



Turkmenistan's 'Golden Age' Lake: a Potential Environmental Disaster

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Introduction by Matthew Stein, FMSO

The shrinking of the Aral Sea and the subsequent environmental damage that has taken place across Uzbekistan, Kazakhstan, and Turkmenistan have been well documented; however, this has not received much attention outside of those concerned with ecological and health issues. There have been a few efforts by regional governments to use water more efficiently for irrigation purposes along the Amudarya and Syrdarya (the two rivers are the main source of the sea's water) in order to allow more water to reach the Aral Sea. Despite these efforts, the Aral Sea has continued to shrink. The construction of a dam on the northern section of the sea in 2005 in Kazakhstan has had some success in stabilizing the water level, but it is only one solution.

The following article by Zhulduz Baizakova focuses on an effort by the government of Turkmenistan to solve some of the country's water problems by constructing "Altyn Asyr" (Golden Age), a lake in the north of the Garagum Desert. As Baizakova explains, Altyn Asyr is not without skeptics, and even if the lake lives up to its intended purpose, it will be some time before its benefits are felt. Baizakova provides a good overview of the project, and there is one issue in particular that she mentions that is worth noting: the problems related to water in Central Asia will not likely lead to any kind of violent conflict. There have been a number of predictions outside of Central Asia that a water war would take place in the region, but recent violent conflicts have taken place for reasons not related to water. This is not to minimize the severity of water issues in the region, but to show that, from a regional perspective, violent conflict related to water problems is not the main focus. It would be worth considering how those in the region view water issues rather than relying solely on outside perspectives.

Turkmenistan's 'Golden Age' Lake: a Potential Environmental Disaster

BY ZHULDUZ BAIZAKOVA

In July 2009 President of Turkmenistan Gurbanguly Berdymukhammedov officially opened construction on Altyn Asyr (Golden Age), an artificial lake created to solve some of the country's irrigation problems. The lake, located in the north of the country, is not expected to be filled to its capacity for a number of years, and will cost an estimated \$4.5 billion.¹ While the lake is intended to solve some of the country's water problems, there is skepticism that it will only cause more damage to an already difficult environmental situation in the region. It is necessary to examine what impact the lake could have on the surrounding environment and population. It is also worth noting how, despite these problems, there have been almost no conflicts in Central Asia involving water since the collapse of the Soviet Union.

Background

Apart from a booming gas industry, the economy of Turkmenistan is focused mainly on agriculture, in particular on cotton production. The issue of irrigation presents constant challenges for the government of Turkmenistan, since 80 percent of its territory is desert and the country currently uses internal and transboundary rivers for irrigation purposes. Turkmenistan is

¹ Luke Harding, "Turkmenistan tries to green its desert with manmade lake," *The Guardian*, July 17, 2009, <http://www.guardian.co.uk/environment/2009/jul/17/turkmenistan-golden-age-lake>, (accessed May 21, 2013); "Turkmenskoe «Zolotoe ozero» mozhnet obrnut'sya ekologicheskim bedstviem," *IWPR*, August 4, 2009, <http://iwpr.net/ru/report-news/туркменское-«золотое-озеро»-может-обернуться-экологическим-бедствием>, (accessed May 21, 2013).

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currently one of the top ten producers of cotton in the world.² Water requirements for cotton are high and the crop must be irrigated at specific times during cultivation to achieve good yields; this, in turn, demands an intricate and complicated irrigation system.³



2 United States Department of Agriculture, “Economic, Statistics, and Market Information System, Commodities, Cotton and/or Wool, Cotton: World Market and Trade, 2010s, 2013, Cotton: World Markets and Trade, 06.12.2013,” <http://usda01.library.cornell.edu/usda/fas/cotton-market//2010s/2013/cotton-market-06-12-2013.pdf>, (accessed June 13, 2013).

3 Food and Agriculture Organization of the United Nations, “Natural Resources, Water Resources, Topics, Crop Information, Cotton,” http://www.fao.org/nr/water/cropinfo_cotton.html, (accessed May 8, 2013).

Driven by the ambitious goal of producing vast cotton plantations, the Soviet Union constructed a solid infrastructure for the drainage system covering the main river basins. This included the pride of the irrigation system in the country, the Karakum Canal, built in the mid-1950s. Due to the construction of dams and the diversion of water, the eastern part of the Aral Sea became critically damaged, especially in areas such as Karakalpakstan, Khorezm (both in Uzbekistan), and Dashoguz (old name Tashauz) regions of Turkmenistan.⁴ (See Map 1 on page 19.)

