

Interstate Commission for Water Coordination of Central Asia	<b>BULLETIN № 2 (48)</b>	May, 2008
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**PROTOCOL OF THE 49th MEETING OF INTERSTATE COMMISSION FOR WATER COORDINATION (ICWC) OF THE REPUBLIC OF KAZAKHSTAN, THE KYRGYZ REPUBLIC, THE REPUBLIC OF TAJIKISTAN, TURKMENISTAN AND THE REPUBLIC OF UZBEKISTAN**

March 19, 2008

Tashkent city

**Participated:**

Anatoly Dmitriyevich  
Ryabtsev  
Baratali Turanovich  
Koshmatov

Saidi Yokubzod

Kakadurdy Khankuliyevich  
Ataliyev

**ICWC members:**

Chairman of Committee for Water Resources,  
Ministry of Agriculture, Republic of Kazakhstan  
Director General of Water Department, Ministry  
of Agriculture, Water Resources and Processing  
Industry, Kyrgyz Republic  
Minister of Land Reclamation and Water Re-  
sources, Republic of Tajikistan  
Deputy Minister of Water Resources, Turkmeni-  
stan

**From the ICWC Executive Bodies:**

Victor Abramovich  
Dukhovny  
Khudayberganov  
Yuldash Khudayberganovich  
Khamidov  
Makhmud Khamidovich

Director of SIC ICWC, Professor, ICWC Honor-  
ary Member  
Chief of BWO “Amudarya”  
  
Chief of BWO “Syrdarya”

**Invitees:**

Nariman Kipshakbayevich  
Kipshakbayev  
Kelesbek Tleulesovich  
Kenzhaliyev  
Nurgazy Patiydinovich  
Mamataliyev  
Anvarzhon  
Kamolidinov  
Yarash Ergashevich  
Pulaton  
Khomidzhon Boirov

Director of SIC ICWC Kazakh Office, ICWC  
Honorary Member  
Director of RGP “Yugvodkhoz”  
  
Director of SIC ICWC Kyrgyz Office  
  
Director of SIC ICWC Tajik Office  
  
Director General of TajikNIIGiM  
  
Chief of Sogd Province Department for Water Re-  
sources  
Head of Department, Ministry of Water Re-  
sources, Turkmenistan

Akhmed Mukhammedov

Nurmukhammad Sheraliyev	Assistant to Head of Water Department, Ministry of Agriculture and Water Resources, Republic of Uzbekistan
Aleksandr Georgiyevich Loktionov	Deputy Chief of BWO "Syrdarya"
Ferdinand Fattakhovich Beglov	Head of Division, SIC ICWC
<b>Chairman of the meeting:</b>	Sh.R. Khamrayev, ICWC member, Deputy Minister, Head of Water Department, Ministry of Agriculture and Water Resources, Republic of Uzbekistan

*Agenda:*

1. On the realization progress of water withdrawal limits and ensuring of the approved operating regime of the tandem reservoir systems at the Amudarya and Syrdarya Rivers during 2007-2008 non-growing season and expected water situation for the Amudarya and Syrdarya Rivers basins during the growing season of 2008 (BWO "Amudarya" and BWO "Syrdarya" responsible).
2. Program for financial-economic activities of ICWC and its executive bodies (BWO "Amudarya", BWO "Syrdarya", ICWC Secretariat, SIC ICWC, CMC ICWC, and ICWC TC responsible).
3. Progress in activities under the ADB RETA 6163.
4. Results of "IWRM-Fergana" Project assessment and consideration of the Project
5. Document for Phase 4 of "IWRM-Fergana" Project.
6. The Statute on ICWC and the Agreement on Strengthening Organizational Framework for Management, Protection and Development of Water Resources from Interstate Sources in the Aral Sea Basin.
7. Results of the 1st Asia-Pacific Water Summit.
8. Agenda and venue of the next 50th ICWC meeting.

*Additional items:*

1. Central Asian International Scientific-Practical Conference "Towards the 5th World Water Forum" (proposed to unite with item 6).
2. Results of the CAREWIB Project for 2007 (included at request of the Swiss Agency for Development and Cooperation).

Having approved the agenda, listened to the speeches of the meeting participants and exchanged opinions, the members of the Interstate Commission for Water Coordination in Central Asia (ICWC) decided:

**On the first item:**

1. Take into account the information of BWO “Amudarya” and BWO “Syrdarya” on the realization of water withdrawal limits and observance of the adopted tandem reservoir systems operating regime during the non-growing season of 2007/2008 as well as the preliminary water balance for the Amudarya and Syrdarya river basins for the growing season of 2008.
2. Based on the predicted extremely tense situation with water supply, BWO “Amudarya” and BWO “Syrdarya” should implement reduction of water withdrawal limits for the states by 10% in April 2008, with the subsequent adjustment for the remaining growing season after obtaining amended forecasts from Hydrometeorological Services.
3. To hold a work meeting of representatives from water and energy organizations of the states in the Syrdarya river basin to determine volumes of water releases from the Toktogul reservoir during the growing season of 2008 and appropriate electric power overflows and fuel-energy resources deliveries, in the shortest possible time.
4. Considering deep drawdown of the Kayrakkum reservoir, with a view to providing normal operation of pumping plants located at it and fortification of dams, to hold a work meeting of chiefs of water management organizations of the states in the Syrdarya river basin to determine scope, financing amount and timeframe of work to be done.
5. ICWC members should submit a petition to the Governments of their countries on allocation of funds for carrying out of low water control.

**On the second item:**

1. Take the information on financial-economic activities of ICWC and its executive bodies into account.
2. Approve cost estimates for financing of operational needs of BWO “Amudarya” and BWO “Syrdarya” for 2008.
3. Approve cost estimates for maintaining of SIC ICWC and its offices for 2008.
4. ICWC members should take measures on ensuring of financing the mentioned activities completely.
5. It is necessary to legalize official ways for co-financing of ICWC and its Training Center activities through the Ministry of Finance of Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan.

**On the third item:**

1. ICWC members considered the existing differences in opinions of the members of the working group and made a decision on the non-agreed items of the draft Agreement on the Use of Water and Energy Resources in the Syrdarya River Basin in the following version:

- Clause 7.2 “The parties admit that water releases from the Toktogul reservoir in a long-term regime should be implemented depending on hydrological conditions of a year on the basis of a long-term planning of a flow regulation regime”.
  - Clause 8.9. “During years of average and above the average water availability and at threat of emergency at the Shardarya reservoir and the Syrdarya river lower reaches as a result of high inflow to them, water is to be discharge from the reservoir to Aydar-Arnasay depression. Release volumes and discharge are agreed by the Republic of Kazakhstan and the Republic of Uzbekistan”.
  - Article 15. Clauses 15.2, 15.3 и 15.4 are to be transferred in “Rules for fulfillment of procedural obligations”.
  - To continue the work on Clause 9.1 of the draft Agreement till achievement of the consensus.
3. Note that under the project, the planned work had been done on preparation of:
- rules for fulfillment of procedural obligations, and recommendations for improvement of the rules for regulation and management of water and energy resources in the Syrdarya river basin;
  - recommendations for clarification of channel losses in the mid- and downstream of the Amudarya river;
  - methods for development and agreeing of detailed methodical recommendations for accounting of basin-wide costs, gathering of data and assessment of actual damage from regimes of water resources use;
  - register of interstate objects in the Amudarya and Syrdarya river basins.
3. Ask ICWC members to organize the expert examination and agreement of the mentioned guidelines prepared with the participation of all national work groups till April 20, 2008 in order to submit the proposals to approve them at the 50th ICWC meeting.
4. In general, assess the activity under the ADB RETA 6163 favorably. Approve in general the listened information of the ADB on the concept of the new project. Ask the ADB to continue rendering assistance in improvement of water resources management in Central Asia in accordance with the main directions of activities proposed by the ADB. Ask ICWC members not later than on April 1, 2008 to submit their proposals on concrete directions of activities within the framework of the new project concept and prepare them for the final consideration at the next ICWC meeting.

**On the fourth item:**

1. Approve the results of “IWRM-Fergana” Project within the framework of Phase III. Consider the achieved results as sufficient to organize final Phase 4 of the project on thir basis.
2. ICWC members express their deep gratitude to the Swiss Agency for Development and Cooperation (SDC) for financial and technical support to the Project.

3. Pay a particular attention to strengthening of activities at the national level related to completion of IWRM implementation at pilot projects and to dissemination of this experience, especially through the projects of regional donors.
4. SIC ICWC together with IWMI should facilitate preparatory work for justification of Project Phase 4 and its launching since 1 May 2008 in order to ensure work continuity.
5. Focus the efforts of national groups on project coordination (NSCG) on wide information of all stakeholders on development of IWRM, dissemination of advanced IWRM principles and on building of government support to IWRM in institutional, legal, and financial aspects.
6. Approve the Project Document for Project Phase 4.

**On the fifth item:**

1. Considering that the members of NWG from the Kyrgyz Republic have not initialed the draft Statute on ICWC and the draft Agreement on Strengthening Organizational Framework for Management, Protection and Development of Water Resources from Interstate Sources in the Aral Sea Basin, ask Mr. B.T. Koshmatov, ICWC member from the Kyrgyz Republic, to take measures on consideration of the mentioned draft documents within a month, with agreeing with ICWC members in form of survey and submitting for approving at the 50<sup>th</sup> meeting of ICWC.
2. SIC ICWC should send the draft “Order of rotation of executive bodies and their chiefs” to the chiefs of the executive bodies of ICWC within a week.
3. ICWC members should consider the draft “Order of rotation...”, give their notes and proposals, and consider the document together with the Statute on ICWC and the draft Agreement on Strengthening Organizational Framework for Management, Protection and Development of Water Resources from Interstate Sources in the Aral Sea Basin in order to be approved at the 50<sup>th</sup> meeting of ICWC.

**On the sixth item:**

1. Take into account the information on the results of the 1st Asia-Pacific Water Summit held under the preparatory activities towards the 5th World Water Forum and participation of a delegation from Central Asia in its activity.
2. SIC ICWC should place the information about the results of the 1<sup>st</sup> APWS on the official site of ICWC, and publish it in the “Bulletin of ICWC” and “Press release” of ICWC.
3. Support the proposal of Mr. B.T. Koshmatov, ICWC member from the Kyrgyz Republic, together with SIC ICWC to hold the Central Asian International Scientific-Practical Conference “Towards the 5th World Water Forum” on May 20-22, 2008 in Bishkek city, at the support of the Secretariat of the 5th World Water Forum and GWP CACENA.

**On the seventh item:**

1. Hold the next 50th ICWC meeting in Bishkek city, the Kyrgyz Republic, on May 20-22, 2008.
2. Approve the agenda of the next 50<sup>th</sup> ICWC meeting.

