Journal of Sustainable Society
Vol. 3, No. 1, 2014, 1-6
DOI: 10.11634/216825851403528

The Effects of Socio-Economic Activities on River Ethiope

P. O. Okumagba[1] and F. Ozabor[2]

[1]*Department of Sociology and Psychology, Delta State University, Abraka, Nigeria*
[2]*Department of Geography and Regional Planning, Delta State University,Abraka, Nigeria*

This paper is on the effects of socio-economic activities on River Ethiope. The paper focused on how socio-economic activities affect Ethiope River quality and its usability, with a view to proffering solutions to the effects of socio-economic on the river. To achieve this, 200 questionnaires were randomly administered on respondents in the area. To ascertain if there was a difference in the sources of pollution both in the urban and in the rural area along the river channel, the paired 't' test was used. The results however reveals, socio-economic activities (cassava processing, cloth washing, discharge of sewage waste by the various resort centres on the river, etc) significantly affect the river quality; while the paired 't' test result showed that the sources of the river pollution does not vary both in the urban and in the rural area (table value 1.943>calculated value 1.596). It was however, recommended that; public awareness on the effects of polluted water should be carried out by both the government and NGO's; alternative sources of water be developed in the area for agricultural and industrial uses; the activities of the various resort centres and people living in the area should be monitored by the ministry of health so as to punish offenders.

Key words: Pollution, Cyanide, River

Introduction

Water is one of the most essential needs of human beings and is the most abundant natural resources on the surface of the earth which occupies more than 70% of the earth surface (Oyinloye and Jegede, 2004). Although, water is an absolute necessity for life, there is an inherent health implication in the consumption of contaminated or polluted water. It can lead to many diseases(diarrhoea, cholera, etc) and even death when contaminated with organic and/or chemical pollutants (Bartran and Balance, 1996). But, clean unpolluted water is necessary for the maintenance of human health as well as quality of the environment (UNEP, 1996). Water that is safe for drinking, pleasant in taste, and suitable for domestic purposes is designated as potable water and must not contain any chemical or biological impurity (Horsfal and Spiff, 1998).

At the U.N. Millennium Summit in 2000 and later at the Johannesburg Earth Summit in 2002, world leaders agreed to a set of time-bound and measurable development targets; generally known as the Millennium Development Goals for 2015; which had as one of the major targets a commitment to reduce the proportion of people without access to safe drinking water (UNDP, 2003). From a total access of 77% in 1990, today, the World population's access to improved water has increased to 87% (WHO and UNICEF, 2010). Surprisingly, in Nigeria, only 58% of the total population have access to improved water. This represents a slight growth in excess from 1990 when the proportion was 47% (WHO and UNICEF, 2010). It has been confirmed that not all improved sources of water are safe. In general, only pipe borne water is usually regarded as safe (Sullivan, *et al*, 2003). When this factor is considered only 30% of the world population has access to safe source of water.

Most water supplies for human needs, especially in the developing countries are from surface sources, which include rivers, streams, lakes, oceans and seas. Mara (1978), defined surface water as polluted, when its quality has deteriorated to such a level that it is no longer suitable for its intended purpose. In fact, any impairment of water quality, which adversely and unreasonably affects its subsequent beneficial use, is defined as water pollution (Aluyi, Atuanya and Amoforitse , 2003). Owing to the universal usefulness of water, most communities are often found along riverbanks. This is because coastal communities and industries alike obtain fresh water from these rivers and in return, discharge their wastes into these water bodies (Aluyi, Atuanya and Amoforitse , 2003). The rural communities in developing countries, particularly Nigeria, depend largely on rivers and other water bodies for their water consumption and such rivers constitute health hazard because of human socio-economic activities and indiscriminate disposal of untreated sewage and

surface run-off into them. Such waters have a high bacterial load which has resulted in epidemics (Bonde, 1977; Kowal and Patiren, 1982; Okoronkwo and Odeyemi,1985;Aluyi, Atuanya and Amoforitse , 2003). However, there are several sources of surface water pollution which include domestic, industrial or agricultural waste and is sufficient to render the water unacceptable for its best usage, and at that state, it is said to be polluted. The substances causing these unfavourable alterations are called "pollutants" (Ekpete, 2002).

