



GROUP ON
EARTH OBSERVATIONS

GEO-IX

22-23 November 2012

Assessment of Progress
against GEOSS 2015 Strategic Targets

Document 5

As accepted at GEO-IX

Assessment of Progress Against the GEOSS 2015 Strategic Targets

Introduction

The present document is a first attempt by the GEO Implementation Boards to respond to the need for an assessment of GEOSS implementation progress against the 2015 Strategic Targets. This need is expressed in the Terms of Reference of the Implementation Boards accepted by the GEO-VIII Plenary in November 2011.

The assessment is divided in two parts as follows:

- First, a summary assessment at the level of the Target featuring: a pyramid diagram (see below); an analysis of implementation status, issues and gaps; and key actions/intervention requested from Plenary;
- Second, a detailed assessment at the level of the Outcome (“Demonstrated by” bullets in the Strategic Targets document) featuring: a colour code; an analysis of implementation status, issues and gaps; and key actions/intervention requested from Plenary.

PYRAMID DIAGRAM

The pyramid diagram intends to provide a compact and comprehensive view of GEOSS implementation progress. It is based on a colour-coded representation of the:

- Strategic Target (*top of the pyramid*);
- Underpinning Strategic Target Outcomes / “Demonstrated by” bullets (*middle of the pyramid*);
- Related Work Plan Tasks (*base of the pyramid*).

Colour codes essentially indicate the degree of progress and levels of priority for Plenary intervention:

G	Green: Expected to be achieved. Some actions/intervention may be required
Y	Yellow: At risk of not being achieved without additional actions/intervention
R	Red: Not expected to be achieved without significant actions/intervention

The rationale for assigning colour codes to the (a) Target, (b) Outcomes, and (c) Tasks is respectively outlined in the (a) Analysis section below the pyramid diagram, (b) “Detailed Assessment” part of this document; and (c) Work Plan Implementation Report (see GEO-IX Document 6).

To understand linkages between Target and Task colour codes, it is useful to note that the relationships are often diverse and complex. In effect, achieving the Outcomes of a particular Target depends on both the definition and implementation of the related Tasks. So whereas Tasks may be green (meaning that Task implementation is in line with the Work Plan), the overarching Target may be yellow or red (meaning that Tasks need to be revised or amended in order to reach the Target).

Also, among the various Tasks geared towards the Outcomes of a given Target, some may be more relevant to those Outcomes than others. This situation may translate into a pyramid that features one red Task at the bottom (typically offset by one or more green Tasks) and a green Target at the top.

GENERAL APPROACH

The Target assessment is jointly performed by the three Implementation Boards:

- The Infrastructure Board focuses on the Architecture and Data Management Targets;
- The Institutions and Development Board focuses on the Capacity Building, User Engagement, and Science & Technology Targets;
- The Societal Benefits Board focuses on the nine Societal Benefit Area Targets (Disasters, Health, Energy, Climate, Water, Weather, Ecosystems, Agriculture, and Biodiversity).

Sources of information for conducting the Target assessment include: (i) Direct Task Coordinator reports; (ii) Online Task Component Sheets (see http://www.earthobservations.org/geoss_imp.php); and (iii) the GEO Secretariat Work Plan Implementation Report (GEO-IX Document 6).

The main part of the assessment relies on qualitative analysis by Implementation Board members. Objective quantitative indicators have been used to the extent that they could be meaningfully defined (see e.g. Architecture and Data Management Targets).

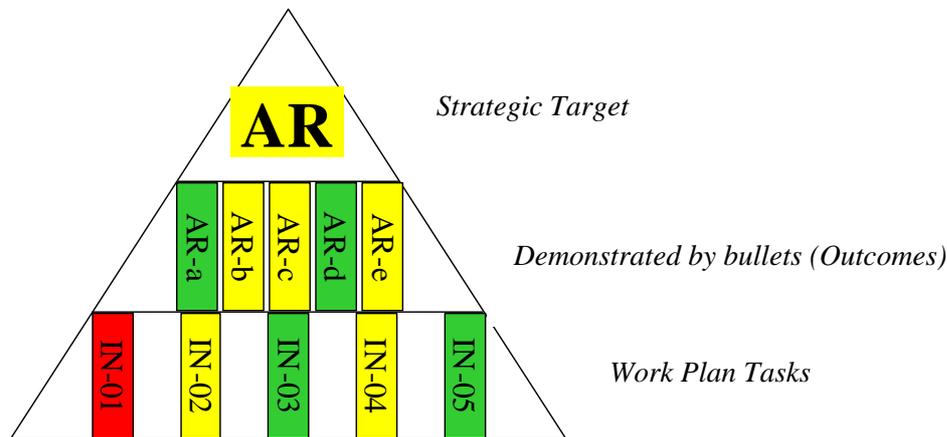
Strategic Targets and underpinning Outcomes (Demonstrated by bullets) are drawn from GEO-VI Document 12(Rev1). The distribution of Tasks under each Target is drawn from the “Related GEOSS Strategic Targets” sections of the GEO 2012-2015 Work Plan (minor adjustments have been made by Implementation Boards). The distribution is not exhaustive; rather it focuses on Tasks that are integral to a given Target.

GEOSS 2015 Strategic Targets

Summary Assessment

1 ARCHITECTURE

Achieve sustained operation, continuity and interoperability of existing and new systems that provide essential environmental observations and information, including the GEOSS Common Infrastructure (GCI) that facilitates access to, and use of, these observations and information.



1.1 Analysis

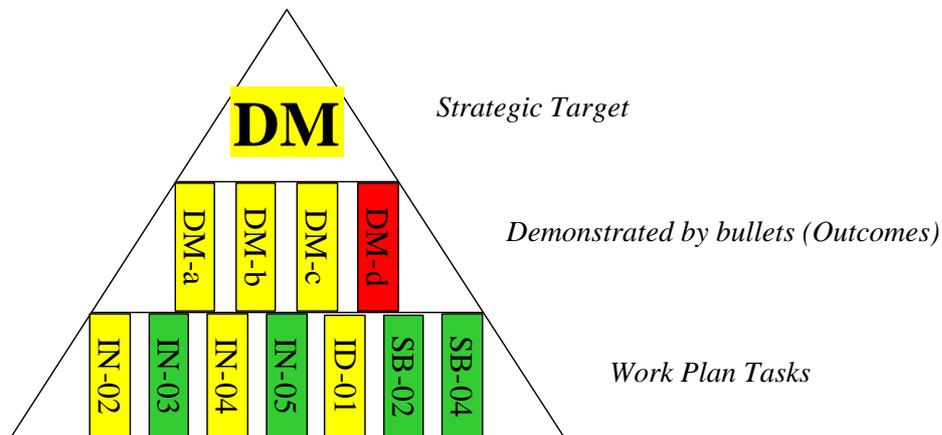
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - Although there is continued progress in most regards on the Architecture Tasks towards meeting the Strategic Target, Yellow is selected as the predominant colour, indicating continued diligence to sustain progress for most outcomes.
- *Key Issues & Gaps*
 - More work is needed to identify, and in particular, to fill critical gaps in observational networks, with particular focus on developing countries and observation continuity;
 - Additional effort is needed on the coordinated collection and registration of in-situ data, the use of sensor observation networks, and support for crowd-sourcing/citizen sensing;
 - Active participation of the GEO community in the Standards and Interoperability Forum and Architecture Implementation Pilot activities is key to advancing GEOSS interoperability and enabling a sustainable user-driven GEOSS.

1.2 Key Actions/Intervention requested from Plenary

- Facilitate efforts to set-up in situ-network and leverage investment for in-situ data collection (including joint governance, harmonised observations, common data management practices and unfired data access)
- Encourage in situ-data and Earth observation (space data) providers to make datasets online-accessible, flag them where possible as GEOSS Data-CORE, and actively contribute to the GEOSS Common Infrastructure development
- Encourage the coordinated deployment of sensor observation networks and support the transition from traditional practices in areas of identified priority
- Identify area where crowd-sourcing could significantly support GEO applications and prototype solutions for integrating crowd-sourcing data in GEOSS

2 DATA MANAGEMENT

Provide a shared, easily accessible, timely, sustained stream of comprehensive data of documented quality, as well as metadata and information products, for informed decision-making.



2.1 Analysis

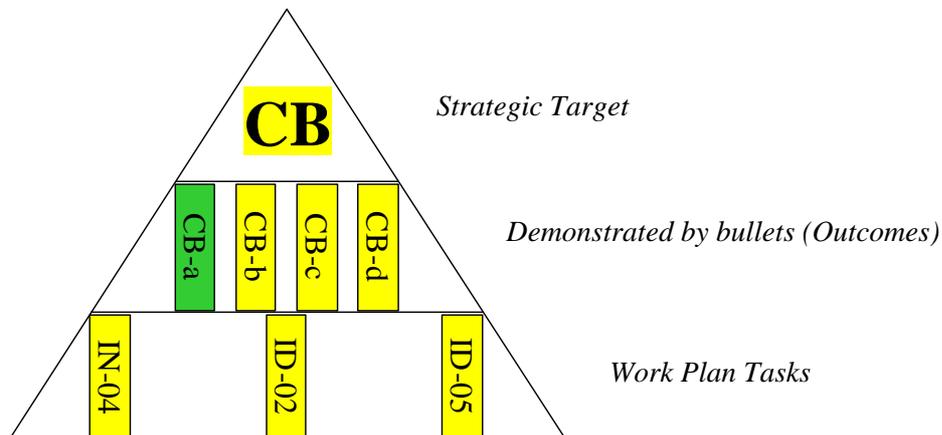
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - Although there is continued progress in most regards on the Data Management activities towards meeting the Strategic Target, Yellow is selected as the predominant colour, indicating continued diligence to sustain progress for most outcomes.
- *Key Issues & Gaps*
 - There is a strong need for GEO Members and Participating Organizations to contribute more of their data management activities – to build synergies and optimize the use of resources.