***Agenda***

1. Approval of water withdrawal limits from the Amudarya and Syrdarya Rivers for the growing season of 2008 and agreeing of forecast tandem reservoir systems operation regimes (BWO “Amudarya” and BWO “Syrdarya” responsible).
2. Approval of documents of ADB RETA 6163 Project.
3. Consideration and approval of the drafts of the Statute on ICWC, “Order of rotation of executive bodies and their chiefs” and Agreement “On Strengthening Organizational Framework for Management, Protection and Development of Water Resources from Interstate Sources in the Aral Sea Basin”.
4. Experience of the activity of the Chu-Talas Joint Commission.
5. Agenda and venue of the next 51th ICWC meeting.

**On the first additional item:**

1. Approve the Project Document for Phase 2 of the CAREWIB Project.
2. Take the results of the CAREWIB Project achieved in 2007 into account.
3. Heighten the attention to the development of the work on formation of national information systems.

From the Republic of Kazakhstan

A. Ryabtsev

From the Kyrgyz Republic

B. Koshmatov

From the Republic of Tajikistan

S. Yokubzod

From Turkmenistan

K. Ataliyev

From the Republic of Uzbekistan

Sh. Khamrayev

## **ON THE REALIZATION OF WATER WITHDRAWAL LIMITS AND ENSURING OF THE ADOPTED TANDEM RESERVOIR SYSTEMS OPERATING REGIME AT THE AMUDARYA RIVER DURING 2007-2008 NON-GROWING SEASON<sup>1</sup>**

### **1. The Amudarya River Basin**

The actual water availability for five months of the non-growing season for the Amudarya River Basin in the given Atamyrat section line upstream of the Garagumdarya amounted to 62.1 % of the norm. At the norm of 12 billion 006 Mm<sup>3</sup>, the actual water availability amounted to 7 billion 455 Mm<sup>3</sup> (last year it was 8 billion 416 Mm<sup>3</sup> or 70.1 % of the norm). The expected water availability for the whole non-growing season will be below the norm within the limits of 75.0-80.0 %.

The actual flow at the Kelif gauging station amounted to 11 billion 693 Mm<sup>3</sup>, in comparison with the last year's level of 12 billion 365 Mm<sup>3</sup> that makes 94.5 %.

Use of the established water withdrawal limits for five months of the current non-growing season across the states appears as follows:

In total, for the basin, the established water withdrawals limit was used by 80.9 %; the actual limit amounted to 9 billion 129 Mm<sup>3</sup> at the limit of 11 billion 283 Mm<sup>3</sup>.

- The Republic of Tajikistan used the established water withdrawal limit by 73.4%; 1 billion 661 Mm<sup>3</sup> were actually used at the limit of 2 billion 263 Mm<sup>3</sup>;
- Turkmenistan used the water withdrawal limit by 78.3 %, 3 billion 512 Mm<sup>3</sup> were actually used at the limit of 4 billion 485 Mm<sup>3</sup>;

The Republic of Uzbekistan used the water withdrawal limit by 85.6 %; 3 billion 678 Mm<sup>3</sup> were actually used at the limit of 4 billion 299 Mm<sup>3</sup>.

Across reaches of the river, the use of the established water withdrawal limits is the following:

1. Upstream – 77.6 %, including Tajikistan – 73.4 %, the Republic of Uzbekistan – 117.8 %.
2. Midstream – 88.8 %, including the Republic of Uzbekistan – 93.5 %, Turkmenistan – 85.4 %.
3. Downstream – 63.1 %, including the Republic of Uzbekistan – 72.6 %, Turkmenistan – 41.6 %.

Water availability of three water users of the river lower reaches for the reported period made as follows:

1. Dashoguz province – 41.6 %
2. The Republic of Karakalpakstan – 83.3 %

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<sup>1</sup> Materials for the first agenda issue of the 49<sup>th</sup> ICWC Meeting, Tashkent city, March 2008



### 3. Khorezm province – 53.0 %

The water supply plan for the Aral Sea and Prearalie for five months of the non-growing season was realized by 63.3 %; 1 billion 107 Mm<sup>3</sup> was supplied at the plan of 1 billion 750 Mm<sup>3</sup>, in comparison with the last year's level - 998 Mm<sup>3</sup>.

By the beginning of March 2008, water volume in the Nurek reservoir composed 5 billion 929 Mm<sup>3</sup>, at the plan 5 billion 964 Mm<sup>3</sup>.

Water volume in the Tyuyamuyun reservoir by 3/1/2008 composed 4 billion 747 Mm<sup>3</sup> (it was 4 billion 049 Mm<sup>3</sup> last year).

As a whole, the reported non-growing season has passed rather tensely. In connection with the severe winter and water availability worsening, the predicted operating regimes of the Nurek and Tyuyamuyun hydrosystems were not observed. During the non-growing season, it was necessary to change the operating regime of TMHS with the purpose to make an ice “pipe” in the river bed, bypassing ice safely through (which thickness was 35-45 cm) in terms of its intensive thawing, and also accumulation of necessary water volumes in reservoirs for successful carrying out of washing irrigation in the Amudarya River lower reaches.

The expected results show that in terms of reservoir water availability increase in March 2008 as a whole across the states, the established water withdrawal limits will be observed but for special water users can be admitted both excesses and shortages.

Water availability in the Atamyrat section line upstream of the Garagumdarya for the growing season of 2008 in view of natural discharge of the Vakhsh River is expected to be below the norm within the limits of 80-85 % from preliminary, rough calculations.

The hydrological, climatic and water situation in the basin tends to be low water or close to low water.

In this connection, it is proposed to consider in advance a possibility of some water withdrawal limits cutting in case of confirmation of this situation by hydrometeorological services and the states and to approve mechanism for its introduction.

The Association has proposed variants of water withdrawal limits cutting to be submitted to ICWC members. We suggest reducing of water withdrawal limits by 20.0 %.

Considering the water availability forecast in the Atamyrat section line upstream of the Garagumdarya for the growing season, water withdrawal volumes, the current water volumes storage in the reservoirs, we suggest to set a plan for water supply in the Aral Sea and Prearalie for the growing season in view of CDS in the volume of 2 billion 100 Mm<sup>3</sup>.

## 2. The Syrdarya River Basin

As predicted by hydrometeorological services during the non-growing season of 2007-2008, water availability for the Naryn river was expected at the level of 100 per cents, for the Chirchik river – 91, and the Karadarya river - 89 per cents of the norm. Inflow to the reservoirs was assessed at the level of 109 per cents, and lateral inflow - 95 per cents of the norm.

The actual water situation for the expired non-growing season as of March 1, 2008 is characterized by the following.

Inflow to upstream reservoirs (Table 2.1) actually amounted to 3 billion 729 Mm<sup>3</sup>, or by 833 Mm<sup>3</sup> less than predicted. 2 billion m<sup>3</sup> flowed to the Toktogul reservoir, 564 Mm<sup>3</sup> – to the Andijan reservoir, 1.1 billion m<sup>3</sup> – to the Charvak reservoir.

Lateral inflow (Table 2.1) amounted to 8.6 billion m<sup>3</sup>.

**Table 2.1**

Parameter	Volume (from 01.10.2007 to 01.03.2008), million m <sup>3</sup>		
	forecast	actual	per cent
Inflow to upstream reservoirs			
to the Toktogul reservoir	2679.66	1999.48	75
to the Andijan reservoir	709.69	564.87	80
to the Charvak reservoir	1047.49	1069.82	102
the Ugam River	126.06	94.34	75
<i>Total:</i>	<i>4562.90</i>	<i>3728.51</i>	<i>82</i>
Lateral inflow:			
Toktogul – Uchkurgan	352.42	329.76	94
Uchkurgan, Uchtepe- Kayrakkum	3375.79	3868.22	115
Andijan – Uchtepe	1899.59	1988.23	105
Kayrakkum – Chardarya	1960.59	1753.10	89
Gazalkent – Chinaz Chirchik gauging station	669.69	632.85	95
<i>Sub-total:</i>	<i>8258.08</i>	<i>8572.16</i>	<i>104</i>
<b>TOTAL:</b>	<b>12820.98</b>	<b>12300.67</b>	<b>96</b>

**Table 2.2**

Reservoir	Releases (from 01.10.07 to 01.03.08), million m <sup>3</sup>		Per cent
	planned	actual	
Toktogul	6585.41	8412.84	128
Andijan	382.23	357.12	93
Charvak	1448.06	1917.17	132
Kayrakkum	7872.33	10259.78	130
Chardarya	5038.85	6760.28	134
<b>TOTAL:</b>	<b>21326.88</b>	<b>27707.19</b>	<b>130</b>

The total inflow for the basin has achieved 12.3 billion m<sup>3</sup>, i.e. corresponds to the forecast.

Actual releases from reservoirs achieved 130 % of the planned volume that is explained by greater discharge from the Toktogul reservoir - 128 %, the Kayrakkum and Shardarya reservoirs - about 130 % of the planned volumes (Table 2.2).

As a result, by March 1, 2008 water storage in the reservoirs amounted (Table 2.3): the Toktogul reservoir – 7.25 billion m<sup>3</sup>, the Andijan reservoir - 689 Mm<sup>3</sup>, the Charvak reservoir - 492 Mm<sup>3</sup>. As a whole, water storage in the upstream reservoirs amounted to 8 billion 438 Mm<sup>3</sup> that by 3 billion 316 Mm<sup>3</sup> less than the volume in accordance with the plan-schedule for this date - 11 billion 753 Mm<sup>3</sup>.

**Table 2.3**

Reservoir	Reservoir water volume, million m <sup>3</sup>			
	by 01.04.07.	planned by 01.03.2008	actual by 01.03.2008	by 01.10.06. actual
Toktogul	13729.00	9811.01	7256.00	11925
Andijan	479.27	804.90	689.22	813
Charvak	1550.20	1137.33	492.40	741
Kayrakkum	853.00	3174.26	361800	3423
Chardarya	907.00	1030.39	701.03	4048
TOTAL:	17518.47	15957.89	12756.65	20950

**Table 2.4**

Site, State – water user	Water with- drawal limit, million m <sup>3</sup>	Actual water withdrawal, million m <sup>3</sup>	Per cent
Toktogul – Uchkurgan hydrosystem, including			
Kyrgyzstan	15.53	15.29	98.4
Tajikistan	47.21	72.41	153
Uzbekistan	1302.2	1180.2	90.6
Uckurgan – Kayrakkum hydrosystem, including			
Kyrgyzstan	21.13	2.66	12.6
Tajikistan	43.48	1.61	3.7
Uzbekistan	121.0	182.03	150
Kayrakkum hydrosystem – Chardarya reservoir, including			
Kazakhstan	404.32	6.05	1.5
Tajikistan	88.89	5.67	6.4
Uzbekistan	1061.17	1425.1	134

Water supply to the states-water users by 01.03.08 amounted to: Kazakhstan for the Dostyk canal – 6.8 Mm<sup>3</sup>, Kyrgyzstan – 17.95 Mm<sup>3</sup> (77 % of the limit), Tajikistan – 79.69 Mm<sup>3</sup> (73 % of the limit) and Uzbekistan – 2877.33 Mm<sup>3</sup> (50 % of the limit) (Table 2.4 and 2.5). The shortage of the limits is explained by that land leaching usually carried out within December-March was not carried out because of the low cold.

