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Pakistan Recovery from The Brink of Drought

Water is an integral part of our everyday lives, whenever we open our taps we do not think twice about where the water comes from or its sustainability. Often, we take our seemingly endless supply of water for granted and never consider the extremely conceivable threat of water scarcity. The average person in the United States uses eighty-five gallons of water every day. At a glance, this does not seem like an overtly large number however, when compared to countries like Pakistan which struggle to access just 0.00026 gallons of water per person per day this number is put into perspective (GPM, 1). Since 2005 Pakistan has been considered a water-scarce country because of its extremely low water availability of less than one thousand cubic meters per person (Meribole). This can be explained by a multitude of factors such as ineffective water management, the arid climate, and poor water usage. In order to tackle this daunting challenge politicians and researchers have suggested the implementation of improved irrigation systems, the construction of large-scale water reserves, and the creation of water retention basins. I believe the best way to alleviate Pakistan's issue of water scarcity is to invest in the implementation of efficient irrigation and retention ponds.

Pakistan hosts a large population of around two hundred and twenty million people, more than half of which live in rural areas and have poor access to water. According to The Express Tribune, a hefty forty-two percent of that population works within just the agricultural sector. Similarly, ninety-seven percent of the freshwater being used in Pakistan goes exclusively towards the production of agriculture. However, agriculture only makes up sixteen percent of Pakistan's gross domestic product (Salman). This significant disparity between the large amount of water input compared to low agricultural output showcases the ineffective use of water and irrigation systems within Pakistan. In addition, crops like wheat and rice which are a staple to the Pakistani diet and thrive in the hot climate require large amounts of water in order to grow. Pakistan's agricultural focus on these crops further exacerbates their poor water situation.

An additional factor that contributes to the extremely water-scarce situation in Pakistan is its hot and arid climate. Pakistan lies in a temperate zone which is generally found near the equator. This contributes to the immense amount of water given to the water-intensive crops that thrive in this area. These crops like wheat, rice, and lentils are a major part of Pakistan's economy and many of the farmers in these areas have become reliant on them for not only income but also their diets. Also, its hot climate plays a large factor in the evaporation of Pakistan's stored water. All of these components play a large role in decreasing Pakistan's supply of water and making it harder for farmers to farm with decreased water.

Pakistan's climate also consists of months of monsoons that usually occur during the summer season. During this time up to nineteen inches of rainfall flood areas of Pakistan. Because of this on and off heavy supply of water, many researchers have pointed to Pakistan's lack of adequate water storage as a major cause of their scarcity. According to the East Asia Forum, Pakistan can only store ten percent of its water, this is strikingly low compared to the world's average storage capacity of about forty percent (Salman). Pakistani policymakers' lack of attention and effective management of water resources is apparent when reviewing these statistics. It also becomes apparent that in order to combat these overwhelming factors

major changes, implementations, and investments are needed to slow the steadily declining fate of water scarcity in Pakistan.

An attractive solution for water scarcity in Pakistan that is being considered is the creation of dams and reservoirs. The large-scale formation and use of these structures would allow for greatly increased water storage and availability during dry spells as well as a larger supply for Pakistan to draw from when they are in need of water. However, it is also important to consider the many drawbacks of dams and reservoirs when evaluating their sustainability in the long term. Reliance on reservoir water creates something called the supply-demand cycle, this states that the implementation of reservoirs leads to long-term increased water usage. This is because as the supply of water becomes more readily available the demand and therefore consumption of water likewise increases. If a population becomes too reliant on reservoir water it suffers from a much larger increase in the potential damage from a water shortage than it had before the reservoir (Uppsala University). Therefore, in order to sustainably fight water scarcity, Pakistani officials need to turn away from their use of dams and reservoirs and look towards a solution that does not fuel, but reduces water consumption.

A much stronger and more sustainable solution to the water scarcity in Pakistan is the implementation of improved irrigation systems within the country's farms. As previously stated, agriculture accounts for ninety-seven percent of Pakistan's water consumption. This is a very large majority and therefore should be the focus of our efforts when trying to conserve water. At present, Pakistan employs a large-scale irrigation system called the Indus Basin Irrigation System. This system relies on three central reservoirs that provide the water for the majority of Pakistani crops. Farmers use this water on their land in a technique called flood irrigation. This technique wastes much water and is not very efficient in the arid Pakistani land.

