground and waste water.

192. Treatment plants in Talas were built in 1989 with design capacity of 3300 m³/d, operate only in mechanical mode. Wastewater from treatment plants is discharged into collector.

193. Due to lack of treatment plants in other settlements of Kyrgyz zone of Talas basin, especially, in district centers and at locations of processing industry enterprises, regular unorganized discharge of wastewater into Kirov reservoir and other basins takes place.

194. There is no valid information on negative impact of agricultural activity both from local pollution by untreated livestock flow, and from fertilizers and pesticides dispersion. However, at present crude manure containing waste of livestock is one of the most dangerous sources of water resources contamination.

195. In general, during long observations, surface water quality has met requirements of cultural and domestic basins. According to general assessment of the specialists, after 1992 reduction of industrial production, application of fertilizers and plants protection means have positively affected surface water quality.

Despite satisfactory state of surface water, during long observations, sharp short excess of various pollutants was registered in comparison with maximum allowable concentrations (MAC). Due to lack of systematic water quality monitoring, objective assessment of qualitative indicators of water resources is hampered, certain conclusions are based only on single measurements.

Local contamination of surface and ground waters in both basins is observed in tailing dumps of dangerous waste, landfills of domestic refuse, in discharge of insufficiently treated wastewater from city treatment plants, unorganized discharge from agricultural objects.

196. Based on survey results, priority measures on water ecosystems sustainability in both basins should be:

- Systematic observation of the quantitative and qualitative state of surface and ground water objects. For that, it is required to recover the number and upgrade technical base of observation network;
- Rehabilitation of technical state of water systems and introduction of new operation technologies for rational use of water resources;
- Restructuring of irrigated agriculture with preferable use of less moisture-loving crops;
- Introduction of water saving technologies in irrigated agriculture, industry and service sectors, use of closed, circulating and recurring-successive water supply;
- Rehabilitation and upgrade of existing local systems on wastewater treatment and commissioning of additional treatment plants for full stopping of untreated flow discharge;
- Rehabilitation of existing and construction of new drainage networks for WT lowering and prevention from the secondary land salinity.

D.6. Assessment of air state

197. According to data of Main Hydrometeorology Department of ME of KR, air is mostly exposed to pollution in Chu oblast, especially - in Bishkek, Karabalta and Tokmok cities. Data on air quality in these cities are presented in Table 3.

Table 3. Air pollution index (API)

Bishkek	0.08	1.69	2	0.77	10.27
Tokmok	0.08	0.69	0.5	-	-
Karabalta	0.08	1	1	-	-

198. According to data of National Statistics Committee of KR, about 36% industrial production of entire Kyrgyzstan is concentrated in Chu oblast, 28% - in Bishkek. Main sources of air pollution in Chu oblast including Bishkek are energy enterprises and utilities, producers of construction materials, enterprises of mining and processing industry, private sector, as well as vehicles. Factories of brick production on Chinese technologies (about 18 nr.) and foundry and smelter shops hugely contribute in region's air pollution, as they were built with violation of ecologic norms and without installation of gas and dust-trapping units.

199. Throughout the year, pollutants emission from stationary sources in Chu oblast: comprised

- Solid – 6.8 thousand ton;
- Gaseous and liquid – 5.8 thousand ton, of them:
- Sulfur dioxide – 1.0 thousand ton;
- Carbon oxide – 3.3 thousand ton;
- Nitric oxide – 0.8 thousand ton;
- Volatile organic components – 0.4 thousand ton.

In Chu oblast, at enterprises 233.3 thousand ton of pollutants were collected and decontaminated.

200. Pollutants emission from stationary sources in Bishkek comprised:

- Solid – 8.3 thousand ton;
- Gaseous and liquid – 8.1 thousand ton, of them:
- Sulfur dioxide – 5.8 thousand ton;
- Carbon oxide – 0.3 thousand ton
- Nitric oxide – 2.0 thousand ton.

In enterprises of Bishkek, 190.0 thousand ton of pollutants were collected and decontaminated

201. Pollutants in atmosphere show that portion of main impurities constitutes about 93÷97% of all pollutants. Among them most specific weight falls on solid substances (soot, ash, dust) which amount to 59%, sulfur dioxide amounts to 16-34%, carbon oxide 14-31% of all relevant substances. Among specific substances centerpiece is a hydrocarbon. Portion of remaining relevant impurities atmosphere is 2.35% of total emissions.

202. Systematic observations of air in Talas oblast by ME of KR were not conducted. However, it is known that main sources of air pollution in Talas oblast are the boilers of

«Teplocommunenergo», economic entities using coal for heating and production, as well as private sector and vehicles. Most air pollution in comparison with other zones of the basin is observed in Talas.

203. In Talas oblast, only 0.6% of Kyrgyzstan's industrial production is concentrated. Few and comparatively small enterprises (cheese-making, butter-making, tobacco, bakeries, mills, etc.) mainly process local by-products. Besides, there are small factories of construction materials, mainly brick factories.

204. Over the course of the year, pollutants emission from stationary sources in Talas oblast comprised:

- Solid – 0.05 thousand ton;
- Gaseous and liquid – 0.05 thousand ton, of them:
 - Sulfur dioxide – 0.8 thousand ton;
 - Carbon oxide – 0.07 thousand ton.

205. Carbon dioxide emissions from thermal power plants entail greenhouse effect that leads to climate change and other negative consequences related with these process, including glaciers melting and desertisation. Other emission - sulfur and nitric oxide in air transform into sulfur and nitric acid and return with snow or as acid rain.

206. Environmental impact of vehicles in Kyrgyzstan is worsening by increasing intensity of traffic and poor state of vehicles pool, as well as by supply of poor fuel to them. As a result of vehicles; work, about 86% of toxic pollutants from total emissions enter into atmosphere. Analysis of vehicles impact on environment pollution shows that they have most significant impact in the populous urbanized districts – in Chu oblast and in Bishkek. At the same time it is appropriate to state that air pollution problem has a local nature, common only for the large cities and industrial centres and is the least priority among other ecologic problems.

207. Priority measures on improvement of state of atmosphere state in both basins should include:

- Upgrade of existing gas and dust removal facilities, especially, at old enterprises;
- Use of alternative raw materials, technologies and production modification;
- Introduction of technologies using nonconventional and renewable sources of energy.
- Reduction of pollution from vehicles
- Ban of importing of leaded petrol.

D.7. Assessment of land resources

208. In Chu oblast, agricultural land accounts for 1355.6 thousand ha, including irrigated area – 314.5 thousand ha. Area of unsatisfactory irrigated area in the Chu River basin amounts to 52.8 thousand ha, including in Chu valley – 51.2 thousand ha, in Kochkor valley – 1.6 thousand ha.

209. In Talas oblast, agricultural land accounts for 743.5 thousand ha. Total area of saline and solonetzic land in the Talas River basin amounts to 4.1 thousand ha, irrigated area with high WT – 6.6 thousand ha.

210. 84% of farmers have arable land of less than 1 ha. With small-scale land, crop rotation, erosion prevention and other works which promote preservation and improvement of arable land fertility are hampered. Therefore, out of 1928.6 thousand ha of agricultural land (arable land and pasture), 60% is exposed to water and wind erosion. Land fertility is decreasing every year. Irrigation in big agricultural regions (Jayil, Panfilov, Moscow, Sokuluk, Isykati districts of Chu oblast, Karabuuri district of Talas oblast) is every year deteriorating, and waterlogged and unfavorable in terms of reclamation lands amount to 8.4%.

211. Main reasons for deterioration of irrigation are insufficient natural degree of drainage, absence or unsatisfactory technical state of collector-drainage network, huge water losses in filtration into irrigation canals, unregulated irrigation that predicated WT rising and development of the secondary salinity.

212. Grave problem is degradation of rangelands. With establishment of farm households and other private farms, near villages and spring-autumn pastures have started to be used mainly for cattle grazing. Cattle stocking per ha of pastures near villages is especially high in the south and in districts with high forest cover.

213. Unordered cattle grazing in high-mountain pastures leads to replacement of valuable herbage of mountain meadow with low-value plants not suitable for fodder. In recent years, in Chu and Talas basins, just as in entire country, minor, but sustained growth in livestock was observed. In comparison with 2000 Cattle and Small Ruminants have increased in Chu oblast from 578.4 thousand to 693 thousand, in Talas oblast from 404 thousand to 449.3 thousand. Increased livestock and reduced rangelands have increased load on pasture ecosystems, and, consequently intensified their degradation.

D.8. Assessment of impact of waste production and use on land resources

214. Problem of waste management both in the country, in general, and in the Chu and Talas Rivers basins is critical one. During active development of mining until 1992, millions of tons of production waste had accumulated in basins, including stripping soils of mining industry, inter alia, radiative, slime of tailing dumps, filtration sediments, various slags, etc., containing considerable heavy metals and other toxins. Despite general decline of industry, waste production continues to grow. Mainly this happens owing to mining and energy sectors. Conditions of maintenance of dumps of production waste notably differ in each concrete case, but, in whole, trend of deterioration of technical state of similar objects is traced up owing to long operation and shortage of funding for fair rehabilitation and safe maintenance. This predicates likelihood of incidents with subsequent emission of radionuclides and toxins in aqueous media.

215. In Chu oblast, over 3 mil tons of toxic waste of the mining and other sectors of industry have accumulated. In Bishkek, 0.3 thousand tons of toxic waste is concentrated in 25 former enterprises. Mainly it is a waste of galvanic enterprises stored in hermetic containers.

216. In Kichi-Kemin valley near Ak-Tyuz village, 4 tanks of polymetallic ore waste with thoracic pollution are located, of which 2 are not suspended. Medium gamma background in these tanks is 60-100 mCr/h, in anomalous sections - up to 1000 mCr/h. State of tailing dumps is deteriorating every year.

217. Tailing dump of Karabalta mining combine is located 1.5 km from Karabalta town and near hydrometallurgical factory, represents several alluvial plots. Area of the site is 268 ha, waste - 37 mil m³. Waste after processing has been stored by turns in one of plots, starting from 1955. During service life, pollution of tailing dump area has stabilized. Radiation is mainly observed on the surface of tailing dump and in some points has a maximum level up to 1500 mcR/h. There is sulfate and nitrate pollution of ground water with absence of a radioactive pollution. Maximum pollution depth of water near the tailing dump is 60 m; salinity is less than 3.6 g/l.

218. Buurda tailing dump for storing of waste from enriching plant in Orlovka village was built in 1954, has an area of 31.2 thousand m². Waste containing thorium, lanthanum and other heavy metals accounts for 62.4 thousand m³.

219. Most of toxic waste is accumulated at the enterprises' territory ignoring public health regulations or removed to the municipal ranges of solid domestic refuse. Its unauthorized removal to the crop lands, gulleys and borrow pits, discharge in basins causes in most cases pollution of the surface and ground waters, land and air.

220. Domestic waste has a huge negative environmental impact. Problems of its collection and disposal are being resolved unsatisfactorily. In the Chu River basin, there are 25 municipal landfills for solid domestic refuse, including Bishkek landfill. In rural settlements, as a rule, waste collection and removal is not organized.

Annually, about 1100 mil tons of only registered and hauled to the municipal landfills solid domestic refuse are formed in the basin. Landfill ranges are serious source of environmental pollution. Soil pollution by lead, arsenic, tin, manganese, chrome, zinc, copper, nickel and other toxic elements and compounds of heavy metals occurs in the landfill impact zone.

221. Another grave problem is the disposal of dangerous biological waste. It becomes acute owing to deterioration of sanitary-veterinary conditions of domestic and farm livestock keeping, emergence of a great deal of wild stray animals, increase of infected laboratory material (medical waste, lab waste), increase of poor imported food that transforms into veterinary condemned material. Difficulty in resolving of problem is in utterly wide dangerous chemical biotoxins which may be formed in handling of infected biological waste. Random inspection at places of disposal of biological waste has shown that it was mostly buried with violation of the ecologic, sanitary and other requirements. There are 38 dead piles and 14 Becker holes in Chu oblast. There are 15 dead piles and 2 Becker holes in Talas oblast.

222. Kyrgyzstan does not have its own pesticides production. However, now there are numerous landfills and storage facilities in which outdated and forbidden for application pesticides are kept. Based on preliminary inventory in Chu oblast, more than 42 tons of old and forbidden for application pesticides related to 1, 2 and 3 classes of danger were revealed.