Table 2.5

Republic – water user	ICWC limit by 01.03.08, million m <sup>3</sup>	Actual water withdrawal by 01.03.08, million m <sup>3</sup>	Per cent
The Kyrgyz Republic	36,66	17,95	49
The Republic of Uzbekistan	2484,36	2877,33	116
The Republic of Tajikistan	179,59	79,69	44
The Republic of Kazakhstan (Dostyk Canal)	404,32	6,05	1,5

4 billion 258 Mm<sup>3</sup> of water or almost by 2 billion m<sup>3</sup> of water more than expected flowed to the Aral Sea and Prearalie by 01.03.08, that is caused by the raised inflow to the Shardarya reservoir and respective increase of releases by 30 % in comparison with the plan (Table 2.6).

Table 2.6

Parameters	Planned, million m <sup>3</sup>	Actual, million m <sup>3</sup>
Water supply to the Aral Sea	2304,11	4257,71
Discharge into the Arnasay depression	0371,95	508,92
Inflow into the Chardarya reservoir	9582,26	10465,15

Release to the Arnasay reservoir achieved 509 Mm<sup>3</sup> of water by 01.03.08.

During the realization, the Plan-schedule of the Naryn-Syrdarya tandem reservoir system operating regime approved at the 48<sup>th</sup> meeting of ICWC was corrected depending on current water situation.

For all that, it is necessary to note that the water situation during the winter season of 2007-2008 is different with that such a long period of low temperatures in the region has not been observed for the recent 30-40 years.

In the river lower reaches, practically along its all extension from the Shardarya reservoir to the Aral Sea, the landfast ice formed. The average thickness of the ice was 40-50 centimeters, it exceeded 1-1.5 meters on separate sites. In connection with the landfast ice, the canal flow capacity decreased to 700 m<sup>3</sup>/s. As a result of releases from the Toktogul reservoir up to 700-800 m<sup>3</sup>/s, in the Syr-Darya midstream discharge achieved 1500-1600 m<sup>3</sup>/s. Because of the raised inflow, there was intensive filling of the Shardarya reservoir leading to fast reduction in its storage capacity. By February 1, 2008, the volume of the Shardarya reservoir amounted to 3.4 km<sup>3</sup> and 2.0 km<sup>3</sup> of free capacity to the full volume remained. However, in view of inflow of up to 70 Mm<sup>3</sup> a day to the reservoir, it could accumulate the full volume already to the beginning of March and completely lose its regulating ability. The extremely tense water situation with threat of flooding of adjoining to the river bed territories, settlements and economic objects within Kyzylorda town area in case of compelled increase in discharge from the Shardarya reservoir was developed. Based on the current water situation, the Republics of Kazakhstan and Uzbekistan to-

gether with BWO “Syrdarya” carried out necessary measures which allowed prevent development of negative consequences.

***The forecast of the Naryn-Syrdarya tandem reservoir system operating regime and water withdrawal limits from the Syrdarya for the growing season of 2008.***

The final forecast of the expected water resources for the growing season should be given by the Hydrometeorological service on April 11-13 this year, therefore the preliminary forecast # 25-07/25 from March 11, 2008 was laid in the basis of calculation of the Naryn-Syrdarya tandem reservoir system operating regime for the beginning growing season.

According to this forecast, precipitation accumulation during October-February 2008 in basins of the Chirchik, Akhangaran rivers and the rivers of the south part of the Fergana Valley amounts to 80-90 %, basins of the Karadarya, Naryn rivers and the rivers of the north part of the Fergana Valley - 60-90 % of the norm.

Water availability of the rivers of the Syrdarya basin is expected to be at the level of 80-90 % of the norm. Water availability of the main tributaries of the Syrdarya will amount to: for the Naryn - 70-90 %, for the Karadarya - 40-70 % of the norm.

The comparison of water availability for the coming growing season with actual indicators of the recent low water years shows that water resources inflow this year is expected to be low, comparable with the water availability of 1997, but the situation is aggravated with that there is practically no water storage in the upstream reservoirs (Table 2.7).

**Table 2.7.**

**Volumes of available water resources,  $Mm^3$**

Years	1995	1997	2000	2007	2008 (forecast)
Inflow total	24078	23803	22411	27361	24328
Percent of the norm (29535 $Mm^3$ ) including:	82%	81%	76%	93%	82%
to upstream reservoirs	14404	13972	14014	16680	14835
lateral inflow	9674	9831	8397	10681	9493
Water storage in reservoirs without taking dead storage including:	16611	12428	13612	13001	8502
Toktogul reservoir	8698	4281	5499	5171	900
Andijan reservoir	896	1222	1226	605	600
Charvak reservoir	653	582	268	388	69
Kayrakkum reservoir	2143	2094	2373	2599	2666
Shardarya reservoir	4221	4249	4246	4238	4067
Total available water resources	40689	36231	36023	40362	32630

Under the conditions, the Toktogul reservoir is the main source for increase in water availability. At the same time, its volume by the beginning of April will be reduced up to  $6.4 \text{ km}^3$ , and life-giving moisture storage in view of the dead volume of  $6.0 \text{ km}^3$  will amount to  $0.4 \text{ km}^3$ . The available water storage in the reservoir will be by  $6.6 \text{ km}^3$  less in comparison with last year when the average annual water volume in the reservoir remained equal to  $13 \text{ km}^3$  by the beginning of a growing season. In view of low intensity of precipitation accumulation, inflow to it during the growing season is expected at the level of  $8.4 \text{ km}^3$ , and the available water resources will amount to  $8.8 \text{ km}^3$ .

However, taking into account a real operating regime of the reservoir, the volume of water released from it during the growing season will not exceed  $4.0 \text{ km}^3$ , that is equivalent to the volume released for meeting of own needs of the Kyrgyz Republic for electric power and filling of the reservoir by the end of the growing season to the volume of  $10.6 \text{ km}^3$ .

For all that, the reservoir will not have resources both for additional compensatory releases for Uzbekistan and Kazakhstan during the growing season and meeting of own needs of Kyrgyzstan for electric power during the autumn-winter period of 2008-2009 (electric power shortage can achieve 5 billion kW/hours).

Nevertheless, in view of the current situation and lack of arrangements on the operating regime of the Toktogul reservoir for the coming growing season now, some possible variants of the operating regime of the NSTRS have been calculated depending on releases from the Toktogul reservoir.

**Variante I:** the release volume of  $4.0 \text{ km}^3$  according to own needs for power consumption by the Kyrgyz Republic.

**Variante II:** the release volume of  $5.0 \text{ km}^3$  or  $1.0 \text{ km}^3$  is released over the needs of the Kirgyz Republic.

**Variante III:** the release volume of  $5.5 \text{ km}^3$  or  $1.5 \text{ km}^3$  is released over the need of the Kyrgyz Republic.

Water withdrawal limits and relative forecast-schedules for the Naryn-Sydarya tandem reservoir system operating regime have been prepared for the mentioned variants. In case of signing an agreement on sharing water and hydropower resources of the Syrdarya basin for the growing season of 2008 between the states of the Syrdarya basin, on the basis of the presented materials, it is possible to clarify the Naryn-Sydarya tandem reservoir system operating regime and water withdrawal limits which should also be corrected depending on a current actual water situation.

At the same time, today it is necessary to search for ways of water storage conservation in March-April. Besides, it is necessary to consider the structure of areas under crops with limiting of water-loving crops sowing, to develop and introduce water conserving technologies, to practice water rotation and other cultural operations.

## ON “IWRM-FERGANA” PROJECT ASSESSMENT RESULTS<sup>2</sup>

The project implemented by local experts under coordination of SIC ICWC and IWMI at financial support of the Swiss Agency for Development and Cooperation (SDC) is aimed at improvement in water resources management efficiency through the IWRM principles introduction in the Fergana Valley.

In September 2001, the Project Inception Phase (Phase I) proceeding till April 30, 2002 started. Project Phase II (01.05.02 - 30.04.05) laid the main organizational foundation for achievement of the principal purposes of the project. Project Phase III (01.05.05 - 30.04.08) is currently coming to the end. To date, as a result of the project activity, the certain results which can be conditionally subdivided into organizational and technological ones have been achieved.

### **The general project achievements on organizational questions:**

1. At pilot canals, for the first time in the practice of Central Asia, the main IWRM principle as a combination of the hydrographic approach – transfer from an administrative-territorial principle to a hydrographic one with wide involving of water users in water governance and management - has been realized. Establishment of water-management bodies in a line: Water Users Group - WUA - Union of Canal Water Users – Canal Management Organization allows bringing democratic principles in the water management system.
2. For the first time in Central Asia, public participation in water management has been implemented through organization of Water Users’ Associations, Unions of Water Users and joint bodies – Canal Water Committees. Representatives of allied fields (ecology, drinking water supply, power engineering) are involved in the process of water management. A clear partition of management and governance functions at WUAs and canals levels has been achieved. Decision-making process on water management has become simpler, more operative and effective. Conflicts have sharply decreased or disappeared.
3. The project has established National Coordination and Support Groups for IWRM realization through which directions of strategic organizational reforms including legal aspects and economic initiatives are recommended to the ministries. The basis for transfer from administrative water allocation to demand-based one has been prepared.
4. The project has done great work on capacity building (social mobilization and training activity) at all levels - from farmers to a main canals level.

Project Phase III has shown that successful IWRM promotion is possible only at a close combination of organizational and legal tools used in water governance with a set of administrative mechanisms supporting and ensuring the purposes and objectives planned by the Governing Body and giving possibilities to administrative staff and public representatives to implement and supervise the set objectives.

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<sup>2</sup> Materials for the fourth issue of the agenda of the 49<sup>th</sup> meeting of ICWC, Tashkent city, March 2008

The main achievements of the project on development, testing and introduction in practice on technical questions:

1. Management Information System (the database (the reference unit) and models - for seasonal planning, operational planning and on-line analysis).
2. The system of water distribution indicators (water supply sustainability, water supply equitability, water availability and unproductive water losses).
3. Perfection of the water accounting system (flow-measuring tables and curves for key water accounting points at canals and WUAs has been corrected, supervision frequency has raised, reliability of metering characteristics has raised, additional equipment at canals and in WUAs has been installed). Preparation work for realization of three pilot Canals Automation Project has been carried out.
4. Upgrading of pumping stations operation (reliability of accounting of pump operation on power characteristics has been assessed, PS operation has been arranged on the basis of optimum operation schedules, command areas clarification, coordination of Unions of Water Users has been strengthened).
5. Crop requirement norms have been clarified (on the basis of hydromodule areas).
6. Actions on land reclamation have been proposed (principles of organization of drainage systems maintenance and land reclamation have been proposed, recommendations on safe CDW use have been given).
7. "Know-how" for increase in water and land productivity (the bases for extension service establishment have been created).
8. Financial and economic tools (business plans for canal managements organizations and WUAs, recommendations on increase in collecting of payment for services have been given).

The most important achievement of the project is that water parameters have considerably improved at all pilot canals and WUAs: water availability, sustainability and equitability. From 2002 up to 2007, sustainability of on crop productivity parameters achieved due to the project decisions and the actions implemented (Annex) is observed at all demonstration farms.

