Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-1 Issue-2 || April 2022 || PP. 83-92 https://doi.org/10.55544/sjmars.1.2.11

Water And Soil Pollution: A Dual Threat to Environmental Sustainability

Abdulsamea Mohammed Elhadi Hussen[1] and Faiza Tawati Abdulnaser[2]
[1]Department of Physics, Faculty of Education, Zintan University, Derj, LIBYA
[2]Higher Institute of Sciences and Technology, AL Garaboulli, LIBYA

[1]Corresponding Author: abdulsamea.hussen@uoz.edu.ly

www.sjmars.com || Vol. 1 No. 2 (2022): April Issue

Date of Submission: 30-03-2022	**Date of Acceptance:** 25-04-2022	**Date of Publication:** 30-04-2022

ABSTRACT

Water and soil pollution pose a double whammy to environmental sustainability by endangering ecosystems, biodiversity, and human health. This article discusses the causes and connections between these two forms of pollution: inappropriate waste disposal, agricultural runoff, and industrial waste discharge. The study focuses on how contaminants in soil may find their way into water bodies **and how polluted water deteriorates soil quality, which in turn causes more environmental damage. Comprehensive policies incorporating sustainable practices and regulatory measures are necessary to safeguard natural resources for future generations. Using a qualitative methodology, this study will investigate the connection between soil and water contamination. In addition to field observations in impacted locations, data will be gathered through interviews with community people, local authorities, and environmental specialists. This research will also examine secondary data from case studies and reports. Thematic and content analysis will be employed to find important themes and insights. The objective is to offer a more thorough comprehension of the connections between these two pollution categories and suggest practical remedies for environmental sustainability.**

Keywords- Water, Soil, Pollution, Environmental, Sustainability.

I. INTRODUCTION

Land and water pollution, which endangers ecosystems and human health, are two of the most urgent environmental problems the world is now dealing.[1] According to a study by the Lancet Commission on Pollution and Health, pollution is a major cause of disease and premature death worldwide. An estimated 9 million premature deaths in 2015 were attributed to pollution-related diseases, accounting for 16% of all deaths worldwide and three times as many deaths as AIDS, malaria, and TB combined. Furthermore, in 2015, pollution caused the loss of 268 million disability-adjusted life years (DALYs), which included 14 million years lived with a disability and 254 million years of life lost.[2]

Since contamination in one medium often affects the other, both forms of pollution are tightly connected, raising environmental risks and sustainability. The provision of vital services like food production, drinking water, and habitats for various species makes soil and water vital natural resources that sustain life. Regrettably, human activity has badly deteriorated water quality over the last century, mainly as a result of industrial, agricultural, and urban processes that discharge dangerous substances into the environment.[3]

The main source of water pollution is the direct release or flow of dangerous substances into water bodies, such as chemicals, heavy metals, plastics, and illnesses. Waste disposal practices, sewage systems, industrial processes, and agricultural runoff are the main sources of this contamination. Agricultural runoff is the term used to describe the movement of pesticides, herbicides, and fertilizers from fields into lakes, rivers, and groundwater. These pollutants damage aquatic life and render the water unfit for human use and agriculture, compromising food and water security in impacted areas. Because

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-1 Issue-2 || April 2022 || PP. 83-92 https://doi.org/10.55544/sjmars.1.2.11

waterborne bacteria may flourish in polluted locations, surface water contamination can also spread illness, becoming a major public health concern.[4]

Conversely, the earth's surface contamination by dangerous substances, including chemicals, plastics, and heavy metals, is called soil pollution. This frequently happens as a result of agricultural practices such overuse of chemical fertilizers and pesticides, as well as industrial activities and inappropriate waste disposal. Soil contamination decreases the land's ability to sustain plant growth and disturbs ecosystems, making it more difficult to cultivate food and conserve biodiversity. Furthermore, by releasing harmful substances into the air and water, contaminated soil can exacerbate environmental effects. When plants absorb soil pollutants and make their way into the food chain, it poses a major risk to the health of both humans and animals.[5]

One of the biggest challenges in combating soil and water contamination is their interdependence. Pollutants from polluted soil can seep into groundwater or flow into rivers and lakes, worsening water pollution. For instance, dangerous metals and compounds from the soil may be carried by irrigation or rainfall, poisoning adjacent water sources. In the same manner, pollutants in streams can harm the quality of soil. For instance, when water gets enriched with nutrients from agricultural runoff, ecosystems may suffer further harm from eutrophication in water bodies brought on by algal blooms that remove oxygen and nutrients from the soil. The necessity of integrated solutions that address both types of pollution at the same time is highlighted by this feedback loop.[6]

Water and soil pollution affects already vulnerable ecosystems and communities, with far-reaching and frequently disproportionate effects on the environment and human health. In addition to damaging ecosystems and biodiversity, pollution may lead to long-term health issues in humans, such as cancer, neurological disorders, and respiratory issues. These health risks are particularly noticeable in poorer nations, where access to clean water and sanitary wastewater is restricted, and poverty and inadequate infrastructure can worsen pollution. Furthermore, pollution has enormous financial implications, such as decreased agricultural output, higher medical expenses, and the deterioration of natural resources that people depend on for their subsistence.[7]

