

NATURAL DROUGHT OR HUMAN MADE WATER SCARCITY IN UZBEKISTAN?

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“Water flows uphill to money and power” (Reisner 1984)

Introduction

In the year 2000 and 2001 Central Asia was hit by a drought. While the first drought has been called the ‘worst in 95 years’ (Deputy Agriculture Minister Abdurakim Dzhalahov in CNN.com, 2000), the second drought was even more devastating at least for the areas in Uzbekistan close to the Aral Sea, Khorezm and Karakalpakstan. These provinces lie on the lower reaches of the river Amu Darya are most vulnerable to low regional river flows. The water scarcity seems to continue. According to the United Nations Food and Agricultural Organisation (FAO) Central Asia faces a “third consecutive year of drought”. (in CBS NEWS, 2001)

Reports indicate that the water scarcity in Uzbekistan was worst in the downstream regions of the Amu Darya. To analyse the problems of the scarcity the Amu Darya has to be viewed in three parts: upstream in Tajikistan, midstream and downstream in Uzbekistan. Upstream, midstream and downstream water scarcity differed. The phenomenon of unequal water scarcity could be an indication that the causes are not only natural but also management and therefore institution related.

The analysis of the drought starts of with a short theoretical introduction to the problems of river basin management and equal resource utilisation. An institutional approach of analysing the water management is applied. After giving a brief background into the history of agricultural production in Uzbekistan before and after independence in 1991, the focus shifts to the consequences of the drought and the question whether the drought is only natural. The examination of upstream (Tajikistan) and downstream (Uzbekistan) water availability will be used as evidence. The main evidence will be based on data of water the Nurek reservoir upstream in Tajikistan at the river Vakhsh and the Tujamujun reservoir downstream before Khorezm in Uzbekistan. (see map)

Finally the question who is responsible for the scarcity is addressed. The paper concludes that the current water scarcity downstream is neither a natural problem nor a problem of the institutions managing the water. The inefficiency of the institutions does not explain the current natural resource scarcity. The water scarcity downstream is based on the political agenda of Uzbekistan to produce cotton for export.



Social theory explanations to natural resource systems and scarcities

A river basin system is a common pool resource. Common pool resources are defined by Ostrom as resources, which share two attributes “(1) the difficulty of excluding individuals from benefiting from a good and (2) the subtractability of the benefits consumed by one individual from those available to others”. (Ostrom, 1994, p.6) Because of their position in a basin system, downstream users are in a geographical weaker position than the upstream users. The downstream users are directly affected by the water use of the upstream users. They are vulnerable to misuse and are dependent on institutions, which represent their interest. Such institutions might ensure equal sharing amongst all users of the common resource can be reached. In this case institutions are organisation, which are responsible for equal and efficient use of water between the water users. If effective these institutions will bring order and stability and reduce transaction cost.

The water of the rivers Amu Darya and Syr Darya are centrally managed in Uzbekistan. Hence, one national authority allocates water to the different regional levels (oblast), which distribute water to the districts (rayon), and then to the former state and collective farms. Although, within the given resource distribution system each level tries to bargain for the maximum allocation, the decision for allocation is made in a top-down approach. Each distributional level faces the difficulties of exclusion and subtractability of benefits. Hence, each level faces institutional dilemmas of equal and efficient distribution, which are connected to high information, monitoring and enforcement costs. (compare Ostrom 1990) Because of the high institutional costs the system of centrally managed water allocation has a tendency to inefficiency as well as water theft and free riding.

The analyses of the water scarcity in Uzbekistan will enable insights to be gained on whether the resource scarcity of the 1999-2001 'drought' is due first to natural causes, secondly to weak institutions failing to manage water equally and efficiently or thirdly to other reasons, which cannot be explained by common pool resource analysis.

