PATTERN OF POLLUTION ALONG THE LOWER REACHES OF RIVER PRA

Bayitse, Richard

2010

ABSTRACT

The main objective of this research was to establish the pattern of pollution along the lower reaches of River Pra. Raw water samples were taken from six (6) communities located along the Pra River. These communities are Enyinabrim, Abetemasu, Sekyere Nsuta, Krobo, Daboase and Beposo at Mpohor Wassa East District in the Western Region. In each community, water samples were taken from both Pra River and one tributary within the vicinity of the community. In all, ten (10) samples were taken from these communities on monthly basis from September 2009 to March 2010, giving a total of seventy (70) samples.

The results of the study indicated various levels of pollution. Some of the physico-chemical parameters were above the WHO (2006) guideline limits for drinking water whiles others were within the acceptable limit. The conductivity values at Beposo far exceeded WHO (2006) guideline value of 1500µS/cm. Beposo recorded a mean conductivity value of 2308µS/cm. The TDS value of Beposo was 1205mg/l, which exceeded 1000mg/l (the WHO (2006) guideline limits). The mean turbidity values ranged from 11.95 to 36.61 NTU, which were higher than the WHO guideline value of 5 NTU for drinking water. Total iron values were in the range 0.37-1.32 mg/l and thus above the WHO (2006) limit of 0.3mg/l for drinking water. Chlorine level exceeded WHO (2006) limit of 250mg/l only at Beposo. Mercury was in the range 23.61 – 67.78 ppb. The mean faecal coliform ranged from 4 to 51 colony forming units (CFU) per 100ml of water.

Most of the physico-chemical parameters showed seasonal variation in their concentrations. The dry season values of pH, Temperature, EC, BOD, Calcium, Magnesium, Sulphate, Chloride, TDS and Mercury were higher than the wet season, while TSS, Turbidity, Total iron, Pb, Ammonia-nitrogen, Nitrate, Phosphate and faecal coliform values in the wet season were also higher than the dry seasons. These variations in the values could be as a result of dilution which was high in the rainy season as well as runoffs from both agricultural fields and settlements. The

TDS and total hardness increased downstream with higher values recorded at Daboase and Beposo. The phenomenon increased in these values at these two locations was as a result of inflow of the sea into the Pra River during the dry season, thereby affecting the quality of the river. The higher values of mercury during the dry season may be due to alluvial mining in the river during the dry season. The TDS and TSS values for the streams were lower than that of the Pra River. The arsenic values of the streams were lower than the Pra River. The mean variations in the values of arsenic for dry and wet seasons were not significant. The adopted Solway Water Quality Index for Ghana (swqi) analysis indicated that the quality index of all the sampling points were within the range of 50-80, which described the water as fairly good quality, needing improvement. The WQI values for the river range from 54.76 to 65.61. Although, the water Quality Index (WQI) were within the same range of 50-80, there were variations in the WQI within the sampling catchment area. The WQI of the streams ranged from 62.4 to 64, which were higher than that of the Pra River indicating that the streams might be less polluted than the Pra River. WQI at Abetemasu were 64 for Abetemasu stream and 65.6 for River Pra which were highest within the sampling catchment. These high values which signified good quality water could be attributed to the location as well as the population size of Abetemasu from the river. The WQI of the Pra River reduced towards the downstream of the sampling catchment. Sekyere Nsuta recorded the lowest WQI of 54.8, followed by Krobo, 56.3, Beposo 56.3, and Daboase 59.3.

SUPERVISORS

Prof. Carboo, Derick

Dr.Kortatsi, Benony

Dr. Hodgson, Isaac