Interstate **C**ommission for **W**ater **C**oordination of Central Asia	**BULLETIN № 1 (60)**	February 2013

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MINUTES OF THE 60TH MEETING OF THE INTERSTATE COORDINATION WATER COMMISSION (ICWC)

September 21, 2012 Almaty city

Attended by:

ICWC members:

Kokumbek Zh. Tashtanaliyev	Director General, Department for Water Resources and Land Reclamation, Ministry of Agriculture and Land Reclamation, Kyrgyz Republic
Anvar M. Zoirov	Deputy Minister, Ministry of Land Reclamation and Water Resources, Republic of Tajikistan
Akhmed Mukhammedov	Deputy Minister, Ministry of Water Resources, Turkmenistan
Ravshan A. Mamutov	Deputy Head, Central Water Resources Administration, Ministry of Agriculture and Water Resources, Republic of Uzbekistan

ICWC Executive bodies

Viktor A. Dukhovny	Director of SIC ICWC, Professor, Honorable member of ICWC
Burkitbay T. Kdyrniyazov	Head of BWO Amudarya
Makhmud Kh. Khamidov	Head of BWO Syrdarya
Khayrullo E. Mukhitdinov	Head of ICWC Secretariat

Invited persons:

Saghit R. Ibatullin	Chairman, Executive Committee of IFAS
Ondasyn Ye. Zhiyenkulov	Deputy Chairman, Water Resources Committee, Ministry of Agriculture, Republic of Kazakhstan
Musilim R. Zhiyenbayev	Chief expert, Water Resources Committee, Ministry of Agriculture, Republic of Kazakhstan
Darkhan K. Nursadykov	First Secretary, SCO, Asian cooperation department, MFA RK

Adylbek K. Karlykhanov	Head, Aralo-Syrdarya Basin Inspection, Water Resources Committee, Ministry of Agriculture, Republic of Kazakhstan
Abdibay Sh. Djayloobayev	Deputy Director General, Department for Water Resources and Land Reclamation, Ministry of Agriculture and Land Reclamation, Kyrgyz Republic
Dinara R. Ziganshina	Deputy Director, SIC ICWC
Iskander F. Beglov	Chief expert, SIC ICWC
Kurbangeldiyev B. Balliyev	Representative of Turkmenistan in EC IFAS
Chairman:	Islam A. Abishev, Chairman of Water Resources Committee, Ministry of Agriculture, Republic of Kazakhstan

Agenda:

1. About the results of the vegetation 2012, operation modes of the reservoir cascade and water limits for non-vegetation 2012-2013 in the Amudarya and Syrdarya river basins (responsible: BWO “Amudarya” and BWO “Syrdarya”).

2. Regarding agenda and venue of the next 61st ICWC meeting.

The first item:

1. Take into account consideration the information of BWO Amudarya and BWO Syrdarya about the results of the vegetation 2012. Indicate shortcomings in operations of BWO Syrdarya, including water distribution along the Dostyk canal.

2. Take into account consideration the information about preliminary water withdrawal limits in Amudarya and Syrdarya limits for non-vegetation 2012-2013 and make provisions for possible correction of these limits.

3. The operation mode of Naryn-Syrdarya reservoir cascade is to be considered at the next ICWC meeting (in Bishkek city), the representatives of energy sector being invited.

4. BWO Syrdarya should prepare draft Agreement about the use of interstate water bodies between the Republics of Kazakhstan and Uzbekistan.

5. Request the Tajik party to consider an issue of automation of gauging stations along the Syrdarya river.

The second item:

1. Next 61st ICWC meeting is to be held in the Kyrgyz Republic in 2013.

2. Approve the agenda of the next 61st ICWC meeting.

Agenda of the next meeting:

1. Fulfillment of water withdrawals during the non-vegetation 2012–2013 in Amudarya and Syrdarya basins (responsible: BWO "Amudarya" and BWO "Syrdarya").

2. Consideration of the finalized "Concept for developing information exchange and mechanisms of relationships among its participants in Central Asia".

3. Additional items of the agenda will be agreed upon in due course.

4. Agenda and venue of the next 62nd ICWC meeting.

For the Republic of Kazakhstan	I.A. Abishev
For the Kyrgyz Republic	K.Zh. Tashtanaliyev
For the Republic of Tajikistan	A.M. Zoirov
For Turkmenistan	A. Mukhammedov
For the Republic of Uzbekistan	R.A. Mamutov

RESULTS OF IRRIGATION DURING THE GROWING SEASON OF 2012, MULTI-RESERVOIR SYSTEM OPERATION MODES, AND QUOTAS FOR THE AMUDARYA AND SYRDARYA RIVER BASINS[1] FOR THE NON-GROWING SEASON 2012-2013

1. Amudarya River Basin

At the end of the growing season of 2012, the expected water content in the Atamyrat gauging station, upstream of Garagumdarya, made 113.0 %, and, in the high-water growing season 2010 it was 125.9 %.

During the growing season, the water diversion accounting in the Amudarya BWO was made in conformity with the submitted but not officially approved at the ICWC meeting water diversion quotas for the Amudarya River basin.

The use of the fixed water diversion quotas broken down by the countries for the reporting non-growing season is as follows:

- the water diversion quota set for the basin as a whole was used by 93.5 %; the actual diversion made 37 044 mln m^3 compared with the quota of 39 601 mln m^3.

- the Republic of Tajikistan used 84.8 % out of the fixed water diversion quota; at the quota of 6881 mln m^3, 5836 mln m^3 were actually used up;

- Turkmenistan used 94.3 % out of its water diversion quota; at the quota of 15 500 mln m^3, 14 618 mln m^3 were actually used;

- the Republic of Uzbekistan used 96,3% out of its water diversion quota; at the quota of 17 220 mln m^3, 16 bln 579 mln m^3 were actually used;.

For five months of the current growing season, 6263 mln m^3 of water were supplied into the Priaralie and Aral Sea, as a whole water supply of 7.0 m^3 is expected within for the growing season.

As of September 11, 2012, 5407 mln m^3 of water is accumulated in the Tuyamuyun reservoir.

Following the adopted Agreement on Water Resources Sharing Between Turkmenistan and Republic of Uzbekistan in the Lower Reaches of the Amudarya River, three meetings of the Commission for water allocation were hold during the reporting period with participation of the leaders of the Production Association Dashoguzsuvkhojalyk", Lower-Amudarya BISA (Karakalpakstan and Khorezm), BWO "Amudarya" and Tuyamuyun Hydroscheme (TMHS) Management Organization. At those meetings, the TMHS operation modes were determined, and water resources were allocated in conformity with the agreements reached.

Tables 1.1-1.3 present more detailed information on the results of the growing season 2012.

[1] Materials to the first issue of the agenda of the 60th meeting of ICWC (Almaty, September 2012)

Table 1.1

Analysis of use of the water diversion quotas during the growing season of 2012 within the Amudarya River basin

Description	Submitted quotas for the growing season 2012	Actual	In percentage terms
Upper Amudarya Administration (Upper reach)	8081.3	6536.5	80.9
including: Republic of Tajikistan	6881.3	5835.9	84.8
Republic of Uzbekistan	1200	700.6	58.4
Water diversions from the Amudarya River to the Atamurat gauging station (GS) (Kerki)	31520	30507	96.8
including: Turkmenistan	15500	14618.3	94.3
Republic of Uzbekistan	16020	15888.8	99.2
Middle Amudarya Administration (Middle reach)	16207	15170.2	93.6
including: Turkmenistan	10472	9378.1	89.6
Republic of Uzbekistan	5735.0	5792.1	101.0
Amudarya Irrigation Canals Administration	7999	8159.9	102.0
including: Turkmenistan	2709	3011.7	111.2
Republic of Uzbekistan	5290	5148.2	97.3
Lower Amudarya Administration	7314	7177	98.1
including: Turkmenistan	2319	2228.5	96.1
Republic of Uzbekistan	4995	4948.5	99.1
Total for the basin:	39601.3	37043.6	93.5
including:			
Republic of Tajikistan	6881.3	5835.9	84.8
Turkmenistan	15500	14618.3	94.3
Republic of Uzbekistan	17220	16589.4	96.3

Table 1.2

Tuyamuyun reservoir operation mode from April 2012 to September 2012

Tuyamuyun reservoir	Unit	Actual					Forecast	Total
		April	May	June	July	August	September	
Volume: at the beginning of the period	mln m^3	3276	3587	4959	5381	5537	5083	3276
Inflow to the reservoir	m^3/s	904	1771	1946	3093	1659	1399	
	mln m^3	2343	4744	5044	8284	4443	3626	28484
Release from the reservoir	m^3/s	784	1259	1783	3035	1828	1249	
	mln m^3	2032	3372	4622	8128	4897	3237	26288
Volume: at the end of the period	mln m^3	3587	4959	5381	5537	5083	5472	5472
Accumulation(+), drawdown(-)	mln m^3	311	1372	422	156	-454	389	2196

Table 1.3

Information on water supply to the Aral Sea and the Amudarya River delta during the growing season of 2012 as of 01.09.12

Description	April	May	June	July	August	Water supply from 01.04.12 to 31.08.12
						Actual
From the Amudarya River through the Samanbay GS	503	589	583	2812	319	4806
Total release from the Kyzketken and Suenli canals system	0	0	169	321	214	704
CDF	98	86	139	209	221	753
TOTAL:	601	675	891	3342	754	6263
Aggregate	601	1276	2167	5509	6263	

Note: Data on the water supply to the Priaralie are approved by Central Hydrometeorological Service of the Republic of Uzbekistan

For the non-growing season of 2012-2013, the basin states stated the following water diversion quotas:

- Republic of Tajikistan – 2846 mln m^3
- Turkmenistan – 6500 mln m^3
- Republic of Uzbekistan – 5980 mln m^3
- Surkhandarya province – 370 mln m^3

Total 15 696 mln m^3 were stated for the Amudarya River basin.

Moreover, for the non-growing season of 2012-2013, sanitary and environmental releases in annually accepted amount of 800 mln m^3 is planned to fix for the Amudarya River lower reaches.

In addition, the water supply in the amount of 2100 mln m^3 to the Priaralie and Aral Sea is proposed to fix for the non-growing season.

Table 1.4 presents the draft water diversion quotas for the growing season of 2012-2013. Table 1.5 presents the draft operation mode of the Tuyamuyun reservoir.

In conclusion, BWO “Amudarya” proposes:

- Approve the following submitted for consideration of the ICWC members: the operation mode of the multi-reservoir system, water diversion quotas, volume of water supply to the Aral Sea and the Amudarya River delta for the non-growing season of 2012-2013.

Table 1.4

Water diversion quotas from the Amudarya River and water supply to the Aral Sea and the river delta for the non-growing season of 2012-2013

River basin, Country	Water diversion quotas, km^3	
	Total for the year (from 1.10.12 to 1.10.13 г.)	Including for the non-growing season (from 1.10.12 to 1.04.13)
Total diversion from the Amudarya River	55.520	15.696
Including:		
Republic of Tajikistan	9.500	2.846
Kyrgyz Republic	0.450	0.000
From the Amudarya to the Atamyrat GS	44.000	12.480
Turkmenistan	22.000	6.500
Republic of Uzbekistan	22.000	5.980
In addition:		
Surkhandarya province of the Republic of Uzbekistan	1.570	0.370
In addition:		
- water supply to the Priaralie taking into account irrigation releases and CDF	4.200	2.100
- sanitary and environmental releases to irrigation systems within:	0.800	0.800
Dashkhovuz province	0.150	0.150
Khorezm province	0.150	0.150
Republic of Karakalpakistan	0.500	0.500

Note: Water diversion quotas assume water supply for irrigation, industrial and municipal as well as other needs. Given the changes of the basin's water content, the water diversion quotas will be adjusted accordingly.

Table 1.5

Predicted operation mode of the Tuyamuyun reservoir within the period of October 2012 to March 2013

Tuyamuyun reservoir	Unit	Prediction						Total
		October	November	December	January	February	March	
Volume: at the beginning of the period	mln m^3	5472	5703	5779	5438	5768	5363	5472
Inflow to the reservoir	m^3/sec	626	533	503	441	485	429	
	mln m^3	1676	1380	1348	1181	1173	1149	7907
Release from the reservoir	m^3/sec	540	503	631	318	652	843	
	mln m^3	1445	1304	1689	851	1578	2256	9123
Volume: at the end of the period	mln m^3	5703	5779	5438	5768	5363	4256	4256
Accumulation (+), drawdown (-)	mln m^3	231	76	-341	330	-405	-1107	-1216

2. Syrdarya River Basin

2.1. Results of irrigation during the growing season of 2012 for the Syrdarya River basin

In conformity with the specified forecast by the Hydrometeorological services as of April 9, 2012, during the growing season of 2012, the water content within the river basins in the south of the Ferghana Valley was expected to be 115–120 % of the norm, and in the river basins in the north of the Ferghana Valley, Karadarya, Chirchik and Akhangaran - 100-110 % of the norm. The inflow of 120 % of the norm to the Toktogul reservoir was forecasted, to the Andijan reservoir – 104 %, the Charvak reservoir – 109 % of the norm. The total lateral inflow – 105 % of the norm.

In total, the water content of the rivers within the Syrdarya basin supposed to be 32.76 bln m^3, or 111 % of the norm.

