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Sawaga River's Curse: The Violation of Residents' Right To Health Through Waterborne Diseases

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Abstract

Water is vital for maintaining life and promoting healthy living. The Sawaga River in Malaybalay City, Philippines, has become contaminated, causing the outbreak of waterborne diseases. As a result of poor waste management, agricultural runoff, industrial activities, and deforestation, water quality has deteriorated. This research explores the alarming increase in waterborne diseases in barangays directly affected by the Sawaga River's flow, including Patpat, Kalasungay, San Jose, Laguitas, Linabo, and Bangcud. Based on the records from the City Health Office of Malaybalay City, Bukidnon, as of 2023, Amoeba and Acute Abdominal Disease have emerged as significant health threats in these communities due to exposure through drinking and bathing in the contaminated river. According to international law, which emphasizes the highest attainable standard of health for all people, the residents' right to health is violated. To reduce pollution and protect public health, proactive measures are needed to minimize river contamination. Residents living along the Sawaga River need comprehensive interventions, sustainable water management practices, and policy reforms to restore their health and ensure a safe and healthy future. Qualitative methods were employed, such as key informant interviews, document analyses, and literature reviews. A thematic analysis of the collected data addressed ethical considerations. There were a variety of potential solutions to mitigate waterborne diseases' health risks and environmental impacts, including improved waste management, water quality monitoring, public awareness campaigns, water treatment facilities, community involvement, and enforcement of regulations. The findings of this research underscore the urgent need for stakeholders, including government bodies, policymakers, and environmental organizations, to address the pressing issue of

waterborne diseases in the affected barangays. Evidence-based interventions can be implemented to maintain the Sawaga River's ecological balance while safeguarding the residents' right to health.

Keywords: Sawaga River, Right to Health, Waterborne Diseases, Human Rights, Public Health.

1.Introduction

Water is an essential resource for sustaining life and promoting good health. However, certain bodies of water like rivers that should be a source of vitality and well-being can instead become a curse for the communities residing alongside them. One example is the Sawaga River, whose contaminated waters have become a breeding ground for waterborne diseases, thus violating the residents' fundamental right to health. The World Health Organization's Constitution in 1946 envisages "...the highest attainable standard of health as a fundamental right of every human being." River contamination is an increasing global concern with severe environmental and human health consequences. The continued release of hazardous pollutants into rivers has led to a rise in waterborne illnesses, posing a dire threat to public health. Pathogenic microorganisms responsible for these diseases contaminate sources of drinking water and other domestic uses, resulting in various ailments such as cholera, dysentery, hepatitis A & E, typhoid fever among others.

The Sawaga River, once a pristine and thriving ecosystem, has fallen victim to years of pollution and neglect. In one study conducted in Malaybalay City, Bukidnon, it revealed that Diarrhea as a waterborne disease is common among marginalized communities because of poor water quality/supply, inaccessibility of sanitary toilet facilities, low educational attainment, and the presence of banana plantations and piggery farms (Barroso & Alava, 2020). Further, various industries, urban settlements, and agricultural practices in the surrounding area have contributed to the deterioration of water quality, turning the river into a veritable health hazard. Consequently, the local population now faces an alarming increase in waterborne diseases, which not only impose a heavy burden on their physical well-being but also infringe upon their fundamental human rights.

International law recognizes health as a fundamental right that guarantees every individual the highest possible physical and mental well-being standard. However, river contamination leading to waterborne diseases directly violates this basic right by exposing communities worldwide to serious threats against their well-being. This study provides an extensive review of how international law addresses river pollution and its impact concerning violations of the right to health due mainly to waterborne diseases. As observed globally across nations worldwide today- widespread river pollution necessitates governments worldwide taking proactive steps towards reducing its occurrence while prioritizing citizens' safety from harm's way.

With pervasive river pollution comes resultant water-borne illnesses that pose direct threats at violating international law's enshrined rights related to human wellbeing; thus, urgent effective measures are necessary solutions addressing comprehensively this grave violation witnessed frequently today potential life-threatening situations had they gone unchecked. By exploring reputable research studies from internationally recognized organizations like WHO (World Health Organization), and UNICEF (United Nations Children's Fund), amongst many more committed parties concerned about Human Rights advocacy globally - this paper aims at providing insights into best practices Governments can adopt tackling these challenges without infringing upon anyone's liberties or human rights thereof - ensuring sustainable development goals prioritized through policy interventions aimed at achieving improved Environmental Health outcomes overall within our communities worldwide today. Moreover, the pollution of rivers is a critical issue that has far-reaching consequences on human health and well-being. Humans depend on clean water sources for survival; thus, contaminated rivers cause severe health problems.