Conditions of their storage are satisfactory. In Talas oblast, in former depots of «Selhozhimiya» Association about 11 tons of outdated pesticides were revealed. State of these depots in most cases does not conform to sanitation standards. As a result, pesticides enter into environment.

223. Summation of above presented data allows concluding that main negative anthropogenic impact on land resources within the both basins are an unordered storing of production and domestic refuse, obsolete technologies of agricultural production and irrigation, absence or unsatisfactory state of the collector-drainage network, as well as unordered cattle grazing. Therefore, it is reasonable to take the following priority measures:

- Inventory of the summer and winter pastures, development and implementation of programs on their rational use;
- Introduction of incentives to rise interest of the owners, users and landholders in preservation and increasing of soil fertility, land protection from negative production consequences;
- Recultivation of disturbed lands;
- Construction and rehabilitation of collector-drainage systems for WT lowering;
- Improvement of technologies of industrial and other harmful wastes' disposal.
- Construction and rehabilitation of landfills for toxic wastes burial;
- Construction of garbage recycling plants.

D.9. Assessment of biological resources

224. Key role in climate formation of the Chu and Talas Rivers basins, hydrologic mode of the rivers and other water objects, as well as in preservation of environmental balance is played by the forests, plant and animal life. There is a trend of reduction of forest lands and scrubs in basins. In the southern zone of basin, about 60% of forests are declining that sharply decreases natural reproduction of forest massifs.

225. In entire basin, reduction of natural biodiversity is traced up conditioned by worsening of conditions of flora and fauna habitation. Reasons of this are intense economic development of land and water resources, as well as inadequacy of the legal, administrative and ecologic measures regulating state of ecosystems.

226. Red Book of Kyrgyzstan includes 7 species of mammals, 15 species of birds, 1 species of reptile and fish each and a number of endemic plants affected within Chu-Talas basin. Water-marsh complexes have practically disappeared in Chu valley. Ecosystems downstream rivers degraded owing to strong pollution. In many cases, they disappeared physically due to full water intake for irrigation. Fish fauna practically in all basins has changed due to acclimatization of alien species.

227. Area of Chu oblast covered with forests is 83.8 thousand ha (0.42% of entire oblast). Forest cover in basin is characterized by unevenness and variety of species. Area in Talas oblast covered with forests is 64.7 thousand ha (0.32% of total oblast area).

D.9.1. State of forestry and special protected areas

228. Reduction of area covered with forests leads to direct economic damage from progressing of land degradation, enhancing risks of disaster. According to Forest Code of KR, all forests are objects of conservation and are subject to special protection. Nevertheless, unordered forest felling in the both basins continues.

229. Besides felling, reason of forests depletion and disappearance is an excessive cattle grazing in the forest districts. Stocking of nonwoody forest products, despite a

seeming innocuity of this process, as well as organization of temporary tourist camps, uncontrolled hunting and fires are also the negative factors promoting forest ecosystems' degradation.

230. Total area of the state forest resources of Chu oblast administered by the forestry is 192.8 thousand ha; of them forest area – 31.0 thousand ha. Forest cover of the oblast estimates at 1.6%. By species composition, forests are diverse: scrub, grow juniper, marsh elder, sea-buckthorn prevail, of woody species there are spruce, elm, birch, poplar and others.

231. All forests of the oblast by economic significance belong to the first group. According to Forest Code of KR, they are defined as conservation forests. For biodiversity preservation, forest reproduction and hunting resources regulation, there are 3 forestry farms and 1 forestry hunting farm, 2 national natural parks, 2 hunting reserves, 2 geological reserves and 4 botanic reserves in Chu oblast. Total area of special protected natural reservations (SPNR) is 189.4 thousand ha, of them covered with forest – 30.0 thousand ha.

232. “Ala-Archa” national Natural Park was organized in 1976. Area of park is 2280 ha. Forest lands - 1316 ha, including land covered with forest– 1014 ha, forest cultures – 160 ha. Non-forest lands – 970 ha. “Chon-Kemin” national Natural Park was organized in 1997. Total area of park is 126.5 thousand ha, including forest area – 11.2 ha. “Chon-Kemin” park includes 2 reserves: hunting “Kemin” and botanic “Kapchigai”. Of historical monuments there is Shabdana mausoleum.

233. In Talas oblast, for preservation of biodiversity are organized and functioning: 1 state nursery, 1 national natural park, 5 reserves (1 - integrated, 1 - zoological 1 - hunting, 3 - botanic) in total area of 89.1 thousand ha.

234. Karabuuri state nursery was organized for preservation of biodiversity, rare and endangered species of animals and plants common to Western Tien Shan in total area of 59 thousand ha. Nursery has an interstate significance, according to Interstate Agreement between Kyrgyzstan, Kazakhstan and Uzbekistan dated 19.04.1998, it will serve in the short term as «a heart» Transboundary Protected Natural Area which is now under construction.

235. «Besh-Tash» national Natural Park was organized for preservation of biodiversity and fir community, reproduction, recreation and development of tourism. Its total area is 13.6 thousand ha.

236. Thus, key negative anthropogenic impacts on biodiversity are:

- Destruction of habitation of many wild animals, birds, fish species;
- Shrinkage of areal for a number of species;
- Gradual reduction and forcing out of some species from usual habitat;
- Reduction of forest lands.

237. Provision of integrity of natural ecosystems and their components is paramount task. For that, major ways of its resolving should be:

- preservation of biodiversity both within SPNR and in the productive landscapes;
- expansion of SPNR area;
- expansion of forest area;

- enhancement of works on preservation, rehabilitation and artificial formation of forests
- strengthening of horticulture and forestry as the priority directions of mountain districts development;
- assistance in organization of farms involved in forestry, horticulture and nursery; development and implementation of mechanisms of rising of interest of local population in formation of gardens, artificial cultivation of forests;
- development and long-term cultivation of construction varieties of poplars and other precocious tree crops to meet requirements of population in timber stock

D.10. Recommendations on sustainable environment management in the Chu and Talas Rivers basins

238. Ecologic security and sustainability in formation of social-economic policy in the Chu and Talas Rivers basins should be a priority.

239. Private sector and population involvement in planning and implementation of conservation is a key task, resolving of which will allow, on one side, to provide rational natural resources use, on the other side, to attract funding from independent natural management entities.

240. Introduction of progressive technologies to minimize environment impact so that economic activity does not contravene ecologic sustainability, but is built on its basis. This requires to:

- create economic incentives for active introduction of ecologically clean technologies;
- develop and implement programs on introduction of «clean» technologies in the most problematic sectors of economy;
- introduce renewable sources of energy

241. Provision of integrity of ecosystems and their components is a paramount task. For that, main ways of its resolving should be:

- Sustainable land resources management;
- Biodiversity preservation both within SPNR and in the productive landscapes;
- Expansion of SPNR area;
- Introduction of integrated water resources management practice;
- Reduction of greenhouse gas emissions, ozone-depleting substances into atmosphere.

E. Water resources of Chu and Talas basins in climate change conditions

E.1. Water use and development prospects of water activity

242. Water use within the Chu and Talas Rivers basins, in general, preserves long sustainability and is characterized by prevalence of the agricultural sector, including needs in regular, liman irrigation and waterlogging of pastures (on average about 97% of total water use) and small water use for utilities (2-4%) and industry (about 1%). According to expert assessment, such structure with minor changes will remain, at least, in the midterm period until 2020.

243. In total output in the territory of basins, water-using sectors of economy, first of all, oriented to production and processing of by-products as part of irrigated agriculture, have a prevailing significance. According to the most predictions, such correlation will not significantly change in the medium term until 2020. Restoring of previously lost positions and subsequent intensification of water activity is a priority strategic task for social-economic development of subregion. It has also an important role in the national programs on poverty management, as great number of employable population is engaged in production and processing of products of irrigated agriculture.

244. Objective forecast of water activity and related water use development implies necessity in consideration of the following factors:

- Changes dynamics in water resources owing to transformation of climatic conditions and anthropogenic activity;
- Changes dynamics in demographic situation and related indicators of water use for the drinking, domestic and other social needs;
- Development dynamics of major water-using sectors of economy;
- Efficiency indicators dynamics of water resources use conditioned by adequacy of water saving.

245. With a view to anticipated growth of population, widening of its real access to drinking water and gradual increase of unit water requirement for utilities, increase of water use for these purposes is expected, not exceeding 5% of total water use in 2020. Unit water requirement of industry is expected to be about 1%, though recovery and moderate development of output capacity in this sector will lead to increase annual use water by 5-7 times. It is expected that water use in the industry will be lower than the level of 1990. Growth in agricultural products is expected mainly thanks to restructuring crops and increase of yield as a result of use of advanced farm practices, as well as fuller inclusion of previously reclaimed but degraded as a result of economic crisis or otherwise not used land in agriculture. Main resources to increase productivity of irrigated area are related with successive rehabilitation of previously reclaimed areas, while in the medium term small development of new irrigated areas is expected.

246. Summary of predictive estimates' dynamics of water use in the basins on different scenarios witnesses that:

- At planned growth of macroeconomic indicators and concurrent preservation of specific water intensity of WDM, as well as specific water losses in major water-using sectors of economy, total water use might be restored up to absolute peak achieved in the end of 1980th in the medium term.
- At design scenario of intense development of water use, water intakes in basins may increase by 1.8 times and by 2020 will amount to 75% of estimated long-term average annual water resources within these basins.

247. Small (from the current technical-economic point of view) resources for development of new irrigated area do not contemplate sharp increase of water use for irrigated agriculture in this zone. Therefore, strategic task in the medium term in the context of food security, poverty management and improvement of subsistence population, will be rehabilitation and cardinal improvement of existing water infrastructure and efficiency of previously reclaimed land resources. At the same time, measures on stabilization of a notably deteriorating ecologic situation are expected to be

taken which in the near future will limit water supply to the irrigated agriculture, and then to the industry.

E.2. Modern models of climate change and existing recommendations on food security in conditions of climate change impact on agriculture and water resources

248. At the Second National Communication of the Kyrgyz Republic on Climate Change¹ assessment of changes in main characteristics of Kyrgyzstan glaciation for some (most probable) options of predicted climatic changes from 2000 to 2100 was given.

249. From forecast results, significant reduction of surface flow is expected for all most probable climatic scenarios. Surface flow is expected to be increased until 2020-2025 thanks to increase of glacial element, further decrease of flow up to 42.4 – 20.4 m3 is expected, i.e. 43.6–88.4% of flow in 2000. Decrease of flow after its some increasing early XXI century is firstly stipulated by increase of evaporation. Consequences of such considerable anticipated decrease of surface flow undoubtedly should affect living conditions and economic activity. Without taking preventive measures risks in water use and water apportioning will inevitably increase.

250. Existing recommendations on food security in climate change impact on agriculture² and water resources³ are as follows:

- transfer to water saving technologies in irrigated agriculture;
- increase in ground water use;
- regulating surface flow and creation of water resources in reservoirs;
- stimulation of water users to more efficient use of resources thanks to introduction of paid water use;
- transfer to more drought-resistant varieties and crops, more adapted to climate change;
- construction of mud, flood hydraulic structures to decrease disasters related to water;
- diversion part of river flow within regions and beyond them

251. The following mitigation measures of negative impact vulnerability of water resources on sectors of economy are proposed:

- minimize water losses by efficient management and rehabilitation of the irrigation and water supply systems;
- replacement of moisture-loving crops in irrigated area with less moisture-loving crops;
- introduction of progressive technologies in irrigated agriculture;
- use of modern, more efficient systems and distribution
- waters for losses reduction;
- introduction of the low water and circulating water use technologies at existing enterprises and utilities;

¹ Second National Communication of the Kyrgyz Republic to the UN Framework Convention on Climate Change. Bishkek, 2009

² S. Ibatullin, V. Yasinsky, A. Mironenkov. Impact of climate change on water resources in Central Asia. Industry profile. Eurasian Development Bank, 2009

³ Guidelines for water resources and adaptation to climate change. UNECE, 2009

- use of waste water;

E.3. Recommended actions on adaptation of water resources to climate change and growth in national water use

252. It is apparent that adaptation of water resources to global climate changes against general trends of increase in water use might be achieved by rising of efficiency of fresh water use and widening of water protection. Strategic aim of water policy should be the guaranteed meeting of overall water requirement of population and economy now and in the future. Tasks of water policy are formulated as follows:

- preserve water resources and their cleanness, gradually improving water ecosystems;
- create favorable conditions for accelerated rehabilitation and subsequent sustainable development of water supply to population and water infrastructure;
- efficient management and rational water resources use on basis of water saving and advanced technologies

253. Action plan on introduction of new technologies should help in fulfillment of three main tasks of water saving:

1. Inclusion in economic turnover of previously not used water resources;
2. Reduction of water waste;
3. Transformation of national water use to reduce water resources use.