2.2 Key Actions/Intervention requested from Plenary

- Contribute socio-economic datasets to the GEOSS DataCORE
- Expand national/international contributions related to data management (including processing, inter-calibration and validation, quality assurance, harmonization, archiving, integration, assimilation, modelling, long-term preservation, digitization, and visualization)

3 CAPACITY BUILDING

Enhance the coordination of efforts to strengthen individual, institutional and infrastructure capacities, particularly in developing countries, to produce and use Earth observations and derived information products.



3.1 Analysis

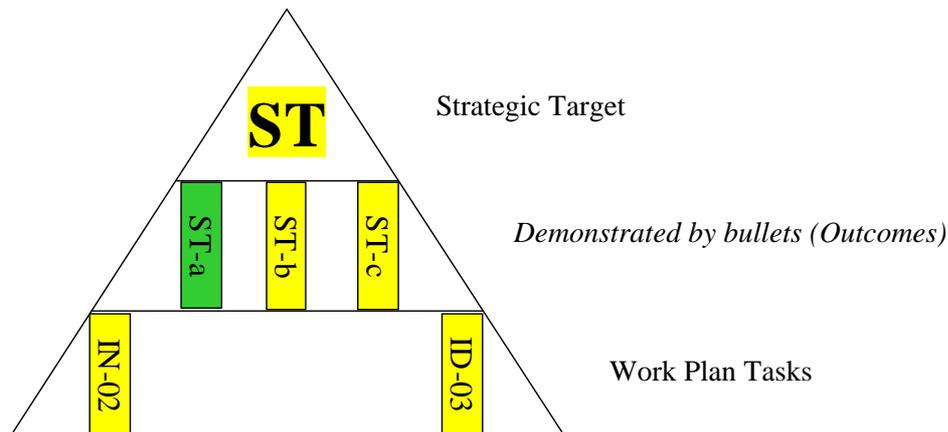
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - Network activities take place at all levels and are regularly organized;
 - Resources are being leveraged and the bottom-up approach works well, especially for funding small activities. Additional funding is needed, preferably from outside the group of traditional resource providers. Non-monetary resources consist mostly of voluntary contributions;
 - Increase in use of Earth observation in policy and decision making can be qualitatively and quantitatively shown. However, the level and speed of uptake of Earth observation should be increased to reach the Capacity Building Target by 2015;
 - Participation of developing countries is increasing, especially through dedicated initiatives. Extra effort should go into increasing participation even more;
- *Key Issues & Gaps*
 - Special focus needs to be given to networking activities that involve (potential) partners from regions with few GEO members;
 - General pledge for funding, with the specific aim to increase leverage and complement the efforts of existing contributors;
 - Formulate GEO needs for funding in terms of attractive propositions;
 - Intensify promotion activities towards policy and decision makers;
 - Work on non-technical, easy to understand success stories;
 - Show cases of getting results with easily accessible datasets;
 - Increase participation in existing initiatives by developing countries;
 - Increase Board membership and participation from developing countries, based on specific expertise;
 - Special activities dedicated to developing countries.

3.2 Key Actions/Intervention requested from Plenary

- General pledge for additional resources, with the specific aim to increase leverage and complement the efforts of existing contributors.

4 SCIENCE AND TECHNOLOGY

Ensure full interaction and engagement of relevant science and technology communities such that GEOSS advances through integration of innovations in Earth observation science and technology, enabling the research community to fully benefit from GEOSS accomplishments.



4.1 Analysis

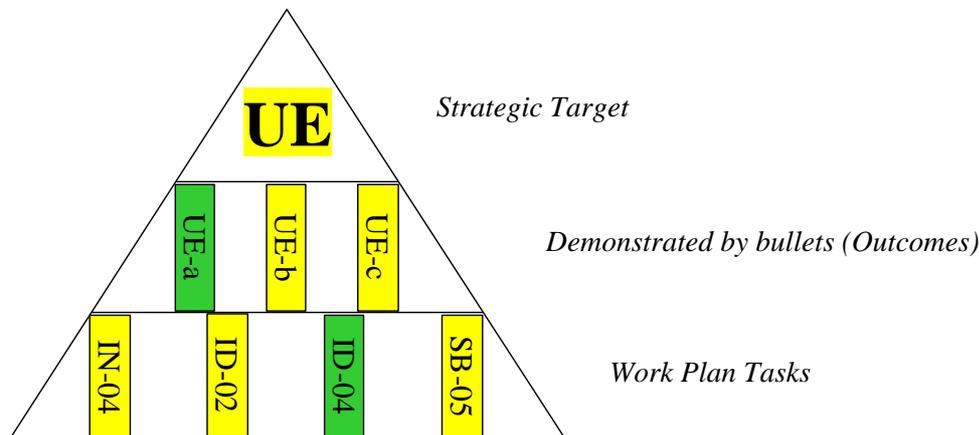
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - In IN-01, the promotion and coordination of surface-based and space-based observing systems to provide long-term continuous observations of all components of the Earth System are underway. Interactions among communities are growing, offering good prospects of cross-fertilization. However, activities for the development, maintenance, and coordination of in-situ networks require additional support from GEO Members and Participating Organizations;
 - On increased accessibility of global sets of scientific data: the Institutions and Development Board believes that some Infrastructure and Societal Benefits Tasks are working on this, but the coordination among the 3 Boards has not yet happened;
 - On improved accessibility of data and improved coordination and maintenance of observation systems: the periodic S&T Workshops are providing a forum for the research community and potential users to interact with providers of operational systems and exchange information on data needs and systems improvements.
- *Key Issues & Gaps*
 - More coordination between ID-03 and IN-04 with the oversight of the two Boards on this Target;
 - Additional Task Team or Board actions may result from the coordination;
 - Coordination of three Boards on the accessibility of global sets of scientific data;
 - Continue the periodic S&T workshops;
 - Identify in the other Tasks and Components workshops and symposia sessions with similar objectives and include the results of these in the appropriate Component Sheets.

4.2 Key Actions/Intervention requested from Plenary

No specific action/intervention required.

5 USER ENGAGEMENT

Ensure critical user information needs for decision making are recognized and met through Earth observations.



5.1 Analysis

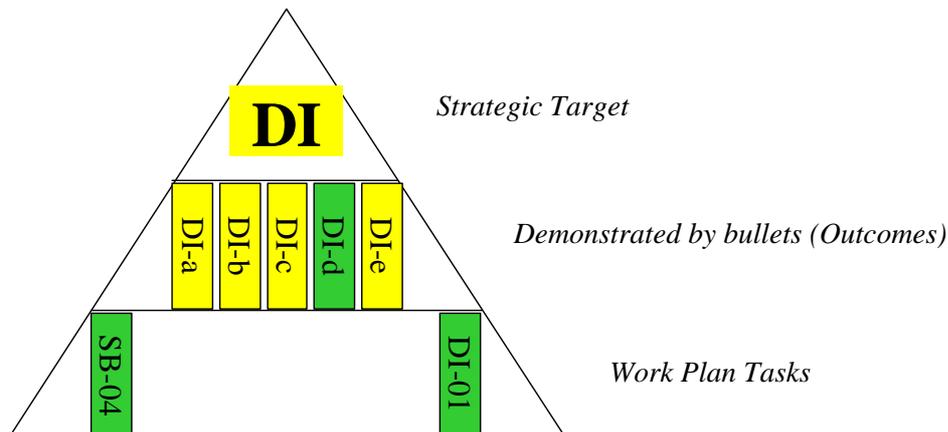
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - On the agreed core set of essential environmental, geophysical, geological, and socio-economic variables: the initial analysis was delivered to Plenary in 2010. An updated and expanded analysis has been completed in 2012;
 - On the involvement of users in requirements, coordination, use and feedback: the Institutions and Development Board believes that some Infrastructure and Societal Benefits Tasks are working on this, but the coordination among the 3 Boards has not yet happened and outputs addressing this Target Outcome are not yet identified;
 - On the increased use of geo-spatial data in all Societal Benefit Areas and in particular in developing countries: the Institutions and Development Board believes that some Infrastructure and Societal Benefits Tasks are working on this, but the coordination among the 3 Boards has not yet happened.
- *Key Issues & Gaps*
 - On the agreed core set of essential environmental, geophysical, geological, and socio-economic variables: an additional update, in response to comments on the 2012 report, by 2015 by the ID-04 Task Team;
 - On the involvement of users: the Societal Benefits Task Teams need to identify ongoing activities involving users and the expected outputs in the Component Sheets;
 - On the increased use of geo-spatial data: the Societal Benefits Task Teams and the Infrastructure IN-02 Task (Earth Data Sets) need to initiate activities that will increase use of geo-spatial data and identify the expected outputs in the Component Sheets;
 - Coordination of the three Boards on user engagement and increased use of geo-spatial data
 - Additional Board or Task Team actions may result from the coordination.

