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Indonesia: Enhancing Water Quality and Engineering Superior Sanitation

The country of Indonesia has been struck with great hardship in the past couple of decades. In 2004, Indonesia was hit by an earthquake with its epicenter being the large Indonesian island of Sumatra. Political hardships have also plagued the nation with the secession of East Timor from Indonesia in 1999 and newsworthy corruption. With rampant poverty levels and an increase in disease, the growth of the country economically and socially is stagnant. But the country still has accomplished a tremendous amount in recent years, joining the G-20 and becoming the 27th largest exporting country in the world. As Indonesia ranks 15th out of all nations in terms of area but 4th in population, high population density leads to unhygienic conditions. This is especially true on the Indonesian island of Java, where over 130 million people reside, making it the world's most populous island. High population density causes overpopulation and a massive depletion of resources. This lack of resources leads to food scarcity and shortages of shelter. Fewer Indonesians are able to find a sustainable home and job, leading to malnourishment. The problem that stands out is the lack of sanitation and water quality in Indonesia and watching Indonesian citizens suffer due to this is unbearable. This problem is caused primarily by inadequate management of potable, drinking water which results in an increase of water-borne illnesses and dehydration. It is now time for Indonesia to face the reality. Unless it acts quickly upon its sanitation woes, the country's population and standard of living will decline and a degradation of economy and society is inevitable. Indonesia must take the world's help in fixing its water and sanitation problems if it wants to not only succeed, but thrive.

Most Indonesian families survive off of the production of food. With the typical family now having on average three children compared to the six in an average Indonesian family in 1970, parents are more successful in being able to obtain enough food for their children. Having fewer children than before also helped the infant mortality rate to go down, largely in part due to the fact that parents now have more money to spend on each child (DKT International). It is important for this rate to continue to decrease as the youth of Indonesia must continue to grow and for the country to be successful a few decades from now, the infants born today must continue to help the country. With an almost equal ratio of males to females in society, Indonesia is primed for equality. This is essential as it largely eliminates the sex segregation that is a crucial problem in many countries. Also, by having much smaller families than before, these families have become more close-knit (The Changing Relationship).

Due to the fact that all traditional Indonesians base their diets upon the grain, rice has become the staple product for all households. As it is also a country of islands, fish is the major source of protein and both foods make up the majority of the Indonesian diet. Most families in the country, especially in the rural areas, are farmers. They take pride in growing their own food which usually includes rice, vegetables, and fruit. As many harvest seasons result in a surplus, the rural farm family majority takes many of their crops to sell into the market (McNair 83-85). But there are many families that do not have the financial abilities to provide for themselves. 6 percent of Indonesians are malnourished and 34 percent of children under the age of five are underweight. The families who are not successful in farming or otherwise obtaining crops are the ones who are struggling tremendously (Food in Every Country). With staple products and numerous rural farm families successful in farming, the majority of Indonesian citizens will get enough food but malnourishment will continue for some.

A typical family would most likely get education for their children at least until elementary school, in order to teach the basic skills for life. With a 95% enrollment rate in primary school but only 58% of

Indonesian children moving on to go to secondary school, many students drop out. This is due primarily to the fact that families cannot afford their children to move on from the required primary schooling and need the child's help on the farm. However, the primary school clearly is very effective as the country's literacy rate is 99.42% for the youth, due to good teachers and schooling. The school system in Indonesia is the fourth largest in the world with over 250,000 schools nationwide (Resources For). The government also cares deeply about the country's education as 15% of the national budget is spent on it (Gerst 45). Regular families have the privilege to receive education but 20% of children in a rural farm family do not move up to secondary education (Basic Education for All). For Indonesians, education is a fundamental concern though children can only be required to get a certain amount of lower education.

