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Water
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of Central Asia

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CONTENT

Protocol No 27
of ICWC meeting of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan

August 4, 2000 Fergana

ICWC members:

A. Ramazanov	Chairman of the Committee of the Ministry of Natural Resources and Nature Protection of the Republic of Kazakhstan
K. Beishekeyev	First Deputy of General Director of Water Department of MAWR of the Kyrgyz Republic
A. Nazirov	Minister of Land Reclamation and Water Management of the Republic of Tajikistan
T. Altiyev	EC IFAS Chairman
A. Jalalov	First Deputy Minister of Agriculture and Water Management of the Republic of Uzbekistan

Honorable ICWC member

N. Kypshakbayev	SIC ICWC Kazakh Branch Director

From SIC ICWC organizations:

G. Negmatov	ICWC Secretariat Head
Yu. Khudaibergenov	BWO "AmuDarya" Head
D. Lysenko	BWO "AmuDarya" Department Head
M. Khamidov	BWO "SyrDarya" Head
A. Leshansky	BWO "SyrDarya" Department Head
P. Umarov	SIC ICWC Deputy Director

Invited

R. Ikramov	SANIIRI Director
Kh. Pulatov	"Yugvodkhoz" Director
R. Srajitdinov	"Uzvodremexpluatatzya" Head
Kh. Umarov	"Uzvodkontrol" Head
Sh. Rakhmatov	Deputy Head, MAWR Department
A. Rakhmatillayev	First Deputy Head of Oblservodkhoz, Fergana oblast
Kh. Khakimov	Big Fergana Canal Head
Kh. Mukhitdinov	Leninabad Oblvodkhoz Head
A. Jailoobayev	MAWR of Kyrgyzstan, Water Department Head
Sh. Alibayev	Deputy Head, Osh Basin Department
A. Yoldashev	Head of Batkent Basin Water Department

Chairman - A. Jalalov, First Deputy Minister of MAWR of Uzbekistan

AGENDA

1. Consideration of current vegetation irrigation and amplification (if necessary) of water reservoirs cascade on SyrDarya and AmuDarya rivers operation regime (responsible: BWO "SyrDarya" and BWO "AmuDarya");
2. About program of ICWC development and strengthening (responsible: SIC ICWC).
3. About perfection of legal base of interstate relations in water resources rational use in light of European Convention in Hague, the Netherlands (responsible: SIC ICWC).
4. Information of ICWC members and their organizations about ICWC decisions made in 1998, 1999, 2000 fulfillment (responsible: ICWC members, SIC ICWC, BWO "Amu-Darya", BWO "SyrDarya", ICWC Secretariat).
5. About the project "About order of financing BWOs, SIC ICWC and ICWC Secretariat" (responsible: SIC ICWC).
6. About Interstate Agreement on SyrDarya water resources management and use preparation (responsible: BWO "SyrDarya", BWO "AmuDarya").
7. About next ICWC 28th meeting agenda.

Having heard participants' presentations and exchanged opinions ICWC members have decided:

On the first question

1. To accept BWOs measures on water intake limits and water reservoirs' cascade on Amu-Darya river and SyrDarya river operation regime realization for past vegetation of 2000 noting proper work of water organizations on mitigation of dry year consequences.
   To note that current growing period was serious test for all water economy of the region and revealed range of shortcomings required efforts for their overcoming.
   To analyze past period activity in all subdivisions to increase readiness level to similar events in the future.
   To charge BWO "SyrDarya" and BWO "AmuDarya" and SIC ICWC to summarize these materials to the next ICWC meeting.
2. To note disproportion in water consumption level in AmuDarya river basin.
   To charge ICWC members together with BWO "AmuDarya" to take measures on current situation improvement. Similar disproportion took place in SyrDarya basin due to non-fulfillment of intergovernmental agreement on water-power resources rational use, except Kyrgyzstan.
   To charge BWO "SyrDarya" to include materials on Kyrgyzstan in the report.
3. To charge BWO "AmuDarya" together with KMZ, SANIIRI and SIC ICWC to workout methodology of inflow to Tuyamuyun reservoir calculation and losses assessment down-stream Tuyamuyun reservoir.
4. To accept request fromKazakhsideaboutincreaseof inflow to Dustlik canal's Kazakh part and Chardara reservoir. ICWC members from Tajikistan, Kazakhstan, Uzbekistan and Kyrgyzstan together with BWO "SyrDarya" to consider measures on Kairakkum reservoir regime changes for August-September 2000 (Annex 2). To approve AmuDarya and SyrDarya reservoirs' cascade operation regime for the late vegetation 2000 (Annex 1, 3).
5. ICWC members to develop and submit to Interstate Council the Intergovernmental Agreement for 2001 on Naryn-SyrDarya reservoirs' cascade water-power resources rational use.

6. ICWC members to control intergovernmental agreements on water-power resources of Naryn-SyrDarya cascade rational use fulfillment; to promote mutual deliveries and payments for electric energy and thermal resources between Kazakhstan, Tajikistan, Uzbekistan and Kyrgyzstan according to above agreements.
7. To consider BWO "SyrDarya" activity during growing period 2000 the next ICWC meeting.

On the second question

1. To accept SIC ICWC information "About SIC ICWC activity development and strengthening".
2. To charge SIC ICWC together with BWOs to finalize this note according to ICWC members' proposals and prepare plan of immediate actions with respect to necessity of water availability forecast reliability increase.

On the third question

1. To accept SICICWC information about legal base perfection activity.
2. To charge ICWC members to submit their comments to SIC ICWC for summary and preparation of agreed version of agreements No.1 and 4 for consideration of special conference.

On the fourth question

1. To accept ICWC members information about ICWC decisions fulfillment made in 1998-2000.
2. To note that majority of decisions were practically realized.

On the fifth question

1. To charge SIC ICWC to finalize the project "Provisions on order of financing of ICWC executive bodies" in accordance with ICWC members' comments and send to ICWC members for further coordination.
2. ICWC members to coordinate draft "Provisions" with own governments and submit to SIC ICWC for final correction and submitting to IFAS Board.

On the sixth question

1. To accept BWO "SyrDarya" and SIC ICWC information about preparation of draft intergovernmental agreement on SyrDarya water resources management and use.
2. BWO "SyrDrya" and SIC ICWC to prepare ICWC decision fulfillment.

On the seventh question

Next ICWC meeting to be held in Turkmenistan in October 2000.

**Agenda for next ICWC meeting in Turkmenistan,
October 2000**

1. About growing period 2000results (responsible: BWO "AmuDarya" and BWO "SyrDarya").
2. Consideration and approval of water intake limits in AmuDarya and SyrDarya basin during non-growing period of 2000-2001; Naryn-SyrDarya cascade operation regime as a proposal to draft intergovernmental agreement on SyrDarya water-power resources rational use (responsible: BWO "AmuDarya" and BWO "SyrDarya").
3. Consideration of BWO "SyrDarya" activity during growing period 2000.
4. About SIC ICWC activity development and strengthening (responsible: SIC ICWC).
5. Program of ICWC and its executive bodies financial activity for 2000.
   - plan of O&M financing;
   - plan of design activity;
   - plan of SIC ICWC and its organizations research activity (responsible: BWO "AmuDarya" and BWO "SyrDarya", SIC ICWC).
6. About project "Provision on order of BWOs, SIC ICWC and ICWC Secretariat financing" (responsible: SIC ICWC).
7. About strengthening interactions between water organizations and hydrometservices on hydrological forecast perfection.
8. About agenda of next 29th ICWC meeting.

For the Republic of Kazakhstan	A.Ramazanov
For the Kyrgyz Republic	K.Beishekeyev
For the Republic of Tajikistan	A.Nazirov
For Turkmenistan	T.Altiyev
For the Republic of Uzbekistan	A.Jalalov

Annex 1
to Protocol 27 1st question
of ICWC meeting in Fergana
on August 4, 2000

SCHEDULE-FORECAST
of Naryn-SyrDarya reservoirs' cascade operation regime
on the period since April 1, 2000 till September 30, 2000

Toktogul water reservoir		April actual	May actual	June actual	July actual	August	September	Total mln.m^3
Inflow to reservoir	m^3/s	286	733	780	711	449	250	
	mln m^3	741	1963	2022	1904	1203	648	8481
Volume: at the beginning of period	mln m^3	10999	10874	12202	13051	13377	13278	
at the end of period	mln m^3	10874	12202	13051	13377	13278	13415	
Release from reservoir	m^3/s	331	352	451	571	480	190	
	mln m^3	858	943	1169	1529	1286	492	6267
Kairakkum water reservoir								
Inflow to reservoir	m^3/s	424	326	309	317	279	252	
	mln m^3	1099	873	801	849	747	653	5023
Volume: at the beginning of period	mln m^3	3227	2957	2761	2421	1875	998	
at the end of period	mln m^3	2957	2761	2421	1875	998	900	
Release from reservoir	m^3/s	547	329	378	456	550	266	
	mln m^3	1418	881	980	1221	1473	689	6662
Chardara water reservoir								
Inflow to reservoir	m^3/s	504	76	84	71	93	233	
	mln m^3	1306	204	218	190	249	604	2771
Volume: at the beginning of period	mln m^3	5246	5146	3663	2605	1206	700	
at the end of period	mln m^3	5146	3663	2605	1206	700	768	
Release from reservoir	m^3/s	599	593	478	498	170	170	
	mln m^3	1553	1588	1239	1334	456	441	6610
Release in Kzylkum canal	m^3/s	22	41	43	67	55	20	
	mln m^3	57	110	111	179	147	52	657
Water supply in Aral Sea	m^3/s	190	113	21	9	15	63	
	mln m^3	492	303	54	24	40	163	1077
Charvak water reservoir								
Inflow to reservoir (amount of 3 rivers)	m^3/s	198	413	321	230	143	82	
	mln m^3	513	1106	832	616	383	213	3663
Volume: at the beginning of period	mln m^3	694	807	1277	1239	895	518	
at the end of period	mln m^3	807	1277	1239	895	518	420	
Release from reservoir	m^3/s	146	214	309	326	282	118	
	mln m^3	378	573	801	873	755	307	3688
Andijan water reservoir								
Inflow to reservoir (amount of 3 rivers)	m^3/s	53	76	90	69	44	29	
	mln m^3	137	204	233	185	118	75	952
Volume: at the beginning of period	mln m^3	1376	1272	1112	888	494	207	
at the end of period	mln m^3	1272	1112	888	494	207	150	
Release from reservoir	m^3/s	90	135	149	199	150	50	
	mln m^3	233	362	386	533	402	130	2045

