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Impact of Ecological Factors on Water quality goals

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ABSTRACT

A deeper knowledge of the processes that influence environmental elements in areas such as water management, consumer services, water reuse acceptability, and risk communication, among others. Also, as a result of the unique climate, soil features, and agricultural idiosyncrasies, water quality and water management for human welfare and the natural environment. Also, various kinds of contamination may also have an impact on aquatic habitats across the world. Trace metals are one of the most major pollutants that have harmed marine environments. Its release into the marine environment is caused by both natural and human activities. Erosion and pollution are two of the negative repercussions of agricultural operations on soil quality. Pollution from nutrient leaching and intrusion is one of the consequences for water resources. To choose the best long-term solutions for mitigating these effects, researchers should focus on developing an accurate water and soil quality monitoring system at many scales based on a functional evaluation. On the other hand, the review focuses on the influence of metals and nutrients on water quality for water usage and its impact on agricultural output. Its mean water quality great impact on natural and human on the other hand effect on environment and ecosystem. finally this review indicated that many ecological factors positive effects on water quality goals.

Keywords: Agriculture, Ecosystem, Environment, Land, Water.

1. INTRODUCTION

Ecology has undergone a progression from observational and analytical research to a process-oriented, frequently experimental, approach, and the questions raised have shifted from 'who, what, where, and how much? "Why and how? Artificial island science is an important science and a process-oriented analysis has often been given low priority.

In many studies, Ecology has followed a progression from empirical and theoretical to a process-oriented, mostly experimental approach, with many physical and biological effects influencing the consistency of water in the ecosystem. Streams, water bodies, including inland wetlands are all interconnected components of water bodies, and the physical and chemical state of these ecosystems reflect land use patterns and the physical qualities of the locations in which they exist. Marine areas with major water sources, on the other hand, are situated on the edges of watersheds, and the quality of water in coastal ecosystems can be tied to both onshore and offshore environments. Though coastal systems cannot be as closely connected near wetlands as systems entrenched popular watersheds, coastal regions are among the most densely populated areas on

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Earth, and there is a widespread problem with the loss of coastal receiving waters (Nixon 1995; U.S. EPA 2001).

There is growing awareness among managers and researchers that the ecological condition of coastal habitats in La La is a major concern (U.S. and Canada 1997). The Great Lakes Coastal Wetlands are situated at the border between the watershed and the bay and are extremely vulnerable to land stressors. Availability of high-quality water is a necessary factor in the prevention of diseases and the enhancement of quality of life (Oluduro and Aderiye, 2007). Water is a required ingredient for the endurance of life on earth, and includes rocks, which are important for human life as well as for earth and sea life (Versari et al., 2002). Lakes have long been the subject of human interest. Several cities also developed commercial infrastructures and agricultural complexes in the vicinity of rivers and other water sources. Human population expansion and increased careless use of water supplies have damaged the quality of river and lake water. (Sanchez, 2007). Population growth and contamination caused by contaminated wastewater, surface water runoff from urban, industrial and agriculture sources have raised pollution loads and further reduced safe water supplies (Siemonov, 2003) and the maintenance of surface water quality. With this in mind, it is unavoidable to comprehend the quality of surface water for a variety of applications, including drinking, commercial, and agricultural usage. Water consumption requires an understanding of the area's point sources of pollutants and contaminants (Siemonov, 2003). Surface water monitoring and management are critical to ensuring high-quality water for a variety of purposes (Bollinger et al., 1999). Lakes and surface water lakes are the world's largest freshwater infrastructure and provide several advantages. Also, a lot. Water is an asset to humanity, and the most readily available source of freshwater is underground. The increased need for water has prompted the development of subsurface water sources. Groundwater, springs, and wells are mentioned multiple times in the Bible (Todd, 1959). Groundwater is water that resides in the open area underneath the earth's surface. Freshwater resides in voids or gaps in natural material layers such as sand, silt, sandstone, and limestone (Nabi, 2004).