The operation mode of the Naryn-Syrdarya multi-reservoir system (NSMRS) and the water diversion quotas for the Syrdarya River for the growing season of 2012 were considered at the 59 Meeting of ICWC in Ashgabat on April 26th, 2012. In conformity with the decision of the Meeting, the water diversion quotas were adopted given the NSMRS operation mode has been agreed during the joint meeting of power engineering specialists and water specialists with a view of meeting the quotas. Since the mentioned joint meeting was not hold, the approved quotas did not come into effect; however, those were taken by the Syrdarya BWO as the ground for water allocation.

The results of the growing season of 2012 are characterized by the following in general.

From April 1 to October 1, the inflow to the upper reservoirs (Table 2.1) made 17 967 mln m^3 of water (97 % of the norm), that is 3 bln m^3 less than predicted. 8 986 mln m^3 of water (94 % of the norm) were supplied to the Toktogul reservoir, 6 258 mln m^3 (108 % of the norm) – to the Charvak reservoir, 2 723 mln m^3 (89 % of the norm) – to the Andijan reservoir.

The lateral inflow amounted to 11 759 mln m^3 (105 % of the norm).

The total inflow to the basin was 29 726 mln m^3 (100.4 % of the norm) instead of 32 762 mln m^3 predicted (111 % of the norm). In comparison with the forecast, in fact the inflow did not exceed 91 % out of the expected values, i.e. the water amount was supplied by 3036 mln m^3 less than predicted.

Table 2.1

Parameters	Norm	Volume, mln m3 (from 01.04.to 01.10.2012)		% of the norm		Actual, in percentage terms of the forecast
		Predicted	Actual	Predicted	Actual	
Inflow to the upper reservoirs:						
To the Toktogul	9588	11490	8986	120	94	78
To the Andijan	3054	3164	2723	104	89	86
To the Charvak (total of the 4 rivers)	5777	6331	6258	110	108	99
***Sub-total*:**	***18419***	***20985***	***17967***	***114***	***97***	***86***
Lateral inflow:						
Toktogul – Uchkurgan	1184	1184	1184	100	100	100
Uchkurgan, Uchtepe - Kayrakkum	3352	3478	3886	104	116	112
Andijan – Uchtepe	2576	2687	2514	104	98	94
Kayrakkum – Shardara	3162	3478	2828	110	89	81
Gazalkent - Chinaz-Chirchik GS	923	950	1347	103	146	142
Sub-total:	***11197***	***11777***	***11759***	***105***	***105***	***99,8***
Total:	**29616**	**32762**	**29726**	**111**	**100.4**	**91**

In general, the releases from the reservoir made 91 % out of the predicted amount in the operation schedule of the Naryn-Syrdarya multi-reservoir system (Table 2.2). The total volume of releases from the Toktogul reservoir amounted to 4618 mln m^3, including 1199 mln m^3 of water released for generating electric power of 1168 thousand kilowatt-hour and its receiving.

Table 2.2

Reservoir	Releases (from 01.04.2012 to 01.10.2012), *mln m^3*		In percentage terms
	As per schedule	Actual	
Toktogul	5236.38	4618.17	88
Andijan	2759.82	2877.86	104
Charvak	5499.88	5092.93	93
Kayrakkum	7734.91	7686.12	99
Shardara	8599.39	6737.04	78
Total:	29830.38	27012.12	91

As of October 1, the volumes of water in the reservoirs make as follows: in Toktogul - 17 560 mln m^3, Andijan – 581 mln m^3, Charvak - 1509 mln m^3,

Kayrakkum – 1427 mln m^3, Shardara – 1433 mln m^3 (Table 2.3).

Table 2.3

Reservoir	Volume of reservoir, mln m^3			
	As of 01.04.12	As per schedule as of 01.10.2012	Actual as of 01.10.2012	Actual as of 01.10.2011
Toktogul	13219	19500	17560	19541
Andijan	743	1222	581	672
Charvak	496	1627	1509	1182
Kayrakkum	3389	1761	1427	1529
Shardara	5132	1567	1433	1118
TOTAL:	**22979**	**25677**	**22510**	**24042**

In General, during the growing season of 2012, the states' needs for water were met. Tables 2.4 and 2.5 present the volume of water supplied to the states and respective shares (%%) out of the predicted ones:

Kazakhstan 646 mln m^3 (83%)
Kyrgyzstan 186 mln m^3 (102%)
Tajikistan 1481 mln m^3 (78%)
Uzbekistan 8236 mln m^3 (94%)

4755 mln m^3 of water were supplied to the Shardara reservoir (Table 2.6).

The inflow to the Aral Sea and Priaralie made 1904 mln m^3 of water.

The actual operation mode of the Naryn-Syrdarya multi-reservoir system over the growing season of April 1 to October 1, 2012 is given in Table 2.7.

Table 2.4

Reach, Water consuming country	Water diversion quotas expected, *mln m^3*	Actual water diversion, *mln m^3*	In percentage terms
Toktogul – Uchkurgan hydroscheme			
Kyrgyzstan	113.42	133.74	118
Tajikistan	146.32	79.85	55
Uzbekistan	3548	3575	101
Uchkurgan – Kayrakkum hydroscheme			
Kyrgyzstan	69.7	52.31	75
Tajikistan	539	521.56	97
Uzbekistan	544	542.72	99
Kayrakkum hydroscheme – Shardara reservoir			
Kazakhstan	779.76	646.01	83
Tajikistan	1219.66	879.33	72
Uzbekistan	4708	4118.58	87

Table 2.5

Water consuming country	Water diversion quotas expected, *mln m^3*	Actual water diversion, *mln m^3*	In percentage terms
Republic of Kaxakhstan (Dostyk canal)	779.76	646.01	83
Kyrgyz Republic	183.12	186.05	102
Republic of Tajikistan	1904.98	1480.74	78
Republic of Uzbekistan	8800	8236.3	94

Table 2.6

Parameters	As per schedule, *mln m^3*	Actual, *mln m^3*
Water supply to the Aral Sea	2894	1904.9
Release to Arnasay	0	59.18
Inflow to the Shardara reservoir	6766	4755.09

Table 2.7

SCHEDULE
of the Naryn-Syrdarya multi-reservoir system operation
over the period of April 1 to September 30, 2012

Toktogul reservoir		*April*	*May*	*June*	*July*	*August*	*September*	*Total mln m^3*
Inflow to the reservoir	*m^3/sec*	522.00	566.35	830.57	624.74	522.84	343.30	
	mln m^3	1353.02	1516.92	2152.83	1673.31	1400.37	889.83	8986.30
Volume: At the beginning of the period	*mln m^3*	13219.00	14039.00	15031.00	16295.00	16961.00	17361.00	
At the end of the period	*mln m^3*	14039.00	15031.00	16295.00	16961.00	17361.00	17560.32	
Release from the reservoir	*m^3/sec*	213.73	198.58	329.23	367.16	380.48	260.97	
	mln m^3	554.00	531.88	853.37	983.41	1019.08	676.43	4618.17
Kayrakkum reservoir		*April*	*May*	*June*	*July*	*August*	*September*	*Total mln m^3*
Inflow to the reservoir	*m^3/sec*	518.30	506.55	500.63	341.29	321.74	353.28	
	mln m^3	1343.43	1356.74	1297.64	914.11	861.75	915.70	6689.38
Volume: At the beginning of the period	*mln m^3*	3389.00	3487.00	3379.00	3021.00	2173.00	1392.00	
At the end of the period	*mln m^3*	3487.00	3379.00	3021.00	2173.00	1392.00	1427.02	
Release from the reservoir	*m^3/sec*	475.17	495.63	534.14	563.53	537.86	305.77	
	mln m^3	1231.65	1327.49	1384.48	1509.35	1440.60	792.55	7686.12
Shardara reservoir		*April*	*May*	*June*	*July*	*August*	*September*	*Total mln m^3*
Inflow to the reservoir	*m^3/sec*	527.53	287.90	416.90	213.96	125.80	241.51	
	mln m^3	1367.36	771.11	1080.60	573.06	336.96	626.00	4755.09
Volume: At the beginning of the period	*mln m^3*	5132.00	4785.00	4713.00	4640.00	2937.00	1621.00	
At the end of the period	*mln m^3*	4785.00	4713.00	4640.00	2937.00	1621.00	1433.03	
Release from the reservoir	*m^3/sec*	552.67	213.39	292.00	668.39	525.81	300.00	
	mln m^3	1432.51	571.54	756.86	1790.21	1408.32	777.60	6737.04
Release to Kyzylkum canal	*m^3/sec*	36.33	47.90	61.33	114.36	33.71	2167.00	
	mln m^3	94.18	128.30	158.98	306.29	90.29	56.16	834.20
Release to the Arnasay depression	*m^3/sec*	22.83	0.00	0.00	0.00	0.00	0.00	
	mln m^3	59.18	0.00	0.00	0.00	0.00	0.00	59.18
Water supply to the Aral sea (calculated)	*m^3/sec*	276.70	142.39	54.00	21.14	95.68	136.37	
	mln m^3	717.21	381.37	139.97	56.61	256.26	353.48	1904.90
Charvak reservoir		*April*	*May*	*June*	*July*	*August*	*September*	*Total mln m^3*
Inflow to the reservoir	*m^3/sec*	435.38	523.00	623.07	411.27	227.73	155.36	
(total of the 4 rivers)	*mln m^3*	1128.50	1400.80	1614.99	1101.54	609.95	402.70	6258.48
Volume: At the beginning of the period	*mln m^3*	496.20	1146.00	1784.00	1990.00	1901.00	1632.00	
At the end of the period	*mln m^3*	1146.00	1784.00	1990.00	1901.00	1632.00	1509.35	
Release from the reservoir	*m^3/sec*	203.73	267.45	541.17	416.29	305.03	198.23	
(release from the Gazalkent HPS)	*mln m^3*	528.08	716.35	1402.70	1114.99	817.00	513.82	5092.93
Andijan reservoir		*April*	*May*	*June*	*July*	*August*	*September*	*Total mln m^3*
Inflow to the reservoir	*m^3/sec*	229.67	272.03	273.80	144.00	52.52	62.80	
	mln m^3	595.30	728.61	709.69	385.69	140.66	162.78	2722.72

Volume:	*At the beginning of the period*	*mln m³*	743.00	943.90	1185.90	1427.40	1007.20	614.30	
	At the end of the period	*mln m³*	943.90	1185.90	1427.40	1007.20	614.30	581.21	
Release from the reservoir		*m³/sec*	150.90	180.35	179.70	300.40	201.76	74.42	
		mln m³	391.14	483.05	465.79	804.60	540.40	192.89	2877.86

2.2. The Naryn-Syrdarya multi-reservoir system operation mode and water diversion quotas for the non-growing season of 2012-2013 for the Syrdarya River Basin

The forecast of the water content within the Syrdarya River basin for the forthcoming non-growing season will be provided by the Hydrometeorological services at the end of September - early October 2012. Therefore, the proposed forecast schedule of the NSMRS was calculated based on the available average annual data on inflow to the upper reservoirs and lateral inflow taking into account actual water reserve in the reservoirs of NSMRS at the beginning of the non-growing season. The predicted values of water diversion for the mentioned season are taken within the quotas set by ICWC over the recent years for a year of average annual water content and in conformity with requests of the water consuming states. Based on this, the total water diversion from the Syrdarya River for the non-growing season within the basin in general makes 3087 mln m^3. The proposed water diversion quotas for the states are presented in the table below.

Table 2.8

Water diversion quotas for the states for the non-growing season of 2012 -2013 (mln m^3)

Total from the Syrdarya River	3087
including:	
Republic of Kazakhstan	400
Kyrgyz Republic	37
Republic of Tajikistan	179
Republic of Uzbekistan	2471

Moreover, the water amount of 1965 mln m^3 is supposed to supply to the Aral Sea.

The calculated operation mode of the Naryn-Syrdarya multi-reservoir system for the non-growing season of October 1, 2012 to April 1, 2013 is given in Table 2.9.

