Puducherry ENVIS Hub

Host Centre : Puducherry Pollution Control Committee
Funded by Ministry of Environment, Forest & Climate Change
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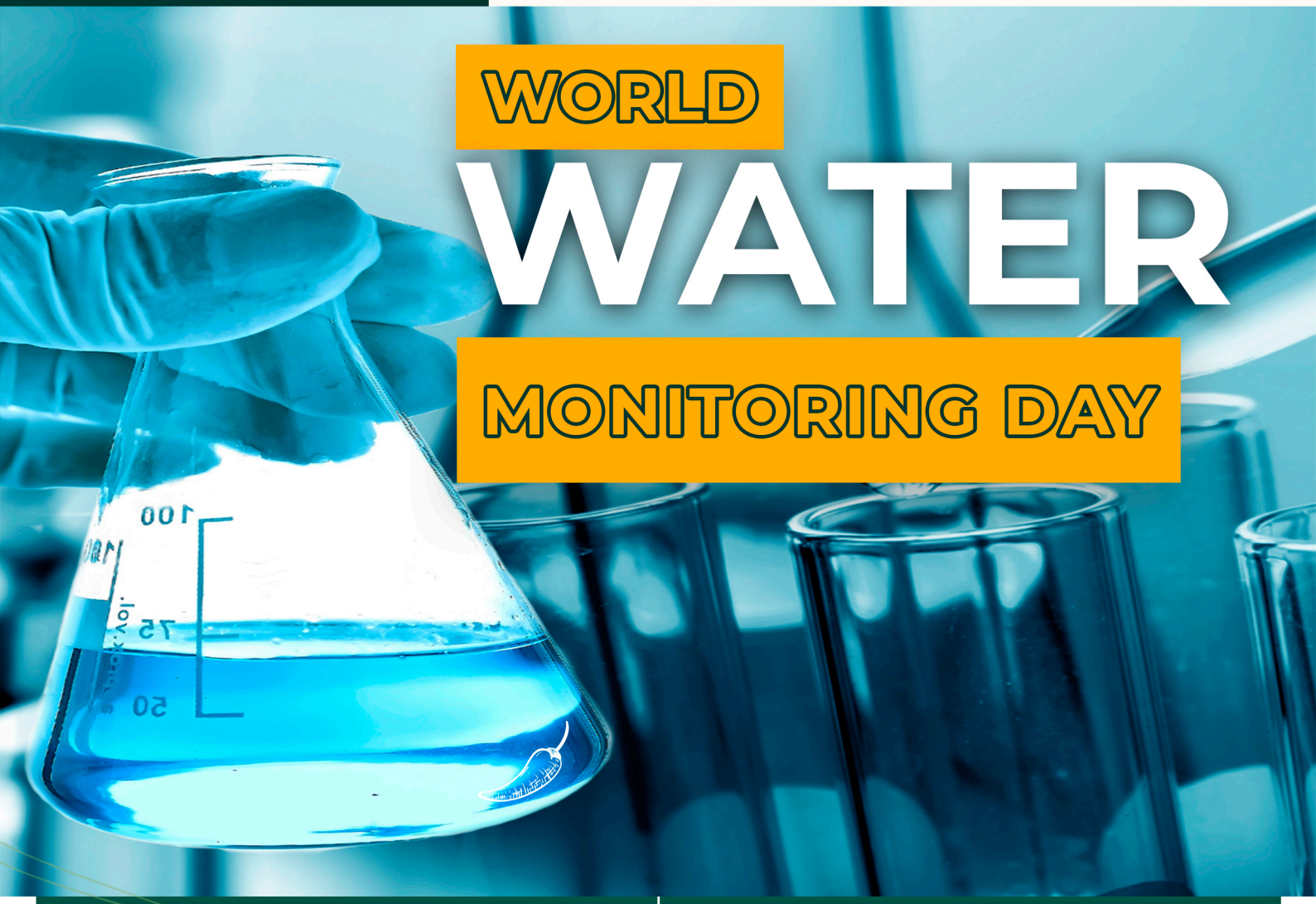

WORLD WATER MONITORING DAY

Every year, the World Water Monitoring Day is celebrated on September 18. The day was first instituted in the year 2003 to build public awareness and involvement in protecting water resources around the world. The day aims to empower the citizens to conduct basic checking of their local water bodies. Water is a very precious commodity and also the basis of food and life. Conserving water should be a way of life and not something we think about once in 365 days. Every one of us depends on water, it should be one of our responsibility to conserve water in every way we can.

There are over 30 countries that have been facing a shortage of water. Singapore has the highest water stress ranking (5.0). The country is densely populated and its demand exceeds the natural supply.

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History

World Water Monitoring Day was established in 2003 by America's Clean Water Foundation (ACWF) as a global educational outreach program. The program, subsequently named the "World Water Monitoring Challenge" and "EarthEcho Water Challenge," aims to build public awareness and involvement in protecting water resources around the world by empowering citizens to carry out basic monitoring of their local water bodies.

What is water quality monitoring system?