Annex 2
to Protocol 27 1st question
of ICWC meeting in Feghana
on August 4, 2000

SCHEDULE-FORECAST
of Kairakkum reservoir operation regime
on the period since April 1, 2000 till September 30, 2000

Kairakkum reservoir	Measurement unit	April	May	June	July	August			September	Total mln m^3
		actual	actual	actual	actual	I	II	III		
Inflow to reservoir	m^3/s	424	326	309	317	310	300	300	252	
	mln m^3	1099	873	801	849	268	259	285	653	5087
Volume: at the beginning of period	mln m^3	3227	2957	2761	2421	1875	1619	1328	1021	
at the end of period	mln m^3	2957	2761	2421	1875	1619	1328	1021	964	
Release from reservoir	m^3/s	547	329	378	456	550	580	567	250	
	mln m^3	1418	881	980	1221	475	501	539	648	6663

Annex 3
to Protocol 27 1st question
of ICWC meeting in Feghana
on August 4, 2000

PLAN
of Nurek and Tuyamuyun reservoir operation
on the period since April 1, 2000 till September 30, 2000

Nurek reservoir	Measurement unit	Actual				Forecast				Total
		April	May	June	July	August			September	
						I	II	III		
Inflow	m^3/s	482	920	979	1400	1320	1231	1064	599	14770
Water losses	m^3/s	0	0	15	122	0	0	0	-1	365
Volume: at the beginning of period	mln m^3	5773	6003	6605	7113	8094	8746	9400	10060	5773
at the end of period	mln m^3	6003	6605	7113	8094	8746	9400	10060	10500	10500
Accumulation (+), release (-)	mln m^3	230	602	508	981	652	654	660	440	4727
	m	857,56	865,8	872,41	884,45	892,3	900,3	905,80	910	
	mln m^3	393	695	768	912	565	475	369	430	9677

Tuyamuyun reservoir	Measurement unit	Actual				Forecast				Total
		April	August	September	July	August			September	
						I	II	III		
Inflow	m^3/s	302	919	846	1096	608	578	531	346	10801
Water losses	m^3/s	56	323	292	308	60	55	50	22	3142
Volume: at the beginning of period	mln m^3	3611	2816	2570	1921	1914	1923	1931	1916	3611
at the end of period	mln m^3	2816	2570	1921	1914	1923	1931	1916	1917	1917
Accumulation (+), release (-)	mln m^3	-795	-246	-649	-7	9	8	-15	1	-1694
	m	117,05	122,44	117,32	118,1	117,4	118,2	118,14	118,15	
	mln m^3	552	688	804	790	400	379	386	323	9353

CONSIDERATION OF CURRENT VEGETATION IRRIGATIONS AND AMPLIFICATION OF AMUDARYA RESERVOIRS' CASCADE OPERATION REGIME

On ICWC 26th meeting on April 28-29, 2000 in Dushanbe it was noted that predicted situation with river flow upstream Karakum canal is close to low flow. Three months of vegetation fully confirmed these preconditions.

Actual water availability at Kerki site upstream Karakum canal during three months of growing period with regard for Vahsh river ordinary discharge was 79% of norm with flow on this site 86.9 % (14.6 km^3) from dry year 1997 (16.8 km^3). At Darganaata site flow was 5434 mln. m^3 that is 44.4% of norm (12236 mln. m^3) and 63.1 % from 1997 flow (8612 mln. m^3). Such low flow situation was not observed during last 20 years.

In result of current situation it was decided to apply proportional water allocation depending on inflow to Tuyamuyun hydrounit and to undertake joint measures on limitation of water intake in midstream of the river. Analysis of water intake during three months of vegetation is presented in table 1.

Table 1

Name	Limit	Incremental at 01.07.00		Over diversion	Saving	Percentage	Percentage of limit
		Limit	Actual				
The Republic of Tajikistan	6946	2813,8	2708,6		105,2	96,3	39,0
The Republic of Uzbekistan, total:	15247	6846,6	5051		1796	73,8	33,1
Including:							
a) water intakes in midstream							
Karshi main canal	2700	1353,9	1179,9		174	87,1	43,7
Amubukhara main canal	2832	1150,3	1250,2	-99,9		108,7	44,1
Total for midstream:	5532	2504,2	2430,1		74,1	97,0	43,9
b) water intakes in downstream							
Khorezm oblast	3315	1690	1053,2		636,8	62,3	31,8
The Republic of Karakalpakstan	6400	2652,3	1567,6		1084,7	59,1	24,5
Total for downstream:	9715	4342,3	2620,8		1721,5	60,4	27,0
Turkmenistan, total:	15500	7320,9	5976,1		1345	81,6	38,6
Including							
Water intakes in midstream							
Garagum canal	7482	3888	3546,3		341,7	91,2	47,4
Lebap veloyat	2897	1184,5	1187,9	-3,4		100,3	41,0
Total for midstream	10379	5072,5	4734,2		338,3	93,3	45,6
b) Water intakes in downstream							
Dashoguz veloyat	5121	2248,3	1241,9		1006,4	55,2	24,3
Total for basin	37693	16981,3	13736		3246	80,9	36,4
Including:					0		
Upstream	6946	2813,8	2708,6		105,2	96,3	39,0
Midstream	15911	7576,7	7164,3		412,4	94,6	45,0
Downstream	14836	6590,6	3862,7		2727,9	58,6	26,0
Besides, Surkhandarya veloyat	1000	415,8	696,9	-281		167,6	69,7
Water intakes in AmuDarya river	14836	6590,6	3862,7		2727,9	58,6	26,0

Name	Limit	Incremental at 01.07.00		Over diver-sion	Saving	Percent-age	Percent-age of limit
		Limit	Actual				
downstream, total:							
Including:	3315	1690	1053,2		636,8	62,3	31,8
Khorezm oblast	6400	2652,3	1567,6		1084,7	59,1	24,5
The Republic of Karakalpakstan	5121	2248,3	1241,9		1006,4	55,2	24,3
Dashoguz veloyat							

From table 1 is evident that states used 13736 mln. m^3 under limit 16.981.3 mln. m^3 or 80.9 %. Uzbekistan used 5054 mln. m^3 (limit 6846.6 mln.m^3) or 73.8%; Turkmenistan-5976.1 mln. m^3 (limit 7320.9 mln. m^3) or 81.6 %; Tajikistan-2708.6 mln. m^3 (limit 2813.6 mln. m^3) or 93.6 %.

As to the river sites, established limits of water intake are used as follow:

Upstream-96.3%

Middle stream-94.6 % including: Uzbekistan-97%, Turkmenistan-93.3 %

Downstream-58.6 % including: Uzbekistan-60.4%/ Turkmenistan-55.2 %.

Water supply of three major water consumers downstream was as follow:

Khorezm-62.3 %

Tashauz-55.2 %

Karakalpakstan-59.1 %.

As analysis shows, main load of low water is laid on downstream consumers in spite of water intake limitation upstream and midstream.

Due to hard situation water supply to the Aral Sea is fulfilled on 31.5 % or 473 mln. m^3 (plan - 1500 mln. m^3) (table 2). It is worth to note that dry period revealed range of shortcomings both in BWO activity and governments' water policy.

During reported period technical meetings were held on Tuyamuyun operation regime under low water. Decade analysis of river channel water balance for reported period shows significant increase of discrepancies along all river sites.

Average discrepancy was on Kelif-Darganata site 18.1 %;on Darganata-Tuyumuyun site 33.1%; on Tuyamuyun-Kipchak site 24.1 %; on Kipshak-Samanbaysite 2.4 %.

For our opinion, this situation is aggravated by the following factors:

1. Sharp fluctuations of river flow and horizons;
2. Insufficient control for water diversion from the river including pumping stations.
3. Local interventions in water intake management.
4. Water registration worsening in Tuyamuyun hydrounit.

Water stock in water reservoirs at 01.07.00 are as follow:

1. Nurek reservoir - 7113 mln. m^3 or 100 mln. m^3 less to compare with schedule.
2. Tuyamuyun reservoir - 1921 mln. m^3 ; 279 mln. m^3 are released from dead volume.
3. In-system reservoirs - 2252 mln. m^3 or 38 % of total capacity.

According to Uzhydromet forecast and BWO "AmuDarya" calculations the second half of growing period is expected tense. Main tasks of BWO "AmuDarya" are as follow:

1. Improvement of water discipline and executors responsibility.
2. Taking measures on all river sites water losses reduction.
3. Providing equitable water resources distribution.

