



**UNEP**

United Nations Environment Programme

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**Terminal Evaluation of the United Nations  
Environment Programme (UNEP)  
“Global Environment Monitoring System  
for Water Programme”**

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**Jeffrey Thornton**

**Evaluation Office**

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## List of Acronyms

Acronym	Organization/Issue
BfG	German Federal Ministry of Environment, Federal Institute for Hydrology
CBD	UN Convention on Biological Diversity
CDN	Canadian dollars (CDN\$)
CFP	GEMS/Water Collaborating Focal Point
DCPI	UNEP Division of Communications and Public Information
DEPI	UNEP Division of Environmental Policy Implementation
DEWA	UNEP Division of Early Warning and Assessment
DHI	Danish Hydrological Institute (UNEP Centre of Excellence)
EC	Environment Canada
EMINWA	UNEP Environmentally-sound Management of INland WATers framework
FAO	Food and Agriculture Organization of the United Nations
GEF	Global Environment Facility
GEMS/Water	Global Environment Monitoring System for Water
GEMStat	Global database for water quality monitoring data
GEO	UNEP Global Environment Outlook
GIS	Geographic Information System
GRDC	Global Runoff Data Centre
IHP	International Hydrological Programme
ILEC	International Lake Environment Committee Foundation
IPCC	Intergovernmental Panel on Climate Change
Irish Aid	Irish Department of Foreign Affairs and Trade
ISO	International Standards Organization
IWRM	Integrated Water Resources Management
MEA	Millennium Ecosystem Assessment
MoU	Memorandum of Understanding
NASA	United States National Aeronautics and Space Administration
NFP	GEMS/Water National Focal Point
NGO	Non-governmental Organization
NWRI	EC National Water Research Institute
PE	GEMS/Water Laboratory Performance Evaluation
POPs	Persistent Organic Pollutants
PoW	UNEP Programme of Work
QA/QC	Quality Assurance/Quality Control
ROtI	Review of Outcomes to Impacts
SPO	Senior Programme Officer (UNEP)
TOC	Theory of Change
ToR	Terms of Reference for the Terminal Evaluation of the GEMS/Water Project
TWAP	Transboundary Waters Assessment Programme
UCC	University College of Cork
UN	United Nations
UN Water	United Nations Inter-Agency Mechanism on Freshwater-related Issues
UNCED	United Nations Conference on Environment and Development
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNEP Live	UNEP online data portal

Acronym	Organization/Issue
UNESCO	United Nations Education, Scientific and Cultural Organisation
USD	United States dollars (US\$)
WHO	World Health Organisation
WMO	World Meteorological Organisation
WQ	Water Quality
WWAP	World Water Quality Assessment Programme

## Project Identification Table

### Project summary

<b>UNEP PIMS ID:</b>	00384	<b>IMIS number:</b>	CPL 5070-3640-1111
<b>Sub-Programme</b>	Ecosystems Management	<b>Expected Accomplishment/</b>	313
		<b>PoW Outputs</b>	Output # 3: Tools, technical support...
<b>Expected Start Date:</b>	October 2010	<b>UNEP approval date:</b>	October 2010
<b>Actual start date:</b>	5 Oct 2010	<b>Planned duration:</b>	48 months
<b>Intended completion date:</b>	31 March 2014	<b>Actual completion date:</b>	31 March 2014
<b>Planned project budget at approval</b>	CDN\$2,000,000	<b>Secured budget*:</b>	CDN\$2,000,000
<b>UNEP contribution*</b>	USD 1,295,550 (in kind)	<b>Co-financing</b>	CDN\$1,136,000 (in kind, from Environment Canada)
<b>Mid-term review/eval. (planned date):</b>	None	<b>Terminal Evaluation (actual date):</b>	March 2014 to July 2014
<b>No. of revisions:</b>	None	<b>Date of last Revision:</b>	None

## Executive Summary

The Global Environment Monitoring Programme for Water (GEMS/Water) was initiated in the 1970s as an outcome of the United Nations Conference on the Human Environment. It was established to acquire, manage, and disseminate water quality data in order to support assessments of inland water quality as a foundational activity for the scientifically-sound management of these shared water resources. The Programme has attracted the participation and involvement of an increasing number of countries since its inception and currently provides a central data repository for data on about 250 waterbodies worldwide.

During the current project period, 2010 through 2014, the GEMS/Water Programme has held four regional workshops, delivered one training course and conducted three laboratory performance evaluation studies, which are important value-added elements of the Programme. In addition, new monitoring stations have been added and many more data included within the GEMS/Water data base, although the distribution of monitoring stations remains uneven across the world. Although rarely recognized for its role, GEMS/Water also has developed specialized algorithms and data processing capabilities in support of UN Water initiatives and UNEP regional and global assessments, which are available through GEMStat.

Because data remain a cornerstone of scientifically sound water resources management, effective environmental planning and policy-making, and regional and global human development, GEMS/Water has an ongoing role in contributing to the sustainable utilization of the world's resources.

Recognizing that the current project period precedes a transition of responsibilities from the Government of Canada to the Governments of Germany and Ireland, with the support of the Government of Brasil as the first regional hub, this report emphasizes the value of water quality data and encourages the future development of additional regional hubs as vehicles to deliver GEMS/Water products and services to specific regions of the world and, especially, as mechanisms to encourage wider participation in GEMS/Water by the countries of the world. The report further encourages the linkage of water quality with water quantity data and new analytical tools and techniques as important components that add value to the Programme. The report also reinforces the vital and valuable role of capacity building in water quality data acquisition and utilization.

This evaluation report supports the continuation of the GEMS/Water Programme, encourages its expansion and revitalization, and endorses Resolution/Decision 10 of the 2014 UN Environment Assembly which recommends that the Executive Director of the United Nations Environment Programme (UNEP) incorporate GEMS/Water into the UNEP Work Plan and ensure its continuity. A summary of the ratings is presented below.

Criterion	Rating <sup>a</sup>
<b>A. Strategic relevance</b>	MS
<b>B. Achievement of outputs</b>	S
<b>C. Effectiveness: Attainment of project objectives and results</b>	
1. Achievement of direct outcomes	S
2. Likelihood of impact	HS

<b>Criterion</b>	<b>Rating<sup>a</sup></b>
3. Achievement of project goal and planned objectives	MS
<b>D. Sustainability and replication</b>	
1. Financial	U
2. Socio-political	MS
3. Institutional framework	S
4. Environmental	S
5. Catalytic role and replication	S
<b>E. Efficiency</b>	S
<b>F. Factors affecting project performance</b>	
1. Preparation and readiness	MS
2. Project implementation and management	S
3. Stakeholders participation and public awareness	MS
4. Country ownership and driven-ness	S
5. Financial planning and management	S
6. UNEP supervision and backstopping	S
7. Monitoring and evaluation	HU
a. M&E Design	U
b. Budgeting and funding for M&E activities	U
c. M&E plan Implementation	HU
<b>Overall project rating</b>	S

## I. Introduction

1. This report represents the output of the Terminal Evaluation of the UNEP Project entitled “Global Environment Monitoring Systems for Water Programme.” The Programme, known as “GEMS/Water,” was operated and managed by Environment Canada (EC) under the auspices of the United Nations Environment Programme (UNEP), Division of Early Warning and Assessment (DEWA), and represents an ongoing commitment to the initiative that grew out of a response to the 1972 Stockholm Conference on the Human Environment. This report evaluates Programme activities undertaken between October 2010 and March 2014. The Terms of Reference (ToR) of the evaluation are appended hereto as Annex 1.

2. GEMS/Water was inaugurated in 1978 as an inter-agency Programme under the auspices of the United Nations Education, Scientific and Cultural Organization (UNESCO), the World Health Organization (WHO) and UNEP, with the participation of the World Meteorological Organization (WMO) and support of the Governments of Canada (through EC), the United Kingdom and the Netherlands. The first two decades of GEMS/Water activities (1978 through 2002) were led by WHO, while EC hosted and operated the data acquisition and management element of the Programme. Between 2002 and the present project period (initiated in 2010), the UNEP assumed a greater role in project management, as the roles of WHO and (later) UNESCO and WMO diminished. Simultaneously, EC assumed an increasing responsibility for the execution of Programme activities, gradually assuming full responsibility for project execution during the current project period (2010 through 2014).

3. GEMS/Water had the initial mandate of determining the status and trends in freshwater quality in all parts of the world. This assessment mandate has shifted more into the ambit of UNEP in recent years. UNEP is the UN agency with the greatest comparative advantage in the conduct of global and regional assessments, especially water assessments which long have been conducted by UNEP under various Programmes including the Regional Seas Programme, the Environmentally-sound Management of INland WAters (EMINWA) Programme and their successors. Nevertheless, the initial collaborative approach retains much value in that water quality is closely linked to rainfall/runoff (the discipline of hydrology), human health and well-being, and the state of the environment. Consequently, UNESCO, WMO and WHO should continue to have important roles within this assessment Programme. These agencies constitute the core of the multi-agency advisory committee, at least in the project’s organogram. However, it is unclear the extent to which they did play a role in the Programme to date.

4. This terminal project evaluation coincides with the shift in institutional responsibilities from the Government of Canada to the Governments of Germany and Ireland, and from EC to the German Federal Ministry of Environment (BMUB), Federal Institute for Hydrology (FIH or BfG), and German IHP/HWRP Secretariat, and to the Irish Department of Environment, Community and Local Government (DECLG), Department of Foreign Affairs and Trade (DFAT or Irish Aid), and University College Cork (UCC). The former will support the GEMStat component of the Programme, while the latter will support the capacity building activities of GEMS/Water. This institutional shift builds on the comparative advantages of the two new institutions, who bring much experience in managing

global data collection programmes (the Global Runoff Data Center—GRDC) and developing and delivering training in water quality assessments. The support of EC in this transition is recognized.

## II. The Evaluation

5. This evaluation was conducted by the Evaluation Office of the UNEP as part of the UNEP project cycle. Jeffrey A. Thornton PhD MBA PH CLM, whose curriculum vitae is appended hereto as Annex 9, served as the external consultant in the conduct of the evaluation. The evaluation was implemented with the participation and assistance of the UNEP Division of Early Warning and Assessment (DEWA) and in consultation with GEMS/Water stakeholders. Dr Thornton had the privilege of conducting site visits and interviews with staff from the UNEP DEWA, UNEP Division of Environmental Policy Implementation (DEPI), UNEP Division of Communications and Public Information (DCPI), EC, BfG/FIH, and UCC. The list of institutions visited and persons interviewed is appended hereto as Annex 2. Staff provided Dr Thornton with complete access to documents and other file information necessary to conduct of this evaluation, which was conducted between May 2014 and October 2014.

### III. The Project

6. The Global Environment Monitoring System for Water (GEMS/Water) was conceived as a mechanism to assemble and disseminate water quality data as the foundational building block of scientifically sound water resources management, as the fundamental element of conducting assessments and formulating remedial Programmes that will support interventions to ensure continuing human use and usability of water. The Programme was established in response to the challenges posed at the 1972 UN Conference on the Human Environment, the Stockholm Conference. The essential elements of the Programme were affirmed by the Brundtland Commission in their 1987 report entitled, "Our Common Future." The role of freshwater was given further prominence in 1992 at the Rio de Janeiro Summit, the UN Conference on Environment and Development, whose output is known as "Agenda 21." Most recently, the UN Environment Assembly, held during June 2014, reaffirmed the role of GEMS/Water as an essential element in global water resources management (Resolution/Decision 10 of 2014), which is included herein as Annex 7.

#### A. Context

7. These and subsequent Conferences, Declarations and actions by the UN and its agencies and member countries have all recognized the central role of water in human life and the need for periodic assessment of water quality. Data and knowledge have been and remain fundamental to our human understanding of the (aquatic) environment, and this understanding is basic to the successful management and sustainable utilization of our (water) resources.

8. GEMS/Water was designed to encourage the acquisition of data on water quality, with one element of the Programme being the assurance of the quality of the data so all data users will have confidence in the information being collected and shared. Good (= accurate and precise) scientific data remain central to GEMS/Water.

9. Beyond the basic water quality data acquisition, GEMS/Water has evolved to include elements of data utilization and data manipulation that adds value to the basic information gathering and sharing aspects of the Programme. These elements are embodied in GEMStat, which allows users to calculate contaminant loads and water quality indices for specific waterbodies. These data products enhance the value of the data and support the use of the data in resource management.

10. Finally, GEMS/Water has contributed to the experience that has led to the creation of UNEP Live, blending the ongoing demand and need for environmental data with the new technologies for knowledge acquisition and dissemination.

#### B. Objectives and components

11. The "UNEP GEMS/Water Programme 2010-14 Narrative Report" (hereinafter the "Narrative Report" appended hereto as Annex 3) enumerates five overall objectives of the Programme; namely:

- i. Determine the status and trends in inland water quality in various parts of the world;
- ii. Improve the water quality monitoring and assessment activities in countries participating in the Programme;

- iii. Provide data and information to governments, the scientific community and the public on the quality of the world's freshwater resources as they relate to human and aquatic ecosystem health and other environmental concerns;
- iv. Provide information and data to the same audience on the transport and fluxes of toxic chemicals, nutrients and other pollutants from major river basins to the continent/ocean interfaces; and,
- v. Strengthen national water quality monitoring networks, analytical capabilities and data quality assurance in developing countries.

12. The "Contribution Arrangement between the Department of the Environment of Canada as represented by the Minister of the Environment of Canada and the United Nations Environment Programme" (hereinafter, the "Contribution Arrangement" appended hereto as Annex 4) describes GEMS/Water as "a multi-faceted water science centre oriented towards knowledge development in inland water quality issues throughout the world", and enumerates the Programme objectives (stated as outcomes) as follows:

- i. new knowledge and data produced by collaborating organizations contribute to the conservation and restoration of water resources and aquatic ecosystems;
- ii. additional financial resources are generated to support GEMS/Water; global coverage and consistency of data is improved;
- iii. data access for users is improved; increased developing country capacity for water quality monitoring.

13. Finally, the "Terms of Reference [for the] Terminal Evaluation of the UNEP Project 'Global Environmental Monitoring Systems Water Programme'" (hereinafter, the "ToR", Annex 1) echoes the language of the "Contribution Arrangement" but separates the outcome of point iii into two elements focusing on a) data access and b) developing country capacity building. The "Terms of Reference" further note the following activities as part of the project objectives and components:

- Identify opportunities for UNEP to partner with other stakeholders on GEMS/Water.
- Contribute information for regional, country and international awareness campaigns.
- Use opportunities at international meetings to raise the profile of GEMS/Water.
- Provide advice and support on potential research partners and projects.
- Make available GEMS/Water database and personnel to participate in improvements to the database.
- Lead the performance evaluation of laboratories every two years.
- Contribute personnel to assist in the development of the web-based data system and its operationalization.
- Assist in engaging countries in its use and maintenance.

14. These three similar but different statements of the project's objectives and components are illustrative and suggest that, in the absence of a UNEP project document and perhaps because of the lack within UNEP of a guiding document, there were differing conceptualizations of the Programme amongst the partners and participants. These differing perspectives, with their varied emphases,

strongly suggest that major shortcomings of the Programme was the *lack of a unifying vision* for the Programme within the UN system and the *lack of a strong degree of ownership* of the Programme within UNEP. Different people and various organizations perceived the GEMS/Water Programme differently. All were agreed that the Programme was to create, maintain and operate a database on inland water quality, although the priority given to this task seems to vary between documents/statements of Programme objectives, and all noted an emphasis on developing countries and data quality and dissemination, although the documents variously highlighted both data and information/knowledge. While there is a clear central tendency amongst these various statements of objectives, the lack of a common statement is a deficiency that is reflected in all other aspects of the Programme.

15. With respect to the components of the GEMS/Water project, the Contribution Arrangement sets forth the contractual obligations between EC and UNEP, which, in the absence of significant additional external funding, should be seen as establishing the components of the Programme as a whole. To this end, Appendix E of the Contribution Arrangement, entitled UNEP-GEMS/Water 2010-14 Workplan, provides the clearest statement of the Programme components, identified in the Appendix as Strategic Goals and elaborated as Strategies from which the Programme activities were drawn:

- Generate financial resources
  - Secure adequate funding from diverse partners
  - Project funding from diverse sources available for implementation of activities
  - Create opportunities for cost recovery for GEMS/Water services
  - Initiate awareness campaigns at country and regional levels seeking to highlight the services and products of the GEMS/Water Programme
  - Enhance capacity, expertise and leadership on international water quality issues
- Global coverage and consistency of data
  - Identify and determine ways of covering data gaps
  - Improve reliability, comprehensiveness of data from many countries
  - Resolve difficulties in assessing and comparing information from different countries and organizations
  - Increase level of rigour for member countries [and] laboratories
  - Increase the sources of data input at the country level
  - Improve country level investment in environmental data monitoring, indicators development, assessment and reporting
  - Expand the existing WQ database
  - Contribute to other relevant water quality assessments
- Access for users
  - Improve data accessibility to research and water communities
  - Expand users market to include MEAs
- Capacity building
  - Invest in capacity building for water quality monitoring in developing countries
  - Initiate a GEMS/Water youth wing which involves the youth [in] water quality sampling and analyzing inland water bodies globally

- Strengthen capacity for better lake, reservoir and wetland basin management at the local, regional and global levels
- Facilitate regular meetings between users and providers of data on specific studies.

16. Again, there is a broad coincidence of components and Programme objectives, although many of the foregoing elements (= Strategies) go beyond the EC-UNEP Arrangement as indicated by the inclusion of the column labelled “Required additional funding to be raised.” It is noteworthy that additional financial resources were indicated as being necessary to achieve the Strategic Goal of generating financial resources. This is consistent with the suggestion that the Programme was under-funded.

17. For the purposes of this terminal evaluation, the four Programme objectives set forth in the EC-UNEP Contribution Arrangement were adopted as the key elements of the project. These four points were stated in the legal arrangements governing the Programme, and, therefore, have a binding nature beyond those contained within the Narrative Report and ToR. In the Reconstructed Theory of Change (Figure 2, below), the securing of financial security for the Programme and adequate staffing of the GEMS/Water Programme would be parallel actions to the primary data collection, analysis and dissemination functions identified in the Theory of Change schematic shown in Figure 2.

### C. Target areas/groups

18. While the foregoing discussion implies some degree of confusion regarding the Programme as a whole, the various source documents cited above are consistent in placing the emphasis on developing countries and focusing on the target area of water quality monitoring data. The documents are also consistent in their emphasis on information and knowledge creation as outcomes of the collection and dissemination of the water quality data. This is equally congruent with the Strategic Goals of capacity building and global coverage and consistency of data.

19. With respect to the target groups, the documents are less consistent in noting the actual target groups. In a general sense, the documents state that the Programme is focused at the international, regional and country levels, with an emphasis on developing countries, although there are indications that the Programme includes a focus on local level stakeholders. Obviously, sampling locations are situated at specific geographic points which, by definition, must be at the sub-country or local scale. Similarly, stakeholders and researchers have a physical address which must lie within a specific country and community. This distinction is especially important with respect to the capacity building task; for example, should the capacity building activities target individual persons and/or organizations sampling individual waterbodies or should the capacity building target agencies coordinating and/or conducting the sampling Programme of a country or a region? The response to this question must be spelled out to the extent practicable (training, by definition, being provided to individuals) in future iterations of this project.

20. In conversations with staff, there were several mentions of a “business plan” having been considered as a means of creating an overarching vision for GEMS/Water. This draft business plan has been noted as forming the basis for the activities set forth in the EC-UNEP Contribution Arrangement. Curiously, the initiative was discontinued, in part, due to the fact that UNEP did not view GEMS/Water as a “business”. While GEMS/Water is not a traditional for-profit enterprise, it clearly is a business in the same way that government is a business; to wit, the acquisition and

dissemination of water quality data and, more specifically, water quality knowledge and information by a “body corporate” (i.e., governments) for use by a range of “consumers” (i.e., stakeholders) in exchange for the expenditure of monies (e.g., tax income, staff labour, or volunteer actions) by the “body corporate” has all of the attributes of a business transaction. In this sense, government itself is a business in that it provides services to a consumer (its citizens) for the benefit of a market (civil society). In developing a business plan, therefore, GEMS/Water would have benefited from a clear statement of purpose (i.e., a mission statement), a clear definition of the product(s) (i.e., data and possibly information and knowledge drawn from the data), and a clear identification of the client base or consumers (e.g., national governments, international organizations, and/or individual communities or researchers). In the absence of a project document, completion of a business plan could provide the clarity of purpose and action required for a project of this scale and scope.

21. Translating the foregoing into the language of the UNEP Programme Manual, GEMS/Water would have benefitted from an agreed project document, with a clearly stated project objective(s), distribution of roles and responsibilities (especially with the division of duties between BfG/FIH and UCC in the next iteration of the Programme), and source of funding. Data, especially water quality data, are foundational to the management and sustainable utilization of our shared inland water resources. The ultimate outcome of the application of these data would be the protection of existing high quality water resources and the rehabilitation of currently degraded water resources, through the application of the knowledge gained from the analysis of the data and application of the data in planning and the formulation of supporting legislation. Data are the output of the GEMS/Water Programme; knowledge is the outcome of utilizing the data and the foundation upon which policies and practices are built.

22. Having defined and agreed goals, it is also possible to identify indicators and milestones against which to assess project achievements. These indicators should be formulated in a way that makes them measurable. For example, “improved water quality” would not be an acceptable indicator since this statement cannot be quantified; “improved water quality in four major transboundary lakes” is more quantitative and enables determination of project progress. And such goals should be verifiable, with water quality, in the case of the above example, being defined in terms of specific indicators (such as phosphorus concentration) and identified target levels (such as a phosphorus concentration of less than 20 micrograms per litre). These latter targets may be supported by legislation and/or scientific consensus.

23. In guiding the project, note should be made of the need for a consistent level of staffing and retention of staff to ensure continuity of the Programme. Reconstitution of the multi-agency advisory committee and formalization of its role in guiding the future development of GEMS/Water and its utilization in global and regional assessments would be an important part of this continuity of service and in mobilizing human and financial resources. In this regard, UNEP’s Regional Offices should be active partners in encouraging Member States to participate in providing data to GEMS/Water and making use of the data for their water resources management Programmes. To this end, the designation of regional hubs and centres of excellence are important steps toward reinvigorating the effectiveness of GEMS/Water as a data source and planning resource in the field the water resources management. Signature of Memoranda of Understanding with participating countries, and especially the regional centres of excellence, would be important elements in building

and maintaining regional partnerships. Again, clear statements of partner duties and responsibilities and expectations will be critical to making these agreements operational.

24. Finally, GEMS/Water must remain flexible enough to respond to emerging threats to water quality. Adequate funding to ensure a forward looking stance of the Programme is critical. As noted elsewhere in this evaluation, adoption of a cost accounting structure for the Programme is likely to be counter-productive and result in Member States may be less willing to provide the data upon which GEMS/Water is founded; however, development and provision of value added products should be encouraged. Again, liaison with the multi-agency advisory committee and regional hubs/centres of excellence would go a long way to ensuring that the GEMS/Water Programme remains vital and relevant in a changing world.

#### **D. Milestones/key dates in project design and implementation**

25. The project documentation sets out a project that is envisioned as a single unit, with a start date and an end date. The anticipated start date was stated in the “ToR” as October 2010 with an actual start date noted as 5 October 2010. The “ToR” also states the expected and actual end dates as 31 March 2014. There was no mid-term evaluation and the terminal evaluation period was extended from March to July 2014 to March to October 2014 (principally due to the UN Environment Assembly being held in the middle of the evaluation period). There were no revisions of the project.

26. Although the nominal period of the project was from October 2010 to March 2014, the “Narrative Report” notes that the GEMS/Water Programme Manager was in office only between February 2011 and November 2013. Staff further noted that there was a delay in project implementation due to the need of UNEP and EC to clarify the terms of the “Contribution Arrangement” with regard to the transfer of funds between organizations. One case in point was the disparity in understanding of the term “committed” used by UNEP but not used by EC, who understood the assignment of budgeted funds as being an “expenditure”; UNEP only considered the funds to have been spent once a cheque or other financial instrument was issued. Consequently, the actual period during which project activities were conducted by UNEP was significantly shorter than the nominal project period based on the “Contribution Arrangement”. (It should be noted, however, that EC staff continued to operate the Programme without interruption.)

#### **E. Implementation arrangements**

27. Implementation of the GEMS/Water Programme was governed by the “Contribution Arrangement” agreed between EC and UNEP. Under these arrangements, EC executed GEMS/Water through the NWRI located in Burlington, Ontario, Canada. Oversight was provided by UNEP DEWA located in Nairobi, Kenya. A Multi-Agency Advisory Committee is alluded to in the “ToR” although it does not appear that this Committee had a significant role in the Programme. Indeed, this Committee never met as a formal coordinating body during the project period (the last formal meeting of the Technical Advisory Committee being held in 2006), although there is some indication that GEMS/Water representatives and representatives from the various agencies did meet at side events to other global water meetings. Nevertheless, many countries have nominated National Focal Points (NFPs). Additionally, GEMS/Water staff interacted with Collaborating Focal Points (CFPs), the latter representing a range of academic and research institutions who submitted data directly to GEMS/Water; these data are treated differently within GEMStat as they have not been vetted through the NFPs and cannot be construed as “national” data. At the time of the terminal

evaluation, the participating countries and other bodies numbered about 123 organizations. About 76 countries participated in the 2013 laboratory performance evaluation in which 146 laboratories submitted data. These numbers represent a continuing increase in the number of participating organizations participating in the laboratory performance evaluations.

28. The decision of the Government of Canada to relinquish their leadership role in GEMS/Water meant that the Programme, from the point of view of the Government of Canada who provided the major portion of the GEMS/Water staff as well as the Programme finance, was in the status of being wound up. Staff retirements or resignations among GEMS/Water personnel in EC resulted in vacancies that were not filled; a similar situation occurred within UNEP where the UNEP project manager retired prior to the end of the project period. In short, this situation led to remaining staff managing the Programme in an increasingly “survivalist” mode; in other words, programming became increasingly constrained to the point where only essential tasks were performed and the outreach elements limited or discontinued for reasons both of finance as well as human resources.

29. It should be noted that the Government of Germany has expressed an intention to back fill the vacancies and to more fully staff the GEMStat activities, while the Government of Ireland is still gearing up to perform their outreach and capacity building role in support of GEMS/Water. These activities should proceed quickly now that two MoUs have been signed recently with the Government of Ireland (between DFAT and UNEP and between DECLG and UNEP).

30. It further should be noted that the UN Environment Assembly (UNEA), pursuant to Resolution/Decision 10 of 2014, has underlined the need for Member States and other stakeholders to support GEMS/Water with financial and in-kind contributions and has requested the Executive Director of UNEP to introduce a revised GEMS/Water work Programme and budget for adoption to the next session of the UNEA. The Resolution also requests that the GEMS/Water Programme be clearly linked to the biennial work Programme of UNEP. This request also has been actioned by UNEP staff.

31. In this regard, the strategic action of diversifying the financial base of GEMS/Water is critical for the future of the Programme. While UNEP would seem to have an advantage in executing this action (through its Regional Offices and collaboration with other UN agencies involved in water resources management and development, such as UN Water), UNEP appeared to have been less than effective in diversifying and sustaining the budget for GEMS/Water during the project period under review. In fact, it appeared that UNEP actually was a drain on the financial resources of the Programme, utilizing some funds provided by the Government of Canada for internal staffing and support activities (see Section F, below). While the latter concern was consistent with the use of funds agreed in the Contribution Arrangement, the former represents an important issue given UNEP’s premier role as a regional United Nations agency and its participation in successful regional and global assessments and Programmes. Against this background of regional success, UNEP should have played a greater role in soliciting support for GEMS/Water from Member States. In contrast, the duplicative accounting procedures employed by Canada and UNEP definitely introduced delays and paralysis in the administration of the available funds which were likely to have contributed to the inability of UNEP staff to devote more time to the fund-raising/diversification element of the work Programme.

32. Finally, with regard to implementation arrangements, GEMS/Water would benefit from continuity of staffing, a formal organogram clearly identifying organizations and agencies as well as roles and responsibilities of each, and the active participation of UNEP in soliciting partners, finance and participation. UNEP, potentially in partnership with UN Water, should be a source of funds to support GEMS/Water activities and not be a drain on these financial resources. To this end, and building on the UNEA resolution, UNEP should actively promote GEMS/Water not only within UN Water and associated UN activities, but also through, *inter alia*, its Regional Offices and Regional Seas networks UNEP should promote water quality monitoring, all the while adding value to the data collected by its Member States through GEMStat and its regional and global assessment, with the active financial participation and support from the Environment Fund and other funds made available through Member States.

## F. Project financing

33. Table 1 summarises the proposed budget and actual expenditures associated with the GEMS/Water Programme based on the information reported to EC pursuant to the Contribution Arrangement. The actual summary was initially prepared by the UNEP DEWA staff as a contribution to the project report provided to the Government of Canada at the conclusion of their participation in GEMS/Water.

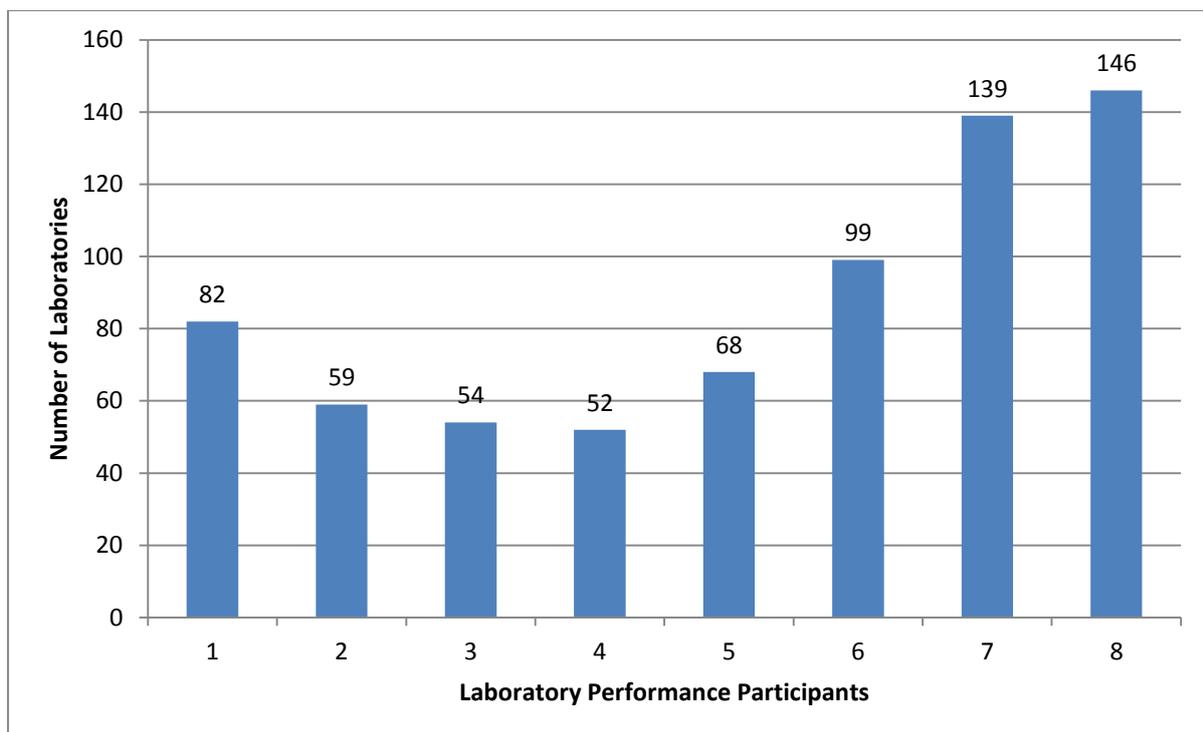
34. It is clear from an examination of Table 1 that the funds provided for the execution of the GEMS/Water Programme were almost exclusively sourced from the Government of Canada. The lack of financial contributions from other Member States was identified in the ToR as a major concern of the project staff and a significant shortcoming with respect to the execution of the project as envisioned at its inception and documented in the Contribution Arrangement.

35. It should be noted that the actual data contained within the GEMS/Water data base and utilised by GEMStat were collected at the expense of participating Member States. The investment in data gathering represents a significant and substantial additional investment in the GEMS/Water Programme that is not documented or quantified in financial terms. While it is not possible to assign an average cost for each analyte reported and included in the database—some of the analytes such as those associated with pesticide concentrations and requiring high pressure liquid chromatographic analysis may cost USD 100 or more per sample analysed, while analytes such as pH which require a relatively simple probe may cost USD 1 or less per sample—the numbers of data points reported and included in the GEMS/Water data base during the project period reflects a significant additional investment in the Programme, even when a nominal cost is assumed. That said, it may be argued that the data represent information that each Member State would have collected with or without their participation in GEMS/Water, the additional step of providing the data to GEMS/Water argues that the analytical costs be considered as contributory, in part, to the GEMS/Water Programme.

36. Further, it should be noted that there are elements of the GEMS/Water Programme that are beyond the ability of an analyst to quantify. The increasing levels of participation in the Laboratory Performance Evaluations (Figure 1) provide testimony of the increasing value of this service. Indeed, this service has value beyond that implied by the increasing numbers of participants. For example, Laboratory Performance Evaluation 7A, while limited to 24 laboratories in Argentina and Uruguay, selected by the Commission for the Administration of the Uruguay River (CARU), was persuasive in

convincing the basin countries to forego a possible armed conflict and address a shared environmental problem through peaceful means and joint action. It is not possible to place a monetary value on peace, although it is equally clear that peace does have a huge value not only for local communities but also the larger geographic region and world in which we live.