254. Detailed proposals to action plan on introduction of technologies are systemized in «Matrix of recommended actions on adaptation of water resources to climate conditions change and growth in national water use».

Matrix of recommended actions on adaptation of water resources to climate change and growth in national water use

Main adaptation measures	Recommended technologies and measures	Priority index of technologies and measures	Need in introduction of recommended technologies and measures	Risks index preventing implementation of adaptation measures
A. Reduce losses of water resources	<u>A.1. Rehabilitation, upgrade of equipment and further development of communication water infrastructure to reduce water losses related to leakage, filtration, evaporation, including:</u>			
	A.1.1 In main and inter-farm canals of irrigation network	X1 (Xn)	Y3 Y4 Y5 Y8	R3 R5 R7 R8 R11
	A.1.2. In central water supply	X1 (Xn)	Y3 Y4 Y5 Y8	R3 R5 R7 R8 R11
	A.1.3. In rural water supply	X1 (Xn)	Y3 Y4 Y5 Y8	R3 R5 R7 R8 R11
	A.1.4. In industrial water supply and service sphere	X2 (Xn)	Y3 Y5 Y6 Y8	R3 R5 R7 R8 R11
	<u>A.2. Rehabilitation and upgrade of hydraulic structures and valves in distribution, use and water discharge points, including:</u>			
	A.2.1. Irrigation network	X1 (Xn)	Y3 Y4 Y5 Y8	R3 R5 R7 R8 R11
	A.2.2. Centralized water supply	X1 (Xn)	Y3 Y4 Y5 Y8	R3 R5 R7 R8 R11
	A.2.3. Rural water supply	X1 (Xn)	Y3 Y4 Y5 Y8	R3 R5 R7 R8 R11
	A.2.4. Industrial water supply and service sphere	X2 (Xn)	Y3 Y4 Y5 Y6 Y7 Y8	R3 R5 R7 R8 R11
	<u>A.3. Rehabilitation and upgrade of equipment of on-farm irrigation network belonging to the independent water users</u>	X1 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R7 R8 R10 R11 R12
	<u>A.4. Optimization of application of progressive methods and equipment for irrigation, including on basis of furrow irrigation, sprinkling, drip irrigation, etc. to reduce water waste in irrigated area.</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R6 R6 R8 R10 R11 R12
B. Comprehensive upgrade of existing water use system	<u>B.1. Consistent revision of water use norms for sustainable development of economy and social needs taking account of changes dynamics in water resources and increase of water requirement</u>	X2 (Xn)	Y1 Y2 Y5 Y6 Y7 Y8	R1 R2 R3 R6 R9 R11

<u>B.2. Revision of state regulating mechanisms of water use and water saving, including:</u>			
B.2.1. Revision of Water Law and other enactments.	X1 (Xn)	Y1 Y4 Y5 Y6 Y7 Y8	R1 R2 R3 R9 R10 R11
B.2.2. Reforming of the state bodies that direct and control water resources use.	X1 (Xn)	Y1 Y4 Y5 Y7	R1 R2 R3 R6 R11 R12
B.2.3. Stirring up of inspection on rational water use and observance of water law	X1 (Xn)	Y1 Y2 Y4 Y5 Y6 Y7 Y8	R1 R2 R3 R5 R9 R11
B.2.4. Toughening of legal responsibility of the water users for rational water resources use	X1	Y1 Y2 Y5 Y6 Y7	R1 R9 R10 R12
B.2.5. Revision of the state licensing system of water use	X1 (!)	Y1 Y2 Y4 Y5 Y7	R1 R5 R6 R10 R11 R12
B.2.6. Improvement of contractual arrangements related to revision and provision of obligations of the providers and consumers of water resources	X1	Y1 Y2 Y4 Y5 Y6 Y7 Y8	R1 R2 R3 R5 R11 R12
B.2.7. Accelerated establishment of WUAs to promote preservation of water use owing to liquidation of excessive on-farm networks, improvement of water use, concentration of investments, etc.	X1	Y1 Y2 Y4 Y5 Y6 Y7 Y8	R1 R2 R3 R9 R10 R11 R12
<u>B3. Reforming of water-economic relations, including:</u>			
B.3.1. Restructuring cost items of government budget for water protection;	Xn	Y1 Y2 Y3 Y5 Y6	R1 R2 R5 R7 R12
B.3.2. Optimization of credits, tariff and tax policy, stimulating rational water resources use;	X1 (Xn)	Y1 Y2 Y3 Y4 Y5 Y7 Y8	R1 R3 R5 R7 R12
B.3.3. Stimulation of growth of internal and external investments in development of water infrastructure and widening of water protection	X1 (Xn)	Y1 Y2 Y5 Y6	R1 R5 R7 R9
<u>B.4. Rehabilitation and further development of controlling state and use of water resources, including:</u>			
B.4.1. Recovery of the number and upgrading technical state of observation stations and posts in surface water objects	X1 (Xn)	Y2 Y3 Y5 Y8	R3 R5 R7 R8 R11 R12

	B.4.2. The same in ground water deposits	X1 (Xn)	Y2 Y3 Y5 Y8	R3 R5 R7 R8 R11 R12
	B.4.3. Recovery of the number and upgrading of equipment of chemical labs and observations points on qualitative indicators of water resources	X1 (Xn)	Y2 Y3 Y5 Y8	R3 R5 R7 R8 R11 R12
	B.4.4. Equipping of all water users with facilities of primary accounting of water resources use	X2 (Xn)	Y1 Y2 Y3 Y5 Y6 Y7	R5 R7 R8 R9 R10 R11
	B.4.5. Revision of the state statistics system of reporting on water use, state water cadastre and improvement of planning of integrated water resources use at the national, regional and basin levels	X2 (Xn)	Y1 Y4 Y5 Y6 Y7 Y8	R1 R2 R3 R5 R11 R12
C. Inclusion of previously unused water resources	<u>C.1. Optimization of non-vegetation riverflow use including:</u>			
	C.1.1. Construction of new reservoirs	X3	Y2 Y3 Y5 Y8	(R4!) R5 R7 R8 R12
	C.1.2. Rehabilitation of existing ponds and reservoirs with increase of their storage capacity	X2	Y2 Y3 Y5 Y8	(R4!) R5 R7 R8 R12
	C.1.3. Interbasin diversion and flow cyclization for regulating seasonal flow of surface sources	X3	Y2 Y3 Y5 Y8	(R4!) R5 R7 R8 R12
	<u>C.2. Optimization of local natural sources use, including construction of water intakes, flow accumulation, laying of communications for feeding of water systems from the streams, springs and small rivers</u>	X3	Y2 Y3 Y4 Y5 Y6 Y8	R3 R5 R7 R8 R12
	<u>C.3. Optimization of ground water deposits use, including hydrogeologic exploring, construction and equipment of wells, laying of communications, etc.</u>	X2	Y2 Y3 Y5 Y8	R5 R7 R8 R12
	C.4. <u>Optimization of return water use, including:</u>	X2	Y2 Y3 Y5 Y8	R5 R7 R8 R12
	C.4.1. Range of works on accumulation, treatment and use of melted and storm water	X3	Y2 Y3 Y5 Y8	R5 R7 R8 R12
	C.4.2. Range of works on treatment (if required) and use of collector-drainage water for irrigated agriculture	X2	Y2 Y3 Y5 Y6 Y8	R5 R7 R8 R12
	C.4.3. Range of works on treatment and use of utilities and industrial waste water, disposal of impurities into this water.	X3	Y2 Y3 Y5 Y6 Y8	R5 R7 R8 R12

D. Restructuring of national water use	<u>D1. Works on use in irrigated agriculture of more yielding and less moisture-loving crops including breeding, farm and other technologies</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R6 R7 R9 R10 R11 R12
	<u>D2. Works on increase of elite high-productive livestock and efficient water use in stockbreeding</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R6 R7 R9 R10 R11 R12
	<u>D3. Improvement of use and further widening of cultivated grassland, as alternative to expanding of irrigated area for stockbreeding</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R6 R7 R9 R10 R11 R12
	<u>D4. Development of industrial fishery as part of natural water objects and reservoirs to expand tradeable fish in the national food basket thanks to preservation of some high-absorbency food</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R6 R7 R9 R10 R11 R12
	<u>D5. Widening of use of closed, recurring-successive and circulating water supply, limiting the use of water from the natural sources in sectors of industry and service systems</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R6 R7 R9 R10 R11 R12
	<u>D6. Widening of use of progressive resource saving and low waste technologies to reduce water unit requirement in mining, processing, construction and other sectors</u>	X2 (Xn)	Y2 Y3 Y5 Y6 Y7 Y8	R3 R5 R6 R7 R9 R10 R11 R12
	<u>D7. Development of interstate cooperation on integration of production and division of labor for water use reduction</u>	X2 (Xn)	Y1 Y2 Y3 Y4 Y5 Y6 Y8	R1 R2 R3 (R4!) R5 R7 R9 R12

255. Matrix envisages 4 base directions of adaptation measures, including:
- A. Reduce losses of water resources;
 - B. Comprehensive upgrading of existing system of water use;
 - C. Inclusion of previously not used water resources;
 - D. Restructuring of national water use.
256. Ranking of recommended technologies and measures is taken on 4 criteria considering both importance of some actions and real possibilities of their implementation at present and in the short term taking account of the development of social-economic situation. In graph 3 of table 11, indexes priority are codified as follows:
- X1- immediate;
 - X2- medium;
 - X3- perspective, i.e. implying implementation not earlier than in 10 years time;
 - X4- permanent, i.e. requiring successive implementation continuously during long time, as situation changes.
257. List of actions for introduction of recommended technologies and measures (graph 4 of matrix) is codified as follows:
- Y1 –statutory regulation;
 - Y2-economic regulation;
 - Y3- investment;
 - Y5-organizational-technical;
 - Y6- information- propagandistic;
 - Y7- training;
 - Y8- research, i.e. related to research, technical-economic or experimental justification of approach to resolve concrete problems.
258. In formation of matrix of recommended actions, possibility of negative impact risks preventing their implementation are envisaged. Risks mentioned in graph 5 matrix are codified as follows:
- R1-imperfection of existing regulatory basis;
 - R2-imperfection of existing management and control;
 - R3-insufficient stirring and (or) coordination of cooperation of water users involved in implementation of technologies and measures;
 - R4- imperfection or blocking impact of existing system of interstate relations;
 - R5-imperfection of state economic system in whole;
 - R6-shortage and imperfection of existing incentives system;
 - R7-deficit of internal and (or) external investments;
 - R8-underdeveloped or degrading technical state of infrastructure;
 - R9-shortage of existing propagandistic measures;
 - R10-insufficient awareness of population and water users;
 - R11-low qualification of control organs' personnel and entrepreneurs–water users;
 - R12-insufficient study of problem requiring additional research, technical-economic or pilot development

F. Information support of Commission activity and development of cooperation

259. In 2009, after a short break, official CTWC website was reopened which presents information on the Commission, main legal documents, minutes of meetings of the Commission and other materials. Website is in the Russian and English languages that allow

increasing the number of users and wider dissemination of knowledge on the Commission. New CTWC website is at: www.chutalas-commission.org.

260. Coverage of results of CTWC's work in regional MM plays important role. Articles on this topic are occasionally published in the Kazakh oblast newspaper «Znamya Truda», as well as in the institutional newspaper of Kyrgyz irrigators «Water, Land, People».