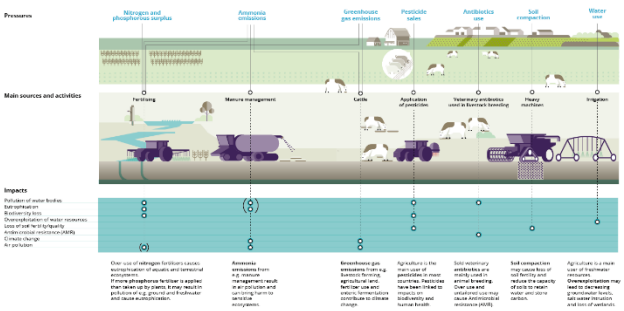

Figure 1. Pollution impacts on the environment

Figure 1 shows that while some contaminants in soil decompose over time, others persist indefinitely. Different contaminants often wind up on land and in its soil, where they gradually build up. It is unknown how dangerous these substances and different combinations of them are. However, we know from sampling locations that soil and land pollution may majorly affect ecosystem health, soil biodiversity, and human health. In addition to potentially contaminating our food and drinking water, these contaminants can impact soil organisms.[8]

The twin issues of water and land contamination require a comprehensive approach incorporating cleanup and preventative methods. Governments, corporations, and individuals must collaborate to implement laws that reduce pollution at its source. Enforcing laws on the disposal of industrial waste, encouraging recycling, and supporting sustainable farming practices are a few ways to lessen the release of dangerous compounds into the environment. Restoring damaged ecosystems by techniques like phytoremediation, soil rehabilitation, and water treatment is also necessary to partially undo the harm that pollution has caused. International cooperation is also necessary to address the global character of this environmental issue, particularly when it comes to shared ecosystems and transboundary water pollution.[4]

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-1 Issue-2 || April 2022 || PP. 83-92 https://doi.org/10.55544/sjmars.1.2.11

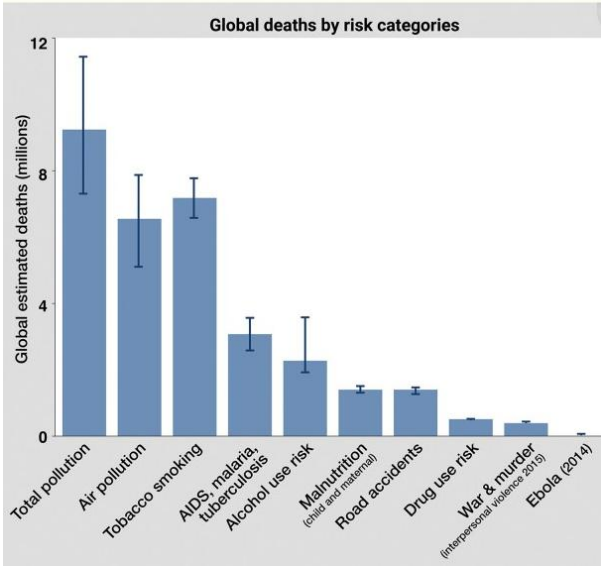

Figure 2. Global Death by Risk Categories

Ultimately, pollution control and wise management of natural resources are essential for environmental sustainability. In addition to being essential for the well-being of the present generation, maintaining the resilience and survival of future generations also depends on protecting the quality of water and soil.[9] The impacts of soil and water pollution and advancing a healthier and more sustainable world can be reduced by implementing sustainable practices, enforcing environmental laws, and encouraging international collaboration.

II. LITERATURE REVIEW

2.1. Pollution

Pollution is the release of dangerous substances or pollutants into the environment, which has detrimental effects on ecosystems, human health, and the overall functioning of the planet; pollution happens when an excessive buildup of these dangerous substances upsets the ecosystem's natural equilibrium, which lowers the quality of the environment.[10] Each of the several types of pollution has distinct qualities. Aquatic ecosystems suffer, and the availability of clean drinking water is jeopardized when contaminants, including chemicals, plastics, garbage, and heavy metals, get into water bodies.[11] To battle pollution and lessen its detrimental effects on ecosystems while protecting the planet for future generations, stricter legislation, eco-friendly behaviour, technology advancements, and more public awareness are all necessary.[12] Toxic metal contamination of soil reduces the amount of arable land available, lowers crop yields, contaminates agricultural products, and has detrimental effects on human health and food safety, all of which, if left unchecked, affect social and economic sustainability. Numerous research has been carried out over the past 20 years to look into the origins of toxic metal contamination, find signs of soil pollution, and create models to evaluate how soil pollution affects ecosystem processes and human health. To shed light on the future management of soil contamination, this work aimed to present a quick summary of current advancements in this subject, as seen in Figure 3.[12]

