

Proposed Water Quality Monitoring Methods

This document describe the methods adopted for the participatory water quality monitoring programme conducted around Vembanad lake.

The basin stations set up at every identified sampling point with the help of panchayats, stakeholder communities and educational institutions are actively involved in the water quality monitoring process. The basin stations are situated at a nearby school or panchayat office. Volunteers are trained in water sampling and primary data collection using water quality monitoring kits provided.

Water quality parameters to be checked ideally

Parameters	Frequency of testing	Unit cost(per sample)	Institutional tie up	Comments	Man days
Physiochemical Parameters					
Ph	Monthly	10	Possible tie up with institutions having PG course in Zoology		1
Dissolved Oxygen	Monthly	35	Possible tie up with institutions having PG course in Zoology		1
Biological Oxygen demand	Monthly	35	Possible tie up with institutions having PG course in Zoology		2
Phosphate	Monthly	40	Possible tie up with institutions having PG course in Zoology		1
Sulphate	Monthly	40	Possible tie up with institutions having PG course in		1

			Zoology		
Total hardness	Monthly	50	Possible tie up with institutions having PG course in Zoology		1
Chloride	Monthly	25	Possible tie up with institutions having PG course in Zoology		1
Turbidity	Monthly	10	Possible tie up with institutions having PG course in Zoology		1
Salinity	Monthly	10	Possible tie up with institutions having PG course in Zoology		1
Nitrate	Monthly	15	Possible tie up with institutions having PG course in Zoology		1
Total alkalinity	Monthly	45	Possible tie up with institutions having PG course in Zoology		1
TDS	Monthly	45	Possible tie up with institutions having PG course in Zoology		1
Temperature	Monthly	5	Possible tie up with institutions having PG course in Zoology		1
Biological Parameters			Possible tie up with institutions having		

			PG course in Zoology		
Primary Productivity	Monthly	55	Possible tie up with institutions having PG course in Zoology		1
Zooplankton	Quarterly	25	Possible tie up with institutions having PG course in Zoology		1
Microbiological Parameters			Institutes having microbiology or Biotechnology		
Total plate count	Monthly	150			2
Coliforms	Monthly	150			4
Staphylococcus	Monthly	150			4
Vibrio sp	Monthly	150			4
Heavy metals			CIFT		
Iron	Bimonthly				
Mercury	Bimonthly				
Zinc	Bimonthly				
Arsenic	Bimonthly				
Lead	Bimonthly				
Calcium	Bimonthly				

Physical examinations: Color, odor, turbidity, electrical conductivity, total dissolved solids and suspended solids.

Chemical examinations: pH, alkalinity, hardness, calcium, magnesium, sodium, potassium, iron, manganese, ammonia, nitrite, nitrate, chloride, fluoride, sulfate, phosphate, silica, BOD, COD, TKN, oil & grease, aluminum, chromium, arsenic, free chlorine.

Bacteriological examination: Standard plate count, total Coliform, fecal Coliform, fecal Streptococci.

Sampling Procedures

Sampling for Chemical examination

1. Water for chemical examination should be collected in a clean, white 2 liter polythene container.
2. For lakes, rivers and dams, the water should be collected near the off-take point.
3. Before collection of sample, the container should be washed with the water to be sampled for at least 2 to 3 times.
4. The water should be then filled completely in the container without leaving any air space.
5. Place the inner cap. Place a polythene sheet (10x10 cm) in between the inner and outer caps. Screw the outer cap. Place another polythene sheet of same size over the outer cap and tie the neck with a rubber band or twine thread.
6. Label the container with all required source particulars.
7. The sample should be delivered to the lab within 24 hours from the time of collection.

Sampling for Bacteriological examination

For bacteriological examination, the water should be collected only in a pre-sterilized 250 ml glass bottle which is supplied from the laboratory after remitting the testing charges.

The sample collection procedures will be explained in the laboratory when the sampling bottles are delivered to the customer.

The sample should reach the laboratory within 6 hours from the time of collection. However when preserved in an icebox, the sample can be delivered within 24 hours.

The sample should be labeled properly before it is dispatched.

HEALTH EFFECTS OF CHEMICAL PARAMETERS

Parameter	BIS Guideline value (maximum allowable)	General & Health effect
Total dissolved solids	2000 mg/L	Undesirable taste; gastro intestinal irritations; corrosion or incrustation
PH	6.5-8.5	Affects mucous membrane; bitter taste; corrosion; affects aquatic life
Alkalinity	600 mg/L	Boiled rice turns yellowish
Hardness	600 mg/L	Poor lathering with soap; deterioration of the quality of clothes; scale forming; skin irritation; boiled meat and food become poor in quality
Calcium	200	Poor lathering and deterioration of the quality of clothes; incrustation in pipes; scale formation
Magnesium	100	Poor lathering and deterioration of clothes; with sulfate laxative
Iron	1.0	Poor or sometimes bitter taste, color and turbidity; staining of clothes materials; iron bacteria causing slime
Manganese	0.3	Poor taste, color and turbidity; staining; black slime
Aluminum	0.2	Neurological disorders; Alzheimer's disease
Copper	1.5	Liver damage; mucosal irritation, renal damage and depression; restricts growth of aquatic plants
Zinc	15	Astringent taste; opalescence in water; gastro intestinal irritation; vomiting, dehydration, abdominal pain, nausea and dizziness
Ammonia	-	Indicates pollution; growth of algae
Nitrite	-	Forms nitrosoamines which are carcinogenic
Nitrate	100	Blue baby disease (methemoglobineamia); algal growth
Sulfate	400	Taste affected; laxative effect; gastro intestinal irritation

Chloride	1000	Taste affected; corrosive
Fluoride	1.5	Dental and skeletal fluorosis; non-skeletal manifestations
Phosphate	-	Algal growth
Arsenic	0.05	Toxic; bio-accumulation; central nervous system affected; carcinogenic
Mercury	0.001	Highly toxic; causes 'minamata' disease-neurological impairment and renal disturbances; mutagenic
Cadmium	0.01	Highly toxic; causes 'itai-itai' disease-painful rheumatic condition; cardio vascular system affected; gastro intestinal upsets and hyper tension
Lead	0.05	Causes plumbism-tiredness, lassitudes, abdominal discomfort, irritability, anaemia; bio-accumulation; impaired neurological and motor development, and damage to kidneys
Chromium	0.05	Carcinogenic; ulcerations, respiratory problems and skin complaints
Pesticide	0.001	Affects central nervous system
Detergent	-	Undesirable foaming