261. For popularization of transboundary cooperation between countries booklets are issued:

- «Commission of Kazakhstan and Kyrgyzstan on use of interstate water structures in the Chu and Talas Rivers ahead of the 10th anniversary of signing of Agreement dated 2000»;
- IWRM in the Chu and Talas Rivers basins;
- «State of environment in the middle and low zones of Chu-Talas basin»

262. The Commission's activity was reported at:

- The 5th World Water Forum, Istanbul, March 2009
- The 5th session of meeting of Water Convention Parties, Geneva, November 2009;
- Kyrgyz national seminar «Management of transboundary water resources in Central Asia», Bishkek, September 2008;
- Regional workshop «Ecologic security – key factor in water resources use», Tashkent, October 2008;
- The Second meeting of Steering Committee of EU Project «Management of water resources in Central Asia», Dushanbe, September 2009;
- Seminar «Transfer to rational water use», Taraz, August 2009;
- Seminar «Integrated Water Resources Management in transboundary rivers basins of Kazakhstan», Almaty, September 2009;
- International Conference «Current aspects use of natural-resource capacity of transboundary rivers of Central Asia», Taraz, November 2009;
- International conference «Establishment of interstate basin water organizations between Kazakhstan and neighboring countries in joint management and protection of transboundary water resources», Almaty, December 2009.
- Final Conference on IWRM, Almaty, 6-7 November 2012.
- International Conference on water cooperation «Exchange of advanced expertise between Europe and Central Asia in management of transboundary river basins». Dushanbe, 19-21 August 2013.
- The third meeting of Target Group of pilot projects on adaptation to climate change in transboundary basins in accordance with UNECE Convention on Transboundary Waters and the first meeting of global net. Geneva, 20-21 February 2013
- The forth workshop on water resources and adaptation to climate change in transboundary basins. Geneva, 25-26 June 2013.

263. Key activity to promote development of informing on Commission's activity, supported by ADB RETA 6486 Project, was International Conference on the 10th anniversary of Agreement between Governments of Kyrgyzstan and Kazakhstan on use of interstate water structures in the Chu and Talas Rivers. Bishkek, Kyrgyzstan 23-24 May 2011.
264. Program of conference envisaged hearing and discussion of Chu-Talas Commission's report, reports on support of international programs on development of cooperation in use of the Chu and Talas Rivers. Experience of cooperation in management and protection of water resources in other transboundary river basins was presented and development prospects of such cooperation in Central Asia were reviewed.
265. President of Kyrgyzstan R. Otenbaeva in her greeting of conference's participants stated that Chu-Talas Water Commission was now regarded as a model of cooperation of countries on joint water resources use in Central Asia.
266. With support of ADB RETA 6486 Project, video on cooperation of Kazakhstan and Kyrgyzstan in joint use of water resources of the Chu and Talas Rivers were prepared for the conference, jubilee badge and stamps were issued.
267. Following the results of work, participants of conference made a joint statement, full text of which is given in Annex 3.
268. Study tour in learning experience of Commission and Secretariat of the Mekong River in Thailand and Laos under ADB RETA 6486 Project has significantly promoted development of cooperation in joint water resources use.
269. Study tour was held on 3-8 April 2011 with participation of 9 representatives of Chu-Talas Water Commission (4 - from Kazakhstan, 5 - from Kyrgyzstan). According to Program of Tour the following meetings were planned at:
- Centre of Environment Protection, Bangkok;
 - Water Resources Department of Thailand, Bangkok;
 - Staff of Committee's Secretariat on Mekong, Vientiane;
 - Leadership of National Committee on Mekong, Vientiane;
 - Management of Project Development of Nam Ngum River Basin, Vientiane;
 - Management of ADB resident offices in Thailand and Laos;
 - Hydraulic structures of Nam Ngum, Laos;
 - Pilot objects on IWRM introduction in Laos.
270. During the tour there were useful debates promoting sharing experience between commission's staff, useful contacts were established, cooperation between Chu-Talas Water Commission and the Mekong River Commission was discussed on basis of Memorandum of Understanding, draft of which is presented in Annex 4.
271. At present, joining of Chu-Talas Water Commission to Asian River Basin Organization Network with assistance of ADB is being discussed.

CONCLUSION

Implementation of RETA 6486 Project «Improvement of water resources management in Central Asia» allowed the following:

- Agreement dated 2000 on the Chu and Talas Rivers developed, agreed and amended.
- Accounting and planning of water resources use in the Chu and Talas Rivers basins improved.
- IWRM plan for the Chu and Talas Rivers basins elaborated and discussed at meetings of Chu-Talas Commission.
- Cooperation in conservation, monitoring and data exchange in the Chu and Talas Rivers basins improved.
- Recommendations on adaptation of water resources of Chu and Talas basins to climate change elaborated.
- Population is regularly informed about Commission's activity through the mass media. Video on development of cooperation between Kazakhstan and Kyrgyzstan in the Chu and Talas Rivers was shot. Conference on the tenth anniversary of signing of Agreement dated 2000 was held with delegations from Central Asian countries, international and donor organizations.
- Familiarization with activity and establishment of cooperation with the Mekong River Commission.

However, in view of certain circumstances, it was not possible to accomplish some measures envisaged by the Project. Particularly, for reasons beyond control to the date of the Project completion, Protocol on amending Agreement on the Chu and Talas Rivers dated 2008 was not agreed by the Governments, including sustainable financing of Chu-Talas Commission's Secretariat. Nevertheless, the leadership of water agencies of Kazakhstan and Kyrgyzstan found an opportunity to financially support secretariat from the budgets of these agencies that predetermines sustainability of Commission's activity in the future.

Computerized module on assessment of water distribution for the Chu River basin, developed under the Project, by the time of Project completion was being tested and in the future it is intended to introduce it fully. Joint action plan of the state bodies of Kazakhstan and Kyrgyzstan on IWRM introduction in the Chu and Talas Rivers basins was in detail discussed at meetings of Chu-Talas Commission; however its wider discussion among the stakeholders of both countries is coming.

In general, it can be stated that main tasks of the Project are fulfilled. This is particularly proved by outcomes of ADB's assessment mission (aide-mémoire is given in Annex 5) and positive assessment of the Project activity by the co chairpersons of Chu-Talas Commission (Annex 6).

List of main sources of information

1. Report on World Bank PO88671 IWRM Project «Outcomes of studying of world experience in water resources management, existing and perspective management structures in Kyrgyzstan. Bishkek, 2008.
2. Report on World Bank Project PO88671 IWRM «Justification of plan on reforming of water sector management of Kyrgyzstan». Bishkek. 2008.
3. Report on World Bank PO88671 IWRM Project «Legal and institutional aspects of reforming of water sector». Bishkek. 2008.
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Annex 1

Adopted on 31 May 2013 at the 16th meeting of
Kazakhstan and Kyrgyzstan's Commission
on Interstate Water Structures Use in the Chu and Talas Rivers

Protocol on amending of Agreement between governments of Kazakhstan and Kyrgyzstan on interstate water structures use in the Chu and Talas Rivers of 21 January 2000

Governments of Kazakhstan and Kyrgyzstan, further referred to as Parties,

For further development of cooperation between Kazakhstan and Kyrgyzstan in
interstate water structures use in the Chu and Talas Rivers,

Following article 13 of Agreement between Kazakhstan and Kyrgyzstan's
governments on interstate water structures use in the Chu and Talas Rivers dated 21 January
2000 have agreed on:

1. Make the following changes in Agreement: article 2 shall be reworded as follows:

The Parties refer to interstate water structures:

- Below water structures, in ownership of Kyrgyzstan:

Orto-Tokoi reservoir in the Chu River;

Chu bypass canal in the Chu River from Bystrov HPP to Tokmok city;

Western and East Big Chu canals with structures;

Chumysh control structure in the Chu River;

Kirov reservoir in the Talas River, **including structures in zone of reservoir impact:**

Koj canal with structures in the Talas River:

Karataki canal with structures in Kurkureusu River;

Tomentamga canal with structures in Kurkureusu River;

Akmolda canal;

Kolos canal in the Chu River.

- **Water objects located in Kyrgyzstan, in ownership of Kazakhstan and supply in
irrigation lands in Kazakhstan:**

Koksai canal (Talas-Assa basin);

Rais canal (Talas-Assa basin).

2. Article 4 shall be reworded as follows:

The Parties shall participate in **financing of the maintenance, running and overall
repair costs, as well as rehabilitation of** interstate water structures and other agreed actions
in proportion with **received water.**

3. Article 5 shall be reworded as follows:

For the safe and reliable work of interstate water structures, the Parties shall establish
Standing Commission which will set a regime of their operation, identify required costs for
their O&M, **as well as their executive body – secretariat. Upkeep of secretariat shall be
from the national budgets of the Parties.**

4. Article 11 shall be reworded as follows:

The Parties shall create conditions for unimpeded and duty-free movement of personnel vehicles and mechanisms, raw products, materials for operation and maintenance of water structures **given in article 2 of this Agreement**, across the borders and territories of their countries,.

Customs clearance of goods given in the first paragraph of this article, name and amount of which are agreed by Commission that is set up in accordance with article 5 of this Agreement, shall be conducted with tax exemption.

Use of goods given in the first paragraph of this article otherwise not stipulated in this Agreement shall be forbidden.

5. This Protocol is an integral part of the Agreement and enters into force as set forth in article 14 of the Agreement.

This Protocol shall remain in force until termination of the Agreement.

Done in city of ____ «_____» _____ 20____ in two copies, in the Kazakh, Kyrgyz and Russian languages each, thereat all texts are equally authentic.

In case of controversy in interpretation of provisions of this Protocol, the Parties shall follow the text in the Russian language.

For Government of Kazakhstan

For Government of Kyrgyzstan

Draft Joint Action Plan for Kazakhstan and Kyrgyzstan on IWRM introduction in the Chu and Talas Rivers' basins

Key tasks and measures on IWRM introduction	National control organs	Main expected outcomes	Indicators of achieving results	Sources of funding
<u>1. Develop regulatory basis in IWRM context</u> 1.1. Revision of water law of KR and RK	KR Jokorku Kenesh, KR Government, KR DWRA, RK Senate and Mejlis, RK Government, CWR/ RK MEPWR	Water Code of KR amended and Water Code of RK approved	Law of KR On amending of Water Code of KR Law of RK On amending of Water Code of RK dated 12.02. 2009	Government budget of KR Government budget of RK
1.2. Elaboration of National Water Strategy of KR and RK	President of KR, Government of KR National Water Council of KR, KR DWRA, President of RK, Government of RK RK CWR/ MEPWR IRG IWRM	National water strategies of KR and RK developed and approved. External and internal water policy of KR and RK implemented in accordance with national Strategies.	a) Decree of President of KR on approval of national water strategy; b) Water Strategy published and used as basics of national water policy of KR. a) Decree of President of RK on approval of a National Water Strategy; b) Water Strategy of RK published and used as basics of a National Water Policy	Government budget of KR Government budget of RK
1.3. Comprehensive revision of enactments regulating water relations in KR and RK	KR Government, KR SCWRA, KR Min Justice RK Government RK CWR/ MEPWR IRG IWRM	Revised enactments approved and introduced in practice of KR and RK's water relations regulation. Their improvement continued	a) Decrees of KR and RK governments on approval of enactments; b) Knowledge dissemination on new regulatory basis provided; c) Water relations in KR and RK consistently regulated by new regulatory basis	Government budget of KR Government budget of RK
<u>2. Reforming of water resources management of KR and RK in IWRM context</u> 2.1. Establishment and reforming of central and regional control organs of water resources and water infrastructure of KR and RK	President of KR Government of KR President of RK Government of RK	Control bodies including SCWRA of KR, BWMA, EDW in Chu and Talas Rivers basins, etc. established and fulfill functions and powers Control bodies including CWR, Chu-Talas BWA, «Jambylvodhoz», etc. established and fulfill functions and powers	a) Regulations and statutes regulating rights, functions and powers of new control organs approved by KR government; b) Control organs staffed; c) Infrastructure for control organs sustainability created; At regional level: a) Regulations and statutes, regulating rights, functions and powers of control organs revised, b) Control organs staffed; c) Infrastructure for control organs sustainability created;	Government budget of KR (with support of external donors) Government budget of RK (with support of external donors)