5.2 Key Actions/Intervention requested from Plenary

No specific action/intervention required.

6 DISASTERS

Enable the global coordination of observing and information systems to support all phases of the risk management cycle associated with hazards (mitigation and preparedness, early warning, response, and recovery).



6.1 Analysis

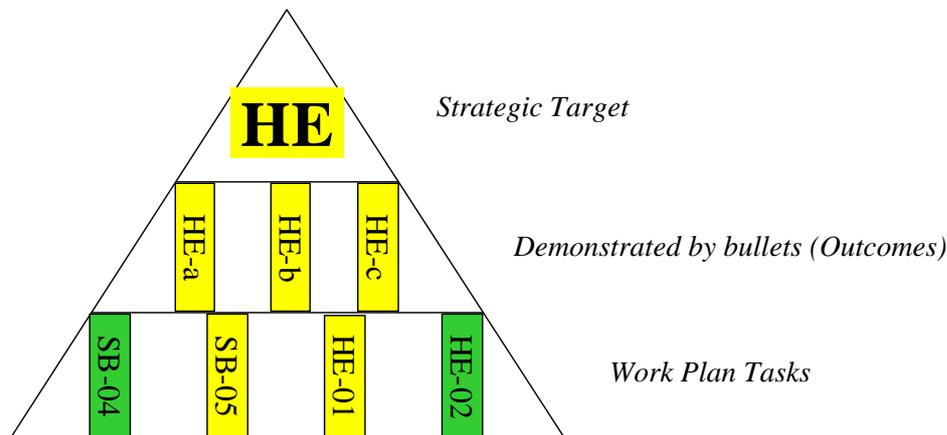
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - DI-01 is the only Task that reported ongoing contributions to this Target;
 - All activities under DI-01 support the Hyogo framework but may not be determinant to ensure the successful implementation of this framework;
 - The Task team considers that the text of the Outcomes should be close to the “achieved through” bullets.
- *Key Issues & Gaps*
 - Coordination between the DI-01 and SB-04 (Urban) is needed;
 - Some of the Outcomes, such as DI-a, require further definition to better define the 2015 Target
 - The structure of the current Disaster Task does not favor the development of a multi-hazard approach. There is a proposal to restructure the Task in that sense based on three cross-cutting Components. The proposal has been incorporated in the GEO-IX Work Plan update
 - A regional strategy is needed to engage participation at community level. A better link to the stakeholders of the Hyogo framework is required.

6.2 Key Actions/Intervention requested from Plenary

- Approve modification to the outcomes and structure of the Task in order to clarify the Target for 2015 and to ensure the development of a Multi-hazard approach;
- Support the engagement of the appropriate stakeholders of the Hyogo framework that builds the resilience of nations and communities to disasters.

7 HEALTH

Substantially expand the availability, use, and application of environmental information for public health decision-making in areas of health that include allergens, toxins, infectious diseases, food-borne diseases, and chronic diseases, particularly with regard to the impact of climate and ecosystem changes.



7.1 Analysis

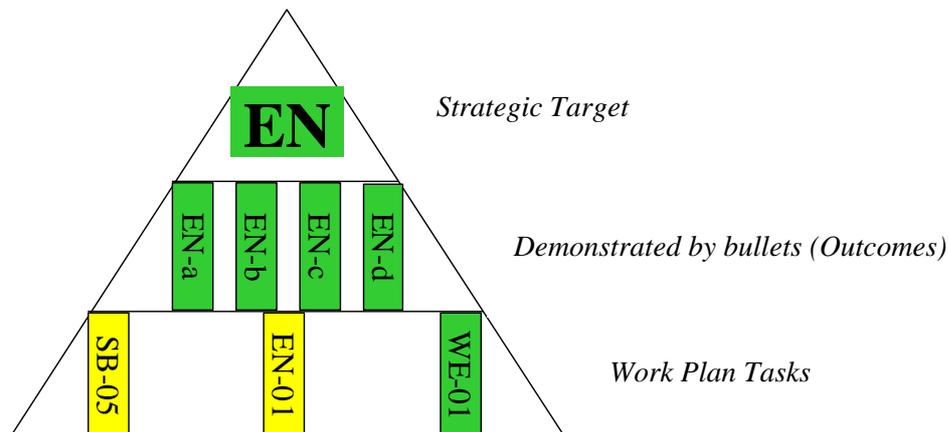
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - HE-01 and HE-02 Tasks are the major contributors to this Target and the BI-01, SB-04 (Urban) and SB-05 (Impact) contribute by computing Year of Life Loss from coal activities;
 - Although the Target is vague and based on current knowledge, one might consider that Health Tasks are on track for 2015. However due to a lack of information on many fronts, it is only fair to be conservative and signal that much work still needs to be done, with actions needed from the Implementation Boards and Task Teams;
 - Based on available information, there is little evidence that in-country capacity building is being done at sufficient level.
- *Key Issues & Gaps*
 - In-country capacity building is needed;
 - Much work is needed to improve cross Task coordination, including funding to implement certain Tasks and accelerate progress of these Tasks;
 - Data on atmospheric levels of Persistent Organic Pollutants need to be reported together with human exposure data (human blood and breast milk). Such data are quite scarce. In addition, even though reporting primary data is strongly recommended, many partners are not willing to report primary data. Also, data are being reported in various formats. This lack of harmonization limits their potential for future interpretation;
 - Lacking information on links between mercury in ambient air and human health.

7.2 Key Actions/Intervention requested from Plenary

- Support in-country capacity building activities for health;
- Provide fund for the implementation of the key for the Target Tasks;
- Support the provision of national health-related data, especially in developing countries, including with the establishment of bigger networks.

8 ENERGY

Close critical gaps in energy-related Earth observations and increase their use in all energy sectors in support of energy operations, as well as energy policy planning and implementation, to enable affordable energy with minimized environmental impact while moving towards a low-carbon footprint.



8.1 Analysis

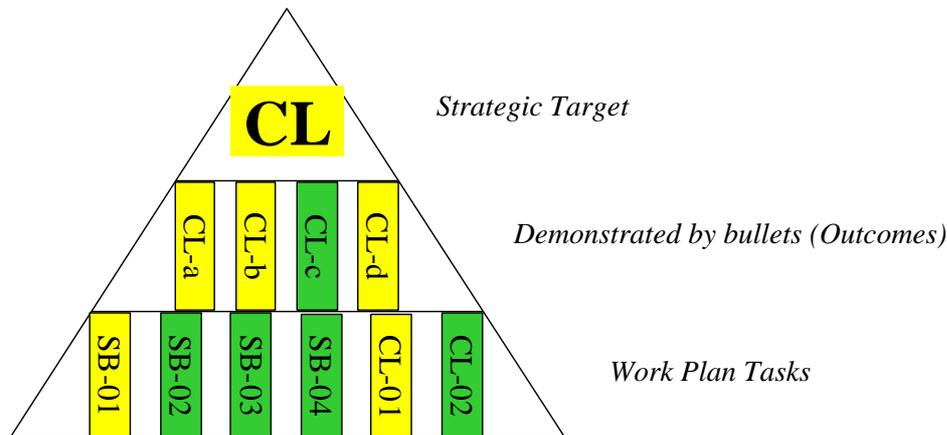
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - EN-01 is the major contributor and SB-02 (Global Land Cover) and SB-05 (Impact) Tasks include activities contributing to the environmental, economic and societal impact assessments of energy exploration, extraction, conversion, transportation and consumption;
 - All the activities contributing to this Target are advancing well;
 - Six pilots, for wind energy, 3 for solar energy, for biomass and for fuels, have been developed and delivered within the EnerGEO projects, related to environmental impacts of different means of production of energy. These pilots are going to be included in the PIA (Platform for Integrated Assessment) and combined with energy scenarios;
 - The Target is expected to be achieved by 2015.
- *Key Issues & Gaps*
 - Better collaboration among the various Tasks contributing to the Energy Target is needed;
 - Additional resources are needed for the implementation of the key projects, and the expansion of the activities to other regions;
 - Develop Earth observation based applications and services in the fields of ocean, hydro, nuclear, and fossil fuel energies.

8.2 Key Actions/Intervention requested from Plenary

- Provide resources for the implementation of, at least, the key projects, such as EnerGEO, ENDORSE and COST-WIRE;
- Support the expansion of the Energy Target related activities to other regions and energy fields such as ocean, hydro, nuclear, and fossil fuel energies

9 CLIMATE

Achieve effective and sustained operation of the global climate observing system and reliable delivery of climate information of a quality needed for predicting, mitigating and adapting to climate variability and change, including for better understanding of the global carbon cycle.



