



THE PROBLEMS OF SURFACE WATER POLLUTION MANAGEMENT IN PORTHARCOURT AND ENVIRONS

Chukwu, Kevin Ejike, Ph.D., Department of Geography and Meteorology, Faculty of Environmental Sciences, Enugu State University of Science and Technology (ESUT), Enugu State

Abstract: *The world's water resource includes the entire range of natural waters on earth, either in vapour, liquid or solid form. Water is found in the oceans, lagoons, rivers, lakes, glaciers, permanent snow fields and underground layers. Water sources may be classified as either surface water or ground water. Surface water includes rain water collected into rivers, lakes, reservoirs and oceans. Surface water, its pollution and management is the centre form of this paper and the research findings so far carried out makes it clear that the rate of surface water pollution has been on the increase and the management of same has been inadequate. It is therefore clear that more efforts regarding the management of surface water pollution, should be critically examined and implemented to reduce the problems of surface water pollution; management.*

Keywords: *Urbanization, Sustainability, Water Sources, Surface Water Bodies, Hydrologic Cycle*

1.0 INTRODUCTION

According to Berkley and Sackler (1972), the history of man is largely written in terms of the struggle between man and nature over the terms of man's existence. The term nature as used in this context refers to the physical environment in its description of the land surface and its cover of the vegetation of which the surface water is a prominent part, and other water bodies and the envelop of gases which surround man called the atmosphere.

Turner (1990) defined the environment as the component and systems of the geosphere – biosphere e.g soil, flora, climate etc. This is a more restrictive meaning of the term environment because it rules out the broad socio – anthropological connotation of the term. Therefore the physical environment is the reservoir of resources on which man draws for his survival through socio-economic and industrial activities, thereby affecting or polluting the surface waters. The technological development of the last two centuries gave man the false impression that he had at last won the battle against nature because of his ability to



transform environmental resistance into resources. This gave birth to the concept of human possibilism against the backdrop of environmental determinism, implying that man's intellect enables him to use anything he desires in the physical environment. This euphoria was short lived, as man soon discovered that all his technological breakthrough reached in one form of environmental degradation or the other. It has been clearly noted that the systems and subsystems of the natural environment co-exist in a state of dynamic equilibrium with a free exchange of energy and materials between the major components of the ecological system and the uncontrolled exploitation of any of the component of the ecosystem by man to meet his needs, brings about a dislocation of this state of balance.

It is the absence of this equilibrium which brings about environmental deterioration. Erhlich (1970) affirms that a deteriorating environment among other features is unable to perform optimally such beneficial public service functions as chemical soil balancing etc. The term surface water pollution refers to all instances in which the delicate balance between the various water bodies, its components within the environment are polluted through nature and anthropogenic agencies. The natural agencies include the changes in climate leading to flooding and the effect of running water. Anthropogenic influence on the hand comes from agriculture, Pastoralism, mining, infrastructural development and urbanization.

We should note that both surface and ground water supplies are used as sources of water in the community and that these water bodies are useful to man and animals in various ways. In Portharcourt and its environs these surface waters are abound but its usefulness is limited because of pollution. When properly managed the rivers and other surface waters bodies are useful in providing water for domestic and industrial uses. It is therefore useful in the following ways viz -

1.1 Domestic Uses: This involves the use of water largely for cooking, drinking and washing of cloths, dishes, bathing, flushing toilets etc.

Agricultural Uses: Water can be drawn from rivers, lakes and reservoirs for irrigation purposes in agricultural set ups. The use of water for irrigation should be high in areas of little and irregular rainfall.

Industrial Uses: A great amount of water is needed in many industrial plants for washing and cooling purposes. And much water is needed in dinks and food processing plants or factories.



Transportation: Oceans, Lagoons, Rivers, Lakes, Creeks in the different parts of Portharcourt and environs are used as a medium of movement of goods, humans and other services.

