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Uzbekistan: Water Scarcity and Its Impact on the Nation and Its Future

An ancient Uzbek legend describes Uzbekistan's beginning. God had divided land to form countries and gave them to the people. One man, Uzbek, was kind and patient. He allowed others to receive their land before him, leaving him last. When Uzbek finally came forward, God said, "Uzbek, my son, you have come too late. I have allotted all of the land. Where were you?" Uzbek bowed before God and said," My god, you have taught me to always be merciful and to love my neighbors. And I, the servant of god, allowed others to go before me." God saw that Uzbek was a merciful man with a good heart. The face of God brightened and he smiled purely. "My son Uzbek," God beamed. "You are truly a generous person with a pure soul. I shall give you the land I left for myself which is like a paradise." So God gave Uzbek the land that would be known as Uzbekistan. In the past fifty years, God's paradise has morphed into a dry and salty desert. Due to climate change and wasteful farming practices, water has become extremely scarce. The amount of rain has decreased rapidly in the past few years, 10 mm less than average in Uzbekistan's highlands (Schrader-King 1). Temperatures, on the other hand have been steadily rising over the years, causing the Aral Sea, one of the biggest bodies of water in Uzbekistan to shrink rapidly. This troubling situation has affected the nation's crops and farms, which in turn has caused a lack of food and extreme poverty within Uzbekistan. The lack of food has affected most of the country in some way. In some parts of Uzbekistan, grocery stores, markets, and restaurants are closed due to the famine that has plagued the country. Uzbekistan's future is gravely threatened by this food crisis and extreme lack of water. Uzbekistan needs to practice water conserving techniques in order to increase food production and end food insecurity.

There are many Uzbek subsistence farm families due to the fact that the majority of the population lives in rural areas. According to the Uzbek government, 63% of the overall population of Uzbekistan resides in the countryside (Asadov 13) and an estimated 65% of the population is involved in agriculture (Allnut 2). The standard rural Uzbek family traditionally has five members, often consisting of two parents and three children (Asadov 15). Grain foods such as Non, a traditional flatbread, noodles, and rice are staple foods in the Uzbek diet. Uzbek dishes often contain meat such as beef, lamb, and horse meat. Uzbekistan has an extremely high literacy rate for a developing country. In 2003 a poll revealed that 99.3% of Uzbeks are literate and more than 75% of adults have a secondary, vocational, or higher education of some form ("Welfare Improvement Strategy Paper of the Republic of Uzbekistan for 2005-2010"). Uzbekistan also has a gender equal school system for seven to fifteen year olds, which is why 96% of Uzbek women have had some sort of education (Adasov 16).

Medical care in rural parts of the country can be substandard at best. The Uzbek government released statistics stating that infant mortality rates and maternal mortality rates have decreased, however these numbers aren't necessarily true. When asked about this statement put forward by the government, a Tashkent endocrinologist states, "Officials tend to include large infrastructure projects in healthcare spending [thus inflating the figures]. The reality is that government spending has been declining" ("Uzbekistan: Healthcare Reality Belies Official Cheer").UNICEF and other global charity operatives

have visited the western part of Uzbekistan, where most children are malnourished. An article published by UNICEF titled “In Uzbekistan, expanding health care to the most vulnerable and hardest-to-reach “, goes into depth about a visit to Karakalpakstan, a small village in western Uzbekistan. The article states:

Karakalpakstan is blighted by the shrinking Aral Sea, which has worsened water quality and food security, and has threatened livelihoods. These conditions are reflected in high rates of pneumonia, diarrhoea, anaemia and malnutrition among children. In fact, child health and nutritional indicators in the western region are among the worst in the country. And given the area’s remoteness, extra effort is required to reach the most vulnerable children here.

Organizations such as UNICEF have provided government sponsored health care for people in rural regions of the country. There are also government sponsored hospitals and practices, however most of these healthcare facilities are out of reach for many Uzbeks who reside in rural areas. The majority of the population doesn’t have access to medicine or necessary drugs, causing viruses and infections like HIV and tuberculosis to spread throughout the nation. In addition to this, medicine and treatments are very expensive, despite the fact that the government states that Uzbekistan citizens have the right to free healthcare ("Uzbekistan: Healthcare Reality Belies Official Cheer”). Medicine, needles, and other common medical supplies are often too expensive for medical facilities to have a full stock. A retired doctor recounts his experience visiting a local hospital, stating,”… I was shocked to see that even basic things – such as disposable needles, anesthetics, and antibiotics – are in short supply” ("Uzbekistan: Healthcare Reality Belies Official Cheer”).