Since the collapse of the Soviet Union the same irrigation system has remained in place throughout the whole Central Asian region. The land is also poorly maintained in most Central Asian countries; arable land in Uzbekistan suffers from bad irrigation and over use of fertilizers, and many farmers tend to over use water.⁵ The same is also true for Turkmenistan; for each liter of water needed for irrigation, there are 110-170 liters that are wasted, which is how drainage waters develop.⁶

Although the total area of irrigated land in Turkmenistan in 2007 equalled 1.1 million hectares (ha) (4,247 square miles), this constitutes 100 percent of the overall available irrigated land. Moreover, the share of the irrigated land affected by salinization is 95.5 percent. Additionally, the share of agriculture in the gross domestic product (GDP) of Turkmenistan, according to figures from 2008, is only 20 percent compared to Kyrgyzstan and Afghanistan, 39 and 29 percent respectively.⁷

4 Fishery in the lower Amu-Darya under the impact of irrigated agriculture by L.P. Pavlovskaya, Karakalpak Branch of the Academy of Sciences of Uzbekistan, Nukus, Uzbekistan, <http://www.fao.org/docrep/V9529E/v9529E04.htm> (accessed May 9, 2013).

5 Conflict over Water Related Resources in Uzbekistan and Tajikistan and Its Impact on Local Security by Matthew Stein, Foreign Military Studies Office, <http://fmso.leavenworth.army.mil/documents/Conflict-Over-Resources.pdf>, (accessed May 21, 2013).

6 "S. Kuvaldin: Vodnyi mir "zlotogo veka", *CA Water Info*, http://www.cawater-info.net/review/turkmen_lake_3.htm, (accessed May 21, 2013).

7 Alfred C. Diebold and Jenniver Sehring, *Water Unites: From the Glaciers to the Aral Sea* (Trescher Verlag, 2012).

The Amudarya is Turkmenistan's biggest water source used for irrigation purposes. The river's annual average water flow varies between 73-79 km³ (17.5-18.9 cubic miles) and its total length is 2,540 km. Today the river no longer reaches the Aral Sea.⁸ The other small rivers in Turkmenistan are the Tejen (1,124 kilometers), the Murgap (852 kilometers), and the Atrek (660 kilometers). All of them are used for irrigation.

Inefficient and uncontrolled use of the Amudarya has created immeasurable problems for irrigation. Excessive drainage water floods arable lands and pastures and creates salt marshes, further damaging the fragile balance of nature in Turkmenistan. The Altyn Asyr Lake will draw from this drainage water and there are troubling reports that it might be filled with sewage water.⁹

The idea of using drainage water by diverting it first appeared in the 1960s during Soviet rule, with a plan to divert it into the Caspian Sea. In the 1970s a project to collect water in the natural Karashor depression was developed; the project would carry water from Dashoguz to Karashor (passing south of Sarygamish Lake) along part of the dried up Uzboy riverbed and carry it from the city of Turkmenabat through the Karakum desert. The latter route would be the main collector of water and run around 720 km (447 miles). Construction on the routes stopped after the collapse of the Soviet Union. This same project is now being implemented to create Altyn Asyr.

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- 8 Aral Sea update by Eric Walberg, Peace Magazine Jan-Mar 2007, page 11, <http://peacemagazine.org/archive/v23n1p11.htm> (accessed May 21, 2013).
- 9 Andrey Kostyanoy, Igor Zonn, Dmytri Solovyov, “Construction of the Turkmen Lake «Altyn Asyr» and the results of its satellite monitoring in 2009-2011,” *International Water Technology Journal (IWTJ)* 2, no. 1 (March 2012), <http://iwjtj.info/wp-content/uploads/2012/11/V2-N1-p6.pdf>, (accessed May 21, 2013).

“Thus, the outdated irrigation system currently in place presents on-going problems for all parties involved, including the government, farmers, villagers, the ecosystem, and the river basin itself.”

The main sources that the lake will divert water from are the Republic of Karakalpakstan (an autonomous republic in Uzbekistan) and the Dashoguz Province, Turkmenistan, which are considered to be the poorest regions in Central Asia. There is no firm evidence or argument to prove how these two provinces would economically benefit from Altyn Asyr’s construction.

The water for Altyn Asyr travels through an extensive network of canals and manifolds, some of which are not properly lined or maintained, resulting in water being leaked and drained along its pathway. Additionally, the open canals and the region’s environment (depending on the season) lead to a high level of evaporation. Evaporation in the desert takes place much more intensively than the flow of new water. After evaporation, minerals from the water remain and begin to contaminate the soil, leaving behind salt marshes. Thus, the outdated irrigation system currently in place presents on-going problems for all parties involved, including the government, farmers, villagers, the ecosystem, and the river basin itself. The Karakum Canal is believed to lose around one third of its water by some estimates.¹⁰

Due to the poor maintenance and dilapidation of the irrigation system, more than 50 percent of the river water does not reach the crops. The water discharges back to the Amudarya with an increased mineralization level, affecting the local population in both Turkmenistan and Uzbekistan. Fresh river water then becomes polluted, both for drinking and irrigation, and this vicious cycle repeats itself.

