



Technical Advisory Paper No. 2

*Goals and Targets for
Global Water Quality Assessment*

UNEP GEMS/Water Programme

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Goals and Targets for Global Water Quality Assessment

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The target audience for this paper is national focal points and partner agencies. Readers are encouraged to send comments, feedback and suggestions to info@gemswater.org.

Contents

Part I	Introduction	5
	Context— Mandate, Goals and Activities	5
Part II	Emerging Issues and Recommended Actions	7
	1.0 Global Water Quality Assessments	7
	2.0 Global Water Quality Data	9
	3.0 Data Integrity (QA/QC)	12
	4.0 Building Water Quality Capacity	13
	5.0 Organizational Performance	14
Annex	Agenda 21 - Calls to Action in GEMS/Water	15

PART I: Introduction

2005 marks the 'UN Decade of Action: Water for Life,' a ten-year framework within which the international community has committed to achieving water and sustainability goals and targets. The agenda and priorities contribute to the role that GEMS/Water plays as the water quality assessment resource for the United Nations system. Since GEMS/Water is science-driven, technical issues are central to all activities.

The role of the Technical Advisory Group (TAG) is to convene every two years to examine in detail a wide range of technical aspects of, and projects for, the UN GEMS/Water Programme. The group is composed of members of the GEMS/Water Steering Committee, as well as representatives of other GEMS/Water partners. The TAG is chaired by a senior UNEP official.

The Technical Advisory Papers serve to provide background information as a guide for the discussions of the TAG meetings. The present paper represents the "corporate view" of the TAG on global water quality monitoring, and the most salient issues facing GEMS/Water. It forms the basis for determining partnership activities: on one hand, the most constructive ways in which partner organizations can contribute to the successful implementation of core activities; and, on the other hand, the best ways for meeting partners' data and service needs.

This paper, being developed in that context, is divided into three main parts. Part I outlines the global context in which the Technical Advisory Group works, and its general role. An update of the mandate, overarching goals and activities of GEMS/Water are briefly described.

For each core activity area, there are several emerging issues identified for consideration by the TAG. The intent of Part II is to develop strategic recommendations to take advantage of opportunities, and to mitigate challenges. This section also focuses on key projects in which GEMS/Water is, or should be, actively engaged. The broader international scientific and technical context helps to identify the most constructive ways in which partner organizations can contribute to the successful implementation of the core activities. This paper will be used to guide the technical aspects of GEMS/Water for the next few years.

Many of the questions identified in the first TAG paper of 2003 are still relevant. However, the various responses to them are different but complementary.

Context— Mandate and Goals

At the 23rd Governing Council, February 2005, Decision 23/2: Updated water policy and strategy of the United Nations Environment Programme, strengthened GEMS/Water's mandate as:

10. *Requests* the Executive Director to facilitate the further development of the United Nations Environment Programme Global Environment Monitoring System on Water to ensure:
 - (a) Its continued role as a major global water quality assessment and monitoring programme;
 - (b) Its continued role as the repository for global water-quality data and its growing role in the development of water-quality indicators to support achievement of the water-related goals contained within the Millennium Declaration and the Plan of Implementation of the World Summit on Sustainable Development;
 - (c) Its continued provision of inputs to the World Water Assessment Programme and the World Water Development Report.

GEMS/Water has renewed its participation at the CSD (sessions 12 and 13) as a UNEP contribution to the implementation of the international water and sanitation targets. This activity was reported in the 2004 Sanitation Report of the Secretary-General:

The Global Environment Monitoring System (GEMS)/Water Programme of the United Nations Environment Programme (UNEP), a global water quality monitoring and assessment programme, provides information on the state and trends of global inland water quality. The programme works with more than 100 partner countries and counterpart organizations within and outside the United Nations system to build capacity in developing countries for collecting and managing information on water quality. GEMS/Water has recently broadened the scope of its datasets to cover parameters related to wastewater and sanitation, including metals, persistent organic pollutants, water-borne pathogens and micropollutants.¹

