



GROUP ON  
EARTH OBSERVATIONS

## GEO-V

19-20 November 2008

GEOSS Performance Monitoring & Evaluation  
Framework

Document 11

This document is submitted to GEO-V for decision.



## **GEOSS Performance Monitoring and Evaluation Framework**

### **1 SUMMARY OF DECISIONS**

Recalling that the 10-year Implementation Plan:

- Acknowledges the importance of “...evidence that the implementation of GEOSS is measurably beneficial in order to assure continuing support.” with the backing of negotiated text “GEO will develop performance indicators for GEOSS.”;
- “...sets out the proposed mechanism for assessing the performance of the 10-Year Implementation Plan against these goals. It is proposed to use a broadly recognized four-part system of indicators for assessing the performance of GEOSS...”; and
- Impels “An early task of GEO will be to work out the details of these indicators.”

And recognizing:

- The discussion and action arising at GEO-III Plenary about the perceived need to articulate performance indicators that focus on the outcomes and impacts from GEOSS implementation;
- The first GEO workshop (February 13-14, 2007) entitled “Outcome Performance Indicators Planning Workshop”;
- Document 26 submitted to GEO-IV Plenary for information (GEOSS Outcome Performance Indicators, which summarizes the results of the first workshop and the steps taken to prepare for GEO-IV Plenary discussion; and
- The second GEO workshop (September 10-12, 2008) entitled “GEO Performance Indicator Workshop.”

GEO should enhance its four-part system of indicators for assessing the performance of GEOSS by committing to exemplify leadership in adapting state-of-the-art performance monitoring and evaluation principles and practices to GEOSS implementation.

GEO-V Plenary is asked to:

1. Take note of this document, including the GEOSS Conceptual Framework for Performance Monitoring and Evaluation (Table 1);
2. Establish a Performance Monitoring and Evaluation Working Group, tentatively guided by the draft Terms of Reference (Annex 1);
3. Task this “M&E” WG to develop a Performance Monitoring and Evaluation Framework for GEOSS Implementation based on the draft annotated outline (Annex 2);
4. Acknowledge and commit to support the first independent evaluation of GEOSS implementation, with final report provided in time (by mid 2010) for its use in planning the next Earth Observation Summit (anticipated in November 2010).

## **2 PERFORMANCE MONITORING AND EVALUATION OF GEOSS IMPLEMENTATION**

### **2.1 Introduction and Background**

At GEO-III Plenary (November 28-29, 2006), several GEO members (e.g., Italy, Brazil, Canada) expressed a need to articulate performance indicators that focus on the outcomes and impacts from GEOSS implementation. GEO members also noted that, given the forthcoming Earth Observation Summit IV Ministerial meeting (November 30, 2007), they needed some indicators of the societal value and benefits, which could be attributed to GEOSS implementation, GEO, and its membership activities (i.e., “outcomes” and “impacts” in performance evaluation parlance).

The United States volunteered to lead this action taken at GEO-III Plenary, with the Canadian GEO Secretariat subsequently hosting the “GEO Outcome Performance Indicators Planning Workshop” in Montreal, Canada on February 13-14, 2007. Even though participation at this first workshop was largely bi-national (United States-Canada), it was decided that the United States and Canada would continue to jointly develop and refine the workshop results to a point where it would then be more widely shared with GEO membership. The result was GEOSS Outcome Performance Indicators – Document 26 – submitted to the GEO-IV Plenary for information.

Discussions at the GEO-IV Plenary on this agenda item were minimal – yet positive – with the topic referred to the GEO C4 Committee for action and next steps. In response, the European Commission and the European Space Agency hosted the “GEO Performance Indicator Workshop” in Paris, France on September 10-12, 2008.

During this second workshop many timely opportunities were discussed, including expanding the focus from ‘outcome performance indicators’ to ‘performance monitoring and evaluation’ and also realizing the appeal of a performance monitoring and evaluation framework, not only for performance monitoring and evaluation purposes, but also for planning purposes. The workshop participants all agreed that a decisional document on this topic at GEO-V Plenary was not only timely, but a strategic leadership opportunity in applying state-of-the-art performance monitoring and evaluation principles and practices in an early stage of GEOSS implementation.