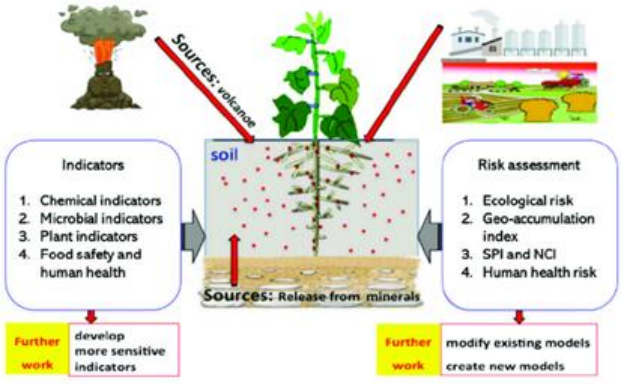

Figure 3. Map illustrating the framework for managing soil contamination

2.2. Water Pollution

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-1 Issue-2 || April 2022 || PP. 83-92 https://doi.org/10.55544/sjmars.1.2.11

Water pollution deteriorates water quality and disturbs aquatic ecosystems because of harmful substances in bodies of water, such as rivers, lakes, reservoirs, groundwater, and seas.[13] Water pollution occurs when dangerous chemicals, heavy metals, waste products, bacteria, or too many nutrients are introduced into a water supply. This frequently renders the water unfit for human consumption, recreational use, or aquatic life. There are several typical ways that water contamination can arise. When dangerous substances that might endanger people and aquatic life, such as sewage, industrial waste, and pesticides, are dumped into a body of water, chemical pollution results. Another major source of pollution is oil spills, which cover the water's surface, obstruct sunlight, and damage marine life. Nutrient pollution, particularly from agricultural runoff that contains excess nitrogen and phosphorus, can result in eutrophication, which is the overabundance of nutrients in a body of water. Aquatic life can be killed by oxygen shortage and toxic algal blooms. In addition to harming ecosystems and animals, contaminated water risks human health by spreading waterborne illnesses like cholera and dysentery, particularly in areas with inadequate sanitary facilities. To address water pollution, restoration efforts to clean and safeguard water resources must be combined with preventative measures, including cutting back on industrial discharges, enhancing waste management, and encouraging sustainable agriculture practices.[14]

2.3. Soil Pollution

Soil contamination occurs when harmful substances contaminate the earth's surface, lowering soil quality and impairing its ability to sustain ecosystems, human activity, and healthy plant development.[15] Industrial waste disposal, which includes inappropriate handling of chemicals and hazardous materials, is another significant contributor to soil contamination.[16] Illegal landfills and trash dumping can introduce a range of dangerous compounds into the soil, affecting plant life and poisoning groundwater systems, which can further environmental harm. In addition to being non-biodegradable and accumulating in the environment, plastics may pollute soil, upsetting ecosystems and putting animals in danger. Furthermore, heavy metals, particularly detrimental to plant and human health, such as lead, mercury, and cadmium, can infiltrate the soil frequently due to industrial activities. A few of the extensive effects of soil pollution include decreased agricultural productivity, biodiversity loss, and food chain contamination. To combat soil pollution, stricter chemical laws, effective waste disposal methods, and sustainable land management plans are all required.[17]

2.4. Environmental Sustainability

Environmental sustainability is the wise use and management of natural resources to meet current requirements without endangering the capacity of future generations to meet their own.[18] Environmental sustainability aims to reduce the harm that human activity does to the environment while promoting actions that preserve ecological resilience and balance. Important tenets of environmental sustainability include waste reduction and energy. This covers recycling, using renewable resources, and using technology that lessens the environmental impact of many sectors, such as industry, urban development, and agriculture. Sustainable agriculture, for instance, promotes adopting ecologically friendly farming practices that preserve soil health, save water resources, and steer clear of dangerous chemicals.[19] Besides resource conservation, environmental sustainability involves lowering greenhouse gas emissions to slow climate change. Ultimately, environmental sustainability seeks to establish equilibrium so that human civilizations may coexist peacefully with the environment, natural resources are conserved for future generations, and the planet's ecosystems continue to flourish. Cooperation is needed at the local, national, and international levels to guarantee a sustainable future for all.[20]

III. METHODOLOGY

A qualitative research methodology will be used. The primary data will be gathered through in-depth interviews with officials of the local government, environmental experts, and community members who are directly or indirectly harmed by pollution. Secondary data, such as academic literature, case studies, and reports from environmental authorities, will also be used to provide the main findings with more context and support. These resources will be useful in determining more general trends and patterns in pollution and its impacts in various geographical areas. Thematic and content analysis will be used to examine the information gathered. Using this approach, the researcher can find recurrent themes, patterns, and connections in the data, giving them a thorough grasp of the connections between soil and water contamination.

4. Result and Discussion

According to the data gathered, soil and water contamination are strongly related and have a major role in the environmental problems that impacted areas confront. The interviews' theme analysis revealed several important conclusions.

4.1. Relationship Between Water and Soil Pollution

Environmental specialists have highlighted the interdependent relationship between soil and water contamination, noting how pollutants can move between these mediums and exacerbate environmental degradation. According to an environmental expert, soil pollutants such as pesticides and heavy metals can seep into groundwater, contaminating water sources. Similarly, contaminated waterways can reintroduce hazardous substances into the soil, leading to further deterioration. Local government officials also emphasized this cyclical nature of pollution, citing observations where industrial effluent leaks into rivers, pollutes surrounding land, and harms aquatic ecosystems, perpetuating a continuous cycle of contamination.