The uniformity of underground is determined by the recharged water's composition, the interaction between the water and the surface, the soil-gas, and the rock with which it comes into contact in the saturated zone (Toma, 2013). According to WHO, clean water is crucial for a number of reasons for healthy living; water causes around 80% of all human diseases (Toma, 2013). This problem provides a perennial source of water for drinking purposes and various operations within the province of Erbil, the Kurdistan Region of Iraq, and there is a significant

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abundance of groundwater-drilled wells in the province (Toma, 2006). Once poisoned, the quality of the groundwater cannot be restored by removing the source of the pollutants. It is therefore critical to monitor the state of groundwater on a daily basis and to develop forms and methods to safeguard it (Chauhan and Singh, 2010). certainly, little doubt that population expansion and economic development will lead to an increase in demand for water consumption for a variety of purposes (Toma, 2006). The Water Quality Index (WQI) is one of the most effective tools for disseminating water quality information to the general public and decision-makers. It is also a crucial metric for estimating and maintaining ground water levels.

Water quality refers to water that is safe to consume and use for various domestic purposes such as heating, shaving, bathing, and showering. Drinking water should ideally be clean, colorless, and highly aerated, with no appealing flavor or odor, and should be free of suspended particles, harmful pollutants, and pathogenic microbes. In other words, drinking water is safe for a lifetime; it poses no serious health risk. Water quality is determined by its physical, chemical, and biological properties. The factors that contribute to the protection of human drinking water are the major source for such classification.

Water, on the other hand, is widely recognized as the most crucial and valuable natural resource on which all life on Earth ultimately depends. Water is critical to the expansion of several economic sectors, including irrigation, cattle production, forestry, commercial energy generation, fisheries, and other revolutionary activities (Bouslah et al. 2017; Tyagi et al. 2013). However, as the human population grows, so does the demand for water, and the security of freshwater availability is being jeopardized by widespread resource degradation, pollution of surface water, and the impact of climate change (IPCC 2007; Poudel and Duex 2017). As a result, several nations are experiencing severe water scarcity and poor water quality. Water supply knowledge and compatibility is also required for urban planning and sustainable development. This is especially important in dry and semi-arid regions where water is scarce and long-term average rainfall is decreasing (Barakat et al. 2018; Mishra and Singh 2010).

2. RESEARCH METHODS

During this review article study some factors of ecological factor which positive effect on water quality and impact of it on nature human activity like agricultural application effects

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3. RESULTS AND DISCUSSION

Environmental impact of water

Environmental concerns are equally important as other goods. The prospective source of water supply and its ability to supply the whole population are critical elements to consider. Furthermore, environmental repercussions may emerge, particularly if a big number of bored wells are pumped, which may have some issues. (Ndege, 2001)

Impacts of agricultural practices on soil and water quality

Agricultural produces indirect and direct effects on the land and water supplies. These outcomes are influenced by both macro and microscale factors. Temperature, landscape topography, and parent material are all macroscale variables that have a big impact on areas. These characteristics categorize habitats based on input similarity (Odum, 1983) and influence the kind of agricultural methods that are possible. The research foundation also lacks understanding of how different ecosystems function and how various environmental factors interact to govern the functioning of the outside world (Maltby, 1991). Microscale factors, such as watershed management and land use, or industrial land use, will have an impact on the region's soil quality and water supply. The main impact of farming on soil quality is deterioration, salinization, compaction, loss of organic matter, and non-point source voting because to the specific characteristics of the terrain and agricultural characteristics of the Mediterranean. As a result, soil erosion affects water consistency by leaching toxins and excessive nutrients into surface and ground water, as well as saltwater intrusion into reservoirs.

Excessive use of fertilizers

Excessive fertilizer use (including the quantity and time of application) generally exceeds the soil's capacity to maintain and convert nutrients, as well as coordinate nutrient delivery with crop requirements. In some circumstances, nitrogen or phosphorus saturation of the soil has contributed to nitrate losses in shallow groundwater and phosphate saturation of the soil, which can even migrate into groundwater (Breeuwsma and Silva, 1992). Contact between large fertilizer inputs and big irrigation systems promotes nitrate leaching and non-point source surface and ground water discharge (EEA, 1995). While not common, acidification of Mediterranean soils is induced by land use, namely the loss of base cations from the soil through harvesting, the uncontrolled use of nitrogen fertilizers, and soil runoff. Acidification reduces soil fertility and reduces soil buffering capability at the farm scale. The principal effect of acidification is the mobilization of aluminum from clay minerals that may have accumulated in the soil (Logan, 1990).

