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Iraq, Water Scarcity

Iraq: Quenching the Fertile Crescent's Thirst for Water

"Thousands have lived without love, not one without water." - W. H. Auden, *First Things First*

Ahmed has lived in southern Iraq along the Euphrates River all his life. He comes from generations of date farmers and works on the land of his ancestors. His father and grandfather used to make a good living from this plot of land. Ahmed remembers when the Euphrates River used to flood during the rainy season each spring which made for fertile farmland. He also remembers when Iraq had more than 30 million date palms, enough to export more dates than any other country in the world (Sonneborn, 2012). This area used to be known as the Fertile Crescent - but no longer. This once fertile soil is now suffering desertification. The area sees frequent dust storms, some lasting up to three days. Layers of silt cover fields and trees. The Euphrates has receded to the point where Ahmed can no longer irrigate his date palms and his wells have run dry. He can't afford equipment to tap water from the underground aquifer. Ahmed has lost more than half of his savings trying to keep his farm operational. Furthermore, he can no longer fish in the Euphrates where there used to be an abundance of fish for his family. No rain means no crop; no crop means no harvest; no harvest means no food; no food means no livelihood. Climate change is not an abstract concept in Iraq. It's a real issue for Ahmed and his family.

Ahmed is one farmer of thousands whose existence is threatened along the Tigris-Euphrates system due to water scarcity. "The land between the rivers", Mesopotamia, has historically produced an abundant supply of tall grasses and grains, fruits and vegetables, lamb, goat, and fish. Long ships used to navigate the Tigris on their way to and from Baghdad, Iraq's capital and most populous city. The Tigris River originates in Turkey, and flows southeast through its low-mountain valleys, then into Iraq, passing through the capital city and beyond. The Euphrates River also starts in Turkey, runs through Syria, then heads into Iraq. The Euphrates River is long whereas the Tigris is deep. Iraq depends on both of these rivers and it depends on the countries north of it to keep the water flowing.

Iraq has endured long years of war and most recently attacks from the extremist group ISIS. The country's infrastructure shows it, as evidenced by damaged roads, bombed bridges and neglected railways. Trade and business are disrupted by an unstable electric grid that has frequent blackouts. Electricity is available for only one out of five hours a day (Sonneborn, 2012). Iraq is an oil rich country with one of the largest oil reserves in the world. Oil accounted for 98% of exports in 2013 (Martin et al., 2017). However, the revenue from the oil is not distributed equitably to the people of Iraq. Too often, the revenue stays in the possession of corrupt politicians. In fact, Iraq is among the top ten most corrupt countries in the world (Martin et al., 2017).

About one third of Iraq's 37 million people live in rural areas and make their living off the land (Solomon & Pitel, 2018). The Tigris and Euphrates no longer have sufficient water for irrigation, thus Iraqis have turned to the underground aquifers. These aquifers are shrinking quickly and they take centuries to replenish. Iraq has experienced below-average rainfall for over a decade, creating a drought. Drought causes failed crops, and when crops fail, food prices soar. Sixty percent of Iraq's population relies on low-quality food rations provided by the government (Sonneborn, 2012). In recent years, Iraq has had to import almost all the food it needs.

A *Wall Street Journal* article written earlier this year shows how dire the situation is, stating that, "Temperatures across southern Iraq are so high in the summer months that birds drop dead from the sky due to heat exhaustion. And tap water runs piping hot." (Coles & Nabhan, 2018, para 1). The high summer temperatures, averaging 110 degrees Farenheit ("Iraq weather", 2018), cause increased evaporation from farmland which further reduces availability of water. This parched soil contains a higher concentration of salt. As water from irrigation systems runs over it, the water becomes more saline. This affects farmers downstream and also places more strain on the public water system by increasing water treatment costs that make the water acceptable for household use. Farmers who are displaced as a result of this cycle become refugees in their own country. Many move to urban areas which increases the population in the cities and compounds the demand for urban water. Government estimates suggest close to 2 million Iraqis face severe drinking water shortages (Chulov, 2009).

