B-GTOS Strategy document

The role of GTOS in biodiversity science and conservation

GTOS Secretariat document

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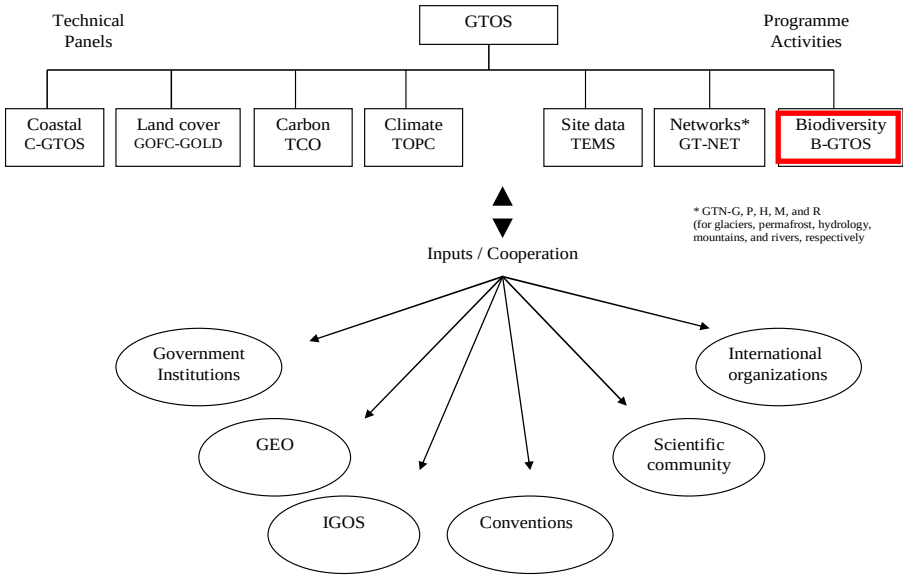
1. Introduction



Biodiversity supports human societies in many different ecological, economical, cultural and spiritual ways. Despite the importance of biodiversity, however, ecosystems are being degraded and species are being reduced at an alarming rate due to the impact of a growing human population and its efforts to satisfy its needs and desires. The global decline of biodiversity is now recognized as one of the most serious environmental issues facing humanity.

Recognition of the world-wide impact of the decline of biodiversity inspired the global community to negotiate the United Nations Convention on Biological Diversity (UNCBD).

The three objectives of the Biodiversity Convention are:

- the conservation of biodiversity;
- the sustainable use of biological resources; and

- the fair and equitable sharing of the benefits that result from the use of genetic resources.

In 2002, the Conference of the Parties of the Convention on Biological Diversity (CBD) committed "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level as a contribution to poverty alleviation and to the benefit of all life on earth". Such a target – known as Target 2010 – was later endorsed in the Plan of Implementation of the World Summit on Sustainable Development (WSSD).

We are just around the corner of 2010, progress towards Target 2010 is being assessed through the identification of sub-targets and indicators. As explained in the Biodiversity Synthesis Report of the Millennium Ecosystems Assessment, it is unlikely that the Target will be achieved at the global level for all the components of biodiversity.

However, the international community is working cohesively towards reducing the rate of biodiversity loss. GTOS is contributing to this effort through the identification of products and services that will assist in determining progress towards Target 2010. GTOS, through its GOFC-GOLD panel on land cover change, can make particular contributions in relation to the extent, fragmentation and connectivity of ecosystems and habitats.

While the topic of biodiversity loss has been in the GTOS mandate since its inception, few Panels and Initiatives have to date focused specifically on biodiversity, but the next period should see the establishment of a building blocks of a GTOS Initiative for biodiversity observations at the global scale.

The Biodiversity GTOS Initiative (B-GTOS) is an outcome of the work by GTOS in assessing the needs of the global biodiversity community in achieving Target 2010 and beyond, within the framework of Biodiversity-Related Conventions (CBD; Convention on Migratory Species of Wild Animals CMS; the Ramsar Convention on Wetlands; and the World Heritage Convention) and related multilateral environmental agreements.

These objectives illustrate the nature and breadth of the Convention. It is a global instrument which sets the stage for each nation to assess the adequacy of current efforts to conserve biodiversity and sustainably use biological resources and to determine how any gaps will be filled and opportunities realized.