Building on this general role, the Strategic Business Plan 2002-2007 for GEMS/Water describes the work plan, timeline and budget for producing a series of outputs designed to help the programme successfully achieve its mandate. The rationale behind the Plan is that reliable, consistent and appropriate information is the key to understanding and improving the world's supply and quality of inland water. All operational activities and results have been organized into four core areas:

Four Core Activities and Results
1. Global Water Quality Assessments
2. Global Water Quality Data
3. Data Integrity (QA/QC)
4. Building Water Quality Monitoring Capacity

In view of the need for better integration of activities and key results, a fifth activity has been added as a cross-cutting measure to enable effectiveness and sustainability. The fifth activity should help the other core activities become more results-oriented. These have been integrated into DEWA's programme of work for 2006-2007 as below:

1. Water Quality Assessments, Advocacy

Enhanced awareness of, and cooperation on, water quality, and water quality monitoring, problems and emerging issues, among governments and the public, to better support sustainability

2. Water Quality Data, Indicators

Development and maintenance of global water quality data and information systems to improve accessibility to credible and comparable data; and contribution to the development and use of indicators for better understanding and decision-making of inland aquatic environmental issues, and in support of MDG/WSSD targets

3. Data Integrity, incl. Technical Tools, QA/QC, Alternate Technology

Increased reputation as a credible and reliable source for global water quality data and information, to add value to local-level data collection, and appropriate monitoring and observation technology

4. Capacity Building, Regional Development

Increased participation or involvement in water quality monitoring, assessment and reporting in developing countries and countries with economies in transition to better achieve MDG/WSSD targets

5. Organizational Performance Cross-cutting Function

¹ E/CN.17/2004/5 Sanitation Progress in meeting the goals, targets and commitments of Agenda 21, the Programme for the Further Implementation of Agenda 21 and the Johannesburg Plan of Implementation. Report of the Secretary-General, section C. Monitoring water quality and sanitation, paragraph 45.

Improved internal calibre of the Programme to deliver results 1. to 4. and products, by strengthening human, financial and information management; and by institution building.

Many new and important issues have been identified as impacting or influencing the implementation of the four core activities and cross-cutting function.

Part II: Emerging Issues and Recommended Actions

1.0 Global Water Quality Assessments

“The Millennium Development Goals are not limited to water scarcity and access. Water quality is an important determinant of availability. Water which is not fit for a particular use is effectively unavailable.”²

“The promising performance of the GEMS Water initiative provides important inputs with regard to assessment of water quality.”³

“The main outputs of UNEP’s assessment activities will include GEMS/Water freshwater assessment reports.”⁴

- How can GEMS/Water best contribute to global and regional assessment results?
- What should GEMS/Water be anticipating in terms of future needs of assessment processes and governments?
- What is the correlation between scientific monitoring/assessment and the health of an ecosystem?

The Global State of Water Quality Monitoring:

GEMS/Water has begun to report on the global state of the GEMS/Water global monitoring network, alongside the Annual Report. The purpose is to create linkages within the network and to encourage participation and regional development.

Regional and global meetings of NFPs could strengthen the network. One avenue could be on the margins of the Governing Council of UNEP. This would also strengthen countries internal political coordination.

Establishing linkages with the UNICEF/WHO Joint Monitoring Programme would also be strategic, as focusing on water quality can contribute to the Millennium and WSSD goals. The UNICEF/WHO is very important in groundwater monitoring regions, which would help fill gaps in Northern Africa and West Asia.

Water Assessment Reports:

It is recommended that GEMS/Water increase its efforts in assessments and products. The primary assessment processes that GEMS/Water should engage more fully are the Global Environmental Outlook and the World Water Development Report. Other key reports and assessment publications should be undertaken in a strategic way to include the Digital Atlas and Triennial statistical reports, and the UNEP Library Series.

The WHO retains interest in seeing GEMS/Water progress as an inter-agency initiative and as such has endeavoured to maintain the 'water resources management' series of publications which are associated with GEMS/Water. 'Water Quality Assessments' has had a significant impact in its two editions and the development of the third edition is at an advanced stage. 'Water Quality

² R. Robarts, June 2004 quote of the month, www.unesco.org/water

³ Policy statement of the Executive Director, UNEP/GC.23/2 paragraph 24.