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-1 Issue-2 || April 2022 || PP. 83-92 https://doi.org/10.55544/sjmars.1.2.11

The study's findings indicate a significant, occasionally overlooked, link between water and soil pollution. Environmental professionals like environmental experts stressed the reciprocal nature of this link by pointing out that pollutants in soil, such as pesticides and heavy metals, seep into groundwater and contaminate bodies of water. The recurring cycle of pollution this event creates exacerbates the environmental disaster. On the other hand, contaminated waterways may return toxic materials to the soil, causing more deterioration. Because of this interdependence, tackling one type of pollution without considering the other might result in insufficient or inefficient solutions.

Representatives of the local government supported the findings by describing how nearby rivers are contaminated by industrial wastes, harming aquatic ecosystems. This results in a continuous cycle of pollution whereby the contaminated soil affects water quality through runoff, and the contaminated water sources worsen soil health even more. Pollution mitigation measures should include integrated solutions that target both sources simultaneously because of the numerous effects on soil and water systems. If this cycle is not addressed, there may be continuous environmental damage, impairing ecosystems' capacity to recover and lowering living standards for populations dependent on these resources.[2]

The cyclical nature of soil and water contamination highlights the urgent need for comprehensive management strategies that address the causes and effects of pollution on both environmental components. Breaking this damaging loop requires solutions like the implementation of stronger laws governing industrial waste disposal, sustainable agricultural methods to cut down on pesticide runoff, and the construction of efficient waste treatment facilities. Additionally, by educating the public on the connection between soil and water pollution, communities can be empowered to adopt more sustainable practices that lessen their influence on both resources.[22]

4.2. Sources of Pollution

According to the interviewees, agricultural runoff and industrial discharge are the primary contributors to soil and water contamination. An environmental expert explained that runoff is a major concern. Farming practices depend heavily on chemical fertilizers and pesticides, which can wash into nearby water bodies during rainy seasons, impacting soil health and water quality. A local resident noted that industrial waste is often dumped in uncontrolled areas near rivers and lakes, leading to severe environmental consequences. The resident highlighted long-standing issues such as stunted crops in nearby fields, frequent fish deaths in the river, declining soil fertility, and increasing water contamination.

The results of the interviews highlight how important agricultural runoff and industrial discharge are in causing contamination of the land and water. The remarks provided by environment expert, offer important new information on the farming methods that contribute to pollution. Chemical fertilizers and pesticides used in conventional farming are commonly washed into nearby water bodies by runoff, especially during rainy seasons. This technique hurts water quality and soil health. Environmental experts' comments highlight the broader effects of these farming practices, emphasizing that while they may boost crop yields in the short run, they significantly influence the ecosystem due to soil and water contamination.

Local residents also related personal accounts of how industrial trash dumping is a persistent issue in unregulated regions near lakes and rivers. The regular fish deaths and stunted crops in neighbouring fields exemplify how industrial waste directly and visibly affects local ecosystems. This trend implies that unregulated industrial waste dumping into water bodies damages aquatic life and degrades soil fertility, intensifying the pollution cycle.[23] Local residents reported stunted crops are a blatant sign of soil contamination, most likely caused by heavy metals or other harmful materials in the industrial waste.

According to the interviewees, structural problems with agricultural operations and a lack of control and regulation over industrial waste disposal are frequently the causes of contamination in water and soil. Environmental laws governing industrial discharges and agricultural runoff are not adequately enforced in many areas. Because of this regulatory vacuum, pollutants can build up and harm soil ecosystems and water bodies. Adopting sustainable agricultural methods is essential to effectively addressing these types of pollution. These strategies include encouraging organic farming, integrated pest control, and minimizing or doing away with chemical fertilizers and pesticides. Additionally, industrial waste disposal has to be better regulated and monitored, especially in locations close to bodies of water. The quantity of hazardous materials discharged into water sources and the nearby soil might be decreased by strictly enforcing environmental regulations and constructing waste treatment facilities.[24]

Previous studies concentrated on how these pollutants affected the mangrove ecosystem separately. Thus, as seen in Table 1., the relationships and effects of each pollutant found in the mangrove habitat are shown in Table 1. Fossil fuel combustion, vehicular pollution, industrial emissions, and agricultural practices all produce harmful air pollutants. Air pollutants harmful to the ecology include O3, PM, SO2, and NOx. This will ultimately expose the plants to high quantities of ozone, which might lead to slower forest development and possible hazards for tree degeneration. This unfavourable state will prevent the mangrove from reaching maturity and impact restoration efforts. [25]

One significant source of contaminants, such as microplastics and nanoparticles that infiltrate surface waters is urban runoff. This discharge can introduce microplastics, metals, organic compounds, and numerous contaminants into the aquatic ecosystem. Rainfall events, land use types, and watershed characteristics can all impact the concentration and makeup of these contaminants in urban runoff. Stormwater runoff is a major danger to water quality because it is frequently released into receiving waters untreated. Effective control and regulation of runoff pollution requires a thorough understanding of contaminants' temporal and spatial distribution in urban runoff. Targeted initiatives in broader urban catchments are

necessary to address microplastic pollution specifically. Essentially, urban runoff becomes a complicated issue that needs to be managed.