37. Finally, it should be noted that the GEMS/Water project did achieve many of the Programme goals set forth in Appendix E of the Contribution Arrangement (see also Table 4 below) even without additional financing. This speaks well for the dedication of the project staff and for the enthusiastic participation by the Member States and Collaborators. This should be noted as another major accomplishment of the GEMS/Water Programme during the project period.



**Figure 1. Numbers of Participants in the Laboratory Performance Evaluations conducted during the course of the GEMS/Water Programme.**

**Table 1. Summary of Financial Transactions conducted within the GEMS/Water Project**

Year	Task	Item	Budget C\$	Spent C\$	Actual Total by component	Funds Provided by EC	Interest	Total Funds	Budget v Actual	Income v Expenses
2010- 2011	Secure diversified financing	Salaries	165,300	34,635						
		Services	41,325	25,409						
		Travel	41,325	17,627						
		Supplies	41,325	1,489						
		Other	41,325		79,160					
	Improve global coverage	Salaries	17,400	50,817						
		Services	17,400	193,554						
		Travel	17,400							
		Supplies	17,400							
		Other	17,400		244,371					
	Improve data access	Salaries	3,480							
		Services	3,480							
		Travel	3,480							
		Supplies	3,480							
		Other	3,480							
	Increase developing country capacity	Salaries								
		Services								
		Travel								
		Supplies								
		Other								
	UNEP Support Costs		56,550	42,059	42,059					
			491,550	365,590		594,256	3,815	598,071	125,960	232,481

Year	Task	Item	Budget C\$	Spent C\$	Actual Total by component	Funds Provided by EC	Interest	Total Funds	Budget v Actual	Income v Expenses
2011-2012	Secure diversified financing	Salaries	102,430	104,279						
		Services	179,900	75,756						
		Travel	63,736	24,470						
		Supplies	10,280	2,259						
		Other			206,764					
	Improve global coverage	Salaries	41,942	41,712						
		Services	66,820							
		Travel	5,140							
		Supplies								
		Other			41,712					
	Improve data access	Salaries	20,971	20,856						
		Services	28,270							
		Travel								
		Supplies	1,234							
		Other			20,856					
	Increase developing country capacity	Salaries	41,942	41,712						
		Services	71,960							
		Travel	10,280							
		Supplies								
		Other			41,712					
	UNEP Support Costs		83,838	40,436	40,436					
			728,743	351,480		355,705	4,070	359,775	377,263	8,295

Year	Task	Item	Budget C\$	Spent C\$	Actual Total by component	Funds Provided by EC	Interest	Total Funds	Budget v Actual	Income v Expenses
2012-2013	Secure diversified financing	Salaries		112,304						
		Services		137,793						
		Travel		24,534						
		Supplies		9,790						
		Other			284,421					
	Improve global coverage	Salaries		44,921						
		Services		12,069						
		Travel								
		Supplies								
		Other			56,990					
	Improve data access	Salaries		22,461						
		Services		7,433						
		Travel								
		Supplies		24,692						
		Other			54,586					
	Increase developing country capacity	Salaries		44,921						
		Services		127,827						
		Travel								
		Supplies								
		Other			172,748					
	UNEP Support Costs		72,177	72,177						
			640,922		404,698	0	404,698		-236,224	

Year	Task	Item	Budget C\$	Spent C\$	Actual Total by component	Funds Provided by EC	Interest	Total Funds	Budget v Actual	Income v Expenses
2013-2014	Secure diversified financing	Salaries		188,152						
		Services		42,465						
		Travel		17,466						
		Supplies		113						
		Other		419	248,615					
	Improve global coverage	Salaries								
		Services								
		Travel								
		Supplies								
		Other								
	Improve data access	Salaries								
		Services		83,813						
		Travel								
		Supplies								
		Other			83,813					
	Increase developing country capacity	Salaries								
		Services		94,388						
		Travel								
		Supplies								
		Other			94,388					
	UNEP Support Costs		55,486	55,486						
			482,302		450,000	0	450,000		-32,302	

Year	Task	Item	Budget C\$	Spent C\$	Actual Total by component	Funds Provided by EC	Interest	Total Funds	Budget v Actual	Income v Expenses
	TOTALS				1,840,294			\$1,812,544.00		-\$27,750.00

NOTE: The sum of C\$ 4,554 was "deleted" in 2012-2013 due to UNEP accounting practices; loss possibly due to currency conversions to USD.

Table 2. GEMS/Water participation: 2010 - 2014

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
<b>Afghanistan (CFP Water &amp; Sanitation Program)</b>	2007	68			68			May 2004 - Dec 2005	2	Aral Sea, Hari/Harirud, Helmand, Indus, Kowl E, Murgab, Tarim
Albania	2010									Danube, Drin. Lake Prespa, Vijose
<b>Algeria</b>	2010	45				45		Jan 2004 - Mar 2010	7	Daoura, Dra, Guir, Lake Chad, Medjerda, Niger, Oued Bon Naima, Tafna
American Samoa										
Andorra										Ebro, Garonne
Angola										Chiloango, Congo/Zaire, Cuvelai/Etoshia, Kunene, Okavango, Zambezi
Anguilla										
Antarctica										
Antigua and Barbuda										
<b>Argentina - CFP IHLLA</b>	2013	3			3			Nov 1996 - Jan 2013	17	
<b>Argentina - CFP Pilcomayo River Basin Trinational Commission</b>	2013									
<b>Argentina</b>	2013	15	10	1	1	3		Sep 1979 - Dec 2011	33	Aviles, Aysen, Baker, Carmen Silva/Chico, Comau, Cullen, Gallegos-Chico, La Plata, Lake Fagnano, Palena, Pascua, Puelo, Rio Grande (LA), San Martin, Seno Union/Serrano, Valdivia, Yelcho, Zapaleri
Armenia										Kura-Araks
Aruba										
Ashmore & Cartier Islands (Australian)										
<b>Australia</b>	2012	11	8	1	1	1		Jan 1979 - Jul 2004	25	Murray-Darling
<b>Austria</b>	2000	6	6					Jan 1995 - Jan 1996	2	Danube, Elbe, Po, Rhine
Azerbaijan										Astara Chay, Kura-Araks, Samur, Sulak

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Bahamas, The										
Bahrain										
Baker & Howland Islands										
<b>Bangladesh</b>	<b>1998</b>	<b>9</b>	<b>5</b>		<b>3</b>	<b>1</b>		<b>Mar 1979 - Nov 1995</b>	<b>12</b>	Fenney, Ganges, Kamaphuli
<b>Bangladesh - CFP Hydro-Chemical Analysis - Chandpur District</b>	<b>2010</b>	<b>86</b>			<b>86</b>			<b>Jan 2004</b>	<b>1</b>	
Barbados										
Belarus										Daugava, Dnieper, Neman, Samur, Vistula/Wista, Volga
<b>Belgium</b>	<b>2013</b>	<b>77</b>	<b>75</b>		<b>1</b>	<b>1</b>		<b>Jan 1978 - Dec 2012</b>	<b>34</b>	Rhine, Schelde, Seine, Yser
Belize	2010									Belize, Grijalva, Hondo, Sarstun
Benin	2010									Mono, Niger, Oueme, Volta
Bermuda										
Bhutan										Ganges
<b>Bolivia</b>	<b>1982</b>	<b>2</b>				<b>2</b>		<b>Apr 1979 - Jul 1982</b>	<b>4</b>	Amazon, Cancoso/Lauca, La Plata, Lake Titicaca-Poopó, Zapaleri
<b>Bolivia - CFP ORE-HYBAM</b>	<b>2006</b>	<b>1</b>	<b>1</b>					<b>Jan 2003 - Sep 2005</b>	<b>3</b>	Amazon
<b>Bolivia - CFP Pilcomayo River Basin Trinational Commission</b>	<b>2013</b>	<b>4</b>	<b>4</b>							
Bosnia and Herzegovina										Danube, Krka, Neretva
Botswana										Limpopo, Okavango, Orange, Zambezi
Bouvet Island (Norwegian)										
<b>Brazil</b>	<b>2013</b>	<b>115</b>	<b>108</b>			<b>7</b>		<b>Sep 1971 - Oct 2013</b>	<b>42</b>	Amazon, Chuy, Corantijn/Essequibo, La Plata, Lagoon Mirim, Maroni, Oiapoque/Oyupock, Orinoco
<b>Brazil - CFP International Institute of Ecology</b>	<b>2007</b>	<b>1162</b>	<b>905</b>	<b>257</b>				<b>Oct 2003 - Dec 2004</b>	<b>2</b>	Amazon, Sa Francisco, Parana, Tocantins,
<b>Brazil - CFP ORE-HYBAM</b>	<b>2006</b>	<b>9</b>	<b>9</b>					<b>Jan 2003 - Oct 2005</b>	<b>3</b>	Amazon

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
British Indian Ocean Territory (British)										
British Virgin Islands (British)										
Brunei Darussalam										Bangau, Pandaruan
Bulgaria										Danube, Maritsa, Nestos, Rezvaya, Struma, Velaka
Burkina Faso	2005									Komoe, Niger, Volta
<b>Burundi</b>		<b>1</b>		<b>1</b>						Congo/Zaire, Nile
<b>Cambodia (Democratic Kampuchea)</b>	<b>2012</b>	<b>12</b>	<b>12</b>					<b>Aug 1993 - Mar 2009</b>	<b>17</b>	Mekong, Saigon, Song Vam Co Dong
<b>Cameroon</b>	<b>2005</b>									Akpa, Benito/Ntem, Congo/Zaire, Cross, Lake Chad, Niger, Ogooue
<b>Canada</b>	<b>2010</b>	<b>71</b>	<b>48</b>	<b>22</b>	<b>1</b>			<b>1965 - 2006</b>	<b>40</b>	Alsek, Chilkat, Columbia, Firth, Fraser, Mississippi, Nelson-Saskatchewan, Skagit, St. Croix, St. John (NA), St. Lawrence, Stikine, Taku, Whiting, Yukon
<b>Canada - CFP Huron-Erie Corridor</b>	<b>2008</b>	<b>97</b>	<b>38</b>	<b>59</b>				<b>2004</b>		
<b>Canada - CFP Saskatoon Wetlands</b>	<b>2006</b>	<b>18</b>					<b>18</b>	<b>1993-1997</b>		
Cape Verde										
Cayman Islands (British)										
<b>Central African Republic</b>	<b>2004</b>									Congo/Zaire, Lake Chad, Nile
Chad	2005									Lake Chad, Niger
<b>Chile</b>	<b>1988</b>	<b>3</b>	<b>2</b>		<b>1</b>			<b>May 1979 - Jun 1988</b>	<b>10</b>	Aviles, Aysen, Baker, Cancoso/Lauca, Carmen Silva/Chico, Comau, Cullen, Gallegos-Chico, Lake Titicaca-Poopó System, Lake Fagnano, Palena, Pascua, Puelo, Rio Grande (LA), San Martin, Seno Union/Serrano, Valdivia, Yelcho, Zapaleri
<b>China - CFP Hong Kong SAR</b>	<b>2013</b>	<b>2</b>				<b>2</b>		<b>Jan 1979 - Mar 2013</b>	<b>34</b>	

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
<b>China</b>	<b>2012</b>	<b>12</b>	<b>11</b>	<b>1</b>				<b>Jan 1980 - Nov 1997</b>	<b>18</b>	Amur, Aral Sea, Bei Jiang/His, Beilun, Ganges, Har Us Nur, Ili/Kunes He, Indus, Irrawaddy, Mekong, Ob, Pu Lun To, Red/Song, Salween, Sujfun, Tarim, Tumen, Yalu
Christmas Island										
Cocos Islands (Australian)										
<b>Colombia</b>	<b>2013</b>	<b>3</b>	<b>3</b>					<b>Mar 1981 - Aug 1988</b>	<b>8</b>	Amazon, Orinoco, Catatumbo, Jurado, Mataje, Mira, Patia
Comoros	2005									
Congo, Republic of the	2004									Chiloango, Cong/Zaire, Nyanga, Ogooue
Cook Islands (New Zealand)	2010									
Coral Sea Islands ( Australian)										
Costa Rica	2010									Changuinola, Chiriqui, San Juan, Sixaola
<b>Côte d'Ivoire</b>	<b>2010</b>	<b>12</b>	<b>12</b>					<b>1997-1999</b>	<b>3</b>	Bia, Cavally, Cestos, Komoe, Niger, Sassandra, Tano, Volta
Croatia	2010									Danube, Krka, Neretva
<b>Cuba</b>	<b>2005</b>	<b>3</b>			<b>1</b>	<b>2</b>		<b>Jan 1993 - Mar 1995</b>	<b>3</b>	
Cyprus										
Czech Republic										Danube, Elbe, Oder/Odra, Vistula/Wista
<b>Democratic Republic of the Congo - CFP ORE-HYBAM</b>	<b>2006</b>	<b>1</b>	<b>1</b>							Chiloango, Congo/Zaire, Nile, Zambezi
<b>Democratic Republic of the Congo</b>	<b>2010</b>	<b>1</b>	<b>1</b>					<b>Jul 1984</b>	<b>1</b>	Chiloango, Congo/Zaire, Nile, Zambezi
<b>Denmark</b>	<b>2001</b>	<b>6</b>	<b>6</b>					<b>Jan 1979 - Dec 1996</b>	<b>9</b>	Wiedau
Djibouti										Awash
Dominica										
Dominican Republic										Artibonite, Massacre, Pedemales
<b>Ecuador</b>	<b>2010</b>	<b>3</b>	<b>3</b>					<b>Oct 1979 - Dec 1986</b>	<b>8</b>	Amazon, Chira, Mataje, Mira, Patia, Tumbes-Poyango, Zarumilla
<b>Ecuador - CFP Chevron Inc - Western Amazon Basin</b>	<b>2010</b>	<b>391</b>						<b>Aug 2004 - Jun 2008</b>	<b>4</b>	Amazon

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Ecuador - CFP ORE-HYBAM )	2006	1	1					Jan 2003 - Jan 2006	3	Amazon
Egypt	2010	10	7	1	2			Jul 1979 - Dec 1980	2	Jordan, Nile
El Salvador	2010									Goascoran, Lempa, Paz
Equatorial Guinea										Benito/Ntem, Mbe, Ogooue, Utamboni
Eritrea										Baraka, Gash, Nile
Estonia										Gauja, Narva, Pamu, Salaca
Ethiopia										Awash, Gash, Juba-Shibeli, Lake Turkana, Lotagipi Swamp, Nile
Falkland Islands (British)										
Faroe Islands (Denmark)										
Fiji	2010	1	1					Feb 1980 - May 2004	18	
Finland	2002	12	10	2				Jan 1979 - Sep 1998	20	Kemi, , Naatamo, Olanga, Oulu, Pasvik, Tana, Tome/Tomealven, Tuloma, Vuoksa
France	2010	20	20					Jan 1979 - Dec 1996	18	Bidasoa, Ebro, Garonne, Po, Rhine, Rhone, Roia, Schelde, Seine, Yser
French Guiana - CFP ORE-HYBAM	2006	2	2					Jan 2003 - Oct 2005	3	
French Polynesia (French)										
Gabon										Benito/Ntem, Congo/Zaire, Mbe, Nyanga, Ogooue, Utamboni
Gambia,The	2009									Gambia
Georgia										Coruh, Kura-Araks, Sulak, Terek
Germany	2008	20	20					Jan 1979 - Dec 1995	14	Danube, Elbe, Oder/Odra, Rhine, Wiedau
Ghana	2013	4	2	1		1		Jan 1991 - Dec 1995	5	Bia, Komoe, Tano, Volta
Gibraltar (British)										
Greece	2000	6	6					Jan 1990 - Dec 1995	6	Lake Prespa, Maritsa, Nestos, Struma, Vardar,Vijose
Greenland (Denmark)										
Grenada										

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Guadeloupe (French)										
Guam (USA)										
<b>Guatemala</b>	<b>2012</b>	<b>116</b>	<b>82</b>	<b>14</b>	<b>20</b>			<b>Jul 1981 -Jul 2012</b>	<b>2</b>	Belze, Candelaria, Coatan Achute, Grijalva, Hondo, Lempa, Motaqua, Paz, Sarstun, Suchiate
Guernsey (British)										
Guinea-Bissau										Corubal, Geba
Guinée, Republique de	2011									Cavally, Cestos, Corubal, Gambia, Geba, Great Scarcies, Little Scarcies, Loffa, Moa, Niger, Sassandra, Senegal, St. John (Africa), St. Paul
Guyana										Amacuro, Amazon, Barima, Corantijn/Essequibo
Haiti										Artibonite, Massacre, Pedemales
Heard & MacDonal Islands (Australia)										
Holy See (Vatican City)										
Honduras	2010									Choluteca, Coco/Segovia, Goascoran, Lempa, Motaqua, Negro
<b>Hungary</b>	<b>2010</b>	<b>4</b>	<b>2</b>	<b>1</b>	<b>1</b>			<b>Jan 1979 - Dec 1996</b>	<b>18</b>	Danube
Iceland										
<b>India</b>	<b>2010</b>	<b>72</b>	<b>60</b>		<b>12</b>			<b>Nov 1978 - Dec 2008</b>	<b>32</b>	Fenney, Ganges, Indus, Irrawaddy, Kaladan, Kamaphuli
<b>Indonesia</b>	<b>1994</b>	<b>22</b>	<b>12</b>		<b>8</b>	<b>2</b>		<b>Feb 1979 - Mar 1994</b>	<b>16</b>	Fly, Sembakung, Sepik, Tami, Tjeroaka-Wanggoe
<b>Iran</b>	<b>1993</b>	<b>20</b>	<b>5</b>	<b>2</b>	<b>12</b>	<b>1</b>		<b>Jan 1980 - Sep 1992</b>	<b>9</b>	Astara Chay, Atrak, BahuKalat/Dasht, Hari/Harirud, Helmand, Kowl E, Kura-Araks, Tigris-Euraphrates
<b>Iraq</b>	<b>2007</b>	<b>25</b>	<b>25</b>					<b>May 2005 - Apr 2007</b>	<b>2</b>	Tigris-Euraphrates
<b>Iraq - CFP University of Waterloo</b>	<b>2008</b>	<b>3</b>					<b>3</b>	<b>Apr - Aug 1973</b>	<b>1</b>	

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
<b>Ireland</b>	2001	4	4					Jan 1979 - Dec 1996	9	Bann, Castletown, Eme, Fane, Flurry, Foyle
Isle of Man (British)										
<b>Israel - CFP Lake Kinneret</b>	2010	1		1				Jan 1969 - Dec 2006	37	
<b>Israel</b>	2010	2		1	1			Jan 1980 - Aug 1981	2	Jordan, Tumen, Wadi Al Izziyah
<b>Italy</b>	2000	16	16					Jan 1979 - Dec 1995	7	Danube, Isonzo, Po, Rhine, Rhone, Roia
Jamaica	2004									
Jan Mayen (Norwegian)										
<b>Japan</b>	2013	32	17	11	2	2		Jun 1973 - Mar 2012	40	
Jarvis Island (USA)										
Jersey (British)										
Johnston Atoll (USA)										
<b>Jordan</b>	2010	4			3	1		Dec 1987 - Jul 1999	9	Jordan, Tigris_Euraphrates
<b>Kazakhstan</b>										Aral Sea, Ili/Kunes He, Ob, Oral/Ural, Pu Lun To, Volga
<b>Kenya</b>	2012	11	7	3	1			Feb 1977 - Mar 1988	4	Juba-Shibeli, Lake Natron, Lake Turkana, Lotagipi Swamp, Nile, Umba
Kingman Reef (USA)										
Kiribati										
<b>Korea, Democratic Republic of</b>										Amur, Han, Tumen, Yalu
<b>Korea, Republic of</b>	2012	12	12					Dec 1982 - Dec 2010	27	Han
Kosovo, Republic of - 2008										
<b>Kuwait</b>		2			2					
Kyrgyzstan										Aral Sea, Ili/Kunes He, Tarim
<b>Lao, People's Republic of</b>	2012	20	14				6	May 1985 - Dec 2008	24	Ca/Song Koi, Ma, Mekong, Red/Song Hong
Latvia										Barta, Daugava, Gauja, Lielupe, Neman, Pamu, Salaca, Samur, Venta

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Lebanon										An Nahr Al Kabir, Asi/Orontes, Jordan, Tumen, Wadi Al Izziyah
<b>Lesotho</b>	<b>2011</b>									Orange
Liberia										Cavally, Cestos, Loffa, Mana-Morro, Moa, St. John (Africa), St. Paul
<b>Libyan Arab Jamahiriya</b>		<b>5</b>			<b>5</b>					Lake Chad
Liechtenstein										Rhine
<b>Lithuania</b>	<b>2010</b>	<b>4</b>			<b>4</b>			<b>Sep 1991 - Jun 2004</b>	<b>12</b>	Barta, Daugava, Lielupe, Neman, Venta
<b>Luxembourg</b>	<b>2000</b>	<b>1</b>	<b>1</b>					<b>Jan 1979 - Dec 1995</b>	<b>8</b>	Rhine, Seine
<b>Macau (China)</b>										
Macedonia, The Former Yugoslav Republic of										Drin, Lake Prespa, Struma, Vardar
Madagascar	2010									
<b>Malawi</b>	<b>2005</b>									Congo/Zaire, Ruvuma, Zambezi
<b>Malaysia</b>	<b>1994</b>	<b>8</b>	<b>8</b>					<b>Feb 1979 - Dec 1992</b>	<b>13</b>	Bangau, Golok, Pandaruan, Sembakung
Maldives										
<b>Mali</b>	<b>1997</b>	<b>11</b>	<b>7</b>		<b>4</b>			<b>Sep 1987 - Oct 1996</b>	<b>7</b>	Komoe, Niger, Senegal, Volta
Malta										
<b>Marshall Islands</b>	<b>2010</b>	<b>1</b>			<b>1</b>			<b>Jan 2007 - Aug 2008</b>	<b>1</b>	
Martinique (French)										
Mauritania										Atui, Senegal
<b>Mauritius</b>	<b>2010</b>									
Mayotte (French)										
<b>Mexico</b>	<b>2010</b>	<b>16</b>	<b>11</b>	<b>1</b>	<b>3</b>	<b>1</b>		<b>Jan 1979 - Dec 1996</b>	<b>17</b>	Candelaria, Coatan Achute, Colorado, Grijalva, Hondo, Rio Grande (NA), Suchiate, Tijuana, Yaqui
Micronesia, Federated States of										
Midway Islands (USA)										
<b>Moldova, Republic of</b>	<b>2005</b>									Danube, Dniester, Kogilnik, Sarata

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Monaco										
<b>Mongolia</b>	<b>2010</b>	<b>4</b>	<b>4</b>					<b>Apr-Nov 2004</b>	<b>1</b>	Amur, Har Us Nur, Jenisej/Yenisey, Lake Ubsa-Nur, Ob, Pu Lun To
Montenegro										Danube, Drin, Krka, Vardar, Struma
Montserrat (British)										
<b>Morocco (Maroc)</b>	<b>2013</b>	<b>8</b>	<b>4</b>		<b>2</b>	<b>2</b>		<b>Jan 1985 - Dec 2012</b>	<b>26</b>	Daoura, Dra, Guir, Oued Bon Naima, Tafna
Mozambique										Buzi, Incomati, Limpopo, Maputo, Ruvuma, Sabi, Umbeluzi, Zambezi
Myanmar										Ganges, Irrawaddy, Kaladan, Kamaphuli, Mekong, Pakchan, Salween
Namibia										Cuvelai/Etosha, Kunene, Okavango, Orange, Zambezi
Nauru										
Navassa Island (USA)										
<b>Nepal</b>	<b>1999</b>	<b>8</b>	<b>8</b>					<b>Oct 1992 - Dec 1998</b>	<b>6</b>	Ganges, Indus
Netherland Antilles (Netherlands)										
<b>Netherlands</b>	<b>1996</b>	<b>15</b>	<b>14</b>	<b>1</b>				<b>Jan 1979 - Dec 1995</b>	<b>16</b>	Rhine, Schelde
New Caledonia (French)										
<b>New Zealand</b>	<b>2012</b>	<b>81</b>	<b>80</b>		<b>1</b>			<b>Jan 1979 - Dec 2011</b>	<b>33</b>	Waikato
Nicaragua	2010									Choluteca, Coco/Segovia, Negro, San Juan
<b>Niger</b>	<b>2010</b>	<b>79</b>	<b>74</b>	<b>1</b>	<b>4</b>			<b>Mar 1995 - Jul 1996</b>	<b>1</b>	Lake Chad, Niger
<b>Nigeria</b>	<b>2010</b>									Akpa, Cross, Lake Chad, Niger, Oueme
Niue (New Zealand)	2010									
Norfolk Island (Australian)										
Northern Mariana Islands (USA)										
<b>Norway</b>	<b>2013</b>	<b>18</b>	<b>14</b>	<b>3</b>	<b>1</b>			<b>Aug 1981 - Dec 1993</b>	<b>13</b>	Glama, Jacobs, Kemi, Klaralven, Naatamo, Pasvik, Tana, Tome/Tomealven
Oman										

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
<b>Pakistan</b>	<b>2010</b>	<b>7</b>	<b>4</b>	<b>1</b>	<b>1</b>	<b>1</b>		<b>May 1979 - Mar 2003</b>	<b>25</b>	Aral Sea, BahuKalat/Dasht, Helmand, Indus, Tarim
Palau										
Palestine	2010	74						Nov2009-sample data		Jordan
Palmyra Atoll (USA)										
<b>Panama</b>	<b>2012</b>	<b>3</b>	<b>2</b>	<b>1</b>				<b>March 1979 - Aug 1986</b>	<b>7</b>	Chanquinola, Chiriqui, Jurado, Sixaola
<b>Panama - CFP Panama Canal Authority</b>	<b>2013</b>	<b>83</b>	<b>61</b>	<b>22</b>				<b>Jan 2003 - Dec 2010</b>	<b>7</b>	
<b>Papua New Guinea</b>		<b>1</b>	<b>1</b>					<b>Aug 1979</b>	<b>1</b>	Fly, Sepik, Tami, Tjeroaka-Wanggoe
Paracel Islands										
Paraguay	2012									La Plata
<b>Paraguay - CFP Pilcomayo River Basin Trinational Commission</b>	<b>2013</b>									
<b>Peru</b>	<b>2010</b>	<b>10</b>	<b>3</b>		<b>7</b>			<b>Dec 1979 - Sep 1983</b>	<b>4</b>	Amazon, Chira, Lake Titicaca-Poopó System, Tumbes-Poyango, Zarumilla
<b>Peru - CFP ORE-HYBAM</b>	<b>2006</b>	<b>2</b>	<b>2</b>					<b>Jan 2003 - Oct 2005</b>	<b>3</b>	
Peter Island (Norwegian)										
<b>Philippines</b>	<b>2010</b>	<b>4</b>	<b>2</b>	<b>1</b>		<b>1</b>		<b>Jan 1979 - Dec 2004</b>	<b>20</b>	
Pitcairn Islands (British)										
<b>Poland</b>	<b>2004</b>	<b>8</b>	<b>6</b>	<b>1</b>	<b>1</b>			<b>Dec 1991 - Oct 2003</b>	<b>13</b>	Danube, Dniester, Elbe, Lava/Pregel, Neman, Oder/Odra, Prohladnaja, Vistula/Wista
<b>Portugal</b>	<b>2010</b>	<b>13</b>	<b>12</b>			<b>1</b>		<b>Jan 1980 - Sep 1994</b>	<b>15</b>	Douro/Duero, Guadiana, Lima, Mino, Tagus/Tejo
Puerto Rico (USA)										
Qatar										
Reunion (French)										
Romania										Danube

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
<b>Russian Federation</b>	<b>2013</b>	<b>43</b>	<b>32</b>	<b>8</b>		<b>3</b>		<b>Jan 1980 - Dec 2012</b>	<b>33</b>	Amur, Daugava, Dnieper, Don, Elancik, Har Us Nur, Jacobs, Jenisej/Yenisey, Kemi, Kura-Araks, Lake Ubsa-Nur, Lava/Pregel, Mius, Narva, Neman, Ob, Olanga, Oral/Ural, Oulu, Pasvik, Prohladnaja, Pu Lun To, Samur, Sujfun, Sulak, Terek, Tuloma, Tumen, Volga, Vuoksa
<b>Russian Federation - CFP</b>	<b>2014</b>	<b>10</b>	<b>7</b>	<b>3</b>				<b>Sept-Oct 2013</b>	<b>1</b>	
<b>Rwanda</b>	<b>2012</b>									Congo/Zaire, Nile
Saint Helena & Dependencies (British)										
Saint Kitts and Nevis										
Saint Lucia										
Saint Martin										
Saint Pierre & Miquelon (French)										
Saint Vincent and the Grenadines										
Saint. Barthelemy										
Samoa										
San Marino (an enclave in central Italy)										
Sao Tome and Principe										
<b>Saudi Arabia</b>		<b>4</b>			<b>1</b>	<b>3</b>				Tigris-Euraphrates
<b>Senegal</b>	<b>2010</b>	<b>11</b>	<b>5</b>	<b>1</b>	<b>5</b>			<b>Feb 1986 - Mar 2000</b>	<b>8</b>	Gambia, Geba, Senegal
Serbia										Danube, Drin, Krka, Vardar, Struma
Seychelles										
Sierra Leone										Great Scarcies, Little Scarcies, Mana-Morro, Moa, Niger
<b>Singapore</b>	<b>2010</b>	<b>13</b>				<b>13</b>		<b>Jan 2004 - Jan 2009</b>	<b>5</b>	
<b>Slovakia (Slovak Republic)</b>	<b>2010</b>									Danube, Oder/Odra, Vistula/Wista
Slovenia										Danube, Isonzo
Solomon Islands										

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Somalia										Awash, Juba-Shibeli
<b>South Africa</b>	<b>2012</b>	<b>29</b>	<b>22</b>			<b>7</b>		<b>Jan 1990 - Dec 2010</b>	<b>20</b>	Incomati, Limpopo, Maputo, Orange, Umbeluzi
<b>South Africa - Hartbeespoort Dam - CFP</b>	<b>2010</b>	<b>1</b>				<b>1</b>		<b>Jan 1982 - Dec 1988</b>	<b>7</b>	Limpopo
<b>South Africa Wetlands - CFP</b>	<b>2005</b>	<b>79</b>					<b>79</b>	<b>May 1987 - Jan 1989</b>	<b>3</b>	
South Georgian & South Sandwich Islands (British)										
<b>Spain</b>	<b>2001</b>	<b>21</b>	<b>20</b>		<b>1</b>			<b>Jan 1979 - Dec 1995</b>	<b>10</b>	Bidasoa, Douro/Duero, Ebro, Garonne, Guadiana, Lima, Mino, Tagus/Tejo
Spratly Islands										
<b>Sri Lanka</b>	<b>2013</b>	<b>49</b>	<b>34</b>	<b>14</b>	<b>1</b>			<b>Aug 1979 - Jan 2013</b>	<b>16</b>	
<b>Sudan</b>	<b>2010</b>	<b>4</b>	<b>2</b>		<b>1</b>	<b>1</b>		<b>Jan 1980 - Aug 1992</b>	<b>13</b>	Baraka, Congo/Zaire, Gash, Lake Chad, Lake Turkana, Lotagipi Swamp, Nile
Sudan, South										
Suriname										Amazon, Corantijn/Essequibo, Maroni
Svalbard (Norwegian)										
Swaziland										Incomati, Maputo, Umbeluzi
<b>Sweden</b>	<b>2001</b>	<b>15</b>	<b>11</b>	<b>1</b>	<b>3</b>			<b>Jan 1978 - Dec 1995</b>	<b>15</b>	Glama, Klaralven, Tome/Tomealven
<b>Switzerland</b>	<b>2003</b>	<b>7</b>	<b>7</b>					<b>Jan 1978 - Dec 2002</b>	<b>25</b>	Danube, Po, Rhine, Rhone
Syrian Arab Republic										An Nahr Al Kabir, Asi/Orontes, Jordan, Nahr El Kebir, Tigris-Euraphrates
Taiwan (China)										
<b>Tajikistan</b>										Aral Sea, Tarim
<b>Thailand</b>	<b>2010</b>	<b>27</b>	<b>25</b>		<b>1</b>	<b>1</b>		<b>Jan 1978 - Dec 2008</b>	<b>31</b>	Golok, Mekong, Pakchan, Salween ( <i>Chao Phya</i> )
Timor-Leste (East Timor)										
Togo										Mono, Oueme, Volta
Tokelau (New Zealand)										

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Tonga										
Trinidad and Tobago	2004									
Tunisia	1982	7	1	1	5			Feb 1980 - Dec 1982	3	Medjerda
Turkey	2003	14	11	1	2			Apr 1971 - Oct 2002	29	Asi/Orontes, Coruh, Kura-Araks, Maritsa, Nahr El Kebir, Rezvaya, Tigris-Euraphrates, Velaka
Turkmenistan										Aral Sea, Atrak, Hari/Harirud, Murgab
Turks & Caicos Islands (British)										
Tuvalu										
Uganda	2012	17	10	7				Apr 1978 - Dec 1980	3	Congo/Zaire, Lake Turkana, Lotagipi Swamp, Nile
Uganda - CFP Lake Victoria	2005	13		13				1994-1996	3	Lake Victoria
Ukraine										Danube, Dnieper, Dniester, Don, Elancik, Kogilnik, Mius, Sarata, Vistula/Wista
United Arab Emirates										
United Kingdom	2006	28	23		2	3		Apr 1974 - Dec 2005	32	Bann, Castletown, Eme, Fane, Flurry, Foyle
United Republic of Tanzania	2013	9	4	3	2			Apr 1978 - Aug 2012	36	Congo/Zaire, Lake Natron, Nile, Ruvuma, Uмба, Zambezi
United States of America	2007	547	547					1976 - Sep 2005	30	Alsek, Chilkat, Colorado, Columbia, Firth, Fraser, Mississippi, Nelson-Saskatchewan, Rio Grande (NA), Skagit, St. Croix, St. John (NA), St. Lawrence, Stikine, Taku, Tijuana, Whiting, Yaqui, Yukon ( <i>Alabama &amp; Tombigbee, Hudson, Sacramento, Susquehanna</i> )
Uruguay	2010	5	4		1			Oct 1981 - Nov 1987	7	Chuy, Lagoon Mirim, La Plata ( <i>Uruguay</i> )
Uzbekistan	2004									Aral Sea
Vanuatu	2010									
Venezuela										Amacuro, Amazon, Barima, Catatumbo, Essequibo, Orinoco

Countries and Areas	Last updated	Total # of Stations	River Stations	Lake Stations	Ground-water Stations	Reservoir Stations	Wetland Stations	Temporal Coverage	Total # of Years of Data	Basin Name
Venezuela - CFP ORE-HYBAM	2006	1	1							
Viet Nam	2012	54	54					May 1985 - Dec 2008	24	Bei Jiang/His, Beilun, Ca/Song Koi, Ma, Mekong, Red/Song, Saigon, Song Vam Co Dong
Virgin Islands (USA)										
Wake Island (USA)										
Wallis & Futuna (French)										
Western Sahara										Atui
Yemen										
Zambia	2012									Congo/Zaire, Zambezi
Zimbabwe	2004									Buzi, Limpopo, Okavango, Sabi, Zambezi
Zimbabwe - CFP Lake Kariba	2010	10		10				Apr2008 - Jul2009	1	Zambezi

## G. Project partners

38. Table 2 presents a summary of the participation within the GEMS/Water Programme by Member States and collaborating entities. Again, it should be noted that the levels and extent of participation varies by Member State and Collaborating entity span a range of intensities from countries that simply appoint a National Focal Point (NFP) to countries that provide a link to their web-based data sources to countries and collaborating entities who supply data to the GEMS/Water data base. The level and extent of participation is voluntary.