9.1 Analysis

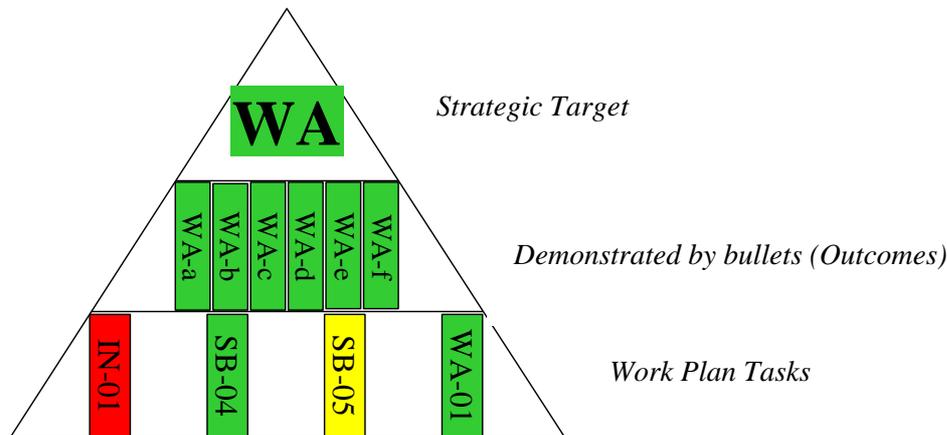
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - CL-01 and CL-02 Tasks are the major contributors to this Target;
 - There is no report available from Task CL-01 Component 4 (Easy Access to, and Use of, Climate Information);
 - SB-02 (Global Land Cover), SB-04 (Urban) and BI-01 include activities that contribute to the achievement of some Outcomes too. Better coordination of activities is required;
 - The development of a global carbon observation and analysis system is underway;
 - The required political, infrastructural and financial support will be provided so that by 2015, Task CL-02 will be able to achieve many of its objectives, including the release of the first reliable policy-supporting information and the operation of a global monitoring system;
 - Availability of climate data records for a significant subset of, but not all, the ECVs, will be considered as sufficient for the achievement of this Target.
- *Key Issues & Gaps*
 - Coordination among CL-01, CL-02 and the other carbon related GEO Tasks is needed.
 - Lack of information on the activities of some Components
 - Not all publicly available Earth observation data is freely accessible to date
 - A wide internationally-coordinated Global Land Cover mapping framework in support of the monitoring of global land carbon observation and analysis still needs to be defined
 - Lack of continuity and sustainability of many of the past and current monitoring networks
 - Lack of coverage especially in less developed regions, like Africa
 - More easily accessible satellite and in-situ data sets, extensively used by weather and climate models for data-assimilation and model verification, is needed
 - Link with policy and decision maker end-user communities needs to be strengthened.

9.2 Key Actions/Intervention requested from Plenary

- Facilitate the access to satellite and in-situ datasets used by weather and climate models;
- Ensure activities of GEO Members and Participating Organisations contribute to the GEO Work Plan;
- Provide the Task team working on the global carbon observation and analysis system with political, infrastructural and financial support;
- Support the development of new and maintenance of the current carbon monitoring networks;
- Support the expansion of the carbon observations activities to the less developed regions.

10 WATER

Produce comprehensive sets of data and information products to support decision-making for efficient management of the world's water resources, based on coordinated, sustained observations of the water cycle on multiple scales.



10.1 Analysis

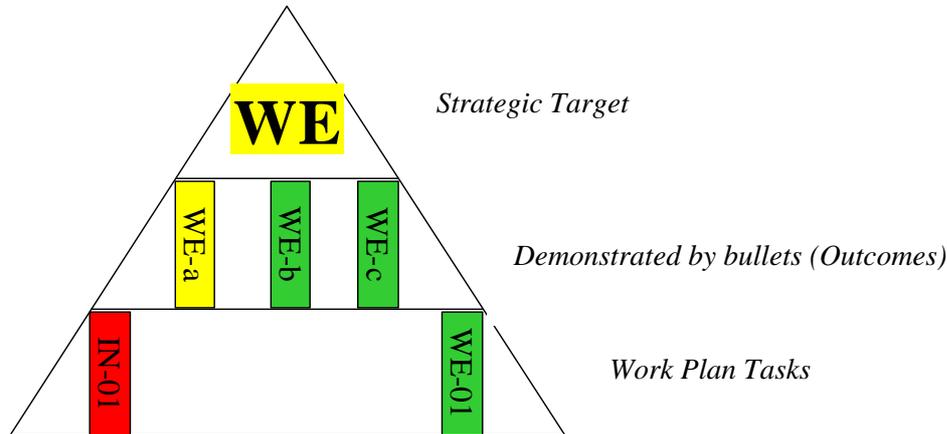
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - Water Task WA-01 is the major contributor to this Target. Tasks IN-01, BI-01 and HE-02 include activities that contribute to this Target too;
 - The WA-01 Task Team considers appropriate to report its progress against two additional Outcomes (Development of integrated data products; and Regional data systems and information systems in developing countries);
 - Most projects advance well and new initiatives replace those that cannot be implemented due to lack of funds.
- *Key Issues & Gaps*
 - Coordination among WA-01 and the other water related GEO Tasks is needed.
 - Global networks for most water-cycle variables have had a net reduction rather than a net growth in the past 5 years;
 - Lack of resources for coordination results into lagging of drought activities;
 - The riverine activity has not been implemented because the project was not funded but new ideas have being introduced;
 - Integrated data products are not being vigorously pursued in the areas of surface and sub-surface flow;
 - Evapo-Transpiration does not get sufficient attention (it is not recognized as an ECV);
 - There is a need for further activity and a strategy in Latin and Caribbean areas;
 - The value of the in-situ soil moisture network for calibrating SMOS and SMAP measurements has not yet been demonstrated;
 - In-situ networks, which implementation and growth depends on national budgets, have not advanced sufficiently in the last few years due to the economic downturn.

10.2 Key Actions/Intervention requested from Plenary

- Support the development and/or maintenance of networks for water cycle variables;
- Provide resources for the implementation of, at least, the key projects identified by the Water Task Team;
- Support water activities in developing countries, especially Latin and Caribbean areas (through CIEHLYC) and Africa region (through African Water Cycle Coordination Initiative);
- Support the development and/or maintenance of in-situ networks for water activities.

11 WEATHER

Close critical gaps in meteorological and related ocean observations, and enhance observational and information capabilities for the protection of life and property, especially with regard to high-impact events, and in the developing world.



11.1 Analysis

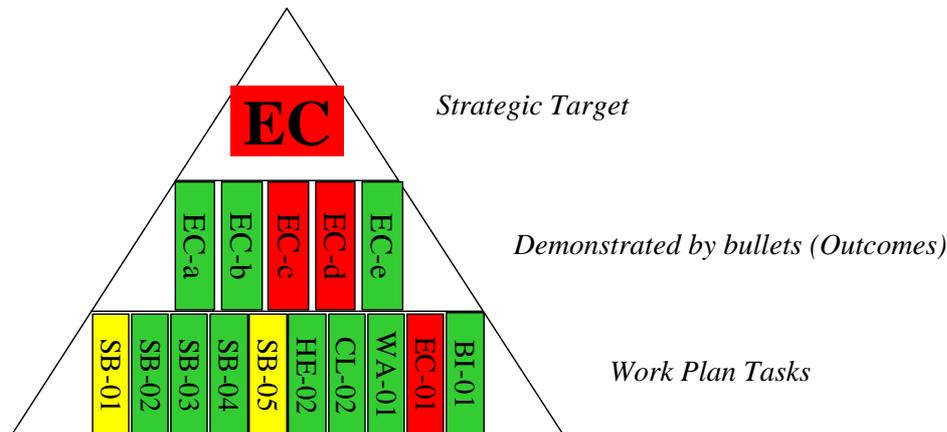
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - Weather Task WE-01 is the major contributor to this Target. Task IN-01 includes activities that contribute to this Target too;
 - IN-01 (Earth Observing Systems) weather-related activities accomplishment will contribute partially to the identification and addressing of critical gaps in observational networks (WE-a);
 - GEOWOW project continues as expected.
- *Key Issues & Gaps*
 - The identification and addressing of critical gaps in observational networks needs additional contribution.

11.2 Key Actions/Intervention requested from Plenary

- Support the implementation of THORPEX Africa;
- Provide resources to conduct assessments of forecast system performance for high-impact weather events across Africa.

12 ECOSYSTEMS

Establish, in conjunction with a comprehensive biodiversity observation network, a wide-ranging monitoring capability for all ecosystems and the human impacts on them, to improve the assessment, protection and sustainable management of terrestrial, coastal and marine resources and the delivery of associated ecosystem services.