### **2.2 Overview of September 10-12, 2008, GEO Workshop**

The GEO Performance Indicator Workshop held in Paris, France on September 10-12, 2008, surpassed the expectations of its planners by providing a timely overall context of performance monitoring and evaluation, which facilitated discussions beyond outcome performance indicators and in some sense, reaffirmed an overall coherence to the improvements being considered for GEO-V Plenary.

Specific workshop objectives identified in the invitation letter (July 15, 2008) included: 1) seeking a common understanding of performance measurement concepts and terminology, including logic models, program evaluation, outcome indicators, evaluation frameworks; 2) reviewing two case studies from another context (e.g., OECD or World Bank examples relevant to GEOSS); 3) reviewing GEO document 26 and the proposed framework; 4) reviewing the Canadian and US illustrative examples (Soil Moisture and AIRNow-International); and 5) discussing specific examples of indicator work offered by workshop members.

The workshop agenda (Agenda v3, September 3, 2008) was planned to allow adequate time for participant discussion on each objective, noting specific examples on “European Commission Lessons Learned for GEOSS,” Intergovernmental Oceanographic Commission Work on Performance Indicators for Global Ocean Observing System,” “Lessons from the Global Environment Facility,” “Lessons from Independent Evaluation Group-World Bank Experience,” “Global Monitoring for Environment and Security Cost-Benefit Analysis,” and “GEOBENE – Global Earth Observation - Benefit Estimation: Now, Next, and Emerging.” All agenda topics were covered during the three days, with the one major challenge being trying to keep to the time schedule.

Workshop attendance (over 20 participants) was diverse and conducive to good discussions. Eight GEO member countries (Australia, Canada, European Commission, Germany, Italy, Panama, South Africa, and United States) and five GEO participating organizations (ESA-European Space Agency, UNESCO-United Nations Educational, Scientific, and Cultural Organization, IOC-Intergovernmental Oceanographic Commission, UNEP-United Nations Environment Programme, and UNOOSA-United Nations Office of Outer Space Affairs) participated in the workshop. Three members of the GEO Secretariat participated, as well as five outside experts interested in helping the GEO community address performance monitoring and evaluation (International Institute of Applied Systems Analysis, University of Natural Resources and Applied Life Sciences – Vienna, Global Environment Facility (GEF), and Independent Evaluation Group-World Bank (IEG-WB)). One-hour teleconference presentations/discussions with a couple GEF and IEG-WB staff in Washington, DC took place during the afternoons of the first and second days of the workshop. These teleconference interactions were central to appreciating the leadership opportunity for the GEO community to consider at the GEO-V Plenary.

The first day of the workshop provided a strong foundation for performance monitoring and evaluation along with examples relevant to GEOSS. In the course of the discussions focused on GEO Document 26 (GEO-IV Plenary information document) and the proposed Performance Evaluation Framework, the framework took on a greater role than the outcome performance indicators (which was the original motivation for the workshop), especially considering its perceived harmonization of the GEO Work Plan revisions, Target/Task Team (T3) discussions, and proposed GEOSS Roadmap. Participants embraced the conceptual framework as very timely and relevant (especially for performance monitoring) to the different improvements being proposed for decision at GEO-V Plenary, which could be integrated under performance monitoring, as well as sparking ideas for the next Earth Observation Summit in 2010, which could be integrated under evaluation. The conceptual framework provides a broad, strategic context, not only for GEOSS implementation and evaluation, but also for planning. For example, Ex-ante evaluations (also called impact assessments) in planning new Tasks could have immediate application in performance monitoring in the 2009-11 Work Plan.

The second day of the workshop began to explore a broader path forward than that envisioned by the workshop planners. The notion of GEO-V Plenary committing to an independent evaluation of GEOSS implementation was discussed along with the strategic opportunity to have the evaluation report in hand (mid 2010) to help prepare for the Earth Observation Summit anticipated in November 2010. The scope, charge and resources to complete such an independent evaluation were discussed, and in the end the feeling was that this was such a great leadership opportunity for the GEO community that it could not be ignored. How better to demonstrate “evidence that the implementation of GEOSS is measurably beneficial in order to assure continuing support” (February 2005) than to make a good faith effort at applying the state-of-the-art performance monitoring and evaluation, and demonstrating leadership at this early stage of GEOSS implementation, for use in planning the next Earth Observation Summit. It was also made quite clear by the participants that the overall monitoring/evaluation exercise should be kept reasonable in size and kept properly dimensioned with respect to the size of the GEOSS initiative. In particular the performance monitoring should be as much as possible based on a self-monitoring of the tasks themselves and should be facilitated by the use of common reporting templates and electronic means. And the first evaluation exercise should be based on the use of simple and classical performance indicator categories: relevance, efficiency, effectiveness, utility, and sustainability.