According to BWO "AmuDarya" calculations expected flow at Kerki site upstream Karakum anal during growing period is 31 km^3 or 77.7 % of water availability. Taking into account current water situation Tuyamuyun reservoir's operation regime is developed.

It is proposed to keep proportional water allocation for the rest of period depending on inflow to Tuyamuyun reservoir. Expected water use will constitute 87.8 %, downstream - 61 %.

Nurek reservoir operation regime is amplified by BWO "SyrDarya" and agreed by ODZ "Energia". BWO "AmuDarya" offers to approve submitted to ICWC cascade operation regime.

Table2

Water supply to the Aral Sea and AmuDarya delta for April-June 2000

Name	April	May	June	July	August	September	Water supply since 01.04. till 01.07.00 г		Percentage of fulfillment
							plan	actual	
Samanbay gauge	68	63	49				1500	180	12
Total release from Kyzytken and Suenli canals' system	0	0	0					0	
Collector-drainage water	127	78	88				500	293	58,6
TOTAL: Incremental	195 195	141 336	137 473	0 473	0 473	0 473	2000	473	23,65

Note: Data about water supply to Aral Sea coastal zone are coordinated with Glavgydromet of the Republic of Uzbekistan

Actual regime of Nurek and Tuyamuyun reservoirs' operation since October 1999 till March 2000

Nurek reservoir	Unit	Actual						Total
		October	November	December	January	February	March	
Inflow	m^3/s	364	288	234	172	105	221	3665
Water losses	m^3/s	2	8	-10	-12	8	4	-4
Volume: at the beginning of period	mln m^3	10541	10096	9335	8302	7117	5972	10541
at the end of period	mln m^3	10096	9335	8302	7117	5972	5773	5773
Accumulation (+) and release (-)	mln m^3	-445	-761	-1033	-1185	-1145	-199	-4768
Altitude: the end of period	m	906,10	898,58	886,93	872,46	857,11	854,18	
Releases from reservoir	m^3/s	528	574	630	626	555	292	8437

Tuyamuyun reservoir	Unit	Actual						Total
		October	November	December	January	February	March	
Inflow	m^3/s	807	801	1025	881	715	454	12351
Water losses	m^3/s	132	170	119	115	284	114	2437
Volume: at the beginning of period	mln m^3	3684	4044	4968	5476	6002	5275	3684
at the end of period	mln m^3	4044	4968	5476	6002	5275	3611	3611
Accumulation (+) and release (-)	mln m^3	360	924	508	526	-727	-1664	73
Altitude: the end of period	m	126,83	128,6	128,78	129,28	128,2	122,86	
Releases from reservoir	m^3/s	541	275	717	570	722	961	9987

SYRDARYA RIVER WATER COMPLEX OPERATION DURING THE FIRST HALF OF VEGETATION 1999-2000 AND ITS INDICATORS AMPLIFICATION FOR JULY-SEPTEMBER 2000

SyrDarya water complex operation indicators (Naryn-SyrDarya cascade and water intake limits) for current vegetation are approved by 26th ICWC meeting in Dushanbe (April 29, 2000).

According to forecast of April 10, 2000 water availability was expected lower than norm (about 93 %) and, taking into account releases from Toktogul and Kairakkum reservoirs, foreseen by intergovernmental agreement, available water resources are found lower than needed that required to correct water intake limits. ICWC has approved water intake limits for year of normal water availability authorizing BWO to correct them depending on current water situation.

Predicted and actual water resources for past half of vegetation are presented in table 1 which shows what is difference between them.

Most serious deviations are in inflow to Andizhan reservoir (3 times) and on lateral inflow to SyrDarya site between Kairakkum and Chardara reservoirs(1.5 times). This fact together with others (Kairakkum reservoir is found not filled to the beginning of summer that was foreseen by Agreement between Uzbekistan and Tajikistan; releases from Toktogul reservoir do not exceed 5 km^3 for season that is not enough for dry year) required to re-build some reservoirs operation regime (table 2, 3).

Table 1

Parameter (since 1.04 till 30.06.2000)	mln m^3		In percentage of norm	
	forecast	actual	forecast	actual
Inflows to upper reservoirs				
Toktogul	5101	4725	109	101
Andijan	1700	571	87	29
Charvak	2592	2443	85	80
Ugam river	371	296	96	77
Subtotal	9764	8035	97	80
Latera inflows:				
Toktogul-Uchkurgan	780	687	100	88
Uchkurgan, Uchtepe-Kairakkum	1610	1341	84	70
Andijan-Uchtepe	1322	1211	91	83
Kairakkum-Chardara	1500	1030	82	56
Gazalkent - gauges Chinaz-Chirchik	415	301	72	52
Subtotal	5627	4570	86	70
Total	15391	12605	93	76

Table 2

Reservoir	Reservoir volume, mln m^3			
	on 1.04.2000	on 1.07.2000		on 1.07.1999
		On schedule	actual	
Toktogul	10999	14110	13051	13045
Andijan	1376	1389	888	1876
Charvak	694	1504	1239	1722
Kairakkum	3227	2273	2421	2977
Chardara	5246	2701	2605	3521
Total	21542	21977	20204	23141

Table 3

Reservoir	Releases, mln m^3	
	on schedule	actual
Toktogul	1910	2970
Andijan	1488	981
Charvak	1775	1752
Kairakkum	3921	3277
Chardara	4763	4379
Total	13857	13359

First of all, Toktogul reservoir's operation regime has changed due to additional reception of electric energy from Kyrgyzstan (since May) by Uzbekistan and Kazakhstan (since June) increased releases exceeding 1 km^3 approved by ICWC. Reduction of releases from Andizhan reservoir is to compensate three-fold decrease of inflow. Anyway, water stock in the reservoir was found 500 mln. m^3 less than planned one. It was necessary to reduce releases from channel reservoirs of seasonal regulation. Charvak reservoir is emptying faster than it was planned previously. Taking into account that within the second half of vegetation water availability is expected lower to compare with April-June, Charvak and Andizhan reservoirs will be released up to dead volume and this will create unfavorable starting conditions for next year, moreover, flow from Chirchik and Karadarya to SyrDarya reduces.

Listed above changes, intensity of which grew since June, forced to correct water intake limits. In table 4, 5 water intake data are presented for the first halh of vegetation 2000.

Table 4

Republic, water management site	ICWC limit, mln m^3	Actual; mln m^3	Percentage
The Kyrgyz Republic	200	118.66	59.33
The Republic of Uzbekistan	8800	3930.68	44.67
The Republic of Tajikistan	1800	859.74	47.76
The Republic of Kazakhstan ("Dostyk" canal)	730	100.47	13.76

∗ To compare with other states-consumers insignificant share of actual intake to Dustlik canal is explained by the fact that water intake for June is planned by Kazakhstan Committee of Water Resources such a way that it constitutes two thirds of total diversion for the first half of vegetation.

Table 5

Parameters	On schedule, mln m^3	actual
Inflow to Chardara reservoir	3170	1727
Water supply to Aral Sea	850	850

SyrDarya water complex functioning during current vegetation is characterized by the following features:

- Actual water resources are found significantly lower compared with designed ones, used in calculations of the complex operation regime; because of that inflow to Chardara reduced

by 5 times; Andizhan and Charvak reservoirs' cascade operation was substantially aggravated;

- Available water resources reduction compared with expected volumes has led to necessity to correct reservoirs regime and water intake limits that were foreseen by ICWC decision in Dushanbe in April 2000;
- Situation was mitigated by additional receipt of electric energy generated by Naryn hydropower cascade. In result 1 km^3 water was released from Toktogul reservoir that compensated water resources reduction.

Glavgidromet forecast for the third quarter of 2000 takes into account appearance in the first half of vegetation negative trends in SyrDarya water resources formation - if 93% of norm was expected in the first half of vegetation, according to the last forecast this figure is 68% (table 6).

Table 6

Parameter (since 1.07 till 30.09.2000)	m^3/s		In percentage of norm
	Norm	Forecast	Actual
Inflows to upper reservoirs			
Toktogul	571	450	79
Andijan	119	45	38
Charvak	258	160	62
Ugam river	18	10	56
Subtotal	966	665	69
Latera inflows:			
Toktogul-Uchkurgan	47	38	80
Uchkurgan, Uchtepe-Kairakkum	210	120	57
Andijan-Uchtepe	123	110	89
Kairakkum-Chardara	170	110	65
Gazalkent - gauges Chinaz-Chirchik	54	28	52
Subtotal	604	406	67
Total	1570	1071	68

Taking into account, that peak water requirements coincide with July-August, significant tension should be expected in irrigated agriculture and substantial correction of water intake (figure 1) where results intergovernmental agreements, signed in January, March and July are taken into account. The following circumstances can mitigate crisis situation:

- Regular reception of electric energy from Kyrgyzstan in July-August into power systems of Uzbekistan and Kazakhstan in volume which corresponds to discharge at Uchkurgan hydropower of 550-580m^3 /s;
- It is necessary to launch "Makhram NO" pumping station that will permit to include significant part of Kairakkum reservoir's useful volume and to keep water availability level for irrigated lands in SyrDarya midstream;

Schedule-forecast of Naryn-SyrDarya reservoirs' cascade on vegetation 2000 is presented in Annex 1 to the first question of ICWC 27th meeting.