12.1 Analysis

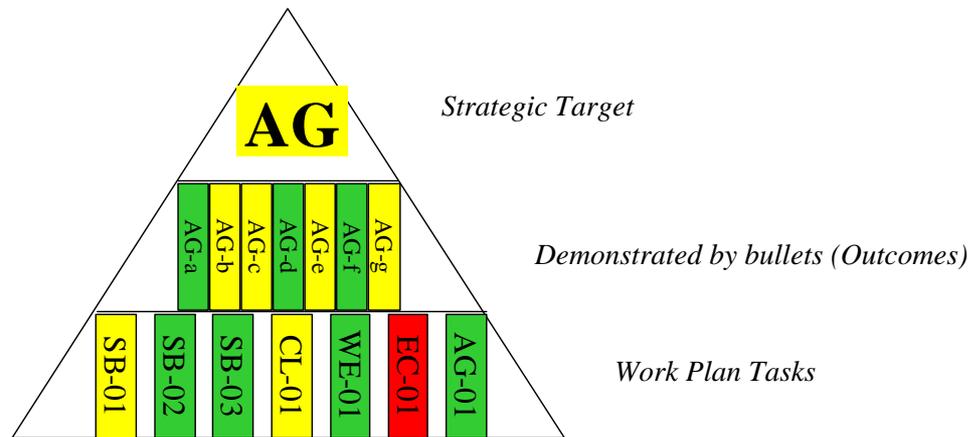
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - EC-01 is expected to be the major contributor to this Target;
 - SB-02 (Global Land Cover), SB-04 (Urban), BI-01, CL-02, WA-01 and HE-02 include activities that contribute to the achievement of the Outcomes. Better coordination of activities is required;
 - EC-01 is missing a Task Coordinator as well as a representative for the Societal Benefits Implementation Board. Hence activities have been only partially reported. Due to the big number of contributions, Task EC-01 will not be achieved without a Coordinator.
- *Key Issues & Gaps*
 - The contribution of the SB-03 (forest) is expected and required;
 - All BI-01 (GEO BON) activities are dependent on resources for implementation;
 - There are several Global Land Cover (GLC) mapping initiatives, led by China, USA, Europe but a wide internationally-coordinated GLC mapping framework still needs to be defined;
 - Advances in measuring water level from space have not progressed very rapidly because of delays in the development and approval for the SWAT mission;
 - Integration of in-situ groundwater data and surface/sub-surface water data with GRACE satellite data (or other space-based observations) has not been undertaken on a regional or global basis;
 - The diversity of language preferences in different regions can affect the clarity of the interactions between regions.

12.2 Key Actions/Intervention requested from Plenary

- Identify a Task Coordinator for Task EC-01 and related representative for the Societal Benefits Implementation Board;
- Support the provision of water level data from space mainly by facilitating the progress of the SWAT mission;
- Support the development of a internationally coordinated Global Land Cover mapping framework;
- Support regional activities, including the translation of key document that will facilitate interaction between regions.

13 AGRICULTURE

Improve the utilization of Earth observations and expanded application capabilities to advance sustainable agriculture, aquaculture, fisheries and forestry in areas including early warning, risk assessment, food security, market efficiency, and, as appropriate, combating desertification.



13.1 Analysis

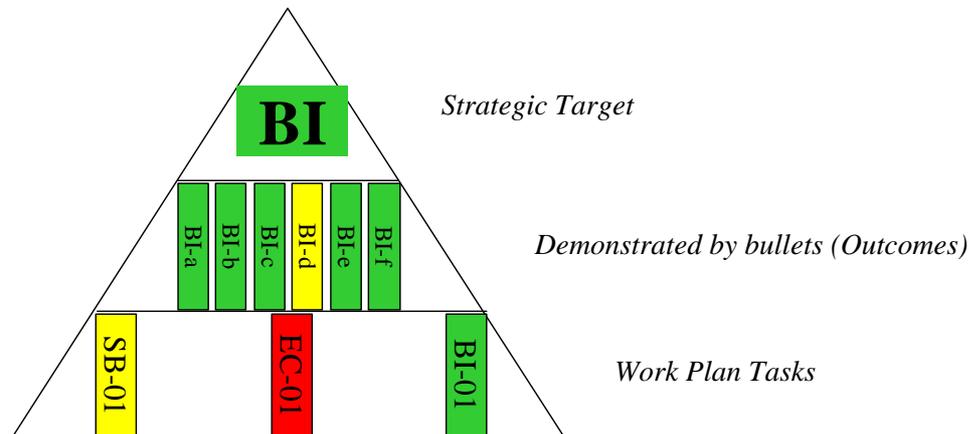
- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - AG-01 Task is the major contributor to this Target and is on track;
 - Desertification is not addressed by the AG-01 Task. The EC-01, with ongoing discussion with the UN CCD, has been identified as the most appropriate Task to address this Outcome;
 - SB-02 (Global Land Cover) and the WE-01 Tasks contribute with 15 days ahead weather forecast and land cover products respectively;
 - Further contribution from other Tasks such as Blue Planet (aquaculture and fisheries) (SB-01), and Global Forest Observation Information (SB-03) is expected and required.
- *Key Issues & Gaps*
 - Forest, fisheries, aquaculture, and desertification, are not under the scope of the AG-01 Task; Land cover mapping requires cross-Task coordination;
 - Data sharing is a prerequisite; AG-01 Task relies mostly on public good satellite with free and open data police but commercial data is required for high resolution data (at a cost); ensuring long term investments in satellite and in situ networks is required;
 - Wiki based activities require continuous support from the Agricultural Community of Practice; validation require field sampling at a cost and timely available satellite imagery;
 - The Agriculture Community found no consensus about desertification being an "agricultural" problem and no leadership to take this Outcome on; this should be dealt with within ecosystems/biodiversity;
 - Some regions could still benefit from having a JECAM site and sharing its benefits;
 - Detailed mapping of crop land at higher resolution (e.g. 30 m) cannot be achieved with only a single imagery data set. Multi-temporal imagery data need to be collected and shared.

13.2 Key Actions/Intervention requested from Plenary

- Expand national participation in, and funding for, GEOGLAM implementation
- Support the provision of high resolution (commercial) data and timely available satellite imagery for the implementation of the GEO-GLAM activities
- Ensure long term investments in satellite and in-situ networks
- Continue supporting the JECAM sites that can still benefit the concerned areas
- Support the provision and sharing of multi-temporal imagery high resolution (30m) data

14 BIODIVERSITY

Establish, in conjunction with a comprehensive ecosystem monitoring capability, a worldwide biodiversity observation network to collect, manage, share and analyze observations of the status and trends of the world's biodiversity, and enable decision-making in support of the conservation and improved management of natural resources.



14.1 Analysis

- *Rationale for assigning colour codes to the Target and underpinning Outcomes*
 - BI-01 Task is the major contributor to this Target and is on track;
 - SB-02 Global Land Cover supports BI-01 activities for the achievement of biodiversity Outcomes too. Better coordination of the Tasks is required;
 - Further contribution from other Tasks such as Blue Planet (SB-01), and EC-01 is required;
 - A mechanism that enables users to interact with the development of biodiversity observations systems and request services has been implemented only for freshwater. Other mechanisms exist and GEO BON (BI-01) has been approached for the development of specific products e.g. requests from CBD (Convention on Biological Diversity) via COP and SBSTTA and requests from Ramsar;
 - Robust remote-sensing based methods for in-situ and locally-observed biodiversity information still belongs to the research field.
- *Key Issues & Gaps*
 - All GEO BON activities are dependent on sufficient resources for implementation;
 - Increased data collections will contribute to the Target;
 - The remote sensing community should take up calls for increased monitoring of specific Essential Biodiversity Variables (EBVs) not reliant on in-situ measurements alone;
 - Participating Organization to allow free and open access to information and data required
 - A number of partners do not see value in contributing their data through GEOSS since their data is already available elsewhere;
 - EBVs should be accepted by the broader community and integrated into current long-term monitoring schemes as appropriate.

14.2 Key Actions/Intervention requested from Plenary

- Provide resources required for the implementation of GEO-BON activities;
- Support provision of data required for biodiversity monitoring (especially the remote sensing community);
- Support free and open access to information and data required, through GEOSS;
- Support the EBVs concept and integrate into it current long-term monitoring schemes

Annex:

GEOSS 2015 Strategic Targets

Detailed Assessment

Strategic Target	Strategic Target "Demonstrated by" bullet (Outcome)	Dem. By bullet color	Analysis	Actions/Intervention needed
Architecture	1. Deployment, population, and enablement of sustained operations and maintenance of a user-friendly and user-accessible GEOSS Common Infrastructure (GCI), including the core Components and functions that link the various resources of GEOSS.	G	The significant increase in GEOSS registrations and a doubling of accessible harvested metadata records demonstrate increased use of GEOSS for publishing. The number of new visitors/users of the GEO Portal are evidence of system popularity within the EO community. Activities in various Tasks are supporting, monitoring, and enhancing the capabilities of GEOSS and the GCI.	Encourage providers to make datasets accessible, flag them where possible as GEOSS Data-CORE, and actively contribute to GCI development. Encourage GEO communities (e.g. data providers, scientists, decision makers) to identify requirements, support testing and enhancements, and showcasing of GCI and the benefits of registration.
	2. Coordinated planning and sustained operation of national, regional and global observing and information systems within an interoperability framework.	Y	Whilst more and more resources can be searched from the GCI, there is still considerable work to do to improve data access by assuring that metadata records include direct links in the to services for data view and/or download. This requires a concerted effort with the data providers. Too many of the links provided are broken or not working.	To promote interoperability, Earth observation providers must register and provide sufficient metadata (descriptions) that includes direct links to the specific described data resource, whether by data download URL or Web service interface. The providers must ensure that the URLs are 'live'. Where appropriate, resources shall also be tagged with GEOSS Data-CORE. GCI operations should also periodically verify the availability of link URLs in metadata and help improve quality of service and availability of data.
	3. Continual improvement in observations and information available to users through the transition of research Outcomes and systems into operational use, and through an optimal mix of space-based, airborne and in-situ observing platforms.	Y	More work needs to be done to achieve this Target, particularly in relation to in-situ observing platform and information resources. Closer relationships with the in-situ data provider communities need to be developed in collaboration with the SBAs	Encourage providers to make datasets accessible, flag them where possible as GEOSS Data-CORE, and actively contribute to GCI development; Contribute to the GMES In-Situ Coordination initiative (GISC) and the development of global framework for in-situ network management; Support the expansion of the International Terrestrial Reference Frame (ITRF) through education and partnership development (e.g. in Africa); Liaise with national representatives in radio-communication fora – to ensure sustained political support for radio-frequency protection; Strengthen simulation capabilities to better understand options, scenarios, sensitivities and trade-offs in observation deployment strategies Conduct GEO-wide studies on crowd-sourcing;
	4. Increased efficiency in the operation of observational systems through convergence among global, regional and national facilities.	G		
	5. Comprehensive gap analysis and gap filling, integrated across all Societal Benefit Areas, including issues pertaining to operational redundancy and succession planning (especially with respect to space missions) for systems and products.	Y	More work needs to be done to achieve this Target. In particular in order to influence future space missions, all requirements should expressed well in advance. This activity should be accompanied by an outreach exercise in order to be sure that potential data providers are fully ware about new or consolidated user requirements.	In order to become an effective GEOSS Common Infrastructure resource, the User Requirements Registry needs to undergo a peer review.