The Uzbekistani agriculture system is made up of three different types of farms: agricultural cooperatives known as Shirkats, private farms known as Fermer Khohajaligi, and Dekhan farms. Each of these farms has different uses and levels of importance. Shirkats are the biggest production units in the agriculture system. The average size of a Shirkat in the Sirdarya province is 1554 hectares and 896 in the Bukhara province (Djalalov 1). Shirkats are often made up of oilavii pudrat, which are smaller units that are family contractors (Djalalov 1). Shirkat land is owned by the government and is used to produce strategic crops such as wheat and cotton, two of Uzbekistan’s largest crops. Private farms are usually twenty hectares in size. These private farms take up 1.2 million hectares as of 2002 (Djalalov 1). Farmers who work on this land lease it from the state, usually for extended periods of time. Most farmers lease this land for ten years, however, some farmers lease land for up to fifty years. These farms grow state ordered crops such as melons, tomatoes, and apples, along with staple crops such as wheat and cotton. The smallest type of farm in the agricultural system is the Dekhan farm. The average Dekhan farm is .35 hectares (Djalalov 2) and is used as an additional source of income for Shirkat employees and private farmers. These farms are usually owned and operated by subsistence families. Dekhan farms are not as strictly controlled by the government, which gives the farmers the liberty of choosing which crops to grow and which methods of farming they prefer. Common crops on Dekhan farms include cotton, melons, tomatoes, apples, potatoes, wheat, and beans. Dekhan farms often use traditional farming practices that have been passed down from generation to generation. Some of these farming practices are beneficial, such as second and third cropping. This system of farming incorporates two or three different crops, which utilizes the land to create a large and diverse crop yield. Other farming practices such as a lack of crop rotation and poor irrigation techniques are detrimental to the land. Crop rotation is a vital practice that keeps nutrients in the soil. Certain crops, such as cotton, use up a lot of soil’s natural nutrients. If cotton is grown year after year, the soil will lose most of its nutrients, leaving it barren and unfit for agricultural use. Also, irrigation

is Uzbekistan in notoriously poor. The majority of water in Uzbekistan is taken from the Aral Sea, Tajikistan, and Kyrgyzstan. Water is delivered through systems of channels that clean and reduce the salinity of the water. These channels are over 171,000 kilometers in length. In addition there are also 53 reservoirs throughout the nation. Between the channels and the reservoirs, 16 billion cubic meters of water could be contained ("USAID's Water User Association Support Program Implemented by Winrock International."). Over time, the irrigation and drainage systems have been neglected. The government did not clean or maintain the pipes enough, causing them to back up and create a large amount of salt build-up. This build-up is making a majority of irrigation water salt water, thus killing the crops and making the land a salt flat. Uzbekistan consumes over 50% of the total Aral Sea basin drainage from the Amudarya and Syrdarya, causing the country's largest body of water to shrink drastically. All of these practices are deeply rooted in Uzbek farming culture which is slowly destroying agricultural productivity. Fewer crops are being successfully grown, making it almost impossible to receive nutrition. The amount of wages a farming family earns depends on the amount of crops they grow and sell, thus the decline in crop production are causing wages to fall and increasing the amount of people living in poverty. Traditional farming practices are making food insecurity very common.

The issue of water scarcity is very serious at this time. Not enough action is taking place in order to improve water conservation and end water scarcity. If water scarcity continues at this rate or becomes more severe many more Uzbeks will go hungry and there is potential for drinking water to become scarce as well. The environment is also being severely degraded by drought. Water sources are being depleted, crops are not rotated enough, and the nutrients in the soil are being absorbed, leaving the land salty and infertile. Decreasing water scarcity would increase the amount of food available to Uzbeks exponentially. By preserving more water and using farming techniques that use a minimal amount of water, there would be more nutritionally dense food and also more usable water. Instead of weak, withered, nutritionally poor crops, new farming techniques and water conservation would increase the amount of nutrient rich crops. It is estimated that 65% of the Uzbekistan population is in the agriculture sector ("The Life of the Uzbek Cotton Farmer"). A steady rise in crop production means the income of farmers and other agriculture employees would steadily rise. Increased crop production would also lower food prices for urban families and families who are not involved in agriculture. Saving water would positively impact the country's environment as well. Climate change has been talking its toll on Uzbekistan. According to the World Bank temperatures will rise two to three degrees Celsius over the next fifty years (Schrader-King 1). If water scarcity increases along with the higher temperatures, the Aral Sea and its tributaries will shrink even more. But if water conservation techniques are implemented the Aral Sea could recover and return to its former state. In addition, ending water scarcity would lead to economic development and poverty reduction. By using less water while increasing crop yields, the agriculture sector would give the economy of Uzbekistan a much needed boost. Most of Uzbekistan's income is earned through agriculture exports such as wheat and cotton. If the country has a surplus of popular crops the government would receive more profit. That money would circulate throughout the nation or within the government. If it is circulated throughout the nation, more and more Uzbeks would become food secure due to an increase in income. If the money would circulate within the government, it can be used for poverty reduction programs, education programs, financial assistance, or programs that educate farmers on water preserving irrigation techniques and water conservation.