The case of Ethiope River is not different as most of the local inhabitants view the river as a waste disposal site, where poultry dung and sewage wastes are deposited. Similarly, clothes are washed by the local inhabitants along the river course. On the other hand, most indigenes are agriculturists and cassava is one of the major farm produce. However, these farmers process and wash off chemicals from the cassava (cyanide) into the stream. And this chemical is very harmful to human health. Furthermore, waste management is poor in the communities along the river (especially Abraka, where Delta State University is sited), thus when rain falls, run-offs carry most of these poorly managed wastes into the River.

Another worrying event is the siting of the various motels/resort centres along the river banks. This ought to be very important for development in the area; however, these recreational centres do not have any waste management plan other than to dispose of wastes into the river. Owing to these problems listed, it is perceived that Ethiope River is polluted.

The consequence of consumption of polluted waters (used as potable water) has triggered various studies on water aquifer and aquatic ecosystem (Akpa and Offen, 1993; Udom *et al.*, 1999; Ekpete, 2002; Oguzie *et al.*, 2002; Aiyesanmi *et al*., 2004 ; Egila and Terhemen, 2004; Abam *et al.*, 2007; Nwala *et al.*, 2007; Bolaji and Tse, 2009).

However none of these works looked at surface water pollution, from the angle of impact of socio-economic activities on surface water quality. This paper is therefore set out to fill this gap.

The present paper therefore, focuses on how social and economic activities carried out along the bank of River Ethiope acts as pollutants to the very important source of potable water (especially for the poor who cannot afford the alternative sources of portable water) for communities along the River Ethiope. The study also proffer solutions on how this problem (pollution) can be ameliorated.

The Study Area

The Ethiope river is located in the western part of Delta State of Nigeria and is situated between latitude 5.53o and 6.05o North and longitude 5.30o and 6.05o East. It takes its source from Umuaja in Ndokwa L.G.A of Delta State and covers a distance of 96.6 kilometres (see fig 1 below) and flows into the Atlantic ocean through the Benin river. Umuaja, Umutu,obi – Iloh,Ebedei-Ukwale, Owa-Abbi, Obinomba, Obiaruku, Umeghe, Urhuoka, Abraka P.O., Ajalomi, Urhuovie, Erho,Oria, Sanubi, Eku,Igun,Okpara Waterside, Ekpan-Ovu , Aghaiokpe, Arabga-Okpe, Adarweran, Egbeku, Ibada, Eko , Amukpe, Okirigwhre, Sapele, Jesse , Oghara are communities traversed by the Ethiope river. At Abraka, the river serves recreational purpose as well as other human activities.

