Open Working Group on Sustainable Development Goals (OWG)

Statistical Note for the Issue Brief on:

Desertification, Land Degradation and Drought (DLDD)

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Main policy issues, potential goals and targets

1. Desertification, along with climate change and the loss of biodiversity were identified as the greatest challenges to sustainable development during the 1992 Rio Earth Summit. Established in 1994, United Nations Convention to Combat Desertification (UNCCD)[1] addresses specifically the arid, semi-arid and dry sub-humid areas, known as the drylands, where some of the most vulnerable ecosystems and peoples can be found. The text of the UNCCD notes that DLDD "is caused by complex interactions among physical, biological, political, social, cultural and economic factors". Therefore, monitoring and assessment of DLDD must effectively address complex human-environment interactions[2].

2. As stated in the issue brief, goals and targets in the SDGs addressing the adverse impacts of climate change and biodiversity loss, including on poverty, would need to address DLDD because of its substantial contribution to these and other problems (diminishing sustainable livelihoods and socio-economic development). A DLDD focused goal requires a concerted global shift to the sustainable management of land and water resources. A Land Degradation Neutral World (LDNW) would imply: (1) prevent or avoid the degradation of healthy and productive lands through sustainable land management (SLM) and sustainable forestry management (SFM) practices, including agroforestry, sustainable agriculture and livestock practices, water management, and soil conservation, and (2) where feasible, regenerate land that is already degraded.

Conceptual and methodological tools

3. A DLDD policy, conceptual and reference framework can be found in UNCCD. As stated by the Convention, implementation of the UNCCD needs agreed, scientifically-sound and practical methodologies for monitoring and assessing[3] its impacts on dryland ecosystems and on the livelihood of its population, as well as its contribution to global environmental problems. After the initial implementation phase of UNCCD, Parties to the Convention in 2007 adopted a ten-year strategic plan (2008–2018). The plan includes a results-based management approach built on a set of specific objectives and indicators, and a new monitoring, assessment and reporting process – the performance review and assessment of implementation system.

4. Relevant concepts are defined in the official documentation of UNCCD. The Glossary for UNCCD reporting synthetizes and provides basic terminology. The Template and reporting guidelines are currently under revision to accommodate changes requested by COP 11 decisions in 2013. However, after 20 years of implementation of the Convention, the definitions of desertification and land degradation is still under discussion. The lack of an agreed definition of desertification is one of the causes of the limited availability of data that are spatially explicit to affected areas.

5. In terms of conceptual framework for the work of UNCCD, an ad hoc advisory group of technical experts (AGTE) recommended a DPSheIR (Driving Force-Pressure-State-human and

[1] In the 10-Year Strategy of the UNCCD (2008-2018), Parties to the Convention further specified their goals: *"to forge a global partnership to reverse and prevent desertification/land degradation and to mitigate the effects of drought in affected areas in order to support poverty reduction and environmental sustainability"*. The Convention's 195 parties work together to improve the living conditions for people in drylands, to maintain and restore land and soil productivity, and to mitigate the effects of drought.

[2] http://www.unccd.int/en/programmes/Reporting-review-and-assessment/Pages/defaultnew.aspx

[3] http://www.unccd.int/en/programmes/Reporting-review-and-assessment/Pages/defaultnew.aspx

environmental Impact-Response) framework[4] which allows impacts on human well-being to be recorded along with impacts on ecosystem services.

6. In terms of statistical frameworks that could be applied for the production of data and indicators on DLDD relevant themes, the *Framework for the Development of Environment Statistics*[5] *(FDES 2013)*. The FDES 2013 contains the Basic and Core Sets of Environment Statistics which organize a wide scope of statistics useful to inform on the state and changes of DLDD processes on drylands and to guide countries in their data collection and dissemination programmes.

