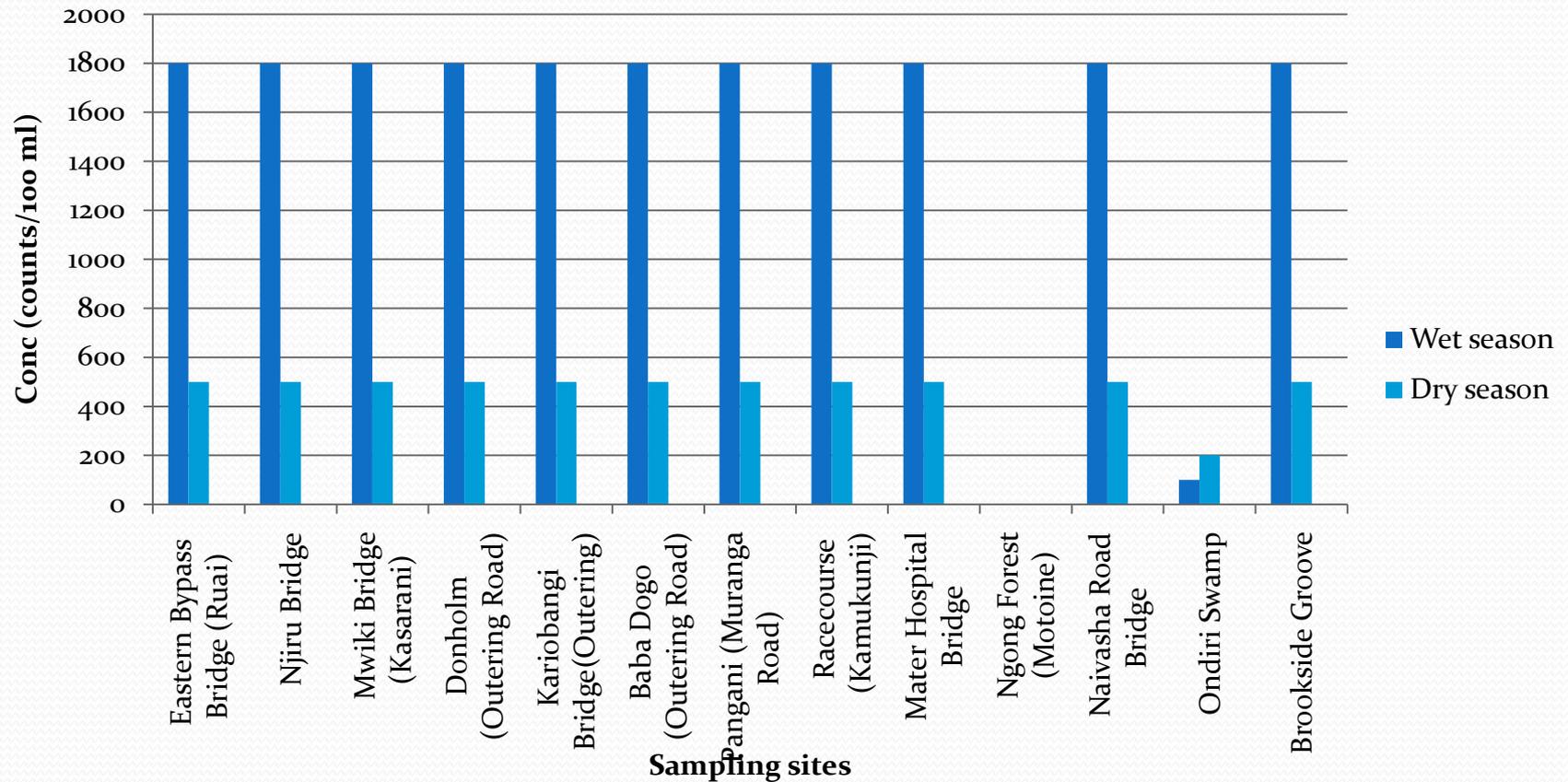


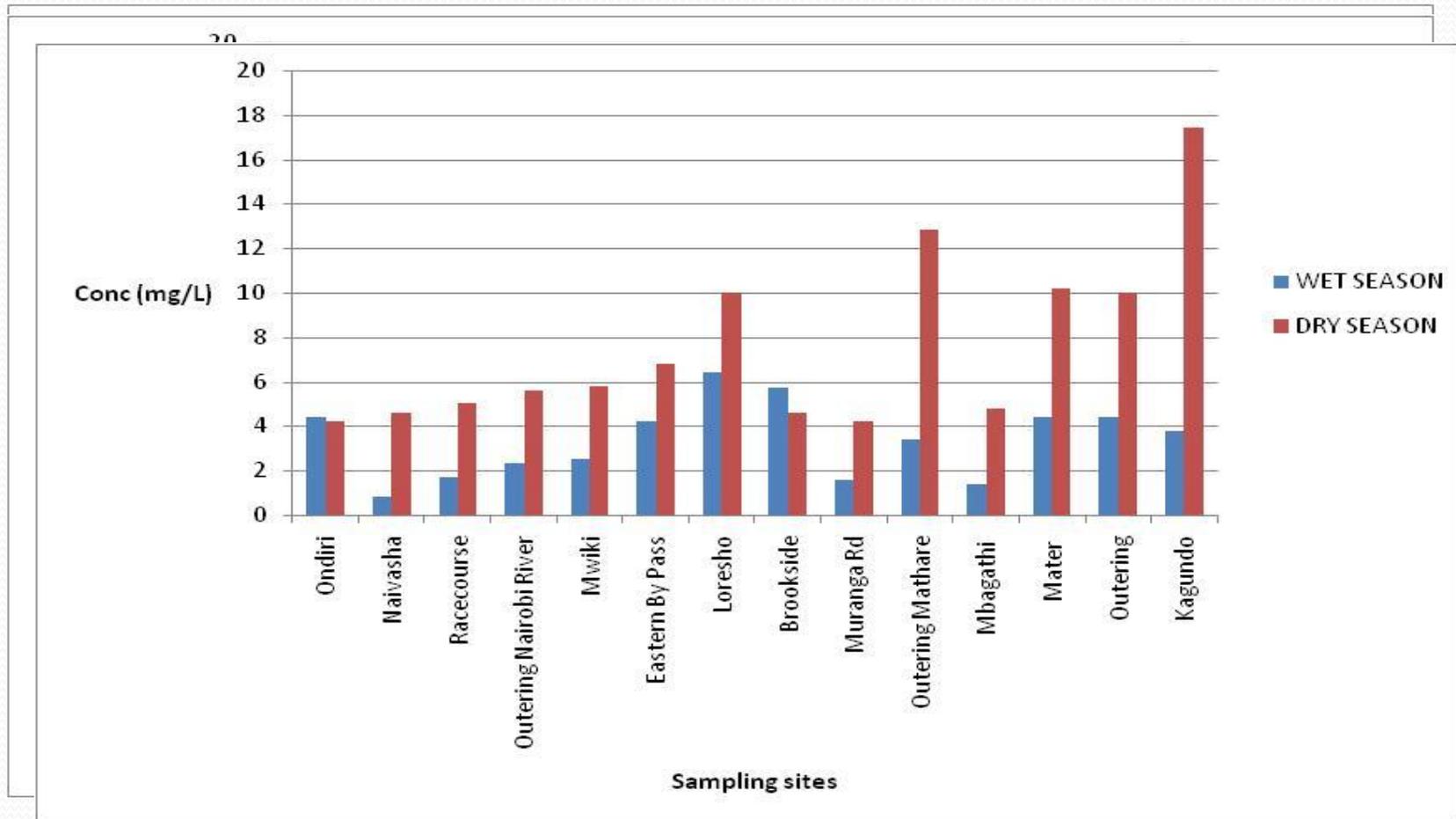
WATER QUALITY ISSUES IN AFRICAN RIVERS

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Coliforms in Nairobi River Water



Concentration of Lead in Water Samples during Dry and Wet Seasons (WHO Guidelines 10 μ g/litre)



Emerging global water contaminant chemicals of human and ecological concerns

Type of chemicals	Guidelines (mg/litre)	Remarks
Endocrine disruptors DDT and metabolites Atrazine Some isomers of PCBs Fire retardants (PBBs) Animal antibiotics, cosmetics and birth control pills	1 2 <0.005 ? ?	May interfere with endocrine systems like thyroid, liver and reproductive systems May cause certain cancers May cause elevated rates of diabetes and infant obesity May contribute to neurological and developmental deficits-low intelligence and learning disabilities May cause low sperm counts
Trace metals Arsenic Lead Mercury Cadmium	0.01 10.0 0.006 0.006	May poison blood, weakens bone structure, interfere with growth and intelligence, may cause cancer

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A presentation at the Scientific Panel on UN Water Day, 22nd March, 2010 at UNON offices Nairobi, Kenya

The quality of river water is an indication of the state of the environment in any country. Rivers are the major source of water in Africa. At the same time river water pollution is ubiquitous and contains high loads of biological, chemical and sediment deposits. Using the example of African rivers we find high coliform counts during the rainy seasons. This is due to the fact that storm waters are the detergent of the plains and bushes where human and animal waste is deposited. The coliform count during the dry season is low due to the fact that the source of biological deposits is the broken sewers and storm water pipes used for sewer disposal which become the major source of river water. Figure 1 gives the study of Nairobi River which shows that except for the river source spring at Ondiri swamp with coliform count of 200 per 100ml the other sites had counts of 1800 or more. The WHO guidelines for drinking water is zero count per 100ml. The high coliform counts in river water imply health problems for users of untreated water. Indeed diarrhea diseases have become the major cause of morbidity and mortality for infants in Africa.