Table 2.9

FORECAST SCHEDULE
of the Naryn-Syrdarya multi-reservoir system operation
for the period of October 1, 2012 to March 31, 2013

Toktogul reservoir		*October*	*November*	*December*	*January*	*February*	*March*	*Total mln m3*
Inflow to the reservoir	*m3/sec*	225.23	195.00	159.98	150.19	148.14	158.23	
	mln m3	603.24	505.44	428.50	402.28	358.39	423.79	2721.64
Volume: At the beginning of the period	*mln m3*	17560.32	17355.49	16820.24	15933.16	1522.65	14219.53	
At the end of the period	*mln m3*	17355.49	16820.24	15933.16	15022.65	14219.53	13705.56	
Release from the reservoir	*m3/sec*	300.00	400.00	490.00	490.00	480.00	350.00	
	mln m3	803.52	1036.80	1312.42	1312.42	1161.22	937.44	6563.81
Kayrakkum reservoir		*October*	*November*	*December*	*January*	*February*	*March*	*Total mln m3*
Inflow to the reservoir	*m3/sec*	488.26	632.98	752.80	764.15	772.06	531.15	
	mln m3	1307.77	1640.68	2016.29	2046.69	1867.77	1422.64	10301.83
Volume: At the beginning of the period	*mln m3*	1427.02	1678.01	1792.55	2236.59	2736.83	3210.68	
At the end of the period	*mln m3*	1678.01	1792.55	2236.59	2736.83	3210.68	3417.02	
Release from the reservoir	*m3/sec*	400.00	600.00	600.00	600.00	600.00	470.00	
	mln m3	1071.36	1555.20	1607.40	1607.04	1451.52	1258.85	8551.01
Shardara reservoir		*October*	*November*	*December*	*January*	*February*	*March*	*Total mln m3*
Inflow to the reservoir	*m3/sec*	437.00	671.23	820.95	862.34	830.61	725.17	
	mln m3	1170.47	1739.84	2198.85	2309.68	2009.40	1942.29	11370.52
Volume: At the beginning of the period	*mln m3*	1433.03	1486.61	2021.16	2920.99	3945.04	4841.61	
At the end of the period	*mln m3*	1486.61	2021.16	2920.99	3945.04	4841.61	5400.00	
Release from the reservoir	*m3/sec*	400.00	450.00	470.00	470.00	450.00	500.00	
	mln m3	1071.36	1166.40	1258.85	1258.85	1088.64	1339.20	7183.30
Release to the Kyzylkum canal	*m3/sec*	5.00	5.00	5.00	5.00	5.00	10.00	
	mln m3	13.39	13.39	13.39	13.39	12.10	26.78	92.02
Release to the Arnasay	*m3/sec*	0.00	0.00	0.00	0.00	0.00	0.00	
depression	*mln m3*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Supply to the Aral Sea	*m3/sec*	123.90	122.30	128.10	123.20	127.00	125.20	
	mln m3	331.85	317.00	343.10	329.98	307.24	335.34	1964.51
Charvak reservoir		*October*	*November*	*December*	*January*	*February*	*March*	*Total mln m3*
Inflow to the reservoir	*m3/sec*	108.73	100.00	84.13	72.57	66.22	98.70	
(total of the 4 rivers)	*mln m3*	291.22	259.20	225.33	194.38	160.20	264.37	1394.70
Volume: At the beginning of the period	*mln m3*	1509.35	1395.41	1327.92	1204.47	1049.05	893.79	
At the end of the period	*mln m3*	1395.41	1327.92	1204.47	1049.05	893.79	729.34	
Release from the reservoir	*m3/sec*	150.00	125.00	130.00	130.00	130.00	160.00	
(release from the Gazalkent HPS)	*mln m3*	401.76	324.00	348.19	348.19	314.50	428.54	2165.18
Andijan reservoir		*October*	*November*	*December*	*January*	*February*	*March*	*Total mln m3*
Inflow to the reservoir	*m3/sec*	65.10	65.80	55.90	49.90	49.00	65.70	
	mln m3	174.37	170.55	149.73	133.66	118.54	175.96	922.82

Volume:	*At the beginning of the period*	*mln m3*	581.21	567.53	646.82	755.81	849.21	919.30	
	At the end of the period	*mln m3*	567.53	646.82	755.81	849.21	919.30	961.26	
Release from the reservoir		*m3/sec*	70.00	35.00	15.00	15.00	20.00	50.00	
		mln m3	187.49	90.72	40.18	40.18	48.38	133.92	540.86

WATER SITUATION ANALYSIS WITHIN THE AMUDARYA AND SYRDARYA RIVER BASINS FOR THE GROWING SEASON OF 2012

1. Syrdarya River Basin

The actual inflow to the upstream reservoirs of the Syrdarya River Basin (Toktogul, Andijan and Charvak without considering the inflow from the Ugam River) for the growing season was 17.32 km^3, or 83.3% of the predicted inflow (planned schedule of the BWO "Syrdarya"). Total 5.13 km^3 of water was diverted to the upstream reservoirs from the Naryn, Karadarya and Chirchik rivers, that is 2.76 km^3 less than planned. The actual release from those for the growing season made 12.20 km^3, that is 9.6% less than planned.

The total lateral inflow to the Naryn and Syrdarya rivers (at the river reaches up to the Shardara reservoir) found by the balance calculation (based on data of the BWO "Syrdarya") made 11.13 km^3.

By the end of the growing season, 19.59 km^3 of water, or 87.6% of the planned volume, was accumulated in the upstream reservoirs, in particular: 17.51 km^3 - in the Toktogul reservoir, 1.51 km^3 - in the Charvak reservoir, and 0.56 km^3 - in the Andijan reservoir.

The total water divertion from the Naryn and Syrdarya rivers reaches up to the Shardara reservoir made 10.99 km^3, in particular: for the Kyrgyz Republic - 0.18 km^3; for the Republic of Tajikistan - 1.48 km^3; for the Republic of Uzbekistan - 8.69 km^3; and for the Republic of Kazakhstan (through the Dustlik canal) - 0.64 km^3.

Over the growing season 2012, the water was diverted 0.678 km^3 (5.8%) less than planned according to the BWO "Syrdarya" schedule. Water supply was unequal for the riparian countries as well as for the river reaches (see Table 1.1 and the data available on the website: www.cawater-info.net/analysis/water/).

The attention needs to be paid to the fact that over the recent 5 years (2007-2008 ... 2011-2012) the average annual inflow to the Toktogul reservoir was 13.55 km^3, including 10.27 km^3 for the growing seasons. For the growing season 2012, the water inflow amounted to 8.99 km^3, that is 1.282 km^3 less than the average inflow over the 5 years.

During the growing seasons of the recent 5 years, the average amount of water released from the Toktogul reservoir is estimated at 5.2 km^3. During the growing season 2012, 4.685 km^3 of water were released, that is 0.55 km^3 less than planned by the BWO “Syrdarya” and 0.52 km^3 less than the amount released over the recent 5 years (see Tables 1.3 and 1.4).

According to our estimation, during the growing season, the releases of 5.5-6.0 km^3 from the Toktogul reservoir meet in general the basin irrigation needs for average water years and would allow (given the regular operation of the Naryn HPS cascade) stable water supply to the Ferghana Valley canals.

The commitments on water supply to the Kayrakkum reservoir were fulfilled by 100%; the water inflow to the reservoir made 6.75 km^3 as compared with 6.75 km^3 as per the BWO "Syrdarya" schedule.

Water availability within the Syrdarya river midstream depends on releases from the Kayrakkum reservoir which can limit water supply to the midstream canals even during average water periods, given it operates in power generation mode.

During the growing season 2012, the lowest water availability, estimated on the limits for 2012, was observed for some ten-day periods in Tajikistan in April 2012 – up to 43.1%; in Kyrgyzstan in May – up to 80.1%, in Uzbekistan in July – up to 76.5%, and in Kazakhstan in July-August – up to 43.4%).

Over the growing season 2012, the total release from the Kayrakkum reservoir was 8.0 km^3, including the release into the river - 7.6 km^3.

The release from the Kayrakkum reservoir was 0.13 km^3 less than scheduled by the BWO "Syrdarya". For the growing season, the total release made up to 1.89 km^3. However, the total water availability of the "Kayrakkum-Shardara" river reach amounted to 85.4%, that is 8.8% less than the average water availability within the basin.

The water inflow to the Shardara reservoir amounted to 4.52 km^3, or 33.1% less than scheduled by the BWO "Syrdarya". It was found from the balance calculation that flow losses at the "Toktogul-Shardara" river reach were 1.32 km^3, at the lateral inflow of 11.13 km^3.

The water release from the Shardara reservoir made 7.85 km^3, including 7.1 km^3 into the river and 0.059 km^3 to the Arnasay reservoir.

The basin reservoir water balance analysis (Table 1.3) found the unconsidered inflow of 0.02 km^3 to the Charvak reservoir. The total water losses in the Toktogul, Andijan, Kayrakkum and Shardara reservoirs amounted to 1.8 km^3.

According to the data from the Kazakhstan Hydrometeorological Station (Karateren gauging station), the water supply to the Aral Sea and Priaralie made 2.8 km^3. The actual water balance of the Syrdarya lower reaches is given in Table 1.5.

Table 1.1

Water availability in the Syrdarya River Basin countries for the growing season 2012

Water user	Water volume, km^3		Water availability, %	Deficit (-), surplus (+) km^3	
	Limit/ Plan*	Actual	Season	Season	Total of ten-day period***
Total water diversion	11.67	10.99	94.2	-0.68	-1.26
By countries:					
Kyrgyz Republic	0.183	0.178	97.4	0.00	-0.01
Republic of Uzbekistan	8.80	8.69	98.8	-0.11	-0.88
Republic of Tajikistan	1.90	1.48	77.7	-0.43	-0.43
Republic of Kazakhstan	0.78	0.64	82.0	-0.14	-0.20
3. By river reaches					
3.1 Toktogul reservoir-Uchkurgan hydroscheme	3.90	4.08	104.7	0.18	-0.16
In particular:					
Kyrgyz Republic	0.11	0.13	111.7	0.01	0.00
Republic of Tajikistan	0.24	0.07	29.1	-0.17	-0.17
Republic of Uzbekistan	3.55	3.89	109.5	0.34	-0.10
3.2 Uchkurgan hydroscheme – Kayrakkum hydroscheme	1.06	1.18	111.3	0.12	-0.04
In particular:					
Kyrgyz Republic	0.07	0.05	74.0	-0.02	-0.02
Republic of Tajikistan	0.45	0.54	120.4	0.09	-0.01
Republic of Uzbekistan	0.54	0.59	108.6	0.05	0.05
3.3 Kayrakkum hydroscheme – Shardara reservoir	6.71	5.73	85.4	-0.98	-1.23
In particular:					
Republic of Kazakhstan	0.78	0.64	82.0	-0.14	-0.20
Republic of Tajikistan	1.22	0.87	71.4	-0.35	-0.35
Republic of Uzbekistan	4.71	4.22	89.6	-0.49	-0.88
4. In addition:					
Inflow to the Shardara reservoir	6.77	4.53	66.9	-2.24	-2.46
Release to Arnasay	0.00	0.06	0.00	0.00	0.00
Water supply to the Aral Sea and Priaralie	2.89	2.05	71.0		

* Limits for the growing season 2010

** Minimum value recorded for the ten-day period

*** Total water deficit recorded for ten-day periods

Table 1.2

Syrdarya River channel water balance for the growing season 2012

Item	Water volume, km^3		Deviation (actual-planned)
	Predicted/ Planned	Actual	
1. Inflow to the Toktogul reservoir	11.57	8.99	-2.58
2. Lateral inflow at the Toktogul reservoir-Shardara reservoir river reach (+)	9.75	11.13	1.38
In particular:			
Release to the Karadarya river	0.88	1.82	0.94
Release to the Chirchik river	0.73	1.41	0.68
Lateral inflow by CDF[2] and small rivers	8.14	7.90	-0.24
3. Flow regulation in the reservoirs: accumulation (+) or drawdown (-)	-5.12	-3.28	1.84
In particular:			
Toktogul reservoir	-6.33	-4.31	2.03
Kayrakkum reservoir	1.21	1.03	-0.19
4. Regulated flow (1+2+3)	16.20	16.84	0.64
5. Water diversion at the Toktogul-Shardara reach (-)	-11.67	-10.99	0.68
6. Flow losses (-) or unconsidered inflow to the channel (+) at the Toктogul-Shardara reach	2.23	-1.32	-3.56
Including in % of the regulated flow	13.78	-7.86	-21.64
7. Inflow to the Shardara reservoir	6.77	4.53	-2.24
8. Flow regulation in the Shardara reservoir: accumulation (+) or drawdown (-)	3.04	3.32	0.28
9. Water release from the Shardara reservoir to the river	8.60	7.10	-0.15
10. Diversion to the Kyzylkum canal (-)	-1.21	-0.80	0.41
11. Release to Arnasay (-)	0.00	-0.06	-0.06
12. Water supply to the Aral Sea and Priaralie	2.89	2.85	-0.04

Table 1.3

Water balance of the Syrdarya River basin reservoirs for the growing season 2012

Item	Water volume, km^3		Deviation (actual-planned)
	Predicted/ Planned	Actual	
1. Toktogul reservoir			
1.1 Inflow to the reservoir	11.57	8.99	-2.58
1.2 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	13.22	13.22	0.00
- at the end of the season (October 1, 2012)	19.50	17.51	-1.99

[2] CDF stands for collector & drainage flow.