⁴ UNEP Water Policy and Strategy UNEP/GC.23/6

Monitoring' has also had a significant impact and the development of its second edition is also at an advanced stage. Both editions are forthcoming in 2006.

The other volumes in this series that are less closely associated with GEMS/Water are 'Water Pollution Control' (2006/7), 'Toxic Cyanobacteria in Water' (2006/7) and 'Bathing Water Monitoring'. Nevertheless the WHO sees advantages in maintaining these together as all are concerned with water resources quality. All will go into further editions or evolve into new volumes in due course. The WHO is seeking an expression of interest from GEMS/Water to be associated with the publications more formally.

The World Bank considers itself as an important client of GEMS/Water, and is involved in surface and groundwater initiatives at many levels.

Science-Policy Linkages:

The widely-accepted framework of DSPIR (Drivers-Pressures- State-Impact-Responses) should be used to guide state and trend assessments of the world's water resources. The GEO, UNEP freshwater modular assessment, the WWAP and many other global and regional assessments which use the framework, have made relatively little use of GEMS/Water in the past. One major reason could be that at the global level, studies on key parameters need to make more compelling arguments or conclusions. There is also a need to overcome the misguided notion that "if we just get the technical science right, it will inform decision-making."

Towards a new DSPIR Framework for Water Quality of Surface and Groundwater Ecosystems

Service and Use (Drivers)	Human Health Drinking Water	Agriculture	Municipal/ Industrial, Energy	Ecosystem Stability, Structure & Health	Tourism & Recreation
Pressures	Pollution	Run-off, Pollution from fertilizer and pesticide use.	Pollution from effluents Construction and other supporting infrastructural impacts	Human activities Climate change and variability	Pollution
Parameter (state)	Total Coliform Faecal Coliform Pathogens POPs DOC Chlorophyll A Turbidity	Salinity Nutrients Chlorophyll A Pathogens Pesticides Suspended solids	Nutrients Temperature Oxygen Pathogens Organic contaminants. Other contaminants such as metals. BOD and COD Heavy Metals (particularly in Sediment)	Temperature pH Conductivity Major ions Oxygen Nitrogen Phosphorus Suspended Solids Biodiversity*	Parasites Pathogens Chlorophyll A Nutrients
(Impact)	Gastrointestinal outbreaks, potential death especially to the vulnerable Lost productivity and economic losses.	Eutrophication, and pesticide and faecal contamination of receiving waters.	Thermal and contaminant pollution of receiving waters affect food chains, biological productivity and species composition.	Loss of species. Altered food webs Increased/decreased biological productivity	Closed beaches, leisure boating restrictions, and effects on other water uses.
Response	Water guidelines and standards Treatment plants.	Green belts and riparian buffer strips. Prevention of direct inputs of contaminants Appropriate practices to minimize impacts through agricultural best management practices Constructed wetlands.	Guidelines and standards. Treatment facilities Polluter-pays principal.	Appropriate treatment facilities for point sources but limited responses for climate change and variability.	Guidelines and standards Water use advisories.

*Less relevant for groundwater

Effectiveness:

The Global Environmental Assessment project developed a comprehensive description of how to

determine the “effectiveness” of an environmental assessment, which includes three elements: credibility, saliency and legitimacy.

Credibility reflects the scientific and technical believability of the assessment to defined users of the assessment. Saliency, or relevance, reflects the ability of an assessment to address the particular concerns of a user. An assessment is salient to a user if that user is aware of the assessment, and if that user deems the assessment relevant to current policy decisions. Legitimacy is a measure of the political acceptability or perceived fairness of an assessment to a user.⁵

These determinants of effectiveness are applicable to global freshwater quality assessments. For GEMS/Water, credibility must be achieved in both policy and scientific communities. The joint accountability can sometimes present challenges, for example, the dilemma of making policy recommendations part of the assessment results or not, even though as an intergovernmental entity, GEMS/Water is obliged to. The GEMS/Water Freshwater Assessment approach should include equal attention to the process as well as the result of the assessment, and must address concerns of multi-causality, cumulative effects and vulnerability.