The third day of the workshop began to outline the path forward, not only from the workshop recommendations to the GEO-V Plenary, but up to the next Earth Observation Summit in 2010, and beyond. It was noted that the workshop participants were in some sense beginning to act like an *ad hoc* task force and an action for the GEO-V Plenary would be to propose a GEO working group called Performance Monitoring and Evaluation (M&E as shorthand). Also, in considering the discussions with the GEF and IEG-WB, and the documentation that OECD (Glossary of Key Terms in Evaluation and Results Based Management, 2002) and IEG-WB (Sourcebook for Evaluating Global and

Regional Partnership Programs – Indicative Principles and Standards, 2007) has produced in the area of performance evaluation, the participants decided it would be reasonable and politically astute for the GEO community to use this documentation as a guide for its performance monitoring and evaluation approaches. A summary diagram conveying both the scope and urgency of the workshop’s results is provided in the next two pages.

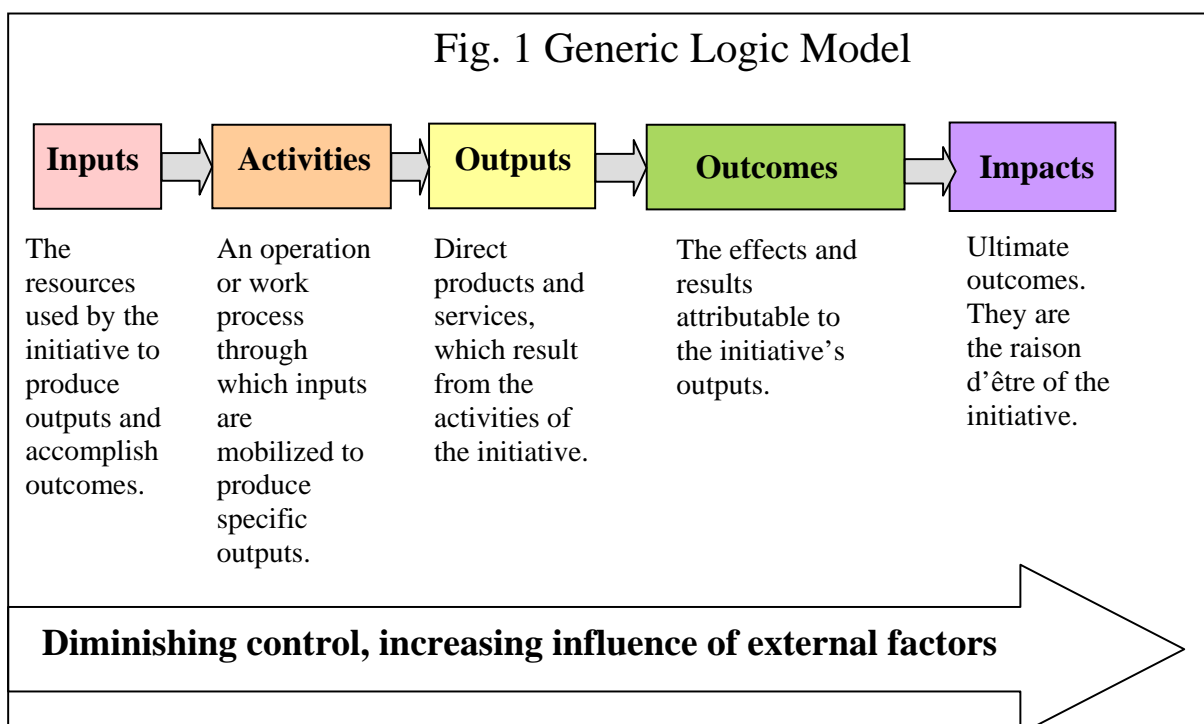
**2.3 General Description of the Performance Monitoring and Evaluation Framework for GEOSS Implementation**

The definition and the actual setup of the Performance Monitoring and Evaluation Framework for GEOSS Implementation is the first necessary step to be taken in order to comply with the request of GEO-III Plenary to evaluate the “GEOSS performance” and to provide the first evaluation for the planned Ministerial Summit in 2010.

