Luke Boyle

Western Dubuque High School

Epworth, IA, USA

Afghanistan, Water Scarcity

**Afghanistan: A Modern Solution to Decades of Drought**

Zahra is a 20-year-old young woman living on the rural-fringe of Kabul, Afghanistan. Unfortunately, every day she struggles to meet her basic needs of survival. Zahra must travel to small, often understocked grocery stores and prepare what little food she can afford. Her family can rarely get enough to eat, mainly due to severe drought that has plagued Afghanistan since the late 1990s. This, coupled with decades of conflict, has impacted her and millions of other Afghans. While some of her neighbors have fled their homeland, most residents, including Zahra, do not have this opportunity and remain in Afghanistan. They are starving, thirsty, and often in need of medical care. This fictional narrative is a common example of life in current-day Afghanistan. Fortunately, solutions lie at hand for those suffering from extreme water scarcity in this country.

Afghanistan is a landlocked central-Asian country, roughly 15 times smaller than the United States (Ali et al.). Afghanistan experiences an arid to semi-arid climate, with hot summers and cold winters. Dry, grassy plains lie in the north and southwest regions. The rest of the terrain is comprised of rugged, rocky mountains (Ali et al.). Due to the rough landscape, only 58% of the total land (652,230 square kilometers) is available for agricultural use. Permanent pasture, arable land, and permanent crops are divided among this portion, making up 46%, 11.8%, and 0.3%, respectively (“Afghanistan-South Asia”).

Multiple different groups of people inhabit Afghanistan’s various regions. Each of these has its own unique and traditional means of housing. The nomadic and transhumant groups that reside in the northern regions traditionally use yurts for their homes (Ali et al.). Likewise, the Pashtun groups live in tents to the south. In terms of permanent settlement, stone and brick fortified hut villages can be found in the northern and western regions. Multi-storied buildings are custom of the Nuristani people in the northeast (Ali et al.).

Most Afghans live in the rough countryside, with the rural population making up approximately 73% of the 39,232,003 total inhabitants (“Afghanistan-South Asia”). This rural population runs the small subsistence farms that are responsible for most of the food produced in Afghanistan, as well as the country’s gross domestic product. These farmers and nomads are distributed unevenly among Afghanistan, mainly finding areas of settlement along major rivers which provide irrigation for crops and serve as a source of hydration for livestock (Ali et al.). In these areas of inhabitation, it is typical to find the permanent stone and brick villages mentioned earlier. These are designed in a fortress-like manner, taking a defensive position to protect the village’s livestock and crops. Due to a lack of support from the Afghan government, this individualistic, tribe-like behavior among its people is the standard for living (Ali et al.).

On the other end of the spectrum, urban residents represent only a quarter of the total population. The rough terrain combined with a lack of government support for infrastructure makes large urban development nearly impossible. Due to this, most large cities and towns are constructed along a circular road that starts and ends with the nation’s capital, Kabul. Some of Afghanistan’s largest cities serve as checkpoints along this crucial line of transportation, including Kandahar, Herat, Mazar-e Sharif, as well as Kabul. The capital of Afghanistan is by far the largest city, with a population near 4.5 million (Ali et al.). However, it is easily understood why. Kabul is located at the intersection of trade routes from Central Asia to the Indian subcontinent and from the Middle East to East Asia. This makes it a hotspot for economic as well as cultural activity in this region (Ali et al.).

Despite the vastly different topographical areas and regions of settlement, the typical societal life of the Afghan population is quite similar. The average family size is quite large, at 7.8 people per household (“Afghan Food”). This is because it is customary for extended family and relatives to live with each other in Afghan culture. The typical diet consists of Afghan bread, curry with rice, mutton, beef, kidney beans, chickpeas, and dairy products as condiments and sauces (“Afghan Food”). This food is either purchased at a local market or grocery store, or is farmed by the family themselves. Agricultural jobs are commonplace, as there is a lack of resources available to support different careers. Among these few other employment choices are industry production jobs, producing bricks, textiles, apparel, and processed food products (Ali et al.). Unfortunately, these jobs do not pay well. According to World Salaries, the typical working citizen in Afghanistan will earn 934,900 AFN per year, which converts to 13,178.38 USD (“Average salary in Afghanistan for 2024”).