Some estimate that out of the total amount of drainage water, only 13 percent is reused for irrigation, 51 percent is discharged back into rivers along with 110-120 million tons of salt,

10 Diebold and Sehring, *Water Unites: From the Glaciers to the Aral Sea*

while the rest is virtually wasted in the desert through evaporation or lost in the soil. This also affects groundwater, with its level of mineralization continuing to rise. Due to the inefficient functioning of the drainage system and drainage water being wasted on an unprecedented scale, 73 percent of irrigated land is now considered to be salinized. Moreover, it is not only salt that remains in the soil; there are pesticides and other chemicals left behind. Dust storms spread the soil over distances of 500 km, causing harm to the local population and the development of natural vegetation and crops.

“Turkmenistan is considered to lag behind its Central Asian neighbors in areas of water governance,”

The Complications of Altyn Asyr

Despite less than optimistic predictions from scientists and specialists who focus on water and agricultural issues, the declared goals of constructing Altyn Asyr are stopping drainage water flow to back to the Amudarya and reducing the mineralization level, improving sanitation, stopping grazing lands from flooding, creating a unified system of collecting drainage water, creating a water reservoir for developing new agricultural space, extending the access to water for local farmers, and changing the irrigation infrastructure of the entire Karakum Desert. When finished the new lake's parameters will be 103 km in length and 18.6 km wide, with a capacity of 132 km³ (31.6 cubic miles) and a surface of about 1,916 km². The lake is located just 350 km from Ashgabat. The budget for the project varies between \$4.5 billion and \$8 billion.¹¹ Turkmen officials claim that the lake would facilitate biodiversity and bird migration and allow the growth of salt tolerant plants, farming of fish and cattle, and even the development of eco-tourism. The government also plans to create around 400,000 ha (988,421 acres) of land to be used for irrigation or pasture.

¹¹ Ibid.

The government of Turkmenistan is doing its utmost to attract and advertise this enterprise by arranging numerous international conferences and workshops involving Global Water Partnership, the United Nations Environment Programme (UNEP), the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Economic Commission for Europe (UNECE), and the Global Environment Facility (GEF), among others. Despite this high-profile involvement, it is difficult to predict how eco-tourism and farming would develop around a lake containing salinized drainage water diverted through an aging irrigation system.

Turkmenistan is a member of both the Interstate Coordination Water Commission (ICWC) and the Interstate Fund for the Aral Sea (IFAS), the two main bodies that protect, monitor, and regulate water resources management across all Central Asian countries; however, Turkmen authorities did not consult with either organization concerning the construction of Altyn Asyr. Turkmenistan is considered to lag behind its Central Asian neighbors in areas of water governance, such as recognition of international water rights, willingness for mutually beneficial cooperation, transparency, involvement of water users, the recognition of the International Water Resources Management (IWRM) process as a key tool in cooperation, the promotion of a respectful attitude to water, or a water conservation policy.¹²

Turkmenistan already has one natural drainage water collector, the Sarygamish Lake (8 km³, 1.9 cubic miles), along with about 80 other smaller lakes where drainage water is collected. Its location is just 200 km southwest of the Aral Sea. Nowadays Sarygamish is used as a discharge collector of salty irrigation water. Scientists estimated that its salinity had increased rapidly from 3-4 grams/liter in the 1960s to 12-13 grams/liter by 1987.¹³

12 Turkmenistan had its first meeting of the Steering Committee of the National Policy Dialogue on Integrated Water Resource Management (NPD/IWRM) in April 2011; Patricia Wouters, Viktor Abramovich Dukhovnyĭ, and Andrew MacAllan, eds., *Implementing Integrated Water Resources Management in Central Asia* (Springer, 2007).

13 Nikita F. Glazovsky, *The Aral Sea basin*, eds. Jeanne X. Kasperson, Roger E. Kasperson, and B.L. Turner II (United Nations University Press, 1995), <http://archive.unu.edu/unupress/unupbooks/uu14re/uu14re0a.htm#3.%20the%20Aral%20sea%20basin> (accessed May 21, 2013).

Professor Viktor Dukhovny, Director of the Scientific Information Center of the Interstate Water Coordination Commission of Central Asia in Tashkent, Uzbekistan, stresses that all closed water reservoirs that are being filled with drainage water need to increase their bio-efficiency.¹⁴ Scientific evidence proves that natural depressions with drainage water cause the appearance of alkali soils and brackish water and a gradual decline in biological productivity.¹⁵ Dukhovny also explains that the Turkmen lake would face the same problems unless it turns into a flow-through lake.¹⁶ Thus, specialists are required to assess the level of salinity in drainage water and how it might interact with ground water, which, in turn, would lead to estimating the amount of the drainage to be used in sandy areas where the canals and manifolds pass.

