



Water Pollution: Causes, Negative Effects and Prevention Methods

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ABSTRACT

Water quality is a big issue that mankind is facing in recent years. Water is separated from other environmental components, because it is not substitutable. The water cycle constitutes the basic dynamics of the life and economy cycle. Water resources are limited and exposed to many human-induced negative effects. Fresh water resources on our planet constitutes only 2.5% of water resources. Water is an indispensable resource for all living things and it is a vital value. Life without water can not be considered. The existence of sufficient and good quality water is the basic condition of freshwater ecosystems as well as food security and sustainable development, and therefore the future of humanity. Pollution of the limited fresh water resources causes further pressure on fresh water resources. Eight liters of clean water must be used to clean one liter of the waste water. Safe drinking water is an indispensable need for all humans. The WHO reports that 80% diseases (bacterial, viral and parasitic) are waterborne. Human beings contribute in a great way to waste and pollute this vital natural resource. Education and raising awareness related to water pollution should be given to the humanity so that this problem can be reduced to a certain level.

This research is about current scientific advances to cope with the water pollutants and focuses mainly on the source of different water pollutants and their current status in the environment and ecosystem. It is thought that this study will contribute to the literature on the subject and to the reduction of the pollution level of water resources.

1. Introduction

Environmental components such as water and the sustainability of these components are very important for all living organisms and the future of the earth. All organisms in the ecosystem are connected to each other with a life link. Therefore, the deterioration that occurs in a part of the system affects the whole system over time. Water is separated from other environmental components as it is the main source of life and cannot be substituted. Most of the big problems that mankind is facing in the recent years are related to water quantity and water quality (Unesco, 2009). Water must be preserved and protected from all type of pollutant. Water is among the indispensable ingredient in the center of the life. Without water, life is not possible. But water resources contaminated by various toxic, industrial pollutants that results in some problems such as unsafe for consumption for humans and irrigation activities; so this lead to water scarcity for humans and ecosystem. There are two different water sources on our planet. The first is the water we see in oceans, rivers, lakes and ponds called surface water. Surface water is home to many species of plants and animals that depend not only on the quantity but also on the quality of the water to survive. Another is groundwater, stored below the surface in Earth's aquifers. This source of water feeds our rivers and oceans and makes up most of the world's drinking water supply. Both of these water resources are critical to life on Earth, both can get dirty in different ways. The word pollution can define as contamination; desecration, dirtying, soiling, spoiling, destruction.

Among the types of pollution, water pollution is of major significant for the health of all living organisms; especially mankind. Unfortunately, water sources are used unconsciously and contaminated by humans and they cause threaten their future generations. When water is polluted, it becomes unsafe for human consumption because the water contains dangerous or toxic substances and disease-causing bacteria and organisms (Friedl, 2003).

While the economic activities that started with the industrialization process provided the growth and development of countries, they also caused environmental problems and especially negative effects on water resources. Although a significant part of the earth is covered with water, the amount of water available is very low. Besides natural causes, the damages caused by human activities have caused pressure on limited water resources and global water problems. Various researches and studies are carried out on the global water problem. Studies show that, in addition to climatic phenomena such as drought, global warming and climate change, many reasons such as the increase in the world population, increase in urbanization rate and pollution of water resources will cause a global water crisis. "As the human population and development in modern technology increases, the risk for water pollution also increases" (Ahmed, 2010). The main cause behind water crisis in the World is, water pollution. Global water quality is threatened by industries, agricultural activities, cities, mining areas and other causes. This pollution is then transferred to surface and groundwater (Dwivedi,

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2017). When surface water polluted it can cause health and environment risks. Besides, waterways have significant roles for washing and cleaning, for fishing and fish farming, and for recreation. In addition, toxic chemicals can be dissolved from the soil or rock layers into groundwater (U.S. EPA, 1999).

In recent years, there has been big increase in the demand for freshwater due to rapid growth of population and fast industrialization (Ramakrishnaiah et al. 2009). Living organism, ecosystem and human health is threatened by most of the agricultural development activities particularly in relation to excessive application of fertilizers and unsanitary conditions (Okeke and Igboanua, 2003). Anthropogenic activities have led to water quality deterioration in many parts of the World (Wang et al., 2010). Water pollution is one of the most important issue for government and scientists. Therefore, protecting water sources and water quality is extremely urgent because of serious water pollution and global scarcity of water resources. To prevent this negative effects, it is primarily necessary to educate people about environment and negative effects of water pollution. In addition, the sensitivity and importance of the subject can be emphasized with such studies.

2. Sources of Water Pollutants

Water pollution is one of the major today's environmental problems. Among the the natural resource water is the most vulnerable in terms of pollution. We can list the main causes of water pollution as follows: industrialization, plastics and polythene bags, pesticides and fertilizers, sewage and other oxygen demanding wastes, domestic sewage, population growth, urbanization, eutrophication, mining, agro-chemical wastes, nutrient enrichment, thermal pollution, oil spillage, disruption of sediments, acid rain pollution, radioactive waste, climate change and others. It is recorded that 75 to 80% water pollution is caused by the domestic sewage. Waste from the industries electroplating, like, pesticides, sugar, textile, paper and pulp are polluting the water (Kamble, 2014). Polluted water and water sources have intolerable smell and contains less flora and fauna. 80% of the world's population is facing threats to water security (Owa, 2013). Large quantity of domestic sewage is drained in to river and most of the sewage is untreated. Domestic sewage contains solid waste, toxicants, plastic litters, bacterial contaminants and these toxic materials causes water pollution. Different industrial waste that is drained in to river without treatment is also one of the main cause of water pollution (Desai and Vanitaben, 2014).

Water pollution consist of point source and non-point source (Table 1).

Table 1. Point and nonpoint sources (Carpenter et al., 1998).

Point Sources	Nonpoint Sources
Runoff from mines, oil fields, unsewered industrial sites	Runoff from agriculture
Wastewater effluent	Activities on land that generate contaminants,
Overflows of combined storm and sanitary sewers	Runoff from abandoned mines
Runoff and infiltration from animal feedlots	Septic tank leachate and runoff from failed septic systems
Runoff from construction sites >2 ha	Runoff from pasture and range
Storm sewer outfalls from cities with a population >100,000	Atmospheric deposition over a water surface
Runoff and leachate from waste disposal sites	Runoff from construction sites
	Urban runoff unsewered and sewerred areas with a population <100,000

Detrimental chemicals can enter waterways with pointsource or a nonpoint source. Pointsource pollution is due to discharges from a single source, such as an industrial site. Nonpoint-source pollution includes many small sources (pesticides, fertilizers..). (U.S. EPA, 2000). "Pesticides are used to kill bacteria, pest and different germs. Chemical containing pesticides are directly polluting the water and affect the quality of water. If pesticides are excess in amount or poorly managed then it would be hazardous for agriculture ecosystem" (Yonglong et al., 2015). If water flowing out of dams has reduced suspended material as a large amount settles to the bottom of dams and it is depleted of nutrients and is often more saline with detrimental effects on downstream agriculture and fisheries. The water pollution grade dependent to pollutant's ecological impact, pollutant's abundance and water use. Pollutants especially derive from biological, chemical, or physical actions, natural reasons; in addition the major pollution is a consequent of human activities. Sometimes rainfall runs across the land and through the ground for collecting contaminants from agricultural fields and lawns such as pesticides, and fertilizers; animal waste, oil, and urban road salt; and toxic elements from abandoned mines (Tóth, 2009).

Increasing population is also plays negative role in polluting the water; increasing population causes increase in solid waste generation (Jaben et al., 2011). Solid and liquid waste is discharged in to rivers; water is also contaminated by human excreta. In contaminated water, a large number of bacteria are also found which is detrimental for human health. As more and more people move into cities and towns, these factors cause water pollution and water consumption. Deforestation and urban growth often leads to water pollution.

Some pollutants (agrochemicals, pesticides, petrochemicals hydrocarbons, heavy metals, and radio nuclides...) can be formed during their domestic, agricultural or industrial use by concentration and transformation of naturally occurring compounds. Many of the chemicals do not occur in the nature and these chemicals entirely manmade. For example, the synthesis of various pesticides, surfactants, plastics and petrochemicals have created serious environmental and water quality problems (Tóth, 2009).

Wetlands are nature's way of cleaning water as well as damming water; destruction of wetlands destroys the habitats and removes the natural filters capable of storing and degrading many pollutants; so destroying wetlands is causes water pollution.