While education is free for all levels in Afghanistan, only a quarter of the population’s children have even attended school (Ali et al.). This can largely be accredited to the Taliban conflict and takeover in recent years. Opportunities of education for girls practically vanished after their rise to power. Most scholastic instruction was dedicated to Quranic studies under the Taliban’s Islamic-state regime. However, it appears Afghanistan historically has had a weak public education system (Ali et al.). According to Encyclopedia Britanica, “in the late 1990s less than half of the male population was estimated to be literate, and probably no more than one in seven women”. Similar conditions are present for Afghanistan’s healthcare systems. Just by examining their high infant mortality rate and low life expectancy, it is obvious that Afghanistan has one of the least developed systems of public health in the world. Waterborne illnesses are widespread due to a lack of portable water (Ali et al.). There is no training available for people to enter the healthcare field, and what little care provided is done so by non-governmental aid campaigns. After the Taliban’s takeover, they banned women, who predominantly made-up healthcare workers, from participating in this field (Ali et al.). Currently, only 42% of the population has access to safe drinking water, and only 27% can use safe toilets (“Afghanistan: The Food Security Situation”). A lack of education and recovery from illness make finding and working a job difficult for most Afghanis. However, there is a deeper root to the food insecurity crisis of Afghanistan that goes beyond poor government, and it has plagued this country for decades.

Ever since the 1990s, water scarcity has left Afghans with barren fields, dwindling numbers of livestock, and empty plates (Ali et al.). On and off throughout the years, droughts have struck Afghanistan during its weakest times, and now is no exception. Since the Taliban’s governmental takeover in 2021 following the U.S.’s withdrawal, the already prolonged drought has intensified and put millions of Afghans at risk (Addario and Kim). According to World Vision, “severe drought conditions led to the failure of the 2020 winter harvest and withered crops that were planted for the 2021 spring growing season. It is estimated that 60% of livestock have died or been sold off for minimal gain, and that 40% of wells have dried up because of water scarcity. Dry conditions have continued through 2022” (Omer). Roughly 22.8 million Afghans, over half of the population, are currently struggling with extreme food shortages, and the current drought is affecting over 80% of the country (“Afghanistan: Worst Drought and Hunger Crisis in Decades: IFRC”). In short, the current Afghanistan drought has persisted for years, causing a lack of food and water for a hungry population. This situation is crippling the nation, and thus steps must be taken to save innocent people from the harshness of nature.

Two main solutions present themselves as means of saving Afghanistan from drought, the first of those being the indoor vertical growing of produce. Indoor vertical growing, or hydroponics, is an agricultural system in which plants are grown in towers or trays stacked vertically. Instead of being planted in soil, these plants’ roots are suspended in water, and the necessary nutrients for the plant’s health are added directly to the water. Plants can absorb these nutrients much more efficiently than in traditional soil-based crop farming. This all takes place in a temperature-controlled, indoor environment (Dupuis). At first, it appears that this method of crop farming opposes a solution to drought. If water is the only resource necessary, one would think enormous amounts of it would be needed to produce these crops. However, production efficiency is the key with this technology. Hydroponics require only 2% of the water needed to produce the same crop in traditional farming practices. For example, it takes approximately 35 gallons of water to produce one pound of spinach when farmed in fields. When using hydroponics, it only takes 0.7 gallons of water (Dupuis). In traditional crop farming, water waste takes place through evaporation, runoff, or ground absorption. With hydroponics, none of these occur, as the water is constantly cycled through the system.

This heightened efficiency is why indoor vertical growing is a viable solution to water scarcity, not to mention the numerous other benefits. Only a small percentage of Afghanistan’s land is suitable for crop production due to the rocky and mountainous terrain. However, this is not a concern with vertical growing of produce. Since the farm’s space is ‘up’ instead of ‘out,’ they can take up roughly 99% less land compared to a traditional farm (Dupuis). In fact, a standard commercial hydroponic farm can produce 500 tons of leafy greens per year, while only using as little as an acre and a half in space (Dupuis). A final benefit of switching to hydroponic farming is the seasonality component. Since these farms are fully indoors, crop farming can take place year-round, without halting production for the cold winters. This way more food can be produced at a highly efficient rate for the people of Afghanistan.