The specific framework and the first evaluation exercise should be properly dimensioned (extent, results, feedbacks) with respect to the nature of the GEO initiative (voluntary and non-legally binding, networking, catalyzing, facilitating function) and this should be made clear to the GEO Plenary, when asked to accept the conceptual framework and the first evaluation.

A generic performance monitoring and evaluation framework is based on a Logic Model (see **Figure 1**) that depicts causal or logical relationships between the Outputs of an initiative (including relevant connection with Inputs and Activities) and its expected Outcomes (or results). Outputs are the monitored results of activities, and will be measured unambiguously with objective and numerical performance indicators. Outcomes are the desired effects and results which occur due to the actions of the activities and the availability of the Outputs. Outcomes are hypothesized results of the availability of Outputs. The evaluation of initiative performance rests on demonstration of effective Outcomes, not upon the availability of task Outputs. The effectiveness of the GEOSS performance is established by identifying changes of decision-making behavior and/or of state of the target population (individuals and/or organizations) that the initiative is intended to influence.

**Figure 1 shows a preliminary definition of a generic Logic Model.**



The two key features of the proposed framework -- monitoring and evaluation -- are intimately connected. The definition of the framework will include the consolidation of the Output Monitoring Component, building on what is already in place (Work Plan, task sheets, periodic progress reports), in such a way as to also properly support evaluation. While the monitoring is performed to ensure that the expected Outputs are achieved, the evaluation shall be performed against expected Outcomes. This is what was asked at the GEO-III Plenary: to define a set of “Outcome-based Performance Indicators.”

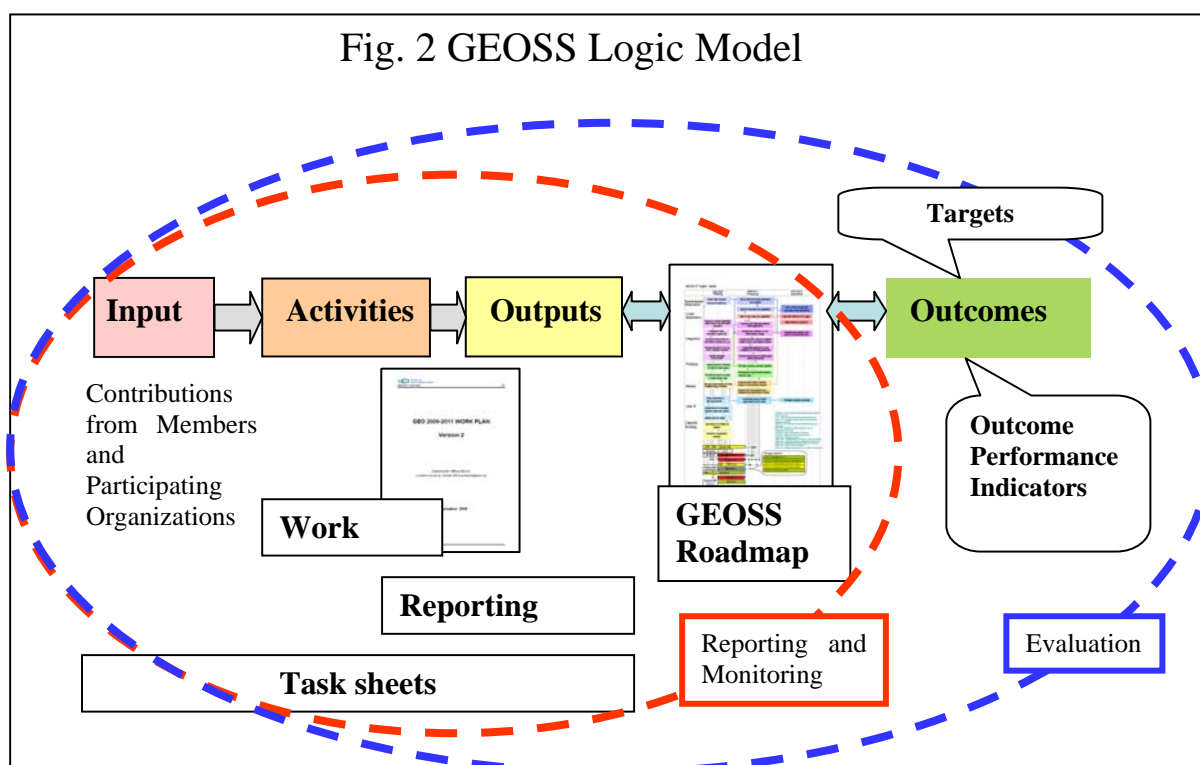
In this Logic Model the expected outcomes are derived directly from the GEO strategic targets and constitute the basis for the detailed definition of the initiative content.