Given the context for a freshwater assessment, the relevant design question becomes how broadly to define the scope of the assessment for it to be most effective. There is a need for further information on how different countries use expertise and expert monitoring and assessment results in water-related decision making. This is important among countries, and also between developed and developing countries.

Fourth World Water Forum (March 2006):

WWDR-2 will be launched. There is an opportunity for GEMS/Water to reach many developing countries, particularly around the ministerial sessions. There could be a side-event or GEMS/Water should lead in coordinating a session on water quality.

2.0 Global Water Quality Data

The intergovernmental consultation also drew attention to the critical issue of environmental data for assessment, early warning and indicator development.⁶

- How can divergent views on access to data be reconciled?
- How can data reporting become more efficient?
- What is the best approach to undertaking indicators development?

Access to Data:

It has been increasingly recognized that access to information and the sharing of tools and resources are vital to achieving results. Open access needs to be balanced with the wishes of data providers regarding use of their data. With these and other considerations in mind, GEMS/Water developed www.GEMStat.org, an online database of global water quality data and statistical summaries. GEMStat was launched on World Water Day, March 22nd 2005, to help kick-off the “Decade for Action: Water for Life.” A policy of open source will be applied equally to GEMSoft (forthcoming data submission software) to increase utility and interoperability.

Currently with GEMStat, the user has the ability to plot data for multiple stations, but is restricted by country or watershed. Only one geospatial location can be searched at a time. In future there should be more comparability across data types. For example, there should be the facility for the user to compare data from one station in one country with another station in a different country. There should be the added capability to search the database by parameter rather than only by

⁵ Eckley, Noelle. “Designing Effective Assessments” October 2001, pp. 3-4.

⁶ International Environmental Governance: Report of the Executive Director: UNEP/GC.23/6

geographical location.

New Online Database on Global Water Quality



Visitors to www.gemstat.org during December 2004 and January 2005 were from:

Australia	Pakistan
Belgium	Poland
Canada	Russian
China	Federation
Croatia	South Africa
Egypt	Sri Lanka
Ethiopia	Sweden
France	Switzerland
Germany	Thailand
India	United
Japan	Kingdom
Kenya	United States
	Uzbekistan

Need for Harmonization of Reporting:

There are a number of international environmental reporting processes taking place at sub-regional, regional and global levels, calling for water quality data submissions. For example, UNSD, UNEP, UN-WWAP, the CBD, OECD, EU, and many regional and basin treaties include provisions for assessments and reporting. These reports are important tools for tracking progress, policy evaluation, and for informing the general public. The problem is that the number of reports and processes brings a heavy reporting burden to national governments that are responsible for submitting water quality data and information to each report. This burden can be particularly great for developing countries, small island developing states, and economies in transition. To help cope with multiple reporting requirements, the GEMS/Water-Belgium focal point, the Flemish Environment Agency, has developed a synthesized work sheet for data collection, as a tool to manage data reporting. It offers the ability to build a nested hierarchy of data collection processes. The work sheet will be presented at a work session on water statistics, to be coordinated by GEMS/Water, under the auspices of the UN Statistical Division.

Indicators and Composite Index Development:

The 2005 Environmental Sustainability Index Report reported that:

The Global Environmental Monitoring System Water Program (GEMS/Water) has been an important source of data for the ESI because it is the primary source of comparable international information on surface water quality. The ESI reports were straightforward in their assessment that the suitability of the GEMS Water data for comparing water quality across nations was very low. In the past, very few countries provided data to the program and the data were difficult to obtain. When the 2003 World Water Development Report reprinted the 2002 ESI water quality indicator data, it drew attention to water quality data issues. Some governments were unhappy with the fact that the data table included only estimates of water quality where data was missing from GEMS/Water. Others were dissatisfied with the fact that some countries reported data from a large number of water monitoring stations whereas others reported only a small number. These complaints drew high-level attention to the serious deficiencies in the GEMS/Water program, and played a significant role in a strategic effort to build the program into a more robust repository of relevant water quality data. A major drive was launched to bring new countries into the program. The approach shifted from passively receiving data from countries to actively requesting data updates on a regular basis. In addition, the data was made much more easily accessible. As a result of these changes, participation in GEMS/Water has grown from less than 40 countries when the ESI first started using the data to over 100 countries today, although data coverage is still

low. While the ESI cannot take credit for this shift, it did contribute to it by aggregating the GEMS Water data into national indicators and raising those indicators to high prominence.

