

PAPER REVISION FOR ENVIRONMENTAL PAPER

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INTRODUCTION:

Highlight 6: During the consultation in Sweden that was held by the Global Water Partnership, the gathering consultations reported water is considered a source of turbulence and destruction that disturb balances ranging from socially, economically, and environmentally all across the globe.

Highlight 21: As time flew by, the lake was awake in bacteria and algae due to the loose environmental laws and protections. As a result, years of industrial pollution and sewage from cities ends up polluting the lake.

Highlight 6: Economic, social, and environmental risks have surfaced due to the lack of monitoring system in regards to water quality and poor administration of municipal wastewater. Thus, stakeholders need to be able to understand and recognize the dire ongoing issues that the world is facing today and be able to manage and consider this as an importance. Effects of the respective issues may result in natural climate changes to extreme climate events. Though the issues can be seen as creating local social disruption, it can be viewed on the other side of the spectrum as issues that may or already have impacted the economic growth, services and likelihood of countries all around the world.

LITERATURE REVIEW:

II.1. Environmental Impact of Water Pollution and Treatment

Highlight 2: Generally speaking, the use of polluted water for irrigation has a handful of benefits for farmers, especially for crops production but on the other side of the coin, it can pose as a threat for those who lived in or around the affected area. One of the many reasons why the polluted water is being used is because of the lack of fund for water treatment that is designed for irrigation purposes.

With polluted water being used for crop production, it deteriorate the environmental surroundings and worse, caused water borne diseases to surface in the concerned region.

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Highlight 47 and 2: Kabir [insert citation] stated that because polluted water “*contains plant nutrients and also organic matter other than high concentration of soluble salts and heavy metals*”, it can result into harmful effects that can potentially stay in the concerned areas for decades because of the utilization of polluted water for irrigation purposes. To make matters worse, the water can seep down into the soil which inevitably have a negative impact on the ground water quality if it reaches in any ground water reserve areas. Furthermore, due to the polluted water that contains toxic contamination from industrial, agricultural, and domestic wastes as well as heat pollution, lakes around the concerned area are being heavily affected.

Highlight 26: The result of utilizing polluted water for irrigation is harmful for consumption, this is due to the evidence of crop contamination that is filled with pathogens, metals, and sediments.

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Furthermore, groundwater intrusion occurs due to the inconsiderate municipal and industrial waste dumps that are intruding the freshwater in groundwater reserve, causing freshwater scarcity in the concerned area.

Highlight 2: Due to a widespread of inconsiderate wastrel dumps that are thrown in aquatic systems, there is a major environmental impact of the morality of fishes and marine life organisms due to the contaminations of pesticides that are entering the ecosystem.

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Highlight 7: This is because wastewater can be seen and considered as an alternative cost-efficient and sustainable source of energy due to the nutrients, organic and organic minerals that are found in the polluted water that are filled with residues from the fertilizers. Furthermore, there are available technologies that can help with the process of sludge/bio-solid treatment process that can be conveniently built in the wastewater treatment facilities. In addition, there are other technological innovations that are being in process such as the development to recover nitrogen and phosphorus from the wastewater.

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Highlight 4 and 8: Additionally, if the wastewater treatment facilities in the concerned areas are not functioning well, flooding may occur thus it is important for wastewater treatment facilities to examine the environmental sustainability in the surrounding area of the facilities. If the facilities are not being well maintained if it suffer breakdowns, it may result in flooding of land area in the surrounding regions.

Highlight 4: The failure at the designated facility has resulted in wastewater being dumped and rerouted into the Halifax Harbor until further notice.

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II.2. Health Impact of Water Pollution and Treatment

Highlight 12: It is well known that clean water is an absolute essential part of living a healthy life. Thus, it is a basic need for all human beings to have access to adequate supply of clean water. Unfortunately, it has been observed that about 663 million people are not getting access to their basic essential needs for water around the world.

Highlight 2: As a result, waterways are being dangerously contaminated with industrial discharges and pesticides due to fallouts, runoff erosions, and drainages.

Highlight 15: There are toxic blue-green algae (also known as cyanobacteria) that can be found in drinking water and water used for recreational activities. This can potentially pose a hazard to humans. Unfortunately, this toxic substance are not being treated fully but rather at a local level or sometimes even be neglected to be treated. Not only is this toxic algae pose a danger to humans but also to both wild and domestic animals alike. The algae are found accumulating along the shores of ponds and lakes and if it is not treated properly, it can consequentially cause the presence of bacteria such as *Escherichia coli* (also known as *E. coli*).

Highlight 12: Besides the fact that freshwater are being threatened by poor management and over exploitations, freshwater are also vulnerable to the growing ecological degradation that are occurring all around the world. Many developed countries are experiencing the disposal of chemicals into their water resources while the developing world on the other hand are experiencing problems with agricultural run-offs. In Asian urban areas, water pollution is mainly caused by the phenomena of rapid urban development, poor enforcement of regulations, and the rapidly growth of unplanned settlements that lack running sewage systems.

Highlight 2: Water pollution has a heavy impact on the food chain.

Highlight 46: There are plenty of health problems that arise due to the consumption of polluted water. This includes diarrhea, skin lesions, negative affect of blood circulation and damage to the body's nervous system.