Sports and Recreation: Surface water bodies are also useful as a means of recreation. Sometimes, people go to swimming pools, beaches, streams and shallow River to exercise the body or release tension after a hard day's work. Others serve as tourism sites.

However, surface water supplies are not as reliable as ground water since quantities often fluctuate widely during the course of the year due to seasonality and various forms of pollution. Therefore the variation in the River flow in Portharcourt and its environs can be so great that even a small demand cannot be met during dry season.

2.0 PROBLEMS, AIMS AND OBJECTIVES

In Portharcourt and its environs numerous problems has risen resulting from surface water pollution in recent times. This surface water pollution is brought about by the activities of man within the environment. These activities include the following and the aim is to reduce these activities to the lowest minimum.

Discharge of domestic sewage and other organic waste.

- Fertilizer Residues
- Insecticides and Pesticides
- Industrial Effluents
- Eroded Sediments and Oil Spillages
- Petroleum and other Solid Wastes

Urban development has also contributed immensely to the pollution of surface water bodies within the Portharcourt area and its environs.

In Portharcourt and its environs, the major aspects of development which have occasioned and surface water pollution includes the following:-

2.1 Urbanization and Urban Development

Urbanization brings a whole lot of people together at given urban places.

It brings about the concentration of people or population and people are generators of wastes and surface water pollution has been on the increase. Research studies have put solid wastes generation rate at an average of 0.5kg per person per day in Portharcourt and its environs. Urbanization also involves the building of numerous housing units, roads and markets which promotes pollution and degradation of the environment. All these buildings



and Construction works means the depletion and using up of Land, disrupting the Ecosystem thereby generating wastes which pollute the surface water bodies.

A drive around the major streets and areas in Portharcourt, will give one a clear picture of how buildings are springing up rapidly and how surface water pollution has adequately increased. With the construction of houses, comes the loading of the environment by inevitable and enormous generation of domestic refuse-liquid and solid wastes including human waste and in the absence of adequate and proper drainage and sewage system, the surface water bodies gets more polluted. This is a great and major cause of environmental and surface water pollution in Portharcourt and its environs.

The development of the extractive Industries has been accompanied by despoiling of the surface water in Portharcourt and environs. In the course of investigating the “problems of surface water pollution management in Portharcourt and environs” it was discovered that in the month of November 2014, there occurred a large oil spillage in the riverine areas of Abonema. This spillage involved an estimated 500 barrels of crude oil in a surface water area of about 25km and affected over 20,000 people and seven villages with their fishing ponds. The effects of this surface water pollution, is still being felt till today in those areas because it polluted surrounding rivers, creeks and streams. Oil spillage can be hazardous and can cause the following:-

- Toxic to most species of fish and other aquatic life
- Creates fire hazards when present on the surface water bodies
- Causes trouble in conventional water treatment processes by imparting taste and odours
- Destroys vegetation along the shoreline with consequent erosion problems.
- Creates an unsightly film on the surface water body and obstructs the passage of light through the water, thus retarding the growth of vital plant foods.

In the course of this research it was discovered that a great number of fishes in the surrounding streams and rivers are being killed off and aquatic life is becoming a thing of the past. The absence of adequate waste disposal facilities, surface and drainage facilities as well as the none functioning of relevant public facilities (pipe-borne water and electricity) made the disposal of liquid waste almost impossible. The aim of this paper is to investigate the problems of surface water pollution management in Portharcourt and its environs. It will

investigate the level of surface water pollution and how it can be managed for sustainable development. It therefore means that a few literatures have been reviewed and these are as follows: can be managed for sustainable development. It therefore means that a few literatures have been reviewed and these are as follows:-