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Nitrate contamination of ground water

The nitrate ion is the most major inorganic pollution in groundwater, and it is often found in aquifers around rural and residential populations. While uncontaminated ground water typically has a nitrate nitrogen level of less than 2 ppm, nitrate in ground water is primarily caused by four sources: • the use of nitrogen fertilizers in crops, both inorganic and animal manure. • atmospheric deposition. • Septic tanks for human waste; • Land agriculture. In the United States, for example, about 12 million tons of nitrogen are used as fertilizers for agriculture each year, with manure production contributing nearly 7 million tons or more. In most cases, depleted nitrogen sources have been oxidized to nitrate in the soil, where it dissolves in water and is diluted. Because removing nitrate from well water is very expensive, water polluted with high nitrate levels is not usually used for human consumption, causing no harm in public health (Barid and Cann, 2005). Jennings et al. (1998) published a report on nitrate toxicity in groundwater, finding that those most at risk of exposure are children under one year of age, pregnant women, and individuals of all ages with decreased gastric acidity or inherited loss of met haemoglobin reductase. (Reddy and Lin, 1999) carried out a study on nitrate removal from ground water by employing a catalytic reduction technique to specifically remove nitrate ion from ground water associated with the agricultural population. Palladium, platinum, and rhodium were utilized as catalysts. The transport of nitrate in ground water aquifers in western central Minnesota has been studied in connection to age, land use patterns, and redox processes (Puckett and Timothy, 2001). They discovered that nitrate concentrations were high, that they behaved similarly to oxygen, and that they dropped with increasing age and depth, implying that after O2 was depleted, nitrate was employed as a consumer of organic carbon oxidation. Rosen et al. (2004) investigated the prediction of surface water nitrate toxicity after the closure of an unlined sheep feedlot in Carson City, Nevada.

Toxic Substances

Although a number of the majority of hazardous substances established into the outside world by human activities have been banned or restricted in use, many remain in the environment, particularly in soils and sediments, where they either remain in contact with food chains or are reabsorbed and taken up by aquatic biota (Catalan et al., 2004; Vives et al., 2005). Sweet water has high amounts of metals (such as mercury, Hg, and lead, Pb) as well as persistent organic pollutants such as polychlorinated biphenyls (PCBs) (Grimalt et al., 2001; Vives et al., 2004a). The mobility and movement of these chemicals in the surroundings (Carrera et al., 2002) and their buildup in cold places (Fernandez & Grimalt, 2003) confirm this. In aquatic ecosystems with extensive food

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chains, biomagnification can elevate concentrations in fish to fatal levels for human ingestion. The main concern with climate change is the extent to which hazardous contaminants can be remobilized, leading to additional degradation and biological uptake of Arctic and Alpine groundwater environments as water levels rise, contributing to soil and sediment depletion and remobilization of metallic substances and permanent organic substances (Grimalt et al., 2004a, b; Rose et al., 2004). While many of the most harmful chemicals released into the atmosphere by human activities have been banned or restricted in their usage, many persist, particularly in soils and sediments, and either remain in touch with food chains or are remobilized and taken up by aquatic biota. (Catalan et al., 2004; Vives et al., 2005Large amounts of chemicals such as mercury and lead, as well as persistent organic pollutants like as the polychlorinated biphenyls (PCBs), are found in drinking water tissue (Grimalt et al., 2001; Vives et al., 2004a). The transport and mobility of these chemicals in the environment (Carrera et al., 2002) and their buildup in cold places (Fernandez & Grimalt, 2003) confirm this. The main concern with active changes in the climate is the extent to which toxic substances will be remobilized and cause additional contamination and biological uptake in arctic and mountain freshwater systems as water temperatures rise, increasing soil and erosion and causing metals and persistent other compounds to move up (Grimalt et al., 2004a, b; Rose et al., 2004). Furthermore, Hg, altering hydrology in Boreal Forest soils may lead to increased methyl mercury synthesis (Meili et al., 2003; Munthe, 2008).