Lakes like Sarygamish tend to contain water full of sulphates and sodium chlorides. Additionally, high levels of calcium and magnesium that exceed the maximum permissible concentration recommended for bodies of water used for fishing are not recommended for developing a healthy fishing industry.¹⁷ In the 1990s the salinity level of Sarygamish Lake was reportedly increasing at a rapid level; it was stagnant in an arid surrounding and, consequently, experts predicted that the number of freshwater fish would not only decline, but even become extinct by 2000. It is unknown if this prediction proved true. Experts also warned that such scenarios could be worse when taking into account how the drainage water is contaminated with pesticides and heavy metals. One of the proposed mechanisms to solve the issue is to supply water with a low level of salinization to the lake regularly.¹⁸ However no such mechanism has been undertaken since Sarygamish is reportedly still a heavily salinized body of water.¹⁹ Eventually, water from Sarygamish has proven to be unusable for cotton and other crops. The

14 "V. Dukhovnyĭ: K voprosu o Turkmenskom ozere. Novaya solyanaya bomba," *CA Water Info*, July 17, 2009, <http://www.centrasia.ru/newsA.php?st=1247815860> (accessed May 21, 2013).

15 Chandra Madramootoo, Victor Dukhovny, Robert S. Baker, and I. Helen Fyles, eds., *Water and Food Security in Central Asia* (Springer, 2010).

16 "V. Dukhovnyĭ: K voprosu o Turkmenskom ozere. Novaya solyanaya bomba," *CA Water Info*

17 Fishery in the lower Amu-Darya under the impact of irrigated agriculture

18 Ibid.

19 Ibid.

fishing industry stopped functioning in the early 1990s. The lake continues its existence in vain, drawing vital irrigation water away from both the Dashoguz and Karakalpakstan Provinces.²⁰

Another important factor to consider is that one of the collectors that would supply drainage water into Altyn Asyr is currently providing water for Sarygamish Lake on the border with Uzbekistan. Since Sarygamish belongs to both states, Ashgabat would need to negotiate with Tashkent concerning the issue. However, it may not prove that simple considering how the Uzbeks already are disputing with Tajikistan (over construction of the Rogun Dam) and Kyrgyzstan (over the Kambarata hydropower station). Tashkent is not likely to agree to potentially turning Sarygamish into another Aral Sea, since diverting water from the Ozerny collector (Khorazm Province, Uzbekistan) would result in a substantial amount of water loss for the lake. Ozerny is estimated to have an annual water flow of 1.5 – 2 km³ (0.36 – 0.48 cubic miles).²¹

Skepticism of Altyn Asyr's Feasibility

Since Altyn Asyr is located near the Aral Sea and Sarygamish Lake, which already have high salinity levels, are contaminated with chemicals, and are subject to significant evaporation, there are major implications for the entire Central Asian region and its population. There are predictions that Turkmenistan will be affected by climate change, that the country will become dryer and warmer over the next few decades. These changes will impact both Turkmenistan and Uzbekistan and are likely to negatively affect cotton, cereal, and forage production, increase already extremely high water demands for irrigation, exacerbate the already existing water crisis,

“As some Turkmen specialists confirm, there have been no comprehensive studies conducted concerning the efficient use of water resources and its implications for the environment.”

20 “S. Kuvaldin: Vodnyĭ mir “zolotogo veka”, CA Water Info

21 “V. Dukhovnyĭ: K voprosu o Turkmenskom ozere. Novaya solyanaya bomba,” CA Water Info

and accelerate human-induced desertification.²² Desertification is noted by Nurgozel Bairamova in her article, “The Great Lake or Turkmenistan’s Dead Sea?,” as she suggests that “the more deserts we turn into the gardens, the more gardens we turn into the deserts.”²³

Some experts claim that the country does not have enough drainage water to make it all the way to the Karashor depression and fill Altyn Asyr. The new canals that are being built, in addition to existing canals, are a very basic construction design and do not include necessary filtration measures. The planned filtration method is to use predominantly biological methods like aquatic plants. Uzbek experts have stated that the lake might become “the latest man-made disaster to hit the region” after the Aral Sea tragedy.²⁴

The leader of the *Tabigat* (Nature) movement in Kazakhstan, Mels Eleusizov, characterizes the project as a “risky venture” for the region since the Aral Sea is already suffering from a lack of water. He believes that taking more resources from the Amudarya is unimaginable.²⁵ Turkmenistan’s Minister of Water Industry, Myratgeldy Akmammedov himself acknowledges that the biological productivity of artificial lakes containing drainage water will gradually deteriorate and decrease because of the salinization process.²⁶

As some Turkmen specialists confirm, there have been no comprehensive studies conducted concerning the efficient use of water resources and its implications for the environment. Since drainage water has a concentration of more than 10 grams/liter, it cannot be used to irrigate traditional crops grown in Turkmenistan, such as cotton, wheat, and sugar beets.