Unfortunately, there are downsides to this seemingly miraculous solution. Luckily, steps can be taken to combat them. Firstly, startup costs of such a new age agricultural practice are quite high. According to Finmodelslab, a financial modeling site, the initial cost for a commercial hydroponics farm could be as much as 114,000 USD (Ryzhkov). When reflecting on the average wage of an Afghan, which is not even a tenth of this amount, it seems that hydroponics may not be a viable option (“Average Salary in Afghanistan for 2024”). However, numerous humanitarian groups, including the United Nations and World Bank, could donate funds to cover the cost of these startup fees. This could allow for indoor hydroponics farms to quickly be produced across the country, reaching all people, no matter where they might live.

Another issue that comes into concern is the role of energy use in hydroponics. Since all plant production takes place indoors, an enormous amount of energy is needed to regulate the temperature, water cycling process, and ventilation. According to Labrie and Stride from Green Forges, a controlled environment agricultural company, vertical farms have an “energy use at 38.8 kWh per kg of produce”. To offset this, hydroponic farmers can use efficient LED lights for their crops, and greenhouse-like glass walls to allow sunlight to nourish them as well. While these are small steps, they can decrease the total energy consumption drastically, with some systems only using 10% of the total energy that they would without these efficient measures (Dupuis).

While hydroponics allows for more food to be grown at a highly efficient rate, it does not solve the systemic problem of drought in Afghanistan. It is simply an adaptation to the issue. Using less water because there is less water does not stop a drought. Luckily, there are further steps that can be taken to directly fix the root of the problem, and they are already taking place now.

The Food and Agriculture Organization (FAO) of the United Nations has been assisting Afghanistan in combating its recurrent problems with droughts since 2018 by providing “emergency livestock protection support” and “emergency agriculture support” to hundreds of thousands of people (“Afghanistan - FAO Drought Response”). Recently, they began facing the root causes of the drought by implementing water infiltration and groundwater recharge infrastructure in the form of check dams. These check dams consist of many multi-layered walls and floors of stone and brick, all tightly knit together by a woven wire mesh. These walls act as barriers to natural rainwater so that it does not flood villages and destroy crops, but remains in reserve in the dam. According to *Reliefweb*, “Over the last two years [the FAO] has supported communities through cash-for-work programmes in building more than 6,000 check dams to support better water infiltration and a recharge of the groundwater” (“Afghanistan: The Food Security Situation”). These dams act as sustainable solution to the problematic cycle of droughts Afghanistan is facing. If maintained, check dams can last for 10-15 years. They are easily constructable and use mostly natural resources (“Reviving Watersheds”). As a bonus, they provide a source of work and income for the men and women of the small villages most impacted by the drought. The civilians who construct these dams receive a living wage from a construction company funded by the FAO (“Crafting a New Livelihood in Afghanistan”). The only additional step would be to increase the production of these dams to maximize the storage of rainwater and ensure as many villages and settlement regions as possible have this vital tool for survival for themselves, their livestock, and their crops.

Yet, it is important to note that a further complication when enacting these solutions would be the role of the Taliban as leaders of Afghanistan. The U.S. does not currently recognize them as an official government after their takeover (“Afghanistan-South Asia”), despite the Taliban repeatedly campaigning for this title (Bateman et al.). This may cause cooperation issues when a plan for further development of this infrastructure takes place. This would include the building of check dams in rural areas and new construction of indoor hydroponic farms, both of which need foreign humanitarian assistance. Therefore, it is important that these parties negotiate boundaries with the Taliban and provide as much help as they are allowed. Hopefully, future progress can be made in foreign relations with the Taliban as they expand their involvement to meet the needs of their citizens.

After examining the evidence, it is clear the combination of new age agricultural practices, such as indoor hydroponic farms, combined with the further development of check dams is an achievable way to solve the problem of water scarcity in Afghanistan. It is not morally acceptable that innocent civilians like Zahra go hungry every day while practical solutions exist. Although fictional, this narrative is all too real for the people of Afghanistan. These hungry men, women, and children deserve to know they will always have food on their tables. Through this humanitarian work, it is not a village or town that can be saved, but rather an entire nation.