Instead, farmers should implement drip irrigation within their farms. Through this system of irrigation, farmers deliver minimal water straight to the root of the plant. A long-established farmer in Pakistan, Obaid Ur Rehman, replaced his flood irrigation system with a drip irrigation system on some of his crops and claimed, "Drip Irrigation has come as a divine help to me in this area". In addition to revitalizing his arid soil the use of drip irrigation has allowed his farm to use sixty percent less water (Mukhtar). This form of irrigation has proven to efficiently utilize the water reserved for agriculture as well as rejuvenate the deficient farmland with much needed nutrients. Therefore, I believe it is a favorable option to help alleviate the water scarcity in Pakistan.

Another equally attractive solution is the implementation of retention basins in regions that experience heavy rainfall. Not only would this help alleviate possible flooding from heavy storms but it would also create new ecosystems for fishing and allow for rainwater to be recycled and utilized. These retention basins differ from the traditional dams and reservoirs because the water stored here is not directly used by people, but is instead held there for long periods of time, effectively creating a pond or lake like environment. These habitats serve as a home for new ecosystems, which also facilitates economic diversity through aquaculture. In addition, the water in this pond can be recycled and used as farming and even drinking water with relatively little filtration. This is because in retention ponds the water is naturally processed and therefore requires little filtration because of the already significantly high water quality. Lastly, retention ponds serve as a good storage place for excess water in the case of severe rainfall, which can be extremely detrimental to crops, infrastructure, and the existing economies. Therefore, establishing retention basins is an imperative and attractive step in the solution to Pakistan's water scarcity.

Finally, one of the most important steps required in the solution to the water scarcity in Pakistan is the funding and implementation of the solution. Unlike other cost and time heavy solutions to Pakistan's water scarcity, the creation of retention ponds is relatively easy. If there is adequate land and space, then the implementation of the basin requires only minimal materials and maintenance. This is a much cheaper and more immediate alternative to other solutions. However, this would only work as a first step in a more intricate and long-term solution to the water scarcity in Pakistan.

In the case of irrigation, there is no doubt that the initial investment into the renovation of the irrigation system will be extremely costly. Reconfiguring the pumps and pipes that irrigate Pakistan's major farms will be very labor and time intensive. However, with the proper funding, support, and oversight from the government and even external nonprofit organizations, switching farms from flood to drip irrigation is in no way an impossible task. In addition, this large task would create work for Pakistan's overflowing labor pool and would stimulate Pakistan's economy. Furthermore, the immense long-term increase of efficiency within the farms that the new irrigation would bring would effectively increase the agricultural output and likewise increase Pakistan's revenue from agriculture. This revenue can then be reinvested into the elimination of water scarcity throughout Pakistan for good.

This is already being seen in the implementation of the "More Crop Per Drop Policy". This policy of increasing crop water productivity is attempting to encourage the use of drip irrigation in order to minimize the use of water within the agricultural sector. In order for Pakistan to implement such a policy, it would need to be a large and multiscale governmental effort. The lower-level governments could encourage farmers to implement drip irrigation systems on their farms. While the national government could fund subsidies for local and large-scale farmers to help facilitate the transition to drip irrigation. In order for a true change to be seen within the agricultural sector both small- and large-scale farms must implement the more efficient and water effective farming practices to end the fight against water scarcity in Pakistan.

In conclusion, the state of water scarcity in Pakistan is increasing at an alarming rate and will only become much more severe if nothing is done to stop it. This has been caused by a variety of factors such as the irresponsible use of water, the arid climate, and the inefficient management of water. However, there are solutions that can be implemented effectively to help control and alleviate the severe state of water scarcity in Pakistan. One of these solutions is the creation and implementation of drip irrigation on farms. Because agriculture constitutes such a large part of Pakistan's water usage, the employment of a water efficient system of irrigation will greatly decrease the overall usage of water within Pakistan. This movement is being seen in the More Crop Per Drop Policy which has been implemented in many countries and would be a great asset if implemented in Pakistan. Another possible solution is the construction of retention basins. This would offer more economic diversity and immediate water access in the case of severe droughts. In all, with the help of government funding and the investment of agricultural revenue back into the country's agricultural sector, the extremely water scarce situation of Pakistan can be effectively minimized.

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