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**The Perilous State of Egypt due to the Water Scarcity**

Benjamin Franklin once said, “When the well is dry, we will know the worth of water”. Water has a powerful influence on humanity, with people depending on it in order to survive. In fact, this natural resource should be cherished. Laws need to be enacted to prevent its wastage. This cannot be further from reality, as people do not seem to understand that although over 70% of the Earth is covered in water, millions of people still do not have this asset. 700 million people from 43 different countries suffer from water scarcity(United Nations). Egypt is one of these 43 countries. Egypt is a transcontinental country spanning across Africa and a small part of Asia. The country itself is extremely dry, containing many desert regions. Rain is often very sparse, and many regions do not receive it whatsoever. Egypt’s population has also reached over 100 million people and is steadily increasing. Only around 3% of the land is cultivated, and Egypt is slowly lowering their supply of water without a source to get more.

Families normally only consist of two members, and live around a small oasis. In fact, 97% of the total population in Egypt live near the Nile. These people only cover around 8% of the entirety of Egypt(Jazeera). Most of these people get their food from farms. On average, each farm is just around 2.5 feddans, or 2.6 acres large. This is quite a large size, but most of the land cannot be used due to a shortage of water. The crops grown need sufficient water, and therefore farmers alternate between small sections of the farmland. Growing less crops each year with an increasing population results in food prices increasing. People have started to find it harder to buy food as farmers have started cutting down on the crops they grow.

Not only do families living in Egypt have a lack of water, but many do not even have a connection to this resource. In rural regions, 12% of the population do not have a connection to water(UNICEF). People who do not have access to safe water contributes to poor hygiene. In the end, this results in the spreading of harmful diseases. The second leading cause of child deaths in Egypt is diarrhea. Most diarrhea related deaths are caused due to dehydration. As it is, around 3,500 to 4,000 children die due to diarrhea each year(UNICEF). Worst of all, the public healthcare is seen to be completely useless since the medical equipment is very outdated. Sanitation levels are extremely low and the staff do not have the proper training in order to take care of the people of Egypt(Allianz Care).

85% of the water consumed in Egypt is being used for agricultural uses(Inter Press Service). Of the water used for agriculture, 90% is consumed during conventional agriculture. Conventional agriculture is when crops are grown using pesticides and other fertilizers. Unfortunately, most of

this water never reaches the plants, instead evaporating or flowing back into the Nile with all the contaminants.

Climate change is another factor that presents a major risk for Egypt. Temperatures are slowly rising, which could lead to crops dying due to a lack of water. As the temperature increases, so will the amount of water required in order to sustain all the crops. It is estimated by the U.N. Food Programme that Egypt will lose 30% of its food production in the next 20 years(Nadeen). Farmers have already started to lose the full amount of produce from the land they own. If they own 2 feddans, or 2.1 acres, then they will only plant in one of them.

The Nile River is essential to the survival of the people in Egypt. It manages to sustain the population. Any alterations to the Nile River could result in drastic changes. Nevertheless, farmers surrounding the Nile Delta plant water-intensive rice crops, resulting in a higher usage of water. There used to be strict laws put into place that forbid farmers from planting such water-intensive crops. These restrictions were not strictly enforced by the government, and did not result in any change. Furthermore, large corporations put the Nile’s water at risk. They have dumped their chemical waste into the Nile River, adding to the pollution.

To make matters worse, Ethiopia has been constructing a dam on the Nile River for just over a decade. This dam will lower Egypt’s water supply by 25%(New Security Beat). Ethiopia needs electricity, and this dam would supply the power required. They plan on completing the dam later in 2020, which could lead to drastic problems in Egypt. Egypt has requested that Ethiopia should take a longer time to fill the dam, as they have been looking into ways to gain water. However, Ethiopia has refused and made plans to fill the dam very soon. It is already estimated that most of Egypt will be in absolute water scarcity by 2025, meaning there will be very little to no physical water for residents(Inter Press Services). The construction of the dam could result in Egypt having an even lower intake of water, which would speed the water scarcity.