The right to good health conditions enshrined in international law is violated by such situations, as highlighted by extensive literature reviews. The scale of this problem underscores the urgent need to take adequate measures to tackle pollution's violation of fundamental human rights caused by river contamination. To accomplish this objective, policymakers should increase awareness about environmental conservation practices among communities near these rivers while imposing stricter industry regulations along their banks. Future research could further explore various aspects related to river pollution. For instance, studies could focus on analyzing how different cultures approach conserving natural resources like lakes or examining how political factors influence policymaking regarding global waste management practices near rivers. Other areas worth exploring include investigating the links between

socioeconomic status and proximity to polluted bodies of water or identifying innovative solutions, such as green technologies that can help reduce contamination levels at source points leading into streams or other freshwater sources.

It is vital that community members and policymakers alike take immediate action since these situations threaten people's right to access basic needs like clean drinking water, which violates international law provisions addressing fundamental human rights concerns critically. Future research must continue exploring ways governments can implement legislation to protect everyone's well-being while preserving our planet's natural ecosystems for future generations prosperity through sustainable development policies concerning resource use management strategies based on scientific inquiry findings.

This research aims to shed light on the profound impact of waterborne diseases in the context of the Sawaga River, emphasizing the violation of residents' right to health. By examining the specific pathogens and contaminants in the river and their association with different health conditions, we highlight the urgent need for comprehensive interventions to address this critical public health issue.

Ultimately, the findings of this research serve as a clarion call for stakeholders, including government bodies, policymakers, and environmental organizations, to address the Sawaga River's curse on public health. By understanding the multifaceted dimensions of the problem, we can pave the way for evidence-based interventions, sustainable water management practices, and policy reforms to restore the residents' right to health and ensure a safer and healthier future for the community living alongside the Sawaga River.

2. Methodology

This study employed a qualitative approach to investigate the causes of waterborne diseases and their violation of the human rights of the residents living near the Sawaga River, specifically, their right to health. The data and information for this study were obtained from the City Health of Malaybalay City, the City Environmental Office of Malaybalay, and various bodies of literature related to the topic.

2.1 Locale of Study

Malaybalay, officially the City of Malaybalay, is a 1st class component city and capital of Bukidnon, Philippines. According to the 2020 census, it has a population of 190,712 people. The town, dubbed the "South Summer Capital of the Philippines," is bordered north by Impasugong; west by Lantapan; south by Valencia and San Fernando; and east by Cabanglasan and Agusan del Sur. It was formerly part of the province of Misamis Oriental as a municipal district in the late 19th century. When the special section of Agusan (now Agusan del Norte and Agusan del Sur) and its sub-province (Bukidnon) were created in 1907, Malaybalay was designated as the capital of Bukidnon. It was formally established as a municipality on October 19, 1907, and was created into a city on February 11, 1998, by *Republic Act 8490*.

The Sawaga River (Binukid: *Wahig Sawaga*) is a river in Central Bukidnon, , on the island of Mindanao. A majority of its catchment area is located in Malaybalay City. Its source is from a watershed west of Mt. Tuminungan (part of the Kitanglad Range) in Barangay Dalwangan. It flows shortly northward and eastward into Patpat and Kalasungay, the river then flows southward into the Poblacion District, past Casisang, San Jose, and Laguitas. The Lower Sawaga Valley is located in its lower course from Barangay Linabo through Bangcud until it meets with the Manupali River and ends at Pulangi River in Kahaponan, Valencia City. The Sawaga River has a total length of about 64.5 km, and the basin has 42,692 hectares. The river could be more navigable, but it significantly contributes to the economy of Malaybalay as a source of irrigation. Hence, this study centered on the barangays directly affected by the Sawaga River's flow: Patpat, Kalasungay, San Jose, Laguitas, Linabo, and Bangcud.

2.2 Research Design

The research design employed in this study is a qualitative approach. This approach allows for a deeper understanding of the causes of waterborne diseases and their long-term effects by exploring the perspectives and experiences of key stakeholders, such as officials from the City Health of Malaybalay City and the City Environmental Office. A comprehensive review of relevant literature will also be conducted to gain a broader understanding of the topic.