Other major issues will affect water conservation in Uzbekistan in the years ahead. Factors such as climate change and population growth will make water scarcity worse if conservation practices are not

put into place soon. In the 1970's and 1980's, there was a high birth rate, causing the population to rise ("Welfare Improvement Strategy Paper of the Republic of Uzbekistan for 2005-2010." 6). With an increase in population there was an increase in demand for food. Water scarcity was not as severe at that time as it is today, so farmers were able to produce a decent amount of food to feed the majority of the population. However, there was another increase in the birth rate during 1991 and 1992 ("Welfare Improvement Strategy Paper of the Republic of Uzbekistan for 2005-2010" 7). Even though the government of Uzbekistan is taking extreme measures to lower the birth rate, there is still not enough food to sustain the entire population due to water scarcity. Climate change will increase water scarcity due to rising temperatures and extreme droughts. If measures to conserve water are not put into effect within the next few years, climate change will increase and water will become even scarcer.

There are several different ways to address water scarcity and improve food security for Uzbekistan. To begin, the government of Uzbekistan could attempt to replace damaged irrigation pipes or introduce GMO's. Fixing the current irrigation system would significantly improve; however, doing so would not only require a significant amount of government spending and time, but it wouldn't completely resolve the issue. If the irrigation system is repaired but farming techniques remain the same, water would still be wasted and lost. Efforts to fix irrigation are counterproductive unless other techniques are introduced. The introduction of GMO's would be a good way to improve food security in Uzbekistan as well, however; at the Agricultural Biotechnologies and Biosafety in Central Asia Conference in Antalya, Uzbekistan proved that they did not have biosafety systems in place to assure safety. Even though Uzbekistan is not a party of the Cartagena Protocol on Biosafety and does not have to abide to its rules, Uzbekistan wouldn't be able to comply with international regulations and wouldn't be able to sell any of its agricultural exports. In order to produce and sell GMO's, the Uzbek government or international charities would have to fund more labs that focus on biotechnology, train personnel, revise biosafety laws, and educate the public about GMO's and the technology and safety measures that go into creating them ("Agricultural Biotechnologies and Biosafety in Central Asia"). Large projects such as these are not currently the best ways to improve water scarcity. There must be immediate action to prevent the situation from worsening, so smaller and less expensive initiatives targeted at educating farmers about water conserving farming practices and techniques would improve water scarcity. Some water conserving techniques as drip irrigation, no-till farming, and rain water harvesting would be good technologies to introduce to farmers. Drip irrigation is a new form of farming that carries water and fertilizer straight to the roots of the plants. This system of irrigation requires supplies such as pipelines, drip emitters, and water pumps in order to function properly. Installing a drip irrigation system can be expensive; however it produces a better crop yield. This technique is 33% to 40% more efficient that traditional farming ("More Food, Less Water: Top Farming Practices to Better Manage Water Use"). No-till farming is when farmers allow the soil to recover by allowing plants to decompose. No-till farming is a farming practice that saves soil nutrients and keeps water in the soil while saving the farmer time and energy. When farmers don't turn the soil in the fields plants, leaves, and other biodegradable substances decompose over time. This gives the soil more organic matter which would replace the nutrients that were absorbed through previous crops. This type of farming would greatly benefit cotton farmers since cotton absorbs a large amount of nutrients. Rain water harvesting is a common and a less expensive way to conserve water for agricultural use. Farmers could create rain barrels which are simple to make and are excellent for small scale water conservation. These techniques are perfect for Fermer Khohajaligi farms and Dekhan farms. Farmers can use a barrel or trash can, drill holes in the lid of the barrel or trash can, and leave it outside. The water

would be collected within the barrel and be used to irrigate crops. The more surface area a rain barrel has the more water it will collect.