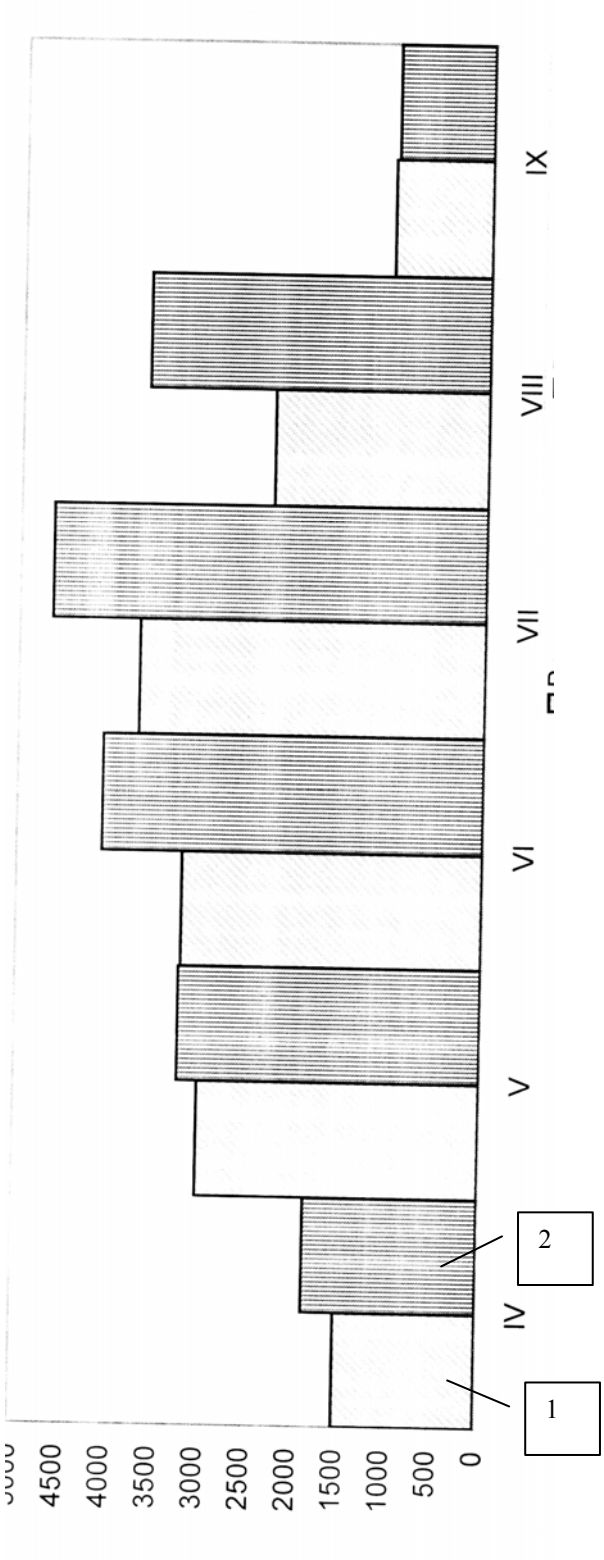

Figure 1. Water resources and water intake limits for vegetation 2000

1 - water resources, 2 - water intake

ABOUT PROGRAM OF ICWC DEVELOPMENT AND STRENGTHENING

Collaboration of Central-Asian water organizations shows its viability and ICWC itself strengthened its position. Nevertheless, recent two years and especially last dry year demonstrated that for this sustainable water supply and ecologically oriented water resources management big efforts are needed to be done both at the regional and national level.

Main problems facing ICWC are as follow:

- weakening of water allocation and release planning and management; water supply irregularity growth and control over water allocation along the river loss;
- worsening of water flow and intake registration and prediction and as consequence losses increase and failure in timely water supply;
- ICWC still does not represent interests of all water users;
- unsatisfactory attention is paid to water saving and limitation;
- unsatisfactory account of ecological requirements and river water quality;
- unsatisfactory attention is paid to economic aspects of interstate relations, between water users and organizations; weak financial base of water organizations; impossibility to maintain all water infrastructure built early;
- absence of necessary links between NGO, water users, public organizations, lack of public control, transparency, trust and responsibility of users for water management;
- lack of information development and exchange.

All these questions have been repeatedly discussing and mostly were presented in "Main provisions of the regional strategy" but, unfortunately, ICWC members' interest to this problem is very low. Since GEF project component A-1 has been started, ICWC activity is under attention both local and foreign consultants and can be open to external world for discussion and criticism.

It is necessary to work out the program of ICWC activity as well as ICWC bodies and national water bodies' collaboration perfection.

What are constituents of this program?

1. Legal strengthening is built upon agreements whish are underway now and will be discussed in items 3 and 6 of agenda after their signing and solution of the range of issues:

- strengthening ICWC role and possibilities, in first line, BWOs and national ministries in river management, regulation of relations between BWO and the national water organizations;
- establishing public participation system for water users participation in basin management;
- following river and other natural objects water requirements and ecosystem approach in water management;
- ICWC bodies financial sustainability;
- BWOs independence of pressure from local authorities;
- gradual establishing information exchange system, analysis and analytical exchange allowing perfection of management process as a whole.

2. Model tool development for water management, prediction and control

First steps in this direction made in USAID and WARMAP programs show that modern technical possibilities, experience and knowledge being transformed into set of working

models of annual and operative planning could help in management and reduce flow losses. Moreover, computer modeling technology introduction will help our decision-makers to understand deeper all interrelations inside water-economic complex.

Is proposed to consider question of modeling use in water management on one of the next ICWC meeting taking into account funding within the projects WARMAP-3, UNDP/USAID and GEF.

3. Training activity development

Thanks to Training Center establishing with its branches in all Central-Asian countries with assistance of CIDA, USAID and other donors real opportunity has been created to rise high and middle level water specialists skill up to world level, opinion exchange and agreed understanding working out. Educational approach will allow both to provide with information and organize discussion how to improve activity in water management.

4. Water saving and experience sharing system in water productivity increase

Under growing population and ecological and social requirements to satisfy water demand sustainable water supply is possible only based on clear understanding that we spend more water than we need and have high opportunities and appropriate approaches to save water. This activity is divided into 2 parts: water saving by water users and water organizations. First steps in this direction made within framework of WUFMAS Component A-2 and other World Bank projects, particularly, in water supply, require so called extension services. It is supposed to organize such work in Fergana valley within the framework of joint project with IWMI under SDC funding as well as in Copernicus project. For that purpose it is necessary this service establishing within the ministries and water supply organizations.

Second direction is organizational losses minimization at the joints: basin-system-canal-water users in water organizations. WUA is other part of this system whish serves not only for water supply, but also for its allocation like developed countries and even India and Pakistan (Warabandi, Sheih jenli, etc.).

5.Water distribution, registration and management system technical improvement

5.1. Attempts to introduce automated registration and regulation were made in the SyrDarya basin already in Soviet time but thanks to CIDA funding it was possible to equip Dustlik canal's headwork by Modicon system and through GEF funding – South-Golodnostepsky canal's headwork by Sigma system. As a result, accuracy of water supply registration has been increased from 10 % down to 2.5 % under control at distance of 50 km. Simultaneously, permanent water registration has been introduced. This method efficiency is evident: its introduction allows to save 3 bln.m^3 water per annum under $15mln. expenditures.

5.2. Broader perspectives are opened under remote methods of assessment, planning and undertaking water-reclamation measures (cropped lands, soil salinity, irrigation and drainage network status, plant evapotranspiration, water availability, wastes releases, etc.).

5.3. Flow registration and prediction has sharply worsened. Control points like Fedchenko and Abramov glaciers, some gauging stations on AmuDarya and SyrDarya do not exist more. BWOs do not receive direct information but through national hydrometservices. It leads to the phenomena that all discrepancies are reflected in channel losses, which in turn, increased twice recently.

Beside foreseen by GEF project 25 gauging stations construction and re-construction on transboundary waters, it is necessary to equip 39 stations more establishing their link with BWO and ministries.

It is expedient to organize joint working meeting of ICWC members and hydromet services and work out joint measures on transboundary water registration improvement together with measures mentioned in items 5.1 and 5.2 and possible IFAS funding additional 39 gauging stations construction.

6. Capital investments in water resources management and conservation system improvement and maintenance are the base for not only survival but sustainability of water complex as a whole as well. Until now all financial means spent for "Program of concrete actions" came from external donors with small contribution from the region's countries, though financing through IFAS branches weakens ICWC participation in purposeful means spending. Though mostly projects were prepared by ICWC, during their implementation ICWC role decreases except the projects implemented by ICWC itself.

From this point of view, it is expedient using existing structure to transform EC IFAS in the body, which jointly with SIC ICWC, BWO;s and ministries would work out prospective plan of capital investments at the regional level, defines country's share according to its contribution to IFAS budget, organizes donors financing, coordinate funding, and implementation of the regional projects attracting NGOs.

For success is important to maintain this body at the same place accumulating experience in relations with donors and provide equal rights by EC IFAS Chairman rotation. Moreover, if under danger of IFAS liquidation this body would be kept within ICWC as financing body providing local and international donor donations to the joint projects.

Three projects at expense of IFAS are under consideration now, which will increase donors confidence:

-BWO SyrDarya and AmuDarya management system improvement;

-strategy of transboundary return waters management and use;

-hydromet services' network on transboundary rivers development.

7. ICWC strengthening, besides all legal, financial, economic and technical measures, requires ICWC members' attention to control of decisions made. Obligatory preconditions for success are the following:

- water policy strict observance based on rigid limitation, equal and equitable water allocation and ecosystem approach;

- permanent governments information about ICWC activity, decisions made and receiving agreement for further actions in this direction;

- financial, juridical and economic support of IWC bodies by governments;

- active participation in ICWC and its bodies technical and institutional improvement.