7. The System of Environmental-Economic Accounting (SEEA) Central Framework was adopted as an international standard by the UN Statistical Commission in 2012. The SEEA Central Framework is a multipurpose conceptual framework for understanding the interactions between the economy and the environment, and for describing stocks and changes in stocks of environmental assets, including land and soil. The SEEA Central Framework is based on agreed concepts, definitions, classifications, and accounting rules. As an accounting system it enables the organisation of information into tables and accounts in an integrated and conceptually coherent way. This information can be used to derive coherent indicators to inform decision-making and to provide accounts and aggregates for a wide range of purposes.

8. The SEEA Experimental Ecosystem Accounting is an integrated statistical framework for organising biophysical data, measuring ecosystem services, tracking changes in ecosystem assets and linking this information to economic and other human activity. The SEEA Experimental Ecosystem Accounting provides a complementary perspective to the accounting approaches described in the SEEA Central Framework by providing a coherent and integrated approach to the assessment of the environment through the measurement of ecosystems, and measurement of the flows of services from ecosystems into economic and other human activity.

9. The SEEA Central Framework and the SEEA Experimental Ecosystem Accounting contain agreed interim classifications of land use and land cover, and several concept, definitions, classifications and accounting tables relevant to the measurement of the drivers, pressures, state, impact and responses related to DLDD.

Existing and new indicators

10. The COP 11 in 2013 adopted a revised set of six progress indicators[6], that are primarily aimed to monitor the achievement of the UNCCD strategic objectives (see annex 1). They include (for the affected areas): 1) trends in population living below the relative poverty line and/or income inequality; 2) trends in access to safe drinking water; 3) trends in land cover; 4) trends in land productivity or functioning of the land; 5) trends in carbon stocks above and below ground; 6) trends in abundance and distribution of selected species. The COP 11 decided that the term "progress indicator" be used, rather than "impact indicator", when referring to the indicators used to track progress in the implementation of the Convention. The previous set of impact indicators has followed a refining and mainstreaming process[7] since they were provisionally adopted[8] in 2009.

[4] Available at http://www.unccd.int/Lists/OfficialDocuments/cop11/cst2eng.pdf

[5] United Nations (2013). *Framework for the Development of Environment Statistics 2013* was endorsed by the Statistical Commission as the framework for strengthening environment statistics programmes in countries, is available at http://unstats.un.org/unsd/environment/fdes.htm. The FDES 2013 is a multi-purpose conceptual and statistical framework that is flexible, comprehensive and integrative in nature.

[6] Decision 22/COP 11, Annex 1, http://www.unccd.int/Lists/OfficialDocuments/cric11/4eng.pdf

[7] The refinement process of impact indicators was launched in 2010. The use of categories such as strategic objectives, indicators, metrics and proxies has evolved over time, and so have the thematic areas, indicators and metrics. In 2012, affected country Parties reported for the first time using two impact indicators: land cover status and poverty rate.

[8] The UNCCD impact indicators (2009) included: 1)Water availability per capita in affected areas; 2)Change in land use; 3) Proportion of the population in affected areas living above the poverty line; 4) Childhood malnutrition and/or food consumption/ calorie intake per capita in affected areas; 5) The human development Index; 6) Level of land degradation (including salinization, water and wind erosion, etc.); 7) Plant and animal biodiversity; 8) Aridity index; 9) Land cover status; 10) Carbon stocks above and below ground and 11) Land under Sustainable Land Management (SLM). Further proxies and metrics are provided in the documentation.

11. With respect to actual quantitative and qualitative data reporting on strategic objectives of the Strategy to the UNCCD, reports by Parties (including affected) and reporting agencies can be seen in the PRAIS[9] website. The main factors which have limited the effectiveness of reporting include both the limited data coverage and comparability of reported national data which have in general not been sufficient to obtain statistically representative results. The limited data comparability results from using different definitions, measurement and/or classification methods by reporting countries.