22 Elena Lioubimtseva, Jahan Kariyeva, and Geoffrey M. Henebry, *Climate Change in Turkmenistan* (Springer, 2012), http://link.springer.com/content/pdf/10.1007%2F698_2012_175.pdf (accessed May 21, 2013).

23 “N. Bayramova: Velikoe ozero ili Mertvoe more Turkmenistana?,” *CA Water Info*

24 “Turkmenskoe «Zolotoe ozero» mozhnet obernut’sya ekologicheskim bedstviem,” *IWPR*

25 Bruce Pannier, “Turkmenistan: Projects Sounding Alarm Bells In Region (Part 2),” *RFE/RL*, August 30, 2004, <http://www.rferl.org/content/article/1054573.html> (accessed May 21, 2013).

26 Myratgeldy Akmammedov, “Ustoichivoe upravlenie drenazhnymi vodami na transgranichnom urovne,” http://www.icwc-aral.uz/workshop_march08/pdf/akmammedov_ru.pdf, (accessed May 21, 2013).

Head of the Turkmen branch of the World Wildlife Fund Timur Berkeliev believes that the contaminated lake will turn into “an artificial Dead Sea.” Berkeliev also noted that the project has never been publicly discussed or subject to consultation before its launch. In 2004 the government banned the only independent environmental body after its members inquired as to whether any ecological expertise had been conducted on Altyn Asyr.²⁷ The government of Turkmenistan has been willing to spend enormous sums of money on ambitious new construction projects, yet the irrigation system developed during the Soviet era has not been maintained or modernized at the necessary level.²⁸

Support for Altyn Asyr

President of Turkmenistan Gurbanguly Berdymukhammedov claims that “as practice shows, water will undergo purification to be used again both for irrigation and other purposes.”²⁹ However, there is no practice known in the world with such a large amount of water to be maintained and purified.

Turkmens stress that Altyn Asyr is the very first experiment in the world to collect drainage water in a special reservoir for its later reuse. Turkmen specialists advocate only one method of filtering drainage, and possible sewage, water, which is to use the so called “bio-plateau,” essentially aquatic plants that can absorb pesticides, petroleum products and other chemical substances.

“It is worth asking how relevant the project really is for the Turkmen authorities when the biggest challenge the Turkmen really need to resolve is to learn how to use water more efficiently.”

27 “N. Bayramova: Velikoe ozero ili Mertvoe more Turkmenistana?,” *CA Water Info*, http://www.cawater-info.net/review/turkmen_lake_9.htm (accessed May 21, 2013).

28 “S. Kuvaldin: Vodnyi mir “zlotogo veka”, *CA Water Info*

29 “Turkmen President explains regional importance of artificial lake in Karakum desert,” *Turkmenistan.ru*, March 19, 2010, http://turkmenistan.ru/?page_id=3&lang_id=en&elem_id=16577&type=event&sort=date_desc (accessed May 21, 2013).

At the moment Ashgabat is trying to attract \$1 billion in foreign investments to expand its cotton industry until 2016, which precedes the expansion of irrigated land, meaning there will be more demand for water. There are also plans to increase the amount of the cotton harvest. According to Minister of Textile Industry Saparmuray Batyrov, 550,000 ha (1,359,079 acres) were sown for cotton in 2012.³⁰ There are predictions that cotton production in Turkmenistan will increase by 4.9 times by 2020, and there are plans to increase irrigation capacity with the construction of new water reservoirs.³¹

An Additional Consideration

Another issue to consider in the context of regional dynamics is the potential increase in the use of Amudarya water resources by Afghanistan. The drawdown of NATO combat forces from Afghanistan in 2014 will leave the country in the hands of the national government. It is difficult to currently forecast who will govern Afghanistan in the near future. However, it is clear that the country needs to better develop its agricultural sector, which includes better overall water usage. This could entail the growth of higher water consumption from the Amudarya basin, since part of it originates in Afghanistan. How this would affect the downstream countries, particularly Turkmenistan, remains unclear. Agreements made between the Soviet Union and Afghanistan in 1946 and 1958 treat the Amudarya as an international river. However, the agreements did not include water quotas, since Afghanistan has only used small amounts of the river water. Since the collapse of the Soviet Union there have been no new agreements with Afghanistan concerning usage of the Amudarya.³²

30 Marat Gurt, "Turkmenistan plans \$1 billion expansion of cotton industry," *Reuters*, October 17, 2012, <http://www.reuters.com/article/2012/10/17/turkmenistan-cotton-idUSL5E8LHONL20121017>, (accessed May 21, 2013).