The water quality measuring system includes many such instrument and manual operation for checking the quality of water manually or through real time using various sensors (for each parameter) to assess the quality of water.

Why we Monitor Water Quality?

1. Water is a critical natural resource for all living beings and for biodiversity.
2. It helps to identify any changes or trends that appear in water bodies over a period of time.
3. Identifying any existing problems, or any issues that could emerge in the future.
4. From sewage contamination, effluent discharge, oil spills and radiation leaks to floods and mass erosion, water quality monitoring data is a must when developing emergency strategies.
5. Monitoring provides the objective evidence necessary to make sound decisions on managing water quality today and in the future.
6. Water-quality monitoring is used to alert us to current, ongoing, and emerging problems; to determine compliance with drinking water standards, and to protect other beneficial uses of water.
7. Protect water resources and ensure sustainable use.
8. Detect pollution of water, resources to be mobilised and ensure sustainable uses of treated waste water.

Why water is essential for life?

Water is one of the most important substances on earth. All plants and animals must have water to survive. If there was no water there would be no life on earth. Apart from drinking it to survive, people have many other uses for water.

Learn about Water Monitoring Day

Water Monitoring Day aims to build public involvement and awareness regarding the protection of water resources around the globe by ensuring that citizens are empowered to carry out standard monitoring of their local water bodies. A simple test kit will enable everyone – both children and adults – to sample local water bodies for a number of parameters that will determine water quality.

This includes dissolved oxygen (DO), as well as clarity (turbidity), acidity (pH), and temperature.

Why is it important to monitor water quality?

Monitoring provides the objective evidence necessary to make sound decisions on managing water quality today and in the future. Water-quality monitoring is used to alert us to current, ongoing, and emerging problems; to determine compliance with drinking water standards, and to protect other beneficial uses of water.

How do you monitor water quality?

Water quality can be measured by collecting water samples for laboratory analysis or by using probes which can record data at a single point in time, or logged at regular intervals over an extended period & the samples are collected and bought to laboratory for analysis.

The water quality measuring system that we have implemented checks the quality of water in real time through various sensors (one for each parameter: pH, conductivity, temperature) to measure the quality of water.

Indicators of Water Quality

Physico-chemical indicators

Physico-chemical indicators are the traditional 'water quality' indicators that most people are familiar with. They include dissolved oxygen, pH, temperature, salinity and nutrients (nitrogen and phosphorus). They also include measures of toxicants such as insecticides, herbicides and metals.

Biological indicators

Biological indicators are direct measures of the health of the fauna and flora in the waterway. Commonly used biological indicators in freshwater include various measures of macroinvertebrate or fish diversity, benthic algal growth and benthic oxygen demand. For estuaries, biological indicators are less developed. The only commonly used biological indicator in estuaries is chlorophyll-a, which is a measure of phytoplankton population density. In coastal embayments, indicators such as seagrass condition or condition of fringing coral reefs are sometimes used. Most of the times bacteriological indicators are used to identify the faecal contamination.

In many aquatic ecosystems, the key influences on aquatic ecosystem health can be factors other than water quality, including habitat degradation and changes to natural flow patterns.

Habitat indicators

Habitat indicators include both fringing (riparian) habitat and instream habitats. Indicators of riparian habitat include the width, continuity, extent of shading and species composition. Indicators of instream habitat include measures of the extent of scouring and bank erosion and the presence of woody debris (fallen trees, etc) that provide important habitat for many species.

Flow indicators

Changes to natural flow caused by humans are varied and include changes to peak flows, base flows, no flow periods and seasonality of flows.

Uniform Protocol for Water Quality Monitoring

Ministry of Environment and Forests, NOTIFICATION S.O. 2151, New Delhi, the 17th June, 2005

1. The Water Quality Assessment Authority (WQAA) was constituted by the Central Government vide Order No. S.O. 583 (E) dated the 29th May, 2001 and No. S.O. 635 (E) dated the 27th October, 2004 to exercise powers under section 5 of the Environment (Protection) Act, 1986 (29 of 1986) for issuing directions and for taking measures with respect to matters referred to in clauses (ix), (xi), (xii) and (xiii) of sub-section (2) of section 3 of the said Act and to standardize method(s) for water quality monitoring and to ensure quality of data generation for utilization thereof and certain other purpose.

2. It is necessary and expedient to evolve water quality assessment and monitoring protocol as directed by the Water Quality Assessment Authority in order to maintain uniformity in the procedure for water quality monitoring mechanism by all monitoring agencies, departments, Pollution Control Boards and such other agencies so that water related action plans may be drawn up on the basis of reliable data.

3. The uniform process on water quality monitoring shall provide frequency of monitoring, procedure for sampling, parameters for analysis, analytical techniques, quality assurance and quality control system, infrastructure requirement for laboratories, procedure for data processing, reporting and dissemination and such other matters as the Central Government deems necessary for the said purpose, both for surface and ground water.

4. Due to the deterioration of the river water quality, health and livelihood of the downstream people are being severely affected and concerns are raised time and again.