They way these new forms of farming are introduced and communicated to Uzbeks would determine whether or not they are used. Communication is key in education. Without good communication, the students learn nothing and the teacher's efforts are fruitless. It is imperative that new forms of farming are communicated in a way that is easy to understand and simple to follow. This technology should be disseminated mostly through hands-on instruction and guided reading. There are many types of teaching that would allow for hands-on learning. In the past, many global charities have sent out travelling instructors to teach new farming techniques. These instructors would show farmers, in full detail, how to use and install new technology. Having an instructors demonstrate in person gives farmers the opportunity to ask specific questions and allows them to visualize what they will need to do. The government could play a big role in education as well by creating government education extension programs. The government could educate the Shirkat workers on water safety techniques by establishing water conservation or agricultural offices in Shirkats and rural areas nearby. These offices could hold information sessions and classes, distribute books and information about water conservation, have long term instructors, and become a community center. Water conservation instructors could be on hand and available at all times and teach classes about installing new irrigation systems and water conserving techniques. Instructors could even assist students with supplying and creating their new systems .Since the people of Uzbekistan have a high literacy rate, providing books would be beneficial along with hands-on instruction. Distributing books give farmers access to information that might not have been covered in a class, give them a manual to use should a complication arises, and they can be used again and again. They could be passed down from father to son, from mother to daughter, and from neighbor to neighbor. As stated previously, the majority of Shirkat workers also reside on Dekhan or Fermer Khohajaligi farms, so having them learn about these new techniques through government education extension programs would encourage workers to install these systems at their farms. These workers could then reach out to other farmers who reside or work on Dekhan or Fermer Khohajaligi farms and teach them about these systems. The information and new techniques would travel through quickly, thus saving more water.

The UN has created a list of Millennium Development Goals in order to end poverty by 2015. Two of these Millennium Development Goals include "Eradicate extreme poverty and hunger" and "Ensure environmental sustainability". In order to meet these Millennium Development Goals and eliminate water scarcity in Uzbekistan, the Uzbek community, national and global government and organizations such as the UN need to be involved. The Uzbek community needs to play a big role in eradicating food insecurity and implementing water conservation methods, especially rural families. Rural families who live on Dekhan farms should embrace farming practices such as drip irrigation, rain barrels, and no till farming. Rural families could spread their new water conserving practices by introducing these new ways of farming to their neighbors and the rest of their rural community. Urban families must also play a role in this situation. Urban citizens need to be educated on the importance of water conservation. If urban citizens use less water, there would be an increase in water for agricultural purposes. As for the government of Uzbekistan, incentives must be given to encourage water conservation techniques. Grants, tax breaks, and other incentives need to be given to farmers who use water conserving farming practices. Without incentives farmers will have no motivation to change their practices. After Uzbekistan became independent, there was a fall in cotton production. In a report about Uzbekistan farm production it was found that the fall in productivity was not only because of bad farming practices, but also a lack of

stimulus for farmers (Djalalov 7). The UN should also play a large role in Uzbekistan's recovery. In order to reduce water scarcity and food insecurity, the UN should support sustainable agriculture in rural communities by giving financial aid to some citizens and farmers, giving Uzbekistan drought resistant seeds, teaching farmers techniques that increase crop yield, and teaching the rural community about water conservation. Communication between these groups is essential. Without the involvement of all of these groups, hunger cannot be eliminated by 2015.

In order to significantly lower food insecurity and improve the lives of people residing in Uzbekistan, new water conservation practices must be implemented before the damage is irreversible. Water scarcity is a daunting issue in Uzbekistan that affects all Uzbek citizens. Food is difficult to obtain and many people in this developing nation suffer from food insecurity, especially those who live in rural areas. If water conserving techniques are taught to farmers and implemented in Uzbek farms, crop yields would increase and the entire nation would benefit. More food would be available at cheaper prices, allowing easier access to food. Uzbekistan's economy would be strengthened by the surplus of crops and it would allow for more international income. If less water is used, the Aral Sea and its tributaries will be able to recover. In recent years, land that was once used for farming has dried up and become salty, infertile plots of land due to over use and lack of water. With new water conservation techniques such as no-till farming, nutrients and moisture would stay within the soil. Local, national, and global communities must assist Uzbekistan and its citizens in conserving water and simultaneously increasing crop yield. Without government assistance and incentives, farmers and citizens in Uzbekistan will have no motivation to improve the conservation of water. Global organizations must also send aide to rural parts of the country to teach farmers new ways to farm without using excessive amounts of water. Combating an issue such as water scarcity is never easy and there is no quick fix to Uzbekistan's problem. It would most likely take years to repair the damage and restore Uzbekistan's water resources, but it is not an impossible task. If water is carefully conserved and used wisely, food insecurity could become a thing of the past in Uzbekistan. Uzbekistan could become God's paradise once more.

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