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Data Management	1. Increased use of observations through advances in all aspects of life-cycle data management, integration, and data recovery and conversion.	Y	There is a strong need for GEO Members and Participating Agencies to contribute more of their data management activities - to build synergies and optimize the use of resources.	Data lifecycle models and concepts document and project results from CEOS WGISS need to be promoted. This activity should be combined with a request to data providers to increase data accessibility by providing direct links in the metadata records to services or URI facilitating user access.
	2. Open, reliable, timely, consistent, and free access to a core set of essential environmental observations and information products, supported by adequate metadata, by users across all GEOSS Societal Benefit Areas in accordance with GEOSS Data Sharing Principles.	Y	Increased effort was made this year in increasing the visibility and registration of EO resources that are provided in accordance with the GEOSS Data Sharing Principles. Over 8,700 individual data sets have been registered and tagged as supporting the GEOSS "Data CORE" – the Data Collection of Open Resources for Everyone (GEOSS Data-CORE). These represent a promise of 'full and open' access to and public availability of EO resources.	Follow up is needed in collaboration between GEO Secretariat, the GEOSS Data Sharing Working Group and the IIB to those GEO members who have pledged resources to the GEOSS Data-CORE but who did not know what was needed to turn these pledges into accessible resources in the GCI. A document describing how to tag resources as GEOSS Data-CORE has been prepared and tested but needs to be disseminated, adopted, and implemented. Aside from tagging, data access must be improved through direct links to services or URIs for data view, and download. This may need further technical guidance document and testing but is urgent. Work initiated in the AIP5 and several research projects on user registration, citation/attribution needs also to be finalized and tested with data providers to support their commitment to the GEOSS Data-CORE.
	3. Removal of important data management deficiencies.	Y		This 'achieved' item should be merged with the first data management item, above. It does not stand on its own
	4. Enhanced information extraction from historical, current and future source data.	R		Need to survey data providers in SBAs and promote them to contribute this
Capacity Building	CB-a Networking activities that specifically build individual, institutional and infrastructure capacity.	G	Network activities take place at all levels and are regularly organized.	1. Special focus needs to be given to networking activities that involve (potential) partners from regions with few GEO members.
	CB-b Leveraging resources for Earth observation capacity building efforts.	Y	Resources are being leveraged and the bottom-up approach works well, especially for funding small activities. Additional funding is needed, preferably from outside the group of traditional resource providers. Non-monetary resources consist mostly of voluntary contributions.	1. General pledge for resources, with the specific aim to increase leverage and complement the efforts of existing contributors. 2. Formulate GEO needs for funding in terms of attractive propositions
	CB-c Increased use of Earth observation in policy and decision making.	Y	Increase in use of Earth observation in policy and decision making can be qualitatively and quantitatively shown. However, the level and speed of uptake of Earth observation should be increased to reach the Target by 2015.	1. Intensify promotion activities towards policy and decision makers. 2. Work on non-technical, easy to understand success stories. 3. Show cases of getting results with easily accessible datasets.
	CB-d Enhanced participation of developing countries in GEO and GEOSS.	Y	Participation of developing countries is increasing, especially through dedicated initiatives. Extra effort should go into increasing participation even more.	Improve inclusion of developing countries by: 1. Increase participation in existing initiatives by developing countries; 2. Increase Board membership and participation from developing countries, based on specific expertise; 3. Special activities dedicated to developing countries.

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Science & Technology	ST-a Improved and new instrumentation and observation system design for in-situ, airborne, and space-based observation, benefiting from advances in science and technology.	G	In IN-01, the promotion and coordination of surface-based and space-based observing systems to provide long-term continuous observations of all Components of the Earth System are underway. Interactions among communities are growing, offering good prospects of cross-fertilization. However, activities for the development, maintenance, and coordination of in-situ networks require additional support from GEO Members and Participating Organizations.	1. More coordination between ID-03 and IN-04 with the oversight of the two Boards on this Target. 2. Additional Task Team or Board actions may result from the coordination.
	ST-b Increased accessibility of global sets of scientific data necessary for improved Earth System modelling in the different GEO Societal Benefit Areas.	Y	The ID Board believes that some IN and SB Tasks are working on this, but the coordination among the 3 Boards has not yet happened.	1. Coordination of three Boards on this Target. 2. Additional Board actions may result from the coordination.
	ST-c Increased accessibility of data and improved coordination and maintenance of observational systems through GEOSS are realized by the research community.	Y	The periodic S&T Workshops are providing the fora the research community and potential users to interact with providers of operational systems and exchange information on data needs and systems improvements.	1. Continue the periodic S&T workshops. 2. Identify in the other Tasks and Components workshops and symposia sessions with similar objectives and include the results of these in the appropriate Component Sheets.
User Engagement	UE-a Establishment of an agreed core set of essential environmental, geophysical, geological, and socio-economic variables needed to provide data, metadata and products in support of all GEOSS Societal Benefit Areas.	G	The initial analysis was delivered to Plenary in 2010. An updated and expanded analysis has been completed in 2012.	1. An additional update, in response to comments on the 2012 report, by 2015 by the ID-04 Task Team
	UE-b Involvement of users in: reviewing and assessing requirements for Earth observation data, products and services; creating appropriate mechanisms for coordinating user requirements; utilizing data/information delivery systems; and capturing user feedback on an ongoing basis across Societal Benefit Areas.	Y	The ID Board believes that some IN and SB Tasks are working on this, but the coordination among the 3 Boards has not yet happened and outputs addressing this Target Outcome are not yet identified.	1. The SB Task Teams need to identify ongoing activities involving users and the expected outputs in the Component Sheets. 2. Coordination of three Boards on this Target. 3. Additional Board or Task Team actions may result from the coordination.
	UE-c Increased use of geo-spatial data in all Societal Benefit Areas and in particular in developing countries.	Y	The ID Board believes that some IN and SB Tasks are working on this, but the coordination among the 3 Boards has not yet happened.	1. The SB Task Teams and the IN Earth Data Sets Task need to initiate activities that will increase use of geo-spatial data and identify the expected outputs in the Component Sheets. 2. Coordination of three Boards on this Target. 3. Additional Board or Task Team actions may result from the coordination.

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Disasters	DI-a Improved use of observations and related information to inform policies, decisions and actions associated with disaster preparedness and mitigation.	Y	There are products developed or under development for policies and decisions associated with disaster preparedness and mitigation such as National Risk and Vulnerability Atlas and Fire Information System in South Africa, volcanos monitoring in Europe, Tsunami Early Warning System in Indonesia.	The improvement required to satisfy the policy and decision makers still needs to be defined. The Outcome itself may need to be revised.	
	DI-b More effective access to observations and related information to facilitate warning, response and recovery to disasters.	Y	Easy access to EUMETSAT data in support of post-disaster recovery and Charter metadata catalog has already been achieved. Regional early warning systems have been developed. Further support is needed for expansion of these systems to more regions.	Further support is needed for expansion of these systems to more regions.	
	DI-c Increased communication and coordination between national, regional and global communities in support of disaster risk reduction, including clarification of roles and responsibilities and improved resources management.	Y	Ongoing regional activities, such as on volcanoes in Europe and disaster pilot in Caribbean generated results with global impact. There are some other ongoing activities with global impact such as the Supersites' development. A multi-hazard approach is needed	A multi-hazard approach is needed.	
	DI-d Improved national response to natural and man-made disasters through delivery of space-based data, resulting from strengthened International Charter on "Space and Major Disasters."	G	Requirements for universal access to International Charter defined and a Charter metadata catalog is online. Continuation of this effort is required.	Continuation of this effort is required.	
	DI-e Support to the successful implementation of the Hyogo Framework for Action 2005-2015.	Y	All activities under DI-01 support the Hyogo framework but may not be determinant to ensure the successful implementation of this framework.	A regional strategy is needed to engage participation at community level. A better link to the stakeholders of the Hyogo framework is required.	
	The Disaster Task Team feels more comfortable and finds it more reasonable to report against the "achieved through" bullets rather than the "demonstrated by" bullets.				
	DI-a more timely dissemination of information from globally-coordinated systems for monitoring, predicting, risk assessment, early warning, mitigating, and responding to hazards at local, national, regional, and global levels;	Y	Activities are ongoing however they may not be sufficient to achieve the Outcome.	Despite the contribution of all Components of the Task to the development of a more timely dissemination of data, there is a need to improve the process and to develop a reliable network.	
	development of multi-hazard and/or end-to-end approaches, as appropriate to meet the needs for disaster risk reduction, preparedness and response in relevant hazard environments;	Y	Activities are ongoing however they may not be sufficient to achieve the Outcome.	The structure of the Task does not favour the development of a multi-hazard approach but instead of some specific efforts. There is a need for a more integrated approach.	
	supporting the implementation of the priorities for action identified in the Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters (HFA).	Y	All activities under DI-01 support the Hyogo framework but may not be determinant to ensure the successful implementation of this framework.	A regional strategy is needed to engage participation at community level. A better link to the stakeholders of the Hyogo framework is required.	