Background

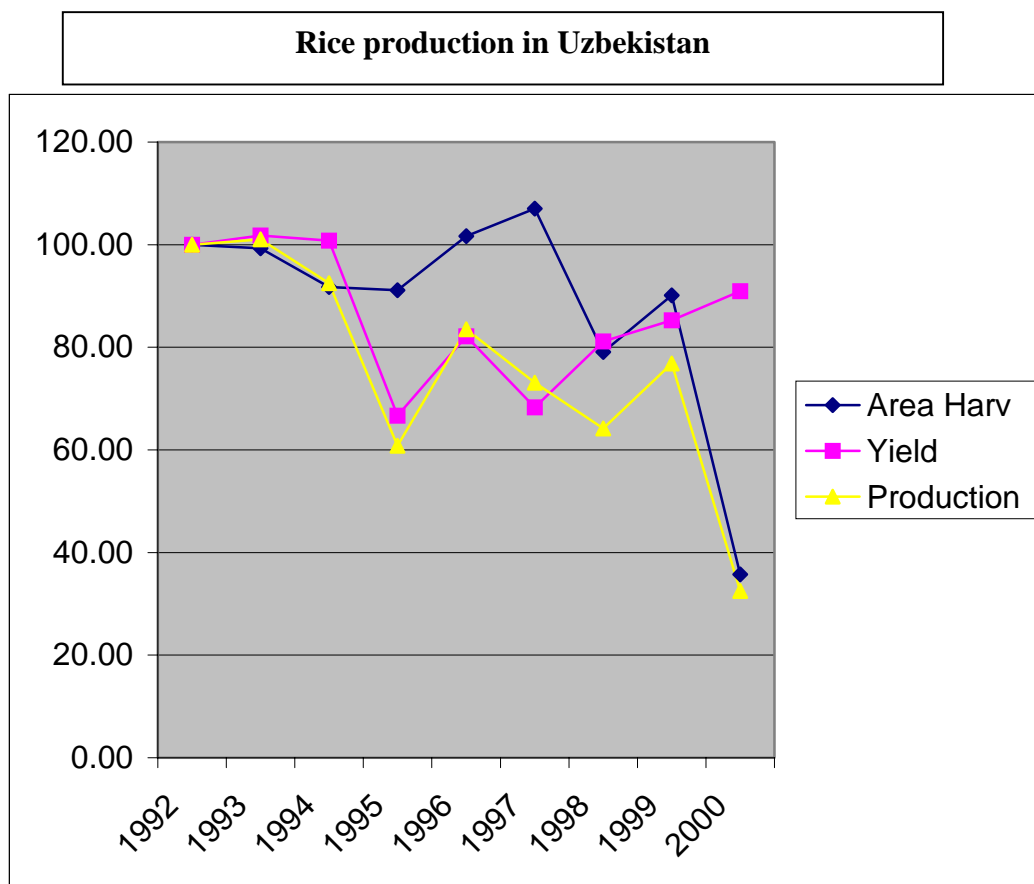
In the era of the Soviet Union, Uzbekistan specialised in cotton production. Craumer argues that in 1987 the irrigated area in Uzbekistan allocated to cotton reached 60 per cent. (Craumer, p.144) In 1991 collective and state owned farms covered 4,2 million ha of irrigated area. Lipovsky argues that "by the 1980s the Central Asian republics had achieved the maximum level of cotton production possible given the existing water resources and the technological condition of the region's irrigation systems" (Lipovsky, p.534)

After independence Uzbekistan continued with the Soviet command-administrative system of state orders and the collective ownership of agricultural land and machinery. FAO data shows that in 1992 the area allocated to cotton was 1.6 million hectares, less than 50 per cent of the irrigated area. Cotton continued to be the main crop in Uzbekistan. Although, in February 1994 land was distributed to peasant farmers specialising in cattle breeding, the main area of agricultural production namely cotton, rice and grain continued to be under state control. Only because of the quest of the Uzbek authorities to reach food self-sufficiency, cotton area harvested declined from 1,666,700 ha in 1992 to 1,425,000 ha in 2000. (compare, Babu and Tashmatov 1999) The cash-crop cotton continued to be the main source of income.

In the era of the Soviet Union, Karakalpakstan specialised in rice production, and was one of the main rice-producing regions in the Soviet Union. After independence specialisation in Karakalpakstan did not change, it continued to be Uzbekistan's largest rice producing region. Because of its specialisation the water allocation to Karakalpakstan was high, 12 km³ annually. Since independence other regions of Uzbekistan started to produce rice as well. However, Karakalpakstan is still providing "half of Uzbekistan's total rice harvest." (Romanova 2001) FAO data shows that the area of rice harvested in Uzbekistan was approximately 170,000 hectares in the period from 1992 to 1999.