In recent years, many types of pollution have also had an influence on aquatic environments across the world. Trace metals are one of the most significant poisons that have had a negative impact on marine habitats (Ali et al., 2013). Both natural and human activities contribute to its discharge into the marine environment (Zhang et al., 2009). They can be dissolved to produce ions or complexes, dispersed as particle debris, or deposited as bed sediments when discharged into rivers (Tuna et al., 2007). If trace metals penetrate the food chain, they will represent a considerable ecological risk due to bioaccumulation (Segura et al., 2006). Increased quantities of radioactive elements over dangerous limits degrade water quality, leaving it unfit for drinking, agriculture, aquaculture, and enjoyment (Zhang et al., 2009). The restoration and conservation of surface water sources is also vital for the long-term survival of all marine and terrestrial species. The suspension of and bed sediments are the most sensitive trace metal indicators because of their ability to accumulate dissolved metals and can act as a non-point trace metal source by releasing them into the water column while undergoing physicochemical changes

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(Karbassi et al., 2008; Sharma and Subramanian, 2010). The most essential aspect in determining the anthropogenic impact of trace metals to marine ecosystems is also the uniformity of sediment beds. as a result of their endurance, and is thus capable of capturing the history of aquatic ecosystem pollution (Tuna et al., 2007). Nevertheless, analyzing metals in dissolved and suspended states may be the best way to determine temporal changes. A comprehensive water conservation program should also include the movement of trace metals between different stages of the aquatic system (Davide et al., 2003).

Water quality and public health

Water quality and the health of the public are inextricably related (Brudtland, 2001). Healthy drinking water is critical for human existence (Michiels et al., 2000). Many hypotheses have argued that water is important for the microbial system's proliferation of many waterborne infections and is the most critical risk factor in the disease's future spread. It is still a major source of illness and mortality (UNEP/WHO, 1996). Although the world's smart initiatives and the accessibility of new technologies for the creation of safe drinking water, the transmission of waterborne disease has been documented as a serious worry (Stevens et al., 1995). Pollution of drinking water during preservation, a lack of laws, and limited community understanding were all documented (Mackenzie, 1994; Roefer et al., 1996Even with the finest treatment and disinfection methods, the detrimental impacts of mechanical failure, human mistake, or degradation in the consistency of the source water will affect the overall quality of the water (Mackenzie, 1994; Roefer, 1996; Geldreich, 1996). In contrast, most recent initiatives to address water quality decline have focused on the physical and chemical qualities of water. The temperature, oxygen that is dissolved, soluble and insoluble chemical and inorganic compounds, heavy metals, and a wide spectrum of toxic substances are all important components. Riffle development, homogeneous substrates, and width. Furthermore, sedimentation increases as a result of canal imbalance and/or soil erosion. subsequently straight, wide rivers with plenty of nutrients, sunlight, and warm temperatures provide ideal circumstances for algae blooms. These algal blooms occur towards the end of May and early June in years with low-normal late spring or early summer precipitation; in years with more intense initial summer precipitation, the blooms of algae are limited by the flushing action of the canal drain.

4. CONCLUSION

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This study builds on an expanding approach to raise awareness of the environmental implications of water quality and to identify critical research issues that must be addressed. While there is agreement on agricultural practice, there is less agreement on the potential impact on water quality as a result of changes in regional agricultural practice, particularly dramatic changes in fertilizer composition. Water quality evaluation in connection to management activities is required for successful management of water resources and their environmental impacts. Furthermore, environmental and management practices, as well as water safety and environmental health, are all interconnected in many ways. Safe and clean drinking water is essential for human survival; nevertheless, many of the most dangerous compounds discharged into the atmosphere by human activities can endanger water quality and characteristics.

Recommendation

1. Cleaning and development of water resources.
2. Improve agricultural lands by organic fertilizer as alternative of chemical fertilizers.
3. Cleaning of agricultural lands from heavy metal and residuals of hazard materials.
4. Development of environment management and monitoring.

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