5. The immediate maintenance and restoration of 'wholesomeness' of the river water quality is the mandate under the Water (Prevention and Control of Pollution) Act, 1974 (6 of 1974) and that of maintenance of the ground water quality by the Central Ground Water Authority constituted under the provisions of the Environment (Protection) Act, 1986;

6. Sub-rule (4) of rule 5 of the Environment (Protection) Rules, 1986, provides that whenever it appears to the Central Government that it is in public interest to do so, it may dispense with the requirement of notice under clause(a) of sub-rule(3) of the said rule" constituted under the provisions of the Environment (Protection) Act, 1986;

Table - 1

Frequencies and parameters for analysis of surface water samples

1	2	3
Type of Station	Frequency	Parameters
Baseline	Perennial rivers and lakes: Four times a year (seasonal) Seasonal rivers: 3-4 times (at equal spacing) during flow period Lakes: 4 times a year (seasonal)	(A) Pre-monsoon: Once a year Analyse 25 parameters as listed below: a) General: Colour, Odour, Temperature, pH, Electrical Conductivity (EC), Dissolved Oxygen (DO), Turbidity, Total Dissolved Solid (TDS). b) Nutrients: Ammoniacal Nitrogen (NH4-N), Nitrite & Nitrate Nitrogen (NO2 + NO3) Total Phosphate (Total P) c) Demand parameters: Biological Oxygen Demand (BOD), Chemical Oxygen, Demand (COD). d) Major ions: Sodium (Na), Potassium (K), Calcium (Ca), Magnesium (Mg), Carbonate (CO3) Bicarbonate (HCO3), Chloride (Cl), Sulphate (SO4). e) Other inorganic: Fluoride (F), Boron (B) and other location specific parameter, if any f) Microbiological: Total coliform and Faecal Coliform (B) Rest of the year (after the pre-monsoon sampling) at every three months interval Analyse 10 parameters: Colour, Odour, Temperature, pH, EC, DO, NO2 + NO3 , BOD, Total coliform and Faecal Coliform.
Trend or impact or flux	Once every month starting April-May (pre-monsoon) i.e. 12 times a year	A. Pre-monsoon: Analyse 25 parameters as listed for baseline monitoring B. Other months: Analyse 15 parameters as listed below (a) General : Colour, Odour, Temp, pH, EC, DO and Turbidity (b) Nutrients : NH3 - N, NO2 + NO3 , Total P (c) Organic Matter : BOD, COD (d) Major ions : Cl (e) Microbiological: Total and Faecal coliforms

Table - 1

Frequencies and parameters for analysis of surface water samples

1	2	3
Type of Station	**Frequency**	**Parameters**
		C. Micropollutant: Once in a year/pre monsoon. a) Pesticides – Alpha Benzenehexachloride (BHC), Beta BHC, Gama BHC (Lindane), OP-Dichlorodiphenyltrichloroethane (OP4 DDT), PP-DDT, Alpha Endosulphan, Beta Endosulphan, Aldrin, Dieldrin, Carbaryl (Carbamate), Malathian, Methyl Parathian, Anilophos, Chloropyriphos b) Toxic Metals:- Arsenic (As), Cadmium (Cd), Mercury (Hg), Zinc (Zn), Chromium (Cr), Lead (Pb) Nickel (Ni), Iron (Fe) (The parameters may be selected based on local need).

Table - 2

Frequencies and parameters for analysis of surface water samples

1	2	3
Type of Station	**Frequency**	**Parameters**
Baseline	**Twice a year (Pre and post monsoon season)**	A. Pre and Post Monsoon Season: Analyse 20 parameters as listed below: a. General: Colour, Odour, Temperature, pH, EC, TDS b. Nutrients: NO2 + NO3 , Orthophosphate c. Demand Parameter: COD d. Major Ions: Na+, K +, Ca++, Mg++, CO3--, HCO3-; Cl, SO4, --% Na & SAR e. Other inorganics: F, B and other locationspecific parameters, if any
Trend	**Twice a year (Pre and post monsoon)**	A. April-May: Analyse 20 parameters as listed for Baseline monitoring B. Other times: Analyse 14 parameters as listed below:- f. General: Colour, Odour, Temperature, EC, pH, TDS, %Na & SAR a) Nutrients: NO2 + NO3, orthophosphate b) Demand parameter: COD c) Major ions: Cl d) Other inorganics: F,B e) Microbiological: Total coliform and Faecal coliform C. Micropollutant (parameters may be selected based on local need): 2. Pesticides- Alpha BHC, Beta BHC, Gama BHC (Lindane), OP-DDT, PP-DDT, Alpha Endosulphan, Beta Endosulpham, Aldrin, Dieldrin, 2, 4-D, Carbaryl (Carbamate), Malathian, Methyl, Parathian, Anilphos, Chloropyriphos. 3. Toxic Metals – As, Cd, Hg, Zn, Cr, Pb, Ni, Fe (Pesticides and Toxic metals may be analysed once a year in pre - monsoon on selected locations).