In the project, a new component has been organized - for realization of the IWRM principles in basins of two pilot transboundary small rivers (Khojabakirgan and Shakhimardan). Within the framework of the component, drafts of bilateral agreements on establishment of Basin Commissions on the basis of inventory of all interested participants and problems connected with water resources management have been prepared. Multilateral consultations on problems of the current water allocation and ways of the IWRM principles implementation in the basins of these rivers have been conducted.

In September 2007, SDC organized the external assessment of "IWRM-Fergana" Project results. The most critical issues which were put by the experts of this external assessment are represented below.

The IWRM concept with division into management and governance is the project achievement but it poorly moves ahead. It needs to be strengthened with economic aspects.



In Kyrgyzstan, laws and organizational structures completely correspond to the IWRM concept. In Uzbekistan, only cautious pilot supervision over the process of introduction of separate elements has been organized and WUAs are established on top-down basis. In Tajikistan, there is no precise strategy for reforms in irrigation - therefore it is difficultly to plan anything.

There is no coordination with other projects which work at WUAs level in the region. National groups for IWRM support are invisible and do not execute their mission - supervision, obtaining of funds, results dissemination and their transformation in the national policy.

In Uzbekistan, there is no law on WUAs that is a barrier to the project efficiency. In Tajikistan, there are too high taxes and payment for water delivery services that is also a barrier.

At canal level, there is no realization of the IWRM concept but only integrated irrigation management. There is no involvement of other sectors, household lands, drinking water supply, etc. in management.

The established canal managements organizations - in Kyrgyzstan, they can be used as a model for dissemination, the old management pattern with participation of an intermediate link – Rayvodkhozes prevails in Uzbekistan, in Tajikistan old leaders command currently - therefore there is no trust to reforms.

There is no precise policy in formation of the budget for operation, and there is nothing in general regarding investments for development.

The project together with its partners should develop a training and extension strategy. Public objects such as NGOs and other projects should be involved in development of the strategy.

Doubts are caused with the fact that many project workers are workers of the local organizations at the same time – how are these dual functions combined for benefit of the project?

In February, 2008 in Tashkent, the workshop of all stakeholders where the draft document for Project Phase IV was discussed took place. It was agreed that the overall goal of the project remained as it had been formulated before:

“The contribution to improvement in the standard of life, environment sustainability and social harmony through perfection of water resources management efficiency in the Fergana Valley”.

Based on the overall goal, three principal purposes have been established for Project Phase IV:

A. Pilot territories and transboundary small rivers (TSR) function in accordance with the IWRM principles. The approaches are consolidated and prepared to be promoted in other regions.

B. Governments and donors follow the general principles concerning roles and framework of IWRM structures at levels from WUA up to basin.

C. Complete clarity on financial and economic aspects including possibilities to pay for services at various management levels is ensured.

To achieve these purposes, the following expected results of the project by the end of 2010 have been formulated in the draft document:

A1. Water management and management procedures based on the IWRM principles are completely introduced and used on pilot canals and TSR.

A2. Joint commissions for realization of the IWRM principles will be established in pilot TSR basins, and agreements on principles and mechanisms for joint water resources management will be achieved.

A3. Direct functional mutual relations are established between canal management organizations and WUAs (with involving of local administrative bodies as less as possible).

A4. IWRM tools and management practices approved at the pilot objects are documented and ready to be disseminated.

A5. Capacity development and dissemination strategy is elaborated and implemented, the impact is analyzed.

B1. Donors and governments have common full understanding in each of the countries about roles and spheres, objectives and responsibility of all bodies at levels from WUA up to basin.

B2. The national policy and legal basis for IWRM dissemination is available.

B3. Flexible mechanisms for water accounting at levels from WUA up to basin are established, a differentiated tariffs system for payment of services is prepared.

B4. Financial and economic aspects and possibilities to pay for services at various management levels are assessed.

B5. Assessment of the project results (economic, social and ecological) is carried out.

The draft document proposes a new organizational structure for management of the project according to which the general management will be carried out by the joint association of IWMI and SIC ICWC. The basic volume of works will be supervised and carried out in fields by three established national project offices.

*Annex***Water distribution indicators for the pilot canals**

Pilot canals	Years	Actual water supply, (Mm <sup>3</sup> )	Equitability (per cent)	Sustainability (per cent)	Efficiency (per cent)	Unit water supply, thousand m <sup>3</sup> /ha
SFMC	2003	1053	60	85	81	12,6
	2004	925	89	87	88	11,0
	2005	871	94	85	87	10,3
	2006	816	94	84	89	9,2
	2007	643	92	84	86	7,2
AAC	2003	83	45	70	54	13,1
	2004	66	63	91	53	9,8
	2005	57	69	84	54	8,5
	2006	54	74	81	59	8,0
	2007	64	82	90	59	8,3
KhBC	2003	116	36	41	80	14,4
	2004	113	82	58	78	15,8
	2005	115	73	64	78	16,5
	2006	90	80	54	80	12,1
	2007	88	77	62	81	11,8

**Water productivity assessment for special project demonstration plots**

Farm	Unit water withdrawal (gross) thousand m <sup>3</sup> /ha						Crop yield, t/ha						Water productivity, ton/thousand m <sup>3</sup>					
	2002	2003	2004	2005	2006	2007	2002	2003	2004	2005	2006	2007	2002	2003	2004	2005	2006	2007
Sayed	7,3	5,9	6,7	6,4	5,7		2,8	2,9	2,99	3,4	3,1		0,37	0,49	0,45	0,53	0,53	
Nursultan (wheat)	5,1	2,1	4,4	3,5	1,80	2,40	2,4	4,3	4,3	4,0	4,2	3,57	0,48	2,0	0,98	1,14	2,08	1,49
Turdiali	4	3,4	3,3	5,2	3,40	2,90	3,5	3,9	4,6	4,4	4,6	4,48	0,88	1,14	1,4	0,84	1,28	1,54
Tolibjon	9,4	5,9	5,8	5,6	3,90	4,70	3,7	3,6	3,7	4,2	3,9	4,1	0,4	0,61	0,71	0,75	1,0	0,87

**TASHKENT DECLARATION OF THE INTERNATIONAL CONFERENCE  
“PROBLEMS OF ARAL: IMPACT ON THE GENE POOL OF POPULATION,  
FLORA, FAUNA AND INTERNATIONAL COOPERATION FOR  
MITIGATING CONSEQUENCES”**

Participants of the International Conference have adopted the following statement on environmental crisis in the Aral Sea region and measures of international cooperation for mitigation of the Implications:

1. The outcomes of the International Conference have proved once again that inefficient use of water resources which took place over the recent 15 years resulting in change in waterflow of the Amudarya and Sirdarya rivers have caused one of the most large-scale man-made disasters in modern history – drying out of the Aral Sea. As a result a complex range of environmental, socio-economic and demographic problems emerged, of international, global character in terms of origin and the level of implications.
2. The situation in the Aral Sea region is under peril of rapid and considerable deterioration if inflow of water resources decreases and becomes imbalanced in future. Glaciers of Pamir and Tuan-Shan over the last 50 years have lost 25% of their ice reserves and this process is progressing intensively. Coupled with inefficient use of water resources this can contribute to expansion of disaster area, increase area of saline lands, unsuitable for agricultural cultivation and living, deprive millions of people of employment and income and cause further losses in flora and fauna of the Aral Sea region. Prevention of aggravation of the Aral Sea area situation is an integral part of economic, social, environmental and other aspects of regional security both for Central Asian counties and their neighbors.
3. In this context the issues of reasonable use of water resources of transboundary rivers of the region is becoming increasingly important as well as the need in comprehensive and well-considered approach and decisions related to use of water resources, primarily runoff of transboundary rivers for the sake and in the interests of all countries and peoples living in the region. Countries of the region, in accordance with key documents of international applicable law, including Conventions on Protection and Use of Transboundary Waterways and International Lakes (1992) and On Right of Unnavigable Use of International Waterways (1997), defining key principles of using transboundary rivers within the limits of their respective territories should strive for using of transboundary rivers in fair and reasonable manner, implementation of appropriate measures for prevention of considerable detriment to other runoff countries.
4. The efforts taken by the Central Asian states and international community during the last fifteen years brought certain positive results that permitted to mitigate the consequences of the Aral Sea crises to local population, flora and fauna within the territory of disaster. However, over the pas several years, the amount and intensity of this assistance has declined. Kazakhstan, Turkmenistan and Uzbekistan – the states that are the first to face the implications of the disaster – experience serious difficulties in overcoming the outcomes of global catastrophe.

5. Participants of the conference express their great appreciation to the Government of the Republic of Uzbekistan, UNDP, UNICEF, UNESCO, WHO, UNFPA, UNIDP, the World Bank, Asian Bank, GTZ and other international organizations for new initiatives in finding and development of effective ways and mechanisms aimed at mitigation of the Aral Sea region environmental crisis implications, as well as social and economic protection of the population, sustaining and restoring of biodiversity.

6. The participants highlighted the necessity of maintaining strict water resource saving regime and efficiency in the region both for potable water and water used for agricultural purposes, prevention of unjustified water losses in the process of its delivery to consumers through, for instance, introduction of new irrigation technologies, implementation of projects of reconstruction of water supply and irrigation systems, reconstruction and building of new collector and drainage systems, technical modernization of pumping facilities and extensive installation of water consumption meters, development of water management institutions.

7. After discussing of all the issues, participants of the conference have resolved that key tasks of international community and countries of Central Asia should include the following:

- assist the Aral Sea regions in the environmental disaster in issues of protecting gene pool of population, improvement of public health, access to clean potable water, enhancement of the sanitary and hygiene level, decrease in incidence levels, infant and maternal mortality and improvement of environment protection;
- provision of assistance in transboundary water resource management, prevent deliberate decrease in volume and regime of transboundary rivers runoff to the Aral Sea, which might entail worsening of environmental situation in the Aral Sea area, health, living conditions of millions of people living in this region;
- assist countries of the region using water resources of transboundary rivers for supply of drinking and irrigation water, in its efficient use by reducing the unjustified losses, implementation of state-of-art watering technologies, integrated management of water resources which would balance needs of sustaining and restoring functions of fragile eco-system of the Aral Sea area with other needs, including agricultural and commercial;
- implement measures restricting desertification and salinization of soil including forest planting, rehabilitation of ponds in Amudarya delta, and other land treatment and specialized measures in the area of environmental disaster;
- create conditions for expansion of employment and growth in individual income in the environmental disaster area by development of small businesses, primarily those with low water consumption in industry, agriculture and services as well as improvement of economic activities to ensure better food supply, higher farmers' incomes and quality.

8. The participants invite international donor and sponsors, including international organizations, financial institutions, foreign countries and other donors, to participate in implementation of the Comprehensive Plan of Actions focused on mitigation of climate change implications in the Aral Sea area.