Item	Water volume, km^3		Deviation (actual-planned)
	Predicted/ Planned	Actual	
1.3 Release from the reservoir	5.24	4.68	-0.55
1.4 Unconsidered water inflow (+) or losses (-)	-0.05	-0.01	0.04
In % of the inflow to the reservoir	-0.45	-0.16	0.29
1.5 Flow regulation: accumulation (+) or drawndown (-)	-6.33	-4.31	2.03
2. Andijan reservoir			
2.1 Inflow to the reservoir	3.25	2.71	-0.54
2.2 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	0.74	0.74	0.00
- at the end of the season (October 1, 2012)	1.22	0.56	-0.66
2.3 Release from the reservoir	2.76	2.89	0.13
2.4 Unconsidered water inflow (+) or losses (-)	-0.01	-0.01	0.00
In % of the inflow to the reservoir	-0.37	-0.22	0.15
2.5 Flow regulation: accumulation (+) or drawdown (-)	-0.49	0.17	0.66
3. Charvak reservoir			
3.1 Inflow to the reservoir	5.97	5.62	-0.35
3.2 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	0.50	0.50	0.00
- at the end of the season (October 1, 2012)	1.63	1.51	-0.12
3.3 Release from the reservoir	5.50	4.63	-0.87
3.4 Unconsidered water inflow (+) or losses (-)	0.66	0.02	-0.64
In % of the inflow to the reservoir	11.06	0.43	-10.64
3.5 Flow regulation: accumulation (+) or drawdown (-)	-0.47	-0.99	-0.52
4. Kayrakkum reservoir			
4.1 Inflow to the reservoir	6.75	6.75	0.00
4.2 Lateral inflow	0.25	0.23	-0.02
4.3 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	3.39	3.39	0.00
- at the end of the season (October 1, 2012)	1.76	1.50	-0.26
4.4 Release from the reservoir	8.22	8.00	-0.22
In particular:			
- release to the river	7.73	7.60	-0.13
- water withdrawal from the reservoir	0.48	0.40	-0.08
4.5 Unconsidered water inflow (+) or losses (-)	-0.41	-0.87	-0.45
In % of the inflow to the reservoir	-6.14	-12.84	-6.70
4.6 Flow regulation: accumulation (+) or drawdown (-)	1.21	1.03	-0.19
5. Shardara reservoir			
5.1 Inflow to the reservoir	6.77	4.53	-2.24
5.2 Lateral inflow	-	-	-
5.3 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	5.13	5.13	0.00
- at the end of the season (October 1, 2012)	1.57	0.91	-0.66
5.4 Release from the reservoir	9.80	7.85	-1.96
In particular:			
- release to Arnasay	0.00	-0.06	-0.06
- release to the river	8.60	7.10	-1.50

Item	Water volume, km^3		Deviation (actual-planned)
	Predicted/ Planned	Actual	
- *water diversion from the reservoir*	1.21	0.80	-0.40
5.5 Unconsidered water inflow (+) or losses (-)	-0.53	-0.91	0.38
In % of the inflow to the reservoir	-7.78	-20.01	-12.23
5.6 Flow regulation: accumulation (+) or drawdown (-)	3.04	3.32	0.28
TOTAL Flow regulation: accumulation (+) or drawdown (-)	-3.04	-0.78	2.26
TOTAL Losses (-), unconsidered inflow (+)	-0.34	-1.77	-1.42

Table 1.4

Inflow to and release from the Toktogul reservoir during the period of 2007-2012

Hydrologic year	Inflow, million m3			Release, million m3		
	Non-growing season	Growing season	Annual	Non-growing season	Growing season	Annual
2007-2008	2505	7371	9876	9726	4408	14134
2008-2009	2672	9876	12548	5884	5748	11632
2009-2010	3898	15244	19142	6965	5445	12410
2010-2011	3896	9888	13783	8000	5714	13714
2011-2012	3408	8992	12401	9730	4685	14415
Average for the five years	3276	10274	13550	8061	5200	13261

Table 1.5

Water resources and flow consumption in the lower reaches of the Syrdarya river for the growing season 2012

Item	Water volume, km^3	
	Predicted/Planned	Actual
1. Release from the Chardara reservoir to the river and Koksaray reservoir	8.6	7.1
2. Release to the Arys river	-	0.5
3. Drawdown (+) or accumulation (-) of the Koksaray reservoir	-	2.4
Total water resources (1+2+3)	-	10.0
4. Water withdrawal (-)	-	-5.7
5. Losses (-)	-	-1.5
6. Release to the Aral Sea (Karateren gauging station) (-)	-2.89	-2.80
Total consumption (4+5+6)	-	-10.0
Balance	-	0.0

Within the Syrdarya river reach, from the Toktogul reservoir to the Kayrakkum reservoir, the water deficit was observed in most ten-day periods of the growing season: in Kyrgyzstan - slight water deficit in April-July (5-20%); in Tajikistan - in

May-August (up to 25-31% in June); in Uzbekistan - in July (8-17%).

The midstream water diversion deficit was much higher: in Tajikistan, it was observed during all ten-day periods of the growing season with peak values in April-early May (90-60%); in Kazakhstan - in April, early May, late July, August-September; and in Uzbekistan - in April-July and early August.

In April, August, the water divertion deficit was mainly related to insufficient water releases from the Toktogul reservoir (12-15% in April, and 36-41% in August) and insufficient releases from the Kayrakkum reservoir (see Table 1.6.).

Table 1.6

Release from the Kayrakkum reservoir during water deficit periods for the growing season 2012

Item	Unit	April	August		
		III	I	II	III
Predicted	m^3/s	517	584	584	584
Actual	m^3/s	451	327	331	307
Water release deficit	m^3/s	66	257	253	277
	%	13	44	43	47
Water withdrawal deficit at the Kayrakkum-Chardara reach. Total:	%	37	23	11	-
In particular:					
- Kazakhstan	%	56	56	57	15
- Tajikistan	%	83	17	24	28
- Uzbekistan	%	20	16	-	-

2. Amudarya River Basin

The actual water content of the Amudarya River at Atamyrat gauging station (located at upstream of the water intake to Garagumdarya) was 53.28 km^3, that is 7.45 km^3 less than expected, scheduled by the BWO "Amudarya" (Table 2.2). In the meanwhile, the inflow to the Nurek HPS was 2.95 km^3 more than predicted! Therefore, the release from the reservoir made 15.52 km^3, or 2.91 km^3 more than planned.

In the existing water situation, 93.0% of the fixed water diversion limit for the canals within the Amudarya River basin was used; the total water diversion amounted to 36.83 km^3, including 30.32 km3 from downstream of the Atamyrat gauging station (starting from the water diversion to Garagumdarya). The water supply was unequal for countries, and for river reaches (see Table 2.1 as well as data on the website: www.cawater-info.net/analysis/water/).

By the end of the season, up to 10.54 km^3 of water were accumulated in the Nurek reservoir and up to 5.74 km^3 - in the Tuyamuyun Hydroscheme (TMHS) reservoir (Table 2.3). The river flow diversion for accumulation in the Nurek and Tuyamuyun reservoirs (including the water diversion from TMHS) made 8.86 km^3.

The Nurek reservoir operation differs from the Tuyamuyun reservoir operation in that the Nurek reservoir accumulates water during the whole growing season, i.e.

diverts it from the river flow, while the TMHS, if required, releases water from the reservoir during some dry ten-day periods (months), thereby covering the water deficit. Table 2.4 provides comparative assessment of the operation of the Nurek and Tuyamuyun reservoirs in dry periods.

With the balance calculation, the water losses from the Amudarya River within the river reach from the Atamyrat gauging station to the TMHS inflow point made 4.92 km^3, or 9.2% of the flow at the Atamyrat gauging station. The water losses at the river reach from the TMHS inflow point up to the point of water supply to the Aral Sea and Priaralie amounted to 2.77 km^3, or 9.1% of the inflow to TMHS.

There were no water losses in the Nurek reservoir; while those made 1.92 km^3 in the Tyuyamuyun reservoir.

In general, water losses within the Amudarya River basin made 9.60 km^3, or 18% of the river water content (Atamyrat gauging station), that is 7.75 km^3 (10.54%) less than estimated (planned by BWO "Amudarya"). By the beginning of the non-growing season 2012-2013, the both reservoirs were filled in to the optimum water volume.

The flow at the Samanbay gauging station made 5.45 km3; and given the CDF releases, 7.19 km^3 of water were supplied to the Aral Sea and Priaralie.

Table 2.1

Water availability in the Amudarya River Basin countries for the growing season 2012

Water user	Water volume, km^3		Water availability, %	Deficit (-), surplus (+) km^3	
	Limit/ Plan	Actual	Season	Season	Total for ten-day period**
1. Total water withdrawal	39.60	36.83	93.00	-2.77	-2.87
2. By countries:					
Kyrgyz Republic	-	-	-	-	-
Republic of Tajikistan	6.88	5.82	84.53	-1.06	-1.06
Turkmenistan	15.50	14.48	93.45	-1.02	-1.18
Republic of Uzbekistan	17.22	16.53	95.98	-0.69	-1.18
3. Downstream of Atamyrat GS***	31.52	30.32	96.20	-1.20	-1.51
In particular:					
Turkmenistan	15.50	14.48	93.45	-1.02	-1.18
Republic of Uzbekistan	16.02	15.84	98.85	-0.18	-0.80
4. By river reaches:					
Upstream	8.02	6.51	80.54	-1.57	-1.58
In particular:					
Kyrgyz Republic	-	-	-	-	-
Republic of Tajikistan	6.88	5.82	84.53	-1.06	-1.06
Surkhandarya province, Uzbekistan	1.20	0.69	57.68	-0.51	-0.52
Midstream	16.21	15.15	93.45	-1.06	-1.12
In particular:					
Turkmenistan	10.47	9.37	89.48	-1.10	-1.14
Republic of Uzbekistan	5.73	5.78	100.70	0.04	-0.29
Downstream	15.31	15.18	99.10	-0.14	-0.77
In particular:					
Turkmenistan	5.03	5.11	101.73	0.09	-0.22
Republic of Uzbekistan	10.28	10.06	97.82	-0.22	-0.67
5. In addition:					
Emergency and environmental releases to canals within lower reaches	0.0	0.79			
In particular:					
Turkmenistan	0.00	0.00			
Republic of Uzbekistan	0.00	0.79			
Water supply to the Aral Sea and Priaralie	7.00	7.19	102.7		

***** Minimum value recorded in the ten-day period

****** Total water deficit for ten-day periods.
******* Atamyrat gauging station – located at the Amudarya upstream of the water intake to Garagumdarya

Table 2.2

The Amudarya River channel water balance for the growing season 2012

Items	Water volume, km^3		Deviation (actual-planned)
	Predicted/ Planned	Actual	
1. Water content in the Amudarya river: unregulated flow at the Atamyrat GS	60.73	53.28	-7.45
2. Flow regulation in the Nurek reservoir: accumulation (+) or drawdown (-)	-4.44	-4.48	-0.04
3. Water withdrawal in the midstream (-)	-16.21	-15.15	1.06
4. Midstream return CDF (+)	1.85	1.57	-0.28
5. Water losses (-) or unconsidered inflow to the channel (+)	-9.01	-4.92	4.09
In % of the flow at the Atamyrat GS	-14.8	-9.2	5.61
6. Inflow to the TMHS (Bir-Ata GS)	32.92	30.30	-2.62
7. Flow regulation at TMHS: accumulation (+) or drawdown (-)	-2.27	-4.38	-2.11
8. Losses (-) in the TMHS reservoirs, lateral inflow (+)	0.00	-1.92	-1.92
In % of inflow	0.00	-6.33	-6.33
9. Releases from TMHS (including water diversion from the reservoir)	30.65	25.92	-4.73
10. Downstream water diversion, including diversion from TMHS (-)	-15.31	-15.18	0.14
11. Downstream return CDF (+)	0.00	0.00	0.00
12. Emergency and environmental water releases to canals (-)	-0.00	-0.79	0.79
13. Runoff losses (-) or unconsidered inflow to the channel (+)	-8.34	-2.77	5.57
In % of the flow at the Tuyamuyun downstream pool	-27.2	-10.7	16.52
14. Water supply to the Priaralie and Aral Sea	7.00	7.19	0.19
TOTAL losses:	-17.35	-9.60	7.75
In % of the water content in the river	-28.56	-18.0	10.54

* After deduction of the upstream water diversion (Tajikistan and Surkhandarya province of Uzbekistan)

Table 2.3

Water balance of the Amudarya River Basin's reservoirs for the growing season 2012

Items	Water volume, km^3		Deviation (actual-planned)
	Predicted/ Planned	Actual	
1. Nurek reservoir			
1.1 Inflow to the reservoir	17.05	20.00	2.95
1.2 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	6.06	6.06	0.00
- at the end of the season (October 1, 2012)	10.50	10.54	0.04
1.3 Release from the reservoir	12.61	15.52	2.91
1.4 Lateral inflow (+) or water losses (-)	0.00	0.00	0.00
In % of the inflow to the reservoir	0.00	0.00	0.00
1.5 Flow regulation: accumulation (+) or drawdown (-)	-4.44	-4.48	-0.04
2. TMHS reservoir			
2.1 Inflow to the TMHS	32.92	30.30	-2.62
2.2 Water volume in the reservoir:			
- at the beginning of the season (April 1, 2012)	3.28	3.28	0.00
- at the end of the season (October 1, 2012)	5.55	5.74	0.19
2.3 Release from the TMHS	30.65	25.92	-4.73
In particular:			
- release to the river	25.04	20.67	-4.36
- water diversion	5.61	5.25	-0.37
2.4 Lateral inflow (+) or water losses (-)	0.00	-1.92	-1.92
In % of the inflow to the reservoir	0.0	-6.3	-6.3
2.5 Flow regulation: accumulation (+) or drawdown (-)	-2.27	-4.38	-2.11
TOTAL flow regulation by the reservoirs: accumulation (+) or drawdown (-)	-6.71	-8.86	-2.15
TOTAL losses (-), unconsidered inflow (+)	0.00	-1.92	-1.92

Table 2.4

Comparative assessment of the operation of the Nurek and Tuyamuyun reservoirs during dry periods

Year	Month	Ten-day period	Accumulation (+) in the Nurek reservoir, mln. m^3	Drawdown (-) of TMHS reservoirs, mln. m^3	Lower reach deficit, mln. m^3
2000	April	I - III	213	-843	0
	May	I	233	-39	-431
	June	I - III	554	-598	-1447
	July	I, III	674	-29	-1657
	August	I - III	1474	-50	-2211
	September	I, II	488	-21	-305
2001	April	I	44	-129	0
	May	I - III	471	-63	-1402
	June	III	542	-40	-316
	July	I - III	1692	-108	-1740
	August	I - III	741	-36	-1589
	September	I	53	-7	-229
2008	April	II	13	-79	-131
	May	I, II	144	-212	-871
	July	I - III	928	-666	-1891
	September	II	15	-46	-188
2012	April	I	192	-126	-17
	July	III	655	-553	-107
	August	I, II	772	-404	-36

INFORMATION AND KNOWLEDGE EXCHANGE AND CAPACITY BUILDING IN THE WATER SECTOR OF EECCA

The research-practice workshop «Exchange of Information and Knowledge and Capacity Building in the Water Sector of EECCA» was held in Almaty on the 19th of September 2012.