Indonesia recently switched to a more universal healthcare plan, giving 5 million more poor people, health insurance. Although this enables typical rural farm families greater access to better healthcare, it has actually made the healthcare system less successful. With much longer queues and an increase in corruption, the whole health system has become flawed and hospitals are largely underfunded. This universal healthcare plan is certainly a bust and Indonesia must try to improve it for the country to be successful (Indonesia's Nationwide Healthcare Plan). The current access to health insurance has helped life expectancy rates in the country increase to almost 70 years from only 58 years, the expectancy in 1990 (Gerst 46). The number of nongovernmental organizations has greatly risen recently in Indonesia which provides a larger health care access for a typical family. For every 30,000 people, there is one public health center and the private sector as well has done a grand amount for the health system in Indonesia (WHO in Indonesia-Health System). Many factors have recently affected the Indonesian health care system and some must be improved for it to be successful.

60% of the workforce in Indonesia is in agriculture and they produce 1/4 of Indonesia's GNP. Also by using 8% of Indonesia's land, most of which is on Java, many crops are being produced. Typical families, since there are so many in the farming industry, only get a small plot of land less than 1/4 of a mile. The main crop that the typical subsistence farm family grows is rice along with coconuts, corn, and peanuts. Additionally, most Indonesian families will raise animals such as water buffalo and poultry for food. Major crops grown include rubber, coffee, and tobacco which are sold as grand exports. These are crops that are primarily grown on small scale farms, run by regular rural families. Farmers use the agricultural practice of slash and burn agriculture for the most part. This is when trees are chopped down and burned to clear room for crops. Also the government is trying to move farmers from large farming areas like Java to less developed areas which will likely increase rice production tremendously (Gerst 52-53). The typical farm family uses their small plots of land to produce a large amount of crops and raise animals to help all of Indonesia.

The slash and burn agriculture method is really what is hurting Indonesian agricultural improvement, as it is not productive over a long period of time. Also, since Indonesia has a very limited amount of fertilizer, the soil is receiving inadequate amounts of nutrients (Gerst 54). All in all, agricultural productivity is being limited due to the techniques used and limited capital. Since there are many problems with farming in the nation, many families are not able to earn a reasonable salary as the majority of them are farmers. With few of their crops being sold, farmers are not able to earn wages that they can survive off of which leaves drastic unemployment rates. Malnutrition also comes to play as not enough crops are being produced and sold at an efficient rate, causing not only people unable to buy the necessary amount of produce, but also the farm family to not make enough money to feed themselves. Essentially, the poorly used agricultural methods combined with the fact that Indonesia is unable to grow healthy crops with their capital causes a massive trickledown effect, leaving families poor and famished.

The water and sanitation woes that have struck Indonesia play a large role in the day to day lifestyle of a typical rural family. The problems with sanitation in the nation, such as leakages of sewage water and open sanitation, cause soil and groundwater contamination. This will hinder the ability for crops to grow

successfully as they are not getting the proper nutrients required. Many water problems in the area through extracted groundwater cause severe floods, leading to crops being over watered and unhealthy (Juliman 4-5). As it causes the farm family to not be able to produce enough crops, sanitation and water issues need to be fixed immediately. Presently, only around 37% of rural Indonesian families have access to safe drinking water and only around 20% of these families are able to obtain piped water (Juliman 2). In addition, 43 percent of the nation, around 94 million people, does not have access to sanitary toilets. Sanitation problems cost Indonesia almost 6 billion US dollars annually. It is the rural families that are being affected so greatly as they are the ones near the unhealthy rivers and are not able to produce their crops. The situation right now in Indonesia is very severe because around half of the nation is unable to get clean water and proper sanitation (Poor Sanitation). The problems that Indonesian families face do not only affect themselves, but also their environment. With open sanitation, human waste is leaking and polluting the environment, causing animals to contract various diseases. Furthermore, river basins are highly polluted in Indonesia which causes marine life to be negatively affected; only adding to the problems caused by poor water and sanitation (Hansnata). The troubles caused by water and sanitation in Indonesia need to be solved to improve the welfare of all citizens and their environment.