The expected outcomes are also the reference for performance evaluation, which will be based on:

- the definition of suitable indicators associated with expected outcomes
- a periodic calculation of these indicators, in order to assess the performance (of GEOSS in producing the expected outcomes and, therefore, in addressing the established GEO strategic targets)

Construction of this Logic Model for GEOSS and its components clarifies the identification of the desired outcomes by which GEOSS performance will be evaluated. The first essential step is to develop a Performance Monitoring and Evaluation Framework, and then fill in this framework.

**Figure 2** shows a preliminary definition of the GEOSS Logic Model; it includes the elements of the performance monitoring and evaluation framework that are already in place, such as Work Plan, task sheets, and identifies the elements still to be consolidated in order to substantiate the model, i.e., Targets (currently under review) and the outcome performance indicators.



A complex initiative like GEOSS needs the definition of different levels of outcomes, each one strongly dependent on the success in achieving the previous one. One may think of the key transition points among different levels as the evidence of further maturation of GEOSS towards the intended

benefits for stakeholders. These levels of outcomes should serve to guide the development of specific indicators, as well as to enable performance information from diverse sources to be assembled and comparably aggregated for analysis.

Four levels of outcome were preliminarily identified to properly address GEOSS maturation:

- Level 1 Uptake and application of GEOSS standards, etc., and implementation of GEO recommendations
- Level 2 Improvement of information systems interoperability and information accessibility
- Level 3 Increase of the use of Earth observation information by end users as valuable inputs to decision support systems  
Changes (increase in number and improvement in performance) to decision support products and services
- Level 4 Effects of the use of improved decision support systems (responses by affected populations to improved decision support)

While it was recognized suitable to define Indicators for the **Outcomes**, the participants deemed it more effective to assess **Impacts** (as identified in Figure 1 – Generic Logic Model) at the Societal Benefit Area level through dedicated cost/benefit analyses, or other evaluation tools and methods.

The annotated outline of the definition document “Performance Monitoring and Evaluation Framework for GEOSS Implementation” is reported in **Annex 2**. It has been prepared in accordance to the Independent Evaluation Group-World Bank Sourcebook for Evaluating Global and Regional Partnership Programs - Indicative Principles and Standards (2007). The preparation of this definition document will be one of the first actions that the proposed Performance Monitoring and Evaluation Working Group (M&E WG) (see next chapter) will be asked to complete.

**2.4 Need for a GEO Working Group**

The approach taken after the GEO-III Plenary, which launched this whole effort, has been largely two GEO workshops, with GEO Plenary discussion (and informational document), and GEO committee discussions serving to broaden the workshop discussions across GEO membership. At the end of the second GEO workshop the participants decided that the amount and nature of the work ahead on this topic - in the next two years - merited the formation of a GEO working group. A few individuals have sustained the momentum on this topic since the GEO-III Plenary in a largely – “make it up as you go along” – process. Along with current efforts on the Work Plan revision, T3, and proposed GEOSS Roadmap, this topic gained attention and support, and now with the proposal to commit to an independent evaluation in time for its use in planning the next Earth Observation Summit, the workload envisioned compels formation of a GEO working group. Also, a working group would ensure continuity of participants, whereas workshops and *ad hoc* discussions don’t always involve the same people. Finally, establishing a working group dedicated to this topic signals that this is a priority for GEO right now. Refer to **Annex 1** for the draft Terms of Reference.