31 Wouters, Dukhovnyĭ, and MacAllan, *Implementing Integrated Water Resources Management in Central Asia*
32 Stuart Horsman, *Central Asian Security: The New International Context*, ed. Roy Allison and Lena Johnson (London: The Royal Institute of International Affairs, 2001), 77-78.; Masood Ahmad and Mahwash Wasiq, "Water Resource Development in Northern Afghanistan and Its Implications for Amu Darya Basin," *World Bank Working Paper No. 36* (June 2004): 3, 37-40.

Outlook

Outside of official statements and the predictions of experts, maps made from satellite monitoring by the P.P. Shirshov Institute of Oceanology and the Geophysical Center of the Russian Academy of Sciences, working with the Marine Hydrophysical Institute in Ukraine, have shown increasing amounts of salt patches along the path of collectors and riverbeds as recent as July 2011.³³ Also, there have been few reports about the progress of the project from inside the country or abroad. An article by Valery Obramenko in the newspaper, “Turkmenistan: the Golden Age,” mentions benefits from Altyn Asyr, such as the expansion of new land for irrigation, increased opportunities for shepherds to water their cattle, vegetation growth on the banks of man-made canals, the availability of fishing for some villages, and the reappearance of some species of fish as well as other wildlife that live in the area.³⁴ While it is highly doubtful that the new lake will be of some help in supplying the water, no one in the Turkmen government doubts that the water must be clean to grow the high quality, marketable cotton to produce “made in Turkmenistan” jeans that would lead the country into its bright and shining future.

“Despite tension among Central Asian governments there has been no record of any kind of armed conflict over water in Central Asia.”

It is difficult to determine Ashgabat’s policies when it has the means to implement a \$6-8 billion project like Altyn Asyr and acquire the latest construction equipment from such companies as Komatsu and Caterpillar, but refuses to maintain and modernize existing manifolds and canals. It is worth asking how relevant the project really is for the Turkmen authorities when

33 Kostyanoy, Zonn, and Solovyov, “Construction of the Turkmen Lake «Altyn Asyr» and the results of its satellite monitoring in 2009-2011,”

34 Vitalii Obramenko, “Karakumy v ozherel’e rek,” *Turkmenistan: Zolotoi Vek*, December 14, 2012, <http://www.turkmenistan.gov.tm/?id=2952> (accessed March 27, 2013; note: Turkmenistan’s official government website is believed to be malicious, see Kaspersky Lab report: http://www.securelist.com/en/downloads/vlpdfs/theteamsystory_final_t2.pdf, accessed May 21, 2013).

the biggest challenge the Turkmens really need to resolve is to learn how to use water more efficiently. This, by itself, would reduce the amount of drainage water being leaked around the canals and riverbeds and prevent contaminated water from discharging back into the Amudarya. One solution to reduce the flow of drainage water is to use low-mineralized ground water (with a salinity level of 1-4 milligrams/liter) from depths of 1-2 meters (3.2-6.5 feet). Studies have shown that at a depth of one meter water quality improves cotton production by 30-70 percent.³⁵

One other issue that continues to be discussed in the media is that a war or a violent conflict over water could happen in Central Asia.³⁶ President of Uzbekistan Islam Karimov believes that some of the existing tensions around the transboundary rivers in the region might result in war.³⁷ Uzbekistan is disputing with its upstream neighbors Kyrgyzstan and Tajikistan over their plans to build hydroelectric dams, which would impact downstream irrigation.³⁸ There are viewpoints that climate change would also make water less available and create a hostile environment; however, that situation might occur only if severe water shortages take place.³⁹

Despite tension among Central Asian governments there has been no record of any kind of armed conflict over water in Central Asia.⁴⁰ Instead, other types of violent conflicts have taken place, both domestic and regional. Some of the major incidents include several terrorist attacks

35 Madramootoo, Dukhovnyĭ, Baker, and Fyles, *Water and Food Security in Central Asia*

36 "Dammed if they do," *The Economist*, September 29, 2012, <http://www.economist.com/node/21563764>, (accessed September 23, 2013).

37 "Uzbek leader sounds warning over Central Asia water disputes," *Reuters*, September 7, 2012, <http://www.reuters.com/article/2012/09/07/centralasia-water-idUSL6E8K793I20120907>, (accessed September 20, 2013).

38 Tobias Siegfried, Thomas Bernauer, Renaud Guiennet, Scott Sellars, Andrew W. Robertson, Justin Mankin, and Peter Baeur-Gottwein, "Will Climate Change Exacerbate or Mitigate Water Stress in Central Asia?" *Columbia Water Center* (November 2011), http://water.columbia.edu/files/2011/11/syrDarya_ClimateImpacts_Siegfried.pdf, (accessed September 20, 2013).

