

WATER QUALITY ANALYSIS

DATA ANALYTICS WITH COGNOS- GROUP2

Problem statement:

The quality of our water sources is a critical concern for public health, environmental sustainability, and economic well-being. However, the current state of water quality in [specific region or area] is a matter of serious concern due to [briefly describe the key issues, such as contamination, pollution sources, or declining water quality parameters]. These issues pose significant risks to human health, aquatic ecosystems, and various industries that depend on clean water.

Objectives:

Water quality analysis is essential for ensuring the safety of drinking water, the health of aquatic ecosystems, and the protection of human and environmental health. The objectives of water quality analysis are multifaceted and can vary depending on the specific goals and context of the analysis

water quality analysis involves the collection, testing, and interpretation of various physical, chemical, and biological parameters of water. Common parameters include temperature, pH, dissolved oxygen, turbidity, nutrients (e.g., nitrogen and phosphorus), heavy metals, bacteria, and specific contaminants of concern (e.g., pesticides, volatile organic compounds).

The specific objectives and methods of water quality analysis will depend on the goals of the study or monitoring program, the type of water body being assessed, and the available resources. Effective water quality management requires ongoing monitoring and adaptive strategies to address changing environmental conditions and emerging threats to water quality.

Design Thinking:

Design thinking is a problem-solving approach that focuses on understanding the needs of the end-users and creating innovative solutions to address those needs. When applied to water quality analysis, the goal is to design a system or process that can accurately and efficiently assess the quality of water in various contexts

Step1: Sample Collection:

- Identify the sampling locations, considering factors like water source, potential pollution sources, and regulatory requirements.
- Use appropriate sampling equipment and containers to collect water samples, ensuring they are clean and free from contaminants.
- Follow proper sampling techniques, such as taking samples at different depths and locations to obtain representative samples.

Step2: Sample Preservation:

- Depending on the analysis to be conducted, add appropriate preservatives (e.g., acid, chlorine) to the samples to prevent chemical changes during transport and storage.

Step3: Transport and Storage:

- Label each sample container with essential information like location, date, time, and any preservatives used.
- Store samples in coolers with ice packs to maintain the required temperature (e.g., 4°C for most biological samples) during transportation to the laboratory.

Step4: Laboratory Analysis:

- Perform various analyses based on the parameters of interest, which may include:
- Chemical analysis for parameters such as pH, dissolved oxygen, nutrients, heavy metals, organic compounds, and contaminants (e.g., pesticides, pharmaceuticals).
- Microbiological analysis for the presence of bacteria, viruses, and other microorganisms.
- Physical analysis for temperature, turbidity, conductivity, and total suspended solids.
- Use appropriate analytical methods and instruments for each parameter, ensuring accuracy and precision.

Step5: Data Interpretation and Comparison:

- Compare the analytical results with water quality standards and guidelines established by regulatory agencies (e.g., EPA, WHO) or relevant local authorities.
- Evaluate the data in the context of the intended use of the water (e.g., drinking water, recreational water, industrial discharge, or environmental protection).

Step6: Quality Control and Quality Assurance:

- Implement quality control measures to ensure the accuracy and reliability of the analytical results, including the use of certified reference materials and regular calibration of instruments.
- Follow established laboratory protocols and maintain records of quality assurance procedures.

Step7: Reporting:

- Prepare a detailed water quality analysis report, including the methodology used, sampling information, results, and interpretations.
- Share the findings with relevant stakeholders, such as government agencies, water utilities, or the public, as appropriate.

Step8: Action or Mitigation:

- Based on the analysis results, take necessary actions or implement mitigation measures to address any identified water quality issues or violations of standards.
- This may include water treatment, pollution control, or changes in water management practices.

Step9: Monitoring and Continuous Assessment:

- Establish a regular monitoring program to track changes in water quality over time.
- Use the data collected for ongoing assessment and to make informed decisions regarding water resource management and protection.