Table 1. Urban Runoff

Point Sources	Non-Point Sources
Discharge of wastewater from municipalities and industries	Agricultural runoff, including return flow from irrigated areas
Runoff and seepage from sites where waste is disposed	Runoff from pastures and ranges
Runoff and seepage from animal feeding operations	Urban runoff from both sewered and unsewered areas with populations below 100,000
Runoff from mining activities, oilfields, and unsewered industrial sites	Leachate from septic tanks and runoff from malfunctioning septic systems
Stormwater discharge from cities with populations exceeding 100,000	Runoff from construction sites
Combines sewer overflows during storms	Runoff from abandoned mines
Runoff from construction sites exceeding 2 hectares	Atmospheric deposition over water surfaces

4.3. Environmental and Health Impacts

The study highlights that soil and water contamination adversely impacts ecosystems and human health. Environmental experts observed a significant decline in biodiversity, particularly within aquatic environments, where polluted water bodies result in the death of aquatic species and disruption of local ecosystems. Officials from the local administration also acknowledged the serious health risks posed by contaminated soil and water. According to environmental experts, waterborne diseases such as cholera and dysentery are becoming more prevalent, and industrial chemical contamination in soil is contributing to higher rates of cancer and respiratory illnesses within affected communities.

The study's findings, which reveal the wide-ranging detrimental impacts of soil and water pollution on the environment and public health, underscore the urgent need for comprehensive solutions to address these issues. Water source pollution kills aquatic species, disrupting entire ecosystems and having a cascading effect on biodiversity, according to environmental experts, highlighting the substantial effects of contaminated water bodies on regional ecosystems. Pollutants including heavy metals, pesticides, and industrial waste, frequently affect aquatic creatures first, including fish and other species that rely on clean water.

These species' extinction has the potential to drastically change the ecological balance, impacting food chains and endangering the existence of other creatures that depend on them. Since many species are essential to ecosystem functions like carbon sequestration and water purification, biodiversity loss in water bodies is especially alarming. The ecosystem's general health declines when these species are threatened, which has long-term effects on human and environmental well-being.[26]

Officials from the local administration expressed grave worries about public health in addition to the effects on the environment. Communities are in serious danger from waterborne illnesses like cholera and dysentery, which are directly related to contaminated water supplies. The spread of these illnesses is especially problematic in areas with inadequate or nonexistent sanitary facilities. Moreover, a surge in many health concerns, such as cancer and respiratory disorders, has been connected to the contamination of soil with industrial chemicals. People can directly ingest contaminated crops and groundwater from soil pollution, especially from heavy metals and dangerous compounds. It has been demonstrated that prolonged exposure to these contaminants causes major health issues, such as cancer and chronic illnesses.[27]

The findings show the complex relationship between soil and water pollution, human health, and the ecosystem. The pollution cycle has long-term effects on human health and the local environment because soil and water contaminate the food chain and water supply. Resolving these effects requires an all-encompassing strategy incorporating public health and environmental initiatives. Stricter environmental laws to stop industrial waste from spilling into soil and waterways and encourage sustainable farming methods to reduce fertilizer and pesticide runoff are two ways to lessen these effects. Public health measures are also crucial to safeguard vulnerable communities, such as enhancing water sanitation systems and increasing awareness of the dangers of polluted soil and water.[28]

4.4. Community Awareness and Involvement

Community members exhibited varying levels of understanding about the connection between soil and water contamination. While some individuals, particularly those in rural areas, demonstrated awareness of the environmental impact of farming practices and industrial discharges, others were less informed about the long-term consequences. A local resident noted that, although they were aware of the river's pollution, they did not realize it was also negatively affecting the land.

Experts have recently begun to inform us about this link. Environmental experts emphasized the significance of increasing awareness and giving local communities the resources and information they need to address these problems successfully. The study's conclusions highlight how important community knowledge is in combating the twin threats of soil

and water contamination. According to the interviews, some members of the community, particularly those who reside in rural regions, are fully aware of the environmental effects of industrial discharge and agricultural practices. In contrast, others are unaware of the connection between soil and water pollution. Local residents highlight a significant information gap in the area. This statement claims that although the community has long been aware of water pollution, they have not understood how it contributes to land degradation. This ignorance might make it more difficult for the community to understand the extent of environmental harm and the long-term effects of their or surrounding companies' actions.[29]

Environmental specialists like environmental experts stressed the significance of educating people and increasing understanding of the links between soil and water contamination. The environmental expert observation supports that education is essential for enabling local communities to take proactive measures to reduce pollution and make educated decisions. Since people aware of the problem are more likely to support change, embrace sustainable practices, and hold businesses responsible for their pollution, community engagement is crucial to the local implementation of successful environmental legislation.[30]