2.3 Data Collection Methods

1. *Key Informant Interviews:* Key informant interviews were conducted with officials from the City Health of Malaybalay City and the City Environmental Office. These interviews served as a primary data source to gather insights into the causes of waterborne diseases and their long-term effects. A semi-structured interview guide was developed to ensure consistency across interviews while allowing for flexibility to explore emergent themes.
2. *Document Analysis:* Documents, reports, and records related to waterborne diseases and environmental management from the City Health of Malaybalay City and the City Environmental Office were analyzed. This analysis provided valuable information on the existing policies, programs, and practices related to water quality monitoring, sanitation, and disease prevention.
3. *Literature Review:* A comprehensive literature review was conducted to gather insights into the causes of waterborne diseases and their long-term effects. Relevant academic journals, research articles, books, and reports were consulted. The literature review focused on identifying common causes of waterborne diseases, the impact of poor water quality on public health, and the long-term effects of exposure to contaminated water sources.

2.4 Data Analysis

The collected data were analyzed using thematic analysis. The key informant interviews were transcribed, and the texts were coded to identify recurring themes and patterns. The document analysis and literature review data were also coded and integrated into the analysis. Comparative analysis was conducted to identify similarities and differences between key informants' perspectives and the literature findings.

2.5 Ethical Considerations

Ethical considerations were addressed throughout the research process. Informed consent was obtained from all participants before conducting the interviews. Confidentiality and anonymity were ensured by assigning pseudonyms to the participants and organizations mentioned in the research. The study complied with ethical guidelines and regulations for human subject research. Some potential limitations of this study include the availability and accessibility of data from the City Health of Malaybalay City and the City Environmental Office.

Furthermore, the study's findings may be influenced by the perspectives and experiences of the key informants interviewed. However, efforts were made to mitigate these limitations by utilizing multiple data sources and conducting a comprehensive literature review.

This study has outlined the qualitative methodology employed in the research study, which investigates the causes of waterborne diseases and their long-term effects. The data were collected through key informant interviews, document analysis, and a literature review. Thematic analysis was used to analyze the data, and ethical considerations were addressed throughout the study.

3.Results and Discussion

The prevalence of waterborne diseases in certain barangays of Malaybalay City, specifically those located along the Sawaga River, is a concerning issue based on the 2023 data from the City Health Office. Based on the interview conducted with the City Health officer of Malaybalay City, Bukidnon, the critical informant revealed that the affected barangays include Patpat, Kalasungay, Casisang, San Jose, Laguitas, Linabo, and Bangcud. Further, he identified the common waterborne diseases they have recorded in their office such as Amoeba and Acute Abdominal Disease, which are known to be associated with waterborne contamination, likely resulting from exposure through drinking and bathing in the river. This discussion explores the reasons behind water contamination, its health implications, and potential solutions to mitigate the risks.

Table 1. Coliform content of Sawaga River

Station	Test 1 (MPN/100ml)	Test 2 (MPN/100ml)	Test 3 (MPN/100ml)
1	900 MPN	500 MPN	240 MPN
2	1000 MPN	760 MPN	350 MPN
3	680 MPN	700 MPN	350 MPN

Source: Lubos, et al., (2020)

The Sawaga River has a high coliform level, as seen in Table 1. When testing for total coliforms, there should be NONE detected per 100ml as the accepted concentration. The Sawaga river's total coliform finding may be a factor in the water-borne illnesses

that affect locals close to the river. The harm associated by the high coliform level in the Sawaga river affects not just the human population that depends on the river but also the biodiversity found in it. Additionally, the high Coliform content in the river is a sign that the water should not be consumed (Lubos et al., 2020). According to CDC (2013), the presence of coliform in water is a sign of both water pollution and an increase in the risk of developing a water-borne illness.

Causes of Water Contamination:

Several factors could contribute to the contamination of the Sawaga River and subsequently lead to the outbreak of waterborne diseases:

1. *Poor Waste Management:* Inadequate waste disposal practices in the barangays may directly discharge untreated sewage into the river, contaminating the water with harmful microorganisms.

Table 2. Frequency and Percentage Distribution of Waste Disposal

		Frequency	Percentage(%)
Waste Disposal	Dumping	48	45.28
	Burning	15	14.15
	Composting	3	2.83
	Segregation	38	35.84
	Dumping and Burning	2	1.88

Source: Lubos, et al., (2020)

Table 2 shows that the majority of the resident dumps their waste. This shows the lack of proper waste disposal management in the community. Accordingly, the barangay health personnel who said that most informal settlers put their trash in the close-by Sawaga River further supported these practices. Their yearly report makes it clear from the data that waste disposal is an issue in their community. However, given that the majority of the respondents are situated close to a major road where garbage trucks can pass, many respondents also practice waste segregation.

This poor waste management also extends to the lack of proper sanitary toilet. Different bacteria and pathogens found in human feces are dangerous to people and can cause various diseases, and even death. Evidence suggests that some households dispose of their waste in the Sawaga River because they lack a sanitary toilet. Similarly, CPDO reveals that approximately 59.71% of the total households lacks sanitary toilet facilities. This indicates that the majority of the locals dispose of their waste in a wide open space.