In total, 27 representatives of water-management organizations, research institutes, universities, and NGOs from Armenia, Georgia, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan, Uzbekistan, Ukraine, and Switzerland took part in this workshop (Annex 2).

The aim was to share experience in information exchange in the water sector of EECCA countries, identify problems, and develop recommendations for their solution.

The participants shared experience in developing water information systems and the principles of information dissemination.

The following reports were delivered:

Dukhovny V.A. (SIC ICWC, Uzbekistan, Executive secretary of NOW EECCA) The Network of Water Organizations in EECCA - our Present and Future.

Mukhamedjanov Sh.Sh. (SIC ICWC, Uzbekistan) About Activities of ICID Work Group on Irrigation and Drainage in the States under Socio-Economic Transformation.

Thalmeinerova D. (GWP, Sweden) Knowledge Management in GWP.

Sokolov V.I. (GWP, SIC ICWC, Uzbekistan) GWP CACENA's Activities for Capacity Building in the Water Sector.

Sorokin D.A. (SIC ICWC, Uzbekistan) Water Management Models for Transboundary Rivers in the Aral Sea Basin: Application, Development, and Integration.

Shivaryova S.P. (RHC IFAS, Kazakhstan) Experience of Cooperation among Hydrometeorological Services in CA in the area of Information Exchange.

Prokhorova N.B. (RosNIIVH, Russia) Development of Scientific-Methodological Bases for Transboundary Water Management.

Omelianenko V.A. (NIA «Priroda», Russia) Experience in the Development of Water Information System in Russia.

Trophantchuk S.I. (Seversk-Donets BWMA, Ukraine) Transboundary Cooperation and Data Exchange in the Seversk Donets River Basin.

Bulekbayeva L.B. (Department for Water Resources and Land Reclamation,

Kyrgyz Republic) Development of Water Information System in Kyrgyzstan.

Kobuliev Z.V. (Institute of Water, Hydropower, and Ecology, Academy of Sciences, Republic of Tajikistan) Development of Water Information System in Tajikistan.

Nurmukhammedova G. (Analytical Agency "Ynanch-Vepa", Turkmenistan) State of Information Systems in Turkmenistan.

Abduraimov M.F. (NGO «Zeravshan River Basin Protection, Uzbekistan) Development of Water Information System in Uzbekistan.

Chkhobadze N. (National Water Partnership, Georgia) Development of Water Information System in Georgia.

Movsisyan G. (Scientific-Training Center for Environmental Law at YSU, Armenia) Development of Water Information System in the Republic of Armenia.

In **Kyrgyzstan**, the national information-analytical system is based on regulations of the Kyrgyz Water Code, Chapter 17 "The unified water information system". The leadership of national water sector was among pioneers who recognized the benefits and advantages of developing a national information system for its use in daily work. A number of projects were implemented in different years with the support of donors under the auspices of the national water agency. This has resulted in the development of databases on various directions. The proposed information-analytical system should become a powerful tool supporting governance and development of the whole national water sector.

In **Tajikistan**, the national information system for the most part is integrated with the regional IS of CAREWIB. At present, the national team is occupied in testing of the Aral Sea basin management model (ASBmm) developed by SIC ICWC with the support of IHE UNESCO.

In **Turkmenistan**, high-level officials of the country already raise the issue of regular information exchange between Turkmen agencies. This work is full-speed running in some agencies, including Statistics Committee, Ministry of Economy, and Strategic Planning Institute. Moreover, people start understanding the system of storage and comprehensive analysis of collected information using up-to-date technologies. Improvement of information storage and processing systems is of crucial importance in the short-term.

In **Armenia**, information support of the national water sector is provided by the Environmental Impact Monitoring Center at the Ministry of Nature Preservation. Information is provided on the web-site www.armmonitoring.am and in form of monthly and annual bulletins. The Center performs hydrochemical monitoring at 131 stations located along 39 rivers, in 6 reservoirs, and Sevan Lake.

In **Georgia**, such state organizations as the Agency for Nature Preservation (former "Hydromet") at the Ministry of Environment and the Emergencies Agency at the Ministry for Foreign Affairs mainly deal with prevention and mitigation of disasters (floods, droughts). There is also a network of non-governmental

organizations for disaster mitigation.

Activity of the Seversk-Donets Basin Organization (**Ukraine**) shows an excellent example of basin management. The information-advisory framework for water resources management - Decision-Support System (DSS) - established by the North Caucus branch of the Water Research Institute is used in the Seversk-Donets Basin Organization and the Don Basin Organization. This system includes such subsystems as "Hydrochemistry" (database on water quality) and "Water balances" (database on hydrology). An interstate data exchange system has been applied since 2006 between Russia and Ukraine to support decision making in water management within these states. The system enables flexible regulation of data sets received on:

- operation regimes of reservoirs, including small border ones;
- quality of water resources in border cross-sections;
- forecasts of flooding and flow conditions during low-water period;
- implementation of water measures affecting riparian party.

It was noted that the application of data exchange system, using modern data transmission methods, at the intra-state level enhanced timeliness and quality of information on transboundary water bodies within Kharkov, Donets, and Lugansk provinces in Ukraine. Development of information system in Ukraine progresses in conformity with the European Water Framework Directive.

The Federal Special-Purpose Program "Development of the water sector in Russia up to 2020" makes provision for advancing the information support in **Russia** that consists in the following:

- adoption of common legal mechanisms of environmental planning that should comply with the international law
- harmonization of standards in the area of nature conservation and natural resources use
- development of a single system of information exchange
- creation of databases on best environmental, resource-saving technologies and treatment systems and their regular updating.

The long-term objective of regional water cooperation in **Central Asia** should be ensuring environmental, food, and energy security through the balanced development, first of all, of water and energy sectors. The negotiation process is to aim at harmonizing the interests of water, energy and environmental spheres in connection with the national socio-economic development thrusts. However, low success rate of forecasts, lack of reliable information on river runoffs, water diversions, and return water in some reaches are destabilizing factors that further complicate the situation in the Aral Sea basin and lead to unjustifiable losses, shortages, irregular and unstable water supply to water-economic areas and to aquatic ecosystems in the basin. The problem is that decision makers do not have

common tools for estimation and control that are based on agreed approaches to assessment of available water and to management of large reservoir hydrosystems and HPP cascades. For solution of those tasks the following was developed:

- Aral Sea Basin Economic Allocation Model (BEAM), jointly by DHI, COWI and Global Water Partnership CACENA on request of the Executive Committee of IFAS and USAID
- Integrated model of the Aral Sea Basin (ASBmm) by experts from UNESCO IHE and SIC ICWC.

Many experts think that exactly those models (adequately enhanced, adapted and tested) can solve important tasks on flow control in river basins at transboundary (interstate) level.

The main purpose of this pair - BEAM & ASBmm - in the future is the professional use of given tool for studies of alternative scenarios and for building of effective national development strategies in the region. At the same time, this package is aimed at wide circle of users. BEAM & ASBmm should become an element of the decision support subsystem3, which is a part of the regional information system.

The common problems for **EECCA** countries are:

1) those voiced at the meeting of the ICID Working Group on Irrigation and Drainage in the States under Socio-Economic Transformation (63rd meeting of ICID Executive Committee, Adelaide, Australia, 24-29 June 2012).

- There is population growth along with sharp rise in prices of food related with water (i.e. with irrigation).
- By 2025, the whole south territory of the Earth would virtually suffer from water shortage.

In this context, ICID sets the following priorities and targets for the near future:

- Target I Increase rainfed land productivity
- Target II Increase water productivity in irrigated agriculture
- Target III Increase sustainable productivity and lower costs of water management such that by 2025 there is food security at acceptable prices for all
- Target IV Safe use of non-conventional waters in agriculture and aquaculture
- Target V Water storage in support of irrigated agriculture
- Target VI Personal visions

[3] The Decision support sub-system is a set of models integrated in single information platform through user's Interface. The models should use uniform dataware and, primarily, be developed on an open and collaborative basis.

- Target VII Groundwater
- Target VIII Food supply chain efficiency
- Target IX Support to small-holder farmers

2) those set in the presentation of Prof. V.A.Dukhovny, Executive Secretary of NWO EECCA:

- Changes in global water situation since 1997 to 2012:

- General water consumption increased by 550 billion m3;
- Water shortage (less than 1000 m3/person) affected 1.4 billion people as compared to 0.5 billions in 1990;
- Irrigation areas decreased by 12 Mha - 5 % of the total irrigation;
- Number of starving population increased from 850 to 1020 millions;
- 2 billion people do not have access to sanitation;
- Negative consequences of floods have grown dramatically.

- Major challenges in the EECCA region:

- Climate change impact: reduced runoff, melting of glaciers, prevalence and intensification of extreme phenomena;
- Demographic pressure – growth of population: 1.2-1.8% per year;
- Weak economic base;
- Poor water management;
- Hydro-egoism;
- Current restructuring of economy, particularly of irrigated agriculture;
- Market and price volatility;
- Lack of political attention.

It was underlined that the region has developed its own vision of IWRM, which includes:

- Multilevel water management system supported by appropriate governance system;
- Set of institutional, legal and engineering measures;
- Combination of state path with powerful community initiatives.

The main IWRM principles include:

- Water resources management within hydro-geographic boundaries;
- Use of all sources (surface water, groundwater, and return water);
- Close coordination of all water users and organizations;

- Public participation both in management of water resources and in financing, planning, and development of water infrastructure;
- Setting of ecosystem demand's priority;
- Water saving and control of non-productive losses;
- Information exchange, openness and transparency of water management system;
- Economic and financial sustainability of water-management organizations.

Finally, the participants made the following conclusions.

1. The participants of the joint workshop of EECCA Network and GWP CACENA shared information about progress in cooperation among the partners in the field of water sector improvement in our regions.

2. Water sectors in all the countries show positive developments towards improved water supply and sanitation, especially in the urban sector, mainly at the expense of IFI loans. An importance of IWRM was recognized but also IWRM principles were developed specifically for conditions of the region, where irrigated agriculture prevails, and being implemented successfully on the vast areas in Central Asia, Ukraine and in Azerbaijan.

3. At the same time, in general, current water governance and management do not meet present requirements and need to be improved radically, as well as require significant efforts of both state and community actors. In this context, activities of GWP CACENA and EECCA Network need to be intensively developed and supported in part of:

- Dissemination of appropriate governance and management principles in context of IWRM;
- Enhancement of information exchange, with focus on dissemination of knowledge and best practices accumulated in the region;
- Organization of training in the main directions that lead to improved water sector functioning (IWRM, water use technologies, IS application, international water law) in form of both training workshops and distant learning ("e-learning");
- Development of knowledge centers (regional and national) aimed to assist water users at different levels of water hierarchy;
- Involvement of organizations of water profile, especially research institutions, and regular communication of R&D results for their application in practice for efficient water use and protection.

4. It is necessary to attract basin organizations in EECCA Network and enhance exchange of information on activities of lower level organizations.

5. The participants thanked RFBR (Russian Foundation for Basic Research), UNECE, and GWP CACENA for the provided financial support that allowed publishing four collections of scientific papers, maintaining the Network's web-site www.eecca-water.net, and organizing annual meetings, including the workshop in Almaty. At the same time, it was noted that the size of this support obviously is not enough for wider involvement of the Network's members in regular activities. The same concerns attention of INBO to EECCA Network operation.

APPLIED RESEARCH IN LAND AND WATER RESOURCES MANAGEMENT IN CENTRAL ASIA

On October 9, 2012, the workshop on sharing the experience in Applied Research in Land and Water Resources Management in Central Asia between staff of International Center for Agricultural Research in the Dry Areas (ICARDA), International Water Management Institute (IWMI) and Scientific-Information Center of Interstate Coordination Water Commission Central Asia (SIC ICWC CA) was hold in Training Center of SIC ICWC. The workshop participants shared information on their recent best practices and long-term plans in order to define feasible directions for joint work aimed at more effective solution of applied objectives in the mentioned research field.