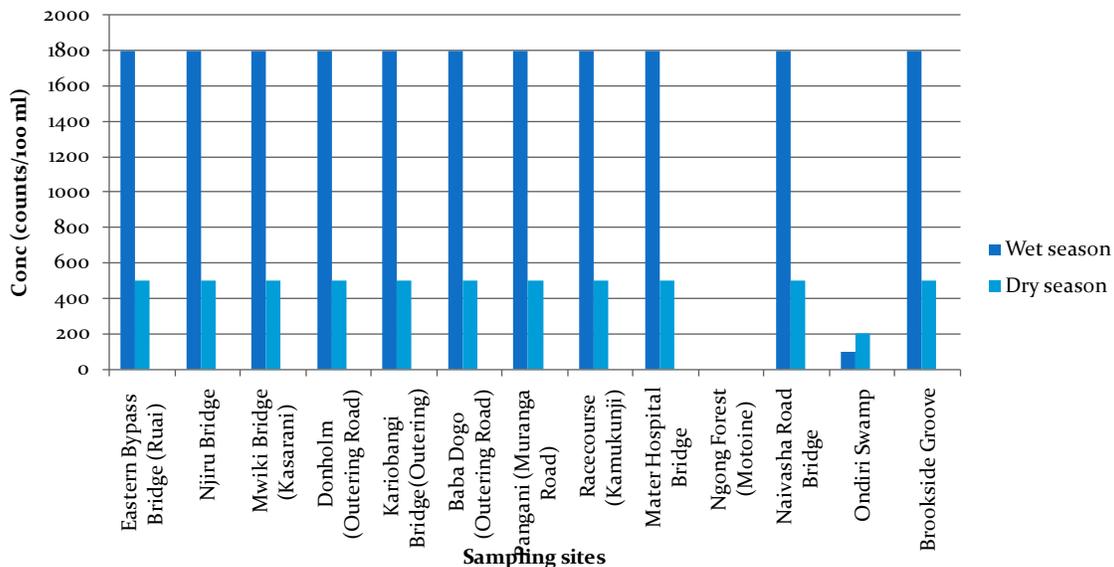


Figure 1: Coliforms in Nairobi River Water

The chemicals load in river water includes organic and inorganic chemicals, pesticides and agricultural chemicals. The majority of these chemicals may be removed by having green spaces between the rivers and the farms and construction of storm water soak ponds. Some chemicals with developmental consequences are also found in river waters. These include chemicals which have been introduced for commercial and industrial purposes like polychlorinated biphenyls (PCBs) whose presence in river waters are due to either careless disposal of electric transformer fluids or through air transport. Figure 2 shows the concentrations of PCBs in Nairobi river waters. The low levels are found at the sites with low industrial activities like spring source and residential areas. However, industrial sites show high concentrations of this chemical. It is important to note that some of the congeners of this chemical are endocrine disruptors and hence have long term effect to the users of untreated waters.