Consequences of the water scarcity

The 1999-2001 'drought' had a devastating effect on Karakalpakstan's rice production. Even though in the year 2000 115,000 hectares were planted, "only 45,000 hectares were harvested". (oryza 2000, November 29, Alimatov, 2000) According to FAO data in the whole of Uzbekistan the rice area harvested in 1999 was 164,000 ha. The area shrank in 2000 to only 65,000 hectares, and the total rice production fell from 414,000 in 1999 to 175,000 tons in 2000. (FAO data)



Area harvested, yield and production given in percentage

Rice production

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Area Harv (Ha)	182,020	180,700	167,000	165,900	185,000	194,800	144,000	164,000	65,000
Yield (Hg/Ha)	29,607	30,138	29,838	19,747	24,324	20,226	24,028	25,244	26,923
Production (Mt)	538,900	544,600	498,300	327,600	450,000	394,000	346,000	414,000	175,000

in per cent	1992	1993	1994	1995	1996	1997	1998	1999	2000
Area Harv	100.00	99.27	91.75	91.14	101.64	107.02	79.11	90.10	35.71
Yield	100.00	101.79	100.78	66.70	82.16	68.31	81.16	85.26	90.93
Production	100.00	101.06	92.47	60.79	83.50	73.11	64.20	76.82	32.47

There is still no official data from the FAO for the year 2001 available. However, according to R. Koshekov (head of Water Use Department, in the Ministry of Agriculture and Water Economy in Karakalpakstan) in January 2001 it was planned to sow rice on 120,000 hectares in Karakalpakstan, but because of the expected water shortages, rice was only planted on approximately 5,000 hectares. (informal interview July 2001) Due to the continuing water shortages, it is not certain even for the reduced area whether there will be any production resulting from the sowing.

The effects of the 'drought' for the farmers are devastating. In October 2001 an UN assessment mission to Uzbekistan determined that 45,000 people might experience food supply problems. (The Times of CA, 2001) OCHA gave a higher estimate, stating that the water shortage "has rendered 100,000 farmers (79,000 people in Karakalpakstan, 21,000 in Khorezm) without a stable source of income." (OCHA No.2, 2001) Northern Karakalpakstan is the most affected area, and also the furthest downstream in the Amu Darya Basin. According to Romanova, the region's nine northern districts have produced no rice in two years. (Romanova 2001) As a result people have left the farms for better opportunities in other regions. OCHA states that the drought has "led to limited population movements from the most affected areas to other parts of Uzbekistan, as well as across international borders to Kazakhstan and the Russian federation." (OCHA No.2, 2001) Romanova claimed that, "entire villages began leaving northern Karakalpakstan". (Romanova 2001)

Drought and water scarcity

According to the Deputy Agriculture Minister Abdurakim Dzhalahov the rainfall in Uzbekistan in the summer of 2000, the first year of drought, was "less than 15 per cent of the usual amount". (CNN.com, 2000) The drought reduced the available amount of water for the different water users in Central Asia. The Uzbek newspaper, Halq Suzi, reported, "A quota of 25,289 m cubic metres of water was set for the irrigation period of 1999-2000. But only 16,734 m cubic metres of water were supplied" due to water shortage. (Halq Suzi 2001) Dr. E. Kurbanbayev, Director of SANIIRI Karakalpak branch confirmed this figure. He argued the drought reduced the available water by 30 per cent in the year 2000. (Informal interview, Nukus, July 2001)

However, if one takes the water storage of reservoirs in the Amu Darya Basin as an indicator of the reduced water availability, then it seems that the drought did not reduce the water by 30 per cent. The Amu Darya has two water reservoirs, the Nurek reservoir upstream in Tajikistan and the Tuyamuyun reservoir downstream in Uzbekistan. The Nurek reservoir stored in the end of May, June and July 2000: 6,611, 7,081 and 8,048 mcm respectively. According to available data, the average for the last five years was 6,817, 7,779 and 9,418 mcm for the same months. Comparing average and drought year shows that the effects of the drought on available water for irrigation were not severe. The drought reduced the stored water in the Nurek reservoir only by approximately 10 per cent.

In the second year of the drought the water shortfall was less as the previous year. Dr. E. Kuranbayev stated that in the year 2001 the drought reduced the available water by approximately 25 per cent. (Informal interview, Nukus, July 2001) However, the Nurek

reservoir in Tajikistan stored in May, June and July 2001; 6,309; 7,854 and 9,678 mcm of water respectively. The available water stored in Nurek in 2001 was more than the average stored in the last five years. The high amount of water in the reservoir can be explained by an increased snowmelt, due to the relatively high temperatures in the spring period in Tajikistan.

In July 2000 the drought reduced the available water for irrigation upstream only by 10 per cent. The impacts of the drought should have been moderate. However, the drought was called “severe” (oryza November 2000) and its consequences “devastating”. (Romanova 2001) The water shortages were especially severe in the lower Amu Darya region in Khorezm and Karakalpakstan in Uzbekistan.