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Health	HE-a Access to improved environmental information and tools to support the global community of human health and environment experts.	Y	Although the Outcome is vague and based on the information at hand today, one might think that Health Tasks are on track for 2015, but due to lack of information on many fronts, it is only fair to be conservative and signal that much work still has to be done with actions from the Boards and related Task Teams.	Cross-Task (Component) coordination has been difficult. Some of this is due to lack of funding. Progress on some of the Health Components is slow. Issue to be resolved within the next few weeks include: Test-bed launched for networking the Global Mercury Observation System. Data on atmospheric levels of POPs are supposed to be reported together with human exposure data (human blood and breast milk). Such data are quite scarce. In addition, even though reporting primary data is strongly recommended in the Guidance document for GMP, many partners are not willing to report primary data. As the Guidance document does not provide any guidance on data aggregation, data are being reported in various formats. This lack of harmonization limits their potential for future interpretation.
	HE-b Increased use of environmental information and tools to support decision making in epidemics and/or disease management and planning for well-being. The effectiveness of these tools is demonstrated in at least 3 specific areas on different continents.	Y	Although the Outcome is vague and based on the information at hand today, one might think that Health Tasks are on track for 2015, but due to lack of information on many fronts, it is only fair to be conservative and signal that much work still has to be done with actions from the Boards and related Task Teams. In addition there is a need for country capacity building. Based on the current available information, there is little evidence that this is being done at sufficient level.	Cross-Task (Component) coordination has been difficult. Some of this is due to lack of funding. Progress on some of the Health Components is slow. Lack of information on links between mercury in ambient air and human health; The protocol on data policy is under evaluation among all partners involved, it was reviewed during the GMOS project meeting held in Rome on September 23rd 2012. A major gap is the lack of data in developing regions. It can be overcome by close cooperation with partners from developed countries. Establishment of bigger networks is crucial.
	HE-c Applying Outcomes from other Societal Benefit Areas to improve health and well-being.	Y	Although the Outcome is vague and based on the information at hand today, one might think that Health Tasks are on track for 2015, but due to lack of information on many fronts, it is only fair to be conservative and signal that much work still has to be done with actions from the Boards and related Task Teams.	Cross-Task (Component) coordination has been difficult. Some of this is due to lack of funding. Progress on some of the Health Components is slow. To what extent phenology will be taken up by observation partners is not certain, so the level of contribution here is not known.
Energy	EN-a Significant increase in use of Earth observations by all sectors for improved: o Environmental, economic and societal impact assessments of energy exploration, extraction, conversion, transportation and consumption.	G	The ENDORSE project is making progress as planned under EC FP7.	Contact should be established to ensure that synergies are made with SB-02 Task outputs.
	o Prediction of potential hazards to the energy infrastructure.	G		
	o Prediction of the production of intermittent sources of energy.	G	COST-WIRE action is making good progress	
	o Mapping of renewable energy potential.	G	The work is developed smoothly and it can be handled by the Task Team.	

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Climate	CL-a Improved scientific understanding, modelling and prediction of climate.	Y	There are many completed and ongoing activities. But more efforts are needed in order to achieve this Target Outcome	A wide internationally-coordinated Global Land Cover mapping framework (including Earth observation data supply, processing chain and associated standardized or harmonized rules) still needs to be defined. CL-01-03: In the framework of the WWRP/WCRP-YOTC project, satellite and field-campaign data sets are extensively used by weather and climate models for data-assimilation and model verification - further easily accessible data are needed.
	CL-b Accessibility of all the observational data needed for climate monitoring and services in support of adaptation to climate variability and change.	Y	Even though there are a number of relevant datasets available, they are often difficult to access. Moreover, focus has so far been on ECVs, and more specific user requirements for information to support adaptation, and derived requirements for datasets, need further elaboration. ECVs are useful in this respect, but additional datasets are needed.	Not all publicly available Earth observation data are freely accessible to date. CL-01-04: No reports available
	CL-c Development and facilitation of a comprehensive (atmosphere, ocean, land) global carbon observation and analysis system in support of monitoring based decision-making and related environmental treaty obligations.	G	The development of a global carbon observation and analysis system is underway. Before 2015 we should be able to have i) identified the key elements and players to be involved, ii) coordinated the most important observing systems, and iii) defined the requirements for building such a system. The first reliable policy relevant information will also be released. A single global monitoring system could be operational around 2015, assuming that there would be the needed political, infrastructural and financial support by governments.	A wide internationally-coordinated Global Land Cover mapping framework (including Earth observation data supply, processing chain and associated standardized or harmonized rules) still needs to be defined. Not all publicly available Earth observation data is freely accessible to date. A key issue for a globally coordinated carbon observation and analysis system is the lack of continuity and sustainability of many of the past and current monitoring networks. A key gap is the lack of coverage especially in less developed regions, like Africa. Coordination between BI-01 and CL-02 is needed.
	CL-d Availability of all Essential Climate Variables needed by the WCRP, the IPCC and the UNFCCC.	Y	Climate records covering all the ECVs cannot be expected. Strengthened coordination and contributions are needed in order to achieve this for a majority of the ECVs.	Strengthened coordination and efforts to produce Thematic Climate Data Records are needed for most ECVs.

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Water	WA-a An operationalized and sustained global network of in-situ observation sites.	G	The global networks for most water-cycle variables have had a net reduction rather than a net growth in the past 5 years. The progress of the related IN-01 activities is considered satisfactory and their contribution to the achievement of this Outcome significant.	The value of the in-situ soil moisture network for calibrating SMOS and SMAP measurements has not yet been demonstrated. No concept developed yet. The implementation and growth of networks is dependant on national budgets. In reality in-situ networks have not advanced very much in the last few years likely due to constrained budgets.
	WA-b Increased availability of information products and services for monitoring changes in the water cycle, including clouds and precipitation, appropriate for both research and integrated water resource management.	G	Drought activities are lagging due to a lack of resources for coordination.	Advances in measuring water level from space have not progressed very rapidly because of delays in the development and approval of the SWOT mission. While the coordination elements are developing well, the distinct use of global data sets and the GEO infrastructure is not fully defined. The linkages between the WMO Global Cryosphere Watch and other data systems used within GEO should be leveraged.
	WA-c Increased availability of data and information, including quantity and quality of both surface and groundwater, to support a water cycle decision making system.	G	The HE-02 activity is not included in the Water Task. The riverine activity is missing from the 2012-2015 Work Plan because the project was not funded	The integration of in-situ and remote sensing products has not fully occurred due to the late entry of the in-situ component into the Water Task. Uncertainties surrounding the future of the GEMS water data set have led to the curtailing of some of the research plans in this area. The integration of groundwater data and surface and sub-surface water with the GRACE satellite data or other space based observations has not been undertaken on a regional or global basis. There is no common reporting platform for Persistent Organic Pollutants on surface waters. The Global Monitoring Plan database and visualization portal can be used for these purposes.
	WA-d Routine, reliable production of "watershed" and human health indicators from satellite data, surface and subsurface data, and data assimilation capabilities.	G	Topic is green with one exception: The Riverine activity in the Work Plan	Note should be taken of the Watershed Health Index initiative being driven by Conservation International.