39. Project staff reported that participation in the GEMS/Water data base have had unexpected benefits to Member States. For example, the GEMS/Water data base provides an important back up for national or other local data bases which might be damaged or fail for a wide range of reasons, including civil unrest, human error, and/or natural disaster.

## H. Changes in design during implementation

40. There were no changes in project design during implementation during the 2010-2014 project period. No changes were evident from a review of the project documents or revealed during discussions with project staff.

## I. Reconstructed Theory of Change of the project

41. Sound data are the foundation of good planning, and good planning is essential for effective environmental management. This is especially true for transboundary waters where shared data, agreed by all stakeholders, are critical to developing appropriate and acceptable and applicable plans and strategies.

42. That said, data are expensive to acquire, requiring skilled manpower to collect environmental samples from known locations, skilled analysts to manage the samples in the laboratory, (potentially) expensive laboratories and analytical equipment, and knowledgeable professionals to interpret and act upon the results. Consequently, many organizations are beginning to rely more heavily on modelling data, generated from a range of (generally) temperate zone algorithms, and remotely sensed data, generated from earth observation satellites. The latter are often focused on the northern hemisphere as their operators and owners are generally located in that region. This can result in uneven global coverage. Further, the use of temperate zone algorithms may limit applicability of remotely sensed data outside of this zone. All this is to say that, no matter how important to the development of good plans and strategies for environmental management, data acquisition would appear to be declining worldwide even as the volume of information is increasing as a result of remote sensing and modelling.

43. A second consequence of the high cost of data collection is the frequent unwillingness of the owners of the data to share such data outside of their own operations. Whether by governments or academic institutions, ambient quality data are often seen as proprietary. Especially in recent years, after 2001, environmental quality data also are being viewed as strategic information vital to national security, further reducing the willingness to share such information in wider fora.

44. A further factor to be considered is the increasing use of web-based dissemination methodologies by national and subregional data-generating entities. The publication of data using the internet by the

institutions generating the data could increase their reluctance to post such data using a third-party server, such as GEMS/Water.

45. Notwithstanding, GEMS/Water offers value-added, especially in cases where the data are used or intended to be used across boundaries, whether local government boundaries or international boundaries. Ensuring the quality of the data, and the laboratories generating the data, allows users to place confidence in the information. While this benefit may not be sufficient to create traffic of such volume as to warrant the investment in maintaining the data base, GEMS/Water has the advantage of being accessible across the globe, and of offering users a single portal through which to access data, develop maps, and generate statistics such as loading rates and water quality indices which are vital for use in water resources management.

46. These considerations underlie the reconstructed theory of change model for the GEMS /Water Programme, shown in the Figure 2, which is drawn from the information set forth in Appendix E of the Contribution Arrangement. The overall objective of GEMS/Water was to support environmental assessment and reporting processes on the state and trends of water resources at the global, regional, and national levels by providing access to quality-assured data and information on water quality in freshwater ecosystems worldwide. Thus, the ultimate objective would be enhanced assessment and reporting of water quality information at all levels. The Impacts, therefore, would be better data and better assessments, leading to better decisions and therefore improved water quality.

47. The outcomes necessary to support these impacts focus on: (i) the availability of adequate finance to support both data acquisition as well as storage and management, (ii) the presence of trained and professional staff to assist participating countries, deliver training and capacity building services, and operate and improve the data storage Programme, (iii) the continued input of quality assured and quality controlled data from existing and new monitoring stations and locations, (iv) the development and implementation of new data acquisition and management tools, and (v) the dissemination of knowledge and promotion of partnerships to undertake water quality improvement Programmes and actions. Knowing the quantitative and actual status of a water resource is the first step in determining whether that resource would meet the demands being made upon the resource, as well as potential future demands likely to be made upon the resource. Sound management decisions cannot be made without a realistic assessment of the current state of the resource. In this regard, knowledge of the quality of a specific water resource is critical to determining and formulating remedial Programmes of management, if necessary, and/or protection.

48. In parallel with the functional responsibilities of the GEMS/Water Programme are the support functions associated with running the Programme effectively. These responsibilities include gaining a diversified base of support to financially sustain the Programme as well as increasing the coverage of the GEMS/Water data base by adding to the base of data suppliers. A broader and more representative data base will encourage a wider range of data users and the data base and data management tools will serve a wider cross-section of the international, regional and local communities (who will access the data and information using portals such as UNEP Live). The support functions also serve to inform GEMS/Water of emerging concerns and data needs and needs for new data products. Hence, the relationship between the outcomes of the Programme as a whole and the outcomes of Programme administration become

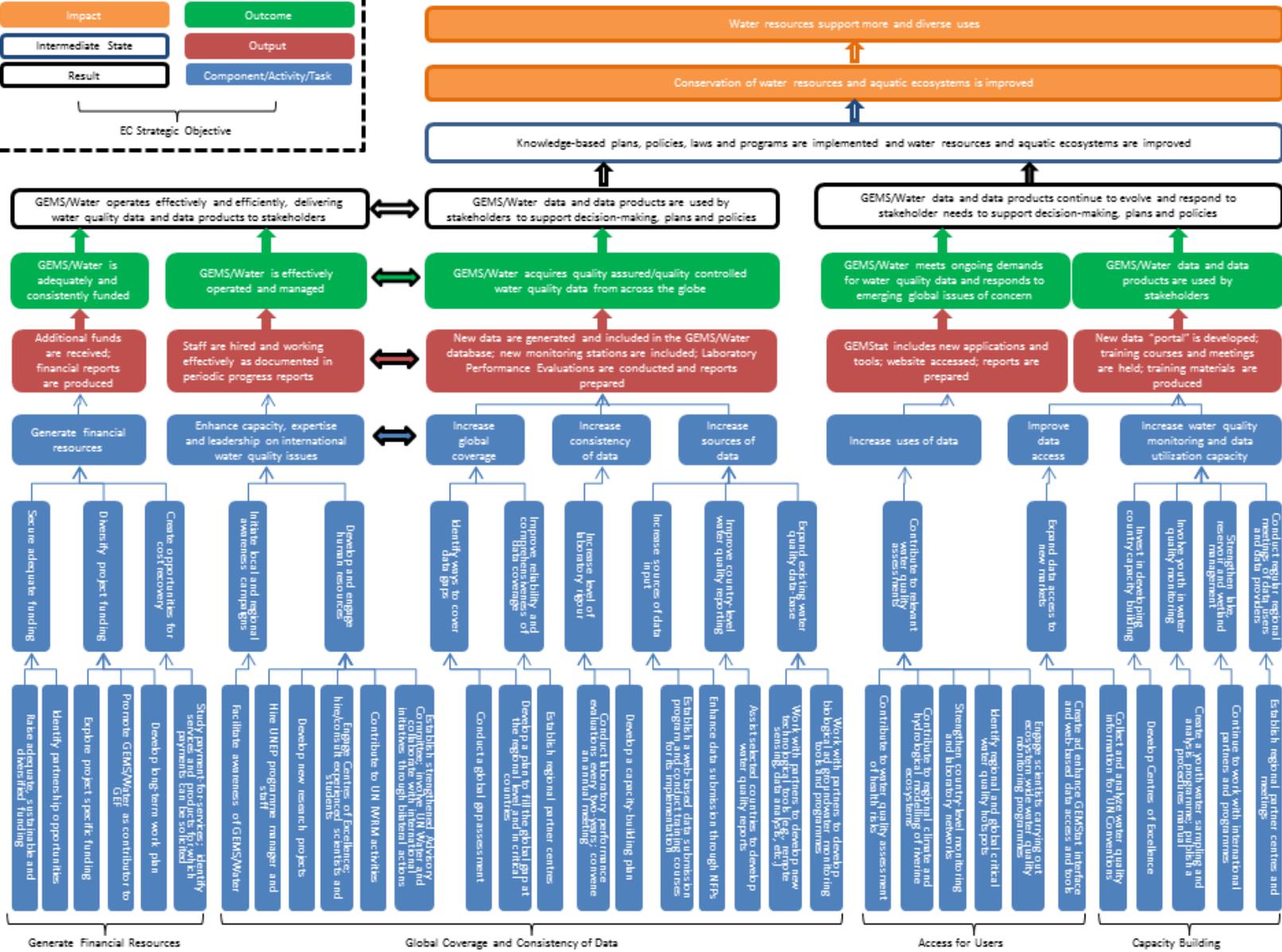
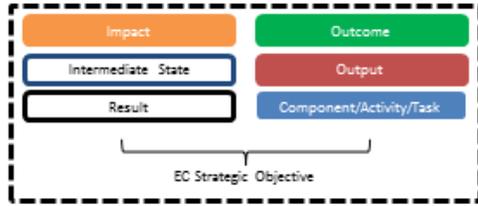
interactive, with the stakeholders actively supporting and participating in the Programme not only through their application of data and data-based knowledge for country and regional applications but also contributing to the ongoing sustainability of the Programme itself.

49. The ability of GEMS/Water to achieve these objectives and associated outcomes is influenced by both internal factors (drivers) and external factors (assumptions) that can affect the degree to which the project which can achieve success. These factors are summarized in Table 3, which sets out the basic drivers and preconditions assumed to be necessary for the successful completion of the GEMS/Water Programme. For ease of analysis, the drivers or internal aspects of the Programme necessary to achieve a successful result are divided into types that follow the “who, what, where, when and how” outline; the assumptions necessary to achieve the Programme results are also set forth in a similar format.

50. Achieving the desired outcomes requires the production of a range of products or outputs. These outputs include not only data but also various analyses and meta-data such as contaminant loads and water quality indices that are calculated from the data managed within the GEMS/Water database. Using the GEMStat functions, these outputs can be generated for the various waters for which data are available within GEMS/Water.

51. Finally, the activities necessary to produce the outputs must be satisfactorily carried out. These are the functions of (1) *project management*, which oversee the operations of the Programme from the financial, administrative, staffing and scientific perspectives, and include the identification of stakeholders in the form of (2) *data providers* who generate the data on the state of water resources (knowledge), and (3) partnerships with the stakeholders who comprise the *data users*, by providing access to the GEMS/Water database through an appropriate interface, and contributing support to the stakeholders to facilitate their participation and utilization of the GEMS/Water data and meta-data products. In addition, the functions also include the recognition of civil society, NGOs and others who are critical to the successful management of water quality and who require informational materials to enhance their awareness of their role in water quality management. These three focal areas are shown in Figure 2 as the three outcomes elaborated in the white box with the blue border in the Figure.

52. The roles of these three groups of partners (e.g., data managers, data providers, and data users) are interactive, as shown by the double-headed arrow in Figure 2 linking the project management function with the data acquisition and dissemination functions. All three sets of actions are necessary to the conduct of the primary activities of data gathering and utilization (monitoring, analysis including quality control/quality assurance or QA/QC; and institutional arrangements).



**Figure 2. Reconstructed Theory of Change Model for the GEMS/Water Programme.**

NOTE: The lowest level of blue blocks indicates activities needed to accomplish the major tasks (second level of blue blocks) within each component (top level of blue blocks) identified in the Contribution Arrangement. These tasks and activities generate the outputs/deliverables shown in the red blocks, leading to the outcomes identified in the green blocks. These outcomes directly support the desired longer-term results intended for the project set forth in the white blocks and to the desired changes set forth in the orange blocks. In general, the three pillars upon which the GEMS/Water Programme is established rely directly on data providers and data users, and are supported by the project administration

**Table 3. Analysis of Drivers and Assumptions**

DRIVERS		WHY	WHO	WHAT
OUTCOMES	GEMS/Water is adequately and sustainably funded	Funds are necessary not only for collecting and analyzing water samples but also for storing, processing, and disseminating data and data products.	Governments and other data users are stakeholders; water quality data acquisition is primarily a governmental function allied to protection of public health and welfare.	Countries and other stakeholders utilize water quality data for protecting public health and welfare, identifying sources of pollution as well as materials of value, and managing waters for multiple purpose uses.
	GEMS/Water is effectively operated and managed	Staff are necessary to coordinate and conduct data acquisition and analysis Programmes, compile and analyze data, and manage the sites from which data are collected.	Human resources are required at all levels; from the Programme administration perspective, staff are required to coordinate Programme activities in outreach, information production, and data management.	Staff are required for Programme coordination, product development and delivery, data management and dissemination, and Programme promotion and development.
	GEMS/Water acquires quality assured/quality controlled water quality data from across the globe	Given the regulatory and societal applications of data and data products, stakeholders must have confidence in the provenance of the data, especially in transboundary waters.	Stakeholders, including governments, citizens, and corporations.	Quality assurance/quality control (QA/QC); laboratory performance evaluations; training of staff; and, building capacity for data analysis and utilization.
	GEMS/Water meets ongoing demands for water quality data and responds to emerging global issues of concern	Water quality analytes address specific ecological and legal requirements, and must change as the regulatory and societal data demands change and evolve.	Stakeholders, including governments, citizens, and corporations.	Analytes should include not only inorganic elements but also organic analytes such as chlorophyll-a, bacteria, and complex/synthetic organic chemicals; emerging analytes include pharmaceuticals and growth hormones
	GEMS/Water data and data products are used by stakeholders	Data are essential for making informed decisions, determinations of regulatory excesses and ecosystem degradation, and impacts of environmental management Programmes.	Stakeholders, including governments, citizens, and corporations.	Stakeholders use water quality data to modify practices and procedures, create and amend laws and regulations, and determine policies and Programmes to ensure safe and sustainable supplies of good quality water.
ASSUMPTIONS		Governments and other stakeholders will have an ongoing need for high quality data	Governments and other stakeholders collect water quality data	Governments and other stakeholders provide data and information to GEMS/Water
RESULTS		<b>KNOWLEDGE-BASED PLANS AND LAWS PREPARED AND IMPLEMENTED:</b> Conservation of water resources and aquatic ecosystems is enhanced <b>WATER QUALITY ENHANCED:</b> Water resources support and sustain more and diverse uses		
DRIVERS		WHEN	WHERE	HOW

<b>OUTCOMES</b>	GEMS/Water is adequately and sustainably funded	Ongoing (annual) authorization, appropriation, and allocation of funding to support data collection Programmes at the local and national levels, and GEMS/Water data storage and information development Programmes is required.	Funds to support monitoring Programmes at the local and country levels as well as funds to support staff and data storage facilities and outreach Programmes at the international level are required.	<ul style="list-style-type: none"> <li>• Consider payments for services options</li> <li>• Identify partnership opportunities</li> <li>• Explore project-specific funding</li> <li>• Promote GEMS/Water role in GEF and related Programmes</li> <li>• Develop a long-term work Programme</li> <li>• Seek ongoing support from governments and NGOs</li> </ul>
	GEMS/Water is effectively operated and managed	Dedicated GEMS/Water staff are required to operate the data storage and management systems, information development, and capacity building Programmes; dedicated local and national staff are required to acquire water samples and analyze data.	GEMS/Water staff should be located both at UNEP and its regional offices, possibly in centres-of-excellence, and in the collaborating organizations such as BfG, UCC, and centres-of-excellence.	<ul style="list-style-type: none"> <li>• Establish strengthened Advisory Committee</li> <li>• Contribute to UN Water activities</li> <li>• Engage centres-of-excellence</li> <li>• Develop new research projects</li> <li>• Adequately staff UNEP GEMS/Water unit and related entities</li> <li>• Facilitate awareness of GEMS/Water</li> </ul>
	GEMS/Water acquires quality assured/quality controlled water quality data from across the globe	Data acquisition should be based upon rigorous protocols based upon hydrological, medical, and related data collection Programme requirements, generally associated with legal and public health requirements and societal demands	All water supply reservoirs (natural and constructed) should be monitored regularly; recreational waters; waters utilized for specific industrial processes; water treatment and wastewater treatment facilities; and other locations related to ecosystem health and sustainability.	<ul style="list-style-type: none"> <li>• Work with partners to develop biological and groundwater monitoring tools and Programmes</li> <li>• Work with partners to develop new technological tools</li> <li>• Assist countries to develop water quality reports</li> <li>• Enhance data submission</li> <li>• Establish web-based data submission program</li> <li>• Develop capacity-building plans</li> <li>• Conduct laboratory performance evaluations</li> <li>• Establish regional partnerships</li> <li>• Develop a plan to fill data gaps</li> <li>• Conduct global data gap assessment</li> </ul>

	GEMS/Water meets ongoing demands for water quality data and responds to emerging global issues of concern	Governments and other stakeholders will continue to require sound data and data products to support regulatory and ecosystem management Programmes and projects; some of these projects will be ongoing while some will be episodic or periodic in nature while others will be research oriented	Sampling should focus on key lakes and reservoirs, rivers (especially at key river confluences), wetlands, and groundwater extraction points.	<ul style="list-style-type: none"> <li>• Engage scientists carrying out ecosystem and water quality assessments and Programmes</li> <li>• Identify critical hot spots around the world</li> <li>• Strengthen monitoring and analysis (laboratory) networks</li> <li>• Contribute to regional and global climate and hydrological modelling</li> <li>• Contribute to water quality assessment of health risks</li> </ul>
	GEMS/Water data and data products are used by stakeholders	Water supply and wastewater treatment facilities require regular monitoring for public health purposes; factories and outfall require periodic monitoring for regulatory compliance purposes; ecosystems require periodic monitoring to establish ecosystem health status; and data are required for research and development.	Ongoing in the case of monitoring Programmes; periodic in the case of research Programmes; and episodic in other cases.	<ul style="list-style-type: none"> <li>• Establish regional partners</li> <li>• Collaborate with international partners</li> <li>• Create and support youth monitoring Programmes</li> <li>• Develop centres-of-excellence</li> <li>• Collect and analyze water quality data for UN conventions</li> <li>• Create and enhance the GEMStat interface and utilities</li> </ul>
<b>ASSUMPTIONS</b>	Governments and stakeholders understand the need for and use of water quality data and information	Global and transboundary waters especially require shared data for sound management and sustainable use	Governments and other stakeholders utilize the water quality data and information	

NOTE: The colour code mirrors the colour scheme utilized in Figure 2: Outcomes are identified in the green blocks. These outcomes directly support the desired longer-term results intended for the project set forth in the white (intermediate results) and orange (longer-term changes) blocks.

## IV. Evaluation Findings

53. Based upon the foregoing background and observations, this part of the Terminal Evaluation sets forth the findings of the external evaluator with respect to the GEMS/Water Programme. This section is intended to be synthetic, bringing together a review of the project as it was executed by the Government of Canada during the period from October 2010 through March 2014 with a look forward to the next phase of the project as it will be executed by UNEP in collaboration with the Governments of Germany and Ireland. This section is predicated upon the belief that water quality data remain a vital and essential component of any water quality management and planning Programme, whether at the local/community level, national level, or regional and global levels. Nevertheless, while GEMS/Water is perfectly placed to ensure the acquisition and dissemination of such data, especially for transboundary and transjurisdictional waters, the Programme will need to move beyond simple data cataloguing to offering value-added services such as those associated with water resources planning and management. This importance is underlined by the UN Environment Assembly Resolution/Decision 10 of 2014.

### A. Strategic relevance

54. The availability and accessibility of data is a critical element of immense importance for any strategy intended to ensure the sustainability and usability of freshwater resources for the survival of humans and ecosystems and support of human economies. Identification and protection of waterbodies with good water quality is important and even more critical than the assessment and rehabilitation of waterbodies with poor water quality, although it is the latter that generally tend to be monitored for purposes of water resource management interventions. Notwithstanding, the essential relevance of the GEMS/Water Programme is the acquisition, compilation and dissemination of water quality data; data being fundamental to sound lake and reservoir planning and management. Data are central to the Theory of Change model, shown in Figure 2, and the focus of the GEMS/Water project has been on the acquisition and dissemination of quality controlled/quality assured data. New data have been acquired and incorporated into the GEMS/Water database and are accessible to users through the GEMStat portal. The conduct of GEMS/Water training courses and laboratory performance evaluations during the project period has been critical to the quality control/quality assurance of the data, and therefore to the integrity of the data, included in this data base.

55. The relevance of the GEMS/Water project is highlighted in the 2014 UN Environment Assembly Resolution/Decision 10 of 2014, which recognizes the central role of data in achieving water-related Sustainable Development Goals and its associated assessments, including the World Water Quality Assessment Report. To this end, the GEMS/Water Programme responds directly to those areas of the 2010-2011 UNEP Programme of Work, adopted by the Governing Council (UNEP/G.C.25/12 dated 7 October 2008) and the 2012-2013 UNEP Programme of Work, adopted by the Governing Council (UNEP/G.C.26/13 dated 18 October 2010), that call upon UNEP to “facilitate a cross-sectoral, integrated approach to ecosystem management to reverse the decline in ecosystem services and improve ecosystem resilience with respect to such external impacts as habitat degradation, invasive species, climate change, pollution and overexploitation. UNEP will continue to catalyse integrated approaches

for the assessment and management of freshwater, terrestrial, coastal and marine systems. In facilitating a more integrated approach, UNEP will draw upon its knowledge base and on its integrated environmental assessments for more effective management of natural systems on multiple scales and across sectors through technical and institutional capacity building.” However, while GEMS/Water responds directly to principles set forth in SubProgramme 3, Ecosystem Management, of the Programmes of Work, the Global Environment Monitoring Initiative (GEMI) is not explicitly mentioned in these documents.

56. Further, despite the important role of water quality data in water resources management and planning, GEMS/Water does not seem to have capitalized on their relative advantage over other data sources. While the Resolution/Decision 10 of 2014 of the UN Environment Assembly notes the central role of data in global and regional assessments, few of these assessments seem to have made explicit use of the GEMS/Water data base. For example, the Transboundary Waters Assessment Programme (TWAP), executed by UNEP and supported in part by the Global Environment Facility (GEF), has made little or no use of the GEMS/Water resources, despite citing GEMS/Water as one *potential* source of water quality data in the project document. This would appear to be illustrative of the experience of other GEF projects in the International Waters focal area. Consequently, this strategic area remains an opportunity for the future of GEMS/Water.

57. Despite this lack of overt recognition, UNEP DEWA staff have indicated that GEMS/Water data are being used by global and regional assessments without explicit acknowledgement or awareness of the role of GEMS/Water in their assessments. Specifically, staff have noted that the World Water Quality Assessment Programme (WWAP) has not only made use of specific indices included in the GEMStat interface but also that these indices were developed under the auspices of the GEMS/Water Programme as a work product/output. Consequently, GEMS/Water has played a valuable, if unseen, role in the successful execution of that global assessment.

58. It may be the fate of data collection and distribution platforms to remain unseen and unrecognized. However, it also is a feature of such Programmes that in meeting the needs for data the platforms become mired in “business as usual” and fail to adapt to changing needs for data and remain a relevant project. That said, GEMS/Water has shown an ability to change and adapt, for example, by adding pesticides/persistent organic pollutants (POPs) to its list of analytes in recent years. Further, the emergence of GEMStat also is indicative of the ability of GEMS/Water to develop and grow beyond a data collection platform. This function adds value to the data by allowing users to calculate contaminant loads and water quality indices, among other potential outputs, as value-added products that extend the value of the data themselves. (It is important to recognize the fact that these other data products require access to basic data.)

59. Future development of the GEMS/Water platform will have to take note of a number of innovations in environmental monitoring that are currently emerging:

- i. *The existence and ongoing creation of national water quality databases.* Table 2, for example, note that some GEMS/Water participants already have links in place to take users from their

data collection and dissemination platforms, suggesting that GEMS/Water might consider extending this network-of-networks approach, in a similar vein to the approach utilized by UNEP Live.

ii. *The increasing coverage, utilization, and capability of remote sensing technologies.* While remote sensing and satellite observing systems continue to develop and gain ground as monitoring technologies being adopted in the northern hemisphere, it should be noted that ground truthing of such data continue to be required and necessary for interpretation of the remotely-sensed information. GEMS/Water should play an increasing role in coordinating data collection efforts at the national and regional levels to coincide with satellite passages as part of a global effort to enhance the value of satellite-based technologies. Linking the outputs from these global monitoring efforts with the GEMS/Water data base also presents possibilities for the future development of the Programme.

iii. *The increasing number of citizen scientists.* Aging populations are bringing an unexpected bonus for environment observations and monitoring; specifically, persons with skills and training are retiring and, in the northern hemisphere, are moving into lake-oriented communities. While few of these retirees are trained as natural scientists, they do represent a skills base that can be developed into a cadre of citizen scientists. In addition, the inclusion of environmental science in schools curricula is leading to an increasing number of young people with an interest in their environment. Countries such as Brasil and the United States are tapping in to this pool of interested persons in local communities to supplement the water resources professionals involved in water quality monitoring. While these volunteers and citizen scientists will not replace water resources professionals in the field, they can supplement these individuals, especially in tasks such as the collection of water quality data from many smaller waterbodies in concert with the remote sensing technologies.

60. The foregoing also will require GEMS/Water to consider and potentially incorporate modifications to its capacity building Programmes:

i. *Determination of the level at which capacity building will be delivered.* Waterbodies have discrete locations that can be identified and geo-located. Consequently, water quality monitoring is a community level activity, with sampling sites being situated within local communities (or groups of communities). That said, GEMS/Water is an international Programme delivered at the national level. Consequently, consideration of Programmes such as train-the-trainer courses are important considerations for the future development and delivery of training courses under the auspices of GEMS/Water. Such Programmes could easily be delivered through the proposed regional hubs being created under the auspices of GEMS/Water.

ii. *Determination of the role of short-term studies.* Review of the GEMS/Water data base suggests that at least some of the data are connected with short-term investigations, while other data are part of ongoing (national-scale) monitoring Programmes. While short-term or one-off studies have value and should not be ignored, the data generated through such

purpose-driven studies can become out-dated as time continues to pass after the end of the studies. While these data may continue to be useful for determining temporal trends, they would have limited value in defining the current status of a waterbody. A typical example of such data would be data generated from studies conducted as part of graduate research programmes or targeted research programmes. While these data generally have a defined provenance and follow appropriate quality assurance/quality control practices and are “good” data, they probably should be treated in a different manner within the GEMS/Water system, especially when contrasted to ongoing water quality monitoring Programmes.

iii. *Determination of curricula and curriculum modules.* Given the diversity of development levels of the world’s nations, there remains a need for a full range of training opportunities under the GEMS/Water umbrella. Certainly, the Laboratory Performance Evaluations have been globally recognized for their value and utility, and should remain a stalwart of the GEMS/Water Programme. The next Laboratory Performance Evaluation (PE 9) should be held during 2016. The following elements, new and existing, might be considered:

- Establishing/enhancing water quality monitoring Programmes: including locating stations, selection of parameters, determining frequencies of sampling, and similar basic information for the establishment or strengthening of water quality monitoring Programmes.
- Basic and advanced laboratory practices: including quality assurance/quality control, methods, laboratory procedures, safety and practices, and data storage and dissemination.
- Data storage and handling: including procedures associated with sharing data through the GEMS/Water platform.
- Data analysis, processing and utilization: including basic data statistics, use of simple and complex water quality models, and development of lake and reservoir management plans utilizing the data. This also could include selection of the water quality parameters to be monitored.

61. In summary, GEMS/Water has continuing strategic relevance and importance in our changing world. Data remain an essential part of water resources planning and management, and GEMS/Water should have a major role to play in ensuring the ongoing collection and dissemination of water quality data on a regional and global basis.

i. *Comparative Advantage of UNEP:* In this regard, UNEP should have a continuing comparative advantage in delivering the Programme through its regional networks and complementary Programmes, such as the Regional Seas Programme. International agreements, such as the Convention for the Prevention of Marine Pollution from Land-Based Sources, would provide a firm foundation for promoting water quality monitoring Programmes. GEMS/Water staff should conclude formal agreements or establish explicit linkages with such Programmes.

ii. *Role of Assessments*: Further, data will continue to be necessary to provide a solid scientific basis for water quality assessments, not only at the national level but also at the regional and global levels. Forming a nexus between national water quality assessment needs and regional and global assessments will be a critical strategic element for the future success of GEMS/Water. In this regard, UNEP should have a continuing comparative advantage in delivering the Programme through its Global Environment Outlook (GEO) assessment and related assessment activities. To a degree, project staff could take the lead in making GEMS/Water known within such assessment projects.

Consequently, and in accordance with the Resolution/Decision 10 of 2014 of the UN Environment Assembly, GEMS/Water should be better integrated into UNEP's work Programme and associated outreach activities.

62. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Strategic Relevance is "Moderately Satisfactory", primarily because it is not explicitly or closely tied to the UNEP Programmes of Work adopted during the project period.

## **B. Achievement of outputs**

63. Table 4 reproduces, in part, Appendix E of the Contribution Arrangement governing the GEMS/Water project, and additionally summarises the achievements and outputs of the GEMS/Water Programme during the 2010-2014 project period. Despite few financial resources, the Programme has achieved all of the basic functions established for the GEMS/Water Programme and indicated in Appendix E of the Contribution Arrangement as not requiring additional external financial resources. In addition, the GEMS/Water Programme has achieved many of the other "targets" proposed in Appendix E of the Contribution Arrangement indicated as requiring external finance. This reflects extremely well on the project staff and partners, their enthusiasm, and their commitment to the Programme and its ideals.

64. The principle outputs of the GEMS/Water Programme are data, analytical tools and applications, and access to these outputs through the GEMStat portal, as reflected in the ToC graphic shown in Figure 2. Additionally, ancillary outputs desired were sustainable funding and staff capacity, necessary to support and administer the Programme. Although no (significant) additional funds were secured and project staffing was reduced during the period of the project, project staff did accomplish many of the outputs established for the project in terms of the Contribution Arrangement, as shown in Table 4. These outputs included water quality data that extended the number of data points to over four million stored within the GEMS/Water data base. Four workshops were held, and two global laboratory performance evaluations were conducted; both of these outputs met the established goals for the Programme. In terms of Programme administration, MoUs were signed or are proposed to be signed not only by the Governments of Germany and Ireland, whose agencies are set to take over the GEMStat and capacity building components respectively. The day-to-day operations of the GEMS/Water Programme, in terms of coordination, will remain the responsibility of the UNEP secretariat or, as it is officially known, the Global Programme Coordination Unit (GPCU). The Government of Brasil has already signed a MoU with UNEP, becoming the first Regional Hub. Others countries, like South Africa, Morocco, Jordan, Japan, etc

are to be approached and formally requested to take up the roles of Regional Hubs in their respective regions. Such Regional Hubs should form the primary vehicle through which the Programme will continue to be delivered. Users also have continued to access the database through the GEMStat portal. All of these facts support a satisfactory outcome for the project in terms of the operational deliverables/outputs established for the Programme.