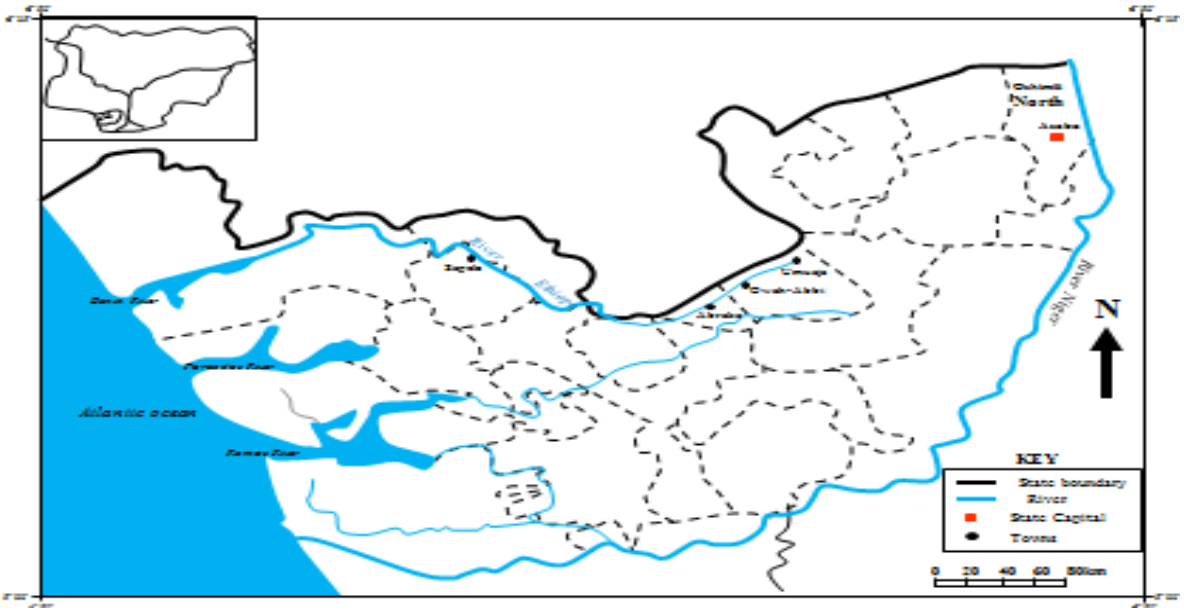

Figure 1. Map of Delata Sate Showing Study Area

The area falls within the equatorial climate belt of the world and tropical rainforest belt of Nigeria with mean temperature of 30^0C. The area experiences heavy and torrential rainfall amount throughout the year. The annual rainfall amount of is 3,098mm with mean monthly rainfall ranging from 25.8mm in December to 628.9mm in September (Efe, 2003). Double rain maxima and August break is witnessed in the area . The heavy amount of rainfall experienced in the area encourages run-offs and when wastes are poorly managed it could mean a lot to surface water quality; which is the case of Ethiope River.

The soils are tropical ferruginous type containing both loamy and clayey, and sandy soil. Their colour vary from greyish-brown through reddish-brown to brown and have a pH (strong acidic) values ranging between 4.50 and 6.50 for surface and subsurface soil (Ejemeyovwi, 2006). Their nature makes it easy to cultivate and also suffer from excessive internal drainage and intense leaching, giving the soils very strong acid reaction. Since these soils are easily cultivated, they encourage agriculture; however, since facilities for processing of agricultural produce are not readily available, the local dwellers are forced to use the river as a processing point.

Materials and method

Data for this study was collected through questionnaire survey in the communities along the Ethiope River (Umuaja, Umutu,Obi – Iloh,Ebedei-Ukwale, Owa-Abbi,Obinomba, Obiaruku, Umeghe, Urhuoka, Abraka P.O., Ajalomi, Urhuovie, Erho,oria, Sanubi, Eku,Igun,Okpara Waterside, Ekpan- Ovu , Aghaiokpe, Arabga-Okpe, Adarweran, Egbeku, Ibada,Eko , Amukpe, Okirigwhre, Sapele, Jesse , Oghara). The area was first classified into urban and rural using population size. The purposive sampling technique was there after used to select five communities each from both the urban and rural areas; on the basis of this stratification 200 questionnaires (100 for each strata) were randomly administered on respondents in the study area.

The techniques employed in this study for data analysis and presentation include, tables, percentages and the paired ‘t’ test. The paired ‘t’ test was used to test the hypothesis “sources of Ethiope River pollution does not vary significantly both in Urban and Rural areas of the Ethiope river.

Results and Discussion

Table 1 knowledge of the existence of the river (Ethiope).

Alternatives	Response	Percentage (%)
Yes	200	100
No	o	o
Total	200	100

Source: field survey 2013

From table 1 above, it is obvious that all respondents (100%) agree to have knowledge of the existence of River Ethiope. Therefore, they have various reasons why they interact with the river.

Table 2: Uses of the Ethiope River.

Uses	Frequencies	Percentage (%)	Ranking
Recreational	190	95	1st
Agricultural	90	45	3rd
Source of water for domestic use	110	55	2nd
Source of drinking water	70	35	4th
Waste disposal point	40	20	5th

Source: field survey 2013

From table 2 above, it is evident that Ethiope River serves several socio-economic purposes, which ranges from recreational (95%), Agricultural (45%), domestic use (55%), drinking water (35%), to waste disposal (20%). The fact that the various recreational centres (which serves 95% of the total respondents recreational needs) and some local inhabitants (20% of the total respondents) not having any proper waste management plan, has a lot of implication on the water quality of the Ethiope River.

Table 3: Perception of Ethiope River pollution.