In his opening speech, *Jozef Turok*, Head of ICARDA-CAC Office, made the overview of principal problems related to the current state of land and water resources within the region, as well as told about main activities of the Consultative Group on International Agricultural Research (CGIAR) in sustainable land and water resources management in Central Asia.

Mohan Reddy Junna, Head of IWMI-CA Sub-Regional Office, briefed the participants on research carried out by IWMI in the region.

Dukhovny V.A., Director of SIC ICWC, indicated the main activities on capacity building for wider implementation of scientific research results in practice: knowledge and data bases development, conduct of trainings and demonstration of best technologies.

Maria Glazyrina (ICARDA) shared the research results on assessment of climate change impact on crop yield, and on development of the climate change adaptation strategy for Central Asia. *Tulkun Yuldashev* (ICARDA) acquainted the participants with new methods of soil salinization assessment and mapping, which are used in research of CGIAR Centers. *Christina Toderich* (ICBA) told about the ICBA activity on adoption of salt-tolerant crops and halophytes in areas of increased soil salinity.

Mohan Reddy Junna told about CGIAR Research Program 5: Water, Land and Ecosystems (CRP5) and activities that IWMI is planning to carry out in the region under CRP5. *Akmal Karimov* (IWMI) shared the experience in

implementation of three projects related to soil salinization and water and land management: Bright Spots, Underground Water and Pumping Irrigation.

SIC ICWC staff presented their experience in implementation of projects on improved water and land management in the region. In particular, *Mukhamedjanov Sh.Sh.* shared the SIC ICWC approaches to water and land productivity improvement at field level and to collector-drainage water utilization. *Nerozin S.A.* told about the IWRM-Fergana project experience in search for and adaptation of advanced technologies that provide increased crop yield. *Horst M.G.* stated the findings of best practices on irrigation technique adaptation to the conditions of irrigation water scarcity. *Mirzaev N.N.* covered organizational and technical dimensions of implementing integrated water resources management. *Solodky G.A.* presented the results of crop requirement assessment in terms of climate change, as well as adjustment of irrigation regime. *Ibragimov I.* paid attention of the participants to the need for improved economic mechanisms of water use. *Ziganshina D.R.* mentioned the importance of improved legal basis for water and land resources management at transboundary and national levels, as well as the need for focusing on enforcement of active regulatory tools.

During the discussion, the following was proposed:

a) consider capacity to create a joint open (public) knowledge base on water and land productivity improvement by ICARDA, IWMI, and SIC ICWC;

b) on the basis of available best practices, conduct trainings regularly, as well as publish and disseminate recommendations for farmers and other end users;

c) for more efficient and wider use of scientific research results of CGIAR Centers and SIC ICWC by farmers of the region, work together on involvement of practitioners and decision-makers to workshops and other meetings to discuss scientific research achievements in agricultural development, and to project implementation as well;

d) facilitate more active cooperation and regular experience sharing between ICARDA, IWMI and SIC ICWC in key research fields such as sustainable water and land management and climate change adaptation;

e) in this context, take into account activities of SIC ICWC and methods of their implementation in joint activities under CRP1.1 and CRP5;

f) at GCARD, jointly present the vision of international activity on land and water resources management in the Aral Sea area;

g) to SIC ICWC - participate at forthcoming events organized by CGIAR Centers, including the workshop on climate change adaptation strategies for agriculture and food security to be held at the end of October 2012.

GLOBAL FOOD SECURITY AND WATER

The Third International Conference on Global Food Security (Montreal, October 15-19, 2012) was organized by McGill University in cooperation with the International Commission on Irrigation and Drainage, FAO, the World Bank and the Research Centre for International Development (Canada) under the auspices of the Canadian Ministry of Agriculture.

The world community, international organizations and research centers working in the area of hunger and poverty eradication are extremely concerned about food price fluctuations that were observed since 2000. Sharp and quite unreasonable changes and growth of the world market prices have led to failure of the UN Millennium Development Goal to halve the proportion of people who suffer from hunger.

Meanwhile, the problem of hunger is not just a problem of nourishment but is a problem of life and social well-being. All over the world, there are 1.5 billion farmers, 40% of the population is occupied in agriculture, and 75% of the poor lives in rural areas. According to FAO, in 2000, the number of those who suffer from hunger was 850 millions, and in 2005 this figure decreased by 10-15 millions, whereas in 2008 it increased to 920 millions and jumped to 1020 millions in 2009. Now this parameter is recorded at the level of 2008. Instead of reduction, the undernourished population increased in the world, although food production was stepped up. If we assess food production at the global level, the daily production averages 4,600 calories per capita. However, different losses and unreasonable use in form of bio-ethanol production reduce the above amount to 2,000 calories per capita on average. Moreover, there are vast areas, where only 1,200 calories are available per capita a day. The number of starving people is 578 millions in Asia and the Pacific, 239 millions in Sub-Saharan Africa and 53 millions in Latin America (Mueller, FAO, 2011).

At the same time, China, the most densely populated country in the world, has not only overcome this problem but also produced an excess of marketable cereals. Dr. Gao Zhanyi, President of the International Commission on Irrigation and Drainage, in his report on Chinese policies and practices for food security showed that though China possesses only 6% of the world's water, 9% of the land, this country has to fed 21% of the world's population. 584 million tons of grain was produced in 2010 given that the demand was 566 million tons. This example is worth to be copied because it shows that the world can feed itself, if a state strongly follows the program of food safety. This program (Document No. 1 of the Central Government, 2011) expects an increase of irrigated area to 66 million hectares in 2020 against 60 million hectares at present and the support for small and medium-size land owners, as well as an increase of capital investment in water conservation and drainage of irrigated land. Besides, it is planned to improve cultivation technology, adopt new crop varieties, control soil erosion, use new fertilizers and

integrated agricultural innovations. One of the tasks is to strengthen Water User Associations and turn them into cooperative multi-sectoral unions of farmers.

The private company "Ecopia" from Ethiopia demonstrated how to improve the production line from producer to end user as a case study on production of mango and other orchard crops. This company organized monitoring of process flows, their recording in computer, identification of potential suppliers of fertilizers and equipment and of consumers' demand within its farm of 70 hectares and a dozen of neighboring farms in 2005. Thus, this helped to increase 2.5 times the farmers' income. Currently, the company serves 11,000 farmers by using a mobile phone system.

Great attention was paid to Africa and to activities of various organizations working together with governments to overcome hunger and poverty. Kenya, Uganda, Tanzania, and Ethiopia are intensively establishing extension services and introduce new technologies for crop growing. The public service "ACC" (Agricultural consulting service), which is entrusted this activity, was organized in all the countries. Farmers have got benefits from earlier preparation of soil for crops and timely implementation of agronomic operations as experts advised, from selection of high-yielding and drought-resistant crop varieties, irrigation and compost application. At the same time, it is noted that the success of innovations in agricultural production needs introduction of technological integrated systems of knowledge that give possibility to complement existing practices with up-to-date methods and techniques. This requires support of government, involvement of public universities and research centers in extension service, and attraction of loans. In Kenya, an inter-sectoral agricultural association to support and coordinate interaction between private, public and local community agencies was established. This organization, aiming to disseminate knowledge and to implement innovations, advertises consolidation of farmers into informal groups that share experience.

Besides an increase of food production at micro- and meso-level, macroeconomic factors are essential. Interestingly, FAO and the World Bank showed themselves completely incapable to explain and even predict probable fluctuations in the world food prices. The world prices trend is more or less understandable, but their fluctuations are unexpected and often paradoxical. Apparently, there are market factors that pull the strings of unknown forces of market situation and stock leverage.

According to Indian experts on macroeconomic planning, the created world stabilization food stock funds could help to stabilize the world food prices. Thus, in India, such fund of $1 per person ($1.2 billion) has reduced by 21% the amount of those who suffer from hunger.

The USAID report on the United States and Canada caused alarm for developed countries as well. In 2011, the U.S. spent 103 billion dollars to help those who suffer from malnutrition (approximately, every fourth resident). About 14.9% of the population is undernourished and nearly 6.8 millions or 5.8% suffer from hunger!!! At the same time, the number of undernourished people increased against

the year 2000, when these figures were 10% and 3%, respectively. The situation is well better in Canada but this richest exporting country shows 6% of malnutrition and 2.5% of the poorest people.

The report of the Central Asian experts (V.A. Dukhovny, Sh.Sh. Mukhamedjanov, G.V. Stulina) was devoted to food security in Central Asia. It was noted that Kazakhstan, Uzbekistan and Turkmenistan is supplied with food. Somewhat more complicated situation is in Tajikistan and especially in Kyrgyzstan, where the social component causes that almost 40% of the population is not provided sufficient nutrition and receives less than 2200 calories a day.

The report demonstrated approaches developed in Uzbekistan to improve land productivity, implemented on the area of almost half a million hectares and successfully applied in Kyrgyzstan and Tajikistan. At the same time, it pointed out that the increasing hydropower hydro-egoism poses a risk of instability and uncertainty of summer releases from hydropower reservoirs with consequent undersupply of irrigation water due to wide flow variations.

This factor was reflected in the final speech of Prof. Chandra Madramootoo, Conference Chairman and Vice-Chancellor of the McGill University and in Conference conclusions.

Finally, it is concluded that there is a need for:

- increase of investment in agriculture and especially in its infrastructure;

- organization of regulation of the food policy and global food market at the global level;

- development of social capacity in the rural area;

- development of lending for farms and their associations, while focusing on small and medium farms;

- building of food security networks.

WORLD WATER COUNCIL 6th GENERAL ASSEMBLY

On November 18-19, 2012, the 6th General Assembly of the World Water Council was held in Marseille, France. The agenda for the first day included the consideration of the report on the Council's activity in 2010-2012, discussion of the results of the 6th World Water Forum, and lessons learnt for the organization of the 7th World Water Forum in Korea. The participants of the General Assembly approved the amendments to the regulatory documentation of the Council and the financial statements for 2009-2011.

A special session was devoted to the Water Security Pact the draft version of which was proposed by the World Water Council and included 6 principal

commitments as follows:

(1) call all countries to include a water right in their constitutions;

(2) recognize the water supply and sanitation as a priority issue in the budget;

(3) adopt and strengthen national and local measures for water demand management in order to reduce water consumption;

(4) support the establishment of a Water and Energy Unit, as well as establishment of a Global Water and Energy Fund which will deal with the two key issues “Water for Food” for local farming development and “Water for Health” for reducing the rate of water-borne diseases;

(5) equip schools with water supply and sewerage systems when modernizing and building them;

(6) ensure that the sustainable development goals should be identified in terms of water and sanitation for the period after 2015.

Reports on water security issues were delivered by Mr. D. Kloss (United Nations Human Settlement Programme, UN-Habitat), K. Abryu (Agriculture and Livestock Confederation of Brazil), and Mr. Al-Attiya (Qatar National Food Security Programme). The Chairman of the Qatar National Food Security Programme signed the Memorandum of Understanding with the President of the World Water Council for carrying out research and addressing water and food security issues all over the world. Orientation towards ensuring water security in Qatar is quite ambitious as well and includes the measures for reducing groundwater use through the development of a sea water desalination system, application of drip irrigation, improvement of knowledge and raising responsibility (right up to the introduction of farming licensing) for efficient water use.

On 18 November 2012, the members of the new Board and Bureau were elected and will perform their duties for the next three years. The 20 new Board members represent 13 countries and 6 international organizations. At the initiative of Loic Fauchon, youth representatives will take part in the Board meetings as observers, as well. The 3 Delegates from the youth movement will represent the ICID Working Group on Young Irrigation Professionals Forum (WG-YPF), Asian-Pacific Youth Parliament for Water under the Korean Water Forum, and Palestinian Hydrological Group. Mr. Martin Vassal (City of Marseille, France), Mr. Zhiguang Liu (Ministry of Water Resources, China), Dogan Altinbilek (Turkish Contractors Association, Turkey), Andras Szollosi-Nagy (UNESCO-IHE Institute for Water Education), and Karin Krchnak (World Wildlife Fund WWF, USA) are elected as the Bureau members. Mr. Benedito Braga (Polytechnic School of the University of Sao Paolo, Brazil) was elected as the President of the World Water Council for a new three year term.

The second day of the General Assembly (November 19, 2012) opened with the discussion of the most burning water issues that claim attention from the Council within its strategy for 2013-2015. The key note addresses were presented by Mr. Jean-Claude Gaudin, Mayor of Marseille, Mme Marie-Arlette Carlotti, Junior

Minister for Disabled People, Mr. Eugène Caselli, President of Marseille Provence Métropole, and Mr. Rintaro Tamaki, Deputy Secretary-General of Organization for Economic Cooperation and Development (OECD). The necessity to move from the solutions indicated at the 6th Forum to undertaking of concrete commitments for their implementation was heard in all the participants' reports. In turn, the purpose of the Council is to pursue three strategic lines for providing water security in order to satisfy basic needs of the population, as well as for ensuring economic development, and environmental sustainability. In this context, they emphasized the essential role of the Green Growth Strategy promoted by the World Water Council along with active participation of Korea.

The discussions of the principal lines of the World Water Council's activity were continued at the roundtable meetings devoted to water diplomacy, communication and membership, thematic initiatives, and organization of the Forum.