Data requirements, challenges and limitations

12. DLDD drivers include social and economic data most of which is available from national or international sources for affected countries. Environmental drivers will include physical characteristics such as land, ecosystem and biota characteristics and their changes over time. Environmental pressures encompass the occurrence of phenomena such as drought. Immediate and pervasive impacts in the environment such as degradation and desertification in particular are clearly identified, although they are more difficult to measure. Other social impacts including negatively affecting livelihoods, increasing hunger and malnutrition and poverty can also be found within the social statistics domain (either from national statistical system or international estimation). Finally, statistics about what the countries are doing to prevent and mitigate negative impacts of DLDD are to be informed upon.

13. In general, DLDD related state and impact data and statistics are scarce, scattered and not produced on a regular manner, particularly in the affected countries. There are insufficient statistics to inform about the extent and location of different types of degradation and desertification processes, as well as other environment topics (i.e. impact on biota, soil quality, agricultural practices, etc); at both the national and global level. Economic activity, health, demographic, poverty and other basic statistics are relatively more available in countries, but to be integrated with DLDD, spatial data need to be geo-referenced, which is not the case in least developed and developing affected countries. Lack of reliable, timely and regular statistics about the drylands severely obstructs production of indicators.

14. Concepts, definitions and classifications pertaining to DLDD issues vary historically and among countries, institutions, as well as across international agencies. The spatial extent of drylands remains uncertain due to variations in ecosystem sub-types, data variability and the different classes and thresholds applied to remotely sensed data, making global comparisons challenging[10]. Furthermore, UNEP[11] states that different methods of assessing land cover and use continue to yield very different results. The limited globally comparable data on land degradation – an essential information base for dryland nations to address the problem – date from the Global Assessment of Human Induced Soil Degradation (GLASOD) in 1990, although new estimates using satellite data are being developed.

15. For the vast majority of least developed and developing affected countries, the case is usually that none or very scarce datasets or statistics, particularly on the environmental aspects, have been produced in accordance to statistical procedures and international recommendations. If produced at all, information might be reduced to an estimation (of single variable, such as degradation extent, erosion extent or location of drylands) for a particular year, sourced in a scientific studies in their field, or from a specific DDLD related project, along with maps to guide the intervention.

16. Technically, if the primary data was produced regularly and in a geo-referenced manner, it would not be difficult to produce statistics and indicators informing about not only the areas affected, its status and trends, but also about their human populations, social and health situation, and the affected natural resources and livelihoods. In countries where the extent and location of the DDLD phenomena can be portrayed on cartographic or digital maps, other layers of key information can be superimposed (as long as they are geo-referenced) in order to show for example the number of

[9] The PRAIS portal (http://www.unccd-prais.com/) contains references to the glossary, concerning methodological matters and the reporting templates.
[10] Reynolds et al. 2007, cited by UNEP GEO 5, 2012, p.73.
[11] GEO-5, UNEP 2012. Chapter 8, Review of Data Needs, p.221

persons, the level of poverty, nutritional levels, mortality rates, life expectancy, agricultural activities and so on.

17. The occurrence of extreme events such as droughts and other similar and to a lesser degree the impact of such disasters might be recorded and constitute the administrative records for the production of statistics at the national level, but they can also be found within the international databases and sources (described in the Statistical Note for Climate Change and Disaster Risk Reduction).

18. The lack of statistics at the national level permeates to the regional and global levels. International organizations mostly rely on scientific studies and expert estimation to report on the main facts and indicators of the extent of drylands, degradation status and trends and desertification. UNCCD conducted a preliminary review of global data availability for the 6 progress indicators, a summary table can be found in annex 2.

19. There is no international database or statistical time series constructed with adequate statistical methods to inform in a harmonized and comparable way on the state and main trends of drylands and degradation. The availability is even less to inform about the impact of these phenomena on population, poverty/hunger, food security, migration, biodiversity, agriculture and livelihoods. Such insufficiency compromises the capacity of countries and agencies to populate and use indicators to inform the public and guide policy making.