2.2. Additional regulating of functions and powers of KR and RK's central and territorial bodies involved in water resources management	<p>Government of KR Ministries and agencies of KR KR DWRA</p> <p>Government of RK Ministries and agencies of RK RK CWR/ MEPWR</p>	Bodies of water management, nature protection, hydrogeology, hydro meteorological service, emergency and health of KR and RK reformed and operate in accordance with revised regulations	<p>a) Regulations and statutes regulating rights, functions and powers of control organs approved by KR Government;</p> <p>b) Adequate coordination of activity bodies involved in management of water resources in Chu and Talas Rivers basins provided. At regional level:</p> <p>a) Revised regulations and statutes, regulating rights, functions and powers of control organs approved by RK Government</p> <p>b) Adequate coordination of bodies involved in water resources management of RK provided. Documents on delineation of powers of control organs of water resources RK approved.</p> <p>c) Proposals on establishment Commission on water and sanitation and State holding company on operation of water systems and structures in RK reviewed;</p> <p>d) Water Partnership Council established in CWR MA.</p>	<p>Government budget of KR</p> <p>Government budget of RK</p>
2.3. Sustainable upkeep and functioning of KR and RK's control organs of water resources	<p>Jokorku Kenesh of KR Government of KR KR DWRA</p> <p>RK Senate and Mejlis Government of RK RK CWR/ MEPWR</p>	Structures and personnel of KR and RK's control organs approved. Budgets for control organs are annually approved by KR's Jokorku Kenesh, RK's Senate and Mejlis. Proposals on additional reform of water resources management in RK reviewed	<p>a) Funding for upkeep of new control organs provided in government budget of KR and RK;</p> <p>b) Number of personnel of control organs of water resources KR and RK optimized thanks to avoiding overlapping and excessive functions;</p> <p>c) Efficiency of personnel of control organs of water resources KR and RK improved thanks to introduction of new technologies and equipment management.</p>	<p>Government budget of KR</p> <p>Government budget of RK</p>
<p><u>3. Management and protection of water resources based on IWRM principles</u></p> <p>3.1. Norming of borders of main water basins in KR including Chu and Talas basins</p>	<p>Government of KR KR DWRA</p> <p>Government of RK RK CWR/ MEPWR</p>	Borders of Chu and Talas water basins in KR and RK updated and approved.	<p>a) Regulation on establishment of borders of water basins in KR and RK and on management of water resources on hydrographic principle approved by Government of KR and CWR MA of RK respectively;</p> <p>b) Registries of natural water objects in both basins revised and approved</p>	<p>Government budget of KR</p> <p>Government budget of RK</p>
3.2. Reforming of organs of	Government of KR,	Management and protection	Control and water resources protection organs in KR and	Government budget of KR

control and protection of KR and RK's water resources on basis of hydrographic principle	DWRA of KR, SAEPF of KR, BWRA Government of RK, CWR/MEPWR of RK, BWA	of water resources in both basins of KR and RK on hydrographic principle provided	RK including in both basins reformed and act on basis of hydrographic principle	Government budget of RK
3.3. Reforming of control organs of irrigation infrastructure of KR and RK on system principle	KR Government, DWRA of KR, BWMA, Local administration, RK Government, MEPWR of RK, RSE, Local executive bodies	Management of irrigation objects in KR and RK on system principle provided	Control organs of objects of irrigation infrastructure in KR and RK including in both basins reformed and act mainly on basis of system principle	Government budget of KR Funds of independent water enterprises Government budget of RK Funds of independent water enterprises
3.4. Development of Water Cadastre of KR and RK including assessment of reserves, quality and use of water resources in Chu and Talas basins	DWRA of KR SAEPF of KR Kyrgyzgidromet CWR/ MEPWR of RK Kazgidromet	Amended water cadastres of KR and RK developed and approved. Updated data on cadastres are used in regulation of water use in KR and RK	a) New Regulation on Water Cadastre in KR and RK developed and approved; b) Water Cadastres of KR and RK published; c) Personnel of control organs trained in procedures of Cadastre compilation; d) database for Cadastres' maintenance organized;	Government budget of KR (with support of external donors) Government budget of RK (with support of external donors)
3.5. Organization of Water users registry and water structures registry in Chu and Talas basins in KR and RK	DWRA of KR, BWMA BWRA CWR/ MEPWR of RK BWI, RSE Local executive bodies	Development and systematic updating of data on water users registry and water structures registry in KR and RK provided	a) Regulation on water users Registry and water structures Registry in KR and RK developed and approved; b) Personnel of control organs of KR and RK trained in registries procedures; c) Data on registries are used by organs of control and protection of water resources in KR and RK.	Government budget of KR Government budget of RK
3.6. Development and implementation of integrated plans on use and protection of water resources (BWU) in the Chu and Talas Rivers basins in KR and RK	DWRA of KR BWRA BWC CWR/ MEPWR of RK Chu-Talas BWI Chu-Talas BWC Local executive bodies	a) BWU for the Chu and Talas Rivers basins in KR and RK developed and approved. b) Measures on use and protection of water resources in both basins planned on basis of BWU.	a) Regulation on BWU in KR and RK developed and approved; b) Personnel of BWRA, BWA and BWC in KR and RK trained in procedures on compilation of BWU; c) BWU in KR and RK for the Chu and Talas Rivers basins developed, approved, published and used as basics for planning and implementation of measures on use and protection of water resources.	Government budget of KR (with support of external donors) Government budget of RK (with support of external donors)

<p><u>4. Widening of participation of NGOs, water users and community of KR and RK in water resources management</u></p> <p>4.1. Establishment of national water council in KR and water partnership council in RK</p>	<p>Government of KR</p> <p>President of RK</p> <p>Government of RK</p> <p>CWR MEPWR</p>	<p>National Water Council of KR established and fulfils functions and powers</p> <p>Water Partnership Council of RK established and fulfils functions and powers</p>	<p>a) Decree of Government of KR on foundation of National Water Council approved;</p> <p>b) Personnel of Council formed;</p> <p>c) Work plan of Council approved</p> <p>a) Regulation on Water Partnership Council adopted;</p> <p>b) Personnel of Council formed;</p> <p>c) Work plans of Council approved.</p>	<p>a) Activity of NGOs in KR and RK, given in Item 4. fulfilled on a voluntary basis</p> <p>b) Targeted support of these organizations will require funds of government budget and external donors</p>
<p>4.2. Establishment of Talas and Chu basins' water councils in KR and RK</p>	<p>DWRA of KR</p> <p>BWRA</p> <p>CWR/ MEPWR of RK</p> <p>Chu-Talas BWI</p> <p>Local executive bodies</p>	<p>Chu and Talas BWC established and fulfill functions and powers</p> <p>Chu-Talas BWC established and fulfils functions and powers</p>	<p>a) Regulation on establishment and activity basin water councils approved;</p> <p>b) Personnel of BWC formed;</p> <p>c) Work plans of BWC approved and implemented.</p> <p>a) Regulation on BC and Chu-Talas BWC approved;</p> <p>b) Personnel of BWC formed;</p> <p>c) Work plans of BWC approved and implemented.</p>	<p>-//-</p> <p>-//-</p>
<p>4.3. Establishment of systemic water councils (SWCs) in the Chu and Talas Rivers basins</p>	<p>DWRA of KR, BWRA, BWMA,</p> <p>Local administration, CWR/ MEPWR of RK</p> <p>Chu-Talas BWI, RSE</p> <p>Local executive bodies</p>	<p>SWCs in both basins in KR are gradually established and fulfill functions and powers</p> <p>Issue of establishment of SWC in Chu-Talas basin in RK reviewed</p>	<p>a) Model regulation on SWC approved by KR Government;</p> <p>b) By 2015, councils cover at least 90% of irrigated area in Chu and Talas Rivers basins</p> <p>Indicators of implementation of 4.3. task in RK will be updated after making decision on establishment of SWC</p>	<p>-//-</p> <p>-//-</p>
<p>4.4. Widening of NGOs involvement in support of development of water and ecologic activity in the Chu and Talas Rivers basins</p>	<p>Government of KR</p> <p>DWRA of KR, NGOs of KR,</p> <p>Government of RK, CWR/ MEPWR RK,</p> <p>Local executive bodies, NGOs of RK</p>	<p>Participation of NGOs in activity of basin councils and other public control organs of water resources in KR and RK provided</p>	<p>a) Regulatory basis and programs of development of NGOs developed and approved by Governments of KR and RK;</p> <p>b) Consistent development of NGOs in KR and RK in research, legal, ecologic and other support of state organizations, water enterprises and water users provided.</p>	<p>-//-</p> <p>-//-</p>

<p><u>5. Widening of involvement of independent water users in maintenance and management of water systems and structures</u></p> <p>5.1. Development and capacity building of associations, federations and cooperatives of water users in rural area of KR and RK (WUAs, FWUAs and AWUCs)</p>	<p>DWRA of KR BWMA Local and self-governing authorities of KR MEPWR RK CWR/ MEPWR of RK BWI RSE of RK Local executive bodies</p>	<p>WUAs and FWUAs establishment in rural area KR completed WUAs and FWUAs provide sustainable maintenance and development of water infrastructure Legal basis of WUAs, FWUAs and AWUCs developed. Establishment of WUAs, FWUAs and AWUCs in rural area of RK continues. WUAs, FWUAs and AWUCs capacity provide sustainable maintenance and development of water infrastructure.</p>	<p>a) Legal basis of WUAs and FWUAs in KR revised; b) Establishment of WUAs and FWUAs in Chu and Talas basins completed; c) Personnel, economic and technical capacity of WUAs and FWUAs gradually strengthened.</p> <p>a) Legal basis of WUAs, WUAs and AWUCs in RK revised; b) Establishment of WUAs, FWUAs and AWUCs in Chu-Talas basin continues; c) Personnel, economic and technical capacity of WUAs, FWUAs and AWUCs gradually strengthened.</p>	<p>Funds of WUAs, FWUAs and AWUCs; Targeted support of WUAs, FWUAs and AWUCs from government budget of KR and RK and external donors</p>
<p>5.2. Transfer in management and maintenance to associations of independent water users (WUA, FWUA and CEW) of state water systems of KR and RK</p>	<p>Ministry of State Property of KR DWRA of KR BWMA Local administration of KR CWR/ MEPWR of RK RSE Local executive bodies</p>	<p>Program of transfer into management and maintenance to WUAs and FWUAs of the state water systems of KR developed, approved and fulfilled Transfer into management and maintenance to WUAs, FWUAs and CEW of the state water systems of RK gradually fulfilled.</p>	<p>a) Irrigation, drainage systems and other water objects as per list approved by KR Government in Chu and Talas basins transferred to WUAs and FWUAs' management and maintenance; b) Sustainable management and maintenance transferred objects by independent water users ensured.</p> <p>a) Irrigation, drainage systems and other water objects as per list approved by RK Government in both basins gradually transferred into WUAs, FWUAs and CEW's management and maintenance; b) Sustainable management and maintenance of transferred objects by independent water users provided.</p>	<p>Funds of WUAs and FWUAs Targeted support of WUAs and FWUAs from government budget of KR and external donors Funds of WUAs, FWUAs and CEW Targeted support of WUAs, FWUAs and CEW from government budget of RK and external donors</p>
<p><u>6. Provision of rights for water resources in KR and RK based on licensing and contractual systems of water use</u></p> <p>6.1. Development of licensing system of trade water activity in KR and RK</p>	<p>Jokorku Kenesh of KR Government of KR Ministry of Economics of KR DWRA of KR Parliament of RK Government of RK</p>	<p>Mechanisms and procedures on licensing of trade activity on construction, water intake, water discharge and water supply in KR and RK developed and introduced</p>	<p>a) Amended Law of KR «On licensing» approved; b) Regulation on water activity licensing approved by Government of KR; c) In 2012 all water organizations in Chu and Talas basins act based on licenses</p> <p>a) Decree of Government of Kazakhstan dated 20 January 2004 No. 56 On approval of rules for issuing of</p>	<p>Government budget of KR Government budget of RK</p>

	CWR MEPWR		licenses for special water use b) All water organizations in Chu-Talas basin have licenses for special water use	
6.2. Revision and development of licensing of water use in KR and RK	Jokorku Kenesh of KR Government of KR Ministry of Economics of KR DWRA of KR Government of RK CWR MEPWR	In KR and RK procedures on issuing of licenses for water intake and water discharge in natural water objects developed and introduced	a) Regulation on licensing of water use approved by Government of KR; b) Starting from 2012, water intake and water discharge in natural water objects in Chu and Talas basins of KR are based on licenses for water use. a) Decree of Government of Kazakhstan dated 20 January 2004 No. 56 On approval of rules for issuing of licenses for special water use b) All water organizations in Chu-Talas basin have licenses for special water use	Government budget of KR Government budget of RK
6.3. Revision of contractual service system on water supply in KR and RK	Government of KR Ministry of Economics of KR, DWRA of KR Government of RK CWR MEPWR, RSE Agency on PU. Agency on regulating natural monopolies activity. Local executive bodies	Revised procedures on execution and implementation of agreements on water supply in KR developed and introduced Model agreements on service provision in water use developed and approved	a) Amended model agreement on water supply approved by Government of KR; b) In 2012, Chu and Talas basins of KR introduced new procedures of execution and implementation of agreements on water supply. a) Decree of Government of Kazakhstan dated 28 November 2003 No. 1194 on approval of model agreements on services (goods, works), related to natural monopoly adopted; b) Contracts between water users and service providers adapted to requirements of stated Decree.	Government budget of KR Government budget of RK
<u>7. Development of prevention system of water resources pollution in KR and RK</u> 7.1. Development of organizational and technical base of water quality monitoring in KR and RK	DWRA of KR, SAEPF of KR Kyrgyzgidromet Government of RK CWR/ MEPWR of RK Kazgidromet Min of Health of RK SES	Observation posts network rehabilitated and widened and regular control of quality water resources in key sections both basins in KR and RK provided	a) Observation posts network in Chu and Talas basins in KR and RK equipped; b) Hydrochemical labs established in both basins; c) KR and RK's control organs staffed and trained in new technologies on monitoring of quality water resources; d) Regular recharge and dissemination of database on water quality provided.	Government budget of KR (with support of external donors) Government budget of RK (with support of external donors)