Works Cited:

Addario, Lynsey, and Victoria Kim. “Barren Fields and Empty Stomachs: Afghanistan’s Long, Punishing Drought.” *The New York Times.* 19 Mar. 2024, [www.newyorktimes.com/2024/03/19/world/asia/afghanistan-drought-photos-climate-change.html](http://www.newyorktimes.com/2024/03/19/world/asia/afghanistan-drought-photos-climate-change.html) Accessed 26 Feb. 2024

“Afghan Food and Cultural Profile: Dietetic Consultation Guide.” *Metro South Health*, metrosouth.health.qld.gov.au/sites/default/files/dietetic-profile-afghan.pdf. Accessed 25 Feb. 2024.

“Afghanistan - FAO Drought Response.” *FAO*, 1 Dec. 2018, www.fao.org/fileadmin/user\_upload/emergencies/docs/CA2268EN.pdf. Accessed 24 Feb. 2024.

“Afghanistan-South Asia.” *Central Intelligence Agency*, 20 Mar. 2024, www.cia.gov/the-world-factbook/countries/afghanistan/. Accessed 24 Feb. 2024.

“Afghanistan: The Food Security Situation Is Improving, but the Crisis Is Far from over - Afghanistan.” *ReliefWeb*, 14 Mar. 2024, reliefweb.int/report/afghanistan/afghanistan-food-security-situation- improving-crisis-far-over. Accessed 25 Feb. 2024

“Afghanistan: Worst Drought and Hunger Crisis in Decades: IFRC.” 2 Dec. 2021, www.ifrc.org/press-release/afghanistan-worst-drought-and-hunger-crisis-decades#:~:text=Around%2022.8%20million%20people%20%E2%80%93%2055,forcing%20people%20from%20their%20land. Accessed 25 Feb. 2024.

Ali, Mohammad, et al. “Afghanistan.” *Encyclopedia Britannica*, Encyclopedia Britannica, Inc., 25 Mar. 2024, www.britannica.com/place/Afghanistan. Accessed 25 Feb. 2024.

“Average Salary in Afghanistan for 2024.” *World Salaries*, worldsalaries.com/average-salary-in afghanistan/. Accessed 25 Feb. 2024.

Bateman, Kate, et al. “Taliban Seek Recognition, but Offer Few Concessions to International Concerns.” *United States Institute of Peace*, 28 Mar. 2022, [www.usip.org/publications/2021/09/taliban-seek-](http://www.usip.org/publications/2021/09/taliban-seek-) recognition-offer-few-concessions-international-concerns. Accessed 26 Feb. 2024.

“Crafting a New Livelihood in Afghanistan.” *Food and Agriculture Organization of the United Nations*, 2 Jan. 2024, www.fao.org/fao-stories/article/en/c/1675084/. Accessed 24 Feb. 2024.

Dupuis, Allison. “Global Water Crisis and How Vertical Farming Helps: 2022.” *Eden Green*, 25 Oct. 2022, www.edengreen.com/blog-collection/water-crisis-drought. Accessed 22 Feb. 2024.

Labrie, Phillip, and Andrew Stride. “Energy and Underground Farming.” *GreenForges*, 6 Jan. 2023, www.greenforges.com/blog/energy-and-underground-farming. Accessed 22 Feb 2024

Omer, Sevil. “Afghanistan Crisis: Hunger in the Land.” *World Vision*, 12 Apr. 2022, [www.worldvision.org/disaster-relief-news-stories/afghanistan-hunger](http://www.worldvision.org/disaster-relief-news-stories/afghanistan-hunger). Accessed 25 Feb. 2024.

Ryzhkov, Alex. “Hydroponics Farm Launch: What the Startup Costs Look Like!” *Finmodelslab*, 10 Mar. 2023, finmodelslab.com/blogs/startup-costs/hydroponics-startup-costs. Accessed 26 Feb. 2024

“Reviving Watersheds with Check Dams: Eco-Friendly Agricultural Solutions.” *YouTube*, uploaded by FAO. 28 Jan. 2024, <https://www.youtube.com/watch?v=sZiZ-BhY7AE>. Accessed 25 Feb. 2024.