Alternatives	Response	Percentage (%)
Yes	200	100
No	0	0
Total	200	100

Source: field survey 2013

From table 3 above, all respondents (100%), do agree to the fact that the river is being polluted through the various socio-economic activities listed in table 4 below. Thus it can be asserted that River Ethiope is seriously being impacted through waste generated from the various socio-economic activities being carried out in and along the river. See table 4 below.

Table 4: Sources of Ethiope River pollution.

Sources of pollution	Rural	Percentage (%)	Urban	Percentage (%)
Cassava processing	20	20	90	90
Cloth washing	80	80	100	100
Bathing along the river course	50	50	100	100
Discharge of sewage waste along the river by the various resort centres	100	100	90	90
Discharge of animal dung by poultry owner in the river	100	100	100	100
Humans using the river as toilet	100	100	90	90
Sand mining	0	0	10	10

Source: field survey 2013

From table 4 above, sources of pollution of the Ethiope River seem not to be different both in the urban and rural areas. For example discharge of sewage waste by the various recreational centres has 100% response both in the rural and in the urban area. Same can be said for, humans using the river as toilet; source of dumping poultry waste. However, cassava processing seems not to be carried out in a high magnitude in the river at the rural communities (20%). This may be attributed to the fact that the rural dwellers know they may not be able to afford alternative sources of portable water and will have to drink the river water even if it is polluted. But in the urban areas cassava processing is widely carried out in the river (90%), since the urban dweller have access to alternative sources of portable water (bore hole) see table 5 below. However, these Socio-economic activities and practices along the river have high negative impact on Ethiope River water quality.

Table 5: Alternative sources of getting portable water in the area.

Alternatives	Frequencies
Well	0
Borehole	130
Pipe borne water	0
Community borehole	30
Rain harvested	40

Source: field survey 2013

From table 5 above, we can deduce that borehole (130 respondents) is the highest source of getting alternative portable water. However, pipe borne water and well water seem to be no alternatives since no respondents went for those options as they shear 0 respondents respectively. However, community borehole and rain harvested water shear 30 and 40 respondents respectively. Thereby, revealing that some of the people cannot afford the cost of private borehole in the area. Again this also reveals that some of the local dwellers are forced to drink Rain harvested water (40% of the total respondent), even though it may be seriously polluted through atmospheric pollution.

Table 6: affordability of the alternative sources of getting portable water.

Alternatives	Response	Percentage (%)
Yes (I can afford alternative sources of water)	140	70
No (I cannot afford alternative sources of water)	60	30
Total	200	100

Source: field survey 2013

From table 6 above, the fact in table 5 above is further reinforced. That is, that some of the local inhabitants can afford alternative source of portable water (70%), while some cannot afford it (30%). This proportion that can't afford alternative source (s) of portable water is either forced to drink from the polluted river or drink from rain harvested water. This is practically dangerous to human health and can even lead to death.

Table 7 variations in the source of pollution in the urban and in the rural area.

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	rural - urban	-18.57143	30.78342	11.63504	-47.04135	9.89849	1.596	6	.162

Source: computed from table 4, 2013.

From table 7 above, the calculated value 't' (1.596) is < the table value of (1.943) at p>0.05. This implies that the null hypothesis is sustained. Thus "sources of Ethiope River pollution do not vary significantly both in Urban and Rural areas.

Conclusion and Recommendation

In conclusion, water is one of the most essential needs of human beings and is the most abundant natural resources on the surface of the earth which occupies more than 70% of the earth surface (Oyinloye and Jegede, 2004). Although, water is an absolute necessity for life, there is an inherent health implication in the consumption of contaminated or polluted water. It can lead to many diseases (diarrhoea, cholera, etc) and even death when contaminated with organic and/or chemical pollutants (Bartran and Balance, 1996). Therefore, it is important to recommend the following on the case of Ethiope river which is becoming a worrying situation;

(a) Public awareness on the effects of polluted water on humans should be carried out by both the government and NGO's;

(b) Alternative sources of water should be developed in the area for agricultural and industrial uses;

(c) The activities of the various resort centres and people living in the area should be monitored by the ministry of health so as to punish offenders.