65. Notwithstanding, the overt utilization of GEMS/Water data, with due recognition of the origin of the data from the GEMS/Water Programme, has been ineffective. This is not to say that the data are not being used and that GEMS/Water has limited value, but rather it reflects the lack of visibility of the GEMS/Water Programme within the international community. Staff have confirmed that at least some of the global assessments, for example, have drawn outputs from the GEMS/Water Programme in to their work Programmes. In fact, some of the outputs from the GEMS/Water Programme were specifically designed and produced in response to requests for various indices by the assessment Programmes. Thus, it is not a matter of GEMS/Water failing to develop innovative and useful products but rather that the clients/users are not recognizing GEMS/Water as the source of these products and information. This lack or failure of recognition of the GEMS/Water Programme as a data source and knowledge base has probably resulted in the perception that there was limited use of the data base and that limited outcomes were achieved from the conduct of the Programme. This perception can be addressed in part by more active participation of GEMS/Water staff in the conduct of the assessments where possible (such as through UN Water) or by making the acknowledgement of GEMS/Water as the data source a condition for such use/access.

66. In contrast, the long-term work plan remains a deficiency of the GEMS/Water initiatives. As noted above, there are various interpretations of the mission of the Programme set forth in the various documents reviewed in this terminal evaluation. This “disagreement” without doubt has been a major shortcoming of the Programme, which has extended to the lack of recognition of the role of the Programme in achieving the desired outcomes for the Programme as an effective instrument for promoting good water quality and rehabilitating waterbodies with poor water quality.

67. Notwithstanding, the emergence of GEMStat as an interface with the GEMS/Water database has been a major factor in adding value and utility to the GEMS/Water Programme. Whether this interface can be developed into a payment-for-service profit centre within the GEMS Programme is debatable and potentially problematic. While the outputs that can and could in future be generated using the database, the addition of a payment-for-service aspect of the Programme would be likely to encourage data suppliers to charge for the data that they are currently providing voluntarily to the Programme. Consequently, any move toward payment-for-service would most likely be counter-productive and damaging to the Programme.

68. GEMS/Water training seminars and laboratory performance evaluations are major outputs and should remain major outputs of the Programme. The engagement of the University College Cork to spearhead at least the training part of this Programme is a major breakthrough that speaks well for the future of the Programme. A similar resolution of the future of the laboratory performance evaluation activity would be welcomed. These training and standardization efforts are key elements of the

GEMS/Water Programme and are essential for the continued provision of high quality, reputable data to the Programme. In this regard, the emerging focus on regional centres of excellence would be a major factor in delivering the Programme. Brasil currently anchors this Programme of development of regional centres of excellence; additional centres in other parts of the world should be pursued. Potential centres of excellence should be sought in Central America, southern Africa, West Africa, East Africa, West Asia, and East/Southeast Asia would be recommended, among others.

69. In this same vein, and as noted above, the addition of a water resources planning and management element to the current trainings would be a useful addition to the Programme. In like manner to the addition of modelling and indices to GEMStat, actions to enhance the value of the data contained within GEMS/Water should be welcomed. The addition of these elements also would contribute to the activities associated with country- and regional-level assessment reports and plans.

70. Figures 3 through 6 show the numbers of contacts made by external users through the GEMStat portal. Figure 3 shows the numbers of contacts per day. While the numbers of contacts were low during the early part of the current project (2012-2013), the numbers of contacts during early 2014 represent a significant increase in numbers of contacts over those made previously. Figure 4 shows that most contacts occurred during the early part of the Canadian working day (UTC/GMT -5 hours), although, on the whole, the numbers of contact were relatively evenly spread across the 24-hour period. Figure 5 suggests that most queries originated through the UNEP website and the GEMStat website. Queries have focused on specific issues, as shown in Figure 6, with South African and Indian projects forming a major element of the queries. With regard to these numbers, EC staff pointed out that there may be some bias in the data associated with periodic requests to NFPs that they “beta-test” portions of the data base and/or spikes in interest associated with periodic promotional activities at various international events. They also noted that the data might reflect only one of the GEMS/Water portals. Consequently, Figures 3 through 6 should be viewed with a degree of caution.

71. Finally, ongoing outreach efforts toward other UN initiatives and Programmes should be encouraged; the levels to which these efforts should be targeted should remain at the regional/country level, with an emphasis on train-the-trainer Programmes to encourage the dissemination of effective monitoring Programmes to the local and community level. Building on schools Programmes and existing community engagement Programmes should be encouraged. Delivery of these Programmes at the regional level would be consistent with UNEP’s comparative advantage within the UN System. Ongoing efforts to include the advisory committee institutions in the delivery of GEMS/Water Programmes and programming should be encouraged, especially as some of these committee member institutions have country-level representation and could assist with country level delivery of GEMS/Water Programmes.

72. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Achievement of outputs is “Satisfactory”. The reason for this rating is primarily because GEMS/Water was functional during the project period, adding data to the database, allowing access to this information to users, and supporting, especially, regional Programmes requiring data and water quality information.

**Table 4. GEMS/Water proposed activities and actual achievements: 2010-2014**

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
Generate Financial Resources	Secure diversified financing	Adequate, sustainable, diversified financial resource base of USD 2.5 million	Broker adequate, sustainable and diversified financial resources from governments, organizations and donors	CDN\$ 1.8 million from Canada	MS	Funding was secured but it was single-sourced (from the Government of Canada)
		At least 5 funding opportunities identified	Explore the use of project specific funding to support GEMS/Water through participation in high profile events	2 -3: Germany, Ireland and Brasil	MS	New funding was secured from the Governments of Germany and Ireland and MoUs were signed/are being signed by the Governments of Brasil and South Africa; additional funding was secured from CARU for the Uruguay River Basin laboratory performance evaluation (USD81,925)
		GEMS/Water contributes to TWAP and IW Science	(1) Promote GEMS/Water role in the Transboundary Waters Assessment Programme	TWAP-Rivers utilized GEMS/Water data	MU <sup>b</sup>	This item was included subject to availability of new/additional financing; however, some use of the GEMS/Water data has been made.
			(2) Promote GEMS/Water role in IW Science as provider of water quality indicators and indices	--	MS	GEMS/Water staff participated in GEF-IW activities and promote GEMS/Water services.

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
		Generate funds for developing country capacity building	(1) Develop long-term work plan for fundable capacity building projects for WQ monitoring	--	U	A UNEP project document for GEMS/Water was not completed. EC developed a “business plan” for the project.
		Generate funds for developing country capacity building (continued)	(2) Invite students from Centres of Excellence to implement research on WQ topics	--	U	No action appears to have been taken.
Generate Financial Resources (continued)	Secure diversified financing (continued)	Payment for products and services developed	(1) Identify value-added products (outputs) that benefit governments	GEMStat includes algorithms for water quality indices and contaminant loadings	S	GEMS/Water has responded to requests for new data products.
			(2) Develop payments for services model for GEMS/Water products (data, analyses, information)	CARU laboratory performance evaluation conducted	S	The conduct of issue-specific studies was undertaken as a test of the ability of GEMS/Water to provide services for payment
			(3) Identify demand for products and services (present and future)	Demands for laboratory performance evaluations, training and other services were identified	S	EC staff note more than a dozen requests for custom evaluation services and training. A QA course was developed and delivered in the Mekong River basin countries during 2013.
			Facilitate country and regional awareness	Four workshops held (in South Africa,	S	GEMS/Water staff have led regional workshops.
		Increased data dissemination;				

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
		more countries join Programme	creation Programmes based on GEMS/Water products and services	Panama, India and Ghana); CDN\$137,793 from EC funds		
Generate Financial Resources (continued)	Secure diversified financing (continued)	Increased data dissemination; more countries join Programme (continued)	Facilitate country and regional awareness creation Programmes based on GEMS/Water products and services (continued)	2004 Evaluation lists 106 countries; active participants in 2010-2014 appear to be 91 countries (although 114 countries have focal points or other GEMS/Water contacts)	S	Country participation has been maintained or possibly increased.
		Sufficient minimum staff to implement activities	Hire SPO [Senior Programme Officer]	EC: 3 staff, UNEP: 3 staff; but retirements deplete staff to 2 in each location	S	Failure to replace key staff reduced the ability of GEMS/Water to provide and deliver services.
		More joint research projects and publications in peer-reviewed international journals	Develop new research projects with research centres of excellence	--	--	This item was included subject to availability of new/additional financing.
		Internationally recognized scientists join GEMS/Water	(1) Hire consultants/staff to implement GEMS/Water projects in various regions	--	U	No action appears to have been taken.
			(2) Engage centres of	--	S	MoUs have been/are

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
			excellence			being signed with the Governments of Brasil and South Africa.
Generate Financial Resources (continued)	Secure diversified financing (continued)	Internationally recognized scientists join GEMS/Water (continued)	(3) Contract students to execute research projects including modelling and socio-economic responses	Research students from the University of Saskatoon were engaged in GEMS/Water activities from 2009 – 2011.	S	This item was included subject to availability of new/additional financing.
		Increased IWRM knowledge and applications	Contribute to UN IWRM activities	--	--	This item was included subject to availability of new/additional financing.
		Increased ability to lead and manage international stakeholder relations/partnerships	(1) Establish an advisory committee	Steering Committee comprised of UNEP, WHO, WMO, and UNESCO	MS <sup>b</sup>	This item was included subject to availability of new/additional financing; however, meetings were held as side events to other meetings in which GEMS/Water staff participated.
			(2) Engage with UN Water	GEMS/Water data utilized in the World Water Quality Assessment	S	This item was included subject to availability of new/additional financing; however, GEMStat developed new data products.
			(3) Collaborate with groups such as EPI, NASA, IPCC, WWAP, etc through	--	S	This item was included subject to availability of new/additional financing;

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
			meetings and bilateral exchanges			however, some contacts appear to have been made.
			(4) Participate in international WQ networks	--	S	This item was included subject to availability of new/additional financing; however, GEMS/Water staff did attend a number of international events.
Generate Financial Resources (continued)	Secure diversified financing (continued)	Increased ability to lead and manage international stakeholder relations/partnerships (continued)	(5) Link with projects carried out through the UN statistical division and others through bilateral meetings and agreements	--	--	This item was included subject to availability of new/additional financing.
			(1) Conduct data gap analysis and formulate action response	Microbiological elements added to the laboratory performance evaluation	S <sup>b</sup>	This item was included subject to availability of new/additional financing; however, new analytes were added.
		More representative geographic coverage and added parameters; coverage of major world watersheds within 4 years	(2) Establish regional partner centres in UNEP regions	Ongoing through governments of Brasil and South Africa	S	This item was included subject to availability of new/additional financing; however, the South African Department of Water Affairs and Forestry and Brazilian National Water Agency have signed MoUs.
Global Data Coverage and Consistency	Improve global coverage	Reliable data and	(1) Develop a plan to	Ongoing through	S <sup>b</sup>	This item was included

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
		information supply	enhance WQ expertise in critical countries	Cork University (Ireland)		subject to availability of new/additional financing; however, the Government of Ireland has signed an MoU.
			(2) Work with regional centres of excellence to deliver short- and long-term capacity building	Brasil and South Africa identified as regional hubs	S	This item was included subject to availability of new/additional financing; however, the Governments of Brasil and South Africa are acting as regional hubs.
		Greater access to credible data and inter-operability with other GIS	Increase data sharing via the internet; ensure that data sharing protocols are established	GEMStat includes modelling applications and other tools	S	GEMStat is operational and used.
Global Data Coverage and Consistency (continued)	Improve global coverage (continued)	Rigorous performance assessment of member labs	(1) Facilitate annual laboratory performance evaluation (PE) meetings	68-146 labs participated in PE 5-8; 52-82 labs participated in PE 1-4.	HS	Laboratory performance evaluations were performed.
			(2) Lead PE biannually	Performance Evaluations conducted in 2010, 2013 and 2014	S	Laboratory performance evaluations were performed each biennium.
		Countries meet ISO standards for laboratories	(1) Develop long-term work plan for monitoring and assessment	85% of labs participating in PE-6 achieved >75% satisfactory results for PE and QC	HS <sup>b</sup>	This item was included subject to availability of new/additional financing; however, the laboratory performance evaluations

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
				measures (ISO 2005)		were undertaken.
			(2) Invite students to participate in research on WQ topics at centres of excellence	EC supported several students to assist with the laboratory performance evaluations, website updates, and GEMStat activities.	MS	This item was included subject to availability of new/additional financing.
			(3) Convene meeting of students and present the research findings	--	--	No action appears to have been taken.
		Web-based platform for data publishing established	(1) Establish a web-based data submission platform and software to support standardised data submissions	GEMStat updated and operational	S	Automated data entry systems are programmed, beta-tested and ready for use.
		Web-based platform for data publishing established (continued)	(2) Contribute personnel to develop and operationalise the web-based Programme and assist countries in its use and maintenance		S	GEMStat is operational and being utilized.
Global Data Coverage and Consistency (continued)	Improve global coverage (continued)	Adequate number of up-to-date sources of data to cover new and emerging issues	Assist National Focal Points to identify and engage centres of excellence in provision of data through meetings and networking	15 countries noted as supplying current data as of mid-June 2014; 92 countries list focal points; 123 countries/entities have supplied data on 247 waterbodies	S <sup>b</sup>	This item was included subject to availability of new/additional financing; however, most countries have appointed focal points.

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
		Availability of country outlook reports for different regions	(1) Assist countries in regions to write country-level WQ assessment reports	EC produced country-level data reports in support of regional workshops and other meetings.	U	This item was included subject to availability of new/additional financing.
			(2) Contribute to WQ assessment reports by providing data and peer-review	--	MU	This item was included subject to availability of new/additional financing; however, data were used.
		Explore need for remotely-sensed data	Work with partners to use state-of-the-art tools and techniques to gather a broad suite of WQ parameters at low cost	--	--	This item was included subject to availability of new/additional financing.
Global Data Coverage and Consistency (continued)	Improve global coverage (continued)	Create a global data base on aquatic biology	Contribute to development of biological and ground water data bases in partnership with identified research organizations	--	--	This item was included subject to availability of new/additional financing.
		Increased quantity and quality of water quality assessments in 10 countries	Contribute to WQ assessments	Contributions to World Water Quality Assessment	MS <sup>b</sup>	This item was included subject to availability of new/additional financing; however, data were used.
		Hydrological models presented to policy makers and used for decisions regarding	Contribute to initiatives of GRDC and UNEP-DHI and others in conducting regional climate and hydrological modelling of	GEMStat includes, <i>inter alia</i> , loading model and water quality index components	S <sup>b</sup>	This item was included subject to availability of new/additional financing; however, models were added to GEMStat.

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
		global climate	critical ecosystems in selected basins			
		Help achieve MDGs	Undertake service projects to strengthen monitoring networks and analytical capacity	--	--	This item was included subject to availability of new/additional financing.
		Understand impact of human activities and climate change on water quality	Carry out assessments of WQ hotspots such as the Himalayas and develop solutions in partnership with high level scientists in the regions	--	--	This item was included subject to availability of new/additional financing.
Global Data Coverage and Consistency (continued)	Improve global coverage (continued)	Well-being of ecosystems and water quality is clearly known	Involve scientists in ecosystem-wide WQ monitoring	--	--	This item was included subject to availability of new/additional financing.
			(1) Create GEMStat website	GEMS/Water and GEMStat websites updated and operational	S	GEMStat is operational.
			(2) Provide inter-operability with other data bases	UNEP Live linkage?	S	Conversations have been initiated with UNEP Live, for example.
		Increased citation of GEMS/Water as a source of water quality data	(3) Create station profiles and web-based services	GEMStat includes mapping utilities.	S	Data are available in GEMStat.
			(4) Maintain the web-site	Websites operational	S	GEMStat is operational.
Access for Users	Improve data access	Science policy and MEAs use	Collect and compile information on the	--	--	This item was included subject to availability of

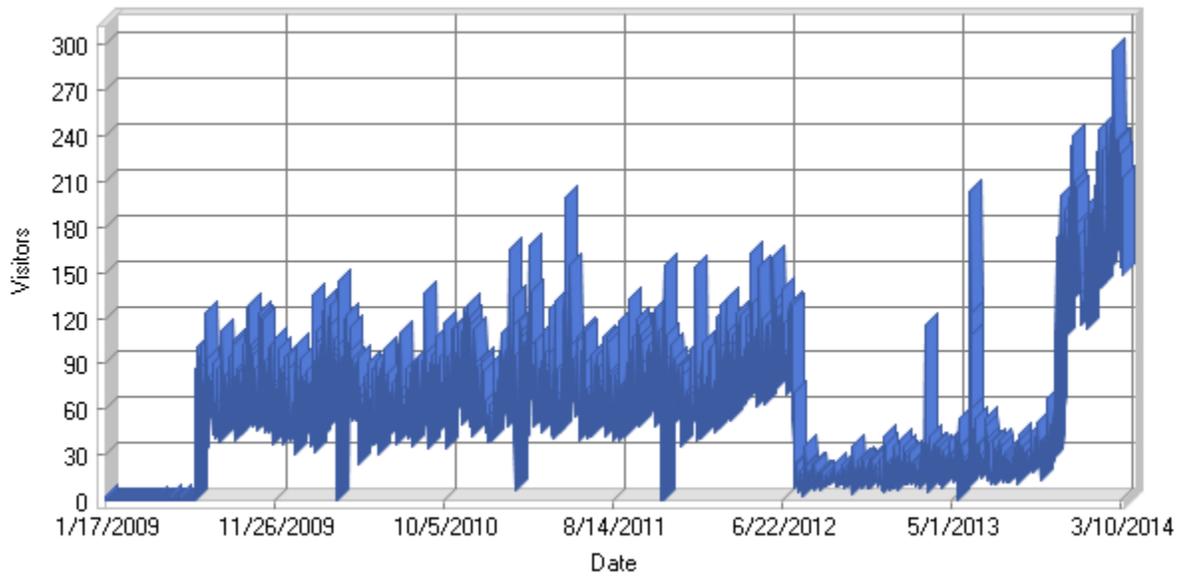
Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
		GEMS/Water data	Stockholm Convention on POPs, CBD, etc.			new/additional financing.
Capacity Building	Increase developing country capacity	Increased number of countries participate in capacity building	Identify centres of excellence	Workshops held in South Africa (24 people from 8 countries); Panama; India (108 people from 8 countries); and Ghana (22 people from 11 countries)--vs one workshop in Burkina Faso in 2005 (34 people from 8 countries)	HS	The South African Department of Water Affairs and Forestry and Brazilian National Water Agency have signed MoUs as regional hubs; minutes of meetings have been prepared and published.
		Increased number of youth with water sampling and analysis skills	Create a global youth GEMS/Water sampling and analysis "club"	--	--	
			Publish guidelines and manuals for use by youth in sampling and analysis	--	--	
		Many countries develop improved IWRM plans	(1) Continue to work with organizations such as ILEC, Ramsar, Wetlands International and others to increase lake and wetland WQ data availability	--	U <sup>c</sup>	This item was included subject to availability of new/additional financing; however, GEMS/Water staff have engaged with some organizations, but it did not result in the desired recognition of GEMS/Water as a data provider

Outcomes (Strategic Goals) <sup>a</sup>	Tasks (Strategies) <sup>a</sup>	Milestones or Indicators where quantified (Indicator/Target) <sup>a</sup>	Activities (Activities and responsible organizations) <sup>a</sup>	Achievements, <sup>b</sup> including Outputs and Outcomes	Rating <sup>b</sup>	Notes (Remarks) <sup>a</sup>
			(2) Provide data and information in support of lake and wetland groups	--	--	
Capacity Building (continued)	Increase developing country capacity (continued)	Data users and providers understand each others' needs	Establish regional partner centres in the UNEP regions	MOUs signed with Brasil, Germany and Ireland in 2014	S	Regional workshops have been held and documents prepared and reviewed by GEMS/Water staff.

<sup>a</sup>This information is drawn from Appendix E to the "Contribution Arrangement" between the Department of the Environment of Canada and the United Nations Environment Programme signed by UNEP on 23 Sep 2010 and EC on 5 Oct 2010, EC Finance ID#: 1004401. The column titles in parentheses reflect the terminology used in that Arrangement.

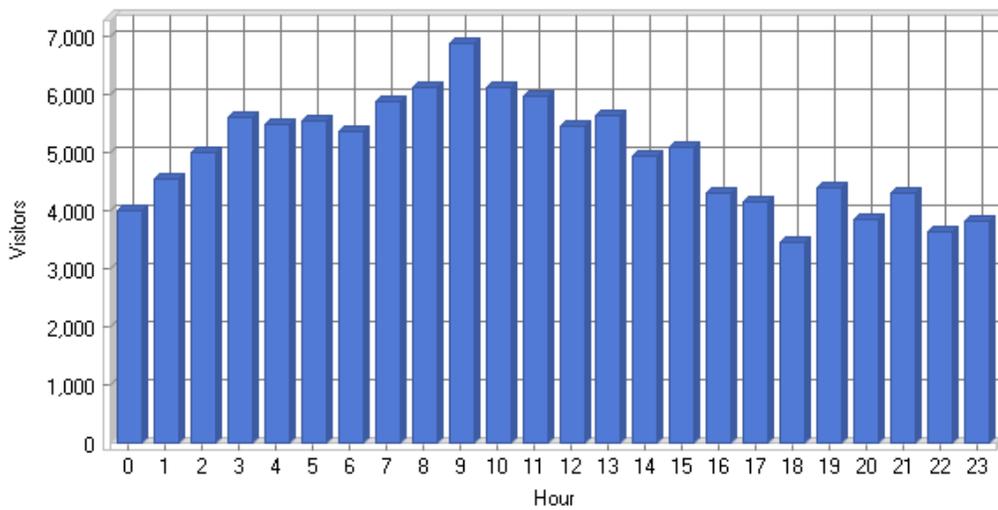
<sup>b</sup>Achievements, including outputs/deliverables and outcomes, were those noted during the Terminal Evaluation and the Rating was given by the Evaluator based on consideration of the degree to which the Programme successfully achieved its stated goals (outputs). Achievements were rated as Highly Satisfactory (HS), Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU), Unsatisfactory (U) or Highly Unsatisfactory (HU).

<sup>c</sup>Although the activity was included subject to the securing of additional financing, some elements of the activity were conducted by project staff using available resources; where such activities were conducted, a rating is indicated regardless of whether or not the need to secure additional financing was indicated. In the case where no action was undertaken, the double-dash (--) is used to signify the fact that no activity was undertaken and therefore no rating is provided.



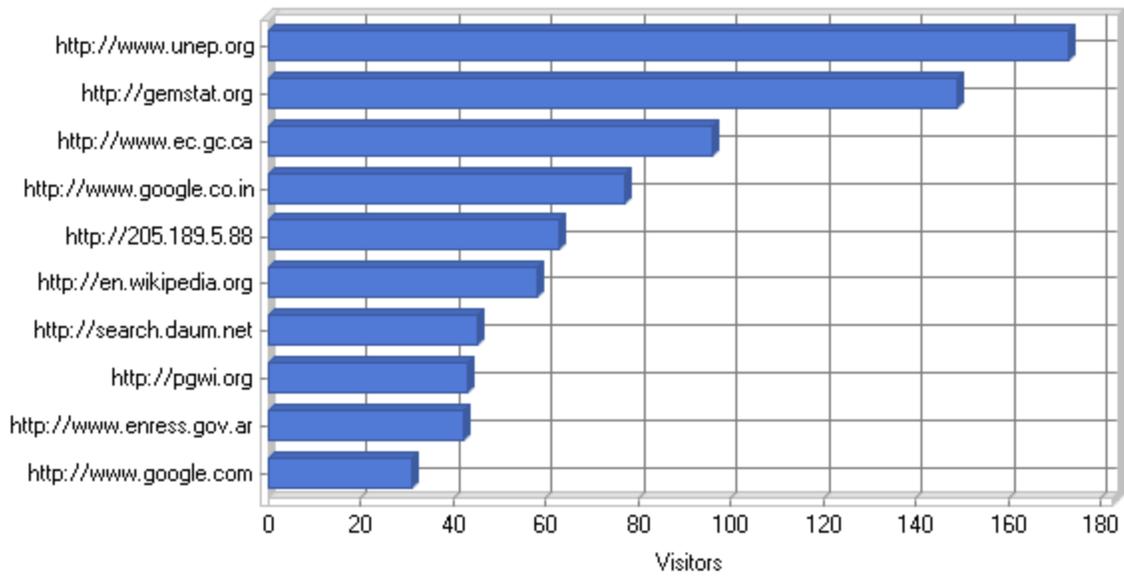
(Source: BfG/FIH and EC)

**Figure 3. Numbers of persons (defined as discrete email addresses) accessing GEMS/Water.**



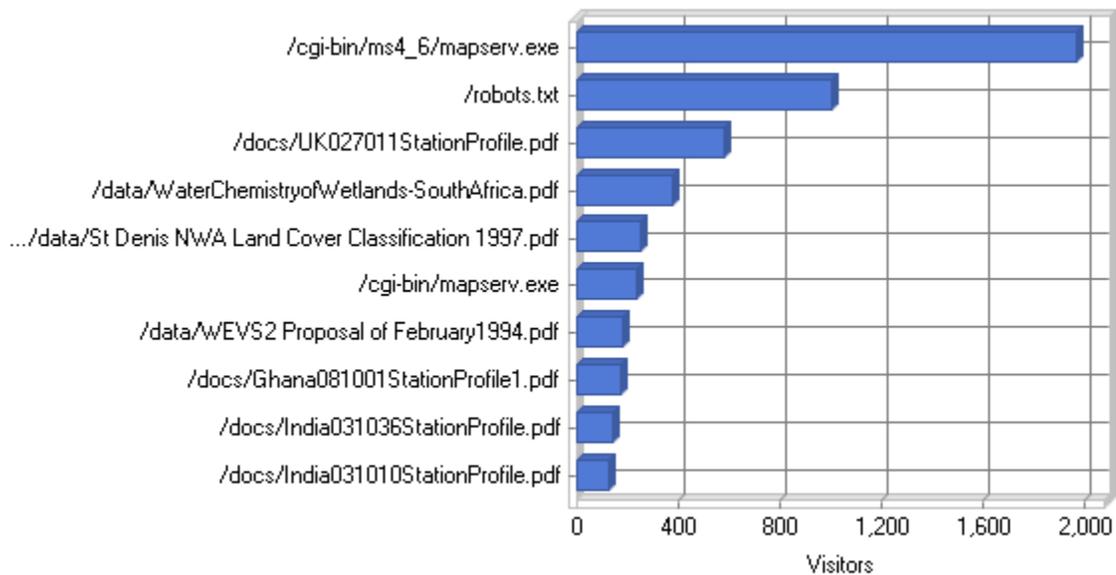
(Source: BfG/FIH and EC)

**Figure 4. Time of day during which visitors to the GEMS/Water site accessed the GEMStat data base**



(Source: BfG/FIH and EC)

Figure 5. Point of entry into the GEMS/Water database.



(Source: BfG/FIH and EC)

Figure 6. Information sought by visitors to the GEMS/Water database.

### C. Effectiveness: Attainment of project objectives and results

73. GEMS/Water has been effective in remaining viable and active during the period of transition of responsibilities from the Government of Canada to UNEP. UNEP subsequently invited the Governments of Germany and Ireland to support the GEMStat and capacity building components, respectively, to carry on the GEMS/Water Programme in to the future. To this end, there has been a successful hand-off of materials and responsibilities from EC-NWRI to UNEP, and from UNEP to the German BMUB, and to the Irish DFAT and DECLG, who, pending formal legal agreements, were to support the aforementioned components during a new phase of GEMS/Water activities. In terms of the then-proposed arrangements, the University College Cork (UCC) was to form and host the Capacity Development Centre.

i. *Direct outcomes from reconstructed TOC.* The desired outcomes of the GEMS/Water Programme, as shown in Figure 2, are: a) adequate and consistent funding for the Programme, b) efficient and effective management and operation of GEMS, c) QA/QC data, d) flexibility in meeting emerging global needs for data, and e) data and data products that are used by stakeholders. The facts that the GEMS/Water Programme, between 2010 – 2014, successfully added new reporting stations to the database, conducted two laboratory performance evaluations during 2011 and 2013, delivered four workshops (in Panama, South Africa, India and Ghana), and included new analytical tools within GEMStat directly address the desired Programme outcomes indicated as outcomes c), d) and e), above. While these outcomes collectively suggest an efficient and effective staff, indicated as outcome b) above, the Programme failed to secure diversified funding as indicated in outcome a) above, although the Programme did establish agreements for the then-future funding of GEMS/Water activities from the Governments of Germany and Ireland. Nevertheless, the uneven geographical distribution of the workshops and uneven distribution of the data sources contributing to GEMS/Water remain issues of concern which should be assumed by the next generation of executing agencies (BfG/FIH, and DFAT, DECLG, and UCC). The workshops and laboratory performance evaluations remain critical and important elements of the Programme and underpin the value and quality of the data acquired, directly addressing the outcomes shown as c), d) and e) above.

ii. *Likelihood of impact using RoTI and based on reconstructed TOC.* The need for sound scientific data to underpin environmental management policies and plans has been stated elsewhere in this evaluation report. The continuity within UNEP of the GEMStat component as a global database bodes well for the likelihood of the Programme achieving its desired impact. Information is the foundation for assessment; assessment is necessary to define areas of concern; identification of the areas of concern substantiates and supports the need for effective policies and workable, practical plans. Consequently, there is every likelihood that the information acquired through country participation in the GEMS/Water Programme being implemented by UNEP will lead to the changes (conservation of water resources and aquatic ecosystems and sustainable use of water resources for diverse purposes) envisioned and shown in Figure 2. A specific example includes the case of participating countries such as Brasil, which forms a major regional hub for the Programme, and which is an example of a country within which access to reliable and comprehensive data has led to fundamental and innovative

changes in water laws that will help to achieve the good/improved water quality (= conserved water resources and improved aquatic ecosystems) and sustainable availability of freshwater resources that are the ultimate, desired impacts of the GEMS/Water Programme and its related national monitoring Programmes.

That said, this is not a once-for-all effort. Data collection, analysis and use is an ongoing activity. In this vein, the water quality monitoring systems implemented by South Korea and South Africa stand out as examples of the changes in data collection and management that have stemmed from participation in the GEMS/Water Programme. Plans and policies must evolve and change as countries and communities grow and develop. Sound data are the foundation of directing policies and practices today and in the future. This is an iterative process, and water quality degradation is a multifaceted problem that manifests in various ways, such that addressing one symptom frequently results in a further symptom being revealed, requiring ongoing and adaptive management to resolve each manifestation. In other words, Programmes such as GEMS/Water will have to be ongoing as new water quality concerns emerge or are revealed.

The ability of the GEMS/Water Programme to continue to achieve the ever-changing goals associated with maintaining or restoring “good” water quality in inland waters has been demonstrated, for example, by the recent inclusion of microbiological indicators within the laboratory performance evaluation process, and by the proposed inclusion of biological indicators and measures of biological diversity in the Programme. This ability to accommodate changing water quality conditions also is reflected in the inclusion of POPs within the analytical profiles of effective water quality monitoring Programmes.

iii. *Achievement of project goal and planned objectives.* The objectives of the GEMS/Water Programme were enumerated as being four-fold in number in the Contribution Arrangement, although one of these goals is actually not programmatic but rather administrative in character. These goals are as follows: a) generating financial resources (the administrative element), b) increasing global coverage and consistency of data, c) enhancing access for users, and d) strengthening capacity building. In reconstructing the Theory of Change model shown in Figure 2, the administrative goals were separated into financial and human resource elements as these were considered to be essentially different given that the human resources were, in part, an in-kind element of the Contribution Arrangement between EC and UNEP. However, for purposes of this rating, the administrative functions can be recombined and the four elements identified in the Contribution Arrangement can be evaluated as follows:

- a) *Generating Financial Resources:* Although the GEMS/Water Programme has remained viable during the transition period (during which responsibilities for specific Programme components were transferred from EC to the German BMUB and BfG/FIH who would execute GEMStat, and to the Irish DFAT and DECLG working with UCC who would execute the capacity development activities), the identification of a centre of excellence in Brasil has addressed only partially the goal of diversifying the Programme’s financial base (by adding a stakeholder albeit without adding additional revenue for GEMS/Water activities). While

additional centres of excellence are planned to be identified, these actions have not addressed the underlying concerns associated with relying on single (or, now, a small number of) funding sources. Inclusion of this concern as a Programme goal is problematic, as the continuity of the Programme should be an outcome of an effective Programme and not a goal. If the Programme provides value, then there should be no doubt as to its survival.

- b) *Increasing Global Data Coverage and Consistency*: The lack of visibility of GEMS/Water—and this is a lack of visibility rather than a lack of relevance as noted above with regard to the development and inclusion of new indices in various assessment projects—remains a concern, however, and to some extent reflects the lack of resources devoted to the Programme by the participants (for example, the UNEP project manager was not replaced following his retirement; Programme staffing has been consistently reduced over time to the point where there are barely sufficient staff to maintain data entry). This has had a knock-on effect with regard to maintaining and increasing global coverage and building country-level and regional capacity which is essential for the future replicability and sustainability of the GEMS/Water data base.
- c) *Increasing Access for Users*: In contrast, EC and UNEP staff have addressed the project goal of enhancing access to the system. The innovations associated with GEMStat have been noted, and the linkages with UNEP Live, indicated by UNEP DEWA staff, are indicative of successes in the area of enhancing access.
- d) *Enhancing Capacity Building*: Similarly, EC staff also addressed the issue of enhancing capacity through regional workshops, although the extent to which these workshops actually led to enhanced capacity is not documented. Notwithstanding, the workshops were successful in generating interest in and support for data gathering Programmes in the regions where the workshops were held.

74. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Effectiveness is “Moderately Satisfactory”, primarily because GEMS/Water staff were unable to secure new and diversified funding to support the full implementation of the Programme as envisioned in the Contribution Arrangement.

#### **D. Sustainability and replication**

75. Sustainability is defined in terms of four elements; namely, i) socio-political sustainability, ii) financial sustainability, iii) institutional sustainability, and iv) environmental sustainability:

- i. *Socio-political sustainability*: GEMS/Water has been operational for more than 35 years. The need for credible data to support public policy and police regulations and legal requirements is ongoing. Laws and policies are only as good as is the ability of governments and others (such as professional organizations and industry organizations) to enforce compliance through both legal requirements and moral suasion. There also is a need for good information and data to support new legislation and new interventions/technologies which is ongoing. While the needs for water quality data remain, the types of data required for lake and reservoir management have evolved

during the period of operation of the GEMS/Water Programme. GEMS/Water has added and changed parameters to the “menu” of analytes during this period, with microbiological parameters and POPs being added as the Programme has sought to keep pace with the changing needs of modern society. The evolution of this Programme, and the continuity embodied in the transfer of responsibilities to the BMUB and DFAT and DECLG, working with UCC, underline this ongoing need for water quality data, and for the continuation (and, in some cases, inauguration) of data collection Programmes, lake and reservoir management planning, and policy development for sustainable water resources to meet both human and ecosystem demands. In this regard, GEMS/Water is certainly necessary and consequently most likely sustainable, and with increasing recognition of the inter-connectedness of our shared water resources (due to climate change, natural disasters, and the seemingly more severe flood/drought cycles) the need for data and the knowledge to be gained from that data is as important to day as it was in the 1970s when the project was first conceived and initiated. However, there is a continuing need for GEMS/Water staff to listen and respond to country-level concerns through the inclusion of new analytes, such as those relating to contaminants such as POPs, in order for the Programme to retain its position as a global data source for water quality data and information.

ii. *Financial sustainability:* Acquisition of water quality data are rarely seen as other than in the public interest. While there is some interest in data gathering as a tool for education, and inclusion of environmental science in the school curriculum remains as vital as ever, the acquisition of data is most likely not a profit generating activity. It should be viewed as a public good; the foundation upon which good policies are implemented, maintained and enhanced. An understanding of the value of good scientific data, acquired through the educational system, provides a solid platform from which current (parents) and future (the scholars) generations will understand the value of water quality monitoring and the need to support the monitoring Programmes upon which databases such as GEMS/Water depend. While there has been some exploration of a pay-for-service approach to GEMS/Water, note should be taken of the fact that the basic data upon which such services are likely to be built have been paid for by the public in the countries that collect, analyze and supply the data to GEMS/Water. While GEMS/Water does add value to these data through providing algorithms and mapping applications within the GEMStat interface, there is likely going to be a reluctance of countries to continue to supply the data without receiving some remuneration for their inputs to the Programme. Rather, it would be more important for GEMS/Water and GEMStat to be recognized as the platform from which data and information is drawn, recognizing the societal value of the data provided by the participating countries and encouraging new countries to participate in the Programme. This recognition in turn will lead to continued financial support for the Programme and the policy and planning Programmes stemming therefrom as an informed civil society demands good quality water capable of meeting the diverse requirements of humans and their environment.

iii. *Institutional sustainability:* There is a continuing need to develop new or additional data sources, especially with regard to mandated data collection and reporting requirements such as are frequently embodied in wastewater and drinking water supply laws and regulations

governing ambient water quality (such as those relating to recreational water use and food security which might be affected by irrigation water quality, for example). This is reflected in the existence of governmental departments dealing with water, the environment and the resources generated from water as an essential natural resource. As data become increasingly expensive to acquire, there will be a greater demand for efficiency in data acquisition and management. Consequently, the training Programmes and laboratory performance evaluations designed to ensure data quality and compatibility will become more important, rather than less important, especially as freshwater and water resources generally become subject to increasingly high demands. Linking volume (through the GRDC) and quality (through GEMS/Water) as is possible through the involvement of the BfG is a crucial step toward minimizing societal conflicts through knowledge. The role of GEMS/Water in resolving conflicts within the Plata River basin emphasizes the positive role that access to sound data can play in addressing potential conflicts. Without access to a common data pool and without confidence in those data the likelihood of additional conflicts occurring is high, with flash points likely in the most water scarce parts of the world.

iv. *Environmental sustainability*: In a similar manner, knowledge of the procedures and practices necessary to secure and share scientifically sound data is of equal or greater value as shared information can be used confidently to negotiate shared solutions (rather than spur conflicts). Consequently, the need for GEMS/Water is a critical need not only for today but for the future. Reputable platforms for data acquisition and sharing are a necessary foundation for environmental peace and justice. So long as the GEMS/Water Programme continues to expand and adjust to meet the needs of a changing world, it will continue to serve the interests of peace and human development within a stable and healthy environment.

76. Notwithstanding, the costs associated with data acquisition are continuing to increase, primarily as a result of the costs of the increasingly highly trained staff required to execute the monitoring and analysis Programmes. Countries are searching for new ways to collect necessary data, such as using remote sensing to gather data more quickly and at a greater density of stations that is possible using human staff. While these techniques and technologies are likely to play an important part in maintaining the data flow necessary for creating sound policies and effective plans, many countries also recognize the limitations of relying on remotely sensed data and are building networks of citizen scientists and volunteer monitors who willingly collect data at low-cost/no-cost. As greater numbers of professionals retire, the numbers of these volunteers increase; however these volunteers generally require training for best effect and the GEMS/Water Programme should include an element of training volunteers as part of its ongoing capacity building task. Use of volunteers is cost-effective and studies in the United States by the US EPA and various state agencies have shown that their data are reliable and robust. Harnessing this pool of labour will become an important element of country-level monitoring Programmes; GEMS/Water can play an important role in encouraging the formation of this resource and in ensuring that volunteers are well-trained through train-the-trainer Programmes incorporated within its training Programmes. These volunteers, in turn, become a powerful voice in demanding and creating

appropriate and effective public policies, plans, and laws at all levels, ranging from the community level to the regional level.

77. In terms of replication, GEMS/Water has encouraged the continuity of national water quality monitoring Programmes and the implementation of new Programmes through its training courses and informational materials, although the actual degree to which such changes have been induced is less than clear. To an extent, the numbers of monitoring stations and participants in the GEMS/Water Programme can be used as a measure. Since the last project evaluation completed by Prof Dr Walter Rast in 2008, GEMS/Water has maintained the numbers of participating countries (at 106), increased the numbers of data entries to over four million, and increased the numbers of monitoring points to more than 4000 stations. The Programme also conducted laboratory performance evaluations which have attracted a record number of participants (including more than 200 laboratories in 90 countries). The parameters included in the evaluation also have increased from four groups of analytes in 2005 to eight in 2012, adding solids, trace metals, and microbiological contaminants to the evaluation in response to country needs. While it is not possible to connect these efforts directly to policy changes, the existence of water quality data have clearly supported such changes, with countries such as South Korea significantly expanding and upgrading its data collection and information dissemination Programme, and South Africa and Brasil adopting far-reaching water laws that include an emphasis on water quality and the aquatic environment as critical elements of the biosphere.

i. *Catalyzed Behavioural Changes:* GEMS/Water appears to have enhanced the standard of monitoring and water quality analyses through the combination of establishing a recommended set of analytes and analytical procedures, ensuring laboratory quality, and encouraging the retention of trained staff through workshops and training opportunities. The opportunity to engage an international community of water resources professionals by sharing data and promoting data products appears to have encouraged countries such as South Korea to enhance their water quality monitoring capacity and make water quality data available using electronic and other media. The adoption of new water management Programmes and systems of governance as in the cases of Brasil and South Africa, while not directly linked to water quality *per se*, has enriched the practice of water resources management worldwide and encouraged countries to become better stewards of the aquatic environment.

ii. *Incentives:* As has been noted, the primary incentive for the conduct of water quality monitoring Programmes and the dissemination of water quality information, data, and data products stems from the grass-roots level, from those communities which are most directly affected by water quality concerns. Their interest supports national and regional monitoring. In addition, the participation of countries in national, regional and global assessments provides reinforcement for water quality monitoring efforts. Data sharing is more problematic aside from the use of the data in the regional and global assessments, and an emphasis should be placed on developing stakeholder understanding of the value and use of water quality data through training. Specifically, this element of water quality monitoring and analysis and data use and dissemination should be included in the train-the-trainer Programmes proposed for delivery during the forthcoming phase of the GEMS/Water Programme.

iii. *Institutional Changes*: As reflected in behavioural changes above, strengthened monitoring Programmes, enhanced data dissemination opportunities, and a more informed constituency all demand more effective systems of water governance within participating countries. The new water laws adopted by South Africa and Brasil have been mentioned. In addition, other countries have maintained or improved their existing water quality management Programmes, as in the case of South Korea.

iv. *Policy Changes*: Driven by world water and world sanitation and world health decades and initiatives and the need for balanced and sustainable economic develop, countries have recognized the central role of water. That said, it is difficult to directly link the policy changes necessary to achieve sustainability to the GEMS/Water Programme. Knowledge of water quality and the factors affecting water quality appears to be fundamental to changes in water resources management policy. Such knowledge extends from the community level to the international level. To this end, GEMS/Water data have a role to play, and this role should be vocalized rather than hidden in contributions to other Programmes of development, assessment, and environmental management. Notwithstanding, initiatives by the GEMS/Water regional hub Brasil are illustrative.

v. *Catalytic Financing*: Funding of the GEMS/Water Programme is a major failing of the current phase of the Programme. Despite being identified early as a major need and included in the Contribution Arrangement as a central Programme task, there appears to have been little effort directed toward placing GEMS/Water on a more secure financial footing. Discussions of offering GEMS/Water products for sale were held, but proved inconclusive, the business plan for the Programme being discontinued. Funding during the 2010-2014 phase of the project remained single-sourced from the Government of Canada. The next phase will have a slightly more diversified funding base, primarily from the Governments of Germany and Ireland, and this may be sufficient to maintain the data base, knowledge development and training elements of the Programme. Nevertheless, adding regional hubs and cooperators who could provide targeted delivery of GEMS/Water training and evaluation programming, for example, would be a major step forward. Such services could be provided on some sort of cost for delivery basis, but payments for services on the whole would appear to be counter-productive given that the Programme is dependent upon voluntary provision of data to the Programme. Support for UNEPs participation—specifically to operationalize the global coordination unit and promote the expansion of the GEMS/Water Programme, its hub-and-spoke arrangement for monitoring and data acquisition, and capacity building activities—therefore should be continued but rather with funding from own resources, such as the Environment Fund, rather than resourced solely from GEMS/Water funds. It would appear that in-kind participation by a number of regional hubs, encouraged by UNEP's Regional Offices, would be the most effective means of continuing GEMS/Water activities (with a large number of such hubs and/or centres of excellence reducing concerns that a few influential countries would dominate the Programme). Contributions by other UN bodies, such as those associated with UN Water, could be solicited, although again in kind participation is probably more likely. The endorsement of the GEMS/Water Programme by

the 2014 UN Environment Assembly could be persuasive in this regard. Countries could be encouraged to contribute to the Programme as a result of this Resolution/Decision 10 of 2014; however, closer integration of the GEMS/Water Programme into the UNEP Programme of Work would be necessary.

vi. *Catalytic Change*: GEMS/Water needs a “champion”. Continuity of staff and adequate staffing is critical to the success of the Programme. Staff—people—are the primary mechanism whereby countries, institutions, and other stakeholders can be persuaded to participate in GEMS/Water. During the 2010-2014 project period, the project staff, especially from EC (and to a lesser extent, UNEP), were quite active in attending meetings and other gatherings, spreading knowledge of GEMS/Water. Unfortunately, the shift in responsibilities from the Government of Canada to the Governments of Germany and Ireland resulted in departing staff not being replaced and the good work devoted to the Programme fading as a result. Securing articulate staff, willing to stay with the Programme for the foreseeable future, and adequately supported and funded, should be a priority for the next phase of the project.

78. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Sustainability/Replication and Catalytic Effects is “Moderately Satisfactory” given that countries continue to expand their data collection and reporting requirements and the world seeks to address its ongoing need for good quality water to sustain both the human economy and the natural environment upon which it is based. In addition, note should be taken of the fact that GEMS/Water and GEMStat remain ongoing, albeit under a new management arrangement between UNEP and the Governments of Germany and Ireland. This fact supports the continuing relevance of the Programme and its products.

## E. Efficiency

79. The current phase of GEMS/Water has proven remarkably efficient in its use of the human and financial resources available. While greater efforts may have been devoted to establishing name recognition for the Programme, the fact that the Programme has been recognized by various UN bodies and collaborators, numerous countries (see Table 2), and other organizations (such as NGOs, regional organizations and the private sector, among others) bodes well for its future development. Additional resources would be most welcome. The Government of Germany, for example, is considering providing additional staff to support the Programme. However, broadening this base of support, through the regional hubs, for example, remains a priority for the Programme. Programmes such as train-the-trainer also can help to maximize the efficiency of the Programme, increasing its impact while minimizing the direct costs of performing the data management and training Programme elements of GEMS/Water. Granted, the bare bones budget of the 2010 – 2014 project period has perhaps intensified the need for efficiencies, but it also has limited the opportunities of which the Programme could take advantage, but the approach to the Programme as executed by EC during this period has demonstrated what can be accomplished with limited resources.

80. It should be noted that simply providing additional financial and human resources will not benefit the Programme. These resources need to be properly directed and targeted. Completion of the business plan for GEMS/Water is strongly recommended. This plan should not be aimed at making the

Programme self-sufficient financially but rather seek to put into place a unified sense of mission for the Programme, to define the overall purpose of the project, and to establish a unique role for GEMS/Water within the world of UN assessments, agreements, and initiatives. Links with UN Water, for example, should be strengthened and the advisory committee reconstituted to empower GEMS/Water staff and collaborators in their efforts to acquire, compile, analyze and disseminate not only data but also water quality information to Member States, allied organizations, and civil society. The need for sound data to support plans and policies for achieving and ensuring the sustainability of good quality water resources will only increase in coming years.

81. The GEMS/Water Programme experienced a slow start during the project period under review, even though it was essentially the continuation of an ongoing Programme of work. In part this delay was due to negotiations between UNEP and the Government of Canada, and, upon the conclusion of these negotiations, due to delays in agreeing implementation modalities, such as staffing and transfers of payments. While UNEP appeared to be a primary beneficiary of the Programme, the agency proved ineffective at reaching out to additional partners and diversifying the funding of the GEMS/Water Programme. While some successes were achieved, notably in securing Brasil as a regional hub, UNEP's advantage in terms of its regional representation and engagement of countries in the Regional Seas Programme, for example, did not appear to have been vigorously pursued with respect to inland water management. Consequently, for much of the project period, UNEP formed a drain on project funds rather than a resource for gaining a diversified funding base (see Annex 4, Annex 5 and Annex 6, for example).

82. Notwithstanding this shortcoming, the project was executed in a timely manner and within the budget provided by the Government of Canada (plus or minus about 15 percent—in part due to currency conversions from Canadian funds to US dollars).

83. Building a base of regional hubs and centres of excellence would be a major step forward in promoting a sustainable GEMS/Water Programme. In this regard, the UNEP Regional Offices should serve as points of contact for the development of regional hubs and other centres of excellence in the major regions of the world. Clearly, there is a need for and demand for elements of the GEMS/Water Programme such as the laboratory performance evaluations and training courses. Training trainers who can support and deliver specialist knowledge of water quality monitoring thus becomes a major part of the future work Programme. As countries develop the ability to effectively utilize GEMS/Water data, the countries will establish and strengthen water quality monitoring Programmes and networks. The data gathered through such Programmes are the foundation of GEMS/Water and further diversification of GEMS/Water data products, through GEMStat, is clearly demanded by the participating countries. Close integration between the capacity building Programme elements/components and the data gathering and dissemination components is required and should be encouraged. UNEP staff have a major role to play in ensuring this integration by acting as the lynch pin for maintaining clear and open communications between the capacity-building and data gathering and processing elements of the Programme, primarily through the global Programme coordination unit. Paying attention to the client stakeholders and their needs will continue to ensure the relevance and participation in the GEMS/Water Programme. In the Reconstructed Theory of Change diagram, Figure 2, this need is shown as interactive

arrows linking the activities, outputs, outcomes, and results of the GEMS/Water Programme. New or emerging analytes, water quality concerns, and capacity needs can be shared widely within the Programme, but such communication will require an active UNEP coordinating unit if it is to successfully connect the stakeholders, hubs and data/capacity building centres of the Programme.

84. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Efficiency is “Satisfactory”. GEMS/Water achieved the delivery not only of the very basic functioning required of the project, but also exceeded this by delivering some or most of the additional elements indicated as requiring further funding. This demonstrated a high degree of efficiency in use of resources, albeit a failure of the Programme to secure additional and more diversified funding.

## **F. Factors affecting performance**

85. The previous paragraphs allude to some of the needs that have been identified within the GEMS/Water Programme; needs that stem from shortcomings identified in previous iterations of the GEMS/Water Programme through this evaluation. Specifically, these factors include:

i. *Diversified financial and institutional support.* The need for ongoing financial commitments from both data suppliers and data users remains a critical element of ensuring the continuity of GEMS/Water. While the acquisition of data may be ensured as this is frequently undertaken as a function of national government, the collection, analysis and dissemination of work products, such as regional and global assessments, requires additional financial support. To this end, both direct contributions and in-kind (e.g., staffing) support could be considered. The establishment of regional hubs would be an effective way to entertain additional support for GEMS/Water as programming could be delivered more effectively (in terms of language, for example) and at lower cost (in terms of travel, for example) than a more centralized operation. This regional approach also better reflects UNEP’s own strategy for delivery of its mandates and services.

ii. *Continuity of staffing.* Having designated contacts who remain in post for an extended period is essential for establishing good and lasting working relationships. It is important that skilled staff be acquired to deliver GEMS/Water programming and that adequate levels of staffing be maintained. The two persons in Canada and one (part-time) person in Nairobi staffing level at the end of the 2010 – 2014 phase of the GEMS/Water Programme was totally inadequate to deliver the types and numbers of Programmes necessary to provide quality programming and continuity of service required for a Programme such as GEMS/Water. Thus, it was encouraging to hear that the Government of Germany is considering seconding up to six staff to the data acquisition and management elements of the GEMStat database within the UNEP GEMS/Water Programme and that the Government of Ireland is considering ways and means of ensuring delivery of its capacity building elements of the GEMS/Water Programme. Again, however, it is equally important to have an adequate number of well-qualified staff who will provide continuity of service over the mid- to long-term.

iii. *Provision of targeted training and development opportunities.* Related to the expansion of the network, training opportunities will be needed to assist countries to create and implement

and/or strengthen their data gathering networks and reporting infrastructure. As implied in this statement, countries are at many different states of development with respect to their water quality monitoring capabilities and capacities. Thus training will be required from the very basic courses on how to create a network (station location, parameter selection, etc.) to the very sophisticated (data management, plan writing, policy development, etc.). Delivery of these through regional hubs, as noted above, provides not only cost benefits but also regional centres to support the monitoring efforts; questions can be answered quickly and in a manner consistent with regional norms and conditions. Identification of regional centres of excellence would augment this system of regional hubs and broaden the access of countries to relevant expertise and water resources professionals.

iv. *Expansion of monitoring networks and data sources.* The purpose of the training and of the networks created for data acquisition and sharing should be beneficial not only for the UN system and its partners but also for the participating countries and organizations. GEMS/Water, through GEMStat, can provide value-added technologies such as the contaminant loading and water quality index applications that will assist countries in using the data that are acquired and stored within the GEMS/Water platform. Access to data, especially in transboundary basins and waterbodies, remains a critical need which can be addressed through an expanded and fully functioning GEMS/Water Programme. The current GEF-supported Transboundary Water Assessment Programme has documented the desire of countries with such transboundary resources for expanded access to data from other parts of these transboundary basins. In such cases, data access and knowledge of associated policies and plans could obviate situations in which a country undertakes extensive remedial measures only to find that another country has implemented off-setting activities elsewhere in a shared basin.

v. *Continuity of scientifically sound data sets.* While many national water quality monitoring Programmes are based upon continuity of data gathering from specific sites, there are other types of research Programmes that generate data for only a short period or specific purpose. Most hydrological monitoring Programmes, focusing on water quantity, are of the former type, while many environmental research activities or pollution control actions are of the latter type. It is desirable that GEMS/Water maintain a continuous data base in which hydrology (as acquired within the GRDC network) can be married with water quality data to generate contaminant loading data which can be used in lake and reservoir planning and management. Countries should be encouraged to enroll their ongoing environmental monitoring Programmes in GEMS/Water. However, as much specific knowledge can be generated through shorter term studies and research, it is important that GEMS/Water should retain the mechanism whereby shorter term data sets are accommodated within the data platform. In other words, the GEMS/Water platform should be flexible enough to accommodate both longer term data sets as well as more targeted research data.

vi. *Development of new products to meet emerging demands.* The needs for data, data products, management knowledge and response information will be continuously evolving over time. To date, GEMS/Water has shown an ability to incorporate emerging issues by expanding or

modifying its basic set of data to include new parameters and variables. The Programme also has developed products such as water quality indices which reflect the changing needs of countries participating in the Programme. Some examples of emerging concerns include the increasing use of remotely sensed data, the increasing reliance on citizen science, the spread of nonnative species, and response of waterbodies to global change. No doubt there will be other issues relating to water quality that will emerge in the near future. GEMS/Water must continue to respond to these changing conditions in the aquatic environment.

vii. *Formalisation of participation.* The use of memoranda of understanding to formalise the agreements between UNEP and its Member States relative to GEMS/Water is a forward looking step. While many countries appoint national focal points, far fewer countries ensure that these focal points provide data or expertise to the GEMS/Water Programme. If every country's national focal point interacted with the GEMS/Water staff with regard to training needs, data collection and dissemination, and laboratory performance the Programme would create a more active group of participants. However, there would have to be some *quid pro quo* on the part of GEMS/Water in providing the participating countries with value added for their participation. In other words, training courses would have to be developed and given, data analysis would have to be expanded, and laboratory performance evaluations carried out, among other Programme elements. Such reciprocity would require adequate levels of staffing and training among GEMS/Water personnel.

viii. *Filling of data gaps.* A recurring theme within the GEMS/Water Programme is the data gaps that occur in various regions. These occur for various reasons, sometimes due to regional conflicts, but frequently due to an unwillingness of countries to participate for various reasons. These reasons seem to range from lack of capacity and lack of finance to lack of benefit, from the country-perspective, received from the GEMS/Water Programme. Clearly, countries see value in the laboratory performance evaluations and training courses, so it can be assumed that GEMS/Water does have "something to offer;" hence, in the absence of conflict, it should be possible for GEMS/Water staff and collaborators to encourage countries to participate. As noted, this may require GEMS/Water to create new data products or include other features in GEMStat which would meet country needs. Regional hubs may provide one new vehicle to encourage countries to participate in the GEMS/Water Programme.

86. Contributing to the successful achievement of the foregoing Programme needs will be factors such as Programme preparedness, project management, stakeholder involvement, country-ownership, finance, supervision, and monitoring and evaluation (M&E). These elements are discussed below:

i. *Preparation and Project Readiness:* The lag time between the signature of the Contribution Arrangement and the initiation of project activities by UNEP, and the lack of continuity of project staff arising from retirements and institutional down-sizing (in the case of EC), have been noted as limitations affecting the successful completion of the 2010-2014 phase of the GEMS/Water Programme. Discussions of terminology, as in the case of committed and expended funds mentioned above, were contributory to the delays documented in the

GEMS/Water reports and documents. Although GEMS/Water has been actively managed since the 1970s, there seemed to be few lessons carried forward into the current phase of the Programme. In part, this seems to have been due to delays in staffing the Programme within UNEP, although these delays, in turn, were linked to the need to define specific terms within the legal arrangements surrounding the Programme. Since this was a continuing effort, it is unlikely that the terms of the legal arrangements were significantly different during the current phase, although this was not specifically determined during the evaluation process. Notwithstanding, it seems that, in future, it will be important to plan for continuation of the Programme as part of the current iteration of the project, rather than trying to address such needs during the next phase of the Programme.

ii. *Project Implementation and Management*: Once the issues surrounding the transfer of funds associated with the Contribution Arrangement were resolved, the Programme seemed to function well, at least until retirements of senior staff in both UNEP and EC removed these key individuals from the Programme. Planning for retention of staff, recruitment of staff, and replacement of staff (and corresponding financial resources) is a vital management function; this function does not seem to have been a part of the current phase of the GEMS/Water Programme, resulting in loss of key players and the failure to secure diversified funding for the Programme (although the transfer of responsibilities from the Government of Canada to the Governments of Germany and Ireland has been quite successful). To this end, the completion of the “business plan” for GEMS/Water would seem to be a critical element for the future. Data collection, networking, management, processing and knowledge development is a business, and recognition of this is critical to the future success of the Programme. Development of a business plan should identify clients, suppliers, and users of GEMS/Water products, building on the Programme’s strengths (name recognition, past performance, scientific integrity, etc.) and addressing the Programme’s weaknesses (lack of overt use of the data base, data gaps, etc.).

The position of UNEP as a reputable and regionally based international organization with much experience in global water issues has been noted, as has the failure of UNEP to build upon this recognition to promote and build the GEMS/Water Programme. The fact that the GEMS/Water Programme lacked a direct connection to the UNEP Programmes of Work also has been noted as a major disconnect. Additionally, the lack of a formal UNEP project document (= business plan) further complicated the success of the Programme. Notwithstanding, and despite these limitations, UNEP and EC GEMS/Water staff not only operated the Programme but went beyond the anticipated Programme performance as set forth in the Contribution Arrangement.

iii. *Stakeholder Participation and Public Awareness*: GEMS/Water staff aggressively pursued participation in global water events to enhance GEMS/Water visibility and participation. This participation, unfortunately, was cut short by the departure of the senior staff who provided the “face” of the Programme. Human relationships remain important even in this electronically connected world. People are important. Hence, continuity of staffing and the active engagement of the staff in regional and international events, for example, is critical for engaging stakeholders and creating Programme awareness. The degree to which GEMS/Water should operate at sub-

national levels has been raised as a concern, with the recommendation having been set forth to engage at this level through train-the-trainer Programmes and the activities of national water resources institutions.

iv. *Country Ownership and Driven-ness*: As with other measures of Programme implementation, the issue of country-ownership has mixed results. Some countries have enthusiastically embraced the Programme—the Governments of Germany and Ireland in taking on the next phase of the project, the Government of Brasil in identifying as a regional hub—while other countries have maintained a “watching brief”—the majority of Member States having appointed national focal points. Building greater country ownership will be critical for the forthcoming phase of the project, and this task should be undertaken not only by the Governments of Germany and Ireland as project executing agencies but primarily by UNEP as the implementing agency. The success of the Programme in compiling and maintaining the global database, and the ongoing flexibility of GEMStat in meeting data product needs, should be recognized and utilized as the foundation for future actions.

v. *Financial Planning and Management*: The financial aspects of the Programme were well-managed with the Programme being completed on time and on budget, as documented in Annex 5 and Annex 6. That said, the single-sourced nature of the funding was recognized as a concern which was not addressed to any degree in the current phase of the project. Reporting requirements imposed by the Contribution Arrangement meant that much time was consumed by financial reporting requirements, and agreeing financial relationships resulted in delays in implementing the Programme. In part, this was due to UNEP’s need to use project funds for Programme staffing and operations. The fact that UNEP was a net drain on project funds has been noted. The endorsement of the GEMS/Water Programme by the 2014 UN Environment Assembly might give UNEP some flexibility in utilizing Environment Funds monies to ensure project continuity; certainly, closer link to the UNEP Programme of Work is required. The suggestion that the Government of Germany might assign staff or solicit UN Volunteers to work with the Programme is welcomed and could offset some of the costs of project implementation.

Development of saleable products has been mentioned and the dangers of such a move (in subsequently discouraging participants who voluntarily provide data by seeking payment for these data) have been discussed above. However, the funding of workshops and training courses through external means should be pursued, and some form of charging commercial operations for access to water quality data products (processed data and specific data reports, for example) obtained from GEMStat could be explored. Cost recovery from laboratory performance evaluations, training courses, and related guidance and assessment services, for example, has been shown by EC staff to be feasible if highly demanding of GEMS/Water staff. To this end, UNEP would have to develop internal mechanisms to respond quickly and effectively to “clients” seeking services on a payment-for-service basis as this business opportunity differs substantially from the services to governments model typically employed within the organization.

vi. *Supervision, Guidance and Technical Back-stopping*: As mentioned above, the lack of continuity in Programme staffing meant that project supervision was variable, being delayed during the formative phase of the project due to the need to recruit staff and absent toward the end of the project due to staff retirements. In the interim, however, the Programme appears to have been well managed. EC and UNEP staff were highly visible at international gatherings, such as Stockholm Water Week, for example, and this exposure was valuable for promoting awareness of GEMS/Water. That said, however, it also seems that GEMS/Water achieved much “behind the scenes”, by developing data products utilized by other Programmes such as UN Water and the World Water Assessment Programme. Continuity of management and leadership by UNEP staff will be critical for the future of the Programme.

vii. *Monitoring and Evaluation*: The absence of a formal project document was noted at the beginning of this evaluation as a key oversight that resulted in not only some confusion over project components but also in the lack of indicators, measureable outputs, and other elements required in a Monitoring and Evaluation (M&E) plan. Certain oversight was performed by the Government of Canada and regular financial reports were generated by UNEP staff in response to the requirements of the Contribution Arrangement. Additionally, information on the Programme was posted to the GEMS/Water website(s) which made the Programme transparent despite the lack of a formal project document. Completion of a “business plan” for the Programme, consistent with the UNEP Programme Manual, is strongly recommended.

87. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Factors Affecting Performance is “Moderately Satisfactory”, primarily because the Programme was in a process of transition. Consequently, much of the GEMS/Water Programme was executed in such a way as to sustain the Programme rather than introducing many new innovations. However, despite being in this “holding pattern”, the Programme has embraced the UNEP Live approach to data dissemination, expanded the GEMStat applications, and updated the database.

## **G. Complementarity with UNEP strategies and programmes**

88. Water has always been a central theme within UNEP: water for humans but more especially for the natural environment upon which humans depend. UNEP has historically provided leadership in the marine environment through Programmes such as the Regional Seas Programme, and UNEP has had active Programmes focusing on inland waters, as in the case of the EMINWA Programme (Environmentally-sound Management of INland WAters). UNEP also provides water resources planning assistance to countries through its participation within the GEF International Waters Programmes. And UNEP delivers its programming through Regional Offices which is consistent with the idea of using regional hubs to promote and support GEMS/Water.

89. That said, it also is true that other UN agencies have water resources expertise, such as the agricultural water expertise of the Food and Agriculture Organization of the United Nations (FAO) and the hydrological expertise of the International Hydrological Programme of UNESCO, among others. Thus, UNEP should reinvigorate the role of the advisory committee (now the global Programme coordination unit) as an interagency mechanism within GEMS/Water, potentially as an element of the UN Water

Programme. UN Water provides an opportunity to increase the visibility of GEMS/Water within the UN System as well as to promote GEMS/Water as playing a vital role of benefit to regions and countries.

90. In order to support and sustain a more vital role for GEMS/Water, however, UNEP must seek and apply additional resources to the Programme. The more passive role of UNEP as a fund recipient needs to change to a more active role of UNEP as an investor in the Programme, with UNEP actively seeking support from its Member States to further the cause of GEMS/Water within the international community of nations. Resolution/Decision 10 of 2014 adopted by the UN Environment Assembly requests the UNEP Executive Director to pursue such a course of action by refocusing GEMS/Water and by providing adequate budget for the Programme. Water is a global concern and effective management of the planet's limited freshwater resources will take focus, leadership, and sound data from which to create effective management strategies. GEMS/Water is a vehicle to accomplish this act of good stewardship.

91. GEMS/Water has effectively contributed to south-south cooperation through its engagement of the Government of Brasil as a regional hub, and the proposal to engage other regional governments in similar roles to support the GEMS/Water Programme. Empowerment of communities has also been encouraged through the GEMS/Water Programme and can be further promoted in future through participatory activities such as citizen-based monitoring and legal structures such as established by the Brazilian and South African water laws. In this regard, women and youth would be primary participants. However, the youth Programmes envisioned in the Contribution Arrangement Appendix E were not funded or executed during the current project period.

92. Based upon the foregoing, the overall rating of the GEMS/Water Programme for Complementarity is "Moderately Satisfactory". GEMS/Water has not been well integrated in to the UNEP Work Programme, albeit being highly complementary to the assessment mandate of UNEP.

## V. Conclusions and Recommendations

93. The transition of the GEMS/Water Programme from the Government of Canada to UNEP, with the financial and technical support of the Governments of Germany and Ireland, opens the possibilities for future continuation and expansion of the GEMS/Water Programme. In particular, the involvement of BMUB opens the opportunity for GEMS/Water water quality data to be effectively linked to the GRDC, allowing concentration data to be transformed into loads which can be assessed against contaminant loads generated using unit area load (and similar) models which can be used to identify hot spots and key geographic areas for interventions to protect and rehabilitate water quality. Similarly, the involvement of UCC will support the watershed planning activities necessary to protect and rehabilitate water quality. UCC staff also have long experience in designing and executing water quality monitoring Programmes as well as long-standing relationships with other advisory committee member organisations which will prove helpful in delivering quality programming and training courses in the future.