8. ICWC viability in the future will depend at some extent on intellectual potential maintenance in ICWC organizations and associated institutions. New technologies introduction in water management will depend on findings of scientists and designers under financial support from outside.

It is expedient to create specialized working groups within ICWC on various directions from different countries and regional organizations' representatives (as it has been done for "Return waters" program by EC IFAS), which will permanently work in different directions of ICWC activity and help ICWC in new technologies introduction.

Such groups could be established in the following directions:

- management system juridical improvement;

- basin integrated management;
- water provision;
- financial interaction between countries, users and water organizations;
- water registration and saving, meteorological services;
- information system development;
- modeling;
- knowledge base;
- land reclamation;
- river and ground water quality;
- Aral Sea and coastal zone.

Working groups would be able to prepare jointly programs of improvement, use together with EC IFAS and ICWC financial means for development and introduction, participate in opinion exchange and expertise of appropriate projects.

LEGAL BASE OF INTERSTATE RELATIONS IN WATER RESOURCES RATIONAL USE PERFECTION BASED ON EUROPEAN CONVENTION IN HAGUE

In January 1996 decision has been made to develop set of juridical documents by the countries-participants of "Agreement on collaboration in joint water resources management in the Aral Sea basin" and "Agreement about joint actions in the Aral Sea problems solution, ecological rehabilitation and social-economic development of the Aral Sea basin". "Agreement about IFAS bodies status" has been signed and "Agreement № 1" and "Agreement № 4" were corrected and revised.

Decision is made to revise "Agreement on water resources use" and to re-make it in two separate agreements. First draft of one of them is submitted to ICWC members for consideration and approval.

First draft "Agreement on Transboundary waters conservation, their quality control and ecological sustainability provision" is presented.

EC IFAS practically headed work on legal base perfection and on two meetings in December 1999 in Almaty and in May 2000 in Nukus process of coordination was accelerated. This work was noted abroad. From OSCE note is evident that discussions between OSCE representatives and five governments showed support of this project by all governments and international community is ready to help them by consultations and training.

In this connection meeting of countries of Convention on international watercourses conservation and use (23-25 March 2000 in Hague) is of high interest.

UN European Economic Commission uniting 55 states (including republics of Central Asia) organized development of "Convention on transboundary watercourses and international lakes conservation and use, 1992". Working groups have been created which develop protocols in addition to Convention ratified by governments. In June 17, 1999 in London Protocol to "Convention on transboundary watercourses and international lakes conservation and use, 1992". Was accepted. In this protocol following Convention form commitments of states on population provision with drinking water and water related diseases dissemination prevention are made more rigid and detailed. Big attention is paid in this protocol to integrated approach to water related activities and international actions coordination.

At present time Convention is signed by 26 and ratified by 28 countries (of 55 ones); protocols signed by 35 countries and ratified by only Russian Federation.

Five directions were defined as priorities for Convention development in 1997:

- joint management bodies;
- assistance to countries under transition;
- integrated management of water resources and associated ecosystems;
- pollution from ground sources limitation;
- water supply and health protection.

Plan of 2000-2003 strengthens these directions, for example, is offered to develop the third direction "ecosystem approach implementation, water demand regulation, water resources allocation and common use by riparian countries".

UN European Economic Commission Secretariat, responsible for Convention, proposed to countries non-members to participate in its working groups' meetings as observers. It is noted especially that very important is to attract countries under transition. In the second meeting in Hague on March 23-25, 2000, where Prof. V. Dukhovny took part, attention was paid to several principal questions:

- necessity for working group to complete leading principles of public participation in water management;
- strengthening mechanisms for Convention and Protocol observance;
- necessity to create procedure of Convention observance and Special Committee;
- preparation and coordination of the document “Sustainable flood prevention”.

Comparative study of UN Convention “Transboundary watercourses conservation and use, 1992” and UN Convention “About international watercourses non-navigation uses, 1997” was presented at this meeting. Compliance of these two conventions is noted though some contradictions take place. At the same time it was noted that Convention 1992 is stricter legal document especially concerning water quality maintenance, capacity building, public involvement, commitments observance. Though issues of joint water use are not mentioned in Convention at all, during discussion Mr. Reiner underline stated that Commission work mechanism allows to introduce amendments and additions in protocols to Convention and such protocols were developed during past 8 years after Convention was accepted.

It is worth to note that some legal documents prepared by us are ahead of existing main provisions of international water right.

Taking into account all above mentioned it is necessary to inform Central-Asian governments about regional approach of UN EEC Secretariat and expediency to involve all countries of the region in Convention meeting work. It is useful from two positions:

- possibility of clearer understanding of its work and increase of legal literacy of our documents;
- possibility of Convention’s provisions perfection through additional protocols acceptance defining peculiarities of the region.

At the same time it is necessary to demonstrate to the world community our willingness to strengthen collaboration amongst our countries on transboundary waters and contribute to the world water right development.

NEW TRENDS IN WATER AND ENVIRONMENTAL ENGINEERING (RESULTS OF UNESCO-MAGI-ITALIAN NETWORK OF HYDROLOGICAL OBSERVATION CONFERENCE, JULY 3-7, 2000)

Environmentally driven management of water resources is gradually taking place, in first turn, in developed countries. Pioneer in this is the Netherlands whose national water policy is oriented to transition from management of hydrostructures to management of functional processes in water-ecological environment with help of these structures through fulfillment of separate functions by existing water system. Since 1993 Ministry of Public Works, Transportation and Water Resources has developed concept and then a plan aimed at fight with floods and support of water systems to use and meet environmental requirements. This plan divide for short-term and long-term measures foresees measures on operation and maintenance including terms, reasons, objectives, and costs.

European Union applies to other countries to elaborate similar measures preventing water ecosystem destruction, flood and draught negative effect and providing sustainable water resources use. It is recommended to prepare plans of management by each river basin including purpose functions, water and ecological processes models, and situation analysis. These analyses contain water quality dynamics, landscapes and their interaction with river and ground waters. Italian special lists (M. Braioni et al.) have demonstrated these approaches on exchange of Adigi and Dese rivers.

Similar plan of Valtuzter Kreak river by australian specialists (N. Johns, V. Philips and L. McLeod). Basin is located in three districts in Quinsland state exposed to high demographic (20 % of territory) and industrial (10% of territory) stress. It leads to natural landscapes (pastures, wetlands, and forests) shrinkage. Based on state's law on environment (1994) and water resources (1997) protection strategic plan has been prepared for watershed management including assessment of flood, water quality, environment, vegetation and agreed by juridical and physical entities concerned.

Water-environmental reforms on American continent were demonstrated in summary report of Inter-American Bank of Development and Reconstruction by Mr. Garcia. New concept of this report is refusal from separate consideration of water and environment and sectoral analysis.

Integrated management of water basins foresees water assessment as dynamic part of environment closely interacting with human activity. Because of that, foundation of this approach is as follow:

- Priority of natural-social aspects over technical aspects of functioning
- Functional planning and analysis of basin development and its components functional links;
- Permanent social-ecological monitoring and accepted decisions correction, biodiversity as one of major indicators of basin welfare or its degradation.

Along with this necessity of development is noted:

- hydrosolidarity;
- hydrodiplomacy;
- remote hydromonitoring;
- fight with technocratic hydroburocracy.

Paper's author Dr. Garcia has noted that announced line and reality are remote one from another. Biggest hope gives public awareness and purposefulness. Canada and USA but also Brazil, Chile, and Mexico are reassessing their positions in water-ecological management.

It is known that all over the Europe during XX century rivers were subjected to transformation and regulation in interests of land drainage and flood protection. As a result, 95 % of natural wetlands along European rivers were cut from their channels and their ecosystems were destroyed. So-called channel stabilization has led to their natural degradation.

At present time trends of ecological recognition and ecological processes' role understanding caused reassessment of approaches to river channel stabilization with regard to their meanders and wetlands restoration. These new natural anthropogenic rivers can be created only by inter-sectoral efforts, which require close interactions between governments, ecologists, morphologists, sediment transportation specialists, and biologists.

This activity development is based on EU Maastricht Agreement and is being developed in Rein basin (Germany, France), in the Netherlands and Denmark.

In the Netherlands (G. Duel, S. Groot, G. Van den Lee, D. Van den Maken), where rivers and lakes rehabilitation is of high priority and where about 0.56 bln. USD is spent annually. "Concept of assessment of procedure" has been developed including 4 stages of ecological modeling:

- modeling of ecotops (distribution of ecological units depending on hydrodynamics, morphodynamics and ecological succession);
- modeling of water communities (types and distribution for different combination of flora and fauna);
- modeling of environment matching to communities requirements;
- modeling of communities network stability.

This method was applied on Issel lake and gave positive results.

Two projects in Denmark (Skzheri and Brons rivers) were implemented in order to improve fish migration conditions, in first turn, salmon simultaneously avoiding risk of flood and pollution.

More bright projects were demonstrated in restoration of natural physical and biological processes and functions in watercourses within the Columbia and Red River in Idaho, USA. Favorable conditions for fish and other fauna were created in 1996-2000 (I. Goodwin, G. Beatti et al.).

In Japan hydroecological restoration has been successfully executed on Tama river, which basin includes southern part of Tokyo, and Tony river, which basin is mostly rural area and there are many hydropower plants. Success of these projects is an example of mass movement in the country on "Watercourses ecological potential restoration" (N. Shirikawa, N. Tama et al.).

This approach is applied as well in Argentina (Lower Parana delta restoration with area of 4800 km^2).