The estimates of actual water supply to Karakalpakstan vary. Dr. E. Kurbanbayev from SANIIRI argues that in 2000 less than 50 per cent of the allocated water reached Karakalpakstan. (Informal interview, Nukus, July 2001) However, Oryza states that in the year 2000 “Karakalpakstan received only 10 per cent of its normal water supply”. (Oryza September 2000) For the year 2001, Dr. E. Kurbanbayev argues that only 30 per cent reached the downstream regions. (Informal interview, Nukus, July 2001) On the other hand, the estimates from Ecosun are lower. Romanova, quoting Ecosun, stated “the region’s water source the Amu Darya, has brought just a fifth its usual amount of water to Karakalpakstan”. (Romanova 2001)

The water storage of the Tuyamuyn reservoir might help to clarify the water availability downstream. The water table in Tuyamuyun was at a level of 2,570 1,921 and 1,914 mcm in May, June and July 2000, and in the same months in the year 2001 at a level of 1,872, 1,912 and 1,779 mcm respectively. Again, the figures can be compared with the average storage in the recent five years. In the three months the water table was at 3,865, 3,688 and 3,854 mcm. However, the reservoir supplies water to Khorezm and Karakalpakstan in Uzbekistan and Dashoguz Turkmenistan. Hence, Karakalpakstan did not receive all of the stored water in Tuyamuyun. According to the figures of Tuyzmuyn the water level was in the year 2000 approximately down to 50 per cent of the average level, and in the year 2001 down to 40 per cent of the average level.

Volume of Reservoirs at the End of Each Month

Reservoir/River	Total Capacity	Dead Storage	2000					
			mcm					
			I	II	III	IV	V	VI
Nurek/Vakhsh	10,500	5,960	7,139	5,990	5,762	6,012	6,611	7,081
Tuyamuyun/Amudarya	7,270	2,000	6,002	5,275	3,611	2,779	2,570	1,921

Reservoir/River	Total Capacity	Dead Storage	2000					
			mcm					
			VII	VIII	IX	X	XI	XII
Nurek/Vakhsh	10,500	5,960	8,048	9,552	10,110	9,830	9,309	8,491
Tuyamuyun/Amudarya	7,270	2,000	1,914	1,858	1,820	1,833	2,245	3,042

Reservoir/River	Total Capacity	Dead Storage	2001					
			I	II	III	IV	V	VI
Nurek/Vakhsh	10,500	5,960	7,450	6,416	5,957	5,946	6,309	7,854
Tuyamuyun/Amudarya	7,270	2,000	3,847	3,971	2,119	1,872	1,803	1,912

Reservoir/River	Total Capacity	Dead Storage	2001					
			VII	VIII	IX	X	XI	XII
Nurek/Vakhsh	10,500	5,960	9,678					
Tuyamuyun/Amudarya	7,270	2,000	1,779					

Reservoir/River	Total Capacity	Dead Storage	Average for Recent Five Years					
			I	II	III	IV	V	VI
Nurek/Vakhsh	10,500	5,960	7,342	6,309	5,808	6,336	6,817	7,779
Tuyamuyun/Amudarya	7,270	2,000	6,055	5,649	4,412	4,227	3,865	3,688

Reservoir/River	Total Capacity	Dead Storage	Average for Recent Five Years					
			VII	VIII	IX	X	XI	XII
Nurek/Vakhsh	10,500	5,960	9,418	10,316	10,458	10,128	9,417	8,458
Tuyamuyun/Amudarya	7,270	2,000	3,854	3,435	3,469	3,797	4,345	4,982

If Karakalpakstan received in 2000 and 2001 less than 50 and 40 per cent respectively, then the difference would have to be explained by unequal water use from Khorezm and Dashoguz, the two upstream regions after Tuyamuyun.

A comparison between the water tables of the Nurek and the Tuyamuyun reservoir shows that the available water decreased from the upstream to the downstream reservoir. In the year 2000 it decreased from minus 10 per cent upstream to minus 50 percent downstream, and in 2001 from a small plus to a minus of up to 60 per cent. This shows that the extreme water shortages downstream have been caused not by nature alone but mainly by diversion of the water in the midstream part of the Amu Darya system.

Is somebody to blame for the water scarcity?

The opinions are divided when it comes to the causes of the water scarcity. V. Antonov of the ministry of agriculture and water resources puts the blame on population growth. He argues that the population has increased four fold to 25 million over the last hundred years. (Bukharbaeva 2001) However, the recent water scarcity is a new phenomenon, therefore it cannot be explained with a rise in population in the last hundred years.