94. Table 5 summarizes the results of the Terminal Evaluation. Table 6 presents a short summary of the key recommendations set forth above, and supplements the recommendations set forth in section C, below.

### A. Conclusions

1. The UNEP Global Environment Monitoring System for Water (GEMS/Water) is an effective programme of the United Nations created for the purpose of encouraging countries to implement water quality monitoring programmes as a basic element of sound water resources management.
2. Data acquisition, compilation and dissemination remain central to the activities of the UNEP GEMS/Water Programme, although the selection of monitoring parameters, recommendation of analytical methods, and utilization of data for water resources management, among other aspects of water resources management, should be promoted as an ongoing features of the Programme.
3. In order to support the acquisition and utilization of water quality data for purposes of environmental planning, policy development and management, capacity building must be a central feature of the UNEP GEMS/Water Programme.
4. Guidance in developing data acquisition, compilation, dissemination and utilization forms an important element of the value-added provided through country participation in GEMS/Water; participation of GEMS/Water in support of regional and global water quality and water management initiatives places the GEMS/Water Programme firmly within the ambit of the UN.
5. The United Nations Environment Programme (UNEP) has a comparative advantage in supporting GEMS/Water as part of its mandate to prepare regional and global environmental assessments and to support Member States in managing our shared environment. However, it is noted that UNEP does not have an exclusive role in this regard, and it is therefore recommended that GEMS/Water remain a joint initiative of the UN System, potentially under the auspices of UN Water but certainly with strong ties of

a steering committee comprised of those UN agencies having interests in inland waters (e.g., UNESCO, WMO, WHO, and FAO, among others) and development partners and key regional hubs and centres of excellence and prominent persons as appropriate.

6. GEMS/Water could play a major role with respect to the aquatic environment in initiatives such as UNEP Live, although many countries will require considerable investments in infrastructure and capacity if there is to be real time water quality data acquisition and dissemination (equivalent to air quality data).

**Table 5. Overall project rating, based on information gathered during the Terminal Evaluation.**

<b>Criterion</b>	<b>Summary Assessment</b>	<b>Rating<sup>a</sup></b>
<b>A. Strategic relevance</b>	Data remain an essential element of water resources and water quality management. However, GEMS/Water was not directly linked to the UNEP Work Programme or explicitly promoted within the international community.	MS
<b>B. Achievement of outputs</b>	GEMS/Water remained active during this project period; additional data sources were accessed, courses given and laboratory performance evaluations conducted.	S
<b>C. Effectiveness: Attainment of project objectives and results</b>		
1. Achievement of direct outcomes	GEMS/Water maintained a web-accessible data base; new data were added to the data base and country capacities were strengthened; some participants adopted new water laws and expanded their monitoring capacities during the project period.	S
2. Likelihood of impact	Data remain a valuable pillar upon which to base water quality management Programmes.	HS
3. Achievement of project goal and planned objectives	The project succeeded in achieving its technical goals, but failed to diversify its funding base and expand its visibility in the international community.	MS
<b>D. Sustainability and replication</b>		
1. Financial	The Programme remains dependent upon a few donors for its financial support. However, the Governments of Germany and Ireland have assumed responsibility for the future of the Programme.	U

<b>Criterion</b>	<b>Summary Assessment</b>	<b>Rating<sup>a</sup></b>
2. Socio-political	Some country water laws were upgraded and water quality monitoring capacity was increased; however, the Programme lacked visibility as a data provider.	MS
3. Institutional framework	The role of the multi-agency advisory committee in the Programme delivery was unclear, and UNEP did not take sufficient advantage of its regional representation as a mechanism for promoting participation within GEMS/Water.	S
4. Environmental	GEMS/Water collected and disseminated water quality data, some of which were used in regional and global assessments.	S
5. Catalytic role and replication	GEMS/Water has enhanced data gathering Programmes in a number of countries, and has contributed to the resolution of water quality disputes.	S
<b>E. Efficiency</b>	Despite a slow start to the Programme and lack of additional funds, the GEMS/Water Programme succeeded in achieving a majority of its goals relative to expanding its network, improving access for users, and capacity building.	S
<b>F. Factors affecting project performance</b>		
1. Preparation and readiness	Although continuing an ongoing Programme, GEMS/Water suffered from delays in funds transfers, staffing, and visibility.	MS
2. Project implementation and management	The Programme suffered from lack of continuity of staff; retiring staff were not replaced and EC downsized its participation in face of the imminent hand over to the Governments of Germany and Ireland.	S
3. Stakeholders participation and public awareness	GEMS/Water remained somewhat invisible as a source of water quality data, even though data were provided to Programmes such as the World Water Assessment Programme.	MS

Criterion	Summary Assessment	Rating <sup>a</sup>
4. Country ownership and driven-ness	Although participation increased, country support was not forthcoming. Nevertheless, the Programme did have a significant role in regional affairs.	S
5. Financial planning and management	Available funds from EC were effectively used; however, additional funding was not available and did not appear to have been actively sought.	S
6. UNEP supervision and backstopping	UNEP staff were primarily a cost centre; UNEP did not appear to make effective use of its regional offices and experience with parallel Programmes such as the Regional Seas Programme. Nevertheless, UNEP staff were enthusiastic in their support and participation in GEMS/Water within these limitations.	S
7. Monitoring and evaluation	There was no mid-term evaluation.	HU
a. M&E Design	Only a terminal evaluation was planned and conducted.	U
b. Budgeting and funding for M&E activities	Only a terminal evaluation was budgeted and conducted	U
c. M&E plan Implementation	There was no M&E plan although there was regular reporting to EC.	HU
<b>Overall project rating</b>	GEMS/Water remained viable and was successfully transitioned from the Government of Canada to the Governments of Germany and Ireland.	S

<sup>a</sup>The ratings range from Highly Satisfactory (HS) through Satisfactory (S), Moderately Satisfactory (MS), Moderately Unsatisfactory (MU) and Unsatisfactory (U) to Highly Unsatisfactory (HU).

## B. Lessons Learned

1. Data remain central to sound environmental management. This is true for water quality, water resources planning, and effective water resources governance.
2. Adequate and diversified support for the Programme is vital to ensuring an effective and efficient delivery of programming and services.
3. Adaptability in terms of Programme content, analytes, and data collection is critical to ensuring the continued relevance of the Programme.
4. Provision of added value through inclusion of data management tools (such as the contaminant loading algorithms and water quality index computations) as well as capacity building is essential if country participation is to be encouraged.

## C. Recommendations

The Resolution/Decision 10 of 2014 adopted by the UN Environment Assembly provides a strategic context for the future work of GEM/water. In this context Member States are encouraged to utilize GEMS/Water resources, trainings, and data support opportunities to implement sub-regional and national water resources plans, policies and management practices. Additionally, UN Water and related UN Organization initiatives are encouraged to recognize the role of GEMS/Water and utilize the data resources provided by the Programme.

The evaluation makes the following recommendations:

1. UNEP should ensure that adequate staff and resources are provided to the GEMS/Water Programme to support implementation of ongoing and incipient initiatives being prepared by the Governments of Germany and Ireland for the further advancement of GEMS/Water and GEMStat.
2. UNEP and its partners should continue the periodic laboratory performance evaluations and water quality monitoring trainings as essential elements of the GEMS/Water Programme concurrent with the acquisition, compilation and dissemination of water quality data through GEMStat and UNEP Live.
3. UNEP and its partners should more closely link GEMS/Water with Programmes such as those of the Global Runoff Data Centre (GRDC) in order to add value to the water quality data base, and utilize these data in the conduct of regional and global assessments.
4. The collaborative, multi-agency approach to GEMS/Water should be maintained, based upon mutually-agreed objectives and a unifying vision for the GEMS/Water Programme in line with the UNEP Results-Based Management approach and the “business plan” for GEMS/Water should be completed using UNEP’s Programme Manual to develop a project document for the Programme. The business plan would:
  - a) Define the level at which GEMS/Water products and services are to be targeted; for example, focusing on train-the-trainer or train-the-staff/volunteers
  - b) Identify consistent staffing, specify an effective Steering Committee, and secure the active involvement of UNEP’s Regional Offices through identification and designation of regional hubs and/or centres of excellence, and implementation of regional water quality activities.
  - c) Incorporate flexibility into the UNEP GEMS/Water Programme to encourage responses to emerging issues of concern to ensure the vitality and relevance of GEMS/Water
  - d) Pursue closer association between UNEP GEMS/Water Programme and the GEF International Waters portfolio.
  - e) Integrate GEMS/Water data and data products into global and regional assessments

It is recommended that the German BfG/FIH and Irish UCC:

Take note of and act on the following trends:

- i. Link GEMS/Water to national online databases
- ii. Increase the use of remote sensing within GEMS/Water as a data generating platform

Consider the following modifications:

- i. Determine the level at which capacity-building should be delivered
- ii. Determine the role of short-term studies as data generating activities
- iii. Create capacity building curricula and curriculum issues.

Collaborate with and utilize scientists as essential elements in GEMS/Water training, data acquisition, and capacity building.

Reconsider pay-for-services as a funding strategy for GEMS/Water which may discourage countries from providing “free” data to the database.

Continue the capacity-building and training Programmes and laboratory performance evaluations as key elements of the GEMS/Water Programme; and, consider the delivery of these Programme elements through regional centres of excellence, for example.

Expand the outputs of GEMS/Water to include the use of data and data products in lake and reservoir management plans, for example.

Emphasize train-the-trainer Programmes to promote water quality monitoring.

Consider the following actions to improve the coverage and impact of GEMS/Water:

- i. Secure diversified financial and institutional support for data acquisition, provision and use; use UNEP’s Regional Offices to secure country participation
- ii. Maintain continuity of staffing to the extent possible; ensure adequate staffing through the use of interns, volunteers, partnerships with countries and NGOs; and, diversify participation in Programme delivery
- iii. Provide targeted training based on modules that can be delivered by regional cooperators and centres of excellence
- iv. Build/strengthen partnerships to expand the relevance of GEMS/Water and its products
- v. Ensure continuity of existing data sets
- vi. Develop new data products and analytes to meet emerging demands and issues
- vii. Formalise participation in GEMS/Water activities through MoUs and other agreements between UNEP and participating entities
- viii. Fill data gaps through targeted delivery of training and capacity-building activities.

## Annexes

1. Terminal Evaluation Terms of Reference of the Evaluator
2. Evaluation Programme: List of Institutions and Individuals Visited and/or Interviewed
3. Narrative Report on GEMS/Water for the period 2010 through 2014
4. Contribution Arrangement between Environment Canada and UNEP [pdf]
5. Annual Financial Reports from UNEP to Environment Canada [pdf]
6. Summary co-finance information and a statement of project expenditure by activity [pdf]
7. Resolution/Decision 10 of 2014 by the UNEA
8. References
9. CV of the consultant
10. Response to stakeholder comments received but not (fully) accepted by the evaluators

## ANNEX 1: TERMS OF REFERENCE<sup>1</sup>

### Terminal Evaluation of the UNEP project “Global Environmental Monitoring Systems Water Programme”

#### 1. PROJECT BACKGROUND AND OVERVIEW

##### Project General Information

**Table 1. Project summary**

<b>UNEP PIMS ID:</b>	00384	<b>IMIS number:</b>	CPL 5070-3640-1111
<b>Sub-Programme</b>	Ecosystems Management	<b>Expected Accomplishment/</b>	313
		<b>PoW Outputs</b>	Output # 3: Tools, technical support...
<b>Expected Start Date:</b>	October 2010	<b>UNEP approval date:</b>	October 2010
<b>Actual start date:</b>	5 Oct 2010	<b>Planned duration:</b>	48 months
<b>Intended completion date:</b>	31 March 2014	<b>Actual completion date:</b>	31 March 2014
<b>Planned project budget at approval</b>	CDN\$2,000,000	<b>Secured budget*:</b>	CDN\$2,000,000
<b>UNEP contribution*</b>	USD1,295,550 (in kind)	<b>Co-financing</b>	CDN\$1,136,000 (in kind, from Environment Canada)
<b>Mid-term review/eval. (planned date):</b>	None	<b>Terminal Evaluation (actual date):</b>	March 2014 to July 2014
<b>No. of revisions:</b>	None	<b>Date of last Revision:</b>	None

## 1. Project rationale

1. The GEMS/water Programme is a global program of the United Nations on water quality whose activities are coordinated by the United Nations Environment Programme (UNEP). In the mid-1970s, its activity centre was established within UNEP to coordinate various environmental monitoring Programmes carried out globally, particularly those within the United Nations System. It comprised five interrelated components and worked through the collaboration between UNEP and other specialised agencies, such as the World Health Organization (WHO), the World Meteorological Organization (WMO), and the United Nations Educational, Scientific and Cultural Organization (UNESCO). Evolving from the pollution and water quality components, the Water Programme of GEMS is one of the two GEMS Programmes that has carried on till today and remained true to its original mandate in acquiring water quality data globally through the global water quality monitoring network.

2. Its roles within and outside the UN system in providing reliable water quality data and information needed for the effective management of water resources are still valued. Therefore, the 26th UNEP Governing Council (GC) in February 2011 in its decision 26/14 encouraged *Governments and other organizations to participate actively in the GEMS/Water Programme by contributing water quality data and information; and inviting Governments and others in a position to do so, including the private sector, to provide financial and in-kind support for GEMS/Water Programme capacity-building and transfer of technology efforts in developing countries.* It also called for further development of the Programme through creating a knowledge base for assessing water quality; promoting access to information; and strengthening capacity to enhance monitoring Programmes and analytical assessment and research activities for integrated water resource management in developing countries; and encouraging cooperation at the regional level to enhance water monitoring at the global level. The progress made in the implementation of the decision was recognised and welcomed by the 27th UNEP GC in February 2013.

3. In response to critical issues such as increasing global water quality degradation, and decreasing sustainable services of aquatic services as identified by several UNEP assessments, an operational strategy for freshwater (2012-2016) was developed to provide a more concentrated and focused approach to freshwater activities based on its mandate and comparative advantage. Therefore the UNEP Water Operational Strategy 2012-2016 identifies four priority areas for action: (1) Meeting the water quality challenge; (2) Benefiting from aquatic ecosystems; (3) Building resilience to climate change through water management; and (4) Mainstreaming resource efficiency. The operational policy reflects on the importance of reversing water quality degradation in the world's freshwater ecosystems to ensure sustainable provision of ecosystem services and benefits. In implementing *Strategic Priority 1 Meeting the global water quality challenge* through its biennial Programmes of work, UNEP has centrally positioned the GEMS/Water to *provide technical support to countries in their efforts to improve and expand water quality (WQ) data collection and intensify global and regional assessments of the status of water quality in critical freshwater ecosystems and improve accessibility to reliable data through the global water quality data base.*

4. In September 2013, the UNEP GEMS/Water Programme held a meeting at the Stockholm World Water Week (SWWW) to inform partners and potential donors of the ending of the current arrangement with Canada and presented its vision for a new GEMS/Water Programme model. It was agreed that a UNEP GEMS/Water Partner and Donor be discussed further, based on conclusions at the SWWW meeting outcomes. The UNEP GEMS/Water Partner and Donor meeting was held from 3-5 March 2014 in Nairobi.

## **2. Project objectives and components**

5. The overall objective of GEMS to date was to support global, regional, and national environmental assessment and reporting processes on the state and trends of water resources by providing access to quality-assured data and information on water quality in freshwater ecosystems worldwide.

Global Environment Monitoring System Water Programme is a multi-faceted water science centre oriented towards knowledge development in inland water quality issues throughout the world. Environment Canada's National Water Research Institute in Burlington, Ontario, is the United Nations GEMS/Water Programme Office and the centre on water quality, under the auspices of UNEP's Division of Early Warning and Assessment. The objectives of the GEMS/Water program activity were to contribute to Water Resource Management and Use, with the expected result(s) of:

- a. New knowledge and data produced by collaborating organizations contribute to the conservation and restoration of water resources and aquatic ecosystems.
- b. Additional financial resources are generated to support GEMS/Water. Global coverage and consistency of data is improved.
- c. Data access for users is improved.
- d. Increased developing country capacity for water quality monitoring.

Furthermore, GEMS/Water was supposed to:

- Identify opportunities for UNEP to partner with other stakeholders on GEMS/Water.
- Contribute information for regional, country and international level awareness campaigns.
- Use opportunities at international meetings to raise the profile of GEMS/Water.
- Provide advice and support on potential research partners and projects.
- Make available GEMS/Water database and personnel to participate in improving the database.
- Lead the performance evaluation of laboratories every two years.
- Contribute personnel to assist in the development of the web-based data system and its operationalisation.
- Assist in engaging countries in its use and maintenance.

### **3. Executing Arrangements**

6. GEMS/Water was managed by the UNEP Division of Early Warning and Assessment. Policy direction for GEMS/Water was guided by UNEP's Water Policy and Strategy, and implemented in cooperation with several UNEP water activities and Programmes, such as the Global Programme of Action (GPA) and the UNEP Collaborating Centre on Water and Environment amongst others. GEMS/Water Programme used to work in close cooperation with other specialised agencies, such as the World Health Organization (WHO), the World Meteorological Organization (WMO), and the United Nations Educational, Scientific and Cultural Organization (UNESCO) and its IHP component.

7. Technical and substantive work was carried out by staff at UNEP-DEWA in Nairobi and at Environment Canada in Burlington, Ontario.

8. A high-level Advisory Committee was responsible for interagency coordination and strategic direction, and provided scientific advice on collaborative projects.

9. National focal points (NFPs) were appointed and funded by member countries and in charge of national cooperation with GEMS/Water and national coordination of activities related to the GEMS/Water Programme of work. Participating governments were expected to ensure that sufficient resources are available to their NFPs to deliver most of the required outputs and services. Collaborating Focal Points played similar roles to NFPs, but they are institutionally different. CFPs are non-governmental organizations, universities, and other institutes. CFPs are designated on a case by- case basis, with roles and outputs determined by mutual agreement.

### **4. Project Cost and Financing**

10. The estimated project cost at design was CAN 5'395'100. Funds for this project were provided by Environment Canada. Other sources of funds originated from the Foreign Affairs and International Trade Canada (DFAIT), Japan's National Institute for Environmental Studies (scientific and technical support of GEMS/Water Japan), the International Atomic Energy Agency and UNESCO.

**Table 3. Estimated project cost**

	<b>Cash</b>	<b>In-kind</b>	<b>Total</b>
<b>2010-2011</b>			
Environment Canada	500'000	284'000	784'000
UNEP and others	254'100	254'100	508'200
<b>2011-2012</b>			
Environment Canda	500'000	284'000	784'000
UNEP and others	399'050	399'050	678'100
<b>2012-2013</b>			
Environment Canada	500'000	284'000	784'000
UNEP and others	327'350	327'350	654'700
<b>After 2013</b>			
Environment Canada	500'000	284'000	784'000
UNEP and others	327'350	327'350	654'700
<b>Total</b>			
	<b>2'000'000</b>	<b>1'136'000</b>	<b>3'136'000</b>
	<b>1'129'550</b>	<b>1'129'550</b>	<b>2'259'100</b>
	<b>3'129'550</b>	<b>2'265'550</b>	<b>5'395'100</b>

### 5. Implementation Issues

11. Two of the key challenges encountered by the project are the inadequate level of financing and a single donor financial support structure. The working model used during the past 35 years relied almost entirely on the technical capability and support of a single donor. It should be acknowledged that Environment Canada provided solid and generous support, but, at the same time, this structure put some restriction on the human and financial resources available to GEMS /Water.

12. The project is also facing a problem of diminishing visibility. It appears that the project experienced challenges in establishing itself as an authoritative voice in environmental water quality assessment within the UN system, which may be linked to a need for a strong global leadership and adequate long term levels of financial support and continued data flows.

13. Existing data coverage, consistency, and range feature critical gaps in some regions. As a consequence, currently available data does not always provide a comprehensive global overview of the water quality status. Additionally, data submitted to the GEMStat is sometimes perceived not to provide immediate benefits to members, i.e. data providers.

14. The termination of the Environment Canada funding for GEMS/Water on March 31<sup>st</sup> 2014, and the introduction of a new host presents an opportunity. The goal is to rethink the role and structure of GEMS / Water, including identifying new ways towards strong global leadership and multiple donor input to global water quality assessment. It is critical is to establish a collective process of technical, structural and funding discussions with partners and stakeholders to build on past accomplishments and experiences in developing a new sustainable GEMS/Water Programme. Several evaluations of the GEMS/Water Programme since 2002 by Environment Canada and UNEP suggested possible future options, business and governance models for the Programme. This terminal evaluation should build on previous work and provide additional input.

## 2. TERMS OF REFERENCE FOR THE EVALUATION

### a. Objective and Scope of the Evaluation

15. In line with the UNEP Evaluation Policy<sup>2</sup> and the UNEP Evaluation Manual<sup>3</sup>, the Terminal Evaluation of the Project “**GEMS/ water**” is undertaken at completion of the project to assess project performance (in terms of relevance, effectiveness and efficiency), and determine outcomes and impacts (actual and potential) stemming from the project, including their sustainability. The evaluation has two primary purposes: (i) to provide evidence of results to meet accountability requirements, and (ii) to promote learning, feedback, and knowledge sharing through results and lessons learned among UNEP and its partners. The evaluation will identify lessons of operational relevance for future engagement in water data collection and achievement of water related development targets. It will focus on the following sets of **key questions**, based on the project’s intended outcomes, which may be expanded by the consultants as deemed appropriate:

- To what extent has the project played the role of a leading source of data, monitoring information, and analysis of inland water quality, for global and regional environmental assessment and better understanding of and decision-making on inland aquatic environmental issues, and in support of UN Water Quality initiatives?
- To what extent has the project developed and maintained global water quality data and information systems to improve accessibility to credible and comparable data and contributed to accessibility and interoperability with other environmental information systems?

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<sup>2</sup> <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationPolicy/tabid/3050/language/en-US/Default.aspx>

<sup>3</sup> <http://www.unep.org/eou/StandardsPolicyandPractices/UNEPEvaluationManual/tabid/2314/language/en-US/Default.aspx>

- To what extent has the GEMS/Water project been relevant, timely and effective in increasing awareness of the state of water quality, importance of water quality monitoring, and problems and emerging issues through cooperation, among governments and the public?
- To what extent has GEMS/Water produced non prescriptive tools drawing on all appropriate existing bodies of criteria and guidelines for planning and management of water quality and their alternatives? To what extent were these tools used by decision makers?
- How successful was the project in developing and maintaining global water quality data and information system to improve accessibility to credible and comparable data and contributed to accessibility and interoperability with other environmental information systems?
- To what extent has the project increased participation or involvement in water quality monitoring, assessment, research and reporting in developing countries and countries with economies in transition?
- To what extent has GEMS/Water built a reputation as a credible and reliable source for global water quality data and information, which adds value to local-level data collection, and as an appropriate monitoring and observation technology?

#### b. Overall Approach and Methods

16. The Terminal Evaluation of the “**GEMS/ water**” project will be conducted by independent consultants under the overall responsibility and management of the UNEP Evaluation Office in consultation with the DEWA Scientific Assessment Branch.
17. It will be an in-depth evaluation using a participatory approach whereby key stakeholders are kept informed and consulted throughout the evaluation process. Both quantitative and qualitative evaluation methods will be used to determine project achievements against the expected outputs, outcomes and impacts.
18. The findings of the evaluation will be based on the following:
  - a. A **desk review** of:  
The project document and work Programme outputs (such as work plans and financial reports, workshop proceedings, translated information documents, database developments, data drives, network building and establishment, websites, reports). Of particular importance will be the 2008 and 2009 evaluation review reports (one by UNEP and the other by Canada) of UNEP GEMS/Water Programme and any other relevant materials which will assist in the exercise.
  - b. **Interviews** with:  
UNEP and the Canadian team, which will include: Director of the UNEP Division of Early Warning and Assessment, the Manager of the GEMS/Water project and other relevant key stakeholders. The consultant shall determine whether to seek additional information and opinions from representatives of donor agencies and other organizations, as appropriate. These interviews could be combined with an e-mail questionnaire. To the extent possible, personal interviews with stakeholders involved in a representative case study of a national or regional multi-stakeholder processes on GEMS/Water.

#### c. Key Evaluation principles

19. Evaluation findings and judgements should be based on **sound evidence and analysis**, clearly documented in the evaluation report. Information will be triangulated (i.e. verified from different

sources) to the extent possible, and when verification was not possible, the single source will be mentioned. Analysis leading to evaluative judgements should always be clearly spelled out.

20. The evaluation will assess the project with respect to **a minimum set of evaluation criteria** grouped in six categories: (1) Strategic Relevance; (2) Attainment of objectives and planned result, which comprises the assessment of outputs achieved, effectiveness and likelihood of impact; (3) Sustainability and replication; (4) Efficiency; (5) Factors and processes affecting project performance, including preparation and readiness, implementation and management, stakeholder participation and public awareness, country ownership and driven-ness, financial planning and management, UNEP supervision and backstopping, and project monitoring and evaluation; and (6) Complementarity with the UNEP strategies and Programmes. The evaluation consultants can propose other evaluation criteria as deemed appropriate.
21. **Ratings.** All evaluation criteria will be rated on a six-point scale. However, complementarity of the project with the UNEP strategies and Programmes is not rated. Annex 2 provides guidance on how the different criteria should be rated and how ratings should be aggregated for the different evaluation criterion categories.
22. In attempting to attribute any outcomes and impacts to the project, the evaluators should consider the difference between *what has happened with and what would have happened without the project*. This implies that there should be consideration of the baseline conditions and trends in relation to the intended project outcomes and impacts. This also means that there should be plausible evidence to attribute such outcomes and impacts to the actions of the project. Sometimes, adequate information on baseline conditions and trends is lacking. In such cases this should be clearly highlighted by the evaluators, along with any simplifying assumptions that were taken to enable the evaluator to make informed judgements about project performance.
23. As this is a terminal evaluation, particular attention should be given to learning from the experience. Therefore, the “*Why?*” question should be at front of the consultants’ minds all through the evaluation exercise. This means that the consultants need to go beyond the assessment of “*what*” the project performance was, and make a serious effort to provide a deeper understanding of “*why*” the performance was as it was, i.e. of processes affecting attainment of project results (criteria under category F – see below). This should provide the basis for the lessons that can be drawn from the project. In fact, the usefulness of the evaluation will be determined to a large extent by the capacity of the consultants to explain “*why things happened*” as they happened and are likely to evolve in this or that direction, which goes well beyond the mere review of “*where things stand*” at the time of evaluation.

#### d. Evaluation criteria

##### A. Strategic relevance

24. The evaluation will assess, in retrospect, whether the project’s objectives and implementation strategies were consistent with global and regional environmental issues and needs.
25. It will also assess whether the project was aligned with UNEP’s Medium-term Strategy 2010-2013 and Programmes of Work 2010-2011 and 2012-2013. The UNEP MTS 2010-2013 specifies desired results in six thematic focal areas. The desired results are termed Expected Accomplishments. The “**GEMS water**” project was located under the sub-Programme Ecosystem Management. The evaluation should comment on whether the project makes a tangible contribution to any of the Expected Accomplishments specified in the UNEP MTS. The magnitude and extent of any contributions and the causal linkages should be fully described.

26. The evaluation will also assess whether the project objectives were realistic, given the time and budget allocated to the project, the baseline situation and the institutional context in which the project was to operate.
27. As the GEMS Water project is entering a new phase, the evaluation should also provide suggestions on how to build a strategy for GEMS Water to monitor and support the SDGs' targets related to water quality and waste water, while liaising with appropriate partners and organisations in the field of data management. It should also look at how to make sure that GEMS Water will be well positioned for SDG's future development on water / in waste water and water quality.

*B. Achievement of Outputs*

28. The evaluation will assess, for each component, the project's success in producing the Programmed outputs and milestones as presented in Table 2 above, both in quantity and quality, as well as their usefulness and timeliness.
29. Briefly explain the reasons behind the success (or failure) of the project in achieving its different outputs and meeting expected quality standards, cross-referencing as needed to more detailed explanations provided under Section F (which covers the processes affecting attainment of project results).

*C. Effectiveness: Attainment of Objectives and Planned Results*

30. The evaluation will assess the extent to which the project's objectives were effectively achieved or are expected to be achieved.
31. The evaluation will reconstruct the Theory of Change (ToC) of the project based on a review of project documentation and stakeholder interviews. The ToC of a project depicts the causal pathways from project outputs (goods and services delivered by the project) over outcomes (changes resulting from the use made by key stakeholders of project outputs) towards impact (changes in environmental benefits and living conditions). The ToC will also depict any intermediate changes required between project outcomes and impact, called intermediate states. The ToC further defines the external factors that influence change along the pathways, whether one result can lead to the next. These external factors are either drivers (when the project has a certain level of control) or assumptions (when the project has no control).
32. The assessment of effectiveness will be structured in three sub-sections:
  - c. Evaluation of the **achievement of outcomes as defined in the reconstructed ToC**. These are the first-level outcomes expected to be achieved as an immediate result of project outputs.
  - d. Assessment of the **likelihood of impact** using a Review of Outcomes to Impacts (ROtI) approach as summarized in Annex 8 of the TORs.
  - e. Evaluation of the **achievement of the formal project overall objective, overall purpose, goals and component outcomes** using the project's own results statements as presented in the Project Document and Project Document Supplement (see Table 2). This sub-section will refer back where applicable to the preceding sub-sections (a) and (b) to avoid repetition in the report. To measure achievement, the evaluation will use as much as appropriate the indicators for achievement proposed in the Logical Framework

(Logframe) of the project, adding other relevant indicators as appropriate. Briefly explain what factors affected the project's success in achieving its objectives, cross-referencing as needed to more detailed explanations provided under Section F.

33. Specifically, this evaluation should consider the following question:

- f. What should be the main product from GEMS Water? And should the project link the water quality assessment report as a main product of GEMS Water? And how can that be supported by GEMStat?

*D. Sustainability and replication*

34. Sustainability is understood as the probability of continued long-term project-derived results and impacts after the external project funding and assistance ends. The evaluation will identify and assess the key conditions or factors that are likely to undermine or contribute to the persistence of benefits. Some of these factors might be direct results of the project while others will include contextual circumstances or developments that are not under control of the project but that may condition sustainability of benefits. The evaluation should ascertain to what extent follow-up work has been initiated and how project results will be sustained and enhanced over time. The reconstructed ToC will assist in the evaluation of sustainability, as the drivers and assumptions required to achieve higher-level results are often similar to the factors affecting sustainability of these changes.

35. Four aspects of sustainability will be addressed:

- g. *Socio-political sustainability.* Are there any social or political factors that may influence positively or negatively the sustenance of project results and progress towards impacts? Is the level of ownership by the main stakeholders sufficient to allow for the project results to be sustained?
- h. *Financial resources.* To what extent are the continuation of project results and the eventual impact of the project dependent on financial resources? What is the likelihood that adequate financial resources<sup>4</sup> will be or will become available to use capacities built by the project? Are there any financial risks that may jeopardize sustenance of project results and onward progress towards impact?
- i. *Institutional framework.* To what extent is the sustenance of the results and onward progress towards impact dependent on issues relating to institutional frameworks and governance? How robust are the institutional achievements such as governance structures and processes, policies, sub-regional agreements, legal and accountability frameworks etc. required to sustaining project results and to lead those to impact on human behaviour and environmental resources?
- j. *Environmental sustainability.* Are there any environmental factors, positive or negative, that can influence the future flow of project benefits? Are there any project outputs or higher level results that are likely to affect the environment, which, in turn, might affect sustainability of project benefits? Are there any foreseeable negative environmental impacts that may occur as the project results are being up-scaled?

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<sup>4</sup> Those resources can be from multiple sources, such as the national budget, public and private sectors, development assistance etc.

36. Taking into account the ongoing re-structuring of the GEMS water project, key questions for this evaluation include the following:

- How should UNEP position GEMS Water in the future, how should it present it as one tool within the framework of the Sustainable Development agenda?
- How can UNEP trigger interest by partners for GEMS Water as the one mechanism for monitoring and evaluation of water quality assessment?
- How can UNEP use the proposed model to move towards the post 2015 agenda?

37. **Catalytic Role and replication.** The *catalytic role* of UNEP interventions is embodied in their approach of supporting the creation of an enabling environment and of investing in pilot activities which are innovative and showing how new approaches can work. UNEP also aims to support activities that upscale new approaches to a national, regional or global level, with a view to achieve sustainable global environmental benefits. The evaluation will assess the catalytic role played by this project, namely to what extent the project has:

- k. *catalyzed behavioural changes* in terms of use and application by the relevant stakeholders of GEMS water tools and processes;
- l. provided *incentives* (social, economic, market based, competencies etc.) to contribute to catalyzing changes in stakeholder behaviour;
- m. contributed to *institutional changes*;
- n. contributed to *policy changes* (on paper and in implementation of policy);
- o. contributed to sustained follow-on financing (*catalytic financing*) from Governments, private sector, donors etc.;
- p. created opportunities for particular individuals or institutions ("*champions*") to catalyze change (without which the project would not have achieved all of its results).