Changes in water bodies' ecology caused necessity to define ecological releases in the rivers that was presented in reports of Italian specialists and scientists. In Italy by laws #183 (1989), 275 (1993) and 36 (1994) water agencies responsibilities for minimum flow maintenance are confirmed. In this connection in Italian reports two approaches were demonstrated (G. Frega, K. Fasso, S. Nasello et al.). One group offers to take into account minimum ecological flow as percentage of mean annual one (many consider 1/10 as sufficient). Others estimate minimum flow based on river depths and flow speed taking into account pollutants, thermal conditions, etc. This approach has found support in the law No 152 (1999). At present

time many Italian scientific institutions are developing intensively such criteria for all rivers taking into account municipal wastes, physical-chemical, bacteriological and ecological parameters of watercourses.

Helmut Mader has demonstrated Austrian approach to minimum accessible flow as minimum reproduction water amount providing watercourse natural productivity maintenance. It is 15-60 % of minimum observed flow in the river.

American researches use method to determine the same parameter. More complicated methods are based on self-cleaning flow kinematics derived from Lagrange convection-diffusion processes of water transport (M. Natali, G. Merola).

Interesting direction is demonstrated by commonwealth of Italian (A. Mafonti) and British (P. Lo Greco) specialists in river water quality control by GIS and remote methods.

Unfortunately, in our country remote methods are limited by assessment of irrigated lands outflow, size of cultivated lands, salinization and some other parameters.

Intensive anthropogenic impact on water courses created problems which differ from ours that rivers come to open seas. Similar problems have led to creation of commonwealth - COMAS project (Tunisia, Lebanon, Egypt, and Syria) for joint management of coastal waters, including:

- Water quality protection;
- Erosion control;
- Fish culture and aquaculture;
- Toxic matters transboundary transport;
- Coral reefs protection;
- Fight with oil products releases;
- Ecological investments planning.

In the Northern Sea near Hamburg and Kil some coastal sites are unusable for recreation due to wastes. Demographic pressures along with stagnation are the most important events. Similar problems are indicated in Italy (lagoon of Nose river, Sardinia coastal zone, etc.). Hard word is performed in Venice Lagoon.

Unique Venice importance forced Italian Government to initiate huge project aimed at hydrological and hydrogeological equilibrium maintenance, water pollution reduction and coastal zone protection. Single organization has been established, which is responsible jointly with Venice and Chokuia municipalities for all measures, including research, design, construction, and operation. Scope of project is all Venice Lagoon ecosystem, including watershed, lagoon, and upper Mediterranean with area of 1877 km^2 with fresh water inflow to the Lagoon 1 billion m^3 annually. Simultaneously, about 400 million m^3 of sea water come to the lagoon. Complex includes observation and modeling system, hydroregulating system, huge beach stripe, barrier protecting the city, gates system, etc.

US Federal Regulation Commission's experience is useful in disputes resolution and licensing of hydropower generation with special computer system LIAM (Legal-Institutional Analyses Model) developed by ecological scientific center USGS, Fort Collins (N. Burhart, V. Lumb).

Report of Yugoslavian group of specialists has caused big concern because it was dedicated to consequences of spring 1999 conflict with NATO bombing. As a result of many chemical plants and refineries destruction and high flow in Danube and Sova rivers pollutant penetrated in groundwater and drinking water supply along Danube river up to the Black Sea. Observation showed high degree of pollution both in Danube river and in major aquifers water.

Beside principal directions many questions were considered among which the following:

- interesting creative and experimental research in vegetation cover impact on channel resistance coefficient (Ugo Maione) and river meanders hydraulic resistance definition (D. Wildon);
- methodology of dam destruction calculation using methods of second degree reapproach (T. Tisueli, D. Termini);
- method of pressurized sediments transport for reservoirs cleaning simultaneously using it as fertilizers (V. Skrilnikov);
- bentonite strengthening against filtration from canals (these methods were developed in our country in 60-70-es).

Our public and governmental bodies understand very well necessity of transition from separate water and ecological activity to united water-ecological integrated use, development, and management.

There are all institutional possibilities: ICWC and CSD activity should be revised under the auspices of IFAS - in water-ecological direction. First of all, EC IFAS together with SIC ICWC and SIC CSD should prepare plan of water-ecological development.

Prof. V. Dukhovny
SIC ICWC Director

NINTH STOCKHOLM WATER SYMPOSIUM "WATER SECURITY IN 21 CENTURY - INNOVATIVE APPROACHES" 13-19 AUGUST 2000

One of the biggest international water for a held in Stockholm on 13-19 August 2000. Each August starting since 1991 water specialists from all over the world come to Sweden to participate in this symposium. Symposium is a part of annual series of for a oriented on prospective water development where linkage between practice, policy and science in sphere of effective water resources management and use is discussed. Special International Water Institute has been established for organization and conduction of this symposium. Its main task is donors' funds attraction and program preparation. Due to Institute's efforts this symposium became picturesque water festival in which during a week its guests and Stockholm inhabitants take part. Public events like concerts, exhibitions, fairs are carried out where the main topic is careful attitude to water.

Main theme of symposium changes each year and specific aspects of main theme are considered during separate thematic seminars. For example, in 2000 main topic of symposium was formulated as follow: "Water security in 21 century - innovative approaches".

Opening of symposium started since 14 August 2000 from plenary session where greetings were made by Chairman of Organizing Committee Mr. S.Skogforce and Minister of Environment Mr. K. Larsson. Prof. M. Falkenmark made review over nine precedent symposia "No water security without significant shift in human mentality". Presentations also were made by ADB Vice-President Mr. I. Serageldin "From vision to action after Second Water Forum", Prof. A. Biswas "Lost and neglected links in water management", International Food Production Research Institute Mr. M. Rosegrant "Global food security and water deficit: alternative decisions in 21 century". Then seminars have begun:

Seminar No 1 - "Movement to increase of water use efficiency - possibilities and reproduction".

12 oral reports and 3 poster papers were presented on the seminar. Ideas about water consumption and harmful matters emission reduction under modern development rate were expressed. Examples of strategies and technologies introduction for water resources development in different zones of the world and economic branches were presented. Report of V.Mikhailov and V.Sokolov (SIC ICWC) "Cost-benefit analysis of water saving measures in irrigated farming" was presented.

Seminar No 2 - "Water and social factors balancing through industry restructuring".

6 oral reports and 4 poster papers were presented. Main context was how to connect economic growth with environment protection. Ideas on some technologies introduction under specific social-economic conditions (examples of Russia, China, Indonesia, Cuba and South Africa) were expressed. Report of M.Molodovskaya "Polychlorinate biphenyl impact on environment and rehabilitation methods in Uzbekistan" was presented.

Seminar No 3 - "Innovative processes for more effective water use in small agricultural production". 7 oral reports and 4 poster papers were presented. Ideas and results of local sources (groundwater outfall) use for irrigation as well as irrigation water harvesting and storage. Representatives from arid countries Ethiopia, Saudi Arabia, and Pakistan made presentations as well as India and China suffering from floods.

Seminar No 4 - "Possibilities of principles "human right" application to water rules and roles". 4 oral reports and 1 poster paper were presented. Main topic was public participation in water management in Germany, Mexico, Canada, and Jordan.

Seminar No 5 - "Feminization and water security". 6 oral reports and 1 poster paper were presented. Representatives from Africa, India, and Sri Lanka expressed ideas about women involvement in water resources management and water protection.

Seminar No 6 - "Water problem is everybody's problem - aspects of education and upbringing". 15 oral presentations and 7 poster papers were made. Main topic was water education for new generations: how and why we need to do it.

Seminar No 7 - "Forward to society of treatment: systems approach to small-scale use of human activity wastes". 9 oral reports and 1 poster paper were presented. Practical results in industrial-municipal wastes treatment and use in agriculture of Great Britain, Switzerland, Poland, Egypt and other countries were discussed.

Seminar No 8 - "Simple, small-scale and accessible technologies in municipal water supply". 4 oral reports and 3 poster papers were presented. Methods and technologies used in treatment plants and water disinfection were discussed. Experience of Germany, Sweden, Yugoslavia and Morocco was presented.

It is worth to note that a competition was organized among the poster papers presented on seminars. Winner received invitation to the next symposium with full reimbursement of all expenses.

One of the brightest events of the symposium was ceremony of annual water prize award of Stockholm Water Foundation for the biggest contribution to science, techniques, education, and public activity related to global water resources. Prize was founded by Stockholm Water Foundation in 1991 and accounted for 150 000 USD. Annually His Majesty King of Sweden Karl XVI Gustav in Stockholm Town Council awards this prize. In 2000 this prize was awarded to prof. K. Asmal, Minister of Education of South African Republic, for his work "Water is peace catalyst history of water transformation into source of conflicts due to its growing deficit and quality worsening". States and their boundaries appearance strengthened contradictions because many (261) river basins are transboundary. Transboundary rivers cross 145 states covering 46% of land and 80% of water supply. Most critical conflicts take place in the river basins of Jordan, Danube, Euphrates, Indus, Nile, Parana, as well as in South Asia and South Africa. Similar conflict can arise in other parts of the world as well. Prof. Asmal said, that time has come when idea of equal rights for each man on equal share of water resources should lead to equitable conflict resolution. This is major concern of all water professionals for today and nearest future.

Few special seminars were conducted within the framework of symposium. Among them was seminar for young specialists (up to 20 years old) "Hydro solidarity - interrelation between generations". Presentations of young specialists from 21 countries were reported. Special prize was awarded in amount of 5 000 USD by Her Majesty Princess of Sweden Victoria. Joint seminar of SIDA, UNDP, and Stockholm International Water Institute (SIWI) "Ecological Hygiene in Treatment Society" was held as well.

