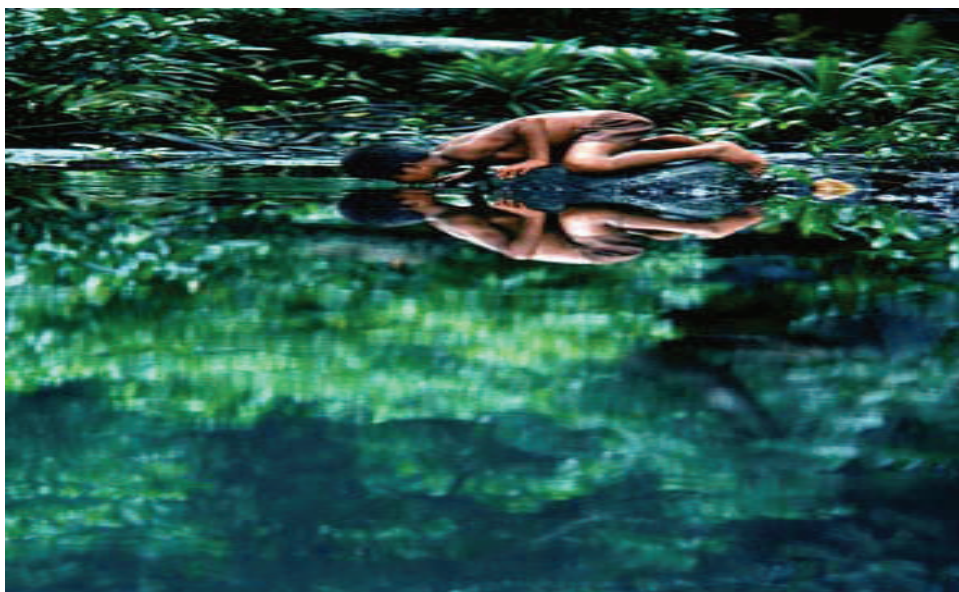


## EVALUATION SERVICES FOR

# National Water Quality Monitoring Programmes and Laboratories

*Clean water is life*



As a service to national water quality monitoring agencies, UNEP's GEMS/Water Programme undertakes specialized auditing activities. These include a review and evaluation of the efficiency, technical rigor and scientific credibility of all aspects of water quality monitoring programmes, from design to implementation.

GEMS/Water also provides national laboratories with the technical basis to judge their own ability to address departmental water quality monitoring responsibilities. As well, GEMS/Water can assist laboratories to prepare for international accreditation to ISO/IEC 17025.

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# NATIONAL WATER QUALITY MONITORING PROGRAMMES

**Objective:** To undertake a full review and assessment of national water quality monitoring strategies and implementation.

To do this GEMS/Water:

- Assesses the strategic design of the overall programme, as well as specific components, if needed. Evaluates capacity to provide accurate, meaningful and timely data and information, including appropriateness of frequency of sampling, representativeness of sampling sites, and techniques employed in sample acquisition, documentation, sample transport and storage.
- Evaluates the ability of the programme to incorporate relevant watershed characteristics such as reference conditions upstream, upstream versus downstream water quality/quantity and use, hydrometric level variation, rainfall and storm impacts, flow patterns in vicinity of industrial and/or sewage outfalls, and flow and depositional patterns downstream of any potential point-source pollution.
- Examines existing and baseline datasets, evaluating with respect to duration, frequency of collection, spatial variation, and inclusion of any reference points.
- Reviews current and proposed uses for any automated monitoring or remote devices in terms of how these data may be used in conjunction with other samples.
- Evaluates existing or proposed data analysis (including data modelling) and its interpretation, validation and release.
- Examines organizational and human resource capacities to effectively carry out sampling, including field logistics and QA/QC measures in place. Determines needs for procedural and training revisions where necessary, including field operations training, occupational health and safety standards training, and use of consistent methods and approach.

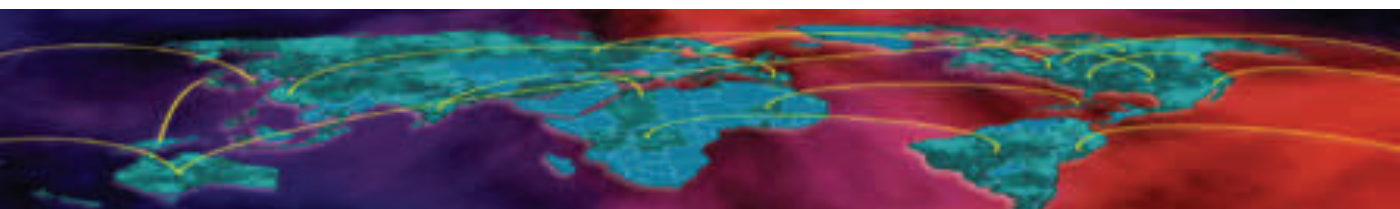
## OUTPUTS

The review is based on internationally-recognized ISO/IEC 17025 assessment procedures that address all aspects of laboratory operations, including documentation, equipment, methods, facilities, staffing, and data reporting. It addresses the strategic design and implementation of the programme, and its capacity to provide accurate, meaningful, and timely data and information. Specific details include sampling site location, number of sites, sampling frequency, parameter selection, sampling techniques and sample handling

After the on-site laboratory assessment, a Draft Assessment Report is prepared for the Laboratory Manager consisting of specific recommendations for improvements to laboratory operations.

Within 30 days, a Final Report is prepared and provided to the Manager which addresses both the laboratory and water quality monitoring programme reviews and the programme's implementation and strategy.