7.2. Revision of national standards and regulatory basis for water resources quality in KR and RK	KR Government, SAEPF KR, DWRA of KR, KR standardization and metrology centre Min of Economics, RK Government, CWR/MEPWR of RK, SES, Kazgidromet, Min of Health of RK	National standards and enactments on water resources quality in KR and RK revised, adapted to international standards and introduced	a) Decrees of Governments of KR and RK on approval of revised enactments and standards of quality water resources; b) Dissemination of knowledge on revised regulatory basis quality water resources provided; c) Personnel of control organs of KR and RK in both basins trained in procedures on control of observance of norms of water resources quality.	Government budget of KR (with support of external donors) Government budget of RK (with support of external donors)
7.3. Inventory of existing and potential sources of water resources pollution in Chu and Talas basins in KR and RK	SAEPF of KR DWRA of KR MEP of RK CWR/ MEPWR of RK Kazgidromet Min of Health of RK SES	Inventory of existing and potential sources of pollution of water resources in both basins in KR and RK held.	a) Regulation on registries and inventory of pollution of water resources approved by governments of KR and RK; b) Personnel of control organs of KR and RK trained in inventory of pollution sources; c) Registries sources of water resources pollution in Chu and Talas basins in KR and RK developed. d) Measures on decreasing adverse impact sources of pollution developed and taken.	Government budget of KR Government budget of RK
7.4. Securing of «pollutant pays» principle in regulation of use and protection of water resources in KR and RK	Government of KR Ministry of Economics of KR, SAEPF of KR, SCWRA of KR, CWR/ MEPWR of RK, Kazgidromet Min of Health of RK, SES	New norms and procedures on payments collection for emission of pollutants into natural water objects of KR and RK developed, approved and introduced	a) Enactments on revised conditions of collection and use of money approved by KR and RK's governments b) Sustainable supply and target use of money for natural water objects pollution in Chu and Talas basins in KR and RK provided. c) Economic incentives on reduction of water resources pollution for entrepreneurs and water users secured	Funds of water users of KR and RK polluting water objects and water resources
7.5. Development and implementation of programs package on rising of water resources quality in KR and RK	Government of KR, SAEPF of KR, ME KR, DWRA of KR Government of RK, CWR/ MEPWR of RK, Kazgidromet, Min of Health of RK, SES, Local executive bodies	State, sectoral and regional programs on rising of water resources quality of KR and RK developed, approved and gradually implemented	a) Consistent reduction of discharge pollutants and untreated waste water in Chu and Talas basins provided; b) Rehabilitation and construction of new treatment structures in both basins gradually fulfilled; c) Water quality in water objects of both basins gradually ensured	Government budgets of KR and RK Local and municipal budgets; Funds of independent enterprises.
8. <u>Development of monitoring system of water resources use</u>	ME of KR Kyrgyzgidromet DWRA of KR	Number and upgraded equipment of hydrologic stations and posts in KR and	a) Hydrologic stations and posts network in Chu and Talas basins in KR and RK are gradually rehabilitated, widened and upgraded;	Government budget of KR (with targeted support of external donors)

8.1.Rehabilitation and development of hydrologic stations and posts network in surface water objects of KR and RK	Government of RK CWR/ MEPWR of RK Kazgidromet Min Health of RK, SES Local executive bodies	RK optimized. Regular observations in widened hydrologic stations and posts network in both basins provided	b) Personnel of hydrometeorological service KR and RK staffed and trained; c) Sustained collection, processing and dissemination of urgent hydrologic information provided.	Government budget of RK (with targeted support of external donors)
8.2. Rehabilitation and development of hydrogeologic posts and wells network in ground water deposits of KR and RK	Kyrgyz HGME DWRA of KR Min Oil and Gas of RK, CGMR Soith-Kazakhstan HGME CGMR of RK Local executive bodies	Hydrogeologic stations and posts optimized. Equipment of posts and observation wells upgraded. Regular observations in widened hydroposts and wells network in both basins provided	a) Hydrogeologic posts and observation wells network in Chu and Talas basins in KR and RK gradually rehabilitated, widened and upgraded; b) Personnel of hydrogeologic expeditions in KR and RK staffed and trained; c) Sustained collection, processing and dissemination of urgent hydrogeologic information provided; d) Ground water deposits in both basins updated and their rational use gradually provided.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
8.3. Rehabilitation and development of water resources use accounting in KR and RK	DWRA of KR Enterprises of city and rural water supply, Enterprises of industry and service sphere of KR CWR/ MEPWR of RK Enterprises of city and rural water supply, Enterprises of industry and service sphere of RK	Hydroposts and accounting facilities of water supply optimized. Equipment of posts and accounting of water supply upgraded. Accounting of water resources use in key sectors of economy and population of KR and RK organized.	a) Hydroposts network and accounting of water supply in Chu and Talas basins gradually rehabilitated, widened and upgraded; b) Metrological provision of water supply accounting organized; c) Valid accounting use of water supply in irrigation, industrial, city, rural water supply and service sectors in both basins KR and RK secured; d) Consistent reduction of losses water supply in both basins owing to organization of its credible accounting provided.	Government budget of KR and RK (with targeted support of external donors) Local and municipal budgets Funds of independent enterprises and water users.
8.4. Revision of technologies and procedures on monitoring of water objects and water resources in KR and RK	DWRA of KR ME of KR Kyrgyzgidromet SAEPF of KR CWR/ MEPWR of RK Water users	New technologies of collection, processing and maintenance of monitoring database in KR and RK developed/procured and introduced. Revised procedures on processing, transfer and use of monitoring data in water resources management in both basins introduced	a) pilot projects equipping of stations and posts with automated collection and data transfer monitoring system in Chu and Talas basins implemented; b) Transfer of monitoring data on basis of technologies of mobile, radio and Internet provided; c) Personnel of control organs gradually equipped with computers and software for automated processing of monitoring data; d) Personnel of central and basins control organs in KR and RK trained in new technologies of database monitoring.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
9. Development of	DWRA of KR	Regulation on information	a) Software, technologies and facilities for sustainable	Government budget of KR

<u>information systems of water sector in KR and RK</u> 9.1. Formation of information systems of KR and RK on basis of institutional databases	Kyrgyzgidromet SAEPF of KR Min of Health of KR ME of KR CWR/ MEPWR of RK CGMR of RK, Kazgidromet Min of Health of RK SES, ME of RK	systems water sector developed and approved by Governments of KR and RK. Formation and sustainable management summary information systems provided. Systematic data exchange KR and RK secured.	functioning of information systems of KR and RK developed, procured and introduced; b) Personnel of central and regional control organs of KR and RK trained in new technologies of using of information systems data; c) Database information systems of KR and RK formed and regularly updated; d) Data on water resources of Chu and Talas basins included in summary database of KR and RK	(with targeted support of external donors) Government budget of RK (with targeted support of external donors)
9.2. Development of GIS-technologies in water resources management of KR and RK	DWRA of KR, Kyrgyzgidromet SAEPF of KR, Min of Health KR, CWR/ MEPWR of RK MEP of RK, CGMR of RK Kazgidromet Min of Health of RK SES, ME of RK	Programs on introduction of GIS in water sector developed and approved by Governments of KR and RK. Consistent widening of GIS use in water resources management and systems KR and RK secured	a) Software and technologies of GIS maintenance in KR and RK developed, procured and introduced; b) Personnel of central and territorial control organs of KR and RK trained in new GIS-technologies; c) Tying in of water data on water resources and water infrastructure of Chu and Talas basins to GIS; d) GIS data exchange between basin control organs of KR and RK provided.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
9.3. Development of forecasting technologies of hydrometeorological situation in KR and RK	ME of KR Kyrgyzgidromet CWR MEPWR of RK Kazgidromet ME of RK	Technologies of operative and long-term forecast hydrometeorologic situation developed and introduced in KR and RK. Provided forecast data validity revised	a) Models, software and technologies of forecast development of hydrometeorological situation in KR and RK developed, procured and introduced; b) Personnel of hydrometeorological service KR and RK trained in new technologies of forecast; c) Validity of forecast changes in water resources of Chu and Talas basins and plans on water use improved.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
<u>10. KR and RK's water ecosystems sustainability</u> 10.1. Full assessment of water ecosystems, formation and dispersion of water flows, glaciers and snowfields	Government of KR Kyrgyzgidromet SAEPF KR.DWRA of KR Government of RK CWR/ MEPWR of RK Kazgidromet	Reports on full assessment of the water ecosystems state in KR and RK developed, approved and published	a) Full assessment of state of water ecosystems in Chu and Talas basins in KR and RK conducted; b) Basin programs on rehabilitation and development of water ecosystems are developed, approved and implemented.	Government budget of KR and RK (with support of external donors)
10.2. Prevention of soil erosion and depletion of water in zones of flow formation	Government of KR SAEPF of KR ME KR DWRA of KR Government of RK	Regional programs on forest widening in flow formation area, prevention and liquidation of mudflow and flood consequences in KR	a) Forest area in zones of flow formation in Chu and Talas basins annually increasing; b) Programs on rehabilitation and construction of flood, mudflow and bank protection structures in KR gradually implemented.	Government budget of KR (with support of external and national donors) Local budget

	CWR/ MEPWR of RK Kazgidromet ME of RK Local executive bodies	developed and implemented Regional programs on rational use and protection of water resources developed and implemented	a) Measures on improvement of ecologic state of water objects of RK developed and implemented; b) Programs on rehabilitation and construction of flood, mudflow and bank protection structures in RK gradually implemented.	Government budget of KR (with support of external and national donors) Local budget
10.3. Provision of minimum allowable sanitary-ecologic flow of rivers	SAEPF KR, DWRA of KR, BWRA, Local administration CWR/ MEPWR of RK Kazgidromet Min of Health of RK, SES	Scientifically justified minimum allowable sanitary-ecologic river flow in KR and RK developed, approved and implemented	a) Minimum-allowable water flow for the Chu and Talas rivers basins in KR and RK specified; b) Water intake from rivers Chu and Talas basins in KR and RK consistently does not exceed specified limits.	Government budget of KR and RK
10.4. Provision of rational operation of ground water deposits in KR and RK	Min of Nature of KR, Kyrgyz HGME, DWRA of KR, BWMA, BWRA, city and rural water supply enterprises, CWR/ MEPWR of RK, CGMR of RK. Kazgidromet, Min of Health of RK, SES, ME of RK	Revision and approval of ground water deposits KR and RK conducted. Rates for water use from ground water deposits approved and implemented.	a) Ground water resources in deposits of Chu and Talas basins in KR and RK explored and approved; b) Water intake from ground deposits of Chu and Talas basins does not exceed specified limits; c) Measures on sustainable state and operation of ground water deposits in both basins developed and implemented.	Government budget of KR and RK. Local budget. Funds of municipal and independent enterprises of water supply and irrigation, WUAs, FWUAs and AWUCs in KR and RK
<u>11. Development of mechanisms of paid water use in KR and RK</u> 11.1. Regulating tariff policy for paid water supply service in KR and RK	KR Government, Min Fin of KR, KR Min of Economics, DWRA of KR, RK Government, Min Fin of RK, Min of Economics and Budget Planning (MEBP) CWR MEPWR, ARNM of RK	New rates for water supply in KR and RK approved and enforced. Tariff rates, adequate development of macroeconomic situation in KR and RK periodically updated.	a) Decrees of Governments of KR and RK on introduction of new tariff rates approved and periodically updated; b) Water users of Chu and Talas basins pay for water supply services under new tariffs; c) In kind service fee gradually reduced; c) Improved procedures collection, accumulation and target use of money introduced.	Funds of water users of KR and RK
11.2. Introduction of payment for natural water objects use and water resources not related to water use	Government of KR, Min Fin of KR, Ministry of Economics of KR, DWRA of KR, RK Government, Min Fin of RK, MEBP, CWR MEPWR, ARNM of RK	Mechanisms and procedures payment for use water objects and resources in KR and RK developed, approved and introduced.	a) Decree of Government of KR on introduction of payments for water resources use approved; b) Water users of Chu and Talas basins in due order pay for use of water objects and water resources. a) Order of the Acting Minister of AC of RK dated 14 April 2009 No. 223 On approval of calculation methods of payment for surface water use b) Base rates for surface water use by basins approved	Funds of water users of KR Funds of water users of RK