One of the key obligations for parties that have ratified the Convention is to prepare a national strategy. The GTOS Biodiversity Strategy will be a response to this obligation and will be developed as a guide to the implementation of the Biodiversity Convention UNCBD. All of the strategic directions contained in the Strategy will be relevant from a global perspective. Governments, in cooperation with members of the public and stakeholders, will pursue the strategic directions set out in the Strategy, according to their policies, plans, priorities and fiscal capabilities.

Parties and stakeholders to the Convention on Biological Diversity are currently discussing an updated Strategic Plan for the Convention. Over the past years, efforts were made to assess biodiversity trends on the basis of a suite of indicators with the members of the 2010 Biodiversity Partnership leading data mobilization, analysis and interpretation. It is anticipated that the post 2010 framework will continue to depend on biodiversity

observations, information, knowledge and assessments. GTOS has so far not been an actor in this process.
The last Conference of the Parties to the Convention on Biological Diversity welcomed the establishment of GEO-BON and the GEO-VI Plenary Session welcomed the progress made on GEO-BON. This strategy will clarify also linkages between GTOS and GEO-BON. Another purpose of this Strategy is to inform the Convention's scientific advisory body (SBSTTA) about the new Strategic Plan for GTOS.

2. Elements of the Strategy

The Strategy presents a Vision for B-GTOS:

Make available data and scientific information to allow society to live and develop as a part of nature, valuing all life, taking no more than nature can replenish and leaving to future generations a nurturing and dynamic world, rich in its diversity of life.

In support of the Vision, the Strategy also presents a series of actions that provide a foundation for implementing the directions of the Strategy.

The Strategy provides a framework for action at all levels that will enhance the ability to ensure the productivity, diversity and integrity of natural systems and, as a result, ability as a global observing system to develop sustainable guidelines for stakeholders. It promotes the conservation of biodiversity and the sustainable use of biological resources, and describes how GTOS will contribute to, and be involved with, international efforts to implement the Convention.

The Strategy has five goals, which are:

- To conserve biodiversity and sustainably use biological resources;
- To enhance both understanding of ecosystems and resource management capability;
- To promote an understanding of the need to conserve biodiversity and sustainably use biological resources;
- To provide incentives and guidelines that support the conservation of biodiversity and the sustainable use of biological resources; and
- To work with stakeholders to conserve biodiversity, use biological resources sustainably and share equitably the benefits that arise from the utilization of genetic resources.

The Strategy recognizes that the conservation of biodiversity and the sustainable use of biological resources are also fundamental to indigenous communities. It describes mechanisms by which they will be able to develop their own understanding of the Convention and respond to it.

Successful implementation of the Strategy will be determined, in large measure, by the degree to which all parts of society adopt its vision and principles and contribute to achieving its goals. Ultimately, the conservation of biodiversity and the sustainable use of biological resources will require the support and participation of all.

3. B-GTOS rule in global conventions

B-GTOS plays an important role in the implementation of different international treaties as Agenda 21 and the following five environmental conventions:

- The Framework Convention on Climate Change (FCCC).
- The Convention on Migratory Species (CMS).
- The Convention on Biological Diversity (CBD).
- The Convention to Combat Desertification (CCD).
- The Convention on Wetlands (Ramsar)

The Agenda 21 priority tasks include the following requirements: bridging the data gap between developing and industrialized countries and improving the quality and availability of environmental information.
GTOS give a great support to the international environmental conventions and Multilateral Environmental Agreements (MEAs), and in particular UNFCCC, UNCCD, CBD, Ramsar and CMS, in monitoring and assessments exercises at the local, national, regional and global scales within the framework of Target 2010 and the Millennium Development Goals.

B-GTOS will enhance its work with the Secretariats and the scientific/advisory bodies of the CBD, CMS and the Ramsar Convention, to identify GTOS products and services relevant to development/implementation of indicators for measuring progress towards *Target 2010 and beyond* and to implement mechanisms to support the countries (in particular developing countries) Parties to the Conventions in assessing progress towards a reduction of biodiversity loss and a sustainable management of biological diversity.

According to this principles it is very important to enable GTOS Technical Panels and Initiatives to contribute actively to the implementation of the Conventions and to global/regional exercises like *Target 2010 and beyond* (e.g. SEBI2010, 2010BIP, Countdown2010).

