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India, Factor 9: Water& Sanitation

## **Water in India**

The world has many problems and I do not pretend to understand all of them but I would like to bring to your attention to one of them. The sanitation of water, specifically in India, is one issue that I have researched thoroughly and determined to be extremely important. When someone thinks of an underdeveloped country one of the first places that comes to mind is India. One major factor in determining a developing country is the quality of the water. India frequently thought of as an underdeveloped country even though it is constantly growing because of the extremely low quality of water. India has been going through a rapid transition were the availability of bacteria free toilets is few and over 80% of the water in India is full of bacteria due to little or no water purification systems throughout most of India.

Every living thing needs water to survive. In my opinion the problem with water in developing countries is the most important because in these places people already have a hard times surviving. While the causes of water contamination are important, it is more important to first discuss the effects of it. Unhealthy water can do more than contaminate people's drinking water; it can also hurt our food production rate by the water containing the crops. Due to the fact water is everywhere this is a very complex issue with no easy solution

India is a country based on tradition which is why it is important to understand the people who live there in order to further understand the country. In India, a typical family is either a joint family or a nuclear family. A joint family consists of many generations on the males' side. A nuclear family is just a husband and wife and their unmarried children. Indian food can vary depending on where in India a person lives. India is divided into four different culinary regions. Northern Indian food is greatly influenced by the Asian culture and is filled with rice dishes (Indian paragraph 3). The food vindaloo is a western dish that was heavily influenced by Portuguese culture. Western India's food is also famous for its unique taste (Indian paragraph 7). Eastern India on the other hand is famous for its fish specialties and the use of bamboo shoot (Indian paragraph 8). In Southern India coastal kitchens are in many places and spices, fish, and coconuts are constantly used in the dishes (Indian paragraph 9). In general, Indian food is distinct based on region or area.

Generally the education in India is not the greatest. According to my cousins, who live in India, the best schools are usually British schools. It is a little known fact that India has the highest rate for illiterate people in the world. According to the 2011 census 24.7% of the males in India are illiterate and 46.3% of the females are illiterate (Numbers chart 1). There are 15 official national languages of India, English is not one of them but there are more English speaking people in India than the U.S. and Great Britain combined. So why doesn't India have a fully literate country? India doesn't have a fully literate country because it, along with 20 other countries, is facing a learning crisis. In 2009 the prime minister of India passed "The Right of Children to free and Compulsory Education". The problem with this is that even though students between 6 and 14 are forced to go to school that does not mean the teachers have to show up or have a regulated lesson plan (Setla paragraphs 2-3). The way to fix this problem would be to make teachers have a regulated lesson plans that is implemented and enforced by the government. An obstacle to implementing this would be the 15 official languages. This would be a problem because different areas in India use different languages and or different dialects. Also 4% of Indian children never start school; on top of that 58% don't even finish elementary school (Teach paragraph 1).

There is very little access to health care throughout India. All over people are dying from diseases that they shouldn't be, less than 5% of the people who need heart surgery are able to receive it. This is because the medical device industries in India are extremely underdeveloped (Jayaraman paragraph 12). Though all of the problems with the health care system it is still important to the people that everyone should be able to have access to good health benefit's whether they can afford it or not (Govindarajan paragraphs 1 and 2).

Labor laws in India are very strict because of their archaic nature. These laws are basically the same as the ones the British made back when India was one of its colonies, due to this the laws are old fashion and hurting the people they are supposed to protect (Why paragraph 4). In most jobs the employer cannot get rid of an employee once they have been hired because the multiple interpretations of the law create multiple opportunities for corruption (Why paragraph 5). There is also very little job opportunities and very few working women. There have not been many improvements in the work force that enlarge it for more jobs which is over all bad because the population keeps increasing. In urban areas there is little to no working women while in the rural areas the amount of working women keeps decreasing. The reason for the decreasing amount of women in the workforce is because it's highly believed that men are better workers than woman. On top of all of this child labor is constantly increasing in India, 40% of the workers who cut precious stones are in fact children. Children are also often employed in the embroidery industry. To make matters worse laws to protect children are ineffective in child labor areas (Child paragraphs 1 and 2).

In India a lot of people have a hard time getting food. The majority of these people are women and children. The problem isn't just that there is not enough food but that it is not affordable. This problem is being addressed by the Right Food Act put in place by the Indian government to make food more affordable. As the years go on the expenditure of food has gone up. About one thousand million people live in the cities of India and majority of the food supplied to those people comes from rural agriculture. In fact the government focuses on rural agriculture to prevent poverty in urban areas. The urban agriculture is mostly the raising of animals such as poultry and goats. There are also dairy and arable farming in urban areas. According to research done in 2013 32% (Urban Indian page) of the 1.28 billion (New chart 1) people in India live in urban areas.