In its report on the causes and consequences of the drought, OCHA states “the protracted drought conditions are caused by a combination of natural causes and structural factors”. (OCHA No.2, 2001) OCHA argues that the most obvious causes are natural “Water

levels are reduced in part as a result of global warming, lack of rain and snowfall in upstream areas of the rivers, e.g. in Kyrgyzstan and Tajikistan.” (OCHA No.2, 2001) However, as seen before the statement can be contradicted simply by utilising the data available from the reservoir in the upstream region. The actual obvious reason is not the real reason for the severe water scarcity in the downstream regions.

The second reason given by OCHA is structural. OCHA identifies three structural reasons for the water shortages: “water management practices at both national and regional levels, irrigation techniques and technology, and agricultural and crop production policies and practices. (OCHA No.2, 2001) The water management practices and the technology used have not changed since independence, a decade ago. The practices and technology can explain inefficient use of the natural resource in Uzbekistan, however they cannot explain the recent scarcity in the downstream regions. Hence, the water scarcity in the last two years would have to be explained by changes in water allocation and use in the mid-strem region.

Kohn argues “What makes the drought unusual is that it is man-made.” (Kohn 2001) Even though Kohn presented such a statement, he did not provide explanations. He did say that most experts do not think that it is a conspiracy against the Karakalpak people, but that the water shortage is because Karakalpakstan is downstream. Kohn quotes D. McKinney “I think it’s more a function of simple geography: the Karakalpaks are downstream”. (quoted by Kohn 2001, p.2) However, this explanation is not sufficient, because Karakalpakstan was always downstream and the phenomenon of water scarcity is new.

Political decisions on agriculture

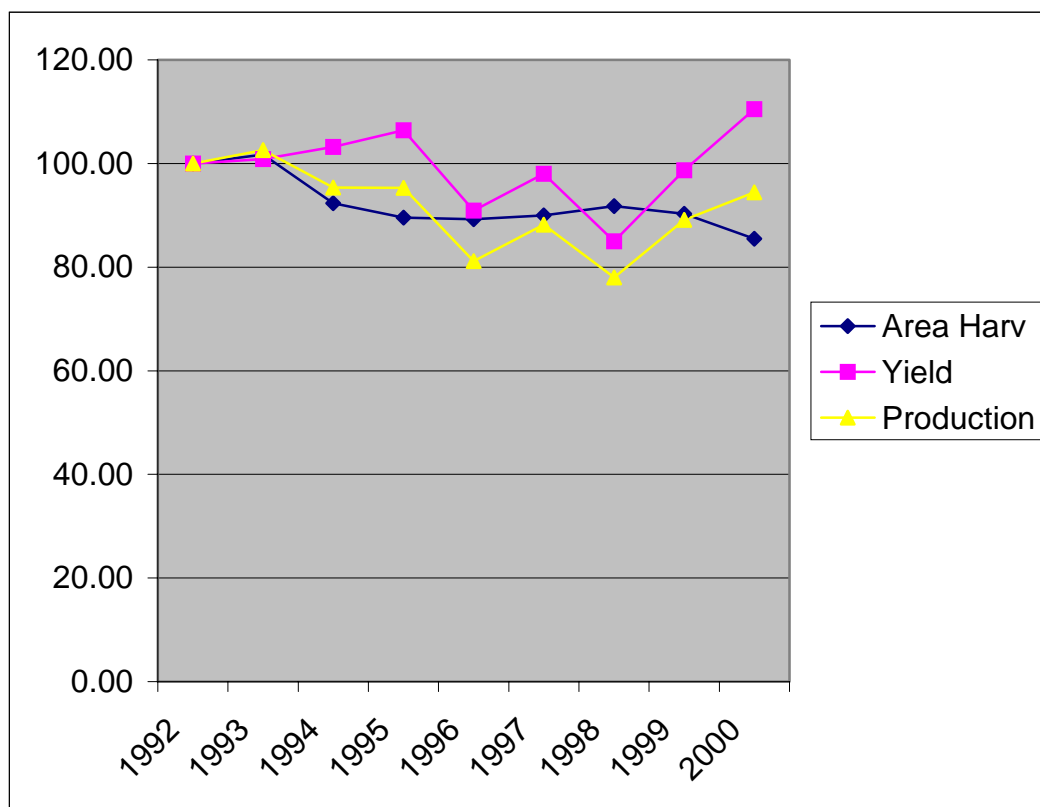
D. McKinney quoted by Kohn states “the Karakalpaks are really at the end of the line. I don’t think it is some kind of political decision to cheat them out of water.” (quoted by Kohn 2001, p.2) However, as stated by Kohn “despite the shortage, many Uzbek agricultural areas had relatively normal yields”. (Kohn 2001, p.1) Instead of looking for a conspiracy against Karakalpakstan, Kohn missed that even in the year 2001 the areas in Karakalpakstan planting cotton received water. “The region’s nine northern districts have produced no rice in two years and cotton farming is down by more than a third.” (Romanova 2001) Water was allocated to farms specialised in cotton production.