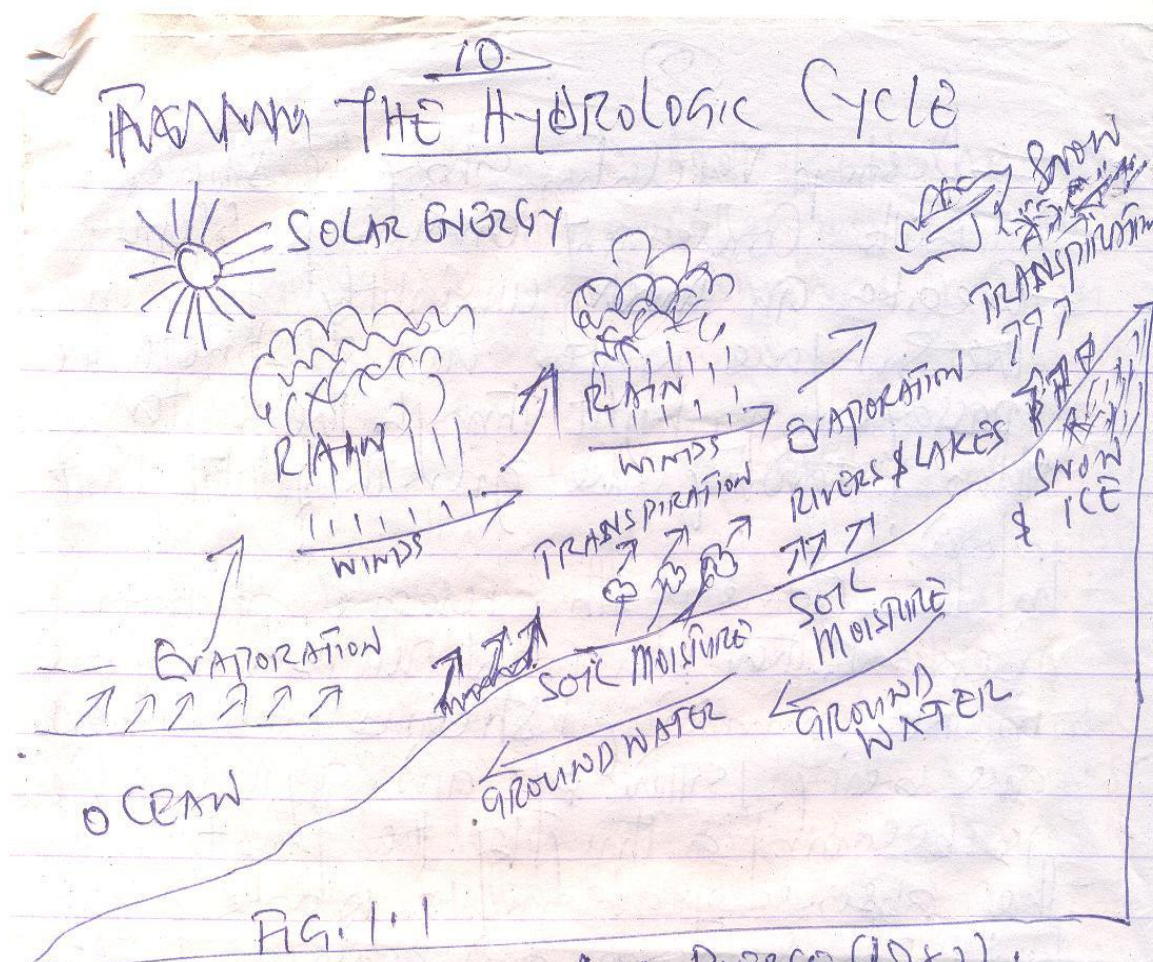


Fig. 1 THE HYDROLOGIC CYCLE

Source: Vesilind and Pierce (1982)

3.0 METHODS OF STUDY / LITERATURE REVIEW

Portharcourt and its environs as an area of study can be classified as an area that is prone to surface water pollution and this is because it is surrounded by water bodies. The following literatures were reviewed thus:-

3.1 Social Impact of Environmental Degradation / Surface Water Pollution

There has been a growing acceptance that environmental pollution which involves surface water pollution is a huge social problem. It is a problem arising from human flawed interaction with the environment arising from partly inadequate knowledge of the laws of



nature (including human nature) and also from greed and selfish attitudes of man within the environment. Whereas environmental degradation or surface water pollution can arguably be said to have been present in some form since homo sapiens began to act on external nature, the massive scale which is today the source of concern for the survival of the earth is a consequence of the pollution generated since the emergence of production processes, lifestyle and political – economic competition of modern industrial societies. The pollution arises and has further gone to the level or degree where the third world countries have fashioned its development goal in the image of the industrial world in sheer imitation of its production processes its high resource consumption rates and the stupendous expenditures on nuclear armaments.