(d) Constant investigation should be carried out on the river water quality, by the ministry of health, to certify the water usable for the public.

References

Abam,T.K.S, Olu, A.W, and Nwankwoala H (2007). Groundwater Monitoring for Environmental Liability Assessment. *J. Nig. Environ. Soc*., 4(1): 42-49.

Aiyesanmi A.F, Ipinmoroti KO, Oguntimehin II (2004). Impact of automobile workshop on groundwater quality in Akure Metropolis. J. Chem. Soc. Nig. (Supplement to 2004 Proceeding) pp. 420–426.

Akpan, E.H, and Offem J.O. (1993). Seasonal Variation in water quality of the Cross River, Nigeria. *Rev. Hydrobiol. Trop*., 26(2): 93-103.

Aluyi, H. S. A., Atuanya. E. I., and Amoforitse. S. C.(2003). Bacteriological and Physico-Chemical Investigations of Ethiope River, Delta State, Nigeria. *African Journal of Applied Zoology & Environmental Biology*. Vol. 5. 29 – 36

Bartran, J., and Balance, R. (1996). Water Quality Monitoring: A practical guide to the design and implementation of fresh water quality studies and monitoring programmes. *E and F. N. Spoon, London.*

Bolaji, T.A, and Tse, C.A. (2009). Spatial variation in groundwater geochemistry and water quality index in Port Harcourt. *Scientia Africana*, 8(1): 134-155.

Bonde, G.J. (1977), Bacterial indication of water pollution. *Advances in Aquatic Microbiol 1:274-327.ed*., pp. 58–60.

Efe, S.I. & Aruegodore, P. (2003), Aspect of microclimates in Nigerian Rural Environment: The Abraka Experience, Nigeria. *Journal of Research and Production, Vol. 2, No.* 3, pp. 48 – 57.

Egila, J.N, and Terhemen, A. (2004). A preliminary investigation into the quality of surface water in the environment of Benue Cement Company Plc. Gboko,

Benue State. Nigeria. *Int. J. Sci. Tech.*, 3(1): 12-17.

Ejemeyovwi, D.O. (2006). Physico-chemical characteristics, classification and mapping of soils in Abraka in Akinbode, A. & Ugbomeh, B.A. (eds.) *Abraka Region. Occasional Publications,Department of Geography and Regional Planning, Delta State University, Abraka*, Pp. 48 – 66.

Ekpete, O.A. (2002). Determination of Phsico-Chemical Parameters in borehole water in Odihologboji community in Rivers State. *Afr. J. Interdiscip. Stud*., 3(1): 23-27.

Horsfall, M., Spiff, A.I. (1998). Principles of environmental Chemistry. *Metrol Prints Ltd, Nigeria*, pp. 107–118.

Kowal, N. E and Patiren, H.R. (1982). Health effects associated with wastewater treatment and disposal. *Journal of Water Pollution Control* 54:167-174.

Mara, D. (1978). *Sewage Treatment in Hot Climates*, John Wiley and Sons N.Y. 785 pp.

Oguzie, E.E, Ayochukwu I.B, Onuchukwu A.I, and Offem J.O. (2002). Groundwater Contamination: Asiunlation study of buried waste. Metallic contaminant penetration through the aquifers. *J. Chem. Soc. Nig*., 27(1): 82-84.

Okoronkwo, N. and Odeyemi, O. (1985). Effect of a sewage Lagoon effluent on the water quality of the receiving stream. *Environmental pollution series* A 37:71-86.

Oyinloye, A.O, and Jegede, G.O. (2004). Geophysical Survey,Geochemical and Microbiology Investigation of ground well water in Ado–Ekiti, North, South Western Nigeria. *Global J. Geol. Sci*., 2(2): 235-242.

Udom, G.J, Etu-Efeoto,r J.O, and Esu, E.O. (1999). Hydrochemical evaluation of groundwater in part of Port Harcourt and Tai–Eleme Local Government Areas, Rivers State. *Global J. Pure Appl. Sci*., 5(5): 545-552.

WHO and UNICEF (2000), Global Water Supply and Sanitation Assessment 2000 Report, WHO, Geneva. *From http://who.int/water_sanitation_health/monitoring/*