**2.5 Path forward from GEO-V Plenary (Nov. 19-20, 2008) to GEO-VII Plenary/Earth Observation Summit-V (anticipated in Nov. 2010).**

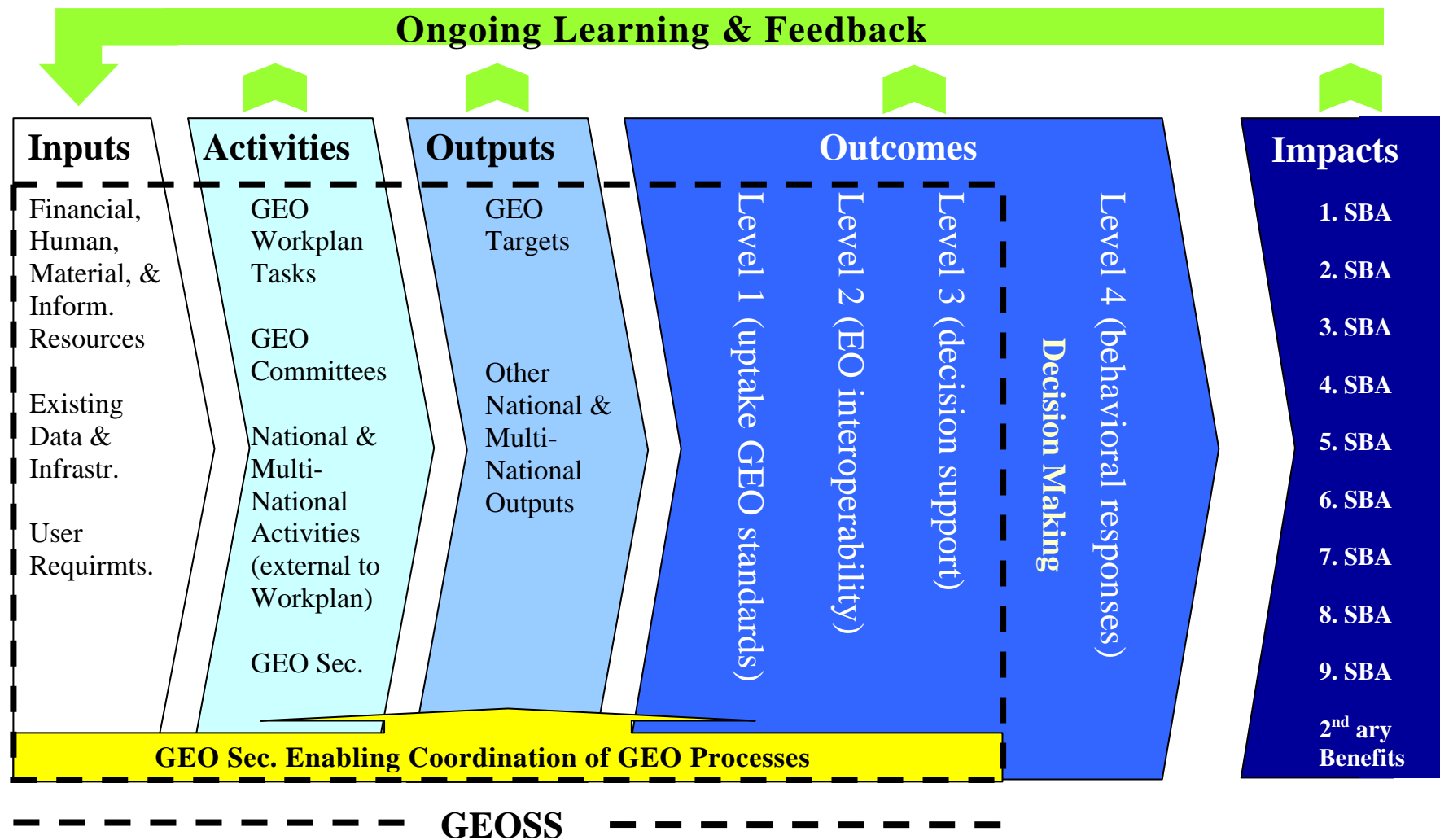
It was recognized by the September 10-12, 2008, Workshop participants the need and the opportunity to present a mid-term performance evaluation to the GEO Ministerial Summit anticipated for November 2010. The path forward to properly support this recommendation is reported below:

GEO-V Plenary Nov. 2008	Proposed decisional action at GEO-V Plenary: 1. Acknowledge and commit to support the first formal evaluation
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	<p>of GEOSS implementation, along with final report provided in time (mid 2010) for planning the Earth Observation Summit anticipated in Nov. 2010;</p> <ol style="list-style-type: none"> <li>2. Accept the proposed GEOSS Conceptual Framework for Performance Monitoring and Evaluation; and</li> <li>3. Establish the Performance Monitoring &amp; Evaluation Working Group – “M&amp;E” WG (approx. 10 to 15 persons), in accordance to the proposed ToR and request nominations to populate it (M&amp;E WG composition considers attendance of the Paris Workshop 10-12 Sept 2008)</li> </ol>
3 <sup>rd</sup> quarter 2009	Final “Performance Monitoring and Evaluation Framework for GEOSS Implementation” and “Plan for First Evaluation” submitted to GEO Executive Committee for approval
GEO-VI Plenary Nov. 2009	Progress Report on the implementation of the Performance Monitoring and Evaluation Framework for GEOSS
First half of 2010	First evaluation completed
GEO-VII Plenary and EO-V Summit anticipated in Nov. 2010	Report on mid-term assessment

It must be noted that the proposed plan of actions is success oriented and the work of the Performance Monitoring & Evaluation Working Group in the first half of 2009 will be of paramount importance to ensure success. In fact, the M&E Working Group will have to prepare, for GEO Executive Committee endorsement in June/July 2009, the detailed Definition Document of the Performance Monitoring and Evaluation Framework for GEOSS implementation, together with scope, charge, and preliminary plan for the first evaluation.

**Table 1: GEOSS Conceptual Framework for Performance Monitoring and Evaluation**



**ANNEX 1****GEO Performance Monitoring and Evaluation Working Group****Terms of Reference****1 PURPOSE**

The Performance Monitoring and Evaluation Working Group (hereafter referenced as “M&E”) will support the Group on Earth Observations (GEO) in all aspects of performance monitoring and evaluation of Global Earth Observation System of Systems (GEOSS) implementation.

**2 OBJECTIVES**

The M&E is convened to:

- Establish a performance monitoring and evaluation framework to support the evaluation of performance of GEOSS implementation, on the basis of outcome performance indicators.  
Develop a document defining adapted aspects of “performance monitoring and evaluation of GEOSS implementation” – following the outline prepared at the September 10-12, 2008, Workshop.
- Develop a plan (including oversight of its execution) for the first independent evaluation of GEOSS implementation; the final report of this evaluation should be completed by mid 2010, in time for its use in planning the Earth Observation Summit anticipated in November 2010.
- Review the existing GEOSS performance monitoring system and contribute to its improvement.

**3 APPROACH AND FUNCTIONS**

- Adapt state-of-the-art approaches and tools (e.g., World Bank - Independent Evaluation Group, OECD, GEF, etc.) to the performance monitoring and evaluation of GEOSS implementation.
- Develop options to mobilize financial and human resources to support the execution of the plan for the first independent evaluation of GEOSS implementation.
- Report to GEO Plenary and the GEO Executive Committee the results of the first independent evaluation for the primary purpose of demonstrating accountability to political sponsors and the public.
- Report to GEO Plenary and the GEO Executive Committee the results of the performance monitoring for the purpose of learning and feedback to refine and focus GEO planning.

## **ANNEX 2: ANNOTATED OUTLINE OF THE DEFINITION DOCUMENT – PERFORMANCE MONITORING AND EVALUATION FRAMEWORK FOR GEOSS IMPLEMENTATION**

### **1 INTRODUCTION**

#### **1.1 GEOSS/GEO is unique in many ways – no parallel similar organization – so we are basically in “pathfinder” mode on designing an appropriate evaluation.**

- Voluntary and non-legally binding
- Modest budget
- Networking, catalyzing, facilitating function
- Acknowledge how GEO operates