The Tigris runs through Iraq's capital city of Baghdad. Raw sewage is pumped into the Tigris, creating a major health hazard for urban dwellers. The river is becoming a sewer. Contaminants and waste sit stagnant in the water and get baked in the sun, which creates another health hazard. Because the water isn't deep enough and the current isn't strong enough like it once was, the water doesn't steadily flow downstream like it should. The *Financial Times* observes that "panic swept the country at the start of June as water levels fell so low that people could wade across the Tigris in Baghdad." (Solomon & Pitel, 2018, para. 8). Giant mud islands appear where giant ships used to sail.

The Tigris and Euphrates Rivers supply Iraq with 85% of its water. Both rivers originate in Turkey and thus Turkey lays claim to all of it. This upstream country controls the rivers with a series of dams and has development plans for more. These plans include an irrigation program and hydroelectric generating plants. Iraq, on the other hand, claims that they have a right to the water as well because of the natural flow of the rivers. Furthermore, Iraq takes the view that countries are "trustees" of water, not "owners" of water. In the past they have had a gentleman's agreement allowing the free flow of both rivers to benefit all. Iraq sees a clean and sanitary water supply as a fundamental human right rather than as a commodity, almost like the air they breathe. Tensions are rising and conflicts are escalating over who controls this liquid lifeline. These strained relations could easily erupt into war. Differences of opinion between upstream users and downstream users spell trouble not only internationally between Turkey, Syria, and Iraq, but domestically as well. Both rivers flow through Kurdish territory in Iraq which creates ethnic tensions. Quarrels also arise between Iraq's city dwellers and the farmers.

Iraq's water shortage is a complex problem with no simple solution. Unfortunately, Iraqis have lost faith in their government's ability to provide basic services. I propose that we look to

education, instead, for solutions. A new degree called “Water Sustainability Solutions” should be created in a university in Iraq. Setting up a program in an existing university has the benefits of an established framework in a known and proven system. This program will be an interdisciplinary bachelor’s degree that weaves together courses in environmental science and engineering, economics, political science, and communications. Professors from many different fields will address issues ranging from water diplomacy to urban water infrastructure to emergency response to agricultural technology to agricultural leadership. Locating this program in an Iraqi university is important because the unique problems of this region should be addressed by those most familiar with the circumstances. Enrolling students from the area and educating them will empower them to become experts and leaders who will make decisions that will affect their own futures. An especially fitting place for this program might be Nahrain University whose name translates into “Two Rivers”. Existing majors offered at this highly-regarded Baghdad university focus on the related fields of on engineering, science, political science, business economics, and law.

Establishing a new program at the university level will require both short-term and long-term funding. Initially, money is needed to hire faculty and staff and to market the new program. Over time it will become self-sustaining from the students’ tuition dollars, just like any other university program. Until that time, additional funding will need to be secured. My recommendation is to reach out to Iraqi refugees who have resettled in other places. Some have been out of Iraq for over 20 years and have since re-established themselves financially. They can contribute once or provide ongoing support to this endeavor. A small donation could go toward student scholarships. A large donation could go toward a specific project or endowment, and donors will be recognized. Word will spread quickly about this initiative because refugees still have very strong connections with family and friends back in their home country as well as in their new country. Because of circumstances, refugees have had to interact with people from other countries. They, more than most, realize that these interactions are desirable and result in trust replacing distrust and cooperation replacing confrontation. Through their networking, money will be raised. The refugees’ education was interrupted because of war, but they could turn that around for others through their contributions. This effort will give them a new sense of purpose which would allow them to leave a legacy for the future. In short, they will create a new Iraq from abroad by restoring hope and dreams through the education of the youth. This has the added advantage of painting refugees in a positive light - they become part of the solution rather than part of the problem.

Even though this university program will be based in Iraq, the students will work with and create ties with professionals from near and far. Online learning presents opportunities to recruit faculty from all over and to enroll students beyond the Baghdad campus. Online learning allows scholars from across the region to work together, strengthening relationships and breaking down barriers. Money should be available to host conferences and bring in visiting professors in order to exchange ideas across the region. Partnering with Iraq’s Ministry of Water Resources to work together on projects would benefit all involved. After all, a more stable water supply will make for a more stable Iraq. Partnerships with industries can be formed to make education more affordable for working adults. For example, employees at a desalination plant might receive tuition assistance when pursuing a Water Sustainability degree.