In this context, one would recall 1988 as a special bench mark for the educated elites of Nigerian citizens, in the sense that it raised the threshold of awareness of the environmental degradation and surface water pollution arising from toxic waste. Reference is made here to the news of drums of toxic waste which an Italian businessman imported to Nigeria and stored in one Chief Nana's compound in Koko town of the present Delta State.

The news, if one may recall was broken to the press by the Nigerian Students Association in Italy after being tipped off by an Italian NGO. Thenceforth a broader understanding of the range of environmental and surface water pollution problems – Toxic effluents, emissions and spillages from industries began to be reported and discussed in the news media.

It was in this regard that KEN – SARO WIWA and his other marthyred colleagues, the MOSOP (Movement for the Survival of Ogoni People) and the Ogoni in general were waken up in the Vanguard of the specific linkage of the oil industry to the fundamental debasement of the people in the Rivers State and Niger Delta in general and the dislocation of their systems or means of livelihood.

It is pertinent to note here that the general tendency of surface water pollution issues is to have consequences which are territorially boundless and in the same vein their most effective resolution also tends to require Trans – border co-operation.

Note that as the effects of hyacinth pollution are within a few years in rivers and streams so as are the effects of oil spillages.



Unsanitary film on the surface water can obstruct the passage of light and air, contaminate under ground water and destroy aquatic life. The situation has been described as environmental racism by a leading environmental NGO based in Portharcourt the Rivers State Capital.

In the case of KEN – SARO WIWA, he wrote a book titled “GENOCIDE IN NIGERIA, THE OGONI TRAGEDY” which also contains the “OGONI BILL OF RIGHTS” and the price of oil; Corporate responsibility and Human Rights Watch, an American NGO, are all classic introductory texts to the enormity of the on-going trauma of surface water pollution in Portharcourt and environs.

3.2 Problems of Surface Water Supplies Management Results and Discussions of Research Findings

It is already known that the problems of surface water pollution management, is as a result of man’s activities in the environment. Man has been responsible for the ugly state of the environment today and therefore must be responsible for the repairs and its possible sustenance by improving the relationships between man and his immediate environment. It was John F. Kennedy of the United States of America who said “Think not what your country can do for you, but think of what you can do for your country”. In the same vein, man should not think of what the environment can do for him, but should think of what (He) man can do for the environment.

There are numerous problems emanating from the surface water pollution management in Portharcourt and its environs. Surface water pollution problem is mostly resulting from exploration and exploitation of mineral resources by oil companies in Portharcourt and its environs.

4.0 DISCUSSION

It should be noted that industries and environment are of particular significance to Portharcourt and environs. This is because the state needs the Revenue from the industries as well as a healthy environment that will sustain a productive livelihood for her inhabitants at large, and thus enhance sustainable development.

The problems of surface water pollution created by the activities of these industries cannot be over emphasized. Other manufacturing and processing industries are not kept out in



these issues. All these activities have greatly impacted on the environment and contributed immensely to the problems of surface water pollution management in Portharcourt and its environs thereby altering the balanced relationship between man and his environment and also increased the problems of surface water pollution management. This has affected aquatic life and public health is being threatened, while the well being of the people is in jeopardy. The communities have experienced loss of aquatic resources, low production of sea foods, surfaces and ground water resources pollution as well as devastating socio-economic impacts which have led to the impoverishment of the population in the city and environs. Industrial development all over the world, Portharcourt city being no exception has emerged as a mixed blessing of a sweet and sour story. This is so because the major sources of environmental degradation, comes from the activities of industries, exploration and exploitation, which has also caused the problem of surface water pollution management in Portharcourt and environs.