R. Koshekov (head of water use department, Ministry of Agriculture and Water economy of Karakalpakstan) stated that water gets distributed to the districts, which specialise in cotton production. (Informal interview, Nukus, July 2001) Within in the districts, the head of water distribution in the district allocated water to the cotton producing farms. (Informal interview with J. Sulaimenov, deputy head of the Department of Agriculture and Water economy Kungrad district, July 2001) The politics of water distribution was not against Karakalpakstan but against rice production.

FAO data confirmed that the Uzbek government favoured cotton production against rice production. While rice production decreased from 414,000 to 175,000 tons in the period from 1999 – 2000. Cotton production increased from 3,680,000 to 3,900,000 tons in the same period. Furthermore, the cotton production rose even though the area harvested

declined. The increased output was due to rising yields. Even in the second year of drought, the cotton harvest decreased only marginally. According to officials in the Agricultural Ministry of Uzbekistan the target for the cotton harvest was down from 3.9 million to 3.79 million tons for the year 2001. (UzbekWorld.com 2001)

Cotton production in Uzbekistan



Area harvested, yield and production given in percentage

Cotton production

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Area Harv (Ha)	1,666,700	1,695,100	1,539,400	1,492,800	1,487,300	1,500,000	1,530,000	1,505,000	1,425,000
Yield (Hg/Ha)	24,772	24,983	25,569	26,355	22,525	24,280	21,046	24,452	27,368
Production (Mt)	4,128,700	4,234,900	3,936,100	3,934,200	3,350,100	3,642,000	3,220,000	3,680,000	3,900,000

in per cent	1992	1993	1994	1995	1996	1997	1998	1999	2000
Area Harv	100.00	101.70	92.36	89.57	89.24	90.00	91.80	90.30	85.50
Yield	100.00	100.85	103.22	106.39	90.93	98.01	84.96	98.71	110.48
Production	100.00	102.57	95.34	95.29	81.14	88.21	77.99	89.13	94.46

The central influence on the regional and local departments on water distribution in 2000 and 2001 made sure that farms specialising in cotton received enough water. The upstream regions specialising in cotton production were also not affected by the drought. T. Lennaerts, a specialist from the Central Asian Natural Resource Management Project

(NRMP), interpreting the data from the reservoirs argued that the water shortages caused by the 'drought' have been moved downstream. (Informal interview, Tashkent, August 2001)

Cotton remains the main cash earner for Uzbekistan. According to UzbekWorld.com Uzbekistan's cotton fibre exports were worth \$897.1 million last year. (UzbekWorld.com 2001) In its report UNESCO states that cotton exports accounts for 40 per cent of the total exports. (UNESCO report 2000, p.64) The policy during the drought to allocate water to cotton crops instead of all crops indicates that cotton is more valuable for the Uzbek state and its command-administrative system than food crops.

Conclusion

The analysis shows that the framework of common pool resource management is inadequate to explain the current water scarcity in the downstream regions of Uzbekistan. The framework uses only institutional factors but does not incorporate political factors for unequal resource depletion.

The evidence of the available data demonstrates that the water scarcity and the devastating consequences of the water scarcity in the downstream regions are the result of political decisions. Natural as well as institutional and technical problems of water management might have contributed to the scarcity, however the main reason for the water scarcity downstream is political. It is the greed for cash crop revenue. The available water is not shared equally amongst the users, but according to economic reasoning at the centre, which preferred the production of cash crops to food crops. The downstream water users growing food crops bare the consequences of the political decision.

International research attention focused on technical and institutional causes for the scarcity, however the main explanation of water shortages downstream was political. Consequently, the downstream regions will continue to suffer. The first negative impact was environmental. The second was on the farming communities of the region who were deprived of the original term flow and then during the 1999-2001 'drought'. First of the re-allocation of water in the mid-stream reaches and secondly of the emphasis given to cash crop production.

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