A degree in Water Sustainability will include courses in agriculture, with goals of developing

drought-resistant crops, exploring genetic modification of crops, and shifting the focus from ‘land productivity’ to ‘water productivity’, that is, getting the highest yield out of every drop of water used in agriculture: Per drop, more crop. Experts from the university and beyond need to advocate for more regulation of aquifer draw-downs. This group will educate farmers about modern conservation tillage practices and how to control erosion by crop selection and management. Likewise, urban populations can be educated on how to reuse gray water. Other initiatives include introducing public awareness campaigns on implementing water conservation solutions and installing community rain gardens.

Displaced farmers could be targeted to introduce and establish hydroponics in either metropolitan or rural settings. Hydroponics is the practice of growing produce indoors in a soilless system using one tenth of the water needed in traditional farming methods (“How to keep”, 2014). This time-tested system doesn’t require standard farm equipment such as tractors and sprayers. There is no need for pesticides or herbicides because no weeds will grow in this controlled environment. Poor soil and droughts are non-issues. Weather conditions outside don’t affect the plants housed inside. The plants can be grown with natural or artificial lights, or a combination of both. Once the produce has been harvested, there is no wait for the soil to replenish and become fertile again; a new crop can be planted instantly. The harvested produce - such as lettuce, tomatoes, bell peppers, spinach and herbs - is cleaner than that grown in dirt.

Along with hydroponics, aquaponics is also promising because Middle Easterners value both fresh produce and fresh fish. The supply of wild-caught fish is rapidly declining partly due to the dwindling water supply. Aquaponics is a combination of hydroponics and fish farming in a controlled and closed system. The plants use nutrient-rich water that comes from the fish waste. In turn, the plants filter the water for the fish to live in, creating a symbiotic relationship. Aquaponics is a relatively young field. The university can serve as an “idea incubator,” allowing students to experiment and gain knowledge along the way. Educated students can become ecopreneurs - an entrepreneur who can take an idea, turn it into a solution, and profit from it, all while keeping the environment in mind.

Aquaponics allows fresh leafy greens to be grown in the desert alongside farmed fish. This locally sourced fish would have several advantages. First, it would reduce food imports into the country. Second, the fish would be fresh. Lastly, Iraqis like fish. Fish has long been a staple in their diet and it is a good source of protein. Science journalist Julian Cribb argues that fish have less impact on the environment than livestock and “fish turn plant matter into meat 5/10 times more efficiently than land animals.” (Cribb, 2013, p. 33). Making hydroponics and aquaponics common practices could go a long way toward bringing back Iraq’s historic status of being known as the Fertile Crescent.

The greatest challenge these university students - indeed all of Iraq - are facing is the politics of the region. Work needs to continue to find political solutions to Iraq’s numerous problems, with the water issue high on the priority list. Water is a necessity for sustaining life on earth and a prerequisite for everything else. It is a truism that “in water, there is life and without water, there is no life.” (Langwith, 2010, p. 106). The U.N. can encourage Turkey, Syria, and Iraq to work together peacefully and rationally to stop the water politics game. What’s needed is a charismatic “water ambassador”, who can convince people of the reciprocal nature of water

usage, and show the squabbling countries that when one thrives, they all thrive; when one benefits, they all benefit. Since that hasn't yet happened and since the political situation is so fraught, we should reorient and look for solutions in other places, namely in education and specifically in agriculture. Building a sustainable agricultural model that can provide food and water for the country is critical.

In the Middle East, water has been called the new oil and conflicts are very likely to arise as water resources become even more scarce. The Tigris and Euphrates rivers are no longer dependable sources of water, and the underground aquifers are drying up. It is essential to seek long-term answers on the policy level and on the regulatory level to address this. But what may be even more imperative is empowering the youth through education. When you sell the youth on the vision and equip them with the tools they need, they will become change-agents in their country. Creating a university degree that focuses on water sustainability allows students to become experts in these fields. The students can then put these skills to use to help shape their country. One graduate might build an aquaponics facility, another might set up rain gardens in urban areas, and yet another could start a desalination plant. Hopefully in ten years - or less - Iraq will be able to transform itself and become known more for its water sustainability practices than for its oil production. For the sake not only of Ahmed, but the whole country, solutions need to be found. Let's share the vision of the "land between the rivers" once again teaming with plentiful vegetation and wildlife, providing its residents with a steady supply of food and water. And let's hope, alongside Ahmed, that his descendants will see a restored Fertile Crescent, just as his ancestors had once experienced.

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