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Weather	WE-a Identification and addressing of critical gaps in observational networks that reflect, in particular, the needs of developing countries, the need for continuity in space-based and in-situ observations, and the potential benefits of an interactive observing system to support user needs.	Y	Progress towards this Outcome is considered satisfactory (through WMO leadership and work under IN-01). However coordination and efforts to address the needs of developing countries are still needed	
	WE-b Improvements in the range and quality of services for high impact weather forecasting due to the design, future development, and operation of global observing, data assimilation, numerical modelling, and user application techniques.	G	The GEOWOW project is on schedule. The Weather Task is about carrying out research in the development of ensemble weather forecast products and then testing and trialling these within the framework of the WMO Severe Weather Forecast Demonstration Projects (SWFDPs). Once the prototype products have been fully developed and tested it will be easier to judge possible impact on the other Strategic Targets (i.e. apart from weather). The GEOWOW project will provide some much needed resources to carry this out.	
	WE-c More accurate, reliable and relevant weather analyses, forecasts, advisories and warnings of severe and other high impact hydrometeorological events enabled by enhanced observational capabilities.	G	The GEOWOW project is on schedule. The Weather Task is about carrying out research in the development of ensemble weather forecast products and then testing and trialling these within the framework of the WMO Severe Weather Forecast Demonstration Projects (SWFDPs). Once the prototype products have been fully developed and tested it will be easier to judge possible impact on the other Strategic Targets (i.e. apart from weather). The GEOWOW project will provide some much needed resources to carry this out.	

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Ecosystems	EC-a Implementation of a global standardised ecosystem classification system and map as a basis for worldwide inventory, assessment and monitoring.	G	(Note: Due to the lack of inputs this exercise has been carried out by the GEO Secretariat Experts.) EC-01-C1: Ecosystem Mapping has its own mapping data from USGS. Better collaboration with the Task Team is required.	Ecosystem activities are dependent on sufficient resources for implementation.
	EC-b Implementation of a global, standardized inventory of major ecosystems and the protected areas within them.	G	(Note: Due to the lack of inputs this exercise has been carried out by the GEO Secretariat Experts.) The individual activities will be completed. Better collaboration with the Task Team is required.	
	EC-c Increased operational monitoring of major ecosystems on land on an annual basis, including properties such as land cover type; species composition; vegetation structure, height and age; net ecosystem productivity; and biomass and carbon estimates of vegetation and soils based on remote sensing and sampled in-situ observations using internationally agreed standards.	R	(Note: Due to the lack of inputs this exercise has been carried out by the GEO Sec Experts.) Individual activities will be conducted. Better collaboration between the Task Team is required.	There are several global land cover (GLC) mapping initiatives, led by China, USA, Europe. However a broad internationally-coordinated GLC mapping framework still needs to be defined. Logistic management for power supply at very remote sites (i.e., Nepal, Amazonia) have caused some delay during the last year.
	EC-d Increased operational monitoring of major marine and coastal ecosystems on an annual basis including properties such as extent, water temperature, salinity, pH and pCO ₂ , phytoplankton species composition and productivity and marine resource stocks, based on remote sensing and sampled in-situ observations using internationally agreed standards.	R	(Note: Due to the lack of inputs this exercise has been carried out by the GEO Sec Experts.) Individual activities will be conducted. Better collaboration between the Task Team is required.	Coordination and synergies with Ecosystem and Forest (SB-03) Tasks is needed to fully meet this Outcome
	EC-e Increased knowledge of environmental flow requirements of river baseflow and peak flow, as well as human requirements for irrigation and power plant cooling water and domestic usage.	G	(Note: Due to the lack of inputs this exercise has been carried out by the GEO Secretariat Experts.) Individual activities will be conducted.	Advances in measuring water level from space have not progressed very rapidly because of delays in the development and approval for the SWAT mission. The integration of in-situ groundwater data and surface and sub-surface water with the GRACE satellite data or other space based observations has not been undertaken on a regional or global basis. The development of a central information system or land has limited the degree to which solutions in one region can be applied in another region. The diversity of language preferences in different regions can affect the clarity of the interactions between regions.

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Agriculture	AG-a Increased use of Earth observing capabilities and supporting applications systems to produce timely, objective, reliable, and transparent agricultural and forest statistics and information at the national and regional level.	G	The Task is on track and the accomplishment of the Task results into the accomplishment of the Target.	Forest is not addressed by the Task; data sharing is a prerequisite; Task relies mostly on satellite with free an open data policy but commercial data is required for high resolution data (at a cost); ensuring long term investments in satellite and in situ networks is required
	AG-b Improved agricultural risk assessment and operational weather/climate forecast systems for early warning and food security.	Y	This bullet is addressed by WE-01 too. Better coordination at least among AG 01, WE-01 and CL-01 Tasks is required.	Weather/climate forecasts for early warning and food security are under development
	AG-c Effective early warning of famine leading to more timely mobilization of an international response in food aid.	Y	Depends on cross-coordination	Weather/climate forecasts for early warning and food security are under development
	AG-d Expanded monitoring of agricultural land use change, through periodic regional and global assessments.	G	The Task is on track and the accomplishment of the Task results into the accomplishment of the Target.	Wiki based activities require continuous report from the Agricultural community of practice; validation require field sampling at a cost and timely available satellite imagery
	AG-e Development of quantitative measurements of global and regional desertification.	Y	This bullet is not addressed by the AG-01 Task at all. There is ongoing discussion between the EC-01 and the UN CCD to address the desertification issue.	AG CoP has no consensus about desertification being an "agricultural" problem; there is no leadership in the community identified to take charge of desertification; key scientists say this should be dealt with in ecosystems/biodiversity
	AG-f Increased capacity building through Targeted workshops and joint multi-institution research teams.	G	The Task is on track and the accomplishment of the Task results into the accomplishment of the Target.	There are still areas that could benefit from having a JECAM site and sharing its benefits.
	AG-g Improved collaboration and coordination on the use and applications of Earth observations for fisheries, aquaculture, forestry and land cover mapping.	Y	Both AG-01 and SB-02 Task contribute to the achievement of this Outcome. Further contribution from other Tasks such as Blue Planet (aquaculture and fisheries), Water Task and GFOI, and coordination of the activities is required.	Detailed mapping of crop land at higher resolution (such as 30 meters) cannot be achieved with only a single imagery data set. Multi-temporal imagery data need to be collected and shared. Fisheries and aquaculture, and desertification, are not under the scope of the AG Task; Land cover mapping require cross-Task coordination

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Biodiversity	BI-a Increased routine collection of long term in-situ and remotely sensed biodiversity observations.	G	All GEO BON activities are dependent on sufficient resources for implementation.	<ol style="list-style-type: none"> 1. Sufficient resources are available for implementation of activities 2. Essential Biodiversity Variables (EBVs) are accepted by the broader community and integrated into current long-term monitoring schemes 3. Increased collection of data counts towards the achievement of this Target 4. The remote sensing community will take up calls for increased monitoring of specific EBVs not reliant on in-situ measurements alone 5. Partners allow free and open access to information and data required
	BI-b Access through GEOSS to a large panel of biodiversity observations, including satellite, aerial and in-situ.	G	<p>Robust remote sensing-based spatialization methods of in-situ and locally observed biodiversity information still belongs to the research field.</p> <p>All GEO BON activities are dependent on sufficient resources for implementation.</p>	<ol style="list-style-type: none"> 1. Biodiversity activities are being implemented 2. Partners see the value of and agree to contributing their data through GEOSS (a number of partners have indicated that they do not see the value in doing so since the data is already available elsewhere) 3. Partners allow free and open access to information and data required
	BI-c Increased information sharing on biodiversity conservation and sustainable use of biodiversity resources.	G	All GEO BON activities are dependent on sufficient resources for implementation	<ol style="list-style-type: none"> 1. Sufficient resources are available for implementation of activities 2. Any level of increased data collection counts toward achievement of this Outcome 3. Planned activities are being implemented 4. Partners see the value of, and agree to contributing their data through, GEOSS 5. Partners allow free and open access to information and data required
	BI-d Implementation of a mechanism that enables users to interact with the development of biodiversity observations systems and request services.	Y	<p>This is only being actively done for Freshwater at the moment. A formal mechanism does not exist. However, other mechanisms exist and GEO BON has been approached for development of specific products e.g. requests from CBD via COP and SBSTA and requests from Ramsar.</p>	<ol style="list-style-type: none"> 1. If a more formal mechanism is required then some intervention/recommendations are required. If the informal mechanisms are acceptable, then this can be a green instead of yellow light.
	BI-e Increased availability of biodiversity information necessary to respond to and support related topics (ecosystems, health, climate, etc.).	G	<p>It would be good to get an indication of the type of Biodiversity data that other SBAs require.</p> <p>All GEO BON activities are dependent on sufficient resources for implementation.</p>	<ol style="list-style-type: none"> 1. Sufficient resources are available for implementation of activities 2. Any level of increased availability counts toward achievement of this Outcome 3. Activities listed are implemented 4. partners see the value of, and agree to contributing their data through, GEOSS 5. partners allow free and open access to information and data required 6. other SBAs indicate their data needs 7. EBVs are accepted by the broader community and integrated into current long-term monitoring schemes as appropriate 8. the RS community will take up calls for increased monitoring of specific EBVs not reliant on in-situ measurements alone.
	BI-f Increased information to reduce the cost and support the management of biodiversity issues.	G	All GEO BON activities are dependent on sufficient resources for implementation.	<ol style="list-style-type: none"> 1. sufficient resources are available for implementation of each of these activities 2. any level of increased availability counts toward achievement of this Target 3. Planned activities are being implemented 4. Partners see the value of, and agree to contributing their data through, GEOSS 5. Partners allow free and open access to information and data required 6. EBVs are accepted by the broader community and integrated into current long-term monitoring schemes 7. The remote sensing community will take up calls for increased monitoring of specific EBVs not reliant on in-situ measurements alone