Table I: Surface Water Bodies Impact by Industries in Portharcourt

S/N	PARAMETERS	PORTHARCOURT CITY
1.	Potential Hydrogen (PH)	6.5 – 7.8
2.	Total Hardness	24 – 518
3.	Total Solids	610.40, 140
4.	Total Suspended Solids	6.1 – 280
5.	Chemical O ₂ Demand	980
6.	Chloride	54 – 1004
7.	Oil and Grease	1.9
8.	Dissolved Oxygen	7.2
9.	Iron	17.1

Source: Field Survey 2015

The above table shows the characteristics of some surface water bodies, impacted by industries in Portharcourt city. These surface water bodies have become so polluted that they are no longer useful for fishing and other social activities.

4.1 Consequences of Surface Water Pollution Management in Portharcourt and Environs

The problems arising from surface water pollution management in Portharcourt and environs are as follows:-



- a) **Water Contamination:** - Which can be caused by oil spillage, improper disposal of human wastes and industrial effluents. And the consequences of this are - loss of fish ponds, contaminated drinking water and water borne diseases.
- b) **Flooding and Erosion:** - This is caused by heavy rainfall, low delta coastal plains, absence of master plan and loss of plants and crops. The consequences are loss of homes, death of human beings and animals, and loss of crops including migration and displacement.
- c) **Industrial Pollution:** This is caused by industries such as paint, cement and agro – chemical industries, emitting smoke, and discharging waste into the surface water bodies. The consequences of these are loss of confidence and degradation of roofing sheets, water, land and air pollution, lung and other respiratory diseases including reduction in crop yield.
- d) **Dredging and Pipeline Operations:** This is caused by oil exploration and exploitation and is the major source of surface water pollution in Portharcourt and environs. Water Navigation and transportation of industrial chemicals and other raw materials are made difficult. The consequences are serious flooding and erosion that affects surface water pollution management. There is also the destruction of Aquatic life.
- e) **Oil Pollution:** This is caused by oil spillage, gas flaring, rupture or failure and damage to oil pipelines and the consequences are blockage of natural water causes affecting surface water bodies. Increased ambient heat, loss of fishes and impairment of human health, are all included.
- f) **SOLID WASTE:** - This is caused by improper urban planning and management. A situation where surface water bodies are used as waste disposal contents and this can result to diarrhea and other diseases. It can also cause intestinal parasitic infections.

5.0 CONCLUSION

In oil prospecting, water bodies and land are acquired by oil companies for flow of station oil locations, pipeline right of ways, terminals, burrow pits among others. In this process, land and water bodies are deprived of its shapes, altered and most times the natural surface water bodies are blocked thereby creating a lot of problems.



In accordance with the provision of the Petroleum Act, enacted prior to Nigeria's Independence, the major oil operators in Nigeria enjoyed unrestrained freedom in determining what was good for them. The companies until recently hardly has any concern for the environment, thus the pollution of surface water bodies in Portharcourt and its environs as a result of incessant oil spillages and gas flares are some of the problems associated with the oil industry. For example the highest number of spills occurred between 1980 and 1982 and largest oil spills were between 1978 and 1980. There should be a review of the existing number of Port Impact Assessment reports in Portharcourt and its environs. These impacts range from localized effects on the flora and fauna usually considered as "Minor" and to "Major" impact on surface water bodies which leads to the problems of surface water management in Portharcourt and environs. While some oil spills did not affect socio – economic condition, other spills resulted in the damage of fishing ponds, fish boats and other aquatic life.