4. B-GTOS role in GEO BON and sponsors (FAO, UNESCO, UNEP,DIVERSITAS and ICSU) mandate

4.1 B-GTOS role in GEO BON mandate

The new technologies are dramatically improving the collection and analysis of biodiversity information. These increasingly sophisticated monitoring systems, which consist of satellite, air, land and ocean-based instruments, are being interlinked through the Group on Earth Observations (GEO) to form a Global Earth Observation System of Systems (GEOSS).

The biodiversity arm of this expanding “system of systems”, called the Biodiversity Observation Network, or GEO BON, represent the first step towards achieving a more complete understanding of the status and trends in the world’s living resources. It was launched in February 2008. By bringing together the diverse, stand-alone observation instruments and systems now tracking trends in the world’s genetic resources, species and ecosystems, GEO BON will create a global platform for integrating biodiversity data with data on climate and other key variables. It will fill gaps in taxonomic and biological information and speed up the pace at which information is collected and disseminated.

GEO BON will also ascertain the data requirements of user groups, review and prioritize research, facilitate interoperability among observation systems and databases, generate

regularly updated assessments of global biodiversity trends, design decision-support systems that integrate monitoring with ecological modelling and forecasting, and make data and reports available to users via GEOSS.

A GEOBON Steering Committee was formed in January 2009 and met in June 2009.

B-GTOS activities in GEO BON implementation programme could be fundamental for the following working group:

- Genetic level
- Terrestrial Species Monitoring Programmes
- Terrestrial Ecosystem Monitoring
- Freshwater Ecosystem Monitoring
- Ecosystem Services
- In-situ / Remote-sensing Integration
- Informatics and Portals

Examples of GEOSS tasks, related to GTOS objectives, are:

- Improving tools for space-based and *in-situ* ecosystems observations, pursuing harmonization of ecosystems observing methods, and developing a global operational scheme for ecosystems classification;

- Developing coherent biodiversity observation strategies within the context of an agreed upon ecosystem classification system.

4.2 B-GTOS role in FAO mandate

Important activities of B-GTOS for FAO mandate are those relating to land and water resource management (including LADA work on land degradation assessment, environmental hotspots analysis), climate change (including adaptation and mitigation, bio-energy and Clean Development Mechanism initiatives and carbon sequestration), biodiversity in food and agriculture, fragile ecosystems (including mountain ecosystems and combating desertification), and water and forestry programmes.

FAO is actively promoting the conservation and sustainable use of biodiversity for food and agriculture.

B-GTOS activities could assists FAO in the implementation of the Global Plan of Action on Plant Genetic Resources and the Global Plan of Action for Animal Genetic Resources, adopted under the aegis of FAO's Commission on Genetic Resources for Food and Agriculture (CGRFA) in 1996 and 2007, respectively.

B-GTOS could also assists FAO to provide instruments to countries for the implementation of biodiversity-related agreements of relevance to food and agriculture. These include the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), the Convention on Biological Diversity (CBD), and the Convention to Combat Desertification (CCD).

The leading role of FAO is recognized in these international fora and FAO contributes actively to the development of international plans and programmes in this area. The Conference of the Parties (COP) to the CBD has recognized the “specific nature of agricultural biodiversity and its distinctive features and problems requiring distinctive solutions”, and the leading role of FAO in agricultural biodiversity, including leading support to the programme of work on agricultural biodiversity (Decision V/5 Nairobi 2000).

4.3 B-GTOS rone in UNESCO mandate

B-GTOS could be more involved in the UNESCO Man and Biosphere (MAB) programme. MAB was launched in 1970 and initiated work in 14 Project areas covering different ecosystem types from mountains to the sea, from rural to urban systems, as well more social aspects such as environmental perception. The MAB governing body, the International Co-ordinating Council (ICC) of the Man and the Biosphere (MAB) Programme, usually referred to as the MAB Council or ICC, consists of 34 Member States elected by UNESCO's biennial General Conference. In between meetings, the authority of the ICC is delegated to its Bureau, whose members are nominated from each of UNESCO's geopolitical regions. MAB's work over the years has concentrated on the development of the World Network of Biosphere Reserves (WNBR).