The four principal lines were discussed at the roundtable on the themes of the WWC's new strategy:

- Water and Sanitation;
- Water and Green Growth;
- Water and Energy;
- Water Security.

Following the results of the discussions, the Council was recommended, in every possible way, to support these key thematic lines for their practical implementation, since they meet current global challenges. In the course of searching for a consensus between water and energy, the WWC was suggested to establish cooperation with the World Energy Council. The latter should take into account the possible negative effects of the hydropower industry development on sustainability of water resources. Deputy Director of Scientific Information Center of the Interstate Commission for Water Coordination (SIC ICWC) of Central Asia Mr. V.I. Sokolov put forward a proposal to include the following into the WWC Strategy within the four above-stated areas: special attention shall be paid to the promotion of mechanisms for legal regulation of water related problematic issues proceeding from the International Water Law.

At the roundtable on communications, they highlighted the necessity of wider involvement of the Council members in the activity refraining from factionalism and authoritarianism in management only within the WWC Bureau. It was suggested that every Council member, both current and new, should identify the scope of his/her involvement in vigorous activity: participation in thematic groups; distribution of information; donor support; etc.

The delegation of the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan presented the materials that demonstrated the achievements made by the Republic in water resources management. SIC ICWC introduced its activities carried out to promote regional cooperation in the Aral Sea basin and

pursue the WWC objectives in the post-Soviet territory.

INTERNATIONAL WATER FORUM "AQUA-UKRAINE 2012"

The International Water Forum "Aqua-Ukraine 2012" was organized on 6-9 November 2012 through joint efforts of the State Water Resources Agency of Ukraine, Ministry of Regional Development, Construction, and Housing and Utilities of Ukraine, Ministry of Environment and Natural Resources of Ukraine, and a number of other national and international institutions in accordance with the decision of the Ukraine Government.

At the opening of the Conference and exhibition, welcome speeches were delivered by the Minister of Regional Development A. Bliznyuk, Ministry of Environment and Natural Resources E.A. Stavitskiy, and Director of the State Water Resources Agency V.A. Stashuk.

The Scientific and Production Conference "Water and Environment", specialized exhibition of water facilities, and the conference of the representatives of the Network of Water Management Organizations from EECCA "Challenges and Progress in Water Management and Land Reclamation in EECCA Countries" were held during the Forum. The total number of the organizations participating in the Forum was more than 300 and the total number of the participating persons was more than 1500. Both the Conference and exhibition (98 participants) were focused on many-sided development and improvement of the multi-industry water management system with extensive use of international experience (Germany, Netherlands, China, Poland, Russia, Czech Republic, Hungary, etc.). At the exhibition, equipment for water conditioning, water supply, wastewater treatment, water quality and quantity control, bottling, as well as pipes, pumps, etc. were demonstrated.

Ukrainian water management organizations showed one of the most impressive developments made throughout the CIS countries. Although it was characteristic of Ukraine too, like other neighboring countries, dramatic decline in irrigated agriculture, which has resulted in decreasing irrigated areas by more than twice, i.e. from 2.2 Mha to 0.7 Mha, yet now the country has obviously made a breakthrough in the restoration and enhancement of the water industry capacity. That was due to the Government of Ukraine Program "Prosperous society, competitive economy, and effective state" and Law of Ukraine "On Approval of the National Program Oriented to the Development of Water Sector and Improvement of the Dnieper River Basin Environment" signed on 21 June 2012 by the President of Ukraine. The purpose of the Program, which provides for the allocation of six billion US dollars by 2020, is to meet the water demands of the population and economic sectors, prevent and protect population against destructive effects of water. This year, water management bodies has done enormous work and made it possible to ensure availability of the national irrigation system on 1007.4 ha. Drainage systems have been made ready on an area of 2,817 ths

ha. Drip irrigation is successfully developing: while as early as in 2002 the areas under this the most efficient type of irrigation was 5 ths ha, now it has come to 55 ths ha!!!

Production and application of sprinkling machines, including long-span ones named “Fregat”, has been re-established.

For financing water management related works the Agency raises the funds allocated from the national budget and the funds received for the water sold as a resource and water supply services provided to users. The total annual financing amount of this industry, including investments, exceeded 800 million US dollars.

Great attention is paid to widespread improvement of water accounting quality and accuracy. The schedule of works for calibration of gauging facilities by the Agency’s provincial laboratories, Basin Water Authorities, and Hydrogeological and Reclamation Field Offices has been drawn up, and its implementation is under strict control. Everywhere water users carry out water accounting according to the form “2TP-Vodkhoz”.

The water sector has a complex structure that is close to European management schemes. Along with provincial water authorities, there are ten basin authorities each of which has basin commissions. Under those, intersectoral commissions have been established for major river basins (there are four ones: Dnieper, Dniester, Danube, and Tisa), which regularly deal with the issues related to flood routing, overcoming water shortage problems, river behavior, additional water supply from other basins. In the current year, their actions helped to successfully solve water shortage problems. The joint actions on the transboundary river Tisa is a typical example. The information system built there for flood warning allowed significantly reducing the damage from this disaster - to 9.1 mln Ukraine hryvna (about 1.1 mln US dollars) in 2010 against 100 mln Ukraine hryvna (about 12.3 mln US dollars) in 1998.

The Agency Director’s attention was given not only to the progress made in the sector, which is prominently evident from the analysis of the overall Agency activity, but also to the team that was carrying out all the works associated with water management. Thirty three thousand people working in the industry, nine thousand of which are engineers and technicians, are in the centre of leaders’ attention. Specialists undergo retraining and advanced training on a regular basis both in the field and in the National Institute of Management and Economy under the Agency.

The Water Management Museum founded by the Agency is an example of the care of the industry history and personnel and, at the same time, dramatically illustrates the progress and outlooks of the water industry. This contributes to the development of professional pride among young specialists, as well as the sense of honor to work in the interests of their country. At the same time, it is important that by presenting the nearly century-long history of the industry the leaders demonstrate that no one is forgotten and nothing is forgotten. The journal “Water Management of Ukraine” issued in Ukrainian not only informs its readers of the accomplishment of plans, introduction of new technologies, and results of investigations, but also celebrates anniversaries, awards and achievements of industry workers from most remote places of the country.

One of remarkable examples of basin authorities' activity is integrated interstate management of the Seversky Donets river water resources to the benefit of Ukraine and Russia.

During the Conference "Water and Environment", definite positive remarks were heard from the floor, in particular the representatives of the Zaporozhye region reported about successful implementation of water pricing initiated in 2000. The Director of the Institute of Water Problems and Land Reclamation, Academician of the Ukrainian Academy of Sciences M.I. Romaschenko presented in terms of figures the upward tendency of private initiative for the development of drip irrigation.

CONFERENCE OF THE NETWORK OF (BASIN) WATER ORGANIZATIONS FROM EASTERN EUROPE, CAUCASUS AND CENTRAL ASIA (NWO EECCA) «CHALLENGES AND PROGRESS IN WATER MANAGEMENT AND LAND RECLAMATION IN EECCA COUNTRIES»

During the Forum, the Conference of the Network of Water Organizations from Eastern Europe, Caucasus and Central Asia was held at the museum complex "Bortnitchi" named after N.A.Garkushi. The participants - members of the Network and representatives of Ukrainian organizations (about 100 people in total) - have visited museum of this complex and laid wreaths on the Garkushi's memorial.

The participants were welcomed by V.A. Stashuk, Chairman of the State Water Resources Agency of Ukraine and P.A.Polad-Zadeh, President of the Network.

The following reports were presented:

History, Problems and Prospects of Ukrainian Water Sector Development - Vasily Stashuk, Chairman of the State Water Resources Agency of Ukraine, corresponding member of the Ukrainian Academy of Sciences

New Tendencies in the World Water Community and Their Impact on Water Development in the Region - Victor A.Dukhovny, Executive Secretary of NWO EECCA, Director of Scientific-Information Center of the Interstate Coordination Water Commission of Central Asia, Ph.D., Professor

UNECE Water Convention and Integrated Water Resources Management - Bo Libert, Regional Adviser for Environment, UN Economic Commission for Europe

Russia's Water Sector - Scientific Grounds for the Advancement - Nadezhda B.Prokhorova, Director, Russian Research Institute for Integrated Water Use and Protection, Ph.D. in economics, Professor

Program for Rehabilitation and Development of the Reclamation System in Russia - Nikolay A.Sukhoy, Chairman of the Russia's Union of Water and Land Reclamation Professionals

Water Strategy in Ukraine, Characteristics of IWRM in Ukraine - Mikhail I. Romaschenko, Director, Institute of Water Problems and Land Reclamation, member of National Academy of Sciences, Ph.D.

Challenges and Prospects of Water Resources Management in Azerbaijan - Mamed S.Kuliev, First Deputy Chairman, Public Corporation «Land Reclamation and Water Management of Azerbaijan»

Experience of IWRM Implementation in Kazakhstan - Ondasyn Ye. Zhienkulov, Deputy Chairman, Committee for Water Resources, Ministry of Agriculture, Republic of Kazakhstan

Issues of Transboundary Water Governance in Chu-Talas Basin - Nurgazy P.Mamataliev, Director of the Kyrgyz Branch of Scientific-Information Center, Interstate Coordination Water Commission

Integrated Water Resources Management in Uzbekistan - Ravshan A.Mamutov, Deputy Head of Central Water Resources Administration, Ministry of Agriculture and Water Resources, Republic of Uzbekistan

Modeling Large Basins: Syrdarya Case-Study - Makhmud Kh. Khamidov, Head of Basin Water Organization «Syrdarya»

Transboundary Aquifers of Belarus and Riparian States - Mikhail Yu. Kalinin, International State Environmental University named by A.D.Sakharov, Professor, Ph.D.

Water Capacity Building Activity of the Global Water Partnership for Central Asia and Caucasus - Vadim I. Sokolov, Regional Coordinator, GWP CACENA, Deputy Director Scientific-Information Center of the Interstate Coordination Water Commission of Central Asia

Experience in Water Cooperation between Moldova and Ukraine in Transboundary Dniester River Basin - Ilya D. Trombitskiy, Executive Director, "Eco-Tiras" International Environmental Association of Dniester River Guardians

Reduction of Vulnerability to Extreme Floods and Climate Changes and Other Areas of Cooperation between Moldova and Ukraine on the Dniester Basin - Anna A.Plotnikova, National Project Officer, OSCE

Reforms in Water Management in the Republic of Armenia over Last Decade - Araksya Davoyan, Deputy Head, Water Resources Management Agency, Ministry of Nature Protection, Republic of Armenia

Basin Principle of Water Resources Management in Seversk Donets River Basin - Ways for Optimization - Victor Ye.Antonenko, Head of Seversk Donets Basin Water Management Administration

About Support by the German Agency for Technical Cooperation of the

Network of Water-Management Organizations from EECCA in 2013-2014 - Jenniver Sehring, Consultant, Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ) GmbH

Prof. V.Dukhovny in his report stated lines of further development of NWO EECCA.

Dr. V.Sokolov, regional coordinator of GWP for Caucasus and Central Asia, presented joint actions for enhancement of exchange of information and dissemination of best practices, especially on IWRM.

Representatives of most countries - Network members - underlined positive changes in the development of national water sectors in Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia, and Uzbekistan.

At the same time, a number of problems related to insufficient financing of water sector were identified. Serious concerns regarding situation in the water sector in Russia were expressed by the Head of the Union of Water and Land Reclamation Professionals Mr. N.Sukhoy.

Mr. B.Libert, Regional Adviser for Environment from UNECE, who presented his report, Mr. D.Valensuela, Deputy Permanent Technical Secretary of the International Network of Basin Organizations, and Ms. J. Sehring, Consultant from GIZ participated also in the Conference.

Finally, the participants adopted the following resolution.

RESOLUTION OF THE INTERNATIONAL CONFERENCE OF (BASIN) WATER ORGANIZATIONS FROM EECCA

Kiev, Ukraine, November 6-8, 2012

Participants of the International Conference of (Basin) Water Organizations "Challenges and Progress in Water Management and Land Reclamation in EECCA Countries" gathered in Kiev on the 7th of November 2012 having discussed the reports presented by the Network's President, academician P.A.Polad-Zadeh, Executive Secretary of the Network Prof. V.Dukhovny, Chairman of the State Water Resources Agency of Ukraine V.Stashuk, UNECE representative B.Libert and speeches of participants from Azerbaijan, Armenia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russian Federation, Uzbekistan and Ukraine stressed high significance of information exchange and best practices dissemination within the framework of the Network of water organizations from EECCA. Systematic information by the Network's members about activities undertaken for improvement of water governance and management in their respective countries, implementation of integrated water resources management, new technological solutions, provision of announcements about new publications, program and methodological products, as well as about training materials allow expending perspectives of local water professionals and

contribute to progress in national water sectors in NIS. At the same time, the participants note that along with certain improvements in water sectors of EECCA countries, particularly the significant increase of attention to access to water and sanitation, the increase of areas under advanced water systems using drip irrigation, SCADA, etc. especially in Ukraine, Uzbekistan, and Kazakhstan, there are also common shortcomings for all the countries:

- Lack of interaction between various agencies in water resources management area;
- Abrupt reduction of irrigated areas – by 6 million ha!!!
- Deterioration of accounting and reporting system on water use in a number of countries;
- Cut of government investments in water management and land reclamation;
- Loss of integrity of water sector's structure as a separate economic sector (except for some countries) and continuing changes: water sector inside agriculture or nature use sectors;
- Increase of water localism and hydro-egoism;
- Decrease in water productivity;
- Sharp reduction of annual operating costs on irrigated and reclaimed lands - from 60 $/ha (1990s) to 8-10 $/ha (at present).