38. *Replication* is defined as lessons and experiences coming out of the project that are replicated (experiences are repeated and lessons applied in different geographic areas) or scaled up (experiences are repeated and lessons applied in the same geographic area but on a much larger scale and funded by other sources). The evaluation will assess the approach adopted by the project to promote replication effects and appreciate to what extent actual replication has already occurred or is likely to occur in the near future. What are the factors that may influence replication and scaling up of project experiences and lessons?

#### E. Efficiency

39. The evaluation will assess the cost-effectiveness and timeliness of project execution. It will describe any cost- or time-saving measures put in place in attempting to bring the project as far as possible in achieving its results within its Programmed budget and (extended) time. It will also analyse how delays, if any, have affected project execution, costs and effectiveness. Wherever possible, costs and time over results ratios of the project will be compared with that of other similar interventions.

40. Based on the experience of GEMS water to date and the need to restructure the operational structure of GEMS for the next phase, it is proposed that the evaluation consider the following questions:

- What kind of role could regional hubs play and to what extent would capacity building be necessary? What incentives can be given to the national focal points to get engaged? And what is a meaningful regional hub?

- What kind of support groups does GEMS Water require, e.g. data and knowledge, capacity building and networking?
- How can the project make sure that all relevant data will feed into the UNEP Live platform from the national level (national reporting toolkit) and will be available for GEMStat? How can the project bring the technical tools together at an early stage?

*F. Factors and Processes affecting project performance*

41. **Preparation and readiness.** This criterion focusses on the quality of project design and preparation. Were project stakeholders<sup>5</sup> adequately identified? Were the project's objectives and components clear, practicable and feasible within its timeframe? Were the capacities of executing agencies properly considered when the project was designed? Was the project document clear and realistic to enable effective and efficient implementation? Were the partnership arrangements properly identified and the roles and responsibilities negotiated prior to project implementation? Were counterpart resources (funding, staff, and facilities) and enabling legislation assured? Were adequate project management arrangements in place? Were lessons from other relevant projects properly incorporated in the project design? What factors influenced the quality-at-entry of the project design, choice of partners, allocation of financial resources etc.?
42. **Project implementation and management.** This includes an analysis of implementation approaches used by the project, its management framework, the project's adaptation to changing conditions (adaptive management), the performance of the implementation arrangements and partnerships, relevance of changes in project design, and overall performance of project management. The evaluation will:
- q. Ascertain to what extent the project implementation mechanisms outlined in the project document have been followed and were effective in delivering project milestones, outputs and outcomes. Were pertinent adaptations made to the approaches originally proposed?
  - r. Evaluate the effectiveness and efficiency of project management and how well the management was able to adapt to changes during the life of the project.
  - s. Assess the role and performance of the teams and working groups established and the project execution arrangements at all levels.
  - t. Assess the extent to which project management responded to direction and guidance provided by UNEP.
  - u. Identify operational and political / institutional problems and constraints that influenced the effective implementation of the project, and how the project partners tried to overcome these problems. How did the relationship between the project management team and the collaborating partners develop?
43. **Stakeholder participation and public awareness.** The term stakeholder should be considered in the broadest sense, encompassing both project partners and target audiences of the project's products. The TOC analysis should assist the evaluators in identifying the key stakeholders and their respective roles, capabilities and motivations in each step of the causal pathway from activities to achievement of outputs and outcomes to impact. The assessment will look at three related and often overlapping processes: (1) information dissemination to and between

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<sup>5</sup> Stakeholders are the individuals, groups, institutions, or other bodies that have an interest or stake in the outcome of the project. The term also applies to those potentially adversely affected by the project.

stakeholders, (2) consultation with and between stakeholders, and (3) active engagement of stakeholders in project decision making and activities. The evaluation will specifically assess:

- a. the approach(es) used to identify and engage stakeholders (within and outside UNEP) in project design and implementation. What were the strengths and weaknesses of these approaches with respect to the project's objectives and the stakeholders' motivations and capacities? What was the achieved degree and effectiveness of collaboration and interactions between the various project partners and stakeholders during design and implementation of the project?
- b. the degree and effectiveness of any public awareness activities that were undertaken during the course of implementation of the project; or that are built into the assessment methods so that public awareness can be raised at the time the assessments will be conducted;
- c. how the results of the project promote participation of stakeholders, including users, in decision making.

**44. Country ownership and driven-ness.** The evaluation will assess the performance of government agencies involved in the project:

- a. In how far have Governments assumed responsibility for the project and provided adequate support to project execution, including the degree of cooperation received from the various public institutions involved in the project?
- b. How well did the project process stimulate country ownership of the project outputs and policy recommendations?

**45. Financial planning and management.** Evaluation of financial planning requires assessment of the quality and effectiveness of financial planning and control of financial resources throughout the project's lifetime. The assessment will look at actual project costs by activities compared to budget (variances), financial management (including disbursement issues), and co-financing. The evaluation will:

- a. Verify the application of proper standards (clarity, transparency, audit etc.) and timeliness of financial planning, management and reporting to ensure that sufficient and timely financial resources were available to the project and its partners;
- b. Appreciate other administrative processes such as recruitment of staff, procurement of goods and services (including consultants), preparation and negotiation of cooperation agreements etc. to the extent that these might have influenced project performance;
- c. Present to what extent co-financing has materialized as expected at project approval (see Table 1). Report country co-financing to the project overall, and to support project activities at the national level in particular. The evaluation will provide a breakdown of final actual costs and co-financing for the different project components (see tables in Annex 3).
- d. Describe the resources the project has leveraged since inception and indicate how these resources are contributing to the project's ultimate objective. Leveraged resources are additional resources—beyond those committed to the project itself at the time of approval—that are mobilized later as a direct result of the project. Leveraged resources can be financial or in-kind and they may be from other donors, NGO's, foundations, governments, communities or the private sector.
- e. Analyse the effects on project performance of any irregularities in procurement, use of financial resources and human resource management, and the measures taken UNEP to

prevent such irregularities in the future. Appreciate whether the measures taken were adequate.

- 46. Supervision, guidance and technical backstopping.** The purpose of supervision is to verify the quality and timeliness of project execution in terms of finances, administration and achievement of outputs and outcomes, in order to identify and recommend ways to deal with problems which arise during project execution. Such problems may be related to project management but may also involve technical/institutional substantive issues in which UNEP has a major contribution to make.
- 47.** The evaluator should assess the effectiveness of supervision, guidance and technical support provided by the different supervising/supporting bodies including:
- a. The adequacy of project supervision plans, inputs and processes;
  - b. The realism and candour of project reporting and the emphasis given to outcome monitoring (results-based project management);
  - c. How well did the different guidance and backstopping bodies play their role and how well did the guidance and backstopping mechanisms work? What were the strengths in guidance and backstopping and what were the limiting factors?
- 48. Monitoring and evaluation.** The evaluation will include an assessment of the quality, application and effectiveness of project monitoring and evaluation plans and tools, including an assessment of risk management based on the assumptions and risks identified in the project document. The evaluation will appreciate how information generated by the M&E system during project implementation was used to adapt and improve project execution, achievement of outcomes and ensuring sustainability. M&E is assessed on three levels:
- a. *M&E Design.* The evaluators should use the following questions to help assess the M&E design aspects:
    - Did the project have a sound M&E plan to monitor results and track progress towards achieving project objectives?
    - How well was the project logical framework (original and possible updates) designed as a planning and monitoring instrument?
    - SMART-ness of indicators: Are there specific indicators in the logframe for each of the project objectives? Are the indicators measurable, attainable (realistic) and relevant to the objectives? Are the indicators time-bound?
    - Adequacy of baseline information: To what extent has baseline information on performance indicators been collected and presented in a clear manner? Was the methodology for the baseline data collection explicit and reliable? Was there sufficient information about the capacity of country partners to collaborate with the project?
    - Arrangements for monitoring: Have the responsibilities for M&E activities been clearly defined? Were the data sources and data collection instruments appropriate? Was the time frame for various M&E activities specified? Was the frequency of various monitoring activities specified and adequate? In how far were project users involved in monitoring?
    - Arrangements for evaluation: Have specific targets been specified for project outputs? Has the desired level of achievement been specified for all indicators of objectives and outcomes? Were there adequate provisions in the legal instruments binding project partners to fully collaborate in evaluations?

- Budgeting and funding for M&E activities: Determine whether support for M&E was budgeted adequately and was funded in a timely fashion during implementation.
- b. *M&E Plan Implementation.* The evaluation will verify that:
- the M&E system was operational and facilitated timely tracking of results and progress towards projects objectives throughout the project implementation period;
  - Half-yearly Progress & Financial Reports were complete and accurate;
  - the information provided by the M&E system was used during the project to improve project performance and to adapt to changing needs.

*G. Complementarity with UNEP policies and strategies*

**49. Alignment with the Bali Strategic Plan (BSP)**<sup>6</sup>. The outcomes and achievements of the project should be briefly discussed in relation to the objectives of the UNEP BSP.

**50. Gender.** Ascertain to what extent project design, process, products and monitoring have taken into consideration possible gender inequalities at different levels:

- a. To what extent were efforts made to ensure a gender balance in project team, partners and selected social entrepreneurs?
- b. To what extent is the contents of GEMS water products made gender-specific? To what extent is the communication of GEMS water products made gender-specific, considering that people from different gender tap different information sources?

**51. South-South Cooperation.** How did the project promote and benefit from the exchange of resources, technology, and knowledge between countries? Briefly describe any aspects of the project that could be considered as examples of South-South Cooperation.

*e. The Evaluation Consultant*

**52.** The consultant who carries out this evaluation should have extensive experience in project evaluation, in particular of water management, data collection and monitoring systems. He or she should be fluent English. He/She should have at least a Master's degree, and 15 years of relevant working experience, respectively (or an equivalent combination of education and experience).

**53.** The consultant will carry out visits to Canada and Kenya.

**54.** The consultant will coordinate data collection and analysis, and the preparation of the main report for the evaluation and will ensure that all evaluation criteria and questions are adequately covered.

**55.** By undersigning the service contract with UNEP/UNON, the consultant certifies that they have not been associated with the design and implementation of the "GEMS water" project in any way which may jeopardize their independence and impartiality towards project achievements and project partner performance. In addition, they will not have any future interests (within six months after completion of the contract) with the project's executing or implementing units.

*f. Evaluation Deliverables and Review Procedures*

**56.** The consultant will prepare an **inception report** (see Annex 2(a) of TORs for Inception Report outline) containing a thorough review of the project context, project design quality, a draft

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<sup>6</sup> <http://www.unep.org/GC/GC23/documents/GC23-6-add-1.pdf>

reconstructed Theory of Change of the project, the evaluation framework and a tentative evaluation schedule.

57. The review of design quality will cover the following aspects (see Annex 9 for the detailed project design assessment matrix):
  - a. Strategic relevance of the project
  - b. Preparation and readiness Financial planning
  - c. M&E design Complementarity with UNEP strategies and Programmes
  - d. Sustainability considerations and measures planned to promote replication and up-scaling
58. The inception report will also present a draft, desk-based reconstructed Theory of Change of the project. It is vital to reconstruct the ToC *before* most of the data collection (review of reports, in-depth interviews, surveys etc.) is done, because the ToC will define which direct outcomes, drivers and assumptions of the project need to be assessed and measured – based on which indicators – to allow adequate data collection for the evaluation of project effectiveness, likelihood of impact and sustainability.
59. The evaluation framework will present in further detail the evaluation questions under each criterion with their respective indicators and data sources. The evaluation framework should summarize the information available from project documentation against each of the main evaluation parameters. Any gaps in information should be identified and methods for additional data collection, verification and analysis should be specified.
60. The inception report will also present a tentative schedule for the overall evaluation process, including a draft Programme for the country visit and tentative list of people/institutions to be interviewed.
61. The inception report will be submitted for review and approval by the Evaluation Office before the evaluation team travels to Canada and Kenya.
62. **The main evaluation report** should be brief (no longer than 40 pages – excluding the executive summary and annexes), to the point and written in plain English. The report will follow the annotated Table of Contents outlined in Annex 1. It must explain the purpose of the evaluation, exactly what was evaluated and the methods used (with their limitations). The report will present evidence-based and balanced findings, consequent conclusions, lessons and recommendations, which will be cross-referenced to each other. The report should be presented in a way that makes the information accessible and comprehensible. Any dissident views in response to evaluation findings will be appended in footnote or annex as appropriate. To avoid repetitions in the report, the authors will use numbered paragraphs and make cross-references where possible.
63. **Review of the draft evaluation report.** The consultant will submit a zero draft report to the UNEP EO and revise the draft following the comments and suggestions made by the EO. Once a draft of adequate quality has been accepted, the EO will share this first draft report with the project manager, who will alert the EO in case the report would contain any blatant factual errors. The project manager will then forward the first draft report to the other project stakeholders for their review and comments. Stakeholders may provide feedback on any errors of fact and may highlight the significance of such errors in any conclusions. It is also very important that stakeholders provide feedback on the proposed recommendations and lessons. Comments would be expected within two weeks after the draft report has been shared. Any

comments or responses to the draft report will be sent to the UNEP EO for collation. The EO will provide the comments to the evaluation team for consideration in preparing the final draft report.

**64.** The consultant will submit the final draft report no later than 2 weeks after reception of stakeholder comments. The team will prepare a **response to comments**, listing those comments not or only partially accepted by them that could therefore not or only partially be accommodated in the final report. They will explain why those comments have not or only partially been accepted, providing evidence as required. This response to comments will be shared by the EO with the interested stakeholders to ensure full transparency.

**65. Submission of the final Terminal Evaluation report.** The final report shall be submitted by Email to:

Mike Spilsbury, Chief  
UNEP Evaluation Office  
P.O. Box 30552-00100  
Nairobi, Kenya  
Tel.: (+254-20) 762 3387  
Email: [michael.spilsbury@unep.org](mailto:michael.spilsbury@unep.org)

**66.** The Head of Evaluation will share the report with the following persons:

Director  
Division of Early Warnings and Assessment  
United Nations Environment Programme, UNEP  
P.O. Box 30552  
Nairobi, 00100, KENYA

Mr Hartwig Kremer  
Senior Programme Officer  
Division of Early Warning and Assessment, DEWA  
United Nations Environment Programme, UNEP  
P.O. Box 30552  
Nairobi, 00100, KENYA  
Email: [hartwig.kremer@unep.org](mailto:hartwig.kremer@unep.org)

Stokker, Yvonne and Kelly Hodgson

The UNEP GEMS/Water Programme  
c/o Environment Canada  
867 Lakeshore Road  
Burlington, Ontario  
L7R 4A6 CANADA  
Email: [Yvonne.Stokker@ec.gc.ca](mailto:Yvonne.Stokker@ec.gc.ca)  
and [Kelly.Hodgson@ec.gc.ca](mailto:Kelly.Hodgson@ec.gc.ca)

**67.** The final evaluation report will be published on the UNEP Evaluation Office web-site [www.unep.org/eou](http://www.unep.org/eou).

- 68.** As per usual practice, the UNEP EO will prepare a **quality assessment** of the zero draft and final draft report, which is a tool for providing structured feedback to the evaluation consultants. The quality of the report will be assessed and rated against the criteria specified in Annex 4.
- 69.** The UNEP Evaluation Office will assess the ratings in the final evaluation report based on a careful review of the evidence collated by the evaluation consultants and the internal consistency of the report. Where there are differences of opinion between the evaluator and UNEP Evaluation Office on project ratings, both viewpoints will be clearly presented in the final report. The UNEP Evaluation Office ratings will be considered the final ratings for the project.

g. Logistical arrangements

- 70.** This Terminal Evaluation will be undertaken by an independent evaluation consultants contracted by the UNEP Evaluation Office. The consultant will work under the overall responsibility of the UNEP Evaluation Office and will consult with the EO on any procedural and methodological matters related to the evaluation. It is, however, the consultant's individual responsibility to arrange for their travel, visa, obtain documentary evidence, plan meetings with stakeholders, organize online surveys, and any other logistical matters related to the assignment. The project manager will, where possible, provide logistical support (introductions, meetings etc.) allowing the consultants to conduct the evaluation as efficiently and independently as possible.

h. Schedule of the evaluation

Table 4 below presents the tentative schedule for the evaluation.

**Table 4. Tentative schedule for the evaluation**

<b>Milestone</b>	<b>Deadline</b>
TORs finalized	April 2014
Consultants identified	April 2014
Consultant contracts signed	April 2014
Inception Report	May 2014
Evaluation Missions	May 2014
Zero Draft Report	June 2014
First Draft Report shared with project manager	June 2014
First Draft Report shared with stakeholders	July 2014
Final Report	July 2014

i. Contractual arrangements

71. The consultant will be hired under an individual Special Service Agreement (SSA). There are two options for contract and payment: lumpsum or “fees only”.
72. **Lumpsum:** The contract covers both fees and expenses such as travel, per diem (DSA) and incidental expenses which are estimated in advance. The consultant will receive an initial payment covering estimated expenses upon signature of the contract.
73. **Fee only:** The contract stipulates consultant fees only. Air tickets will be purchased by UNEP and 75% of the DSA for each authorised travel mission will be paid up front. Local in-country travel and communication costs will be reimbursed on the production of acceptable receipts. Terminal expenses and residual DSA entitlements (25%) will be paid after mission completion.
74. The payment schedule for the consultant will be linked to the acceptance of the key evaluation deliverables by the Evaluation Office:
  - a. Final inception report: 20 percent of agreed total fee
  - b. First draft main evaluation report: 40 percent of agreed total fee
  - c. Final main evaluation report: 40 percent of agreed total fee
75. In case the consultant is not able to provide the deliverables in accordance with these TORs, in line with the expected quality standards by the UNEP Evaluation Office, payment may be withheld at the discretion of the Head of the Evaluation Office until the consultant has improved the deliverables to meet UNEP’s quality standards.
76. If the consultant fails to submit a satisfactory final product to UNEP in a timely manner, i.e. before the end date of their contract, the Evaluation Office reserves the right to employ additional human resources to finalize the report, and to reduce the consultant’s fees by an amount equal to the additional costs borne by the Evaluation Office to bring the report up to standard.

## ANNEX 2: EVALUATION PROGRAMME: LIST OF INSTITUTIONS AND INDIVIDUALS

Institution	Individual	Contact
UNEP-EO	Elisa Calcaterra	<a href="mailto:Elisa.Calcaterra@unep.org">Elisa.Calcaterra@unep.org</a>
	Michael Spilsbury	<a href="mailto:Michael.Spilsbury@unep.org">Michael.Spilsbury@unep.org</a>
UNEP-DEWA	Patrick M'Mayi	<a href="mailto:Patrick.Mmayi@unep.org">Patrick.Mmayi@unep.org</a>
	Hartwig Kremer	<a href="mailto:Hartwig.Kremer@unep.org">Hartwig.Kremer@unep.org</a>
	Matt Billot	<a href="mailto:Matthew.Billot@unep.org">Matthew.Billot@unep.org</a>
	Joana Akrofi	<a href="mailto:Joana.Akrofi@unep.org">Joana.Akrofi@unep.org</a>
UNEP-DEPI	Neeeyati Patel	<a href="mailto:Neeeyati.Patel@unep.org">Neeeyati.Patel@unep.org</a>
	Thomas Chiramba	<a href="mailto:Thomas.Chiramba@unep.org">Thomas.Chiramba@unep.org</a>
	Fanina Kodre	<a href="mailto:Fanina.Kodre@unep.org">Fanina.Kodre@unep.org</a>
UNEP-DCPI	Tamiza Khalid	<a href="mailto:Tamiza.Khalid@unep.org">Tamiza.Khalid@unep.org</a>
	Gregory Mwaura	<a href="mailto:Gregory.Mwaura@unep.org">Gregory.Mwaura@unep.org</a>
	Cheikh Anta Diop University	<a href="mailto:esalifdiop@gmail.com">esalifdiop@gmail.com</a>
EC-NWRI	Salif Diop	<a href="mailto:esalifdiop@gmail.com">esalifdiop@gmail.com</a>
	Yvonne Stokker	<a href="mailto:Yvonne.Stokker@ec.gc.ca">Yvonne.Stokker@ec.gc.ca</a>
	Kelly Hodgson	<a href="mailto:Kelly.Hodgson@ec.gc.ca">Kelly.Hodgson@ec.gc.ca</a>
Bundesanstalt für Gewässerkunde	Richard Robarts	<a href="mailto:rdr Roberts@shaw.ca">rdr Roberts@shaw.ca</a>
	Philipp Saile	<a href="mailto:Saile@bafg.de">Saile@bafg.de</a>
Federal Ministry of Environment	Thomas Stratenwerth	<a href="mailto:thomas.stratenwerth@bmub.bund.de">thomas.stratenwerth@bmub.bund.de</a>
UCC	Deborah V Chapman	<a href="mailto:d.chapman@ucc.ie">d.chapman@ucc.ie</a>
Irish Aid	Sean O Donncha	<a href="mailto:Sean.odonncha@dfa.ie">Sean.odonncha@dfa.ie</a>
Department of Environment	Cian O Lionain	<a href="mailto:Cian.olionain@environ.ie">Cian.olionain@environ.ie</a>

NOTE: EO = UNEP Evaluation Office

DEWA = Division of Early Warning and Assessment

DEPI = Division of Environmental Policy Implementation

DCPI = Division of Communications and Public Information

NWRI = Canadian National Water Research Institute

UCC = University College of Cork

## **ANNEX 3: UNEP GEMS/Water Programme 2010-14 Narrative Report**

**Based on implementation of the arrangement between Canada and UNEP on agreed activities of the  
UNEP GEMS/Water Programme**

**30<sup>th</sup> April 2014**

### **Background and Introduction**

#### **Background**

**Project title:** GEMS/Water Programme. WPL/2F73-6

**Responsible Divisions/Units in UNEP:** DEWA/SAB – Water unit

**Project starting date:** 05/10/2010

**Project completion date:** 31/03/2014

**Reporting period:** 2010-14

**Reference to UNEP Sub-Programme Ecosystems Management:** EM 311

#### **Introduction**

The termination of the generous Environment Canada funding for GEMS/Water at the end of the current agreement, March 31<sup>st</sup> 2014 and the preparedness of a new host (BMUB through engaging FIH in Germany to host GEMStat) presents an opportunity, with Ireland, as co-host mainly focusing on capacity building. The goal is to rethink the role and structure of GEMS / Water including identifying new ways towards a strong global leadership and multiple donor input to global water quality assessments. A business model with strong global leadership and a support base of many partners and donors with long term funding is needed. This provides an opportunity for potential new donors and or technical partners to get involved in the GEMS/Water Programme based on their specific areas of interests and technical expertise. This underlines that UNEP aims to make the development of the new business model a collective and inclusive effort together with partners, as discussed during the partnership and donors meeting held at UNEP headquarters 3-5 March 2014 back to back with the World Water Quality Assessment and the International Water Quality Guidelines for Ecosystems project.

Presently, GEMS/Water Programme is undergoing an evaluation and inclusive redesign process taking into consideration UNEP's thinking on the new partnership model as presented at the GEMS/Water Partners and Donors meeting (Nairobi, 3-5 March 2014) and the Stockholm scoping meeting in September 2013. Key partners and stakeholders have specifically worked out the modalities, outlined the rationale and importantly carried out an initial mapping of individual partner preferences. The future potential for enhancing GEMS/Water Programme's benefits and services for global regional and country based water quality assessment and policy information namely in providing evidence and knowledge products for the Post 2015 process and the new GEO have been explored including the opportunities that emerge from the recent launch of UNEP Live as the central knowledge management platform based on open access to environmental information, synthesis and services. It will provide freshwater quality-QA/QC assured data and information in support of the GEO process.

## Overall objectives of the project:

- i) Determine status and trends in freshwater quality in various parts of the world; and
- ii) Improve the water quality monitoring and assessment activities in countries participating in the Programme.
- iii) Providing data and information to governments, the scientific community and the public on the quality of the world's freshwater resources as it relates to human and aquatic ecosystems health and other environmental concerns;
- iv) Providing information and data to the same audience on the transport and fluxes of toxic chemicals, nutrients and other pollutants from major river basins to the continent/ocean interfaces; and
- v) Strengthening national water quality monitoring networks, and analytical capabilities and data quality assurance, in developing countries.

Overall implementation of the Programme over the duration of this arrangement was carried out by the Project manager, supported by the Programme officer in preparations and occasionally in attendance to meetings, workshops and presentations and by the support of the finance manager office and support staff in the division. The Director UNEP-DEWA was very supportive in matters requiring decision making at UNEP wide level. The UNEP interdivisional water group supported the Programme in consultations and advice and in joint UN Water group initiatives related to water quality.

## Delivery of the project and accomplishments

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### Securing adequate additional funding from diverse sources

#### Initial implementation activities and consultations with Environment Canada

- **Recruitment of the UNEP-GEMS/Water Programme Manager**

On signing of the four year arrangement between Canada and UNEP (5<sup>th</sup> October 2010), UNEP appointed a UNEP-GEMS/Water Programme Manager in February 2011, who was in Office until November 2013 on retirement. Under his leadership, he initiated a number of meetings with members of the UNEP-DEWA, the UNEP Interdivisional Water Group, and the UN Water to discuss participation, potential support and a more relevant role of GEMS/Water in this fora/mechanism, in particular with regards to support to activities and discussions on international water quality policy. Discussions with potential donor countries and organisations were initiated, which helped to forge a strong support to the Programme. Within UNEP, the Programme participated in discussions in the UN Water group aimed at identifying areas where GEMS Water could make substantive contribution.

- **Consultations and planning meeting between- UNEP-GEMS/Water Programme Manager and Officials from the Government of Canada. Burlington, Canada, 11-14 March 2011.**

A 3-day meeting was held in Burlington, Saskatoon and Ottawa with Officials from the Canadian Government's, Environment Canada-GEMS Water Programme. Priorities, activities and budget for 2011-12 were reviewed including status of activities for 2010-11; financial and administrative issues for a more efficient Programme delivery. Challenges were identified, as well as the priorities for the FY 2011-12 - further conversations and discussions followed up in the process of implementation of the project.

### Participation in UN Water Group activities on Water Quality (Assessments)

- **Participation of the UNEP-GEMS/Water Programme at the World Water Day, held in Cape Town South Africa, 21-22 March 2011.**

The GEMS/Water participated in two workshops: (a) Workshop on International Water Quality Standards/Guidelines for Ecosystems, organised by UNEP, and (b) Workshop on UN-Water Mapping Exercise on Water Quality, organised by the UN Water Group. Presentations were made on the GEMS/Water Programme, new directions and contributions to UN-Water activities - specifically to the water quality indicators, standards and guidelines and the Mapping exercises.

- **Preparation of a baseline report on quality and usefulness of available GEMS/Water global water quality data**

The project is a 2-year first phase project reformulated in the context of a **World Water Quality Assessment (WWQA) Report** which started June - 2013. UNEP in partnership with the UN water is taking the lead in implementation of the project in collaboration with many international partners. The GEMS/Water Programme was tasked by the UN Water Group's Thematic Priority Area (TPA) on Water Quality to coordinate the preparation of a desk study on the quality and usefulness of available global water quality data. This study is under way and is the basis for a World Water Quality assessment report that UNEP has initiated in collaboration with its International partners – see

<http://www.unep.org/dewa/Assessments/Ecosystems/Water/tabid/6954/Default.aspx>

The German Helmholtz-Zentrum für Umweltforschung GmbH – UFZ (Centre for Environmental Research) was identified as the lead partner for implementation of this project. The overall budget is US \$ 533,000. Off this several partners gave contributions from the Norwegian Government (USD\$ 420,000 for the biennium 2012-13 and 2013-14), the UN Water Group (US\$115,000) and GEMS/Water (US\$30,000).

The desk study resulted in the initiation of the second Great Water Quality Data Drive – that targets GEMS/Water partners in search for updates of specific inland water quality data among its members around the world. Thirty eight countries received requests for more data and updates and six countries responded. It is an exercise that is going to continue for the next 2 years. The current status of available water quality data can be found by visiting [www.gemstat.org](http://www.gemstat.org), and conducting a Search for Data by country, by watershed, or by parameter. The study will provide the WWQA with available data from the GEMStat. The study has brought to the fore the need to focus data collection and filling of many gaps both in consistency, geographical coverage and relevance of data collected.

## Participation and contribution to Water Quality (WQ) policy advise – Governing Council (GC) / United Nations Environment Assembly (UNEA)

- **Participation of the Canadian Government at the 26th UNEP - Governing council including the UNEP-GEMS/water Programme - held on 21-24 February 2011**

At the UNEPs 26th GC, The Canadian Government tabled a draft decision 26/15. It was discussed and passed with some amendments in the plenary. UNEP-GEMS/Water Office in Nairobi exhibited the work of GEMS/Water and caused awareness about the Programmes products. A favourable response was received about its products. Capacity building inquiries were received from developing countries with interest in this area.

### **Outcome of discussions at the 26th UNEP GC on GEMS/Water:**

At this session of the GC, USA Government presented an amended version of the draft decision on GEMS (UNEP/GC.26/L.1), based on consultations with Canada and Hungary, on behalf of the EU. Delegates agreed to the draft decision with amendments on, inter alia, the encouragement of cooperation at the regional level to enhance water-monitoring systems at the global level.

A final decision was agreed upon and made – refer to GEMS (UNEP/GC.26/L.4). In summary, the decision encouraged member countries to *facilitate the further development of GEMS to ensure the Programme provides scientifically credible water quality data that meets the needs of the UN; and strengthen capacity to enhance monitoring Programmes and analytical, assessment and research activities for integrated water resource management in developing countries.*

It also - *requested governments and other organizations to participate actively in the GEMS Water Programme by contributing water quality data and information, and provide financial and in-kind support to the GEMS Water Programme, capacity building, and transfer of technology efforts in developing countries.*

In follow up of current developments and the future model for the GEMS/Water, an Information Document (see attached) has been drafted for presentation at the UNEA. This comes after a series of consultations before, during and after the Stockholm World Water Week in September 2013 – where a scoping meeting on the Programme was held, followed by the Partners and Donors meeting in March 2014.

GEMS/Water side event document has also been drafted and it will be under discussion at the UNEA in June 2014 (See attached – side event document).

### **Development of the business model**

- **Development of a Business Model for the GEMS/Water Programme - Phase I**

As a start, an expert consultancy for the preparation of viable alternatives for comprehensive business model(s) for the GEMS/Water Programme, with a view to a long-term, self-sustaining Programme generating value-added water quality products and services was initiated. It was supposed to be carried

out in two phases. Phase I looked at the visions and overarching mission and strategic purpose for the GEMS/Water. It took stock of key driving forces or major issues that could affect the Programme. The Strength, Weakness, Opportunities and Threats (SWOT) analysis was produced and a Vulnerabilities and Advantages (VA) assessment, and market potential and segmentation analysis carried out. A first draft of the model was delivered to UNEP at the end of March 2012 and circulated for quick inputs and a second draft was prepared by end of April 2012 accommodating views of members participating in Regional Workshops. After receiving comments phase 2 of the exercise was deemed as not necessary.

- **Preparation of documents on the new model of the GEMS/Water at the Scoping meeting in September 2013 and the GEMS/Water Programme Partners and Donors meeting 3-5 March 2014.**

Documents presenting the new model for the GEMS/Water were prepared for the Scoping meeting in September 2013. The proposed model was accepted by participants and received suggestions for further changes and improvements. Possible commitments by donors were discussed and noted. Proposed changes to this model were considered and incooperated during the 3-5 March 2014 - GEMS/Water Partners and Donors meeting (*see figure 1 – below the new GEMS/Water Programme*)

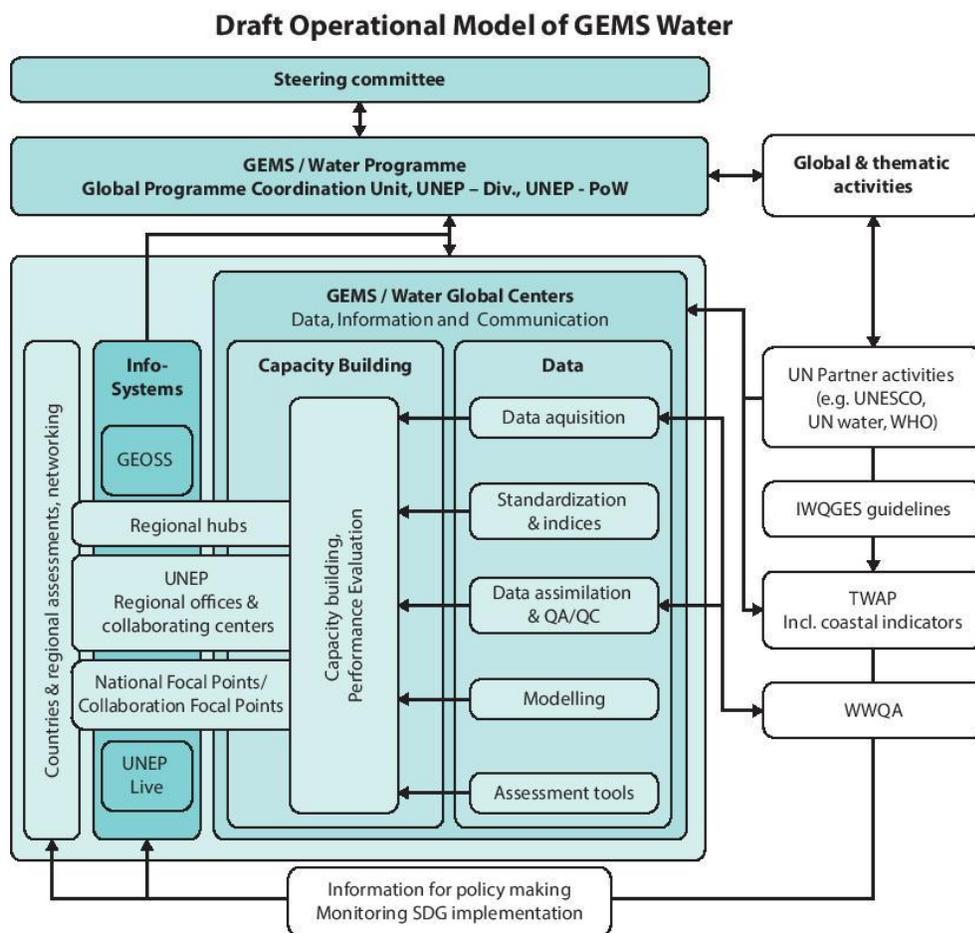


Figure 1: The new model for the GEMS/Water Programme

During the meeting, the Federal Ministry of the Environment, Nature Conservation, Building and nuclear safety (BMUB) and the FIH of Germany, made presentation on how they intend to run the GEMStat database in Germany, whereas the Irish Government through a consortium of Universities and Government Intuitions, made a proposal on how they intend to host the GEMS/Water Capacity Building partnering with UNEP, FIH and the regional hubs. This has been documented in the minutes of the meeting held in March 2014.