## **SOCIO-ECONOMIC STABILITY AND WATER PRODUCTIVITY: FOOD AND WATER SECURITY IN CENTRAL ASIA**

A chief aim of the workshop was to exchange information and experience between the leading researchers and scientists in Central Asia, as well as with foreign colleagues on ensuring socio-economic stability in the region through improved water and land productivities. This is particularly urgent in light of the fact that the region shelters about 50 million people, of which more than half live in rural area and depend on irrigated agriculture. The efficient irrigated agriculture forms people's welfare, food independence and environmental security that, in turn, make general socio-economic stability.

The workshop was held in Tashkent since 18 till 20 March 2008. Active participation of national water leaders - ICWC members and executive bodies' managers - and their key reports representing the Aral Sea basin made this event more significant. The key reports were made also by the following international participants:

- Robert Baker, McGill University, Montreal, Canada;
- Loup Brefort, WB Regional Mission;
- Sergei Vinogradov, Professor of UNESCO Center for Water Law, Policy and Research, University of Dundee, Scotland;
- John Lamers, Bonn University, Germany;
- Amar Shankar Sainju, Canadian Center for International Studies and Cooperation;
- Michele Genovese, International Cooperation Directorate, DG Research;
- Sergei Bednaruk, Federal Water Resources Agency, Russia;

The workshop was opened by the ICWC member from the Republic of Uzbekistan, Deputy Minister of Agriculture and Water Resources, Chief of Central Water Administration, Sh.R.Khamrayev and the workshop's co-directors R.Baker and V.Dukhovny.

After presentation of the key reporters and participants, professor V.Dukhovny reported on "Water security in the region and the world as a whole: conceptual approach and future scenarios".

In this report, he stressed an importance of water, which contributes to employment of 34% of population, to 38% of electricity generation and to 23% of national income in the region. Moreover, the region is characterized by a number of both external and internal destabilizing factors. The external factors include:

- population growth and increased environmental demand;
- decreased world prices of agricultural products and changed cropping patterns;
- more frequent extreme years, in terms of water availability, caused by climate change;
- disturbed river regimes and reservoir operation.

The internal factors refer to:

- decreased reliability of water availability forecasts and water accounting;
- aging of water infrastructure that, in turn, reduces controllability and increases unproductive water losses;
- lack of funds for reconstruction and operation, and hence loss of skilled workers;
- increased number of water users and poor attention to water conservation.

In order to solve those problems, it is proposed to accelerate the development of the regional water strategy, taking into account growing water shortage and required water conservation and potential land productivity to be achieved. This should be linked with environmental demand and IWRM. Moreover, it is necessary to continue working on national efficient water use programs and on enhancement of institutional and legal frameworks of the regional cooperation, strictly following the international water law. To this end, ICWC is developing further the earlier reached agreements about the collaboration in joint management of interstate water use and protection (February, 1992), the joint actions for solution of the Aral Sea and Prearalie problems, environmental improvement and socio-economic development in Aral region (March, 1993), the water and energy use in the Syrdarya river basin (March, 1998), as well as the Decision of the Heads of Central Asian States concerning the Program of Concrete Actions for environmental improvement in the Aral Sea basin (January, 1994) and working on a range of new agreements under the ADB's project RETA 6163 and on a regulation document "Procedures and rules for river basin management". The agreements include those on information exchange, enhancement of ICWC status, water and energy use in the Syrdarya river basin. Besides, there is a need to develop financial basis of the regional cooperation in transboundary rivers by sharing costs of:

- joint water resources management;
- establishing economic mechanism for accounting incomes and damages from water use;
- establishing water and energy consortium as an economic tool of financial and fuel-energy flows management;
- applying water charges for water pollution and quality deterioration.

Robert Baker reported on "Water and food security challenges in the world" as the workshops' co-director. He demonstrated that out of the world's total irrigated area of 280 million hectares, Asia accounts for 70%, Americas - 15%, Europe - 9%, and Africa - 5%. In the recent forty years, development of irrigation has led to twofold increase of food production and demonstrated a possibility to overcome famine even in such grand scales and at high population density as in India and China. Moreover, 92% of the produced world grain is consumed at the location and only 8% is exported. This development caused that in the last hundred years water consumption in the world increased almost six times. Besides, 1.2 billion people do not have access to safe drinking water, about 3 billions do not live in adequate sanitary-hygienic conditions, and 4 billions are not connected to sewerage system. As to the level of prosperity, one billion people earn 1 dollar per day, three billions earn 2 dollars per day and about 850 millions starve.



Future water supply will become even complicated with population growth and economic development, increased pollution and decreased potable water quality. Besides, climate change will contribute to decrease in quantities of fresh water. In the last century, due to climate change, the temperature of air near the ground increased by 0.9 degrees, and the world ocean level rose by 0.17 m. Under such conditions, for mankind to survive and the nature to conserve, people should aim at higher water and land productivities and water conservation, at transfer to IWRM at national and catchment levels and regional cooperation development in transboundary waterways. He demonstrated positive experiences of water management in Canada and lessons of regional cooperation in Colorado River by the US-Canadian Commission and in Nile between ten African countries, five of which were among the top ten poorest countries in the world.

The participants showed interest to the key reports of ICWC members, leaders of delegations from Kazakhstan (A.Ryabtsev), Kyrgyzstan (B.Koshmatov), Tajikistan (S.Yakubzod), Turkmenistan (K.Ataliyev), and Uzbekistan (Sh.Khamrayev).

Ryabtsev's report was dedicated to threats to water security in the Republic of Kazakhstan in transboundary context and probable ways to eliminate them. Most of Kazakhstan's territory comprises desert and semi-desert areas, where water supply is a very acute problem in terms of not only economic activity, but also consumption by the population. The problem of sustainable water supply and water security in Kazakhstan gets acute owing to that most important surface water sources are located in neighboring Russia, China, and Central Asian countries. In normal year, altogether about 44 km<sup>3</sup> of water flows to the territory of Kazakhstan through such transboundary rivers as Ural, Black Irtysh, Ili, Chu, Talas, Syrdarya and others, with total available water resources of the country amounting to 100.5 km<sup>3</sup>. Economic expansion in these countries leads to reduction in inflow of a part of water resources to the territory of Kazakhstan. This is an interstate problem that requires developing an appropriate regulatory legal mechanism with account of the experience of, for example, European countries on the use of water resources in the Danube and other rivers.

The relationships among Central Asian countries in regard to shared use and protection of transboundary river water resources are regulated by several basic agreements, which have been rendered competent by the Heads of Central Asian states in a number of documents, including in the Nukus Declaration of Central Asian States and International Organizations on Sustainable Development in the Aral Sea Basin adopted on 20 September 1995. All of them should be enforced.

All of these steps being taken to retain water security in the Republic of Kazakhstan will not work in full, if regular and purposeful work is not done on extensive introduction of resource- and water-saving technologies in enterprises, water reuse in industry, new and more rational irrigation technologies, broad public awareness raising and the need for respectful attitude to water as a valuable and universal natural resource. All this was reflected in National Plan of integrated water resources Management and water efficiency, which has been developed since 2004. The plan states probable ways of water resources improvement and institutional enhancement for efficient management of changing water use. The plan takes into account gradual reduction of national water due

to decreased inflow from neighboring countries. Therefore, implementation should be based on both efficient use and protection of water resources within the state and improvement of water relations with neighboring states.

B.Koshmatov in his report on IWRM results in South Kyrgyzstan in terms of water productivity improvement showed that orientation to potential water productivity may enable the region's countries to increase agricultural production almost twofold at 10% reduction of water use. One example are WUFMAS data collected from monitoring of factors contributing to crop yield formation on 220 control fields under representative for Central Asian conditions. According to the data, the annual irrigation water losses for the level "outlet to field – cotton rooting zone" average 51% throughout the region. Experience of countries producing up to 4 t of raw cotton per hectare under similar natural-climatic conditions and at unit water inputs of no more than 5 thousand m<sup>3</sup> per hectare indicates to great potential of water conservation. Based on this, the main ways for improving water productivity and water conservation in the region are:

- introducing water charges in irrigated agriculture through establishing incentive step tariffs and fine sanctions per cubic meter of water used over established norms and so on;
- developing common technical approaches to rigid standardization of water consumption based on more precise norms mainly designed for meeting minimum biological needs of plants;
- creating a system of pilot water conservation projects as first-priority entities of demonstrative water use;
- introducing water rotation and other organizational measures aimed at control of water losses in field and its non-productive use (short furrows, irrigation with concentrated stream through furrow, thorough maintenance of field leveling and so on);
- introducing advanced irrigation techniques and technology;
- installing anti-filtration coatings in canals;
- integrated and partial reconstruction (modernization) of irrigation systems.

S.Yakubzon in the report on food security and the improvement of water use efficiency made analysis of population growth in the region's countries and forecast for 2050. The highest growth of 57.6% is expected in Tajikistan. In other countries this growth will achieve: 43.3% - Uzbekistan; 38.8% - Turkmenistan; and 26.4% - Kyrgyzstan. The total population in the region (excluding Afghanistan) will be 75.7 million against 59 million at present. In this context, the following is proposed in order to achieve food security:

- effective agricultural production development policy and cropping patterns aimed to supply people with food;
- regular improvement of water and land productivity by applying intensive technology of agricultural production;
- development of a framework for tax and legal incentives encouraging to use the highly effective and water saving technologies in growing crops;
- regular expansion of irrigation land area according to the population growth.

In order to increase water productivity, we have to develop a long-term program for increasing the effectiveness of water and land use, including solution of the next problems:

- complete transition to the basin principle of management and establishment of basin governance for management of canals and widely involvement of all water users into water management;
- reconstruction, rehabilitation and modernization of irrigation and drainage systems at the inter- and on-farm levels in order to improve efficiency of systems and management;
- finalization of the process of establishing water user Associations on the basis of private farms and at on-farm level;
- improvement of framework and approaches in water resources management at all levels;
- application of differentiated charges for water services; improvement of economic mechanism for water resources management;
- creation of suitable conditions for organization of production and implementation of water saving technology allowing for application of nutrients together with irrigation water and for significant increase of crop yields.
- implementation of improved irrigation technologies, including application of conventional furrow irrigation allowing for decreased surface and drainage outflows on the fields.
- organization of professional training system for hydraulic engineers and training for irrigators;
- development and implementation of the system of material and moral incentives for water saving at all hierarchical levels of water management;
- regional and national water sector development strategies coordinated with agricultural production development.

In agricultural production:

- development of an economical model and legislative support for it's adoption for the balanced and stable turn-over of capital in irrigated agriculture, taking into account, as far as possible, all numerous factors.
- development of enforcement system for obligatory allocation of a certain part of farms' income for O&M of irrigation and drainage systems.
- government economic support for farms situated in the pumping irrigation area; granting of soft loans to them for application of water saving technologies.
- revision of cropping patterns aiming at high-yielding crops, subject to local and international markets, especially in the pumping irrigation area.
- establishment of agroservice and consulting centers (extension services) to support farmers with:
  - application of highly efficient agricultural machinery;
  - marketing of high-quality seeds, fertilizers, and sale of produced products;
  - research and development of recommendations for the improvement of soil fertility;

- development of measures to control agricultural pests and apply pesticides safely;
- application of water saving and land leveling technologies;
- organization of training for farmers.