<p><u>12. Development of programs on integrated use of water objects and water infrastructure in KR and RK</u></p> <p>12.1. Construction of small HPP in rivers, canals and reservoirs</p>	<p>Ministry energy of KR DWRA of KR local administration Independent investors Government of RK MEBP of RK CWR MEPWR Local executive bodies</p>	<p>State program of KR and projects on development of small hydropower approved and gradually implemented State, sectoral and territorial programs of RK approved and gradually implemented</p>	<p>a) Gradual commissioning of small hydropower objects in both basins in KR provided; a) Generation of additional energy thanks to construction of small HPPs in Chu and Talas basins provided. a) Gradual commissioning of small hydropower objects in Chu-Talas basin provided; a) Generation of additional energy thanks to construction of small HPPs provided</p>	<p>Funds of entrepreneurs. Government budget of KR. Local Budget (with support of donors' pilot projects) Funds of entrepreneurs. Government budget of RK. Local Budget (with support of donors' pilot projects)</p>
<p>12.2. Development of industrial fishery and amateur fishery in lakes, ponds, irrigation and hydropower reservoirs of KR and RK</p>	<p>KR Min Energy, DWRA of KR, local administration, independent investors, KR MEPWR, BWI, local executive bodies, NGOs, sports clubs</p>	<p>State programs and projects on development of fishery in KR and RK updated, approved and gradually implemented.</p>	<p>a) Fisheries established (reformed) and commercial production of fish products in Chu and Talas basins in KR and RK provided; b) Infrastructure rehabilitated and widened and conditions for development of amateur fishery in Chu and Talas basins provided.</p>	<p>Funds of entrepreneurs. Local budget (with targeted support of pilot projects by external donors and government budget of KR and RK)</p>
<p>12.3. Development of recreation, water sport and tourism objects in natural water objects, irrigation and hydropower reservoirs of KR and RK</p>	<p>KR Min Energy, DWRA of KR, Local and self-governing bodies, Independent investors, MA of RK, CWR MEPWR, Min Health of RK, RK Min Tourism and Sport</p>	<p>State programs and projects on development of objects recreation, water sport and tourism in KR and RK updated, approved and gradually implemented</p>	<p>a) Infrastructure of integrated use of water objects and water structures created and gradually developed; b) Conditions for development of recreation, water sport and tourism in natural water objects, irrigation and hydropower reservoirs in Chu and Talas basins provided</p>	<p>Funds of entrepreneurs. Local budget (with targeted support of pilot projects by external donors and government budgets of KR and RK)</p>
<p><u>13. Development of prevention and liquidation system of emergency consequences in KR and RK's water sector</u></p> <p>13.1. Establishment of security structures on strategic water structures in KR and RK</p>	<p>Government of KR DWRA of KR KR National water council Government of RK CWR/ MEPWR of RK ME of RK Local executive bodies</p>	<p>KR Commission on dams security established and fulfils functions a) Law of RK «On industrial security» adopted b) Mechanism of declaring water structures security created</p>	<p>a) Regulation on establishment and activity of Commission approved by Government of KR; b) Personnel of Commission formed; c) Work plan of Commission approved and implemented Indicators of implementation of task of 13.1 will be updated after making decision on establishment of Commission on security of dams of RK.</p>	<p>Commission works on a voluntary basis (with targeted support of external donors) Government budget of RK</p>
<p>13.2. Inventory of existing and potential sources of natural and human emergencies in water sector of KR and RK</p>	<p>ME of KR Min Energy of KR DWRA of KR Local administration ME of RK, CWR MEPWR Local executive bodies</p>	<p>Inventory of existing and potential sources of emergency in water sector of KR and RK held. Registries sources of emergency in KR and RK developed, approved and</p>	<p>a) Sources of emergency in water objects and water systems in Chu and Talas basins in KR and RK identified and recorded. b) Systematic monitoring of existing and potentially dangerous objects in both basins KR and RK fulfilled.</p>	<p>Government budgets of KR and RK (with targeted support of external donors)</p>

		published		
13.3. Development of programs on emergency prevention in water objects and water systems of KR and RK	ME of KR DWRA of KR Min Energy of KR Commission on security of dams Local administration ME of RK CWR MEPWR Local executive bodies	State and regional programs on prevention of emergency in KR and RK approved and implemented. Rising of security level of strategic water systems and structures provided	a) Technical state and security of water systems and strategic structures in Chu and Talas basins provided; b) Key water structures in both basins equipped with automated control and alarm signaling systems; c) Procedures and alarm signaling facilities developed and introduced; d) Infrastructure of mudflow, flood, bank protection, etc. structures in both basins gradually rehabilitated and developed.	Government budgets of KR and RK Local budgets of KR and RK (with targeted support of pilot projects by external donors) Funds of entrepreneurs
13.4. Provision of operative management of emergencies in water objects and water systems of KR and RK	ME of KR DWRA of KR Min Energy of KR Local and self-governing authorities ME of RK CWR MEPWR Local executive bodies	Organization upgraded and infrastructure and human resources of organizations and enterprises KR and RK for emergency management in systems strengthened. Negative emergency impact on water objects and systems KR and RK quickly eliminated.	a) Regional plans on management of emergency in both basins developed and implemented; b) Infrastructure of local, water management and other bodies of KR and RK involved in events strengthened; c) Emergency stock of materials for events created; d) Active participation of population, NGOs and independent enterprises in implementation of events provided	Government budgets and local budget of KR and RK Special funds of KR and RK
<u>14. Provision of rational and economic use of water resources in KR and RK</u> 14.1. Development of mechanisms of economic incentives for rational water use	Government of KR Min Fin of KR Ministry of Economics of KR, DWRA of KR SAEPF of KR Government of RK MEBP of RK, Min Fin of RK MEP RK, CWR/MEPWR of RK, CGMR of RK Local executive bodies	Improved mechanisms of differentiated taxation and tariff regulating for stimulation of rational water use developed and introduced in KR and RK.	a) Bonus system to the state, municipal, independent enterprises and water users to reduce water supply losses in both basins and actively applying water saving technologies developed and introduced in KR and RK; b) In tariff regulating and model contracts on water supply of KR and RK responsibility for water overspending toughened; c) Mechanisms of flexible regulating of water services fee depending on efficiency of water users' measures on prevention of water depletion and pollution developed and introduced;	Government budget of KR Government budget of RK
14.2. Strengthening of administrative and material responsibility for violation of water use norms and rules in KR and RK	Jokorku Kenesh of KR Government of KR Min Justice of KR DWRA of KR State Water Inspection Parliament of RK	Additions in civil, administrative law and enactments of KR and RK, contemplating strengthening of administrative responsibility for irrational	a) Procedures on bringing to responsibility for violation of norms and rules of water use introduced and consistently fulfilled; b) System of limiting the rights for water for abusers of norms and rules of water use in KR and RK developed and introduced;	Government budget of KR Funds of independent enterprises and water users of KR Government budget of RK Funds of independent

	Government of RK Min Justice of RK CWR MEPWR BWI	use of water and other natural resources amended and approved. Procedures of bringing to administrative and material responsibility of persons and corporate entities for water irrational use in KR and RK introduced.	c) Adequate compensation of damage for affected parties in RK and KR provided thanks to abusers of norms and rules water use; d) Consistent reduction of administrative and civil offense in water sector of KR and RK in Chu and Talas basins provided.	enterprises and water users of RK
14.3. Provision of efficient supervision and inspection in water sectors of KR and RK	DWRA of KR State Water Inspection State financial police State ecologic inspection of SAEPF of KR Min of Health KR CWR MEPWR BWI Min of Health of RK	Organization upgraded, infrastructure, information base and human resources of KR and RK supervision and inspection bodies strengthened Overlapping functions and excess of power among inspection bodies avoided. Regular supervision of observance of water, conservation law, water use norms and rules in basins provided.	a) Territorial units of Water Inspection established their personnel and infrastructure in Chu and Talas basins in KR and RK strengthened. b) Prevention and quick preclusion violation of water, conservation law, norms and rules water use in Chu and Talas basins provided; c) Indicators of efficiency use of water resources in Chu and Talas basins (efficiency, unit water requirements, service, etc.) consistently improved.	Government budget of KR Government budget of RK
15. Development of programs on mass and special training in the context of IWRM introduction in KR and RK 15.1. Revision of training programs for water sector specialists	MES of KR, DWRA of KR, SAEPF KR, Universities and colleges of KR NGO, Min Science and Education of RK, CWR MEPWR, universities and colleges of KR NGOs	Improved training of KR and RK water sector specialists developed and approved. Students under new programs trained. Engaging young qualified specialists in KR and RK water sector widened	a) New curricula for schools of KR and RK adequately consider progressive technologies of management, construction and operation of water systems and water protection; b) Personnel of schools learned curricula; c) Number of young specialists trained under new programs gradually grows in control bodies and enterprises of water sector in both basins of KR and RK.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
15.2. On-the-job training of water sector specialists of KR and RK	MES of KR, DWRA of KR SAEPF of KR Universities and colleges of KR NGOs Min Science and Education	Improved training of control organs, state and independent water enterprises KR and RK developed and approved. Textbooks developed and published and training	a) New curricula of KR and RK adequately consider progressive technologies of management, construction and operation of water systems and water protection; b) Personnel for conducting training, seminars and practice in objects staffed and trained; c) Regular trainings and seminars for personnel of Chu and Talas basins organized;	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)

	of RK, CWR MEPWR Universities and colleges of RK NGOs	ranges organized. Regular trainings provided	d) Training for personnel of control organs and water enterprises of KR and RK in both basins provided.	
15.3. Training of WUAs, FWUAs, AWUCs, farmers of KR and RK in new technologies of water use and agricultural production	MAWR of KR, Kyrgyz agrarian academy, DWRA of KR, RK Universities and colleges, CWR MEPWR Agricultural academy Universities and colleges of RK NGOs	KR and RK's WUAs, FWUAs, AWUCs, farmers training developed and approved. Textbooks developed and published and training ranges organized. Regular trainings provided	a) New curricula in KR and RK adequately consider progressive technologies of water use and agricultural production; b) Personnel for training staffed and prepared; c) Regular training for WUAs, FWUAs, AWUCs, farmers in Chu and Talas basins in KR and RK organized; d) Rising of knowledge and skills of trained group provided.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
<u>16. Provision of transparency of national water policy of KR and RK and widening of public access to urgent water information</u> 16.1. Development of the state bodies of KR and RK in water policy transparency and dissemination of water information	Government of KR DWRA of KR, SAEPF of KR, ME of KR, Local administration Independent MM Government of RK CWR MEPWR Min of Health of RK, ME of RK Local executive bodies. State and independent MM	Programs and plans of public awareness in central control bodies of KR and RK developed and implemented. Information transparency of control organs of KR and RK on state and development prospects of water resources, activity and relations in KR and RK provided.	a) In central and territorial control bodies of KR and RK, including in Chu and Talas basins, work of staff on sustainable communication with water users and public organized. b) In all control bodies, websites created and regular information update provided. c) Regular newsletters and other prints with information on water in KR and RK organized. d) Consistent widening of access to all stakeholders in both basins to information on water provided.	Government budget of KR Funds of independent MM of KR Government budget of RK Funds of independent MM of RK
16.3. Widening of involvement of research, education organizations and NGOs of KR and RK in dissemination of knowledge and formation of public opinion on necessity of rational natural management and introduction of new technologies	MES of KR, National Academy science of KR Universities and colleges Research organizations NGOs, Independent MM Government of RK Min science and education of RK, Local executive bodies Agricultural academy Universities and colleges of RK NGOs, State and	Regular information dissemination on progressive achievements of engineering science, new techniques, data on legal, economic and other aspects of water use and conservation in KR and RK provided. Special PR-actions on participation of water users, independent entrepreneurs and public in efficient use and protection of water resources regularly held.	a) Regular newsletters, advertising, reference, methodical and other materials organized for introduction of new technologies, equipment organizational procedures in water sector of KR and RK; b) Trainings (seminars, etc.) organized for dissemination of urgent knowledge and learning of practice introduction of new technologies and equipment in Chu and Talas basins in KR and RK; c) Gradual growth of indicators efficiency use of water resources and introduction of progressive technologies of water use in Chu and Talas basins provided.	Government budget of KR (with targeted support of external donors) Funds of entrepreneurs and other independent investors. Government budget of RK (with targeted support of external donors) Funds of entrepreneurs and other independent investors.