Moreover, data revealed that several residents have raised pigs and chicken in their backyard. In a study conducted by Barroso and Alava (2012), it states that presence of piggery and livestock can be a source of water pollution through contaminating the water system with the chemicals and waste they release. With rivers, creeks, and other water supply sources contaminated, residents are at risk of having diarrheal diseases.

2. *Agricultural Runoff:* If agricultural activities occur near the riverbanks, the use of pesticides and fertilizers could be washed into the river during rainfall, contributing to water pollution.

   In an assessment of the quality of health and diseases in selected marginalized barangay in Malaybalay City, it revealed that the presence of banana plantations and pig farms in the barangay was found to be a major factor. By releasing chemicals and trash into the water system, these plantations and pig farms can be a source of water pollution. Residents are at risk of developing diarrheal infections and other waterborne diseases as a result of contaminated rivers, creeks, and other water sources.

3. *Industrial Activities:* If industrial facilities are in the vicinity, improper waste disposal practices or accidental spills could introduce pollutants into the water.

   In a report presented by the local government of the city of Malaybalay, the annual average growth rate of the population of Malaybalay City during the period of 2014 to 2017 is 2.11%. Among the fastest growing barangays are Dalwangan with 7.08% growth rate, Patpat with 6.85%, Casisang with 4.37% and San Jose 3.02%. With this growth rate, it is projected that the city's total population will reach 213,182 with 52,120 households by 2027. This signifies about 40 thousand persons added to the city's *population* and 13,705 households from 2017 to 2027.

The growing population and industrial activities also signify a growing percentage of industrial waste, garbage, and other pollutants. Further, an increase in the level of contamination of the Sawaga River is also a predominant concern among the possible adverse effects of the said industrial activities.

4. *Deforestation:* Loss of forest cover may lead to soil erosion, causing sedimentation and altering the river's natural flow, potentially leading to higher contamination levels.

   The province of Bukidnon has been experiencing an alarming rate of environmental degradation due to rampant deforestation in the province which peaked in the late 1970s, leaving in its wake a trail of destruction in the form of upland erosion, siltation of rivers, and increasing severity and frequency of flooding. From 2002 to 2022, Bukidnon lost 2.11kha of humid primary forest, making up 8.5% of its total tree cover loss in the same time period (Reyes, C., A. Tabuga, R. Asis, and M.B. Datu. 2012). Total area of humid primary forest in Bukidnon decreased by 1.4% in this time period. Deforestation disrupts the natural processes that regulate water quality and flow of the major rivers in the province including the Sawaga river, leading to increased runoff, soil erosion, and the transport of pollutants into water bodies. This can have far-reaching consequences for aquatic ecosystems, human health, and water availability.

Health Implications

The presence of waterborne diseases like Amoeba and Acute Abdominal Diseases can have severe consequences for public health. These diseases primarily affect the gastrointestinal system and can cause diarrhea, stomach cramps, nausea, and vomiting. In extreme cases, they can lead to dehydration, electrolyte imbalances, and even death if left untreated, especially in vulnerable populations such as children, elderly individuals, and those with compromised immune systems. This growing incidence of waterborne diseases is anchored to the inadequate source of water and/or water system in the area.

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Table 3. Frequency and Percentage Distribution of the Respondent's Source of Water

		Frequency	Percentage(%)
Source of Water	Level 1	16	15.09
	Level 2	51	48.11
	Level 3	39	36.79

Source: Lubos, et al., (2020)

Table 3 shows that most of the Station 2 have a level 2 water source. According to DOH, this type of water source uses a communal faucet system that can serve 4 to 6 households (Lubos, et al, 2020). According to the barangay health workers, most of the residents share a water system since most of them are informal settlers in the barangay. A poor water system can have significant and wide-ranging effects on both public health and the overall well-being of a community. Inadequate access to clean and safe drinking water can lead to a host of waterborne diseases, increased mortality and morbidity in the affected community. In a similar study, one of the reason of the increasing incidence of morbidity rate of dengue in Malaybalay City, is many households have no access to clean water. The barangay's main source of water supply is deep well, while some residents get their domestic water supply from nearby springs. As observed, majority of the residents store their water in artificial containers. Uncovered artificial containers of stored drinking water are also the perfect habitat for breeding mosquitoes and a suitable environment for laying eggs (Barroso and Alava, 2012).