K.Ataliyev made report on behalf of the Minister for Water Resources of Turkmenistan M.Akmamedov on sustainable drainage water management at transboundary level. He showed by analyzing dynamics of water and land use in the Aral Sea basin that given the total regional withdrawal amount of 106 billion m<sup>3</sup>, about 30 billion m<sup>3</sup> were collector-drainage water, of which 16-17 billion m<sup>3</sup> were discharged into rivers, 10-11 billion m<sup>3</sup> were delivered to natural depressions, and 4-5 billion m<sup>3</sup> were re-used for irrigation. Discharge of such huge quantities of saline collector-drainage water and accompanying salts in an amount of 110-120 Mt has led to river water deterioration. Water salinity increased by 0.2-0.3 g/l in the upstream, by 0.5-0.7 g/l in the midstream, and by 1.0-1.5 g/l in the downstream.

Irrigation water salinity increase by each 0.1 g/l, against initial value, causes productivity damage, which varies from 134 to 147 US\$/ha in mid- and down-stream in Amudarya basin and 70-150 US\$/ha in the same reaches in Syrdarya basin.

Current generation of such quantity of collector-drainage water is related mainly to poor efficiency of irrigation methods and technique, as well as to irrigation technology. Therefore, when developing measures for sustainable drainage flow management, major efforts should be aimed at water conservation and general reduction of unproductive irrigation water losses and, accordingly, of drainage flow from irrigated hectare.

Similar problems were addressed by Sh.Khamrayev in his report on the role of land reclamation for socio-economic progress in Uzbekistan and the government support to water sector. Given the total irrigation area of about 4.3 Mha in Uzbekistan, more than 3 Mha need artificial drainage to avoid salinization and water-logging and only 2.9 Mha are provided with drainage. Drainage infrastructure is comprised of horizontal drainage, with the total length of about 138 thousand km (including 31 thousand km of inter-farm, 68 thousand km of on-farm, and 39 thousand km of subsurface drainage) and vertical drainage, including 3.5 thousand wells on 380 thousand ha. Uzbekistan is the only country in the region, which allocates government funds for regular repair and renewal of drainage systems. Despite this fact, about half of existing drainage needs repair or reconstruction. In this context, as land reclamation is very important for raising water and land productivities, a special National Land Reclamation Fund was established under umbrella of the Ministry of Finance in 2007 in order to finance and organize work for drainage cleaning and reconstruction.

Proceeding from this positive experience, it should be noted that one important objective for socio-economic stability, food and water-environmental security in the region is to organize special efforts for maintaining stability of land fund by:

- attracting attention of decision-makers to issues related to drainage, its maintenance and development;

- searching for public and private (land and water users) partnerships for rehabilitation, repair, operation and maintenance of drainage under transfer to market economy;
- training people (operators and water users) in efficient management of irrigation and drainage water, as well as soil regimes for effective crop growing with reduced water inputs and application of cheap draining methods;
- organizing management of collector-drainage water, its quantity and discharge regimes, and control of this water limitation within the basin and basin organizations.

Experience of basin water organizations (BWO) for Amudarya and Syrdarya was addressed in the reports of Yu. Khudaibergenov and M.Khamidov. Those organizations, being the executive bodies of ICWC, are responsible for daily management of releases from reservoirs, water supply from interstate sources by national agencies, for operation of hydroschemes and intake structures, and implement measures for environmental improvement and water quality monitoring.

Issues of capacity building and training in IWRM implementation for achieving socio-economic stability through higher productivities of water and land use in the region were raised in the report of ICWC Training Center's Director P.Umarov.

The participants also showed great interest to presentations of foreign reporters.

Dr. L. Brefort dedicated his report to water-energy nexus among five countries in the region and to elaboration of proposals for its improvement by analyzing water-energy balance and establishing a consortium for management of water and energy flows with maximum economic benefit for all. By studying international experience in 260 agreements for transboundary waterways, of which only 44 had downstream countries sharing the benefits with upstream, he gave recommendations for the improvement of the Framework Agreement 1998 on Syrdarya between Kyrgyzstan, Uzbekistan, Tajikistan, and Kazakhstan.

Besides, a four-stage plan of actions is proposed for establishment of water-energy consortium. At the first stage, a forum is needed for discussion of water-energy trade issues. Here scientific research should be conducted in order to:

- determine water and energy exchanges between the states, harmonize legal framework and regulatory practices of this nexus and prepare proposals on new investment projects;
- seek financing for projects of regional significance;
- debate possible solutions at the technical level and reach consensus on them.

At the second stage, a group of national experts is created. Those experts are empowered by their Governments to sign interstate agreements on water and energy trade. The third stage consists in establishment of an international joint-stock company that operates the nationally-owned assets associated with water and energy trade. The JSC:

- operates the assets according to regionally agreed rules;
- negotiates and signs fuel purchases and power sales/transmission agreements;
- finances operation and maintenance of existing assets;
- prepares detailed feasibility studies for rehabilitation and new investment for consideration by the owners of the assets.

At the fourth stage, an international holding is created. This Holding owns and operates the assets associated with water and energy trade. The Holding on least-cost regional investment policy and on individual projects in the countries concerned; finances investments in existing and in new assets; owns and operates the new assets.

The report of Prof. S. Vinogradov on water security, international conflicts and international water law was presented in four dimensions:

- global and regional security;
- new security dimension - water security;
- transboundary water resources and international conflicts;
- international water law and regime of transboundary water resources in Central Asia.

Those problems are significant since the world accommodates 263 international basins that cover 50% of the earth's surface, hold 60% of surface water and affect the interest of 40% of the world's population in 145 countries. Some of these river basins are Danube (17 states), Nile (10 states), Congo, Niger, Rhine, and Zimbabwe (9 states), and Aral Sea (6 states).

Under these conditions, the only main tool resolving contradictions and avoiding conflicts is an international agreement, which follows the principles of international water law:

- equitable and reasonable use;
- obligation not to do considerable harm;
- obligation to notify about planned measures that could have significant impact
- obligation to exchange information;
- obligation to settle disputes in a pacific manner.

Thus, the major objective of such agreement is to create legal and institutional frameworks of water, energy, environmental, and economic collaboration in specific waterway. This would ensure sustainable use of water resources and, finally, economic development in the basin and improvement of living conditions for people who depend on water resources.

Representatives of the German ZEF University, Bonn and the Canadian Center for International Studies and Cooperation (CECI), Montreal demonstrated results of their respective projects on-going in the region.

Presentation of Dr. J.Lamers addressed issues of food security improvement under conditions of irrigated agriculture in Khorezm province, Uzbekistan. The studies were accompanied by training of students (bachelor, master, and post-graduate). Through cotton, grain, vegetables and fruits were examined, wheat was studied in details. The conditions of grain cultivation were examined in various soil salinities, irrigation schedules and methods, fertilization and an impact of these factors on crop yields and produced grain quality was studied.

Presentation of Dr. A.Shankar was dedicated to providing assistance to dehkan farms in Sogd province, Tajikistan under the Facilitating Agricultural Reform and Marketing (FARMS) Project. The overall activity of the project funded by the Canadian International Development Agency is to create and strengthen Water Users' Associations (WUA) so that farmers can operate, manage, and make the investment decision needed to maintain and improve irrigation management in their farms. The major program objective is developing the capacity of WUAs to manage local water delivery systems, using sound business practices, and democratic principles.

Also project focuses on establishment and strengthening of farmers' irrigation management that receives and pays for water by volume. For this project is supporting Dehkan farms with installation of water measurement devises and train irrigation specialists from among Dehkan farms members. Project officials are training the farmers in the rational use of water and promote new management technology.

Presentation of Dr. M.Genovese on «International Scientific Cooperation activities in FP7» addressed organization and strengthening of partnership between the EU science and third countries' scientists and researchers in order to support advanced research on the following ten themes:

1. Health
2. Food, agriculture and biotechnology
3. Information and communication technologies
4. Nanosciences, nanotechnologies, materials and new production technologies
5. Energy
6. Environment (including climate change)
7. Transport (including aeronautics)
8. Socio-economic sciences and the humanities
9. Space
10. Security

The participants had a possibility to acquaint themselves with proposal submission conditions and procedures for joint projects on food and water security, land and water productivity, and socio-economic stability.

S.Bednaruk made a report on experience in controlling structures of Volzhski-Kamsk cascade of reservoirs and issues of socio-economic and environmental stability in the Volga region, demonstrating achievements of Russian colleagues on example of one most

driest and socially tense objects. Management is performed using special information-analytical software for river basin modeling ECOMAG, which consists of the following blocks: database (relief; soil; vegetation; pollutants; climate, etc.), basic GIS information (layered digital model), modeling, and GIS-based analysis of modeling outputs. On-line information incoming through Rosgidromet, Master Station (MS) and Basin Water Organization (BWO) is collected in the on-line database of Information-Analytical Center using ECOMAG, where operation of reservoir cascade is simulated and proposals for operation regimes are developed. Those proposals are submitted to the Agency “Rosvodresursy” and discussed by inter-agency task-force, which represents all stakeholders (hydropower, irrigation, navigation, water supply and sanitation, fishery, flood control), and then a decision-maker gives instructions to MS.

Similar information-advising system is created on the basis of Regional Information Center of SIC ICWC, BWO “Syrdarya” and BWO “Amudarya” for management of water resources in the Aral Sea basin.

Besides the key reports, the following participants from the Aral Sea basin’s countries made their presentations: A.Nurushev from EC IFAS - Kazakhstan; N.Mamataliyev from Kyrgyz branch of SIC ICWC - Kyrgyzstan; A.Kamolitdinov from Tajik branch of SIC ICWC - Tajikistan; academician A.Babayev from the Institute of Desert, A.Mukhamedov from the Ministry of Water Resources - Turkmenistan; E.Makhmudov from Institute of Water Problems, T.Kamalov from Gosvodnadzor, E.Kurbanbayev from Scientific-Production Association “Eco-Prearalie”, U.Buranov from GEF Agency, and S.Nerozin from SPA SANIIRI - Uzbekistan.

Regional presentations of SIC’s staff V.Sokolov, A.Tuchin, and A.Sorokin addressed IWRM theory and modeling tools for IWRM implementation on example of river basins under different development scenarios.

All the presentations made their contribution to better understanding of problems faced in the Aral Sea basin and searching ways for their solution in favor of food supply, energy and environmental security both in national and regional interests.

Major conclusions and recommendations:

1. The only possible way for the Central Asian countries to survive under growing water shortage is to follow a principle of cooperation by sharing water equitably and wisely through implementation of IWRM in the region.
2. First-priority lines in water and energy cooperation among the Central Asian states are information exchange between the countries and information openness as a means to improve trust between the riparian countries.
3. Economic relations in transboundary water should be based on an understanding of common responsibility of the countries for management, protection, and use of shared water and on establishment of a financial mechanism, which would promote fulfillment of international water law’s regulations.



