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India's Water Crisis and Recommendations to Improve Clean Water Availability

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India is a massive country boasting a population over one billion, three hundred million people and is on track to be the most populated country in the world by the year 2027 according to the United Nations recent projections (UNFPA 2021). The question now may be whether India can sustain its population's needs now for water, not to mention the amount of people they will have a decade or two down the road.

The problem in India is with not only the water quality but also with the water's quantity. The water especially in and around the urban centers over the past century has been polluted beyond measure due to the cultural practices of the locals, industry, farming, and poor waste management. This has resulted in the fresh waterbodies of the nation which are already limited becoming a breeding ground for diseases the likes of which, are virtually unheard-of. Despite all this, there is still time and the Indian government in cities like Chennai are taking crucial steps in combating this crisis (UNFPA 2021).

Indian households are not much different from countries like The United Kingdom and The United States of America, with on average around five people in every household. Some regions it is as low as three people per household and others as high as six per household. The diet of the average people in India is primarily plant-based, with some fish and poultry. Like the residence of The United States, most people in India get their food from one of the over four hundred thirty-five thousand supermarkets in the country.

The average wage in India varies greatly, but the average wage per month is around three hundred seventy-seven U.S.D, however, monthly salaries vary greatly with some companies paying nearly thirty thousand U.S.D per month (O'Neil, Aaron 2022). It is important to note in the education realm it is also like the west at least with the cities with the people being highly educated and in general having the largest higher education system with over one thousand universities in the country. Because of its former relationship with Britain, wealthy people in India can send their students abroad to get college

education in the west. In rural areas education is less formal, but the literacy rate is equal to that of the U.S. (UNFPA 2021)

The healthcare funding system is similar to that of the United States with both public and private hospitals some are government funded while others are privately owned, healthcare is universal but the quality of it varies greatly. (UNFPA 2021).

In India, the unemployment is under 6 percent, traditionally this is particularly good for an economy but with India being as populous, this equates to about forty-three million people being unemployed.

In India's modern economy, this means there are far less people buying products, making products, and paying taxes. This forces the government to have to spend more on social services and have less money to pay for infrastructure, health care, and modernization programs. The substantial number of unemployed people can also increase government borrowing and reduce the amount of spending on hardening infrastructure against climate change impacts; and in a country that has numerous densely populated cities, this can have large human impacts (O'Neil, Aaron 2022).

Sanitation is widely available in India and toilets are normally present in households throughout urban and rural India. But unlike in the west, they often have their own separate space outside of the house since they are considered unclean culturally (Epstein, Jill 2015).

These bathrooms use about forty-five liters of water per person daily, which is equivalent to about two trillion, two hundred, sixty-three billion liters of wastewater generated per year. Treating and reusing the wastewater in the local watershed or community can reduce the amount of freshwater needed for daily life. Also, according to the Globalcitizen.org, one in ten or one hundred sixty-three million people in India do not have access to clean water (Globalcitizen.org, 2022). This is nearly equivalent to the entire country of Russia having no clean water near their residence (Dallas, 2017). Improving waste treatment will greatly improve the available drinking water quality and reduce waterborne illnesses (Shah 2019). Investing in low-cost decentralized wastewater treatment technologies like wastewater lagoons, and naturally filtering wetlands or drain fields can be considered as more low-cost treatment options (Varma, 2002).

India can help to solve food problems for their large population by making clean water more available for agricultural usage (Birkenholtz 2016). Adding decentralized, low-cost wastewater treatment facilities can make more clean water available. Additionally, perhaps India could invest in desalinization technology and distribution infrastructure as a long-term solution. Some of this technology is relatively inexpensive and can be deployed in rural areas.

Since ocean water is a homogeneous mixture, separating the salt is an energy intensive process. According to 2021 United Nations statistics, Indian uses about 36 exajoules of fossil fuels per year, making it the world's third largest consumer of fossil fuels (Power-Technology 2022). India could offset the desalination power demand by using renewable energy sources, such as solar power for the pumping and filtration systems. In 2009, India began their journey to convert the nation over to solar power. This project is known as The Jawaharlal Nehru National Solar Mission (Indian Times 2009).

Building an ocean water treatment and distribution system can spur economic growth and create high demand jobs installing the necessary tens-of-thousands of miles of water lines and building thousands of treatment plants (Britannica 2020). If a stepdown filtering system is used, water can be filtered in phases as it moves from the ocean to the rural communities. The filtration and distribution system can include pipes equipped with filter membranes and baffling. As the water moves along the system, more salt will settle naturally, which will further reduce the treatment cost. Salt is a valuable commodity generating about twenty-eight billion dollars globally. The precipitated salt can be collected from the filtering and distribution system, sold in local communities, and excess can be exported internationally. This approach can reduce pump the upfront energy demands and desalinization cost making clean, safe drinking water more accessible for the Indian population.

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