Special seminar "Water Safety - Possibilities for Development and Collaboration within the Aral Sea Basin". Thanks to UNESCO and Japanese Global Infrastructure Fund group of specialists from Uzbekistan took part in this seminar. UNESCO advisor Mr. F. Verhug has opened the seminar and described "Vision 21 for the Aral Sea" prepared under UNESCO support.

Prof. N. Aladin (Zoological Institute, Russia) in his presentation told about the Aral Sea history during last 40 years and about his point of view on possible processes development in the future. In his opinion after the sea division into two parts there is opportunity to maintain Small Northern Sea in Kazakhstan. 5 km^3 water annually is enough to support it. As to Big Sea it is more reasonable to direct water available to the delta in order to mitigate negative consequences.

Uzgipromeliovodhoz (U. Abdullayev, G. Khasanhanova) presented report " Water quality and population health in the AmuDarya river basin". In this paper water quality situation in middle and down stream is described and analysis of water quality impact on population health is done. It was shown how Right Bank Collector and Beruny Collector will help to improve river water quality.

Mr. R. Razakov, Director of the Center "Ecology of water economics", has presented report "Scientific research in environment and irrigation of Uzbekistan". In this report measures on ecological situation stabilization are described.

SIC ICWC (V. Sokolov) has presented report prepared under leadership of Prof. V. Dukhovny "Formulation and analysis of water strategy for water resources management in the Aral Sea basin" and the Regional Information System WARMIS. Scenarios modeling was performed by SIC ICWC specialists (I. Avakyan, M. Ruziyev, V. Prikhodko) on base of modified Globsight model developed by Prof. Mesarovich. WARMIS presentation was prepared using results of WARMAP-2 project.

On behalf of Uzbek Academy of Science, Karakalpak Branch, I. Aimbetov and Yu. Kamalov reported about situation in Karakalpakstan and the role of international donors in ecological and economic problems solution in the region.

View from outside was presented by Prof. J. Allan (London University). Prof. Allan thinks that major objective in the region is water saving technologies application, which will allow to keep economic growth and environment equilibrium. The proposed methodology is for account of expenses necessary for natural complex under economic analysis of water saving measures. Stockholm International Water Institute's Director Mr. U. Ekhlin proposed to use model of Baltic Sea countries collaboration for cooperation building in the Aral Sea basin.

Last report was presented by Japanese Global Infrastructure Fund (GIF) (N. Yamamoto, T. Okumura). GIF is NGO and aimed at peace and safety keeping in problematic regions of the world. Reporters have expressed GIF interest in support of regional investment projects in the Aral Sea basin directed towards balanced economic development under environment stabilization.

After official closure of Symposium Global Water Partnership (GWP) has begun its work. GWP was established in 1996 with objective to set up principles of sustainable water resources management, information and experience exchange. Major working bodies of GWP are Consultative Group (60 representatives from different regions of the world) and Steering Committee (12 persons). In 2000 Prof. V. Dukhovny was accepted as a member of Consultative Group.

Former GWP Chairman Mr. I. Serageldin (WB) has reported about GWP activity for past year. Main activity was devoted to dialogue about approach to integrated water resources management and was concentrated in eight regions: Europe, Mediterranean, South East Asia, South Asia, West Africa, South Africa, Central America, South America. Chairman of Technical Consultative Committee Mr. T. John-Klausen has informed about specific measures on integrated management introduction in these regions.

During the second session new GWP Chairman has been elected - Mrs. M. Katley-Karlsson, Canadian citizen, who is Vice President of International Research Center in Ottawa and a member of a range of international organizations. Four members of Steering Committee were re-elected. 44 candidates competed for these 4 places that shows high prestige of this body. Financial program for next year has been approved, where financial means are foreseen for Technical Consultative Group for Central Asia establishing. Representatives of the Central Asian region should give in short term their proposals for participation in approved portfolio of associated programs, including 31 programs (details on website *www.gwpgforum.org*).

Most interesting programs for Central Asia are the following:

- Development and strengthening of river basin organizations;

- CAPNET - international network for integrated water management (IWRM) capacity building;
- Women involvement in IWRM;
- How to introduce ecological service in IWRM (study phase);
- Common network of water supply organizations in Europe, Eastern Europe, and NIS countries;
- International program IPTRID (SIC ICWC already participates);
- INFONET (WCA 3.1) - Information service on water saving and use in agriculture;
- Political round tables on water saving in agriculture (WCA 2.1).

Special ceremony on transfer of authority from the Second World Water Forum (Government of the Netherlands) to the Third World Water Forum (Government of Japan) was conducted. Japanese delegation officially announced the Third World Water Forum in Tokyo in 2003.

On closing day of Stockholm Symposium seminar of SIWI was held, where decision was made to carry out XI Stockholm Symposium in August 2001 on theme "Water security - possibilities of development in 21 century". First announcement will be disseminated officially in November 2000.

Protocol
of working meeting of representatives of Swiss Agency for International Development and Cooperation (SDC), International Institute of Water Management (IWMI) and SIC ICWC on the project "Integrated water resources management in Fergana valley"

Attendees:

SDC	A. Hartman, M. Muller, M. Mirzayev
IWMI	S. Prathapar, D. Malik, V. Horinkova, S. Gazaryan
SIC ICWC	V. Dukhovny, V.Sokolov, P. Umarov, A. Shapiro, K. Belotserkovsky, M. Pinkhasov
SANIIRI	R. Ikramov, M. Khorst, Sh. Mukhamedjanov
Kyrgyz NIIGM	A. Atakanov
Tajikistan	A. Sultanov
Uzbekistan	Kh. Gapparov
ICARDA	S. Benival
WB	A. di Carlo

Participants appreciated SDC decision on principal support of proposed project and expressed deep gratitude to SDC Director Mr. Fust and Leader of SDC coordination group in Bishkek Mr. M. Muller, SIC ICWC proposals on work composition for the first year and Mr. S. Prathapar and Mr. S. Benival's information. Working programs for each block of work were considered.

Participants visited Fergana Valley during two days. They had opportunity to convince themselves in willingness and possibilities of local leadership to support and participate in the project.

Participants have decided:

1. To agree with proposed final outputs:

on block 1 "Support of WUAs in Kyrgyzstan, Tajikistan, Uzbekistan"

- Improvement of institutional structure and management and creation of appropriate WUAs in other two countries as pilot projects, which experience should be disseminated in each state.

on block 2 "Improvement of institutional structure of water resources management in Fergana valley for more effective and economic water use"

- development of transforming administrative to hydrographic (systems) method of management under market conditions for Fergana Valley and its coordination with governmental bodies and water users.

on block 3 "Improvement of water productivity management monitoring in Fergana Valley"

- development of recommendations on water productivity increase and preparatory work for extension services organization.

2. To approve composition and direction of the first year activity, described in SIC ICWC note and detailed programs on each block with regard for IWMI comments.

3. Project's Leader from IWMI is Dr. S.Prathapar, from SIC ICWC - Prof. V. Dukhovny. Executors are appointed by appropriate ministries:

- from Kyrgyzstan - K. Kulov (KyrgyzNIIGiM Director);
- from Tajikistan - A. Sultanov (Leninabad oblselvodkhoz Deputy Head);
- from Uzbekistan - Kh. Gapparov (MAWR Water Resources Department Head).

4. SDC program and ICWC members' proposals have confirmed necessity of Steering Committee establishing, consisting of:

- representatives of 5 MAWRs (one from each country);
- representatives of 7 oblasts of Fergana Valley (one from each oblast);
- representatives from BWO "SyrDarya";
- representatives of SDC (2), IWMI (1), SIC ICWC (1).

Totally - 17 persons.

SIC ICWC and IWMI will develop and submit ToR for this Steering Committee.

5. Participants agreed that final choice of research objects (one from each country) is desirable to make for possibility of three hierarchic levels "system-farm-field" linkage in single hydrographic zone and administrative oblast. This choice will be made on a base of information submitted by all oblasts with participation of Steering Committee (SC).

To foresee 2 seminars with participation of SC members for next year:

- for Inception Report discussion and approval at the third month of work;
- for the first year's activity discussion, annual report and next year plan coordination (12th month).

To take into account that seminar costs will be paid at expense of IWMI cost estimate (other expenses).

6. Sides will organize field office in Fergana Valley (Fergana city), which will be funded on parity basis by SIC ICWC and IWMI.

7. Sides agreed about information exchange and collaboration with other projects:

- on Uzbekistan agriculture restructuring - with WB;
- on Kyrgyzstan agriculture restructuring - with ADB;
- on Tajikistan infrastructure improvement - with WB;
- on water saving - with GEF Agency;
- on WUA in Kazakhstan and water use improvement on Pakhtaabad canal - with USAID.

8. Dr. Prathapar is sending to SDC, Berne agreed credit proposal not later 1 September 2000. Request to SDC to open financing before 1 October 2000 so that to start work since the beginning of 2001 water-economy year.