4. Enhance joint activities of sectoral agencies in and between the Central Asian countries for the development of integrated methods of water management, giving more attention to environmental aspects of transboundary river basin management.
5. One should note insufficient measures for rehabilitation and development of a network of the national Hydrometeorological services, and lack of regional cooperation, especially regarding stable forecast basis.
6. Though water management by BWO is improved regularly, river water quality issues are left beyond BWO's control. This may lead to further deterioration of national water sector's parameters. In this context, it is necessary to facilitate improvement of hydrometrical observations in major transboundary stations, enhance pollution monitoring in water sources by determining share of each country and pollution structure. Moreover, this information should be made accessible for all countries in the region.
7. The participants appreciated a set of models developed by SIC ICWC as a tool for forecasting and choosing optimal scenario of the Aral Sea basin development in favor of socio-economic stability, food and water security in Central Asia.
8. It is necessary to stir up activities in attracting donor support for enhancement of ICWC Training Center and its branches as a tool for strengthened regional cooperation and implementation of IWRM in the region in order to improve water and land productivities.
9. It is advisable to publish the above presentations in a collection of workshop reports.

### *Annex*

The main scientific contribution to the workshop "Socio-Economic Stability and Water Productivity: Food and Water Security in Central Asia" was presentation to the participants of SIC's analytical approaches and their discussion during reports of SIC's leading personnel on a set of Aral Sea basin management models (ASBMM). This set of models was developed to address future priority tasks related to water, energy and land resources management in Syrdarya and Amudarya basins at the regional and national levels. The set of models targets professionals from water sector, agriculture, environmental and governmental organizations dealing with long-term planning and development scenario preparation. Using the set of models, proposed solution options and projects can be estimated in terms of their harmonization with available water, land and other natural resources; impact of these proposals on social, environmental, and economic conditions in the countries can be determined and compared with indicators of sustainable development.

For transboundary water projects, the models allow for estimating impact of measures undertaken in any country on water availability and environment in neighboring countries, and then can serve as a tool for harmonization of mutually acceptable decisions.

ASBMM is a set of models aimed at solving annual planning and long-term development tasks. It includes:

- hydrological model of basin;

- national planning models;
- socio-economic model of the region;
- planning zone models.

The main geographical basis of this set is a combination of hydrological model of basins, with inter-linked and command planning zone models.

The hydrological model of basin consists of:

- basin morphological structure;
- hydrological model of annual planning;
- hydrological model of long-term planning;
- multi-year regulation models.

The national planning model determines the general increase in national population and water demand for domestic needs, industry, thermal power, etc. in basin dimension. If possible, the model distributes those demands between planning zones. Often a part of planning zone does not belong to given transboundary water basin but should receive water from the latter and, therefore, should be presented directly in national balance. The model also sets targets and fund limits for reconstruction, unit costs or cropping pattern changes among planning zones, as well as possible investments for these targets.

Socio-economic model is a set of social and economic indicators of development in a country, in the region as a whole and its aggregated parts (planning zones) coupled with the hydrological model. The model forecasts a number of socio-economic development indicators, such as population, GNP, GNP per capita, sectoral shares in GNP, especially that of agriculture, crop and food production, food and calorie demands, their meeting, energy demand and supply. The model considers various options of national development, country priorities, investment opportunities, foreign and internal.

Planning zone model is the main model, which reflects all interdependencies: water - technology - environment - agricultural production, including water infrastructure elements, such as water-supply, hydropower, and especially irrigation and drainage systems. The model is coupled with the socio-economic and hydrological models and is their coupling at lower level.

**Besides technical parameters, planning zones are characterized by socio-economic indicators:**

demographic:

- quantity of population, rural and urban;
- population growth rates, percentage to previous year;
- ratio of able-bodied citizens and their employment by activity category;

social:

- per capita income in rural and urban areas;
- rates of growth and income in given zone over elapsed time;
- potential of industrial production and its growth (or decrease) rates;
- actual volume of industrial production;

- agricultural production and food provision kcal/person/year, including by foodstuff;
- services volume, person/year;
- drinking water consumption, l/day/person;
- coverage with water-supply systems, percentage;
- coverage with water-disposal systems, percentage;
- quantity of water-related diseased;
- energy supply per person, kWh/year;

All those indicators more or less affect water sector development in planning zone and are destabilizing factors of development in given zone.

In order to solve the planning zone task, it should be presented in form of GIS layers reflecting all combinations of characteristics:

- irrigation zone consisting of a number (or an object) of irrigation systems with concrete inlet and outlet points;
- zone of local water recharge;
- zone of transboundary water recharge;
- zone of mixed water, with indication of distribution of their irrigation modules;
- zones of discharge, with calculation of water consumption and drainage modules for these zones;
- crop zone;
- distribution of irrigated areas between representative individual irrigation areas;
- natural differences (soil, hydrology, climate, etc.).

Specificity of given approach is a need to get optimal regime for each planning zone through the above process of partitioning and further aggregation and inclusion into the iterative process of interaction with a river or aquifer or with their combination.

The main tasks of each planning zone analysis in terms of water management are:

- meeting population's demand and planning zone economic sectors' demand at present and in the future, based on available local and imported, within the limit, water resources;
- ensuring good environmental conditions in planning zone, i.e. preventing erosion, salinization growth and water-logging, as well as conserving and developing natural system;
- in case of water shortage, elaborating recommendations for minimization of damage from this shortage through corresponding optimal distribution of water between irrigation zones or systems, probably, with the use of additional sources, such as collector-drainage water and for selection of appropriate cropping patterns.

Optimization of planning zone both in terms of long-term development and annual meeting of water demand is made on the basis of agricultural (irrigated agriculture) production function, which considers effect of three major productivity factors, such as water availability in critical period, salinization, and total costs of crop growing.

The models are run in simulation and optimization regimes. Main optimization blocks are in GAMS. The General Algebraic Modeling System (GAMS) is a modern computer

technology for construction of complex systems. It was developed in USA to solve optimization problems of linear and non-linear programming and approved for water-related tasks in Nile, Hindus, Yellow river, etc.

## **WATER IS CONSOLIDATING - NEW PROSPECTS FOR COOPERATION AND SECURITY**

The German Ministry for Foreign Affairs has organized the conference on the initiative of the Federal Foreign Minister Dr. Frank Walter Steinmeier in order to start implementing a strategy on new partnership between Europe and Central Asia as approved by the European Union in August 2007 on the initiative of the German MFA.

This strategy identified water development and water relations between the Central Asian countries as a priority, and the Conference was the first step in implementation of the strategy. The Conference was held on 1st of April, 2008 in the Conference-Hall of MFA. Representatives of all CA countries and members of ICWC (except for member from Uzbekistan Mr. Sh.Khamrayev, who was represented by the Director of the Republican Water Inspection Mr. Khamdam Umarov) took part at the Conference. The participants also were the Executive Secretary of UNECE, the State Secretary of the Ministry for Environment of Slovenia, holding the EU Presidency, high officials of EC, heads of research and other international institutions based in Germany and dealing with water and the Aral Sea problem, as well as Central Asian Ambassadors and their representatives in Germany.

Dr. Steinmeier in his welcoming speech stated that "... we invited representatives of science, policy and water sector to the Conference. We want to keep enhancing approaches to water cooperation both in area of water allocation and its higher productivity. It is a great honor for us to welcome representatives of all countries and distinguished guests in this meeting. Water has become a part of the worldwide policy, and we understand perfectly that this resource is a keystone to peaceful co-existence in such regions as Central Asia. In this context, Germany calls for forward-looking water policy, especially in light of hydropower becoming a strategic resource. We orient our activity towards achieving a mutual benefit to all countries and this should be the focus of cooperation. Often the border of state defines the boundary of mind. Our objective is to step over this boundary. We understand perfectly that the use of water resources in the region has not lead to environmental security. The Aral Sea is an indicator of delicate issue in the region. As a foundation for our partnership relations I would put forward five items:

1. We wish to and will support transboundary cooperation. Moreover, we realize that ICWC is an important element of this cooperation. We are ready to help in strengthening the institutional framework of this cooperation. There are different ways to do this, for example, establishment of water-energy academy or

development of existing training and education network. We are willing to support directions that are more adequate for you.

2. We propose to enhance cooperation through the transfer of German know-how. In particular, we have great facilities for forecasting, hydrometry, and satellite image application in the water sector.
3. Germany has broad experience in the cultivation of sustainable development systems. We have established a University in Bishkek for this purpose. We are willing to render assistance in implementing the principles of sustainable development in CAR.
4. We intend to bridge water professionals in CAR, Germany and Europe as a whole. In our opinion, study-tours to innovative projects and educational and research institutions and a firm network of contacts, including those with high-level officials in water management would be very useful here.
5. German-Water Partnership working in area of urban and rural water supply can help in addressing similar problems in Central Asia through their intrusion into water supply support in all the countries, particularly by attracting small- and medium-scale enterprises.

Finally, I want to underline that Germany does make no political objectives in the development of this program for Central Asia. Our main task is to organize a long-term partnership and then, proceeding from this, contribute to peaceful and fruitful cooperation among the Central Asian countries”.

Then, the UNECE Executive Secretary Marek Belka took the floor and underlined that the Central Asia is a symbol of environmental problems and characterized by competition between energy, irrigation, and degrading environment. He noted that only Uzbekistan and Kazakhstan ratified the European Convention 1992, which should be followed when sharing transboundary rivers between countries. Its basic provisions should be used for settling relations between the countries in Central Asia, including those between Uzbekistan and Tajikistan along the Zerafshan river. Paying particular attention to existing disputes along the Amudarya river and given complications in light of potential Afghanistan claims, UNECE together with OSCE and UNEP have initiated a program “ENVISEC Amudarya”, which would expect to contribute to addressing current problems.

The chairman of the meeting, State Secretary of Ministry of Foreign Affairs Gernot Erler in the opening of the first section underlined that the Germany’s Ministry and EU consider the participation of leading specialists from CAR as very important and hope that the next Conference will be held on the basis of elaborated proposals in autumn and adopt a concrete action plan.

The State Secretary of Slovenia’s Environment Ministry Mitja Bricelj emphasized that the Aral Sea problem and a certain competition between catchments’ upstream and downstream should be solved on the basis of mutual understanding. “We are willing to offer to our colleagues experiences of the Danube Commission and the Sava Commission that achieve sustainable water use through transparent and trust relationship”.

The EU's representative Helga Schmidt stressed that coming climate change may complicate further the state-of-affairs in the region.

Pierre Morel, EU special representative for Central Asia stated that CAR has faced huge degradation; merely Tajikistan and Kyrgyzstan have lost thousands of square kilometers of glaciers and forest areas. Growing electricity demand, given its major amounts in winter, caused the so-called technological floods along the Syrdarya river. In this regard, the experience in 1998 is impressive. Undoubtedly, water saving should be promoted in irrigation as well. At the same time, generated hydropower needs to be economized. Within the framework of Central Asian Regional Economic Cooperation (CAREC) we will support orientation of Central Asia towards the implementation of the European Union's water strategy aimed at EU's Framework Water Program.

