JUSTIFICATION:

Environmental science is the science of the complex interactions which occur among the terrestrial, atmospheric, aquatic living and anthropological environment. It includes the disciplines of physical, chemical and biological sciences.

Water, is one of the most important and most precious of natural resources and a regular and plentiful supply of clean water is essential for the survive and health of most living organisms.

Water is regarded as "polluted" when it is changed in its quality or composition, directly or indirectly as a result of mankind's activities so that it became less suitable for drinking, domestic, agricultural, and recreational, fisheries or other purposes.

Discharge of untreated or partially treated sewage into water bodies is one of the most common primary sources of pollution, especially into large water systems (e.g., lakes). This can produce two major symptoms; depletion of oxygen content, and toxic bioaccumulation.

On the other hand, discharge of treated or untreated effluents can cause very serious pollution indeed. Agricultural and industrial pollutants can involve the monitoring of the levels of toxic materials, such as heavy metals, in abiotic as well as biotic components of freshwaters. A second approach can be the evaluation of structural changes in the ecosystem caused by agricultural and industrial effluents.

Most aquatic organisms are highly sensitive to different pollutants (e.g., fish). The advantage of such indicator organisms lies in the following; they can reveal rates of change and trends in the environment, and they can indicate the pathways and points of accumulation of pollutants in ecosystems, thus often acting as early warning signals of dangerous levels of these pollutants.

Many people here depend on Dukan Lake water resource for drinking, fishery, recreation, agriculture, and other domestic purposes. Thus, finding/assess of the quality of Dukan Lake concerning some toxic heavy metals (e.g., Hg, Cd, pb, Zn, Cu …etc.) in addition to their cycling/vertical stratification, beside of their bioaccumulation in some local fish is a commendable effort.

The Aims of the Proposal:

The prime target of this proposal would be to draw background foreshadow some of our most pressing current issues of public policy in:

1. Water pollution control.
2. The mode of toxicity/bioaccumulation in fish concerning toxic heavy metals.

Design for environmental screening assessment of the location of the study area:

Dukan Lake will be screened for water quality assessment and some toxic heavy metals in addition to their bioaccumulation in some local fish. The lake as a whole (i.e., surface and vertical profiles) would be explored. Not less than 10 sites would be selected for the purposes of the study. Sampling would be on the monthly interval periods. All (physical and chemical) characteristics of Lake water and different vertical profiles will be analyzed, represented, explained, and discussed, giving main conclusions, suggestions and recommendations.

The Suggested Period for Accomplishment of the proposal:

The period needed for the present survey for environmental assessment purpose, differs spatially and temporally from one parameter to another. A regular schedule as given below would be followed here for illustrating specific points:

Sn.	Parameter	No. of Locations (sites)	Interval periods	Frequency
1.	Water Quality	10	monthly	24 Months
2.	Toxic Heavy Metals	5	monthly	24 Months
3.	Local fish	2-3 common species	Local Market	Once

Methodology:

For meeting the requirements of this study, the following criteria have to be focused on:

1. Field Trips and sample collection and the objectives are:

    A. Water sampling for their chemo-physical characteristics would be collected from the study area (Dukan Lake) at monthly interval periods for 24 months (24 field trips).

    B. Vertical stratification studies for heavy metal.

    C. Bioaccumulation of above toxic metals in fish tissues (e.g., liver & kidney).

2. Laboratory methods:

    Analysis of various physic- chemical characteristics of Dukan Lake including the following parameters:

    A. (Temperature, Hydrogen ion concentration (pH), Electrical conductivity (EC), Total dissolved solids (TDS), Total suspended solids (TSS), Dissolved oxygen, biochemical chemical oxygen demand, Chemical oxygen demand (COD), Nitrite (NO_2), Nitrate (NO_3),

Ammonia (NH_3), Reactive phosphorus (PO_4), Total alkalinity, Water hardness, Major cations, Major anions) experimental design and statistical analysis.

B. Evaluation of some toxic heavy metals (e.g., Hg, Cd, pb, Zn, Cu …etc.) in addition to their vertical stratification,

C. Digestion/analysis of above metals in some local fish tissues (e.g., brain, liver, muscle …. etc.).