Environmental experts stressed the significance of educating people and increasing understanding of the links between soil and water contamination. The environmental expert observation supports that education is essential for enabling local communities to take proactive measures to reduce pollution and make educated decisions. Since people aware of the problem are more likely to support change, embrace sustainable practices, and hold businesses responsible for their pollution, community engagement is crucial to the local implementation of successful environmental legislation.[30]

4.5. Recommendations for Mitigation

Both local leaders and experts emphasized the need for a multifaceted approach to address soil and water contamination. Environmental specialists advocated for stricter enforcement of agricultural best practices and regulations on industrial waste disposal. They highlighted the importance of encouraging farmers to adopt integrated pest management and organic fertilizers to reduce runoff, transitioning to organic farming and promoting sustainable water management practices to significantly lower pollution levels. City officials concurred, underscoring the necessity of infrastructure improvements, particularly through investments in wastewater treatment facilities, as a crucial step toward preventing future pollution and ensuring environmental sustainability.

The remarks made by experts and local authorities emphasize the necessity of a comprehensive, multidimensional approach to deal with the interconnected issues of water and soil contamination. The proposed solutions focus on stricter regulations, improved agricultural practices, and infrastructural development, all essential for reducing pollution and ensuring environmental sustainability. Environmental expert proposals for more stringent rules on industrial waste disposal reflect the need for more robust enforcement of environmental laws. Heavy metals, chemicals, and hazardous waste are only a few contaminants that will continue to infiltrate soil and water bodies if industrial discharge is not strictly regulated. Stricter waste disposal regulations would hold businesses responsible for their environmental impact and lessen the negative consequences on nearby ecosystems.

Furthermore, as sustainable water management techniques may aid in preventing soil erosion and water pollution, environmental expert recommendations to support them is consistent with more general environmental objectives. Another important proposal by environmental experts is to switch to organic farming and implement integrated pest management (IPM) techniques. IPM and organic fertilizers can reduce the need for chemical pesticides and synthetic fertilizers, major drivers of agricultural runoff. The agricultural industry may greatly lower the number of dangerous chemicals that contaminate waterways or deteriorate soil by promoting farmers to use these methods, which will benefit ecosystems and increase agricultural production over the long run.[31]

The local government's focus on infrastructure upgrades, such as wastewater treatment facilities, is equally significant. According to city officials, significant investments in waste management and water treatment facilities are required to ensure that wastewater is sufficiently cleansed before being released into the environment. Many places lack the infrastructure to properly manage trash, especially in low-income communities, which causes soil and water pollution. Local governments may significantly lower pollution levels and enhance public health outcomes by investing in appropriate waste management infrastructure.[29]

In addition, as shown in Figure 4, water pollution must be reduced through effective wastewater management to solve the increasing environmental issues that both new and fast-growing cities confront. The wastewater infrastructure in many areas is already outdated and undersized, and the effects of climate change and growing populations are making matters worse. In the upcoming years, this issue is only anticipated to get worse. Millions of people will continue to experience waterborne illnesses, biodiversity and ecosystem resilience will continue to deteriorate, and sustainability efforts will be undermined unless major changes are made to infrastructure and management techniques. Wastewater infrastructure is either nonexistent, antiquated, or insufficient to accommodate the demands of growing populations in many emerging nations. However, history has shown that when well-executed, focused investments in wastewater treatment may result in significant returns.[32]

Stallion Journal for Multidisciplinary Associated Research Studies
ISSN (Online): 2583-3340
Volume-1 Issue-2 || April 2022 || PP. 83-92 https://doi.org/10.55544/sjmars.1.2.11

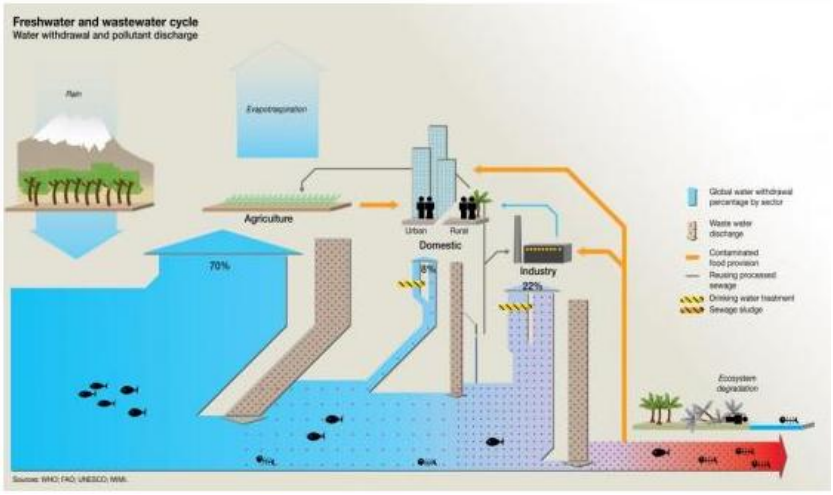

Figure 4. Reducing Water Pollution through Efficient Wastewater Management

IV. CONCLUSION

The study's conclusions demonstrate the connection between soil and water pollution and how it significantly contributes to environmental degradation, public health risks, and biodiversity loss. The study found that industrial discharge and agricultural runoff are the main pollutants contributing to soil and water deterioration. To ensure the long-term health of natural resources, addressing these problems calls for a multipronged strategy that considers industrial waste management and agricultural practices. The ecology and human health are severely impacted by soil and water pollution. A comprehensive approach that considers both environmental protection and human health is required to solve these issues.