Under such conditions, of importance is further development of the network, first of all, in form of strengthening of national centers of NWO EECCA and their better equipping and involvement in their activities of water-management, academic and non-governmental organizations as much as possible in order to create a public platform for water sector improvement and overcome problems and challenges that the global water society faces, taking into account regional specifics.

Transboundary cooperation is of special importance in implementation of IWRM. UNECE Water Convention is an exceptional factor for the development of transboundary cooperation. The participants underlined 20th anniversary of the Convention and its openness to the whole world in 2012-2013.

The Conference proposes:

1. To make provisions for the following as first-priority measures:

1.1. Organization of active national centers of NWO EECCA, with selection of initiative young leaders, in all the countries, including main partner organizations.

1.2. Organization of survey, generalization and analysis of main indicators and trends in water development, including:

- Inventory of existing academic and sectoral research institutions, available innovations and developments, their implementation systems, and look for possibilities for their dissemination;
- Best practices and their dissemination;
- Availability of national water strategies and their correspondence to the European Water Framework Directive.

1.3. Exchange of information needs to be organized in the following directions:

- Status of water resources (quantity and quality);
- Integrated water management and use;
- Water use economics;
- Restoration and protection of water resources;
- Prospective use of transboundary water objects;
- Quality of water resources and ways to improve it, experience in eco-servicing;
- Development of information systems, including electronic databases on water quantity and quality; reliability of data in information systems;
- Hydrological and water-management modeling;
- Environmental safety of water use;
- Systems of water accounting and regulation in river basins;
- IT in water sector and implementation of SCADA;
- Training, life-long learning, professional development;
- International water law, its development and enforcement;
- National water legislations.

1.4. Organization of distance learning (e-learning):

- Identify major training directions;
- Organize workshops on important issues in form of training of trainers;
- Publish training materials;
- Prepare young leaders and establish their network inside NWO EECCA.

1.5. Organization of conferences and mix workshops.

1.6. Promotion of greening of national water sectors in member countries

through integration with forestry, improvement of economic activity management in basin areas for water accumulation by ecosystems and adaptation to climate change.

2.Taking into account:

- available unique theoretical and practical basis in the area of water management and land reclamation, as well as experience in implementation of IWRM and advanced solutions developed together with foreign institutions in organizations that are the membership of NWO EECCA,

- great demand for dissemination of such experience and knowledge for new generation of professionals and water users,

the Conference recommends initiating preparatory work for establishment within the framework of NWO EECCA of a knowledge centers network.

Its aim is to support development in the NIS space of the single system of knowledge centers that meet the world and European requirements regarding classification and unification of information products and is dedicated for serving water-management and land reclamation organizations and extension services. This system, being created by using common principles on a single methodological basis, will provide wider opportunity to pave the "direct way" from available scientific innovations to end users. In this context, the Network's President should prepare relevant proposals for their submission to donors for financing and assign coordinators.

NWO EECCA is collaborating with the Global Water Partnership for Caucasus and Central Asia in this direction.

3. Apply to donors' community, particularly to the Federal Agency for the Commonwealth of Independent States, Compatriots Living Abroad and International Humanitarian Cooperation (Rossotrudnichestvo) and to German Society for Technical Cooperation (GIZ) and EuropeAid for financial support of capacity development and network extension.

4. The participants thanked UNECE for support and assistance in financing events of the Network and for opportunity to organize this Conference, as well as the chairman of the Ukrainian Agency for Water Resources Prof. Stashuk for a warm welcome and excellent arrangement of the Conference.

SIXTH SESSION OF THE PARTIES TO THE UNECE CONVENTION ON THE ON THE PROTECTION AND USE OF TRANSBOUNDARY WATERCOURSES AND INTERNATIONAL LAKES

The Sixth Meeting of the Parties to the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes was held on 28-30 November 2012 in the Chamber of Deputies in Rome at the invitation of the Italy Government. The meeting was attended by more than 320 representatives of the Parties and non-Parties of the Convention, as well as international organizations, non-governmental organizations, and educational institutions.

The Meeting of the Parties consisted of the high-level segment and general segment. The high-level segment considered the situation with the ratification of the Convention and protocols to it and a special meeting was devoted to the Twentieth Anniversary of the Convention and its opening for all the United Nations member countries. Main achievements and remaining challenges issues within the Convention were discussed at a special meeting, as well as opinions on and expectations with regard to a globalized Convention were read.

The general segment was dealing with the review of the past activity and discussion of the future activity of the Water Convention in various areas such as: a) mechanism to support implementation and compliance; b) support to the implementation through capacity building and assistance on the ground; c) transboundary groundwater; d) assessment of the status of transboundary waters; e) joint monitoring and assessment of transboundary water resources, including data management and information exchange; f) water and ecosystems; g) water and adaptation to climate change in transboundary basins; h) European Union Water Initiative and National Policy Dialogues; i) water and industrial accidents. The Meeting of the Parties also gave hearing the reports on cooperation with the Protocol on water and health problems, cooperation with other multilateral environmental agreements and international partners, relationship with the International Water Assessment Center, and vision for the future of the Water Convention.

The Program of work for 2013-2015 assigning the bodies that should support in its implementation and assessing the needs for human and financial resources was presented to the Meeting of the Parties for consideration. The Program of work covers the following seven program areas:

- Program area 1: support to implementation and accession.
- Program area 2: the EU Water Initiatives and the national policy dialogues.
- Program area 3: quantifying the benefits of transboundary cooperation.
- Program area 4: adaptation to climate change in transboundary basins.

- Program area 5: the water-food-energy-ecosystems nexus.
- Program area 6: opening of the Convention outside the ECE-region.
- Program area 7: promotion of the Convention and establishment of strategic partnerships.

The Meeting of the Parties elected Bureau and Implementation Committee members. Mr. Massimo Cozzone (Italy) was elected Chair the Bureau which included also the representatives of Kazakhstan, Hungary, Germany, Finland, Russia, Estonia, France, Serbia, Azerbaijan, and Switzerland. The newly established Implementation Committee was composed of Vanya Grigorova (Bulgaria), Kari Kinnunen (Finland), Stephen McCaffray (USA), Alexander Stankevich (Byelorussia), Ivan Zavadsky (Slovakia), Johan Lammers (The Netherlands), Anne Schulte-Wulwer-Leidig (Germany), Attila Tanzi (Italy), and Saghit Ibatullin (Kazakhstan).

In the course of the meeting, the signing ceremony of a new bilateral agreement between the Government of the Republic of Moldova and Cabinet of Ministers of Ukraine for cooperation in the conservation and ensuring of sustainable development of the Dniester river basin took place. Also a series of side events was organized, including the sections “Adapting to climate change in transboundary basins: future work guided by lessons learned”, “The UN Watercourses Convention and the UNECE Water Convention: future perspectives and potential synergies”, “EU Water Initiative National Policy Dialogue: Identifying good practices and lessons learned, shaping ideas for the future”, “How the UN system supports transboundary water cooperation”, “Managing transboundary waters together: River, lake and aquifer commissions worldwide”, and “Examining the water-energy-food-ecosystems nexus: a thematic assessment in transboundary basins”.

FINAL REGIONAL WORKSHOP "CAPACITY BUILDING FOR INTEGRATED WATER RESOURCES PLANNING AND MANAGEMENT FOR CENTRAL ASIA"

The final regional workshop within the joint program of UNESCO-IHE and SIC ICWC "Capacity Building for Integrated Water Resources Planning and Management for Central Asia" was held on 19-20 December 2012.

The purpose of that event was to discuss the key provisions of future activities and the Educational Capacity Building Strategy in the water sectors of the countries of the region.

At the workshop, they also considered the project outcomes, prospects for the development of the training (advanced training) system for Central Asian countries water sector specialists, raising funds of international donors to impalement the given task.

The workshop was attended by regional and national trainers, representatives of higher educational establishments of Central Asian countries, for example Kazakhstan National Technical University named after K.I. Satpaev, Kyrgyzstan Agrarian University named after K.I. Skryabin, Tashkent Institute of Irrigation and Melioration, as well as representatives of international organizations such as World Bank, United Nations Development Programme, German Agency for International Cooperation, United States Agency for International Development, Swiss Agency for Development and Cooperation, International Water Management Institute, etc.

The workshop was opened by the Deputy Head of the Chief Water Management Department under the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan Mr. R.A. Mamutov.

Prof. V.A. Dukhovny in his welcoming address introduced his view on the development of IWRM potential in Central Asia.

Dr. Yu.Kh. Rysbekov presented the results of the implementation of the joint program, in particular the outcomes of the national workshops conducted in each country.

Mr. N.P. Mamataliev informed the workshop participants of the Training System Development Strategy at the national level for the period of 2013-2015.

Dr. E.E. Drugaleva presented a draft curriculum for the training courses on the subject "Irrigation technologies and administration of water management organization".

Dr. B. Janusz-Pawletta, teacher of the Kazakhstan-German University, delivered a report about the water initiative "Water Diplomacy" undertaken by Germany in Central Asia.

Dr. A.G. Galustyan gave the information about the regional workshop held in

the Kazakhstan-German University on 9 November 2012 and made a presentation concerning the implementation of the IWRM concept in Central Asia, particularly the role of training in dissemination of knowledge and best practice.

The situation in the Uzbekistan water industry and future plans on the development of the training and retraining system for water specialists was elucidated in the report made by V. Akhmadjonov.

In his presentation Mr. Joop de Schutter set a task of establishing a network of capacity building in the Central Asian countries water sectors before the regional and national teams; he highlighted the key problems in the field existing at the moment in the region focusing on the ways to resolve those.

Dr. Sh.Sh. Mukhamedjanov delivered a report regarding the training related activity within the project "Water Productivity Initiative at Plot Level".

Then Dr. A.G. Galustyan took the floor to report about the training activities towards IWRM capacity building in IWRM field within the project "IWRM-FV" (2001-2012).

Ms. E.E. Tsay presented the information on the SIC ICWC TC database, in particular about the workshops held in the Regional Training Center and their participants.

The second day of the workshop was opened by the report of Ms. G. Nurmukhamedova concerning the IWRM concept promotion in Turkmenistan.

Special attention was paid to the discussion of the Training System Development Strategy for 2013-2015 in the context of business planning; its basic provisions were developed and presented by Dr. Yu.Kh. Rysbekov.

Dr. A.G. Sorokin shared information about ASBmm modeling.

The recommendations and notes received in the course of the final workshop concerning the organization of the trainings within the ICWC system were as follows:

1. The Training Center activity should follow two main directions:

- Development of new and existing training materials with the aim to ensure access to these materials for all national teams and higher educational institutions dealing with the improvement of water management and irrigated farming. This work has to be attended by summing up the international experience in various directions of capacity building in the water sector and dissemination of it. At that, it is very important that the regional trainings pertaining common problems of all Central Asian countries be conducted with equal involvement of all the countries with the view of developing a common understanding of both problems and their solutions and provide a basis for reaching a common consensus between their participants as the representatives of the countries. From this point of view this iterative training is of primary importance and, at the same time, lays the foundation for developing the potential of national training centers. This part of the Training Center activity includes analysis of the current situation in relation to the personnel training in

the CA countries and development of e-learning. In this area, it is essential to establish contacts with not only water and agricultural bodies in the CA countries, but also with all universities the curricula of which include the subjects related to water resources and irrigated farming management. This area should have a source of sustainable financing by donors and contributions from ICWC founder organizations. Long-term contracts with educations institutions can be concluded.

- Another area must be organized based on requests from national bodies of ICWC, BWOs "Amudarya" and "Syrdarya", Interstate Commission for Sustainable Development system organizations and various national educational institutions on a contractual basis to provide them with trainers or conduct specialized trainings. In this case, the cost of accommodation, travel and material security costs for of trainees are to be covered by the organizations whish the trainees work for. SIC ICWC has the experience in the organization of such trainings of specialists in using information systems in Turkmenistan, Kazakhstan, and Kyrgyzstan. SIC ICWC works with the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan upon the same terms, where the latter covers the TC maintenance costs as well as all training-related costs.

2. A series of new directions for the preparation of target curricula is recommended:

- Improvement of land state, operation of drainage, and control over the use of saline water;
- Organization of the operation of large facilities and providing their safety;
- Improvement of the water management scheme maintenance and operation system;
- Operational hydrometry;
- Informational technologies and computerization;
- Automation and SCADA system;
- Nation-wide reforms in the water sector.

3. It is necessary to create an organogram (organization chart) of the Center activity and relationship with water management organizations as well as with the universities and other educational institutions in the form of a pyramid of training organization in the Central Asia water sector along with the identification of target groups.

4. As a promising direction for TC activities, one should consider training of the personnel of water supply and sanitation services.

5. Special workshops on international water law and legal training must be arranged.

6. Organization of special paid trainings for post-graduate students must be thought over.

7. Regular dissemination of information about supposed trainings with the invitation of external paid participants.

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