In the past thirty years, sanitation has not improved with 60% of rural families having immense sanitation problems, causing losses in income. Open sanitation and waste disposal is still a major problem and many people are becoming weak due to water shortages. The situation continues to remain horrid as graphs provided by the World Bank shows that the percentage of families in Indonesia with no safe access to water is remaining at a constant of around 53% for the past decade (Indonesia Water Investment Roadmap 12). These water and sanitation problems look to stay the same or even become worse as Indonesia as of now is not doing a great deal to improve it. The plans that Indonesia is currently using are ineffective as 2.3% of Indonesia's GDP was lost in 2012, just due to their sanitation problems (Poor Sanitation). This hurts the rural family tremendously because they are not safe in their present water and sanitation problem and since the country is losing money, these families are not able to sell their crops at the market in the financially struggling country. It is imperative for Indonesia to fix these problems as it is hurting their economy and their citizens.

Currently, Indonesia should not only put forth their best effort in trying to fix their water and sanitation problems to save families from severe dehydration, but also to increase living standards and the economy. First, by fixing many water problems especially in rural areas, the majority of people will not have to use river water for drinking and bathing. In addition, getting access to safe and potable drinking water is a necessity as it should be a fundamental right for all Indonesian citizens. Numerous deaths are caused due to the water issues people face and improving it would help a healthy population grow. By resolving many of the sanitation struggles they face, Indonesia is able to solve two problems with one action. While keeping their citizens much safer from contracting water borne illnesses, such as cholera and dysentery, it also will help reduce the income losses they face from their problems. To tremendously reduce their debt and put people in a better state to survive, Indonesia must make strong beneficial changes to their current water and sanitation policy. In addition, improving these factors will help the environment greatly, giving animals cleaner habitats that are free of disease-carrying human waste. A long-term healthy environment is inevitable if Indonesia takes these steps to end open sanitation nationwide and improve conditions. Rural families will be benefitted the most as they face the toughest of water and sanitation problems, since it is critical for farmers to have clean water. By investing some money to revamp the entire water and sanitation department of Indonesia, the nation is sure to see all aspects of life greatly improved.

The path to better water and sanitation in Indonesia has many obstacles that will make the journey for the nation much trickier. Firstly, there is the massive population density in Indonesia which will make it hard for sanitation to improve as areas are overcrowded which tends to lead to unhygienic habits. With increased pollution and unfair distribution of freshwater, Indonesia will for sure face a lot of challenges (Indonesia Water). We must look towards a more energy efficient way to fuel Indonesian family homes

and getting water into them. With only 1/39 of the world's total water supply being fresh drinking water, we need almost four Earths to compensate the world's population if they drank as much water as a typical American (UN-Water Statistics). It will be very important in the near future to use our limited water resources to their fullest potential and fixing water problems in Indonesia while also conserving as much as possible; a tremendous challenge. The government has to invest more money into water for these problems to be solved, by either building stable pipes to be more resistant to the common earthquakes in Indonesia or by creating more water treatment plants so the water given to families is clean. In addition, another major issue that has the potential of affecting Indonesian families is education. With only a traditional primary education, most children are not informed about the water scarcity problems and therefore, are not able to get a chance to help fix them. Another problem is that three million children are in child labor instead of school which hurts them, creating a poor new generation that is supposed to tackle the country's problems. They cannot do so because they have not received the proper education and must learn how to solve many of the problems Indonesia faces such as water and sanitation (The Children). The challenges that Indonesia will face are great but with an open mind and hard work, they can be overcome to help the growth of clean water and hygiene.