GEMS/Water has become increasingly engaged in indicators development work within UNEP, and also with the WWAP and the Convention on Biological Diversity. The indicators development workshop should result in an agreed-on framework for indicators and index development and application.

Country/Government Participation:

As a United Nations, intergovernmental body, GEMS/Water has a vested interest in strong country participation. There is a strategy to recruit National Focal Points (NFPs) and Collaborating Focal Points, as well as guidelines describing roles, benefits and expectations for both them and for GEMS/Water. There are, however, still gaps in data coverage and many countries for which an official NFP has not been identified.

The Operational Guide has been revised and simplified in order to ease the reporting burden of Focal Points, thereby encouraging data submissions. The new Guide and related data entry forms are available in both hardcopy and electronic formats. However, data submissions by Focal Points still occur on an ad hoc basis. An official data collection process and questionnaire system should be developed and implemented, similar to that conducted by the UN Statistical Division.

Targets for Achieving Global Data Coverage

Key Indicators	1992	Baseline 2000	2005	2008 Targets	2011 Targets	2015 Targets
Global Coverage through participation/data submission	56	69	76	114	152	191 UN member states
Global Coverage through proactive data collection	n/a	n/a	80	140	200	261 countries and areas
Watercourse Coverage	69	69	112	162	232	263 major international basins

Over the long term, there should be a plan to formalize the roles and responsibilities for country activity. It would be beneficial to work on standardization, or systematization of the relationship at all levels (political, capacity building, sub-regional) to become more efficient with tasks that are routine, and to improve uniform and consistent communications with stakeholders.

The FAO has a network of stations for water quantity monitoring in the Nile River basin and Mesopotamian marshlands, and expressed interest in initiating a water quality network to overlap. This activity could be undertaken with training provided by GEMS/Water. The UNEP Mesopotamian wetlands project represents a valuable water quality data source, and submission of data generated by the project to GEMStat would constitute a significant step towards wetland water quality data coverage.

It has been deemed appropriate to endorse the UNECE Water Convention monitoring group’s new strategic guidelines on monitoring and assessment, and to promote and apply them at the global level.

Groundwater:

IGRAC, in collaboration with UNESCO and WMO, is to be a source of general groundwater information for planning and assessments. Since its inception two years ago, it has defined global groundwater regions, and an inventory of guidelines and protocols on groundwater assessment. There should be a clear statement made to UNESCO, with respect to IGRAC and GEMS/Water, and their respective roles in groundwater assessment. IGRAC and GEMS/Water should explore their potential areas of collaboration.

3.0 Data Integrity (QA/QC)

- What are the key questions for the Laboratory Performance Evaluation studies?
- How often should they be done?
- Who should be participating so that they are regionally representative?

For many years, GEMS/Water considered data quality (Quality Assurance and Quality Control) as applicable only to the data. It has been recognized that it is not only the quality of data that affects the reputation of the Programme, but also the quality of all information presented externally. Thus, the notion of data integrity has been adopted so as to broaden QA/QC to encompass organizational character.

New Tools and Resources:

There should continue to be technical advice and resources, such as the Laboratory Performance Evaluation Studies, that can demonstrate that they lead to improved data integrity. IAEA is an active collaborator with GEMS/Water, particularly with Data Integrity (QA/QC) activities. IAEA-IHS contributed to the Analytical Methods guide, as well as provided funding and advice to the Laboratory Performance Evaluation study No. 5.