20. One of the few databases available on the issue of land and soil statistics resides in FAOSTAT, under agri-environmental indicators[12]. It presents national, regional and global data on a number of key indicators, for instance carbon content, average soil erosion expressed in GLASOD erosion degree (degrees) by country in 1991, and average land degradation in GLASOD erosion degree (degrees) by country in 1991. These data sets are presented as statistics and as world maps that can be consulted and downloaded for further work.

21. The Global Land Degradation Assessment in Drylands (GLADA)[13] states that there is no authoritative measure of land degradation or its counterpoint – land improvement. The only harmonized assessment, the Global Assessment of Human-induced Soil Degradation is a map of perceptions on the type and degree of degradation. Dating from 1991, it is now out-of-date. There is pressing need for an up-to-date, quantitative and reproducible assessment to support policy development for food and water security, environmental integrity, and national strategies for economic development and resource conservation. In response GLADA was set to identify: 1) the status and trends of land degradation, 2) hotspots suffering extreme constraints or at severe risk and, also, areas where degradation has been arrested or reversed.

22. The Land Degradation Assessment in Drylands project[14] (LADA 2006-2010) was conceived upon a request by the UNCCD COP, with the purpose of creating the basis for informed policy advice on land degradation at global, national and local level, through the assessment of land degradation at different spatial and temporal scales and the creation of a baseline at global level for future monitoring. The LADA developed tools and methods to assess the baseline condition of land degradation at global and national scale. These assessments are integrated with and supplemented by detailed local assessments focusing on root cause analysis of land degradation and on local (traditional and adapted) technologies for sustainable land management. As global output, a global

[12] http://faostat3.fao.org/faostat-gateway/go/to/browse/E/*/E

[13] "land use change is driving land degradation: soil erosion, nutrient depletion, salinity, water scarcity, pollution, disruption of biological cycles, and loss of biodiversity. (…) Biomass is an integrated measure of biological productivity. Its deviance from the local norm may be taken as a measure of land degradation or improvement. Changes in biomass may be measured by remote sensing of the normalized difference vegetation index (…). Norms may be established by stratifying the land area according to climate, soils and terrain, and land use/vegetation; deviance may then be calculated regionally and combined globally to allow universal comparisons". GLADA http://www.isric.org/projects/land-degradation-assessment-drylands-glada

[14] http://www.fao.org/nr/lada/index.php?option=com_content&view=article&id=32&Itemid=113&lang=en

Land Use System (LUS) classification and mapping was developed; a global NDVI study (GLADA) was conducted led by the World Soil Information Centre (ISRIC). A Global Land Degradation Information System (GLADIS) was also developed with the collaboration of IIASA which maps a new set of pressures and threats indicators at global level and allows access to information at country, LUS and pixel levels.

23. With respect to world soil information, ISRIC[15] has a mandate to serve the international community with information about the world's soil resources to help addressing major global issues. ISRIC provides data and maps[16] on different aspects of soil based on current global availability**.** As a science based foundation, it operates in three priority areas: a) soil data and soil mapping; b) application of soil data in global development issues and c) training and education. It. ISRIC is the ICSU World Data Centre for Soils (WDC-Soils) since 1989 and it collaborates with a wide range of partners worldwide. The institute was founded in 1966 following a recommendation of the International Soil Science Society (ISSS) and United Nations Educational, Scientific and Cultural Organization (UNESCO). With respect to its database[17]**,** ISRIC is developing a centralized 'World Soil Database' or WOSIS***[18]***, were users can easily extract all validated and authorized data from the ISRIC data depository - soil profile data as well as area-class soil maps. Using a set of tools (Global Soil Information Facility, GSIF), it allows users to access, process and visualize various types of soil-related data. GSIF has been inspired by global environmental data initiatives such as Global Biodiversity Information Facilities, Global Land Cover mapping and One Geology.

24. The global land degradation information system GLADIS[19] from FAO can also be an information resource, although it is being subject to a peer review for improvement as stated in their website. The DIS[20] Database is an application developed by NRDin collaboration with the DESERTLINKS and LADA projects.