Highlight 4: An ongoing as well as a primary health concern that is caused by water treatment facilities are airborne hazards. This is due to the abundant of chemicals and harmful organisms that are being discharged from the wastewater treatment facilities into the air, thus, posing health risk of respiratory and gastrointestinal infections, depression, damage to the nervous system, eye irritations, and possible poisoning for those who are in the surrounding regions.

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Highlight 27: According to Moss [insert citation], there are many politicians who do not seem to consider regulating pollution in water as a dire situation. This is due to the perceived risks of investing in any water related projects, thus, as a result, ultimately reducing any investment for new capital and/or maintenance for treatment facilities. This is due to impractical approaches to cost recovery. As a result, especially in less developed countries, people are not getting access to basic sanitation and clean water that they need as individuals.

Highlight 8: The construction and implementation of water treatment plants can affect the financial conditions of people who live in the concerned areas. The results would not only be an increase to tax rates, but rather a significant depreciation in property values that are situated in the surrounding neighborhoods.

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Highlight 13: Moss [insert citation] stated that agriculture, which is the biggest user of water, will be the sector that will have the heaviest impact of all due to the lack of water reduces yields. This will inevitably affect the supply and demand of food thus affecting the trades amongst countries.

Highlight 19: The result of nitrogen (that comes from manure and fertilizers in agriculture) being washed off costs US residents approximately \$155 [can't see the number] billion a year due to the damages it caused in both the environment and human health. Thus as a result, businesses are trying to increase efficiency in their use of water. In return, the stakeholders should continuously encourage their local and state politicians to take legislative actions in recognizing and promoting water conservation [insert citation].

II.4. Water Pollution Treatment and Its Stakeholders

Highlight 1 & 45: The initiatives that motivates the stakeholders' involvement effort to make changes would often centers around a specific issue. This can be seen as protesting for a regulation in water quality violation to prevent harmful pollutant from entering the waterways.

Highlight 1 and 40: Total maximum daily load (TMDL) can be defined as the maximum value of pollutant that is allowed to enter water while still being able to pass the standards to be considered clean water quality. Thus, many watershed groups were formed due to many violation of the TMDL that are occurring to bodies of water around the world.

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Highlight 1: The Environmental Protection Agency, or better known as the EPA, believed that stakeholders' involvement is crucial. Thus, stakeholders are beneficial and invaluable when trying to review the water quality criteria, identifying and determining the source of pollutant that are entering waterways, creating and developing strategies to reduce the TMDL, and implementing the respective strategies.

Highlight 11: The EPA [insert citation] stated that the effect of stakeholders' involvement has a positive impact in identifying citizens' values and concerns regarding the environment. This inevitably develop some kind of consensus amongst the citizens that believes in changes that are occurring in the environment, thus, creating a movement, grassroots organizations, and activists that demand changes to be made. With that said, this will provide and enable efficient and effective possible solutions through an open and inclusive process that includes a diverse range of people who are pursuing a common agenda.

Highlight 1: Approximately 70% of the cities and communities that are situated in and around the Santa Ana watershed in Southern California were considered disadvantaged. In 2009, the Santa Ana Watershed Project Authority (SAWPA) developed its Integrated Watershed Plan. The plan was created by going to communities that are in disadvantaged and engage with them in order to fulfill the goal of stakeholder involvement to resolve the environmental injustice. As a result, many environmental issues were identified in the early stage of the process:

- The presence of localized groundwater contamination from industrial activities
- Many small water companies that are located in the lower income communities lack the resources to upgrade the technologies in the water treatment facilities
- The presence of language barriers and low educational level residents puts many communities at a disadvantages when trying to provide for reliable and factual information regarding any watershed problems (this is due to the high population of Spanish linguist and other immigrant communities)

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Highlight 1: SAWPA discovered that many residents that are situated in and around the Santa Ana watershed are living in fear of drinking contaminated water. Furthermore, the level of fear in ingrained in the communities is so high that many residents were consistently purchasing large bottles of water simply to do basic and essential needs such as cooking and drinking water. Thus, the process of integrated and initiating stakeholders' involvement enables

SAWPA to identify and address the issue of perceived unsafe water to the residents, hence, families can be informed correctly regarding water consumption.

Highlight 1: Engaged stakeholders' involvement can increase the likelihood of identifying any potential environmental justice in the surround regions of the watershed.

Highlight 11: Regardless of the reasons for conducting any kinds of watershed management activities, involving stakeholders can be very beneficial.

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II.5. Cost Benefit Analysis of Wastewater Treatment Plants

Highlight 14: Water treatment systems take two types of costs into account; investment and recurrent costs. Investment costs are costs that account and cover for the planning, construction, housing alternation in surrounding areas as well as the protection of water sources and the educational trainings of employees at the water treatment facilities. On the other hand, recurrent costs are costs that are used to maintain and operate the water treatment facilities. This includes the cost for replacements of parts and any ongoing protection activities that are monitoring the water sources.

Highlight 5: Cost-benefit analysis (CBA) is a tool that is utilized to calculate the estimation of the overall benefits and costs of investment. In CBA, all the impacts that are deemed relevant (both in present and future) will be converted to monetary terms benefits, and costs.

Highlight 5: At the end, the total of those figures represent the discounted benefits, costs, and net present values. This will give information on how effective the water protection measures are in the long run.

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Highlight 32: Hence, since health in of itself is widely considered as an important asset of human capital, efforts need to be made in order to reduce pollution. This can be seen as a plausible investment and even more, can be viewed as a tool to promote the economic development and growth of a country.