While Egypt faces this insane dilemma, it is evident that a lot of work must be put in to develop a sustainable solution. There are other countries that used to also face water scarcity, but managed to gain this resource in creative and innovative ways. One of these countries is Kenya. Kenya has built sand dams, which are designed to trap water from rivers in layers of sand. These dams manage to trap rainwater from evaporating. The sand prevents contamination from mosquitoes carrying diseases. It also filters the water, creating readily available drinking water at any time. The best thing about these dams are that they are extremely cheap to build, and do not require maintenance. Since 2002, over 1000 sand dams have been constructed which support over one million people living in areas where natural resources are absent(Excellent Development). This solution may have worked perfectly in Kenya, but most places in Egypt do not acquire the right amount of rainwater needed in order to sustain these dams. However, due to the low cost of construction, these dams will definitely benefit farmers who need ways to trap rainwater from the few times it actually does rain.

The Egyptian government themselves have been working on sustainable solutions. They will be investing over fifty million dollars over the next twenty years in order to find solutions to this dire situation(Smart Water Magazine). One of the solutions the government has been working on is the desalination of groundwater. The way this works is that the groundwater goes through reverse osmosis, where all the minerals and chemicals are removed from the water. There are quite a few downsides to this situation, such as the fact that the water will now contain no minerals. It will not provide some of the essential minerals such as calcium and magnesium that regular drinking water has. Also, this project would be extremely expensive. The desalination of water costs around 2,000 dollars per acre foot. This is on average the amount of water that a family of five uses per year(The Mercury News). However, the thing about using groundwater is that these machines do not need as much energy in order to run. Salt is harder to remove than chemicals, and therefore using groundwater can save a huge amount of water. Moreover, Egypt is planning on diversifying their sources of energy by building solar, wind, hydropower, and nuclear energy plants(Nassar). If they do manage to succeed in gathering enough energy to run these desalination machines, then the cost would be drastically cut, making this solution possible. It does seem that the government has no plan on taking immediate action, and instead is planning out a future road for themselves.

In addition to trying to increase the amount of water, Egypt can also focus on reducing their current usage. Many researchers have been working on drought tolerant crops. They have been doing tests on how farmers can grow a genetically modified rice crop that decreases the amount of water needed. Not only that, but these crops take less time to grow, meaning that farmers can harvest twice in a season instead of once. They can also plant their crops in any type of soil, whether it be clay or mud. This rice has been tested in laboratories, but has not been grown in an actual farm just yet. However, researchers are coming closer than ever to distributing the crop to the people of Egypt.

Genetically modified crops can perhaps be the saving factor for Egypt. Not only do they yield a higher amount of crops, but they also reduce the need for pesticides(Qaim). This can provide a multitude of environmental benefits. First of all, pesticides would no longer be needed. There would be no chance that they could flow into the river, resulting in lower pollution. Also, these crops would prevent weeds from growing in the soil. When farmers themselves pull the weeds, it results in the loss of topsoil. This can decrease the amount of land usable for agriculture.

Egypt has already started the usage of GM, or genetically modified, crops. In fact, they imported modified corn to see the benefits in 2008(Naglaa). Farmers found that this new type of corn reduced the amount of work required. It also yielded up to 41% more grain than a regular corn crop. This would greatly reduce the amount of farms needed in order to feed Egypt as a whole, in turn reducing the water input.

As the water problem has become worse over the years, Egypt has been planning on setting extremely strict rules on farming. They have been preparing a national plan for water management over the next 20 years with 9 other ministers(Nassar). The government has strengthened their laws on water intensive crops. Though they may have neglected to think about it in the past, during the past few months there has been more talk about finding out where the most water is used. The Ministry of Irrigation is currently developing water resource information using a remote sensing technology. This can find out the exact places where the most water is being consumed(Nassar).

In addition to the stricter farming rules, Egypt can also look into adopting a new method of watering crops, known as drip irrigation. Drip irrigation is more efficient than regular sprinklers, saving around 90% of the water used regularly for farming crops(McFadden). This form of irrigation applies water directly into the soil. This proves two main benefits. The first is that plant roots can access this water easily, preventing the water from evaporating or running away. Second, the water is only absorbed in the areas where plant roots need the water. Not only is it simple to install, but the initial prices are not too high. If farmers are willing to take the investment, it will benefit the entire nation.

In the end, Egypt definitely has the resources to end this water crisis. The scarcity has formed due to years of neglect to the precious resource. The country has been wasting an enormous amount of water each year. Continuing to misuse this supply will lead to it diminishing out of existence. Families all over Egypt are already starting to feel the repercussions of the crisis. Children are dying due to diseases that could be prevented if water was accessible. If the Egyptian government is able to build things such as sand dams and water desalination plants, they will certainly be able to reverse the problem. With the fairly recent introduction of genetically modified plants, Egypt can also look forward to decreasing their usage of water. Strengthening farming laws and using the drip irrigation system will assist in their endeavor to save water. Not only will Egypt increase their intake of water, but they can also reduce the amount of it required in order to sustain the growing population of the country.