25. A new World Atlas of Desertification[21] (WAD) is being compiled under the coordination of the Joint Research Centre (JRC) of the European Commission, in partnership with the United Nations Environment Programme (UNEP). The WAD will be available as both a published reference atlas and an online digital information portal. The new World Atlas of Desertification will be built on recent scientific progress. It aims to be a pragmatic exercise and an example of how to implement up-to-date concepts and robust approaches for assessing and mapping land degradation and desertification.

Conclusions

26. Considerable work have been devoted to propose a set of a reduced number of implementation indicators by the UNCCD, including the consideration and adaptation of existing frameworks for the purpose of describing the DLDD dynamics which can serve as basis to also organize indicators and information for monitoring purposes.

27. Nevertheless, the underlying data and statistics to calculate potential DLDD indicators as well as technical capacities need to be developed in the affected countries. The underlying data needed to calculate some of the relevant indicators in these cross cutting issues spread over a large proportion of the domain of environment, social and economic statistics. The inexistence or insufficiency of statistics on the extent and location of drylands, degradation and desertification, as well as other environment statistics, at both the national and global level is preoccupying. Economic activity, health, demographic, poverty and other basic statistics are relatively more available in countries, but to be integrated with DLDD spatial data they need to be geo-referenced. These elements would

[15] http://www.isric.org/
[16] http://www.isric.org/data/data-download
[17] http://www.isric.org/content/data
[18] http://www.isric.org/data/wosis
[19] http://www.fao.org/nr/lada/index.php?option=com_content&view=article&id=185&Itemid=168&lang=en
[20] http://dis-nrd.uniss.it/
[21] http://wad.jrc.ec.europa.eu/

greatly benefit the construction of key statistics, indicators and maps for the affected areas of the countries and therefore would increase monitoring potential for the goals and targets of the SDGs on DLDD.

28. The SEEA Central Framework and Experimental Ecosystem Accounts provide the tool to bring together and integrate environmental and economic data for the production of more robust and consistent indicators.

Preparation of note:

This note was prepared by UNSD with contribution by the UNCCD Secretariat.

Progress indicators for strategic objectives 1, 2 and 3

Indicator	*Metrics/Proxies*	*Description*	*Potential data source/Reference methodology*
Strategic objective 1: To improve the living conditions of affected populations			
Trends in population living below the relative poverty line and/or income inequality in affected areas	**Poverty severity (or squared poverty gap)** *or*	Takes account of both the distance separating the poor from the poverty line and the inequality among the poor	World Bank methodology[a, b]
	Income inequality	Alternative to the poverty severity metric for those countries where poverty is no longer an issue; strategic objective 1 has in this sense already been reached	OECD* methodology[c]
Trends in access to safe drinking water in affected areas	**Proportion of population using an improved drinking water source**	An improved drinking water source is defined as one that is protected from outside contamination through household connection, public standpipe, borehole, protected dug well, protected spring, rainwater, etc.	WHO/UNICEF* Joint Monitoring Programme for Water Supply and Sanitation methodology[d]
Strategic objective 2: To improve the condition of ecosystems			
Trends in land cover	**Vegetative land cover**	Intended as the distribution of land cover types of greatest concern for land degradation (excluding artificial surfaces) by characterizing vegetative land cover; it should include and specify natural habitat classes	Sourced from products like GlobCover[e, f] or finer-resolution products under development (Gong et al., 2013); and following established land cover classifications (e.g. FAO/ UNEP LCCS*[g])
Trends in land productivity or functioning of the land	**Land productivity dynamics**	Based on long-term fluctuations and current efficiency levels of phenology and productivity factors affecting standing biomass conditions	New World Atlas of Desertification methodology;[h] update foreseen every five years
Strategic objective 3: To generate global benefits through effective implementation of the UNCCD			
Trends in carbon stocks above and below ground	**Soil organic carbon stock** *to be replaced by*	Intended as the status of topsoil and subsoil organic carbon	Sourced from e.g. the GTOS* portal[i]