The next section was opened by the Chairman of Kazakhstan's State Committee for Water Resources A.D. Ryabtsev, who emphasized that water shortage in CAR is the objective reality, and basic Agreements 1992, 1998 and the last Agreement on Chu river form the basis of evolving positive water cooperation, where water is no way a means of political leverage.

Despite all complexities, we are finding ways for solving the problems along the Syrdarya river and we hope that progress made at 49th ICWC meeting in new version of the Syrdarya Agreement will allow us to agree finally upon the text of the Agreement and submit it to the national governments for approval. Under such conditions, considerable progress has been made by Kazakhstan regarding preservation and separation of the Small Aral Sea, as well as for improvement in delta.

Among other means to be used for enhancing of cooperation, as Kazakhstan believe, are the positive experience in implementation of IWRM and Water and Energy Consortium, which has been a topic of discussion during EurAsEC.

Kyrgyzstan's Deputy Minister of Economic Affairs Sandjar Mukambetov in his speech stressed that Kyrgyzstan and Tajikistan use only 10% of their own water resources within their boundaries. Kyrgyzstan's reservoirs supply water to 1.2 Mha of irrigated lands in Kazakhstan and Uzbekistan. Due to irregularities with fuel supply, critical water situation is developing this year. He concluded that Kyrgyzstan put forward an idea of water-energy Academy as a training base for new generation. In his opinion, this Academy should cover existing research centers, including SIC ICWC, as well. At the following meeting, B.T.Koshmatov, the Director of Water Resources Department under Kyrgyzstan's Ministry for Agriculture, Water Resources and Processing Industry in his speech paid attention to an economic mechanism of water use, both national and international, including charges for water as for a natural resource and compensatory payments. As an example of successfully developing cooperation with incorporated economic mechanisms, he cited activity of the Chu-Talas Commission between Kazakhstan and Kyrgyzstan.

Speech of Tajikistan's Minister for Water Resources Saedi Yokubzod was focused on hydropower-oriented use of rivers. Moreover, he underlined that despite Tajikistan's needs, the republic has never cut off water to their neighbors. It is necessary to revise

existing Agreements that do not consider changed conditions and to improve a mechanism of economic and financial relationship in area of international waterways. In his opinion, there is a pressing need for revision of water allocation principles and criteria, pricing concept, water tariff estimation methods, and damage assessment technique.

Turkmenistan's Deputy Minister of Foreign Affairs Khoshgeldy Babayev cited successful cooperation on boundary waters within the framework of joint Irani-Turkmenian program "Dostyk". In his opinion, bilateral agreements on the Amudarya river do not suit the republic since they address only current water allocation but multilateral agreements with a long-term strategy are needed. He stressed a need for a comprehensive study of Amudarya and Syrdarya basins. His report was supplemented by a short speech of Turkmenistan's First Deputy Minister of Water Resources Anageldy Yazmuradov, who emphasized an importance of scientific and technological progress in the development of cooperation and cited application of hydrometrical devices manufactured by the German company "SEBA".

Representative of Uzbekistan Khamdam Umarov outlined issues of water sector development in Uzbekistan. He stated that it was significant for Uzbekistan to ratify the both International Water Conventions and called the riparian states to follow the lead of Uzbekistan and observe the international law principles, especially regarding new projects along international rivers. In his speech Mr. Umarov stressed Tashkent Declaration adopted in March 2008 at a Conference dedicated to the Aral Sea problem. Proceedings of the Conference state that sustainable development of transboundary rivers is of great social importance from the position of guaranteed and stable water supply of irrigated lands that form the basis of employment, food security and rural wellbeing in the republic. Particular attention was given to a need to provide environmental releases for maintaining fragile environment in Prearalie. He underlined also the development of a training network for water sector's specialists in CAR countries. He gave a high rate to joint work of national and German specialists in afforestation of the Aral Sea dried bed and hoped on continuation of this work.

The third section dedicated to cooperation in area of water use in CAR was chaired by the former WB Vice-President Johannes Linn. He reminded of an importance of the regional water strategy development, which was initiated by GEF and would to take follow-up under SPECA program. He stressed a need to keep developing this work in the future.

Dr. Thomas Reiter, member of the Executive Board of the German Aerospace Agency, German astronaut made first report, where he demonstrated ways of applying space techniques in improving water resources management and proposed to establish cooperation in this area.

Prof. V.A. Dukhovny, SIC ICWC, in his report stressed that the direction of the European strategy for new partnership fully corresponds to issues of ensuring water and environmental security in Central Asia as concerns cooperation in transboundary waters. Political will of the leaders of CAR countries, who understand perfectly the challenges

and major directions of the regional water strategy, is at the heard of this cooperation. The main points that we see under cooperation with Germany are the following:

- more than 200 thousand people occupied in Central Asian water sector and many managers and staff of the new established WUAs need state-of-the-art knowledge on water resources management and joining to higher level of water culture that could be achieved through IWRM. The existing Training network with the headquarters in Tashkent and national centers in Bishkek, Almaty, Osh, Urgench, Dushanbe, and Hodjent is only 10-15% operational after the Canadian Development Agency CIDA has stopped its financing. This network has trainers, curricula, equipment and can be easily activated with small investments from European colleagues;
- regional cooperation is based on open and factual provision with forecasts and data on water discharge and use. Installation of automated stations along Syrdarya demonstrated their high efficiency. The support is needed for installation of up-to-date hydrometric sections at the national border when transferring water along Amudarya from Tajikistan to Uzbekistan, from Uzbekistan to Turkmenistan and back from Uzbekistan to Turkmenistan in on-line regime;
- we need assistance in extending positive experience of IWRM. ICWC approved a feasibility study on the project “IWRM in lower reaches” in Turkmenistan, Kazakhstan, and Uzbekistan as long as 3 years ago;
- the positive experience of cooperation with GTZ in combating desertification in Prearalie and investigation on the dried sea-bed should have a follow-up. This concerns also examination of possibilities to use additionally 6-7 billion m<sup>3</sup> of saline water here.

Finally, we think that the next ICWC meeting in May 2008 should consider five directions proposed by the Minister Frank Walter Steinmeier and give joint reasonable proposals for submission.

The Director of Administration for Analysis and Strategic Research under Tajikistan’s Ministry for Foreign Affairs Mr. Ajinayev in his speech stressed that the hydropower systems in Tajikistan allow additional irrigation of 100 thousand hectares besides 3 million hectares located in riparian states of Amudarya basin. He also expressed his confusion that a Yavan hydroscheme project, which was a daily regulation structure, was not agreed upon by a neighboring state.

Dr. Fritz Holzwarth from the German’s Ministry for the Environment underlined that the Ministry is willing to cooperate both in short- and particularly long-term measures. From this point of view, in addition to preparing a feasibility study, it is essential to have clear political consent for implementation.

Ms. Zagler from GTZ stated that they are going to participate in three directions of water cooperation, such as promotion of political dialogue between the countries; proposals on cooperation in science and production; implementation of small projects, transfer of advanced technologies, and improvement of water quality.



Bo Libert, representative of the ECE on East European and Central Asian countries expressed their support to a network of training centers and extension services, as well as to development of water information systems and emphasized on-going activities of CAR countries in area of dam safety. At the same time, water efficiency should be inseparably linked with issues of existing energy resources.

A.D.Ryabtsev concluded on behalf of ICWC that the initiative of Dr. Steinmeier is considered in light of the improvement of institutional framework (legal, training, organizational pattern enhancement), which includes gaining a status of organization under UN umbrella and strengthening the ICWC. In technical and technological area, it is advisable to focus support on water accounting, communication, automation and positive experience transfer.

Finally, Dr. Erder, State Secretary for Foreign Affairs stated that "... we are emphasizing once again a priority of water issue in the region, proceeding from the existing jeopardy of tension between the countries. In this context, we are at one in meeting these challenges and threats: climate change; infrastructure deterioration; increased individual sectoral interests. Since USSR's conditions will not be recovered, we should try to find answers. A political will and the establishment of a dialogue are major. Our initiative issues from EU's will to focus on water in Central Asia. We see interest in developing a new cooperation mechanism without any geopolitical interests. This is in which we differ from another countries. We strive for partnership only. I am glad that the countries in the region have responded to our line. Germany is willing to take on a specific role in the development of this cooperation within the framework of EU strategy. We expect that the next Conference at the end of this year would result in specific joint action plan".

## **TRAINING WORKSHOP ON DEVELOPMENT OF THE NATIONAL INFORMATION SYSTEM IN THE KYRGYZ REPUBLIC WITHIN THE FRAMEWORK OF CAREWIB PROJECT**

On April 29-30, 2008, in Bishkek city, the personnel of CAREWIB Project organized and held the second training workshop on development of the national information system in the Kyrgyz Republic.

The workshop was welcomed by B.T. Koshmatov, Director General of Water Department, Ministry of Agriculture, Water Resources and Processing Industry, Kyrgyz Republic, and Prof. V.A. Dukhovny, Director of SIC ICWC.

It is necessary to note that the Governing Body of WD MAWR and PI KR understands importance of the national information system (NIS) and renders active support to the process of its development. So, people responsible for gathering and transfer of the necessary information to WD have officially been assigned in each BWMA.

I.F.Beglov, the Project Manager, acquainted the presents with the purposes and objectives of the project, achievements of the Phase I, expected results of Phase II. The workshop

participants were acquainted in detail with all sections of CAWater-Info portal. I.F. Beglov also presented the accompanying prepared training-methodical materials:

- • Guideline on CAWater-Info portal use in a daily practice (the 2nd edition)
- • Guideline on use of the Regional Information System of the countries in the Aral Sea Basin
- • Methodical guideline on development of the information system of a water sector at the national level
- • Booklets of the project

The workshop's participants stated the following requests:

- It would be expedient to add an electronic library of the portal with a special scientific section where dissertations, author's abstracts, scientific publications, etc. would be presented

D.A. Sorokin, the Unit Coordinator, presented the regional information system CAREWIB including its sections placed at the portal to the presents.

A.V. Kats, the programmer of CAREWIB project, carried out practices during which parameters of canals and reservoirs were added, corrections were made in tables.

During the discussions of the national information system, the workshop's participants noted the following problems complicating the development of NIS:

- In Osh BWMA, there is no computer with performance required for NIS needs;
- In Chuy and Talas BWMA, there is no possibility of long-distance communication;
- In all BWMA, except for Talas one, there is no direct e-mail;
- The workshop's participants apply to the Governing Body of WD about assistance in solving of the questions.

To connect additional computers to the server with the national information system, WD purchased network equipment (a network cable and distributor) and work on connection was done.

In conclusion, all the participants of the workshop expressed their sincere gratitude to the workshop organizer – SIC ICWC, the Governing Body of WD and the sponsor of the workshop - SDC.



Editorial board:  
V.A. Dukhovny  
A.G. Pulatov  
B.K. Turdybaev

Editorial office address:  
The Republic of Uzbekistan,  
700187, Tashkent city, Karasu-4, house 11  
SIC ICWC  
e-mail: [info@icwc-aral.uz](mailto:info@icwc-aral.uz)

Our web-site:  
[www.icwc-aral.uz](http://www.icwc-aral.uz)

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N.D. Ananyeva

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