## **Regional workshops touching on network strengthening and fund raising**

- **Securing adequate additional funding from diverse sources.**

Several activities took place during the Fiscal Year (FY) 2012-13 aimed at attracting additional funding for the operations of the GEMS/Water Programme, in particular considering its transitioning to a new host/s at the end of the current agreement. UNEP contacted potential donors to discuss their interest in financing aspects of GEMS/Water in the future - amongst them the Governments of Germany and Ireland, which officially requested information about GEMS/Water. Meetings were also held during the last UNEP GC in February 2013. Governments requested until the end June 2013 for a preliminary answer. UNEP also approached other governments and regional organizations to discuss the regionalisation of the capacity building activities and the identification of entities interested in becoming regional hubs for GEMS/Water to deliver capacity building (e.g. India, South Africa, China, Brazil and the CATHALAC). UNEP also established cooperation with the Government of Israel for the update/development of a training module for water quality monitoring in lakes with- Israel structured on the model of Lake Kennet. The Israeli Government requested for time - June/July 2013 to reorganise and identify the appropriate organisation and experts that will work in this project. Others will be contacted in the next FY.

In the meantime the Executive Director of UNEP sent a letter to Governments on 26 March 2013 informing them about GEMS/Water and requesting their support to ensure the Programme's future sustainability. This letter also made a reference to a 'scoping meeting' for potential donors that UNEP organised during the first week of September 2013, at the occasion of the World Water Week, in Stockholm.

- **The Eye-on-Earth and the Eye-on-Earth Summit - Abu Dhabi, UAE, 12-15 December 2011.**

Eye on Earth is a 2-way communication platform on the environment that brings together scientific information and observations from millions of points and people - including on the water quality of 22,000 bathing sites throughout Europe. E-o-E was between Microsoft and the European Environment Agency. GEMS/Water developed a presentation and an i-Phone app showing GEMS/Water data and activities, for the Summit. It is now also part of the special initiative "Eye on Water" approved for additional funding in 2012. There is still continued interest in GEMS/Water Programme with regards to countries in West Asia. A presentation was made by the DEWA regional coordination on the latest developments on GEMS/Water in April 2014.

- **Hosting of GEMS/Water Programme Components.**

The Government of Ireland made its offer during the 3-5 March 2014 meeting, which includes hosting the Capacity Building Component of the Programme in partnership with BMUB/FIH, regional Hubs and in collaboration with UNEP. It will carry out systematic capacity building activities - with a special focus on Africa for the next 5 years. A project document has been drafted to cater for 5 year activities in the region and will be discussed with the Irish Government Officials and the Universities. The Irish Government has also pledged support the operations of the Global Programme Coordination Unit (GPCU). Funding is available to support these activities.

The Government of Brazil was also approached in 2013 with discussions on the regionalisation of the capacity building and assessment activities and seeking to know if it is interested in becoming a regional hub, for Latin America and the Caribbean. Brazil has agreed to play this role and would include Portuguese speaking countries in Africa. Draft terms of reference for the Hubs have been drafted. A Memorandum of Understanding with UNEP has been drafted and will be signed soon. There are possibilities for funding.

Bilateral discussions were held with the Government of Israel which indicated its support for the Programme on capacity building and monitoring based on their expertise and equipment. This activity will be followed up.

### **Participation in Water forums and the World Water Week meetings**

The GEMS/Water Programme participated in the 6th World Water Forum - Marseilles, France, 12-17 March 2012. The visibility of GEMS/Water was greatly enhanced through this presence.

- **World Water Week (WWW) 2012 and 2013**

GEMS/Water participated in the WWW 2012 in Stockholm, August 2012, as part of the UN Water Pavillion-UNEP booth. GEMS/Water participated in the closed sessions organised by UNEP on “Water Quality: messages and recommendations of UNEP’s 5th global Environment Outlook” and “Assessing the Global Water Quality Status” - the later entirely related to GEMS/Water and the preparation of a global water quality assessment report-. GEMS/Water participated in the preparation of a UNEP publication "Pushing the Water Agenda" -released at the WWW 2012-, with a section on GEMS/Water. There were several meetings with members of the UN Water Group and other institutions and partners, to discuss content and participation.

In 2013 - first week of September 2013, it held the Scoping meeting, where the proposed model for a future GEMS/Water was presented and accepted by partners with suggestions for improvement. A new revised document was embarked on for the GEMS/Water Partners meeting which was held in the first week of March 2014. After the meeting, a mapping exercise to collect partner’s views and indicated areas of support, which were received by end of January 2014.

### **Improving global coverage and consistency of water quality data**

#### **Communications with the network and its building**

- **Updating of the GEMS Water Registry of National and Collaborating Focal Points**

Originally not in the work plan, this activity was a necessity for providing understanding on the status of country participation in the GEMS Water Programme and network, state of data contributions to the GEMStat, and reasons for a warning membership participation. The activity took more time than expected because of follow ups and lack of initial responses from many focal points. It reviled many changes in the registry. During the process, results of the analysis assisted in conducting Regional Workshops and preparation of the future model for the Programme. The work was completed by February 2014.

- **Establishing the GEMS/Water regional hub for Latin America and the Caribbean.**

Based on bilateral discussion over the past one year, it was agreed that this regional hub will be based at the National Water Agency (ANA) of Brazil, and will be guided by the new draft MOU under review. It will be guided also by the business model and the terms of reference.

The MOU between UNEP and ANA - Brazil is at an advanced stage going towards the final document. It has been reviewed by ANA's legal experts and sent to UNEP for finalisation and signing. The relation with ANA and UNEP has been strengthened by this action.

- **The second Great Water Quality Data Drive**

This is an on-going activity which was started in June 2013 as part of the WWQA report, desk study on the quality and usefulness of available global water quality data. The second Great Water Quality Data Drive is a specific call for inland water quality data to all water authorities around the world - see [www.gemstat.org](http://www.gemstat.org), and conducting a Search for Data by country, by watershed, or by parameter. Though the exercise was designed to finish in December 2013 - it was realised that it should be a continuing exercise for the next two years at least. UNEP in partnership with the UN water is taking the lead implementation of the project in collaboration with many international partners.

Through the study it has been realised that there are many gaps that need to be filled, especially in terms of geospatial and temporal coverage. Widespread global data coverage implies that participation by all countries is essential.

### Laboratory Performance Evaluation (PE) Studies

- **Laboratory Performance Evaluation (PE) Study No.7 (PE-7)**, contract was awarded to Environmental Research Association (ERA) through a Small Scale Funding Agreement (SSFA) with UNEP-GEMS/Water Program.

PE samples were shipped by ERA to 157 labs in 61 countries. PE data was collected from 137 labs, and custom performance reports were emailed to these participants at the end of the exercise.

Result:

- Most of the laboratories in the study received standards, analysed them and reported on their analytical results.
- The reported laboratory data has been evaluated and customized; individual reports issued.
- The Corporate Report was sent to the Canada Burlington office of the GEMS/Water program.

- The data provided is being reviewed with consultations and discussions on the data provided.

- **Laboratory Performance Evaluation (PE) Study No.7A**

Through a Donor Agreement between UNEP and CARU (the Uruguay River Administrative Commission) for the provision of services from GEMS/Water Programme (US\$ 81,925.00) were established. The GEMS/Water Office in Burlington was tasked – through a Small Scale Funding Agreement (SSFA) to carry out Laboratory Performance Evaluation (PE) Study No.7A for 20 laboratories in Argentina and Uruguay. The exercise was completed in July 2012.

The agreement between UNEP and CARU resulted in a responsible institutionalizing of a system of global administration of the Uruguay River in the section of the river shared by Argentina and Uruguay; providing a good example of the recognition that countries give to UNEP-GEMS/Water services and products.

There are potentials for funding and cooperation through an MOU with the ILEC following several visits by DEWA's Director to Japan, which resulted in a signed MOU an agreement between UNEP and the ILEC Foundation.

- **PE08 - Performance Evaluations**

The start of this activity was been delayed and include in the 2012-2013 FY work plan due to procurement procedures. The Tendering process was completed and the contract awarded to Global Proficiency Limited of New Zealand, and Implementation started at the end of March 2013.

It completed the work on 28th March 2014. 180 laboratories were involved in the study. The vendor - received required information and technical input from both UNEP and Environment Canada staff as per the arrangement in the contract. The corporate report was received by 31st March 2014. This made a successful end to this contract in one year which is half the time it takes to carry out the exercise. However, PE - 08 report has been placed on the GEMS/Water website -see [gemswater.org](http://gemswater.org) website for report and examples of past reports.

## Improving data access for users

### Updates and maintenance of websites

- **Overhauling the GEMS/Water website**

A new GEMS/Water website was launched at the occasion of the World Water Forum 6, in Marseille, France in March 2012. The website was done in collaboration with UNEP's Division of Communication and Public Information and the GEMS Water teams in Canada and Nairobi. The new link is [www.unep.org/gemswater/](http://www.unep.org/gemswater/).

- **Regular update and maintenance of the GEMS/Water website**

This is an on-going activity aimed at updating the website to reflect activities of the Programme worldwide. The link is [www.unep.org/gemswater/](http://www.unep.org/gemswater/). The maintenance of the website including troubleshooting is carried out in collaboration with UNEP-DCPI. Now that the arrangement with Environment Canada has come to an end, major updates to the site are being planned within UNEP to reflect all the changes and the new business model after the GEMS/Water Partners and Donors meeting 3-5th March 2014.

- **Update of the GEMStat website and architecture maintenance**

The project was completed 27th November 2012 and final report submitted to UNEP summarising the work that was carried out. Changes were made during the conversion of web pages to support the new master page structure. The web server was updated and a final version of the source code delivered. Several minor modifications were also made to the interface. These changes related to links to United Nations websites. The clean-up and reorganization of the web site directory structure was completed and is included in the final version of the source code. Future enhancements required were listed.

- **Updates and new developments on the GEMStat website and architecture**

This project was implemented through a consultancy (Contract #22483), and completed on time (March 2014) as planned. This activity facilitated the transferring of the GEMStat to its new host - i.e. Federal Institute of Hydrology of Germany - based in Koblenz. Regular monthly reports indicating progress were submitted on time.

## Newsletters and brochures

See website and <http://www.unep.org/dewa/Assessments/Ecosystems/Water/tabid/6954/Default.aspx>

[www.unep.org/gemswater/](http://www.unep.org/gemswater/).

## Updates and new developments on the GEMStat website

ES Aquatic through a Small Scale Funding Agreement (SSFA) with UNEP-GEMS/Water Program carried out: the completion of the GEMStat and Flux Computation Module. This involves a) Changes to the existing system; b) Regression Analysis; c) Advanced Statistics (Data Mining Tools); d) Visual Statistics – Mapping e) Parameter Selection Using Metadata; f) Watershed Selection; g) Reporting Tools; h) Add ‘sandbox’ functionality; i) Metadata compliance – to comply with FAO & GEO; and j) Loading Estimate Expert System.

The advanced functionality for the intelligent, online data acquisition system has been developed; and the Flux Computational Module base completed. This has among other functions resulted in the following:

- a) a more visual representation of data;
- b) the ability to upload new data into a temporary private area for comparison against existing data holdings; and
- c) to perform analysis and reporting with the combined data etc.

A report was been made on the systems and sent to the GEMS/Water Burlington Office by May 2011, when a beta version of the system was released.

## **Increasing developing country capacity for water quality monitoring**

### **Development and production of training materials for capacity building**

- **Preparation of Water Quality Training Course Modules on Laboratory Operations, Management, Quality Assurance (QA) and Quality Management Systems (QMS) for UNEP-GEMS/Water Programme**

A new requisition and tendering process was initiated in April 2012, Contractor Agreement (ICA) for the process completed and the contract awarded to JRD Consulting Co., Canada. A revised schedule for delivery of outputs was agreed and was concluded by 15 February 2014. Training materials hard copies and soft copies are available for future use.

### **Capacity building and cooperation with partners**

- **Development of spatially distributed constituent flux estimates based on data in the GEMS/Water data archive combined with modelling capabilities.**

A SSFA with City University of New York (CUNY) was signed for carrying out activities touching on a study comparing the value to water managers, policy makers and researchers of the vast amount of North American (U.S. and Canada) data from active and effective Water monitoring Programmes, including the widespread availability of supporting information on specific economic activities and the number of treatment plants verses that available in Africa.

The study: a) provided a cooperation framework between UNEP and the City College of New York (CCNY) in support of the delivery of a project plan for UNEP's Global Environment Monitoring System (GEMS/Water) Programme; b) it developed spatially distributed constituent flux estimates based on data in the GEMS/Water data archive combined with modelling capabilities at the CCNY team in a water quality data assimilation system. A report in hardcopy and electronic version was send to UNEP. Material is also available on the GEMS Water website.

### **Regional workshops:**

The Workshops are prepared in collaboration with UNEP Regional Offices. Their purpose was to raise awareness at national and regional levels about the GEMS/Water Programme, to increase participation in the global network and submission of raw data to GEMStat, to identify prevailing challenges at national and regional levels in water quality data acquisition and sharing, monitoring, assessment and reporting; amongst others.

- **GEMS/Water Capacity Building - Regional Workshops for awareness raising and strengthening of the networks in Latin America; Eastern and Southern Africa; Asia and the Pacific and Central, Northern and West Africa.**

The workshop for South and Eastern Africa took place on 16-18 April 2012; and the Latin America and the Caribbean on 24-26 April 2012; Asia and the Pacific was conducted on 5-8 November 2012 in India, in collaboration with the India Water Foundation. The workshop for Central, North and West Africa was conducted on 12-14 March 2013 in Accra, Ghana, in collaboration with the WRI of the CSIR of Ghana.

The Final reports of the workshops are available on the GEMS/Water website.

- **GEMS/Water Capacity Building – New Partnership with Israel**

The Israeli Water Authority's Lake Kinneret Monitoring & Management Unit has been updated and the GEMS/Water course "Lake and Reservoir Water Quality Management" (WBS 004) completed. The Israel has reorganised the operations of the Unit and follow up will discussions on the delivering the course are required. The Government of Israel is reorganizing some of its agencies to better respond to Israel's obligations at international level. The Government of Israel remains committed to collaborating with GEMS/Water and may entail identification of a new agency and expert who will take on the responsibility to coordinate and implement the project.

- **Preparation of water quality training course modules on laboratory operations, management, quality assurance (QA) and quality Management Systems (QMS) for UNEP-GEMS/Water Programme**

The contractor JRD Consulting after two extensions delivered a good product by February 15th 2014. The contractor was innovated and had the modules tested in November 2013 at a Mekong River Basin Organisation training workshop. The modules were well received by participants and further fine-tuned some aspects of the modules before delivery of the materials to UNEP after a peer review process. Potential partners of delivering the training modules need to be identified. Ireland's University College Cork - is one of the identified institutions. Other partners still need to be identified.

## **Financial reporting (2010-2014)**

Financial support to the Programme was provided by the Government of Canada in support to the Programme. Within this support, the salary of the GEMS/Water Manager was allocated as negotiated between UNEP and Canada within the agreement. Activities were divided under three major strategic areas, which formed the reporting areas also i.e.

- Securing adequate additional funding from diverse sources;
- Improving data access for users; and
- Increasing developing country capacity for water quality monitoring.

Financial reporting was carried out on a yearly basis and was discussed and verified with Canada, before planning and jointly agreeing on activities and budget of the next financial year. Therefore the final report in this narrative captures the last year only (FY 2013/14).

- I. In this report, the exchange gain between the USD and the NZD for the contract with Global Proficiency has been consolidated with the expenditures associated with the implementing partner, Global Proficiency under professional services. Please note: The exchange rate on the day that the CDN\$ was transferred into UNEP accounts has been used and, therefore, converted into USD.  
The uncovered balance of CDN\$ 101,824 is recorded in FY 13/14. This expenditure was related to the initiation of the PE-08 study and was not charged to FY 12/13 expenditures. This was the only way that this expenditure with funds from FY 13/14 could be covered.
- II. The UN internal exchange rate for August 2013 of 1.027 on both the Income and Expenditure report has been applied and support costs updated in proportion with these expenditures.

See attached financial statement in the email for details.

**Other attached relevant documents – for reference are:**

- TOR of the terminal evaluation 2010-14
- Side Events document for the UNEA
- Information document for the UNEP

## ANNEX 4. SUMMARY FINANCIAL INFORMATION FOR GEMS/WATER

### Project Costs

Component/sub-component	Estimated cost at design	Actual Cost	Expenditure ratio (actual/planned)
GEMS/Water	CDN\$1,746,000	CDN\$1,840,294	1.05
Generate financial resources	1,542,667	818,960	0.53
Global coverage and Consistency of data	892,667	343,073	0.38
Access for users	382,666	159,255	0.42
Capacity building	318,000	308,848	0.97
(UNEP Support Cost)	--	210,158	--

### Co-financing

Co financing (Type/Source)	IA own Financing (mill US\$)		Government of Canada (mill CDN\$)		Other* (mill US\$)		Total (mill US\$)		Total Disbursed (mill US\$)
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	
Grants									
Loans									
Credits									
Equity investments									
In-kind support	1.30		1.14				2.44	0.03	
Other (*)									
-									
-									
<b>Totals</b>	1.30		1.14				2.44	0.03	0.03

(\*)This refers to contributions mobilized for the project from other multilateral agencies, bilateral development cooperation agencies, NGOs, the private sector and beneficiaries.

## ANNEX 5: UNITED NATIONS ENVIRONMENT ASSEMBLY RESOLUTION/DECISION 10 OF 2014

### Resolution/Decision 10: Global Environmental Monitoring System/Water (GEMS/Water)

THE UNITED NATIONS ENVIRONMENT ASSEMBLY,

*Recalling* paragraphs 120 and 124 of the outcome document of the United Nations Conference on Sustainable Development, entitled “The future we want”, which calls for taking measures to significantly reducing water pollution and increasing water quality, and the commitment to the progressive realization of access to safe and affordable drinking water and basic sanitation

*Recognizing* that good water quality and adequate water quantity are key to sustainable development and human well-being as well as an indispensable prerequisite for protecting biodiversity and the integrity of the planet’s ecosystems,

*Recalling* Governing Council decisions 23/2, 24/16, 26/14 and 27/11 VI, which set the stage for GEMS/Water, defined its mandate and invited member States to participate in the efforts to provide global water data and information,

1. Expresses its gratitude to the Government of Canada for having hosted and supported GEMS/Water in the past and acknowledges the achievements made, welcomes the commitments by the Governments of Germany, Ireland and Brazil to support GEMS/Water in the future;
2. Considers UNEP and GEMS/Water well suited to support the achievement of water quality and water-pollution-related targets which may be part of the post-2015 development agenda that is still to be decided upon, through providing data and information for relevant assessments;
- 2.bis Emphasizes that the World Water Quality Assessment Report, the water-related Sustainable Development Goals, and other assessments on the state of freshwater resources at different geographic scales will require timely, relevant and reliable data and information from the revitalised GEMS Water Programme in order to inform policy-making at the relevant level.
3. Underlines the need to further improve the global coverage and consistency of water quality data as well as to expand the GEMS/Water network and invites member States, relevant United Nations agencies, the international scientific community and other interested partners and stakeholders to cooperate with the GEMS/Water Global Coordination Unit, the GEMS/Water Capacity Development Centre and GEMS/Water Database (GEMStat) in building a reliable global freshwater monitoring and information

system and to support relevant initiatives including through financial and in-kind contributions to the GEMS/Water network; according to country's national circumstances and priorities

4. Requests the Executive Director to collaborate closely with member states with the aim of identifying additional key elements of GEMS/Water such as regional hubs, capacity development Programmes, technology support and new services as appropriate and to ensure the necessary resources as reflected in the Programme of Work and Budget for enabling the GEMS/Water global coordination unit in UNEP to effectively and efficiently operate as the interface between national focal points, GEMStat, the GEMS/Water Capacity Development Center, GEMS/Water regional hubs and relevant global partners;
  5. Requests the Executive Director to initiate discussions with Member States, United Nations agencies and other relevant institutions and organisations that have done significant work developing water quality exchange standards on a common data policy taking into account relevant national legislation that allows the exchange of water quality related data and metadata for the purpose of building a consistent data base in GEMStat, supporting UNEP Live and informing sustainable development policies;
  - 5.bis Requests the Executive Director to draft a revised GEMS/Water Programme for its adoption at the next session of UNEA, including a budget, while linking it clearly to the next biennial Programme of work of UNEP;
  6. Invites GEMS Water partners to support capacity development in providing standardisation efforts for water quality related data collection, analysis, exchange and management, such as the OGC Best Practice Water ML-WQ (OGC 14-003) and USEPA, USGS WQX standards for the presentation and exchange of Water Quality data and metadata, especially in developing countries, at their request and to coordinate these efforts with relevant ongoing initiatives;
  7. Encourages Member States to approach GEMS/Water with the aim to support and customize capacity development efforts, improving freshwater monitoring systems, exchanging technology that can support national, regional and global monitoring networks and assessments and to seek assistance for joining the GEMS/Water Network.
- 7bis. Reaffirms the mandate of the GEMS/Water.

## ANNEX 6: REFERENCES

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## ANNEX 7: CURRICULUM VITAE

### **THORNTON, JEFFREY ALAN**

Licensed Professional Hydrologist No. 182  
Wisconsin Department of Regulation and Licensing  
E-mail: *IEMS@aol.com, IntlEnvMgmtSrvcs@gmail.com*

#### PERSONAL INFORMATION

Gender: Male  
Date of Birth: 1952  
Citizenship: United States of America/United Kingdom

#### EDUCATION

AB	1990	Baptist Theological College of Southern Africa ( <i>cum laude</i> ) (Theology)
MBA	1986	University of South Africa ( <i>cum laude</i> ) (Strategic Planning)
PhD	1982	University of Zimbabwe (Tropical Resource Ecology)
MSc	1976	University of New Hampshire (Earth Sciences)
BSc	1974	United States Merchant Marine Academy (Marine Transportation/Marine Science)
High School	1970	Auburn High School, Auburn, Massachusetts

#### PROFESSIONAL EXPERIENCE

2013-2015 **Visiting Researcher**: Kobe University, Graduate School of Human Development and Environment,  
Department of Human Environmental Science  
Kobe, Japan

1992-date **Managing Director**: International Environmental Management Services Ltd.  
New Berlin, Wisconsin, United States of America

1992-2013 **Principal Planner**: Southeastern Wisconsin Regional Planning Commission, Environmental Planning  
Division, Lakes Management Specialist  
Waukesha, Wisconsin, United States of America

1995 **Senior Programme Officer**, United Nations Environment Programme, Freshwater Unit  
Nairobi, Kenya.

1990-1992 **Associate Professor/Lake Management Extension Specialist:** University of Wisconsin-Stevens Point,  
College of Natural Resources  
Stevens Point, Wisconsin, United States of America

**PROFESSIONAL EXPERIENCE (continued)**

1987-1990 **Head: Environmental Planning,** City Planner's Department  
Cape Town, South Africa.

1981-1987 **Chief Limnologist,** National Institute for Water Research, Council for Scientific and Industrial Research  
Pretoria, South Africa.

1978-1981 **Government Hydrobiologist,** Department of National Parks and Wild Life Management, Harare,  
Zimbabwe.

1976-1978 **Junior Research Fellow:** University of Zimbabwe, Hydrobiology Research Unit  
Harare, Zimbabwe.

1974-1976 **Research Assistant:** University of New Hampshire, Department of Earth Sciences  
Durham, New Hampshire, United States of America

1971-1974 **Research Assistant and Kings Point Scholar:** United States Merchant Marine Academy, National  
Maritime Research Center  
Kings Point, New York, United States of America.

## Annex 8: UNEP Evaluation Quality Assessment

Evaluation Title:

Evaluation of the Project: Global Environmental Monitoring Systems Water Programme

All UNEP evaluations are subject to a quality assessment by the Evaluation Office. The quality assessment is used as a tool for providing structured feedback to the evaluation consultants.

The quality of both the draft and final evaluation report is assessed and rated against the following criteria:

	UNEP Evaluation Office Comments	Draft Report Rating	Final Report Rating
<b>Substantive report quality criteria</b>			
A. <b>Quality of the Executive Summary:</b> Does the executive summary present the main findings of the report for each evaluation criterion and a good summary of recommendations and lessons learned? (Executive Summary not required for zero draft)	<b>Final report:</b> Good summary		5
B. <b>Project context and project description:</b> Does the report present an up-to-date description of the socio-economic, political, institutional and environmental context of the project, including the issues that the project is trying to address, their root causes and consequences on the environment and human well-being? Are any changes since the time of project design highlighted? Is all essential information about the project clearly presented in the report (objectives, target groups, institutional arrangements, budget, changes in design since approval etc.)?	<b>Draft report:</b> Project context provided mostly based on the consultant's knowledge of the project, essential information provided but not a detailed analysis. Lack of formal project documentation did not facilitate the drafting of this section <b>Final report:</b>	4	4
C. <b>Strategic relevance:</b> Does the report present a well-reasoned, complete and evidence-based assessment of strategic relevance of the intervention in terms of relevance of the project to global, regional and national environmental issues and needs, and UNEP strategies and programmes?	<b>Draft report:</b> Relevance to UNEP was not analysed in terms of links with MTS and PoW. <b>Final report:</b> Section included	4	5
D. <b>Achievement of outputs:</b> Does the report present a well-reasoned, complete and evidence-based assessment of outputs delivered by the intervention (including their quality)?	<b>Draft report:</b> Confusion between activities and outputs hampered the quality of the analysis <b>Final report:</b> Clarified to some extent	3	4

E. <b>Presentation of Theory of Change:</b> Is the Theory of Change of the intervention clearly presented? Are causal pathways logical and complete (including drivers, assumptions and key actors)?	<b>Draft report:</b> ToC needed several rounds of comments and lacked the identification of a clear pathway. The absence of a project document made this exercise difficult. Equally, confusion was noted about activities-outputs-outcomes. EOU reconstructed the ToC and restarted the process after receiving zero draft <b>Final report:</b> ToC is satisfactory	2	3
F. <b>Effectiveness - Attainment of project objectives and results:</b> Does the report present a well-reasoned, complete and evidence-based assessment of the achievement of the relevant outcomes and project objectives?	<b>Draft report:</b> Very confusing section with outcomes not matching the ToC and not clearly derived from any logical analysis. Analysis was very limited and only mentioned the achievement of a few outputs. Difficult to come to an assessment of actual change. <b>Final report:</b> More comprehensive analysis, outcomes match	2	4
G. <b>Sustainability and replication:</b> Does the report present a well-reasoned and evidence-based assessment of sustainability of outcomes and replication / catalytic effects?	<b>Draft report:</b> Section did not address all aspects of sustainability <b>Final report:</b> Missing aspects included	3	4
H. <b>Efficiency:</b> Does the report present a well-reasoned, complete and evidence-based assessment of efficiency? Does the report present any comparison with similar interventions?	<b>Draft report:</b> Section did not address questions in the ToRs <b>Final report:</b> More comprehensive analysis	3	4
I. <b>Factors affecting project performance:</b> Does the report present a well-reasoned, complete and evidence-based assessment of all factors affecting project performance? In particular, does the report include the actual project costs (total and per activity) and actual co-financing used; and an assessment of the quality of the project M&E system and its use for project management?	<b>Draft report:</b> Sections highlighted some key issues relevant to GEMS, but did not include any of the required sections as per ToRs, sections added in third draft <b>Final report:</b> Analysis added	3	4
J. <b>Quality of the conclusions:</b> Do the conclusions highlight the main strengths and weaknesses of the project, and connect those in a compelling story line?	<b>Draft report:</b> Conclusion are ok but brief and could be better linked to the report to highlight strengths and weaknesses <b>Final report:</b> Conclusions are better linked to report	4	4
K. <b>Quality and utility of the recommendations:</b> Are recommendations based on explicit evaluation findings? Do	<b>Draft report:</b> Although several key points were highlighted in the report, R needed work as they were originally very short and not	3	4

	recommendations specify the actions necessary to correct existing conditions or improve operations ('who?' 'what?' 'where?' 'when?'). Can they be implemented?	linked to conclusions and text <b>Final report:</b> Improved		
L.	<b>Quality and utility of the lessons:</b> Are lessons based on explicit evaluation findings? Do they suggest prescriptive action? Do they specify in which contexts they are applicable?	<b>Draft report:</b> Lessons are ok, but brief and could be more specific <b>Final report:</b> Lessons improved	4	4
<b>Report structure quality criteria</b>				
M.	<b>Structure and clarity of the report:</b> Does the report structure follow EO guidelines? Are all requested Annexes included?	<b>Draft report:</b> Not all annexes included, structure has not been followed consistently <b>Final report:</b> All required annexes have been included	4	5
N.	<b>Evaluation methods and information sources:</b> Are evaluation methods and information sources clearly described? Are data collection methods, the triangulation / verification approach, details of stakeholder consultations provided? Are the limitations of evaluation methods and information sources described?	<b>Draft report:</b> The reports highlights the challenges and limitations, mostly due to the lack of documentation <b>Final report:</b> Same	4	4
O.	<b>Quality of writing:</b> Was the report well written? (clear English language and grammar)	<b>Draft report:</b> Required minor editing <b>Final report:</b> Same	5	5
P.	<b>Report formatting:</b> Does the report follow EO guidelines using headings, numbered paragraphs etc.	<b>Draft report:</b> Mostly <b>Final report:</b> Fine	5	5
<b>OVERALL REPORT QUALITY RATING</b>			3.5	4.25

The quality of the evaluation process is assessed at the end of the evaluation and rated against the following criteria:

	UNEP Evaluation Office Comments		Rating
<b>Evaluation process quality criteria</b>			
Q.	<b>Preparation:</b> Was the evaluation budget agreed and approved by the EO? Was inception report delivered and approved prior to commencing any travel?	Budget approved. Inception report delivered before travel, but the assessment of the quality of the project design and the ToC required significant work. The assessment was dropped when it became clear that the absence of a project document was a major obstacle to completing it in a meaningful way.	4
R.	<b>Timeliness:</b> Was a TE initiated within the	Yes.	4

period of six months before or after project completion? Was an MTE initiated within a six month period prior to the project's mid-point? Were all deadlines set in the ToR respected?	Deadlines were postponed to allow for additional revisions and comments to ensure the quality of the report.		
S. <b>Project's support:</b> Did the project make available all required documents? Was adequate support provided to the evaluator(s) in planning and conducting evaluation missions?	Yes		5
T. <b>Recommendations:</b> Was an implementation plan for the evaluation recommendations prepared? Was the implementation plan adequately communicated to the project?	Yes		5
U. <b>Quality assurance:</b> Was the evaluation peer-reviewed? Was the quality of the draft report checked by the evaluation manager and peer reviewer prior to dissemination to stakeholders for comments? Did EO complete an assessment of the quality of the final report?	Yes		6
V. <b>Transparency:</b> Were the draft ToR and evaluation report circulated to all key stakeholders for comments? Was the draft evaluation report sent directly to EO? Were all comments to the draft evaluation report sent directly to the EO and did EO share all comments with the commentators? Did the evaluator(s) prepare a response to all comments?	Yes		6
W. <b>Participatory approach:</b> Was close communication to the EO and project maintained throughout the evaluation? Were evaluation findings, lessons and recommendations adequately communicated?	Yes		6
X. <b>Independence:</b> Was the final selection of the evaluator(s) made by EO? Were possible conflicts of interest of the selected evaluator(s) appraised?	Yes, however the short preparatory time did not allow for an extensive search for candidates		4
<b>OVERALL PROCESS RATING</b>			5

Rating system for quality of evaluation reports

A number rating 1-6 is used for each criterion: Highly Satisfactory = 6, Satisfactory = 5, Moderately Satisfactory = 4, Moderately Unsatisfactory = 3, Unsatisfactory = 2, Highly Unsatisfactory = 1

The overall quality of the evaluation report is calculated by taking the mean score of all rated quality criteria.