39 Ibid.

40 Aaron T. Wolf, Shira B. Yoffe, and Mark Giordano, "International waters: identifying basins at risk," *Water Policy* 5 No. 1 (January 2003) 29-60; Thomas Bernauer and Anna Kalbhenn, "The Politics of International Freshwater Resources," in *The International Studies Encyclopedia*, ed. Robert A. Denemark, Volume IX (Wiley, 2010), 5800-5821.

“Despite the functional failures of the irrigation system, a serious water crisis involving damage to the economy or the loss of lives would have to occur to force any Central Asian state into taking military action.”

against the government and security services in Kazakhstan (2011-2012);⁴¹ the Zhana-Ozen riots, driven by former employees of oil companies demanding justice in December 2011;⁴² Kyrgyz attacks against the Uzbek population of Osh and Jalal-abad in June 2010 with a high number of killed and injured in the aftermath of the Kyrgyz revolution;⁴³ skirmishes on the Uzbek-Kyrgyz border in January 2013;⁴⁴ and the Tajik special operation designed to apprehend former United Tajik Opposition commander Tolib Ayombekov and his supporters after the murder of a National Security Committee general which resulted in huge losses among the Tajik security forces and civilians in July and August 2012.⁴⁵

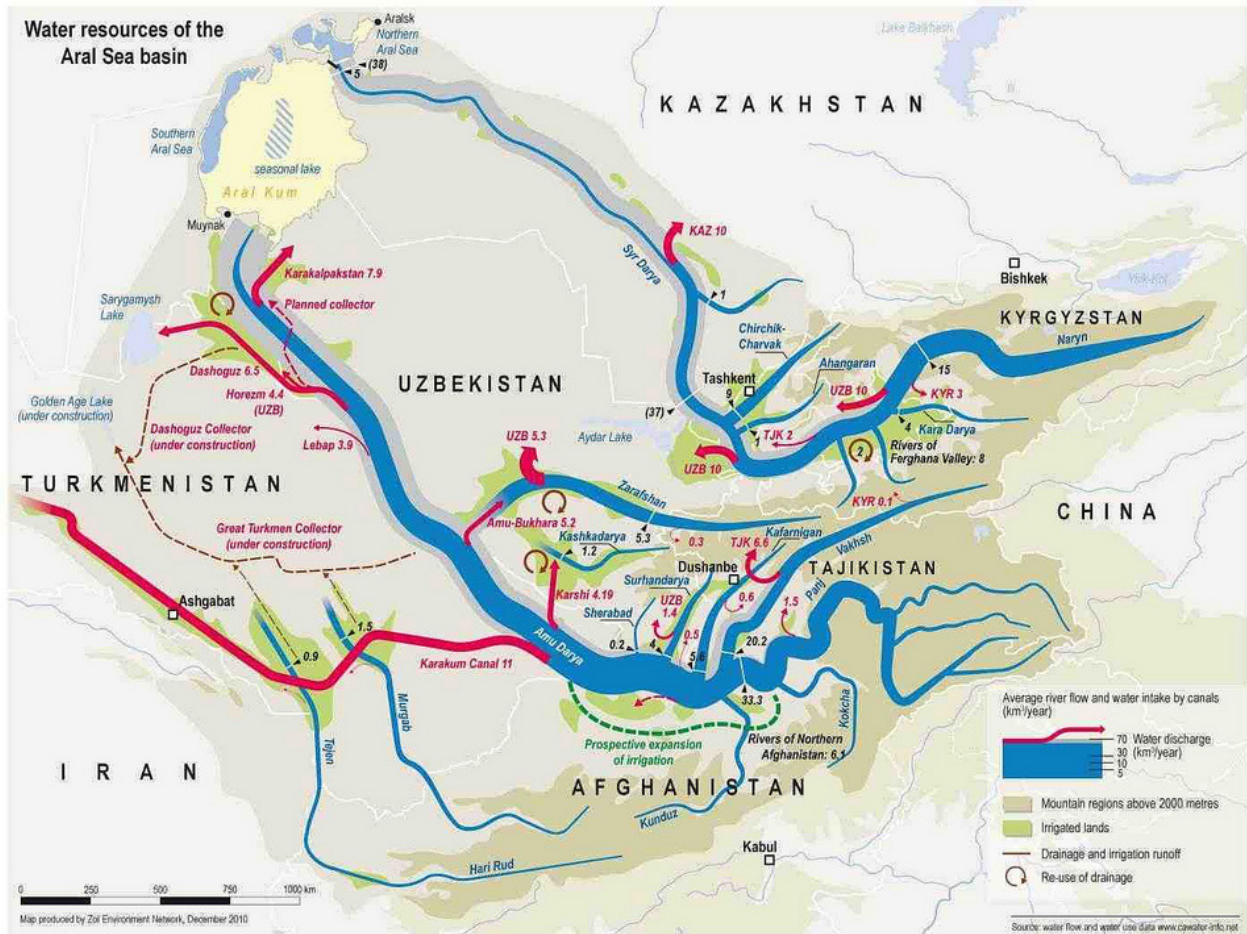
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- 41 “Eta ne terakty, a publichnyy suitsid, popytka vyrazit’ protest,” *Megapolis*, June 6, 2011, http://megapolis.kz/art/Eto_ne_terakti_a_publichnyy_suitsid_popitka_virazit_protest, (accessed September 24, 2013); Maxim Popov, “VIDEO i FOTO: Vzryv pogremel primerno v 30 metrakh ot CIZO KNB v Astane,” *Tengri News*, May 24, 2011, http://tengrinews.kz/kazakhstan_news/188653/, (accessed September 24, 2013); Gennady Benditskiy, “Ad v kamyshovom rayu,” *Vremya*, July 7, 2011, <http://www.time.kz/index.php?module=news&newsid=22465>, (accessed September 24, 2013); Gennady Benditskiy, “Golovu v pesok,” *Vremya*, July 14, 2011, <http://www.time.kz/index.php?module=news&newsid=22632>, (accessed September 24, 2013); Zarina Akhmatova, “Atyrau: pervaya krov’,” *Vremya*, November 1, 2011, <http://www.time.kz/index.php?module=news&newsid=24290>, (accessed September 24, 2013); Galina Vybornova, “Krovavyy put’ ubiytsy,” *Vremya*, November 15, 2011, <http://www.time.kz/index.php?module=news&newsid=24530>, (accessed September 24, 2013); Aleksey Nadymov, “Nochnay ataka,” *Megapolis*, September 15, 2012, http://megapolis.kz/art/Nochnaya_ataka, (accessed September 2013).
- 42 Andrey Skvoretsov, Madina Aimbetova, and Togzhan Gani, “Zhanaozen: pozhar na kraynem zapade,” *Vremya*, December 21, 2011, <http://www.time.kz/index.php?module=news&newsid=25102>, (accessed September 24, 2013); “Zhanaozen. Nine Days Later...,” *Vox Populi*, December 29, 2011, <http://www.voxpopuli.kz/en/post/view/id/546>, (accessed September 24, 2013).