Now that you have been informed about the people of India you can start to understand their challenges. Due to the large population in India one of the greatest challenges faced is water and sanitation. The majority of bad sanitation in all of India is located in the rural areas of the country. According to the data of water testing, 68.2% of households in India have access to clean water (Drinking page 1). This is a very bad thing because it means that 31.8% of the Indian people which equates to 407,040,000 people in India that do not have access to clean water.

There are many ways that water is contaminated and it happens to over 80% of water in countries across the world, however in India this is a major concern. Some of the main type's pollution is caused by the release of not fully treated sewage, farm runoff, increasing water demand, and excessive water withdrawal. The improper dumping of toxic waste and fertilizer and manure are practices frowned upon in the United States as well as India. The reason for this is the chemicals found in fertilizer and waste can change the quality of the water and threaten human health (Water page 4). Some of these problems are increased acidity and higher amounts of things like metal, chemicals, and certain nutrients. Increased amounts of nutrients can seriously degrade water quality. Another issue is that medicines like hormones and steroids are being dumped in the water ways (Water page 4). Both hormones and steroids can be very dangerous if they are ingested by a person who is not prescribed them. Most of water pollution is because of the actions made by humans, like the dumping of factory waste in streams and ponds, farm runoff and

improper disposal of medicines. The high level of water pollution is spreading diseases and hurting the environment.

The most common waterborne diseases in India are Cholera, Hepatitis A, Hepatitis E, Filariasis, and Dysentery (water slide 4). Out of these diseases only two are deadly but that doesn't mean they should just be ignored. Hepatitis A or Hep A is a not lethal liver infection which is very contagious. Hep A causes liver inflammation and does not require treatment because it goes away on its own (Hepatitis paragraph 1). Hepatitis E or Hep E on the other hand is a rare type of hepatitis which occasionally causes death. For the most part only kills 1% of the amount of infected people although the stakes are higher for pregnant woman. In pregnant women the death rate increases to 10%-30% of infected people (Hepatitis paragraphs 3-4). Only pregnant women require treatment. Dysentery is a disease with many different symptoms. Some of these symptoms are stomach cramps, vomiting, and nausea. There are two different types of dysentery Bacillary Dysentery and Amoebic Dysentery (Dysentery paragraphs 7-8). The differences between the two types are the types of bacteria that cause them and the places they can be found (Dysentery paragraphs 7-8). There is no treatment for dysentery because it resolves itself.

Cholera is the most deadly of all these diseases. Without getting treatment for Cholera death will happen within hours. Out of the world's population about 5% of the people will contract this infection (Cholera page 1). Cholera causes approximately 100,000 deaths a year and this is because in developing countries, like India, most people do not have the money for treatment. Filariasis symptoms are fever, testicular pain, limb or genital swelling. This disease is the second leading cause of permanent disability. The only treatment to help deal with the pain is a special type of surgery (Filariasis page 1). Nodules and correcting gross limb elephantiasis are the two types of surgery (Filariasis page 1).

Throughout India the majority of the waste water is put back into the water sources untreated. This problem does not seem to be getting better over the years but instead gets worse as the population increases. The sewage treatment plants in India don't always make the problem better because of the discharge rate coming out of the plants. Most claim there is a zero discharge rate, however it has been proven false because there is no such thing as zero discharge sewage treatment plant, and so most plants strive to discharge only liquid. (Asolekar slides 15-18). This is not good because someone's urine, which is a liquid, can be recycled in to another person's water drinking. Although most sewage treatment plants don't completely help there are other types of treatment systems that are natural. Some examples of this are fish ponds, constructed wetlands, lagoons, and waste stabilization ponds (Asolekar slide 14). These ponds are very helpful to the environment but who knows if these ponds will be helpful in the environment of the Indian subcontinent or even if the people of India will be able to afford some of these processes.

Another process to treat polluted water is reverse osmosis Reverse Osmosis is where a liquid (usually water) is pushed through a semi permeable membrane, the liquid goes through but contaminants cannot. (How page 3). This process can also be put towards purifying waste water. It is argued by some that this processed water can and should be used to purify water (Asolekar slide 20-21). This process could be used in factories and industrial places where water being treated is not being used for potable water. In addition reverse osmosis can be used to convert saltwater into drinking water (How page 2). This could help increase the availability of fresh drinking water.

There are multiple types of toilets in India but very few of them are actual flush toilets, in fact a lot of them are pit latrines without the proper piping. Pit latrines are one of the oldest methods of waste disposal. The pit latrine is commonly used in India's farmlands because it is extremely easy for a less wealthy person to construct and is a smart structure which naturally gets rid of human waste. Pit Latrines are also popular all over the world in the impoverished and rural areas. A pit latrine is built in a specific

way. The pit should be at least 700mm x700mm x1m to hold as much waste as possible. The pit should also be lined to keep the sewage contained. Pit latrines also can be built in a twin system where two pits are used. When the first pit is filled up it gets sealed for at least one year and the other is used. In that year the waste becomes safe to handle and able to be used as compost because of natural bacteria that treats the waste. (The World paragraph 1).