Addressing the water and sanitation problems in Indonesia must be done immediately and many steps must be taken. Essentially, open sanitation is the biggest priority and working toilets and drainage systems have to be put in place in all rural areas. This is the biggest issue as open sanitation hurts the environment, standard of living, and the water quality of the area. By fixing this issue of not having proper toilets, it causes a ripple effect, helping other problems significantly decrease. In addition to open sanitation, pollution poses a great risk to Indonesia as pollutants degrade water quality and can cause epidemics. Pollution must be stopped as the government has to intervene in the situation along with the citizens. In the short term, pollution and open sanitation are the main problems that must be solved, through the investment of more money, for rural farm families to have better lives (Water Challenges). There are many other plans and goals already in place to try to solve these problems. The widely known Millennium Development Goals created by the United Nations give a list of 8 missions to accomplish by 2015 to help the world. The two goals of combating disease and "ensuring environmental sustainability" go hand in hand with helping water and sanitation. By 2015, these goals should be met one at a time and as a result, water and sanitation quality will increase. But, there must also be specific ways to reach these targets which can be primarily done by focusing our efforts on one problem and putting a large amount of resources into solving it. Undeniably, water and sanitation should be the number one priority in Indonesia because of the tremendous amount of hardships it has caused. If we can also focus more capital in limiting diseases and saving the environment, water quality will improve along with it (United Nations). Although there are international goals that can improve Indonesian food security, local community projects are also playing a large role. The Third Water Supply and Sanitation for Low Income Communities project is on the verge of being scaled up and will benefit Indonesia. This local governmental project promoted by the World Bank, is trying to enhance sanitation and decrease the infant mortality rate due to water-borne illnesses. With more funding coming in the near future, this program will be expanded to 32 provinces in the nation to improve hygiene and water access (World Bank). By helping the water and sanitation needs, food security will be improved as well. Better sanitation and water access helps crops thrive, allowing farmers to have plenty of produce. Also by lowering the death rates due to disease, families will be able to work and farm in better conditions. Local projects, along with international goals, are important in ensuring Indonesian food security along with better water and sanitation.

The responsibility of solving these problems should fall into the hands of the Indonesian government, organizations, and the communities in the nation. Beginning with the federal government, the plans that they enact must be clear and accomplish more. As of right now, the Water Resources Law in the nation still needs to create an addendum on how national decisions should be made regarding the environment and water resources (Indonesia Water Investment Roadmap 21). In addition, the government must also

invest more money into water and sanitation. By putting more money into this field, schools can teach more about this area, allowing children to possibly become more interested and consider it as a career opportunity. The central government also must invest the majority of the money in actually fixing these problems directly, whether it is installing toilets or cleaning rivers. The most important factor is in fact money, and the willingness the government has to invest a lot of money into directly giving water to the citizens will be one of the more crucial factors to determine whether the problems will be solved. Organizations can also be of great use in solving this predicament and helping food security. The UN can really be of use by backing up their Millennium Goals and putting the resources in making them come true. The World Bank has already done community projects in the country to help sanitation and UNICEF continues to report on and try to solve these issues. But, the people who can affect the water woes the most are the ones being directly impacted: the local communities and rural farm families in Indonesia. Local communities must have sessions informing the public of the troubles so they will be more inclined to help and work towards a solution. They must not take the help they are receiving for granted and work hard in these projects. Farm families must be more efficient in produce production, possibly by using the slash and burn technique less often, to improve food security. They have to learn and implement new techniques such as going to smaller and more remote islands in the country to use all the land available. People all over the country must take the initiative to educate these farmers about more efficient techniques to help food security. Using the knowledge they received about the issues, local families will make a greater attempt to avoid open sanitation and pollute less. All citizens must get involved with local community projects if they want to see an impact in sanitation and water. These projects are the most effective as they are led by the ones who see the problem first-hand and understand more fundamental ways to solve them. Utilizing the resources that are given to them such as land, money, and labor, these organizations, along with the Indonesian government and people, can implement many plans and strategies to solve many of the water and sanitation crises.

It is clear that Indonesia must enhance their water and sanitation for food security in the country to benefit. With the typical Indonesian family not getting secondary education or good health care access, their whole life must be dedicated to the farm, where a majority of the population works. Without sufficient and clean water, crops cannot grow and dehydration becomes a key issue. If open sanitation and polluted water bodies are present, the quality of marine life and the entire environment will degrade. Farmers must use better agricultural methods to increase productivity and the government should invest more money into these woes as they are losing a large sum of money due to this. Though there are barriers to solving this issue, such as massive population density and limited freshwater, a lot can be done to overcome it. Setting better education standards is the first priority; increasing awareness and getting more people to help. In addition, investing more money into these issues is the only way for large-scale changes to occur. The whole country must be dedicated to solving this issue and should enter a local or national project in order for change to happen. Substantially, Indonesia's food security problems are largely tied to the lack of clean water and prevalence of poor sanitation. If these issues can be solved in the near future, the world is one step closer in ending hunger in Indonesia.

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