Both types of pollution must be addressed with a coordinated strategy. Among the recommendations are the recommendations for stricter garbage disposal laws, environmentally friendly agricultural methods, more public awareness, and infrastructure spending for waste management and water treatment. The combined danger of soil and water contamination may be lessened, and environmental sustainability can be pursued via cooperation between communities, local governments, and professionals

ACKNOWLEDGEMENT

I extend my heartfelt gratitude to my advisor for their invaluable guidance and support throughout this research. I also thank the participants and faculty members who contributed their time and insights, making this study possible. Lastly, my deepest appreciation goes to my family and friends for their unwavering encouragement and motivation

DISCLOSURE

This section is ONLY for those who requested disclosure. The names of the experts who reviewed your paper, in case they accepted selling disclosure to you, will appear here. Each reviewer can make their price for that since it is a public endorsement of your findings and may be used for various purposes.

REFERENCES

[1] P. Babuji, S. Thirumalaisamy, K. Duraisamy, G. Periyasamy, Human Health Risks due to Exposure to Water Pollution: A Review. Water 15(14), 2532 (2020). https://doi.org/10.3390/w15142532

[2] T. Münzel, O. Hahad, A. Daiber, P. J. Landrigan, Soil and Water Pollution and Human Health: What Should Cardiologists Worry About? Cardiovascular Research 119(2), 440 (2020). https://doi.org/10.1093/cvr/cvac082

[3] J. Wang, X. Zhu, Y. Dai, M. Xu, D. Wang, Y. Han, W. Liang, Y. Shi, F. Song, L. Yao, Y. Zhen, Q. Zhu, Health Risk of Heavy Metals in Drinking Water Sources of Water-Carrying Lakes Affected by Retreating Polder: A Case Study of Luoma Lake. Water 16(18), 2699 (2022). https://doi.org/10.3390/w16182699

[4] S. Khan, T. H. Masoodi, N. A. Pala, S. Murtaza, J. A. Mugloo, P. A. Sofi, M. U. Zaman, R. Kumar, A. Kumar, Phytoremediation Prospects for Restoration of Contamination in the Natural Ecosystems. Water 15(8), 1498 (2020). https://doi.org/10.3390/w15081498