Signatures:

A.Hartman
S.Prathapar
V.Dukhovny

A.Atakanov
Kh.Gapparov
A.Sultanov

Protocol of Understanding on the project "Management of agricultural crops irrigation to fight desertification induced by irrigation in the Aral Sea basin" (CIRMAN-ARAL)

27 July 2000 Tashkent

Parties presented on the meeting: Lisbon Technical University (Prof. L. Pereira and Dr. J. Caldas); SIC ICWC (Prof. V. Dukhovny, Dr. V. Sokolov, Dr. P. Umarov, Dr. E. Cholpankulov); SANIIRI (Dr. R.Ikramov, Dr.M.Khorst, Dr.G.Stulina); and, ICARDA (D. C. Studer) on 17-28 July 2000 made field visit to Fergana Valley and preliminary discussed together with representatives of KyrgyzNIIGiM (Dr. R. Gorbacheva and Dr. A. Atakanov) and TadjikNII Irrigation (Prof. N. Kasimov and Dr. Ya. Pulatov), and other water organizations (Fergana oblvodkhoz Director Mr. Sh. Allabayev).

Parties have come to agreement in the following:

1. Parties have come to principal agreement on collaboration within the framework of INCO-Copernicus project "Management of agricultural crops irrigation to fight desertification induced by irrigation in the Aral Sea basin". Parties have agreed that Lisbon Technical University (Prof. L. Pereira) will be general coordinator and SIC ICWC (Prof. V. Dukhovny) will be coordinator in Central Asia.
2. Parties have come to agreement on main directions of research within the project and schedule of its fulfillment. It is decided to start research on winter wheat in October 2000.
3. Parties have agreed to select 3 major farms in Fergana Valley to start work:

- site for soil salinity study in Kanibadam (Leninabad oblast, Tajikistan);
- WUFMAS site in Navoiy farm (Fergana oblast, Uzbekistan);
- SANIIRI site in Navoiy farm (Fergana oblast, Uzbekistan).

4. Each local partner is responsible for linkages arrangement with farmers and local authorities for optimal organization of field works (i. e. guaranteed water supply, etc.). Local officials/authorities (Deputy Director of Oblselvodkhoz) have agreed choice of 3 sites and promised to give necessary assistance.
5. Parties have agreed to study winter wheat and then maize and cotton on selected sites using two water management modes (full irrigation and water saving technology).
6. Investigations within drainage component with CEMAGREF assistance will be limited by one site in Uzbekistan (Navoiy farm).
7. ICARDA agrees to collaborate with INCO-Copernicus project through the project "On-farm management of land and water resources for sustainable agricultural systems in Central Asia", funded by ADB. Taking into account that appropriate mutually profitable activity has been agreed at the level of decision-making structure, these two projects will exchange correspondent information and data with regard to ICARDA requirement for common methodological and data collection approach.
8. Agreed methodological approach and requirements to data collection to the INCO-Copernicus project are listed in Annex 1.
9. SIC ICWC and Lisbon Technical University agreed to combine ISAREG model with GIS at on-farm level (model calibration should be performed on area of 100-200 ha). SIC ICWC together with national institutes should start GIS preparation (soil maps and crop pattern) for three selected farms.

10. Local partners under SIC ICWC leadership will prepare list of equipment according to requirements in Annex 1 during next 3 weeks and send Prof. Pereira for approval.
11. CEMAGREF, which has not been presented at the meeting, is proposed to submit its requirements to methodology and data collection for drainage problems study as soon as possible in order to amplify the list of equipment (Prof. Pereira will contact them on these problems).
12. In order to not loose vegetation period field works should be started in October 2000. EU should complete contracts conclusion and funds allocation as soon as possible. Four local partners will submit information on their bank accounts where Lisbon Technical University will transfer money.
13. Next meeting date is agreed in March-April 2001.

Signatures:

Lisbon Technical University (Prof. L. Pereira)
SIC ICWC (Prof. V. Dukhovny, Dr. V. Sokolov)
SANIIRI (Dr. G. Stulina)
ICARDA (Dr. C. Studer)

IV GENERAL ASSEMBLY OF INTERNATIONAL NETWORK OF BASIN ORGANIZATIONS

Krakow-Zakopane (Poland), September 30-October 4, 2000

International Network of Basin Organizations (INBO) was created in 1994 in Aikes-les-Baines (France). Its main goal is river basin water resources integrated management. Network is open for organizations managing large national or transboundary river basins. 133 organizations from 49 countries are members of this organization.

INBO General Assembly is main network forum, which is held twice a year, and discusses results achieved. This year 158 delegates from 84 organizations of 24 countries were presented. Assembly has approved new INBO status and new president Mr. Tomash Valtsukevich, BVO Upper Vistula Deputy Director, was elected. Liaison Bureau-INBO major executive body composition was approved as well. Liaison Bureau provides interaction between all INBO members through Internet within agreed program of action and prepares issue of "Network Newsletter". Bureau consists of 21 members representing five major region of the world (Africa, America, Asia, Western Europe, Central and Eastern Europe). Dr. V. Sokolov was elected as Bureau member that underlines INBO interest in Aral Sea basin's organizations involvement.

General Assembly has approved two-year program of action "Basin organizations establishing and strengthening" prepared jointly with Global Water Partnership (GWP). Program includes four components:

- Establishing direct cooperation between existing basin organizations based on bilateral agreements;
- Mobilizing within the basin organizations professional skill to be developed and transferred to new organizations;
- Synthesis of knowledge and know-how, modern experience and recommendations preparation for broad dissemination;
- Disseminating through network documents on institutional, legal, economic and technical aspects at international level.

ICWC has opportunity to join this program, for example, for communication development between ICWC organizations. INBO and GWP promise support in search of funding.

FIRST WORKING WORKSHOP ON SPECIAL ECONOMIC PROGRAM IN CENTRAL ASIA

First working workshop on Special Economic Program in Central Asia (SPECA) was held on November 14-17, 2000 in Bishkek. This program is implemented under UN funding according to UN General Assembly resolution of June 2000. Main goal of this program is to work out Strategic Plan of action on Central-Asian countries economic development on 2002-2006.

Program includes four major components:

1. Water and power resources rational and effective use;
2. Agricultural development;
3. Investment policy;
4. Transport and communications development.

Workshop in Bishkek was devoted to the first component-water-power aspects. Participants from 4 states took part in the seminar (except Turkmenistan) and representatives of international organizations and projects. Seminar was divided in twp sections: water and power.

On power section review of existing agreements on power resources in the region was presented, their import and export, demand and production as well as fuel-power balance of three states (Kazakhstan, Kyrgyzstan, Uzbekistan). National reports from Turkmenistan and Uzbekistan were not presented. Participants have decided to prepare guidelines including description of study on power resources rational and sustainable use at the regional level. Is supposed on next seminar in April-May 2001 to discuss and approve these guidelines for regional strategy development.

On water section of the seminar review of bilateral and multilateral agreements on water resources was presented, interstate water allocation and water use in all economic branches were assessed. Participants have decided to prepare diagnostic report, including three main components:

a) water-economic balance on each state and the basin as a whole;
b) to prepare inventory of existing problems and contradictions in water resources management in the region;
c) to give recommendations on these problems and contradictions resolution.

On next seminar (April-May 2001) is proposed to discuss diagnostic report as a base for water and power resources rational and effective use in the Aral Sea basin strategy preparation.

For above mentioned documents preparation two working groups will be created (power and water) under general coordination of UN Economic Commission Advisor for Europe Mr. Branko Bosnykovich.

WATER FOR FOOD PRODUCTION IN 21 CENTURY

This is the title of next Information Collection issued by SIC ICWC. The first line of this Collection is concern about the problem: water, life, and environment in the Aral Sea basin on threshold of 21 century.

Collection contains the following:

V. Dukhovny. Second World Water Forum calls "Mankind! Wake up!"

Program of the Second World Water Forum. Hague, the Netherlands, March 2000.

Memorandum of the workshop "Water for Food Production and Agriculture Development", organized by ILRI, IWMI, IFPRI, and SIC ICWC under financial support of the Dutch Trust Fund.

V. Dukhovny, I. Avakyan, V. Prikhodko, M. Ruziyev. Aral Sea basin and irrigated agriculture of Central Asia in 21 century.

M. Bos. Activity aimed at sustainable food production in Central Asia.

From Vision to Action. Water for food production and agriculture development in Central Asia (Review).

N. Kipshakbayev, I. Malkovsky, V. Mukhamejanov, M. Musekenov. Water availability and food crops production in Kazakhstan (final report).

I. Lopatina. Water availability and food crops production in Kyrgyzstan (final report).

D. Maksudov, N. Nasirov, R. Rahmatilloyev, A. Kholmatov. Water for food production and agriculture development in Tajikistan (final report).

M. Sarkisov, V. Krohmal, V. Golubchenko, S. Aganov, O. Suyunova. Water for food production and agriculture development in Turkmenistan (final report).

A. Jalalov, A. Nisnevich, E. Roschenko. Water availability and food crops production in Uzbekistan (final report).

From Vision to Action (Review).

Collection is available in English.

INTERNATIONAL WATER RIGHT

A series of juridical collections, which are issued by SIC ICWC, have replenished with one more issue. "International water right " collection contains materials, which there will be useful to water experts dealing with questions of transboundary water resources monitoring, environment protection, etc.:

- Convention on access to information, public participation in decision making process and access to justice on questions concerning environment (Orkhus Convention);
- Convention on Rhine river protection;
- Law about Japanese rivers;
- Protocol about integrated water systems use located in activity region of South Africa development community;
- WMO Resolution № 25 "Exchange of hydrological data and outputs ";
- Transboundary waters conservation (contains guideline on monitoring and estimation of quality, recommendation of European Economic Commission (EEC), concerning specific measures on prevention, control and reduction of ground waters pollution and guideline on licensing wastewaters disposals from point sources in transboundary waters.

If you were interested in given information, applications should be addressed to:
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