Further more the effects of some gas flares in the vegetation, health and the micro climate are equally alarming. The free disposal of gas through flaring, demonstrate the marginality of the interest of the oil producing communities in particular and Portharcourt in general. Apart from the deafening howl of the raging time at gas flare units, the thick smoke which blows into the sky, falls back as acid rain which has poisoned most rivers, creeks and streams in Portharcourt and environs thereby enhancing the problems of surface water pollution management in Portharcourt. For example the popular Emohua River in Emohua Local Government Area of Rivers State very close to Portharcourt city which was once the fisherman's constant destination has dried up and its waters are now Lipid due to Acid Rain. This Acid Rain, coupled with constant oil spills has adversely affected almost all the communities in Portharcourt and environs. The ponds and rivers therein which were once rippling sources of community protein, are now wasteful in nature.

Statistically, between 1980, to 1990, there were 874 spillages in Portharcourt, River State, involving an estimated spillage of 335,000 barrels of crude oil. This produces a devastating effect on the surface water bodies including the flora and fauna of the ecosystem.

(Aghalino 1998). I do not by the foregoing presentation, claim in any way that the city of Portharcourt and environs are the only theatre of problems of surface water pollution



management. I have actually focused on it because it is the most dramatic today in its horrific implication, and is covered by the scope of this research.

Many Nigeria towns and neighbourhoods especially the riverine areas and where industries that generate toxic waste exist, are also at the risk of problem of surface water pollution management.

6.0 RECOMMENDATION

Nothing is guaranteed to bring environmental disaster faster than everyone in the world believing that, whatever they do, it won't work or make any difference. Everything we do can make or makes a significant difference (John Belton 1989). Every decision we take about how we live, whether momentary or seemingly insignificant, works either towards the environment or against it. Indeed, the environment is a complex interaction of many ecosystems and it therefore follows that measures to convert an environmental pollution such as the problem of surface water pollution management will similarly be a complicated mixture of action and policies. Note that the overall goal of pollution control measures, is to provide better quality of life by reducing the amount of any waste or pollutant released into the environment or as in this case, surface water bodies, prior to disposal so as to promote the long term sustainability of the environment. Therefore based on these arguments and considering the growing rate of this menace of problems of surface water pollution management, there is critical and urgent need to fill requisite gaps to the following priority areas:-

1. Monitoring and information mechanism
2. Capacity strengthening for Operational National Contingency Plan for Hazardous Chemicals
3. Capacity building for a National registration and tracking system for toxic and hazardous chemicals.
4. Government to enact environmental legislation that will ensure pollution prevention; the legislation should have far – reaching effects on all sectors of the economy. These legislations must be enforced by appropriate government regulatory authority or agencies.
5. The establishment of the Federal Ministry of Environment shows that the government is actually conscious of the environment and therefore this ministry



should be given more powers to operate within the confines of a democratic observation; freedom of speech and due access to information should be granted.

6. Activities within the areas such as Rivers, Creeks, Lakes and Lagoons etc which constitute surface water bodies should be adequately monitored and regulated by the appropriate Agencies to help reduce these problems of surface water pollution management in Portharcourt and environs.
7. Regulation 25 of petroleum (Drilling and production) regulations makes it mandatory for the license or lease of an oil well to adopt all practice precaution, including the provision of up-to-date equipment approved by the Director of Petroleum Resources, to prevent the pollution of in-land Waters, Rivers, Water Courses, Lagoons, the territory water or shorelines which might contaminate the surface water bodies and cause harm to or destruction to aquatic life. This regulation should be adequately enforced or implemented.

REFERENCES

1. Achudume A. C. – *Environment & Biodiversity*
2. Adejo A. P. (2001). *The Roles of E.I.A. Reports in the establishment of Factories in the Nigeria Environment.*
3. Adeniyi Eniola A. O. (2004). *Environmental Management and Development in Nigeria*
4. Aghalino S. O. – *Petroleum Exploitation and Environmental Degradation in Nigeria*
5. Jimoh H. I. and Ifabiyi I. P. (2000). *Contemporary Issues in Environmental Studies*
6. Uchegbu S. N. (2002) – *Environmental Management and Protection*
7. Omafume F. Onuge (2002). (Centre for Advance Social Sciences, Portharcourt River State) – *Social Impact of environmental Pollution*