	independent MM			
<u>17. Prevention of waterlogging and land salinity in KR and RK</u> 17.1. Inventory of reclamation of irrigated and irrigable land in KR and RK	MAWR of KR, DWRA of KR Reclamation expedition State land inspection of KR Local administration CWR MEPWR Agency on land resources of RK Local executive bodies	Full assessment of irrigated and irrigable land in KR and RK held. Amended KR and RK's reclamation Cadastres developed and approved. KR and RK's reclamation plans developed and approved based on land inventory.	a) Inventory and updated assessment of reclamation state of land in Chu and Talas basins conducted; b) Sections of reclamation cadastres of KR and RK for Chu and Talas basins on new methodology developed; c) Plans of reclamation measures for both basins developed and gradually fulfilled; d) Indicators of reclamation state of irrigated and irrigable land in both basins in KR and RK gradually improved.	Government budget of KR Local budget Funds of owners and landholders Government budget of RK Local budget Funds of owners and landholders
17.2. Rehabilitation and development of monitoring systems of irrigated and irrigable land in KR and RK	MAWR of KR DWRA of KR Reclamation expedition State land inspection of KR Local administration CWR MEPWR Agency on land resources of RK Local executive bodies	Methodology and procedures of monitoring of irrigated and irrigable land in KR and RK revised. Rehabilitation of technical state and consistent development of monitoring network in KR and RK provided. Regular observation of land and CDN provided	a) Number of observation posts and wells, controlling state of irrigated and irrigable land in Chu and Talas basins optimized; b) Equipment of monitoring network rehabilitated and upgraded. c) KR and RK's monitoring bodies staffed and trained in new technologies of collection and processing of information; d) Chemical labs for analysis samples water supply and soil in both basins established and equipped.	Government budget of KR (with targeted support of external donors) Government budget of RK (with targeted support of external donors)
17.3. Rehabilitation and development of collector-drainage systems (KDS) in KR and RK	DWRA of KR Reclamation expedition MAWR of KR Local administration CWR MEPWR Agency on land resources Local executive bodies	State, institutional and regional programs of rehabilitation and development of KDS in KR and RK developed and approved. Sustainable measures on rehabilitation and development of KDS. Provided sustainable land improvement in KR and RK provided.	a) Personnel and material-technical capacity of water bodies of KR and RK that repair, rehabilitate and develop KDS in Chu and Talas basins strengthened; b) Equipment consistently repaired, upgraded and new KDS in both basins constructed; c) Consistent reduction of land with reclamation-unfavorable state in both basins in KR and RK provided.	Government budgets of KR and RK. Local budget. Funds of WUAs, FWUAs, AWUCs and other independent land users (with targeted support of external donors)
17.4. Prevention of waterlogging and impoundment of settlements and industrial objects in KR and RK	ME of KR Local and self-governing authorities of KR DWRA of KR ME of RK	KR and RK's state, institutional and regional programs on prevention and management of waterlogging and	a) Integrated area inspection being at risk of waterlogging and impoundment in Chu and Talas basins in KR and RK conducted; b) Personnel and material-technical capacity of bodies strengthened;	Government budget of KR Local budget Funds of independent enterprises, WUAs and FWUAs.

	MA of RK CWR MEPWR Agency on land resources Local executive bodies	impoundment of settlements and industrial objects developed, approved and implemented. Waterlogging prevention systems and settlements and industrial objects impoundment gradually rehabilitated and developed	c) Works on prevention and management of waterlogging and impoundment in both basins consistently executed; d) Number of objects, at risk of waterlogging and impoundment in both basins gradually reduced.	Government budget of RK Local budget Funds of independent enterprises, WUAs, FWUAs and AWUCs of KR
<u>18. Development of interstate water relations of KR and RK in the Chu and Talas Rivers basins</u> 18.1. Improvement of external water policies of KR and RK	President of KR Jokorku Kenesh of KR Government of KR DWRA of KR MFA of KR President of RK Parliament of RK Government of RK MFA of RK MA of RK CWR MA	KR external water policy under national water strategy developed and approved. Section of KR's Water Code on external water policy amended. Provided external water policy transparency. RK's National water security formed. RK's external water policy transparency ensured	a) Principles and mechanisms of cooperation of KR and RK with other countries, international organizations and external independent partners in water relations and water resources protection updated and approved; b) National legal basis of KR and RK on regulating external water policy revised; c) Water relations between KR and RK in Chu and Talas basins consistently developed in directions to be agreed by Governments of both countries.	Government budget of KR Government budget of RK
18.2. Revision of legal basis of water cooperation of KR and RK in the Chu and Talas Rivers basins	Government of KR Government of RK DWRA of KR CWR of RK MFA of KR and RK	Amended 2000 agreement between RK and KR governments on interstate water structures use in Chu and Talas rivers developed and approved in due order. Draft agreement to replace 2000 agreement developed. Execution and ratification of new agreement started.	a) Amended agreement of 2000 between KR and RK approved; b) Water cooperation of KR and RK in Chu and Talas basins gradually widened in accordance with revised agreement of 2000; c) KR and RK's Governments initiated and executed new agreement contemplating joint measures on management of water resources, interstate water infrastructure and protection of water in Chu and Talas basins.	Government budgets of KR and RK (with support of donors)
18.3. Development of Kyrgyz-Kazakh Commission and basin water councils activity	Government of KR Government of RK DWRA of KR CWR of RK MFA of KR and RK Kyrgyz-Kazakh Water Commission	Legal basis of bilateral commission and basins water councils revised. Key role bilateral commission, Chu-Talas, Chu and Talas basin councils KR and RK in coordination of joint use and protection of	a) Amended regulation on Chu-Talas bilateral water commission developed and approved; b) Capacity of commission, its secretariat and working groups strengthened; c) Chu basin council or unified Chu-Talas basin council with representatives of RK established; d) Water resources management in Chu and Talas basins consistently coordinated by bilateral commission and	Government budgets of KR and RK (with targeted support of donors)

		water resources in both basins ensured.	basin councils with representatives of both countries. e) Sustainability and stirring up of commission and councils provided.	
18.4. Development of joint water programs and projects of KR and RK in the Chu and Talas Rivers basins	Government of KR Government of RK DWRA of KR, CWR of RK MFA of KR and RK Kyrgyz-Kazakh Water Commission Regional water organizations and enterprises. Local administration of KR and RK Independent investors and water users of KR, RK and other countries	Favorable legal and organizational conditions and infrastructure for joint reciprocal projects related to water resources use in both basins provided. Attraction of new independent and external investors for implementation of joint projects in both basins provided. Indicators of water supply and economic efficiency from operation of water objects and water resources in KR and RK in both basins consistently grow.	a) All water systems and interstate structures in both basins consistently maintained and developed with adequate participation of KR and RK; b) Joint projects in the following: - rehabilitation and construction of irrigation systems; - rehabilitation and construction of flood and bank protection structures; - prevention of waterlogging and land impoundment; - prevention of water sources depletion; - prevention of water resources pollution; - rehabilitation and development of water infrastructure monitoring; - development and provision of information system's transparency: - development of small HPPs; - natural water objects use in favour of population and entrepreneurs in border area of both basins	Government budgets of KR and RK (with targeted support of external donors) Local budget Funds of independent enterprises External investment for concrete projects

DRAFT DOCUMENT FOR DISCUSSION

**MEMORANDUM OF UNDERSTANDING BETWEEN COMMISSION ON THE
MEKONG RIVER AND KAZAKHSTAN AND KYRGYZSTAN'S COMMISSION ON
INTERSTATE WATER STRUCTURES USE IN THE CHU AND TALAS RIVERS**

Commission on the Mekong River (CMR) and Kazakhstan and Kyrgyzstan's Commission on interstate water structures use in the Chu and Talas Rivers, or for short - Chu-Talas Water Commission (CTWC), further referred to as "the Parties"

Considering that CMR has gained a valuable expertise in initiation and establishment of cooperation in the large transboundary river basin,

Noting that this Memorandum of Understanding developed to support CTWC in strengthening of cooperation in the fair resources use and environment protection in the respective river basins,

Considering that CMR deals with a wide range of problems which are related to Integrated Water Resources Management in the transboundary river basin,

Considering that CTWC intends to be developed to include in its competence issues of water resources management at transboundary river basin level,

Underlining significance of relations strengthening and development of cooperation between two commissions of transboundary river basins,

Considering Memorandum as a base for achievement of concrete results in implementation of joint measures in favor of respective member-countries.

The Parties have agreed on:

1. Purpose

The Parties agree to cooperate and assist in spheres of general interest in accordance with their mandates.

2. Spheres of cooperation

Cooperation covers exchange of knowledge and experience in the following aspects:

Increase of capacity for

- Formulation and execution of the rules and regulations on the river basin;
- Institutional development of organization of river basin, including procedures and operations;
- Interaction with member-countries, procedures and agreements at national level;
- Engaging key stakeholders, such as NGOs and businessmen both with regard to formulation of policy and operational activity;
- Strengthening of role and functions of secretariat of river basin's organization;
- Improvement of cooperation with international community and donors;
- Improvement of partners' knowledge and skills in respective national agencies.

Technical aid for

- Development of procedures for collection, processing and dissemination of data and information on water and other resources;
- Preparation of basin's plan on environment protection;
- Formulation of management plan at the basin level on Integrated Water Resources Management;
- Development of procedures for control of water pollution and water apportioning;
- Planning of infrastructure development;
- Joint operation and maintenance of some water control structures.

3. Forms of cooperation

The Parties shall undertake to cooperate under their respective mandates and powers by development of initiatives, projects and programs on sustainable development in respective river basins and for improvement of social-economic conditions of population in these basins thanks to:

- Sharing of information and materials which relate to spheres listed in Part 2;
- Mutual visits of respective staff;
- Involvement of the Party in the events arranged by the other Party by invitation;
- Implementation of joint measures, projects and programs which should be a matter of concrete agreements between the Parties;
- Other forms of cooperation as required.

Joint measures should be taken in accordance with the rules, regulations and procedures of each Party.

4. Consultations

The Parties should regularly carry out consultations to identify or revise priorities of cooperation and elaborate modalities for joint measures,

5. Entering into force, amendment and termination of Memorandum

Memorandum shall enter into force on the date of its signing and remain in force within 3 years with possible extension for another 3 years time at absence of written notice on termination of either Party.

Memorandum may be changed by written consent of its Parties.

Memorandum may be terminated by any Party by written notice to another Party upon the expiry of 3 months after such notice.

Signed on “ “ 2011

On behalf of CMR

On behalf of CTWC

Statement of participants of International conference on 10th anniversary of Agreement between Governments of Kyrgyzstan and Kazakhstan on use of interstate water structures in the Chu and Talas Rivers, Bishkek, Kyrgyzstan, 23-24 May 2011

Participants of conference:

Highly appreciate results achieved during fulfillment of Agreement between Governments of Kyrgyzstan and Kazakhstan on use of interstate water structures in the Chu and Talas rivers;

Note importance of cooperation in water resources distribution in the Chu and Talas rivers' basins between Kazakhstan and Kyrgyzstan for sustainable development, strengthening of trust and security in Central Asian region;

Regard cooperation between Kazakhstan and Kyrgyzstan in the Chu and Talas rivers' basins as a model of countries cooperation in joint water resources use in Central Asia and joint maintenance of water infrastructure used for division of interstate water resources;

Express an opinion that experience of cooperation in the Chu and Talas rivers' basins deserves thorough study to be used in the other interstate river basins of Central Asia;

Note with appreciation that cooperation of Kazakhstan and Kyrgyzstan in the Chu and Talas rivers' basins is supported by international community, including international organizations, financial institutions and national agencies on cooperation, such as UNECE, ESCAP, UNDP, OSCE, European Union, ADB, SDC and German Society for International Cooperation.

Statement of conference participants is adopted at final meeting on 24 May 2011.