- 43 Kylym Shamy, Centre for Defenders of Human Rights, “Spisok pogibshikhv rezul’tate iyun’skikh sobytiiy 201 goda na yuge respubliki,” December 16, 2011, <http://web.archive.org/web/20130118190350/http://ksh.kg/?p=165>, (accessed September 24, 2013); Inga Sikorskaya, “Na krayu ada. Chetyre strashnykh dnya v Oshe,” *Fergana News*, June 18, 2010, <http://www.fergananews.com/articles/6619>, (accessed September 24, 2013).
- 44 Yekaterina Ivashchenko and Daniil Kislov, “Kyrgyzstan-Uzbekistan: Desyat’ stolbov i shest’ metrov ot granitsy,” *Fergana News*, January 8, 2013, <http://www.fergananews.com/articles/7591>, (accessed September 24, 2013).
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The general population of the Central Asian states does not seriously consider the possibility of an armed interstate conflict over water resources; however, communities living around the transboundary rivers and along the borders do experience certain difficulties when it comes to sharing water for drinking and agricultural purposes. Additionally, since 1991 no Central Asian country has built any modern drainage systems. Despite the functional failures of the irrigation system, a serious water crisis involving damage to the economy or the loss of lives would have to occur to force any Central Asian state into taking military action.

The cotton that was considered to be a blessing and the main economic driver for the country is now possibly becoming its curse. The questions that the contemporary Turkmen generation may need to ask is how much more water would be needed for expansion of the cotton fields and whether or not this is relevant when the country receives its main revenues from the export of hydrocarbons. One solution might be to give up or least reduce cotton production gradually. This would solve a few issues at once, like helping to maintain the present Aral Sea water surface area, reducing the overall amount of collector drainage waters, saving the river basins for future generations as water is an expendable commodity, and improving the agricultural and pastoral lands by reducing salinization. This could also benefit the national budget by reducing the amount of money spent on implementing expensive and time-consuming projects. Turkmenistan should also consider either funding comprehensive studies on or inviting foreign specialists to introduce the best methods and techniques for operating and managing its collective drainage system.

This paper outlines and explains the dangers and negative aspects of the construction of the new Turkmen lake, Altyn Asyr, which is still under construction. Unnamed sources claim that the lake might need 97 years to be completely filled. No one can foresee the state of the Aral Sea or the Amudarya river basin, much less any changes in Central Asia, by that time.

Map 1:



Map 2:

