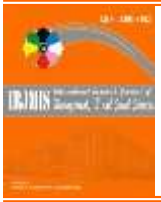

International Research Journal of Management, IT & Social Sciences
Available online at https://sloap.org/journals/index.php/irjmis/
Vol. 3 No. 5, May 2016, pages: 1~7
ISSN: 2395-7492
https://sloap.org/journals/index.php/irjmis/article/view/360

Water Pollution and Its Impact on Environment of Society

N. Thyagaraju [a]

Article history:

Received: 10 February 2016
Accepted: 30 March 2016
Published: 31 May 2016

Keywords:

Chemical fertilizers;
Environmental education;
Industrial drainage;
Mass media;
Pollutants elements;

Abstract

The present seminar paper mainly highlights the concept of water pollution, causes of water pollution, Its Effects, Elements of pollutants, Methods used to prevent the water pollution in the environment and the mandatory initiatives taken by the concerned authorities for prevention of water pollution. Water is essential for the survival of all living organisms on the earth. Thus for human beings and plants to survive on land, water should be easily accessible. The term "Pollution" generally refers to the addition of any foreign body either living or non – living or deletion of anything that naturally exists. The basic Sources of Water pollution causes due to Culmination into lakes, rivers, ponds, seas, oceans etc. Domestic drainage and sanitary waste, Industrial drainage and sewage, Industrial waste from factories, Dumping of domestic garbage, Immersion of Idols made of plaster of Paris, Excess use of Insecticides, pesticides, fungicides, Chemical fertilizers, Soil erosion during heavy rains and floods, Natural disasters, tsunami etc. General pollutants which are also caused for water pollution which include Organic, Inorganic, and Biological entities, Insecticides, Pesticides, Disinfectants, Detergents, Industrial Solvents, Acids, Ammonia fertilizers, heavy metals, Harmful bacteria, Virus, Micro-Organisms and worms, Toxic chemicals. Agricultural lands become infertile and thereby production also drops, Spread of epidemic diseases like Cholera, Dysentery, Typhoid, Diarrhea, Hepatitis, Jaundice etc. The basic responsibility of the Government, NGOs, National Pioneer scientific Research Institutions may conduct research oriented programs on control of water pollution by creating awareness among the public through mass media and Environmental Education on recycling units, and water treatment plants must be established both at domestic levels and Industry levels, Every citizen must feel responsible to control water pollution.

Author correspondence:
N. Thyagaraju,
Lecturer in commerce, Department of Commerce SRI A.B.R Government Degree College,
Repalle, Guntur Dt-5222265. AP., *Email address: drntrajudl2011@gmail.com*

[a] Department of Commerce SRI A.B.R Government Degree College, Repalle, Guntur Dt-5222265. AP.

1. Introduction

Water –A Precious Resource: Water occupies one-third of the earth's surface. They exist in the form of seas and oceans, icecaps, snow, water vapor, etc. Carpenter *et al*., (1998), Dincer (2000), underground water, pond water, and lake water are potable. Förstner & Wittmann (2012), the following paragraph will just tell you how valuable is water for the survival of all living things on earth. All the cellular processes take place using water medium. All reactions within our cells occur between the substances that are dissolved in water. Also, the movement of substances in our body. Thus for humans, animals, and plants to survive on land, water should be easily accessible. The availability of water not only decides the number of individuals of each species that can survive in a particular area, but also the diversity of life there. It is an undeniable fact that water is an important resource that determines life on earth.

2. Research Methods

The concept of water pollution

The term "*pollution*" is subjective depending upon the purpose it is being used. Inglehart (1995), Moore (2006), *Pollution* generally refers to the addition of any foreign body either living or non – living or deletion of anything that naturally exists. *Water Pollution* is an anything or process that causes or tends to cause a change in the state /nature/ character of water in terms of color, taste, texture (softness), temperature, pH value etc.by any means is referred to as Water pollution. In simple terms, anything that causes hindrance to the usage of water by any form of life for the purpose it is intended to use is water pollution. Since the major surface of Earth's surface is covered by water it is naturally more susceptible to pollution.

2.1 Sources of water pollution

The basic Sources of Water pollution causes due to the following reasons are as below.

a) The culmination of the following into lakes, rivers, ponds, sea, oceans etc. causes Pollution
b) Domestic drainage and sanitary waste
c) Industrial drainage and sewage
d) Industrial waste from sugar, paper, chemical factories
e) Dumping of domestic garbage
f) Immersion of Idols made of plaster of Paris
g) Disposal of hot water from nuclear power plants
h) Excess use of Insecticides, pesticides, fungicides, Chemical fertilizers
i) Soil erosion during heavy rains and floods
j) Natural disasters like volcanic eruptions, Earthquakes, tsunami etc.
k) Use of explosives and missiles for testing/wars
l) Navigation
m) Accidents in offshore oil refineries and rigs
n) Ship wreckage due to accidents/disasters
o) Dropping of rocket parts used in space launching vehicles
p) Disposal of the hospital and medical waste

2.2 General pollutants which caused water pollution are

a) The agents that cause pollution are called Pollutants which include Organic, Inorganic, and Biological entities
b) Insecticides, Pesticides, Disinfectants,
c) Detergents
d) Industrial solvents
e) Acids, Ammonia fertilizers, heavy metals

f) Harmful bacteria, Virus, Micro-Organisms and worms
g) Toxic chemicals

2.3 Effects of water pollution on the environment

a) Water pollution is a big issue that concerns humankind and other organisms in the world. Here is information about the long-term effects of water pollution and the elements that contaminate the water bodies.
b) The quality of water utilized and consumed is an important factor that determines the welfare of living things in the world. The contaminated water is the cause of many waterborne diseases, which affects people and consumes their lives. These polluted water bodies not only wipe out the population but also leave behind awful health problems that cannot be treated. So, it is important to know the importance of clean water and also the bad effects of contaminated water.
c) Fertilizers and pesticides that we use in our farms are dissolved in water, and some amount of these dissolved substances are washed into water bodies and pollute them. Sewage and waste from towns, cities, factories, etc., are also dumped into rivers and lakes. Some industries use water for cooling in industrial operations and later drain the hot water into water bodies. This causes a change in the temperature of the water and it harms the life forms and affects the balance between various organisms in the water bodies. Acid mine drainage also contaminates water.
d) Addition of undesirable substances like detergents, polychlorinated biphenyls, mercury salts, etc., cause harmful effects on water bodies. Any changes that reduce the amount of dissolved oxygen would badly affect the aquatic organisms.
e) The eggs and larvae of aquatic creatures get destroyed by changes in the temperature of water bodies as they are very susceptible to such changes.
f) Water pollution is posing a threat to the existence of many species of life in and around water and thereby causing an imbalance in the Bio-Diversity.
g) Infection and spread of waterborne Diseases to all forms of life
h) Agricultural lands become infertile and thereby production also drops
i) Spread of epidemic diseases like Cholera, Dysentery, Typhoid, Diarrhea, Hepatitis, Jaundice etc
j) Increase in the prevalence of cancer due to the presence of asbestos and radioactive elements
k) Oil spillage and ship wreckage cause an ecological disaster in the coastal ecosystem

2.4 Pesticide

2,4,5-T (trichlorophenoxy acetic acid, which contains the impurity dioxin), 2,4-D (dichlorophenoxyacetic acid) are the two common pesticide components that cause water pollution. The effects of pesticides on living things are mostly chronic. It reduces the competence of our immune system, because of which, we are easily prone to various diseases. The fish in the water are susceptible to cancer and tumors due to the presence of harmful pesticides.

2.5 Elementary pollutants

The most harmful and toxic elements that affect the water bodies are heavy metals such as cadmium, lead, iron and mercury and they also hinder the transportation of fluids through the cell wall. They also immobilize enzymes as they have a strong affinity for sulfur bonds present in enzymes. These substances can produce physiological poisoning by getting accumulated over the tissues of water creatures. The toxic effects of mercury are neurological damage, birth defects, and chromosome breakage. Arsenic is one of the most important waters polluting agents as it is a carcinogen (cancer-causing agent). Apart from cancer, it also leads to circulatory problems and respiratory problems.

2.6 Inorganic Pollutants

The inorganic pollutants that cause adverse effects on water bodies are as follows:

a) *Cyanide* exists in water as hydrogen cyanide and can cause nerve damage and thyroid problems.
b) *Ammonia* is formed during microbial degradation of biomass and organic matters. The caustic nature of ammonia damages gills of fish.
c) *Hydrogen sulfide* which evolves from geothermal waters, and wastes from paper and textile mills, causes nervous system poisoning.

2.7 Eutrophication and algal decomposition

Excess of nutrients get into the lake and other water bodies usually caused by run-off fertilizers, animal waste, and sewage. This excessive growth of nutrients causes algal deposits on the rivers. After some days, the algae decomposes producing a foul smell and blocks the penetration of sunlight. The oxygen content in the water reduces due to the scarcity of light and causes anaerobic conditions, which is not good for the plant and animal life in the water body.

2.8 Radioactivity

Radioactive elements such as radon, radium-226, etc., can be fatal if found in water and consumed. Radon is the most significant element that can cause lung cancer when consumed in a dissolved state or inhaled in its gaseous form. Strontium-90 and tritium are radioactive elements that get dumped into the water during nuclear testing. They cause genetic mutations and pose destructive effects on our genes that can pass on to future generations also. Most of the diseases that strike human beings are water-borne. They are typhoid, cholera, paratyphoid fever, bacillary dysentery, infectious hepatitis, poliomyelitis, etc. So, in order to avoid these harmful effects, follow the ways to prevent water pollution and more importantly, drink clean and purified water and never compromise on health.

3. Results and Analysis

Measures to Control Water Pollution Hazards on Environment

a) Imbibe Live and Let Live Policy among all the Human Beings
b) Create awareness among the Public through mass media and Environment Education
c) Creation of stringent laws and acts
d) Strict implementation or enforcement of those laws by statutory bodies(PCB), Govt agencies and NGO's impartially
e) Every citizen must feel responsible not only in following the laws but must fight against the lawbreakers
f) The Govt., NGO's, and Media must take initiative in this regard
g) The Govt. must provide FREE clean and safe drinking water to all the public
h) All the drainages must be prevented from culmination into minor or major sources of water
i) Recycling units and Water Treatment be plants must be established both at domestic level and Industry level
j) It becomes our duty to undertake immediate actions to stop and prevent this destruction.
k) Taking immediate action in order to stop the destruction and pollution of this natural resource.

Methods to Prevent Water Pollution on Environment

It is important to understand the causes of water pollution, only then can prevention of water pollution be carried out effectively. Preventing water pollution is indeed possible and these are some of the methods that will work best.

3.1 Industry waste

Tietenberg & Lewis (2016), Tilman *et al.,* (2001), major industries, chemical factories, business houses and other multinationals that use methods of processing in their factories, dump the waste that is generated in varied water bodies. This comes about as a point source of pollution because it pollutes the water from a single source (drain pipe etc). Needless to say, this leads to alarming rates of water pollution.

It is not that the waste cannot be treated before dumping it in the water, but wastewater treatment is an expensive process that most industries ignore because it directly affects their profits. So also, the government policies that require industries to treat the waste are most often so lax that industries do not follow them. An example of a pollution prevention policy can be - paying a fine for not treating the waste. Industries prefer paying the fine (which is often quite minimal). There needs to be immediate action taken in this direction. The rules, policies, and laws regarding water purification systems need to be made stringent such that the industries cannot break them. Treatment of the waste needs to be a prerequisite and not an option for industries.

3.2 Chemical usage

Industries are not the only culprits that lead to increased levels of water pollution. We, through our everyday activities, add to water pollution as well. The chemicals that we use in our daily lives like the fertilizers and pesticides on our lawns seep into the ground and make their way into the waterbed, thus polluting it. Or the detergent powders that are used for varied washing and cleaning purposes also find their way into the water bed. These chemicals do not have to be dumped into the water directly either. If these chemicals are used near water bodies, they still get carried into the streams and rivers through wind and other sources and affect the ecology of the fish and other creatures of the sea. Thus ruining the ecological balance and causing water pollution.

3.3 Vehicle emissions

The toxic fumes exhumed by vehicles not only lead to air pollution but also water pollution. These fumes go up into the air and settle there taking up the form of soot. The soot being heavy is brought down to the ground and will not only make its way into varied water bodies but also settle onto the ground and seep into the water table - thus destroying the water ecology.

3.4 Suggestions for preventing water pollution on the environment

How can one go about spelling the importance of water in our lives? When we look around and see how water pollution threatens to destroy the Earth, what is our reaction to it? Indifference, perhaps? It is due to this indifference that the world as we know it will soon end. Through a long-drawn, really slow process of torment and torture. It's not just water pollution that spells danger for us, but since water is one of the most crucial resources, without which the very survival of all life on earth will cease to exist, it becomes our duty to undertake immediate actions to stop and prevent this destruction.

a) Use a detergent that has low phosphate levels because high phosphate levels cause added pollution and are hazardous to the animals and plants in the water.
b) Dispose of other forms of wastes like tissue papers and the odd trash bits by putting them in trash bins rather than flushing them down the drain.
c) Use native plants instead of hybrid ones, since those require a lot of pesticides and chemicals for their protection. When it rains, these chemicals seep into the groundwater, polluting it.
d) Make sure that the products which can be recycled are given off to recycling units instead of disposing of them at random. This will ensure that pollution is prevented.
e) Set up a compost unit so that all the household waste can be converted into manure or compost rather than being disposed of in the wrong manner and leading to more pollution.
f) Take your vehicles for regular servicing. This will keep them in top running conditions and prevent pollution. Whenever possible, use a cycle or public transport instead of bringing out the car. Carpool to work if possible.

g) Plant more trees. They are easier to care for than lawns and prevent global warming as well as other forms of pollution.
h) Carry your own cloth bags when out shopping. This will prevent the collection and thereby dumping of plastic bags in the water and destroying it.
i) Do not keep the water running when you're brushing your teeth, washing your hands or washing the dishes. Taking small steps like these are an important way of preventing water wastage. Which is fast depleting due to water pollution.
j) Do not allow household wastes like your pet waste or other items like petrol, motor oil, paint and batteries to be discarded in the trash or thrown into the sewer. These will step down to the water source and pollute it in the worst possible way.
k) Do not keep the engine running at signals. This releases toxic chemicals in the air which eventually lead to water pollution.
l) There have been many water pollution prevention acts that have been set up by the governments of the world. But these are not enough for permanent water pollution solutions. Each of us needs to take up the responsibility and do something at an everyday, individual level. It is only then that we can hope to survive in a world that we hoped and dreamed of.

4. Conclusion

Water Pollution is one of the major concerns of Environment that is causing a threat to the very existence of all forms of life on Earth. Human Being is the only species that is causing this havoc. Hence it is the responsibility of every one of us to revive the Nature back to its original Form. There should be a limit to use of Natural Resources. We should help in preserving all forms of life. We have to develop mechanisms to recycle the materials for reuse. We must make use of biological ingredients rather than Chemicals.Nature shall serve all your needs but if you are greedy you have to pay for it. Protect Nature and Nature will protect you.

Conflict of interest statement and funding sources
The author(s) declared that (s)he/they have no competing interest. The study was financed by personal funding.

Statement of authorship
The author(s) have a responsibility for the conception and design of the study. The author(s) have approved the final article.

Acknowledgments
The author would like to thank the reviewer for their consideration to the further process of the peer review. The author as well as thanks to the editor for their support, valuable time, and advice. Last but not least, the author thanks all researcher for their contribution as the references to the present article.

References

Carpenter, S. R., Caraco, N. F., Correll, D. L., Howarth, R. W., Sharpley, A. N., & Smith, V. H. (1998). Nonpoint pollution of surface waters with phosphorus and nitrogen. *Ecological applications*, *8*(3), 559-568.

Dincer, I. (2000). Renewable energy and sustainable development: a crucial review. *Renewable and sustainable energy reviews*, *4*(2), 157-175.

Förstner, U., & Wittmann, G. T. (2012). *Metal pollution in the aquatic environment*. Springer Science & Business Media.

Inglehart, R. (1995). Public support for environmental protection: Objective problems and subjective values in 43 societies. *PS: Political Science & Politics*, *28*(1), 57-72.

Moore, M. N. (2006). Do nanoparticles present ecotoxicological risks for the health of the aquatic environment?. *Environment international*, *32*(8), 967-976.

Tietenberg, T. H., & Lewis, L. (2016). *Environmental and natural resource economics*. Routledge.

Tilman, D., Fargione, J., Wolff, B., D'antonio, C., Dobson, A., Howarth, R., ... & Swackhamer, D. (2001). Forecasting agriculturally driven global environmental change. *Science*, *292*(5515), 281-284.