3. Negative Effects of Water Pollution

Water pollution; it is the name given to the pollution seen in water basins such as lakes, rivers, oceans, sea and groundwater. It can be defined as the substances mixed with water, changing the physical, chemical and biological properties of water, destroying their natural structure and causing a change that will harm human and living health. Water pollution has many negative effects on the entire ecosystem, especially on humans and sea creatures. As a result of increased water pollution, the growth of plants is adversely affected; The minerals needed for photosynthesis cannot be obtained and forests cannot grow. Mixing wastes with sewage water that causes pollution causes serious pollution. Dirty water also causes bacterial, viral and parasitic diseases in human body. Growth of algae prevents fish and other marine organisms from taking oxygen and negatively affects the ecosystem.

The free circulation of toxic waters in nature poisons the soil and especially pollutes the groundwater. Damage to the soil threatens the lives of living things in the region. With the discharge of sewage

water into the seas, the lives of the creatures in the sea are adversely affected. As the most important symptoms of pollution, improper housing, overfishing and improper use of technology, life in the seas and inland waters decreases in number and species. Exposure to various chemicals causes illness and death as a result. The natural balance of living things that take these chemical substances into their bodies is disturbed. There is a big association between water pollution and health problems. Many waterborne illness and infections are spreading man to man (Halder and Islam, 2015). Health risk associated with polluted water includes different diseases such as respiratory disease, cancer, reproductive system diseases, diarrheal disease, neurological disorder and cardiovascular disease (Ullah et al., 2014).

By its nature, water is a very fluid thing. It flows to the world, regardless of borders or borders, without crossing state lines and country borders. This means that pollution from one part of the world can affect a community in another. This makes it difficult to set any standard in our ways of using and conserving earth's water. When water pollution is mentioned, the first thing that comes to mind is the pollution in rivers, lakes, groundwater and sea water. Water pollution not only threatens life in the water, but also causes serious health problems in the area where the pollution occurs. Water pollution also has serious effects on human health. Environmental risk factors that cause diseases with high mortality in developing countries include unsafe water, lack of wastewater system and inadequate hygiene practices. Intestinal diseases are among the evidentiary results of these factors. Diseases such as hepatitis, diarrhea and cholera stand out as the main diseases caused by water pollution.

4. Conclusion and Recommendations

Water is a very significant source for all living organisms; all the living organisms need water so it is life itself. It keeps them alive but polluted water is a very harmful substance. When humans drink polluted water it has serious effects on their health. The air, water and the soil are the main elements of our environment (Obafemi et al., 2012). In attempt to address environmental pollution, environmental education is a key factor. The main objective of environmental and water pollution education is to equip learners with knowledge, values and skills that promote the protection and conservation of the environment. The best thing you can do to prevent water pollution is to educate yourself and your environment about the world's water supply and support conservation projects and such works. An important purpose of water education is to teach understanding about water pollution in order to best protect the water resources. Water pollution education is a very important and effective tool to promote public awareness. Water pollution prevention training should be done as follows: producers should be informed by experts about proper fertilization, peoples should be informed about recycling process and waste materials, should be informed about the harms of excessive consumption, media should be used in promoting water pollution awareness, people should be informed about the importance of all natural resources for life, activities, presentations about protection of water and water resources should be organized regularly. The ideal procedure to reduce diffuse pollution of waterways is to minimize or avoid the use of chemicals for agricultural, industrial, and domestic purposes (Scheierling, 1995).

Water pollution is a worldwide issue and world community is facing worst results of polluted water. It is recommended that there should be proper waste disposal system and waste should be treated before

entering in to river. Educational and awareness programs, seminars, workshops should be organized to control the pollution. Some measures have to be taken before such a major problem occurs. Water pollution causes many negative effects like diseases, death of aquatic animals, economic costs of cleaning processes, destruction of ecosystems, disruption of food chains. Here, education on the dangers of water pollution is extremely important, as it helps people to apply the right attitudes when dealing with the environment. Education activities that get people informed and empowered to help protect water should be encouraged and invested in. Environmental education teaches individuals to weigh different sides of an environmental issue to make informed and responsible decisions. Awareness-raising activities is of great importance for people before they contaminate water sources. The causes of our undisciplined actions and irresponsibility are water pollution. We all know that water is so important and we don't want to pollute the water. Without water, neither we nor any living thing can survive. So, people should protect, keep, save, and help prevent water pollution. Let's be disciplined and responsible enough to save, protect and preserve not only water sources but also other natural resources because our nature provides and helps us in our everyday lives.

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