Indicator	*Metrics/Proxies*	*Description*	*Potential data source/Reference methodology*
	Total terrestrial system carbon stock *once operational*	Including above- and below-ground carbon	To be streamlined with the GEF*-financed UNEP* Carbon Benefits Project[j,k]
Trends in abundance and distribution of selected species *(potentially to be replaced by an indicator measuring trends in ecosystem functional diversity once system understanding and data production allows)*	**Global Wild Bird Index**	Measures average population trends of a suite of representative wild birds, as an indicator of the general health of the wider environment	Following the indicator guidance provided for and to be streamlined with the CBD* process[l, m]

*Abbreviations:
CBD - Convention on Biological Diversity
FAO - Food and Agriculture Organization of the United Nations
GEF - Global Environment Facility
GTOS - Global Terrestrial Observing System
LCCS - Land Cover Classification System
OECD - Organisation for Economic Co-operation and Development
UNEP - United Nations Environment Programme
UNICEF - United Nations Children's Fund
WHO - World Health Organization

[a] <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20242881~isCURL:Y~menuPK:492130~pagePK:148956~piPK:216618~theSitePK:430367,00.html>.

[b] <http://siteresources.worldbank.org/INTPA/Resources/tn_measuring_poverty_over_time.pdf>.

[c] <http://www.oecd.org/els/soc/43540354.pdf>.

[d] <http://www.wssinfo.org/>.

[e] <http://due.esrin.esa.int/globcover/>.

[f] <http://www.gofcgold.wur.nl/sites/gofcgold_refdataportal.php>.

[g] <http://www.fao.org/docrep/003/X0596E/X0596e00.htm>.

[h] <http://wad.jrc.ec.europa.eu/>.

[i] <http://www.fao.org/gtos/tcoDAT.html>.

[j] <http://carbonbenefitsproject-compa.colostate.edu/>.

[k] <http://www.unep.org/climatechange/carbon-benefits/Home/tabid/3502/Default.aspx>.

[l] <http://www.unep-wcmc.org/wild-bird-index_568.html>.

[m] <http://www.bipindicators.net/WBI>.

Source: Decision 22/COP.11

Annex 2 – Evaluation of the progress indicators approved at COP 11 (source: UNCCD)

SO	Indicator and suggested metrics	Data availability	Time-bound	Reliability	Relevance	Main data sources	Comments
SO 1	**Trends in population living below the relative poverty line and/or income inequality in affected areas** Metric: Poverty severity (or squared poverty gap)	Census data are available for 117 countries National level (rural)	1977-2012 (avail. per country varies) Can detect changes every 4-5 years	MDG indicator	Poverty is a key characteristic of livelihood deprivation and is both a cause and a consequence of DLDD. It can signal progress towards both national and international development priorities.	2013 World Development Indicators (WDI) – the Wold Bank http://wdi.worldbank.org/table/	Availability, frequency, and quality of poverty monitoring data remain low. However, it is essential to keep poverty among the mandatory indicators in order to ensure meaningfulness of reporting. Efforts should be done to provide countries with estimates to be used for reporting at least at the national and rural level. The World Bank is now using a new metric called "shared prosperity" that focuses on the incomes of the less well-off and that could replace the two proposed metrics (poverty severity and inequality) being suitable also for countries where poverty is no longer an issue. Explore the possibility to use it.
	Metric: Income inequality	35 countries through OECD (up to 155 countries through WDI)	1983-2011 (avail. per country varies) Can detect changes every 4-5 years	OECD indicator	Alternative for countries where poverty is no longer an issue. Income distribution has a long-standing tradition among household-level statistics, with regular data collections going back to the 1980s in many OECD countries	OECD http://www.oecd.org/statistics/ 2013 World Development Indicators (WDI) – the Wold Bank http://wdi.worldbank.org/table/	
SO 1	**Trends in access to safe drinking water in affected areas** Metric: Proportion of	About 200 countries National level (rural)	1990-2011 Regularly updated Can detect changes every 4-5	MDG indicator	It measures changes in access to water sources for the population. It is an important measure of human well-being particularly in drylands. It can be used to assess the	WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation http://www.wssinfo.org/data-estimates/introduction/	Data are available at the national and rural level only, but the indicator is relevant, reliable and regularly updated. To be considered mandatory for reporting against SO1.