#### **1.2 Why does GEO want to do evaluation and performance monitoring on GEOSS implementation?**

### **2 PRINCIPLES**

#### **2.1 Formal GEO commitment to conduct evaluations and implement monitoring system**

- When to do the first evaluation? The objective is to have it completed – final report received by mid 2010 – anticipating its use in preparing for the Earth Observation Summit-V (anticipated in November 2010)
- When to plan for subsequent evaluations? Approximately every 5 years.
- Implement monitoring system with Work Plan Tasks-Target revisions being proposed for GEO-V Plenary (November 19-20, 2008)

#### **2.2 Contributing resources to conduct the evaluation and implement monitoring system**

- Person’s time, funds, contractual support
- Consider modular approach for evaluation – which modular component(s) should be independently handled to assure credibility?
- Capacity and resources to collect/verify measures of progress (indicators)

#### **2.3 Purpose of evaluation; how results of evaluation will be published and used**

- What evaluated? The implementation of GEOSS.
- Evaluation for what primary audience? EO Summit delegations

#### **2.4 Quality and credibility assurance of evaluation**

- Who to conduct evaluation? The more independence, the more credibility of the evaluation
  - National Organization
  - User groups

## **2.5 Stakeholder participation**

## **2.6 Roles and responsibilities (e.g., oversight function of M&E):**

- M&E task force/working group/team (use appropriate term)
  - Ideal number of participants and representative from five GEO regions
  - Support from appropriate expertise of agencies working on Work Plan Tasks”
  - TOR – Should this work be considered a “Task” under Work Plan
  - Propose transition from M&E task force to M&E Working Group at GEO-V Plenary
- GEO Plenary/Executive Committee
- GEO Secretariat
- Task teams
  - Capacity Building acknowledgement on Task sheets

## **2.7 Criteria**

# **3 MONITORING AND EVALUATION FRAMEWORK**

## **3.1 Clear and coherent objectives and strategy**

- Scope/charge for evaluation (M&E framework, formative evaluation, baseline established)
  - Formative evaluation
  - Pilots on a few SBAs
  - Case studies addressing added value of GEOSS implementation to existing initiatives (e.g., what would GCOS be today without any GEOSS implementation)  
Evaluation of GEOSS implementation
- For Monitoring – the GEOSS Roadmap – visual display organizes flow and coordination of Work Plan(s) Tasks and Targets
- Opportunity for T3 to translate Targets into outcomes (currently read as outputs in most cases)

## **3.2 An Expected Results Chain/Logic Model**

- Refine conceptual framework (GEO-IV Plenary document 26) to guide both evaluation and monitoring
- Incorporate Ex-ante impact assessment modelling for monitoring

## **3.3 Measureable Indicators that meet the monitoring and reporting needs of the governing body and management**

- Establish baseline for 2003 (when GEOSS concept was developed) and projections
- Ex-ante impact assessment modelling
- How do you collect/verify measures of progress (indicators)? How to establish capacity and resources to carry this function out?

**3.4 Systematic and regular process processes for collecting and managing performance data, including baseline data**

- Web-based tool to assist in updating Tasks and monitoring performance indicators (make it decentralized)
- How do you collect/verify measures of progress (indicators)? How to establish capacity and resources to carry this function out?
- Resources to carry this out

**4 TIMELINE**

**4.1 When to do the first evaluation? The objective is to have it completed – final report received by mid 2010 – anticipating its use for the Earth Observation Summit-V (2010)**

**4.2 When to plan for subsequent evaluations? Approximately every 5 years.**

**4.3 When to implement monitoring system with Work Plan Tasks-Target revisions being proposed for GEO-V Plenary (November 19-20, 2008)**

**4.4 For Monitoring – the GEOSS Roadmap – visual display organizes flow and coordination of Work Plan(s) Tasks and Targets**

**4.5 Opportunity for T3 to translate Targets into outcomes (currently read as outputs)**

**4.6 Establish baseline for 2003 (when GEOSS concept was developed) and projections**

**4.7 Propose transition from M&E task force to M&E Working Group at GEO-V Plenary**

**5 ORGANIZATIONAL ASPECTS****5.1 M&E task force/working group/team (use appropriate term)**

- Ideal number of participants and representative from five GEO regions
- Support from appropriate expertise of agencies working on Work Plan Tasks”
- TOR – Should this work be considered a “Task” under Work Plan
- Propose transition from M&E task force to M&E Working Group at GEO-V Plenary

**5.2 Oversight role for Monitoring****5.3 Oversight role for Evaluation**