GEMS/Water should run three studies and then assess the results to determine if these have led to a significant improvement in laboratory performance or not. If they have not, then two questions arise: the relative worth of investing so much in doing them, and determining how such studies can be made effective. Without these other means will have to be devised in order to get a strong indication of how good the data are that are submitted from each of the laboratories. The Group agreed that the studies should be conducted once every two years rather than annually

It was suggested that GEMS/Water work to develop global guidelines or standards for metadata, to improve comparability and efficiency. The technical tools, methods and studies that are developed and used can also play an added function of being resources for capacity building activities.

Index of Data Quality:

The EEA has developed a semi-quantifiable index of quality of data held in the Waterbase database. The purposes of the Index are to allow users of Waterbase to make judgments about the between-country comparability of the data, and to stimulate countries to improve the quality procedures at regional and national level wherever necessary.⁷ There are eight weighted questions that compose the Index. The highest quality score is 12 and the lowest, zero, reflecting the level of confidence that can be attributed to the data.

European Environment Agency's Eight Questions for National and Regional Monitoring Programmes

	Sampling	Score, if yes
1	Is sampling (and are any field measurements) carried out to a documented protocol by staff who have undergone specific training?	1
Analysis		
2	Are the analytical laboratories accredited by a national accreditation body — to ISO 9000 or EN45000 series standards?	1
3	Are the laboratories subject to external audit?	1
4	Have numerical accuracy requirements been defined for all relevant determinands?	2
5	Do laboratories have performance test data for their own analytical systems — indicating the precision of analysis, spiking recovery and limits of detection?	1
6	Can the laboratories produce routine quality control charts for all relevant determinands?	3
7	Is the monitoring programme linked to a series of routine and regular interlaboratory tests — for all	2

⁷ http://reports.eea.eu.int/technical_report_2003_98/en

relevant determinands either on a national or international basis?		
Data screening		
8	Are the monitoring data automatically (i.e. using specific software) screened for statistical outliers or checked for unusual results before being stored on a national or regional database?	1

The EEA is in the process of implementing the index at both national and regional levels. The Group recommended that a similar Data Integrity Index be developed at the global scale and applied to GEMStat.

A data integrity index could be used to address the situation in which a dataset that is submitted from a Focal Point that is obviously flawed. If it is demonstrable that a method used was in error, then the resulting data are unacceptable. This is a politically sensitive issue, as on one hand, there are governmental relations to consider, but on the other GEMS/Water’s credibility is at risk.

4.0 Building Water Quality Monitoring Capacity

At the 23rd Governing Council, a new capacity building plan was adopted, including:

The plan supports the implementation of the relevant outcomes of the intergovernmental consultation on strengthening the scientific base of UNEP, held in Nairobi on 14 and 15 January 2004, which specify a number of important capacity building needs. These include the need to strengthen national capacities for data collection, research, analysis, monitoring and integrated environmental assessment; developing institutional capacities, staff training and support for appropriate and adaptable technologies and methodologies; support for assessments of environmental issues of regional and sub-regional importance and for the assessment and early warning of emerging environmental issues; support for scientific exchanges and for the establishment of environmental and inter-disciplinary information networks; and promotion of coherent partnership approaches.

UNEP should help reinforce the capacities of national Governments to collect and analyze environmental data for use in decision-making and for participation in broader assessment processes, including, among others, the Global Environment Outlook.⁸

The ability of countries to participate in supranational monitoring activities is a separate development requirement from internal GEMS/Water operational resources. In this respect, linking to existing monitoring projects would strengthen GEMS/Water by association. Shared resources are a key, particularly for African countries, which constitute a priority for increasing local monitoring capacity. Examples of linkages that are underway include Global Resource Information Database-Nairobi and IW-Learn. Plans are underway for two workshops in Francophone Africa to build capacity for 23 countries to participate in the Programme’s core activities.

There is a problem of developing countries’ ability to feed into the international discourse; especially countries without Anglo-Saxon background. Most UN concepts come from five or six think tanks, and are not easily understood, let alone exchanged, between those of other cultures.

Mekong River Training Initiative:

GEMS/Water-Japan has started a capacity building programme for the Mekong riparian states, in collaboration with local NGOs, and the Japan International Cooperation Agency. This initiative is designed to meet GEMS/Water objectives, while increasing a regional presence in the area.