Today, with more than 500 sites in over 105 countries, the WNBR provides context-specific opportunities to combine scientific knowledge and governance modalities to:

- Reduce biodiversity loss;
- Improve livelihoods;
- Enhance social, economic and cultural conditions for environmental sustainability;
- Thus contributing to the pursuit of the Millennium Development Goals, in particular MDG 7 on environmental sustainability.

Biosphere reserves can also serve as learning and demonstration sites in the framework of the United Nations Decade of Education for Sustainable Development (DESD).

4.4 B-GTOS role in UNEP mandate

Many B-GTOS activities are linked to UNEP mandate and assessment processes and products, ranging from the Global Environmental Outlook (GEO) initiative to eco-system assessments, including water, mountains, and the millennium ecosystem assessment. Also important are GRID network (global resource information database), including GRID-DEWA-Europe, with value-adding mandate for handling global and regional environmental data to support environmental assessments and decision making processesUNEP is leading or contributing to a number of international science programmes, including WCRIP (world climate impact assessment and response programme). New initiatives under a revamped ‘Earthwatch’ in mainstreaming terrestrial observations could have important partnership implications for B-GTOS

Land Cover and Land Cover Change analysis carried out by GTOS are other examples of important variables affecting ecological systems that provide significant information for biodiversity protection.
Particularly B-GTOS, could support some UNEP activities related to biodiversity, as for example:

- Measuring agricultural, urban, forestry expansion and the concomitant loss of natural ecosystems and biodiversity
- Quantifying and understanding how policy impacts the composition and configuration of the various land cover
- Prioritizing activities (e.g. reforestation) to address multi- objectives like biodiversity
- Holistic and integrated approach to the conservation and sustainable use of land resources taking into account the multiple roles and functions of biodiversity

B-GTOS can help UNEP to implement its mandate providing data, information and researches for the following programmes:

- Global Environment Outlook: provides an overview of the main environmental developments over the past three decades, and how social, economic and other factors have contributed to the changes that have occurred. Addresses land, forests, biodiversity, freshwater, coastal and marine areas, atmosphere, urban areas, and disasters.
- Global Programme of Action for the Protection of the Marine Environment from Land Based Activities (GPA). The GPA is designed to be a source of conceptual and practical guidance to be drawn upon by national and/or regional authorities for devising and implementing sustained action to prevent, reduce, control and/or eliminate marine degradation from land-based activities. The GPA aims at preventing the degradation of the marine environment from land-based activities by facilitating the duty of States to preserve and protect the marine environment. The GPA is the only intergovernmental programme that addresses the inter-linkages between freshwater and the coastal environment.
- GRASP - Great Apes Survival Project. The Great Apes Survival Project is an innovative and ambitious project of UNEP and UNESCO with an immediate challenge - to lift the threat of imminent extinction faced by gorillas, chimpanzees, bonobos and orangutans.
- Wings Over Wetlands (WOW) UNEP-GEF African-Eurasian Flyways Project. The Wings Over Wetlands (WOW) Project is the largest international wetland and waterbird conservation initiative ever to take place in the African-Eurasian region. Its aim is to improve the conservation status of African-Eurasian migratory waterbirds by assisting countries to take measures to conserve key critical wetland areas these birds require to complete their annual migrations across Africa and Eurasia.
- UNEP-GEF Project on Development of National Biosafety Frameworks. UNEP's Division for Global Environment Facility (GEF) Coordination continues to play a lead role in ensuring that funding flows from the GEF for strategic actions to implement the CBD. The current portfolio of projects related to biodiversity and the CBD totals approximately $300 million (including co-financing from other donors). This includes work in more than 100 countries to help them to prepare National Biosafety Frameworks, a key early step in the Cartagena Protocol's implementation.
- UNEP World Conservation Monitoring Center (WCMC). The UNEP World Conservation Monitoring Centre is the biodiversity assessment and policy support arm of the United Nations Environment Programme. For over twenty-five years the Centre has been undertaking scientific research and providing practical policy advice to help decision makers recognise the value of biodiversity and apply this knowledge to all that they do. Key programmes at the Centre include Protected Areas (and the

World Database on Protected Areas), Ecosystem and Biodiversity Assessments, Biodiversity Indicators, and Species. The Centre also provides support to the multilateral environmental agreements such as Convention on Biological Diversity, CITES, CMS and Ramsar.