Recommendations are suggested on potential linkages with national, regional and international organizations and agencies that may be of benefit to the laboratory for carrying out its mandate for the water quality monitoring programme. Procedures for participation in the UNEP GEMS/Water Programme are identified along with other significant programme interactions and strategic alliances, particularly at the regional level.



## LABORATORY OPERATIONS

**Objective:** To undertake a full review and assessment of laboratories for water quality monitoring and analysis, and to assist laboratory management in preparing for international ISO/IEC 17025 accreditation.

To do this GEMS/Water:

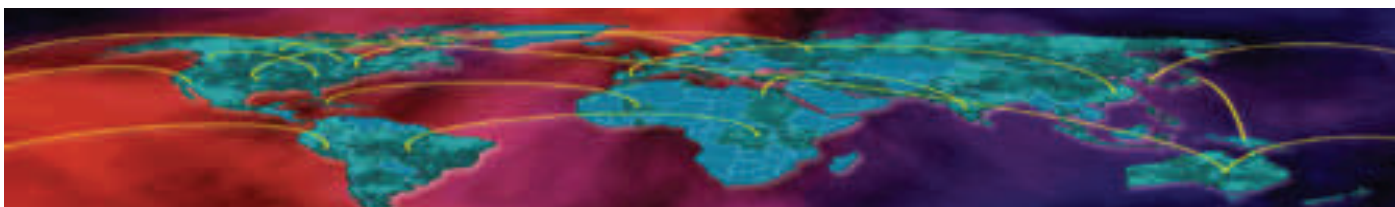
- Assesses the overall mission and ability of laboratories to address the responsibilities of water quality monitoring and management, including elements needed to meet obligations and operational mandate.
- Reviews infrastructure, organization, quality system, documentation, and standard operating procedures (SOPs) to carry out successful monitoring programmes. Identifies infrastructure developments through reductions, expansion or revision to increase laboratory efficiency. Should the review identify significant needs, procurement options for necessary laboratory infrastructure and services are explored, including recommendations for offshore suppliers, if appropriate.
- Reviews human resource issues, staff profiles and specialization, training and sub-contracting practices to confirm the laboratory's ability to successfully implement its mission.
- Assesses the analytical capability and efficiency of operations related to the adequacy of equipment and facilities, including laboratory instrumentation, bench equipment, glassware, and ancillary supplies, environmental conditions, layout of equipment, workspace and associated logistics.
- Reviews laboratory work procedures including sample reception and storage, sample identification and preparation, instrument calibration, analysis, quality control, data recording, data reporting, and sample disposal for efficiency and appropriateness.
- Reviews documentation and implementation of procedures for sub-contracting, control of records and documents, and data processing, interpretation and reporting of results.
- Identifies changes needed in laboratory operations to meet, and apply for, international standards such as ISO/IEC 17025 accreditation..

## TIME FRAME

Five activities are scheduled during the contract period:

1. Review of Quality Management System documentation for the laboratory;
2. Laboratory On-site Evaluation and Assessment; draft report of recommendations for improvements to laboratory operations is provided on-site;
3. Water Quality Monitoring Programme: review of all relevant and available water quality monitoring programme documentation;
4. Water Quality Monitoring Programme in-country evaluation and visit to sampling stations; and
5. Preparation of Final Report.

Activities 1 and 3 are carried out prior to, and during the in-country review period. Activities 2 and 4 are conducted on-site, usually over a four- to five-day period, depending on the scope of the monitoring programme and the size and complexity of the laboratory operations. Activity 5 is completed following the return of the GEMS/Water team to its headquarters in Canada.



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## Expertise

For each review, GEMS/Water creates a team tailored to meet the needs of the country being assessed. The team's experience includes analytical chemistry research; assessment of laboratory quality management systems for compliance with ISO/IEC 17025; field monitoring practices; development and implementation of international laboratory quality assurance (QA) programmes; design and interpretation of performance evaluation and proficiency testing studies; research and development of organic and inorganic certified reference materials (CRMs); development of multi-class organic analytical methods for herbicides, pesticides, phenolics and other organic contaminants in the aquatic environment; and synthesis of toxic organic standards.

## Costs

National water quality monitoring departments are responsible for all costs of the evaluation, including the laboratory assessment, services and outputs, plus travel for the team of experts to conduct the on-site review.

## Who We Are

Established in 1978, UNEP's Global Environment Monitoring System (GEMS) Water Programme (GEMS/Water) is the primary source for global water quality data. It is a multi-faceted water science centre oriented towards building knowledge on inland water quality issues worldwide. Key activities include monitoring, assessment and capacity building. The twin goals of the programme are to improve water quality monitoring and assessment capacity in participating countries, and to determine the state and trends of regional and global water quality. These goals are implemented through the GEMS/Water database, GEMStat, which houses more than 2 million water quality data from lakes, rivers and groundwater from more than 100 countries.

GEMS/Water also carries out training programmes in water quality monitoring and assessment, laboratory operations, and Quality Assurance/Quality Control (QA/QC), and provides guidance to participating countries in all aspects of monitoring programme design and implementation. GEMS/Water participates in water quality monitoring programme development, data gathering and assessment activities with national governments, UN partners and other international agencies throughout the world. GEMS/Water has operated an international laboratory QA/QC programme for participating countries including access to performance testing standards for water quality analysis. Part of the developing QA/QC activities of GEMS/Water is the evaluation and assessment of laboratory procedures and programmes including water quality monitoring strategies.



UNEP GEMS/Water Programme headquarters at the National Water Research Institute, Canada

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