Southern Africa Initiative:

GEMS/Water-South Africa and GEMS/Water-Zimbabwe proposed a meeting, possibly also inviting GEMS/Water-Zambia to strengthen their involvement in the GEMS/Water Global Network.

⁸ Bali Strategic Plan for Technology Support and Capacity-Building: Report of the Executive Director: UNEP/GC.23/6/Add.1, paragraphs 22 and 23.

5.0 Organizational Performance Cross-cutting Function

- What aspects of our business are important to do well?
- Are we making a difference?
- How will global water quality monitoring and assessment help reach the internationally agreed commitments?

The Director of GEMS/Water was asked “If management needs to know 10 things about your organization, then what would those 10 things be?” His list of 11 criteria is:

1. High quality products
2. Influence policy mechanisms such as conventions
3. Strong recognition and support
4. Value-added process
5. Unique services but also essential i.e. leadership role (database, archiving etc.)
6. State of the art organization
7. Strongly integrated in international water agenda and processes
8. Cost-effective
9. Scientifically-based
10. Dependable – timeliness, delivery
11. Flexible – multidisciplinary in outlook and activity.

To be able to measure achievement of these criteria, key performance measures have been developed for each of the core activity areas, and for the cross-cutting function. They should be developed to measure the 11 criteria.

Strength in Resources:

The General Trust Fund for GEMS/Water closes at the end of 2005, and the Canadian government is considering its renewal. The Fund had been \$1.5 million over three years, and GEMS/Water is seeking \$1 million per year for the future. The top funding priorities are resources to adequately develop the groundwater aspect of the database and assessment results and capacity building for developing and transitional countries to participate in the core activities.

ANNEX: Agenda 21 - Calls to Action in GEMS/Water

Chapter 18 - Freshwater

18.39. All States, according to their capacity and available resources, through bilateral or multilateral cooperation, including the United Nations and other relevant organizations as appropriate, could set the following targets:

(d) To participate, as far as appropriate, in international water-quality monitoring and management programmes such as the Global Water Quality Monitoring Programme (GEMS/WATER), the UNEP Environmentally Sound Management of Inland Waters (EMINWA), the FAO regional inland fishery bodies, and the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention);

18.43. Monitoring and assessment of complex aquatic systems often require multidisciplinary studies involving several institutions and scientists in a joint programme. International water-quality programmes, such as GEMS/WATER, should be oriented towards the water-quality of developing countries. User-friendly software and Geographical Information Systems (GIS) and Global Resource Information Database (GRID) methods should be developed for the handling, analysis and interpretation of monitoring data and for the preparation of management strategies.

Chapter 40 - Information for Decision-Making

40.13. Institutional capacity to integrate environment and development and to develop relevant indicators is lacking at both the national and international levels. Existing institutions and programmes such as the Global Environmental Monitoring System (GEMS) and the Global Resource Information Database (GRID) within UNEP and different entities within the system wide Earthwatch will need to be considerably strengthened. Earthwatch has been an essential element for environment-related data. While programmes related to development data exist in a number of agencies, there is insufficient coordination between them. The activities related to development data of agencies and institutions of the United Nations system should be more effectively coordinated, perhaps through an equivalent and complementary "Development Watch", which with the existing Earthwatch should be coordinated through an appropriate office within the United Nations to ensure the full integration of environment and development concerns.

The UNEP GEMS/Water Programme is a multi-faceted water science centre oriented towards knowledge development on inland water quality issues throughout the world. Major activities include monitoring, QA/QC, assessment and capacity building. Organizational goals are to improve water quality monitoring and assessment capabilities in participating countries, and to determine the status and trends of regional and global water quality.

GEMS/Water was created in 1978. Its role is highlighted in *Agenda 21*, Chapters 18 — *Freshwater*, and 40 — *Information for Decision Making*. While the programme belongs to the whole UN system, it functionally fits into the Division of Early Warning and Assessment (DEWA), UNEP.

This series, published by the UN GEMS/Water Programme Office, has been created to disseminate the perspectives and recommendations of the Technical Advisory Group. ♦



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