Table 4. Common water/environment related diseases encountered

		Frequency	Percentage
Common Waterborne Diseases	None	42	39.62
	Skin Rashes	17	16.03
	Diarrhea	26	24.52
	Skin Rashes and Diarrhea	21	19.81

Source: Lubos, et al., (2020)

Table 4 shows that several respondents claim to have experience various waterborne diseases. In a similar study, it reveals the following factors that contribute to the increase rate of Diarrheal diseases. One is no access to portable water. This is because various barangays are not reached by the current water system. As observed, residents get their water from nearby rivers, creeks and springs which are still underdeveloped. Based on interviews, it was revealed that some garbage is dumped and thrown in creeks by nearby residents. The growing number of livestock practices in the area also posed a threat to people's health. These pollutants from poultry and other livestock farms harbors more insects and rodents and can contribute to the increase incidence of dengue (Barroso and Alava, 2012). Thus, residents living on nearby waters are vulnerable to these diseases.

Environmental Impact

The contamination of the Sawaga River not only poses health risks to humans and impacts the surrounding ecosystem. Aquatic life may be adversely affected, leading to reduced biodiversity and ecological imbalances. The river's contamination can also affect the availability of safe water for irrigation and other purposes, thereby affecting agriculture and livelihoods in the region.

Water pollution, such as industrial effluents, agricultural runoff, lack of proper sanitary facilities, and sewage discharge, can introduce harmful chemicals, heavy metals, and other contaminants into the river water. These pollutants can be toxic to aquatic organisms, leading to fish kills, reduced biodiversity, and disruption of food chains. Furthermore, this impact can disrupt the balance of aquatic ecosystems by altering water chemistry, temperature, and nutrient levels. This can favor the growth of certain species while harming others, leading to shifts in biodiversity and ecological imbalances. This continuous contamination degrade the value of the Sawaga river, having adverse effect to the biodiversity found in the river.

Potential Solutions and Collaborative Efforts

Addressing the issue of waterborne diseases requires a multi-faceted approach and collaborative efforts among various stakeholders:

1. *Improved Waste Management:*
   Local authorities should prioritize proper waste management systems, including the establishment of sewage treatment facilities and promotion of responsible waste disposal practices among residents. Intervention on waste management on community near the river is suggested.

2. *Water Quality Monitoring*:
   Regular monitoring of the river's water quality is essential to identify pollution sources, assess the effectiveness of interventions, and take timely corrective actions. Addressing water quality and improving water infrastructure are critical steps in promoting healthier and more prosperous communities.

3. *Public Awareness and Education:*
   Public awareness campaigns on the importance of clean water, the risks of waterborne diseases, and educating the communities on proper waste disposal, proper sanitation practices can empower communities to safeguard their health and the environment.

4. *Water Treatment Facilities:*
   Implementing water treatment facilities or providing access to safe drinking water sources can reduce the risk of infections from consuming contaminated water. Implementing advanced and affordable treatment technologies to address specific pollutants like nutrients and pharmaceuticals.

5. *Community Participation:*
   Engaging local communities in river cleanup initiatives and restoration projects can foster a sense of ownership and responsibility for environmental conservation.
6. *Forestal Restoration*
   Addressing deforestation in Bukidnon requires a holistic approach that considers ecological, social, and economic factors. Collaborative efforts for reforestation and restoration, sustainable agriculture, and community-based conservation involving environmental organizations, government agencies, indigenous communities, and other stakeholders are essential to ensure the sustainable management of forests and the preservation of Bukidnon's unique natural heritage.

7. *Regulatory Measures:*
   Enforcing environmental regulations and guidelines to prevent industrial pollution and other harmful practices is crucial in protecting the river's integrity. Regulations of the adoption of sustainable agricultural practices, river protection and water management are also encourage. Regulations on the activity on different industries located near the river may also be resorted to ensure the implementation of waste reduction programs to minimize their environmental footprints.

Conclusion

The prevalence of waterborne diseases in Malaybalay City's river-adjacent barangays violates the right to health of the residents of Malaybalay City who are living along the river banks under the existing statutes and international law. This circumstance calls for urgent action to address the issue of water contamination. Addressing pollution in rivers requires a multifaceted approach that involves stricter regulations, improved waste management practices, sustainable agriculture, and the promotion of clean technologies. Efforts to mitigate pollution are crucial to preserving the health of rivers, the ecosystems they support, and the well-being of both aquatic and human communities. By adopting a comprehensive approach that involves improved waste management, water quality monitoring, public awareness, and collaborative efforts, the city can work towards mitigating health risks and preserving the Sawaga River's ecological balance for the benefit of both its residents and the environment by enacting a relevant ordinance that would address the brewing health concerns among people living near Sawaga River and to preserve the river for the next generations.

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