4.5 B-GTOS role in DIVERSITAS mandate

The primary means by which DIVERSITAS carries out its mission is through catalysing research aligned with its four Scientific Core Projects:

1. bioGENESIS
2. bioDISCOVERY
3. bioSERVICES
4. bioSUSTAINABILITY

B-GTOS can help DIVERSITAS to implement its mandate under the development of the following activities:

- developing common international frameworks for collaborative research.
- forming research networks to tackle focused scientific questions.
- promoting standardised methodologies.
- guiding and facilitating construction of global databases.
- facilitating efficient patterns of resource allocation, and
- undertaking analysis, synthesis and integration activities on particular biodiversity themes.

4.6 B-GTOS role in ICSU mandate

B-GTOS can provide data, products and information to the International Council for Science for its Environment/Sustainable Development field of research and in particular for the following activities:

- Review of the International Geosphere-Biosphere Programme (IGBP)
- Ecosystem Change and Human Well-being
- A Review of the Scientific Committee on Problems of the Environment (SCOPE)
- ICSU-IGFA Review of the Earth System Science Partnership (ESSP)
- Millennium Ecosystem Assessment Follow-Up
- Socioeconomic Data in Relation to the Integrated Global Observing Strategy Partnership (IGOS-P)
- Priority Area Assessment (PAA) on Environment and its relation to Sustainable Development
- New Genetics, Food and Agriculture: Scientific Discoveries – Societal Dilemmas
- Ad hoc Advisory Group on Consortium for Science and Technology for Sustainable Development

Within its overarching mission, ICSU's objectives with respect to environment and its relation to sustainable development can take advantage of B-GTOS activities that can address the following issues:

 Identify emerging issues on biodiversity, including potential problems and solutions, where scientific knowledge and research can make a difference;
 Catalyze and coordinate scientific research in the domain of the biodiversity that underpins environmental protection and conservation, and addresses the need for economic and social development;
 Contribute to the development of monitoring activities that are essential for documenting the state of the global biodiversity and its components;
 Stimulate collaboration with stakeholders in developing research agendas and communicating results from research of relevance to the development of appropriate policies in managing biodiversity;
 Contribute to biodiversity protection;
 Develop mechanisms to ensure that results from policy-relevant research benefits the governmental and private sectors as well as civil society;
 Catalyze new types of effective collaborations/partnerships within the ICSU family and with others; and
 Promote the synthesis and communication of the policy-relevant work conducted by ICSU's Scientific Unions, National Members, and IBs.

5. B-GTOS vision statement for 2010-2015 period

B-GTOS, during 2010-2015 of operation, will strengthen further development of its configuration and capacity to account for new developments in Earth observations and biodiversity information requirements. In particular, it will promote and support generation of geospatial information products required for timely attainment of Millennium Development Goals related to the protection and services of biological diveristy and integrate its operation with GEO BON, GOFC-GOLD, FAO, UNEP, UNESCO, ICSU, DIVERSITAS, NGOs, Countries, etc.

By the end of this period, B-GTOS will have contributed to sustainable management of terrestrial ecosystems and biodiversity through increased availability of a wide range of Earth observation data and information products designed to meet user's requirements.

B-GTOS strategy for 2010-2015 period could follow this guidelines:

a) Coordinating development of new Earth observation initiatives and their applications to sustainable management and monitoring of terrestrial ecosystems and biological diversity with priority focus on societal benefit areas identified by MDGs, WSSD, WSIS and GEOSS;

b) Support International Environmental Conventions (UNFCCC, CBD, CCD, Ramsar convention on Wetlands) in meeting their objectives related to biodiversity.

c) Further strengthening GTOS networks and capacities for sustained global observation of terrestrial ecosystems and global biodiversity awareness, and efficient interaction with the other global observing systems (GOOS and GCOS);

d) Assisting developing countries with strengthening their institutional capacities for effective use of biological diversity observation data and information products.

e) Improving the management and protection of terrestrial and coastal ecosystems by monitoring changes in land cover and land use, land degradation, and water pollution that could affect biodiversity.