The pit latrine, though beneficial, has many problems, many of which are management problems. Some of the problems include too many people using the same latrine, garbage being thrown in the pit, chemicals being used to maintain the smells, and disposal of kitchen waste. The ways to prevent the problems of the pit latrine is maintenance. To prevent the sewage smell a vent pipe can be added. Other tips are to keep the people using the latrine healthy, during an epidemic; the floor should be cleaned daily. To keep the pit latrine from overflowing a new one should be built when the level of waste is around 0.5 meters from the opening. Pit Latrines are an appropriate solution for treating waste because when using the twin pit latrine system the waste gets turned into fertilizer with benefits for the plants.

There is still a portion of the population in India that doesn't have access to toilets which spreads diseases but due to recent studies there are solutions. Recently Peepoo was invented; this bag is a onetime use toilet that can be buried to turn into fertilizer. In 2010 studies were conducted in India proving the Peepoo bag to be a success. These bags were later reproduced cheaply and sold around \$0.03each (The Worldwatch page 1 of chapter 10 part 2). Just outside the city of Kolkata, the sewage is treated naturally through fish ponds. About 600 million liters of sewage are treated by 300 different ponds. These fish ponds not only treat sewage but also feed the 12 million people living in the city of Kolkata and provide a home for certain birds (The Worldwatch page 3 of chapter 10 part 2).

Even though humans are the main cause of water pollution there are people and companies that are committed to the saving and purifying water. Some of these companies are Charity: Water, Miya, Water.org, Columbia Water Center (CWC), Three Avocados, WATERisLIFE, and PureMadi. Charity :Water is a nonprofit organization that volunteers and holds fundraisers to make wells and filter water in developing countries in Africa, Asia, Latin America, and the Caribbean (7 paragraph 1). Miya works on stopping the loss of clean water in transportation this water is called Non-Revenue Water (NRW). By reducing NRW Miya saves energy, gets more water delivered, and lowers the cost for water. They do this in the Philippines, Brazil, Canada, South Africa, and the Bahamas (7 paragraph 2). Water.org is a nonprofit organization that partners with local companies to build wells and provide education on good hygiene and better health, this takes place in Africa, Asia, and the Caribbean (7 paragraph 3). CWC has scientists working in the fields of hydrology, engineering, public policy, agriculture and finance to develop sustainable water systems fit to the needs of the regions they serve such being Brazil, Ethiopia, Mali, USA, and India (7 paragraph 4). The Three Avocados is a social enterprise that sells coffee to raise the funds to build water projects in Uganda and Nicaragua (7 paragraph 5). WATERisLIFE invented a technology called the straw that when in water removes waterborne diseases and lasts for up to one year, They also provide education on sanitation and hygiene, this service is provided in Haiti, Africa, Indonesia, India, Pakistan, Afghanistan, and South America (7 paragraph 6). PureMadi is a nonprofit organization that is located in the University of Virginia. They partnered with the University of Venda in South Africa to make ceramic water filters that would serve the people of South Africa (7 paragraph 7). With all of these companies in action, one day, hopefully the entire world's water will be clean.

A typical Indian family can help water sanitation by keeping a few things in mind. Garbage should always be put away properly. Chemicals and medicines should be disposed of properly and never ever put down the toilet or sink. A huge amount of fertilizer and pesticides should not be used to prevent garden and agricultural runoffs from polluting the water. All people should use pit latrines and toilets instead of the fields they have been using for generations. Additionally it should also be made possible for each farmer

to have a small fish pond or lagoon so they can dump excess waste in. Rainwater can be caught and saved, because the rain water for the most part would be clean. Furthermore the Peepoo bag could be used to make fertilizer for farms and urban horticulture. Companies can help the cause to. Do we really need fresh water in our toilets? If companies put salt water in toilets instead of fresh water it will not only stop dogs from drinking out toilets but it can help save fresh water for the people that need it All of this can be achieved through passing laws and better educating the people of India about proper handling of sewage and water. All of these suggestions can help stop the pollution of the water in more countries then just India.

In conclusion all of the world's major issues affect each other. The term pollution is a general term which is often separated into categories such as water, air, land, and light. I choose factor number 9, water and sanitation; I believe the effect of pollution on water is greater than any other category because water makes up most of the earth. If all the earth's water was to become polluted there would be no living organisms on the planet. Water affects everything so to pollute one body of water would pollute the world.

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