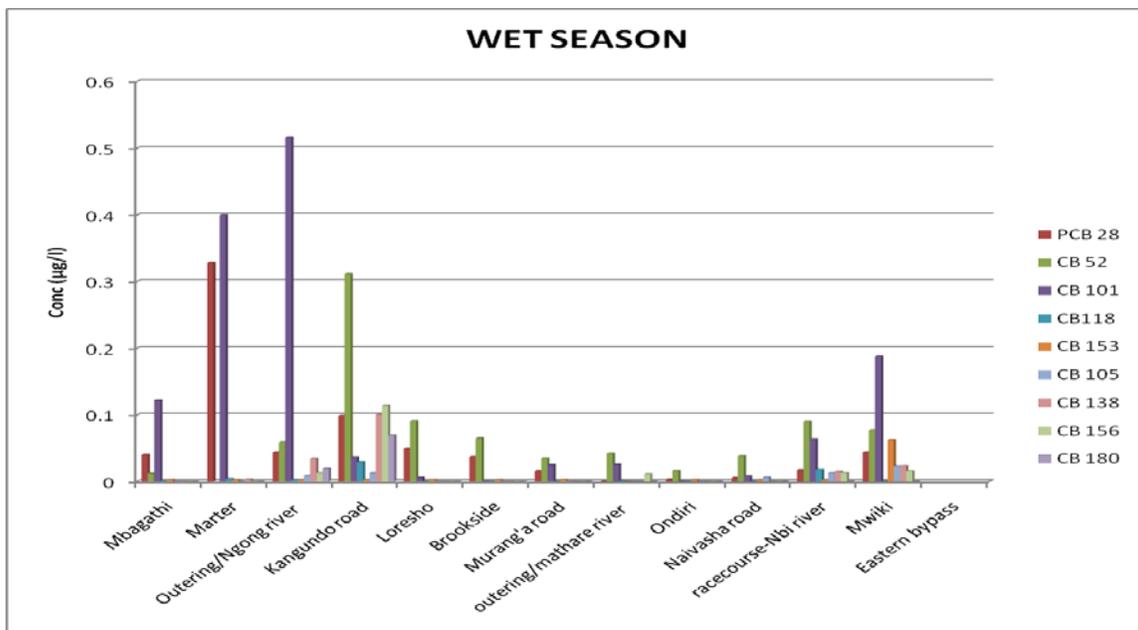


Figure 2: PCB Residues in Nairobi River Basin Water Samples during the Wet Season

Trace metals are similarly of concern to the users of untreated river waters. Such metals of health concern include lead, mercury, arsenic and cadmium, to mention but a few. Although the concentration of these chemicals in water may be at levels below the WHO recommended levels, it is important to note their significance when one takes into account their ability to accumulate through the food chain. Figure 3 shows an example of lead concentration in Nairobi River water. The concentration level during the dry season, with less water for dilution, is in many cases above the WHO guidelines. Users of untreated river waters with these levels of trace metals stand chance of being harmed by its consumption during their lifetime.

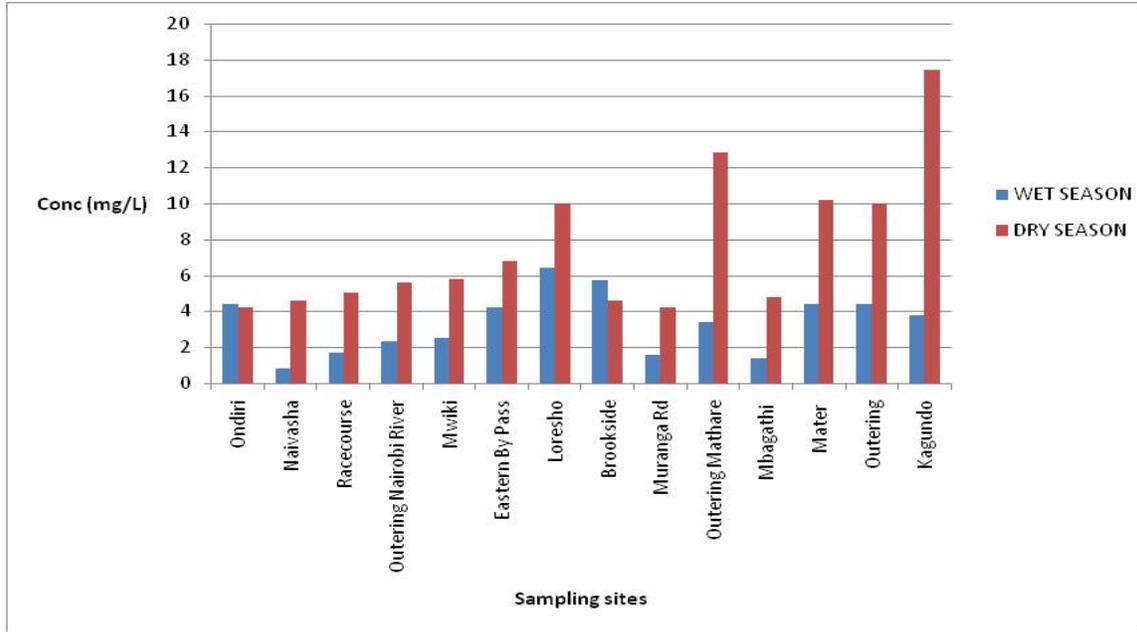


Figure 3: Concentration of Lead in Water Samples during Dry and Wet Seasons (WHO Guidelines 10µg/litre)

River water pollution is found in developing, newly industrialized and developed countries. The newly industrialized countries have seen the levels of organic chemicals pollutants in the rivers increase in the recent past. All forms of water pollutants may be found in all countries but of recent concern are the number and types of endocrine disruptors shown in Figure 4 which is increasingly being detected in waters. Some of these chemicals may have direct effects on developmental systems of living organisms. Indeed, some deformities have been detected in some water living creatures. Some have potential to reduce sperm counts of males.

Therefore, it is for these reasons that river water pollution is of concern to all people in all countries. Restoration, reuse and management of the river water and ecosystem for sustainable life system is a priority on a day when we take stock of water as an essential commodity.

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Figure 4: Emerging global water contaminant chemicals of human and ecological concerns

References

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