6. Standardization, validation and data access of biological diversity research under GTOS umbrella

Through its partnership with other initiatives (especially GEO-BON), B-GTOS should assist in the development of common standards for data quality and database access to allow data harmonization and development of regional and global products. It should also ensure quality products using multiple data sources (e.g. use of multiple sensor and *in situ* data) and validation should be carried out using standard protocols. The Land Cover Classification System (LCCS) being adopted as an international ISO standard is a route which should be considered for the development of terrestrial variables linked to biodiversity. Another important standardization that B-GTOS could follow is the Biodiversity Information Standards (TDWG), known as the Taxonomic Database Working Group.
TDWG was formed to establish international collaboration among biological database projects. TDWG promoted the wider and more effective dissemination of information about the World's heritage of biological organisms for the benefit of the world at large. Biodiversity Information Standards (TDWG) now focuses on the development of standards for the exchange of biological/biodiversity data. GTOS should also assist in data management, databases creation and maintenance and dissemination, particularly with the development and better implementation of Terrestrial Ecosystem Monitoring Sites database. The TEMS biodiversity module has been developed to facilitate access to biodiversity relevant data. The module contains seven core variables relevant to biodiversity and provides links to data holders and major institutions involved in biodiversity. The module also includes a literature and glossary section. Under the new strategy TEMS database of biodiversity will be updated with new information and products.

7. Proposed outline of B-GTOS Strategy for 2010-2015 period

The new biodiversity initiative of GTOS is intended to assist in access to geospatial and ecological data required by the international community in reaching Target 2010 within the framework of the Conventions and related multilateral environmental agreements. B-GTOS will develop products and services to support the work of the CBD and other Biodiversity-Related Conventions. A bigger task team of biodiversity experts will be established to steer such a process. More scientist, researchers, partners and donors will be involved in the programme.
A key issue to improve the actual Biodiversity programme in GTOS and enforce is capacity to provide services to users is to do not forget the importance of synergies between satellite analysis and field research. Many times analysis carried out by satellite, remote sensing and GIS systems on biodiversity have ignored the role in validation, implementation and “real observation” of biological resources. Field researches on biodiversity have a great importance for a better understanding of satellite data and every studies of biological diversity should have an approach directed to both field and satellite survey.
B-GTOS in the 2010-2015 phase should improve synergy between *in situ* monitoring to remote sensed analysis.

7.1 Proposed activities:

a) Ecosystem level:

- mapping of world ecosystem diversity (using LCCS implemented classes, land cover analysis, new standards and synergy between field researches and RS);
- analyse threats for ecosystems by both land cover change and field studies (IUCN particular interest);
- testing indexes of biodiversity per area frame and validate data (IUCN particular interest);
- underline fragmentation and connectivity of ecosystem using both satellite images and field validation (IUCN particular interest);
- provide analytic maps for ecosystems reconnection and connectivity creation;
- determine fragile ecosystems through satellite approaches and validate data *in situ*;
- analyse world forest biodiversity;
- implement studies of Global200 priority ecoregion (WWF particular interest);
- mapping of ecosystem extent, biome occurrence and species distribution data (GEO BON particular interest);
- analyse specie occurrences and population trends data (GEO BON particular interest);
- develop biodiversity value indexes and vulnerability indicators (IUCN particular interest);
- provide spatial models of biodiversity distributionpatterns;

b) Specie level:

- analyse terrestrial features trough land cover and changes and evaluate vegetation indexes to estimate vegetation diversity (i.e. NDVI);
- predict available habitats for species using both satellite images and field survey (IUCN particular interest);
- realise global maps of rare species (georeference species found by field studies);
- realise global maps of species/habitats biodiversity (UNCBD particular interest);
- analyse changes in habitats of migratory species (UNCMS particular interest);
- foresee suitable habitats and mapping changes in migration routes (UNCMS particular interest);
- realise a global map and database of georeferenced species (IUCN particular interest);
- create maps and implementing available information for database already exist of floral biodiversity and vegetation distribution;
- mapping threats for biodiversity and label causes into a global maps and database;
- provide spatial analysis on boundary overlapping between habitats and human projects/activities of high impact to evaluate biodiversity risks;
- define transects within selected study areas to map and georeference species, threats, environmental conditions, ecosystems, etc. found through field transects;
- realise a global map on species indexes of biodiversity;

- analyse speciation effects on population and biogeography of species through both satellite/GIS and field researches;
- mapping and analyse invasive species (IUCN particular interest);
- investigate the possibility to insert Biodiversity in ECVs as an important variable that could affect climate change (UNFCCC particular interest);
- improve connection and analysis both satellite and field on haw fire and deforestation could affect biodiversity loss;
- foresee through satellite studies sustained by field researches ecological corridors for species (UNCMS particular interest);
- define a map of biodiversity at risk due to climate change (UNFCCC particular interest);
- analyse the ecosystem-based adaptation and how biodiversity influences this process (IUCN particular interest);