	population using an improved drinking water source		years		impacts of DLDD and mitigation efforts on water resources.		
SO 2	**Trends in land cover** Metric: Vegetative land cover	Global products available with 300m – 1km resolution	2000 GLC2000 2005 & 2009 GlobCover Can detect changes every 4-5 years	Essential Climate Variable under UNFCCC	Land cover is a basic information requirement for the management of natural resources and it is essential to derive land productivity estimates. Analysing trends in land cover can help to identify changes in land resources and assist decision-making for sustainable land management.	GlobCover – ESA http://due.esrin.esa.int/globcover/ Global Land Cover 2000 (GLC2000) database – JRC http://bioval.jrc.ec.europa.eu/products/glc2000/products.php	Global products are available at a resolution suitable to derive national estimates. A baseline assessment should be possible. There is a need to confirm with ESA whether an update of GlobCover is foreseen to enable trend analysis. To be considered mandatory for reporting against SO2.
SO 2	**Trends in land productivity or functioning of the land** Metric: Land productivity dynamics	Global product under development with 8km resolution. (Also regional studies at 1km and below)	Baseline assessment under development. Update every 5 years. Can detect changes every 4-5 years.	New World Atlas of Desertification	A decline in land-productivity can be a first indication of on-going land degradation processes. Crossing the above analysis with socio-economic and other physical data unequivocally identifies where and why land-productivity is changing and where threats are greatest.	JRC – WAD http://wad.jrc.ec.europa.eu/	Global and regional products (at higher resolution) are under development and should be ready in time for use in the next reporting cycle. A baseline assessment should be possible. Updates are then foreseen every 5 years, thus making possible a trend analysis. To be considered mandatory for reporting against SO2.
SO 3	**Trends in carbon stocks above and below ground** Metric:	Global soil map units with 1km and 9 km	Can detect changes every 4-5 years.	LULUCF – UNFCCC GEF	Soil organic carbon (SOC) is a key element of healthy soils to deliver ecosystem services and a	Harmonized World Soil Database http://webarchive.iiasa.ac.at/Research/LUC/External	Information available at global level can be used to derive a baseline. Updated information on SOC is increasingly expected as a

	Soil organic carbon stock *(to be replaced by* *T*otal terrestrial system carbon stock *once operational)*	resolution linked to organic carbon database		Project on Global Carbon Benefits ITPS	very important component of the carbon cycle. Positive trend in SOC reflects good management practices in term of combating land degradation and mitigating and adapting to climate change	-World-soil-database/HTML/ ISRIC Global Soil Information Facilities http://www.isric.org/projects/global-soil-information-facilities-gsif JRC http://eusoils.jrc.ec.europa.eu/ESDB_Archive/octop/Global.html	result of LULUCF national gas emission inventories under the UNFCCC, the GEF Project on Global Carbon Benefits and activities under Pillar 4 of the Intergovernmental Technical Panel on Soils which will produce a fine-resolution global grid of soil properties by 2015. To be considered as mandatory for reporting against SO3
SO 3	**Trends in abundance and distribution of selected species** Metric: Global Wild Bird Index	Data available for only 18 European countries (plus regional data for North America and Europe)	Time series from 1968 and 1980 onwards	CBD indicator	Measures average population trends of a suite of representative wild birds, as an indicator of the general health of the wider environment.	Biodiversity Indicator Partnership http://www.bipindicators.net/WBI	Not yet ready for reporting purposes. Reporting should be optional unless a more suitable metric is identified in collaboration with the CBD.