Families will be able to live freely once again without having to worry whether they have enough water or not. This still means that people should be wary of how much they expend the resource. Under no circumstances should any child be worrying about where they will get their next drink from. While the government can do their best in order to gain a larger intake of water, it is also up to the farmers to decide how to use it. It is estimated that 47% of the world's population are going to live in "areas of high water stress" by 2030(McFadden). Change must start somewhere, and no place is better than Egypt. With these water conservation efforts, humans can once again thrive and live a quality life.

**Works Cited**

“Scarcity, Decade, Water for Life, 2015, UN-Water, United Nations, MDG, Water, Sanitation, Financing, Gender, IWRM, Human Right, Transboundary, Cities, Quality, Food Security.” *United Nations*, United Nations, www.un.org/waterforlifedecade/scarcity.shtml.

Al Jazeera. “Egypt's Population Nears 100 Million, Squeezing Resources, Jobs.” *Egypt News | Al Jazeera*, Al Jazeera, 31 Jan. 2020, www.aljazeera.com/ajimpact/egypt-population-nears-100-million-squeezing-resources-jobs-200 131155442755.html.

“Water, Sanitation and Hygiene.” *UNICEF Egypt*, www.unicef.org/egypt/water-sanitation-and-hygiene.

“Water Scarcity and Poor Water Management Makes Life Difficult for Egyptians.” *Water Scarcity and Poor Water Management Makes Life Difficult for Egyptians | Inter Press Service*, www.ipsnews.net/2018/09/water-scarcity-poor-water-management-makes-life-difficult-egyptian s/. Ebrahim, Nadeen. “Water Crisis Builds in Egypt as Dam Talks Falter, Temperatures Rise.” *Reuters*, Thomson Reuters, 7 Nov. 2019, www.reuters.com/article/us-egypt-water/water-crisis-builds-in-egypt-as-dam-talks-falter-tempera tures-rise-idUSKBN1XG223.

“Nile River Water Supply Forecasts May Reduce the Chance of Conflict.” *New Security Beat*, www.newsecuritybeat.org/2019/07/nile-river-water-supply-forecasts-reduce-chance-conflict/.

“What Is a Sand Dam?” *Excellent Development*, www.excellentdevelopment.com/what-is-a-sand-dam.

Smart Water Magazine. “Egypt to Invest $50 Billion in Drinking Water by 2037.” *Smart Water Magazine*, Smart Water Magazine, 13 Sept. 2019, smartwatermagazine.com/news/smart-water-magazine/egypt-invest-50-billion-drinking-water-20 37.

Rogers, Paul. “Nation's Largest Ocean Desalination Plant Goes up near San Diego; Future of the California Coast?” *The Mercury News*, The Mercury News, 23 Jan. 2017, www.mercurynews.com/2014/05/29/nations-largest-ocean-desalination-plant-goes-up-near-san-d iego-future-of-the-california-coast/.

Abdallah, Naglaa A. “GM Crops in Africa: Challenges in Egypt.” *GM Crops*, vol. 1, no. 3, Jan. 2010, pp. 116–119., doi:10.4161/gmcr.1.3.12811.

“The Benefits of Genetically Modified Crops-and the Costs of Inefficient Regulation.” *Resources for the Future*, www.resourcesmag.org/common-resources/the-benefits-of-genetically-modified-cropsand-the-co sts-of-inefficient-regulation/.

“Egypt Plans to Face Water Scarcity, Allots LE 900B.” *EgyptToday*, www.egypttoday.com/Article/1/43824/Egypt-plans-to-face-water-scarcity-allots-LE-900B.

“Healthcare in Egypt: Allianz Care.” *Allianzcare.com*, www.allianzcare.com/en/support/health-and-wellness/national-healthcare-systems/healthcare-in- egypt.html.

McFadden, Christopher. “How Exactly Does Drip Irrigation Work?” *Interesting Engineering*, Interesting Engineering, 12 Mar. 2018, interestingengineering.com/how-exactly-does-drip-irrigation-work.