[5] Y. Zhakypbek, B. D. Kossalbayev, A. M. Belkozhayev, T. Murat, S. Tursbekov, E. Abdalimov, P. Pashkovskiy, V. Kreslavski, V. Kuznetsov, S. I. Allakhverdiev, Reducing Heavy Metal Contamination in Soil and Water Using Phytoremediation. Plants 13(11), 1534 (2021). https://doi.org/10.3390/plants13111534
[6] Mohammad, M. J., Krishna, P. V., Lamma, O. A., & Khan, S. (2015). Analysis of water quality using Limnological studies of Wyra reservoir, Khammam district, Telangana, India. Int. J. Curr. Microbiol. App. Sci, 4(2), 880-895.
[7] M. Olivadese, M. L. Dindo, Water, Ecosystem Services, and Urban Green Spaces in the Anthropocene. Land 13(11), 1948 (2018). https://doi.org/10.3390/land13111948
[8] European Environment Agency, Land and Soil Pollution — Widespread, Harmful and Growing. (2020). Retrieved from: https://www.eea.europa.eu/signals-archived/signals-2020/articles/land-and-soil-pollution
[9] Lamma, O. A. (2021). The impact of recycling in preserving the environment. IJAR, 7(11), 297-302.
[10] R. Kumar, A. Verma, A. Shome, R. Sinha, S. Sinha, P. K. Jha, R. Kumar, P. Kumar, S. Das, P. Sharma, P. V. Vara Prasad, Impacts of Plastic Pollution on Ecosystem Services, Sustainable Development Goals, and Need to Focus on Circular Economy and Policy Interventions. Sustainability 13(17), 9963 (2020). https://doi.org/10.3390/su13179963
[11] Lamma, O. A., & Swamy, A. V. V. S. (2018). Assessment of ground water quality at selected industrial areas of Guntur, AP, India. Int. J. Pure App. Biosci, 6(1), 452-460.
[12] X. Xin, J. Shentu, T. Zhang, X. Yang, V. Baligar, Z. He, Sources, Indicators, and Assessment of Soil Contamination by Potentially Toxic Metals. Sustainability 14, 15878 (2021). https://doi.org/10.3390/su142315878
[13] N. Zolkefli, S. S. Sharuddin, M. Z. Yusoff, M. A. Hassan, T. Maeda, N. Ramli, A Review of Current and Emerging Approaches for Water Pollution Monitoring. Water 12(12), 3417 (2020). https://doi.org/10.3390/w12123417
[14] Lamma, O. A. (2021). Groundwater problems caused by irrigation with sewage effluent. *International Journal for Research in Applied Sciences and Biotechnology*, *8*(3), 64-70.
[15] Lamma, O. A., Swamy, A. V. V. S., & Subhashini, V. (2018). Ground Water Quality In The Vicinity of Industrial Locations In Guntur, AP, India. *International Journal of Engineering Science Invention*, *7*(1), 72-80.
[16] Rashid, B. J. Schutte, A. Ulery, M. K. Deyholos, S. Sanogo, E. A. Lehnhoff, L. Beck, Heavy Metal Contamination in Agricultural Soil: Environmental Pollutants Affecting Crop Health. Agronomy 13(6), 1521 (2020). https://doi.org/10.3390/agronomy13061521
[17] F. Mihai, S. Gündoğdu, L. A. Markley, A. Olivelli, F. R. Khan, C. Gwinnett, J. Gutberlet, C. Meidiana, S. Elagroudy, V. Ishchenko, S. Penney, Z. Lenkiewicz, Plastic Pollution, Waste Management Issues, and Circular Economy Opportunities in Rural Communities. Sustainability 14(1), 20 (2021). https://doi.org/10.3390/su14010020
[18] B. Damico, J. M. Aulicino, J. Di Pasquale, What Does Sustainability Mean? Perceptions of Future Professionals across Disciplines. Sustainability 14(15), 9650 (2021). https://doi.org/10.3390/su14159650
[19] Lamma, O., & Swamy, A. V. V. S. (2015). E-waste, and its future challenges in India. Int J Multidiscip Adv Res Trends, 2(I), 12-24.
[20] Lamma, O., Abubaker, M., & Lamma, S. (2015). Impact of reverse osmosis on purification of water. *Journal of Pharmaceutical Biology*, *5*(2), 108-112.
[21] M. Gavrilescu, Water, Soil, and Plants Interactions in a Threatened Environment. Water 13(19), 2746 (2020). https://doi.org/10.3390/w13192746
[22] M. Moshkal, Y. Akhapov, A. Ogihara, Sustainable Waste Management in Japan: Challenges, Achievements, and Future Prospects: A Review. Sustainability 16(17), 7347 (2020). https://doi.org/10.3390/su16177347
[23] M. Lourdes, A. T. Yñiguez, G. Benico, W. M. Lum, K. S. Hii, S. C. Leong, C. P. Leaw, M. Iwataki, P. T. Lim, Fish Kills Related to Harmful Algal Bloom Events in Southeast Asia. Sustainability 16(23), 10521 (2020). https://doi.org/10.3390/su162310521
[24] M. Bianca, K. Miura, K. Watanabe, Sustainability in Japan's Agriculture: An Analysis of Current Approaches. Sustainability 16(2), 596 (2020). https://doi.org/10.3390/su16020596
[25] W. Y. Wong, A. Al-Ani, K. Hasikin, A. Khairuddin, S. A. Abdul Razak, H. Hanee, H. Hizaddin, I. M. Mokhtar, A. A. Mokhzani, T. G. Riad, Pesticide and Chemical Contamination in Aquatic Environments: A Global Review. Sustainability 13(16), 8525 (2019). https://doi.org/10.3390/su13168525
[26] R. A. Niesenbaum, The Integration of Conservation, Biodiversity, and Sustainability. Sustainability 11(17), 4676 (2019). https://doi.org/10.3390/su11174676
[27] D. Luo, Y. Liang, H. Wu, S. Li, Y. He, J. Du, X. Chen, S. Pu, Human-Health and Environmental Risks of Heavy Metal Contamination in Soil and Groundwater at a Riverside Site, China. Processes 10(10), 1994 (2020). https://doi.org/10.3390/pr10101994
[28] Lamma, O. A. (2021). Waste disposal and landfill: Potential hazards and their impact on groundwater. International Journal of Geography, Geology and Environment, 3, 133-141.
[29] G. Vinti, M. Vaccari, Solid Waste Management in Rural Communities of Developing Countries: An Overview of Challenges and Opportunities. Clean Technologies 4(4), 1138-1151 (2020). https://doi.org/10.3390/cleantechnol4040069

[30] S. Kousar, M. Afzal, F. Ahmed, Š. Bojnec, Environmental Awareness and Air Quality: The Mediating Role of Environmental Protective Behaviors. Sustainability 14(6), 3138 (2020). https://doi.org/10.3390/su14063138
[31] A. Lakhiar, H. Yan, J. Zhang, G. Wang, S. Deng, R. Bao, C. Zhang, T. N. Syed, B. Wang, R. Zhou, X. Wang, Plastic Pollution in Agriculture as a Threat to Food Security, the Ecosystem, and the Environment: An Overview. Agronomy 14(3), 548 (2018). https://doi.org/10.3390/agronomy14030548
[32] Asanousi Lamma, O., Swamy, A. V. V. S., & Alhadad, A. A. (2018). Assessment of Heavy Metal Pollution in Ground Water and its Correlation with other Physical Parameters at Selected Industrial Areas of Guntur, AP, India. *AP, India*.