7.2 Outreach

The objective of B-GTOS outreach activities is to raise awareness and understanding of GTOS objectives and its societal benefits, and to promote participation in its activities. B-GTOS could undertake the following outreach activities during 2010-2015 period:

- Appraisal workshops on biodiversity for policy-makers;
- Management and development of B-GTOS and TEMS internet Web site;
- Production of B-GTOS bulletins and news notes;
- Presentation of B-GTOS activities at scientific conferences.
- strengthening international cooperation in sharing Biodiversity Observation data and developing information products.

7.3 Capacity building

The objective of B-GTOS capacity building activities is to assist developing countries with strengthening their institutional capacities for effective use of biological diversity observation data and information products in sustainable management of ecosystems biological resources. B-GTOS could launch the following capacity building activities during 2010-2015 period:

- Training courses on Biological Observation (BO) applications for resource managers and land use planners;
- Implementation of demonstration projects;
- Capacity development in BO-based, human/ecosystem-oriented solutions to emerging issues and areas such as reduce loss of biodiversity, natural resources depletion, prediction and management, ecosystems vulnerability to climate change;
- Production of technical reports and guidelines;
- Facilitating study tours and scientific exchanges.

- Increasing institutional capacities in developing countries to ensure effective application of these products (both at the science and policy and management level).

8. Expected users and stakeholders:

- *International Conventions*: To assist in implementation and development of required products for the UN conventions (UNCBD, UNCCD, UNCMS, UNFCCC, & Ramsar).
- *Regional and international agencies and institutions*: For undertaking regional and global analyses of biodiversity; advising governments on the state of the biological resources; for regional and global sustainable management; for regional action plans to protect biological diversity.
- *National Governments and NGOs:* For interpreting the national state of the biodiversity in relation to global processes; assessing the efficacy of existing conservation systems in natural and managed ecosystems; planning and executing appropriate land and water management to protect biodiversity; national action plans. As state parties to the conventions, national governments are an important category of end users.
- *Global Change research community:* For detecting global change and its connection to biodiversity and to develop and validate global change assessment models that take into account impacts on biological resources (University research departments, international, national, regional research institutions/ laboratories; include ESA, NASA, etc.).
- *Scientific community*: for improve University, Research entities, IUCN, etc. capacity to study biological diversity and provide products reliable and available for all.
- *Sponsors and Donor Group:* B-GTOS will need to attract sponsors and donor support in identifying linkages of interest with GTOS goals.
- *Sister Global Observing Systems:* To ensure a plain achievement of the Global Obervation initiative on the biodiversity issue, GEO, GOOS, GOFC-GOLD and GEOSS will be strongly associated through the various inter-system panels to the strategic orientation and implementation of the respective projects, programs and initiatives of interest

9. Conclusion

This proposed Biodiversity GTOS strategy for 2010-2015 period is to transform the capacity for global, comprehensive and sustained observation of terrestrial ecosystems and biological resources from space and ground platforms that was developed and tested during its first period (1996-2010) into tangible societal benefits identified by Millennium Development Goals and the Convention of Biological Diversity (CBD). Attainment of this objective will be helped by planned partnership with newly established international Global Earth Observation System of Systems (GEOSS) and GEO BON activities.
Unfortunately, too much ecological research is short term: the tenure system in universities mandates that scientists "publish or perish". That mentality does not mesh well with many of

the timescales ecology operates on --a ten year forest population cycle is unlikely therefore to be a popular research topic among ambitious field biologists.
The B-GTOS will support long terms researches to monitor areas of ecological importance over time and publish those integrated data sets on the web.
The world environmental situation is likely to be further aggravated by the increasingly rapid, large scale global extinction of species. It occurred in the 20th century at a rate that was a thousand times higher than the average rate during the preceding 65 million years. This is likely to destabilize various ecosystems including agricultural systems. Global Observation of Biodiversity has never been more important than now to provide instruments for a post 2010 Biodiversity Target and give awareness to communities to understand and save the only thing that allow human being to survive.