Open Working Group on Sustainable Development Goals (OWG)

Statistical Note for the Issue Brief on:

Biodiversity

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Main policy issues, potential goals and targets

1. Biodiversity is defined as the variability among living things and the ecosystems they inhabit, and has three levels: genes, species and ecosystems. Ecosystems are defined as 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit'. [1]

2. Biodiversity benefits people through its contribution to material welfare and livelihoods as well as security, resilience, social relations, health, and freedom of choices and actions.[2] The most important direct drivers of biodiversity loss are habitat loss, land use change, the physical modification or pollution of waterways and marine ecosystems, invasive alien species overexploitation and climate change. [2]

3. Operating in parallel to the Millennium Development Goals (MDGs), the Convention on Biological Diversity (CBD) has established environmental targets and indicators.[3] These targets and indicators are grouped under the Biodiversity Indicators Partnership (BIP) initiative. The BIP is 'a global initiative to promote and coordinate development and delivery of biodiversity indicators in support of the CBD, Multilateral Environmental Agreements (MEA), Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES), national and regional governments and a range of other sectors'.[4] The BIP coordinates over 40 organisations working internationally on indicator development in order to provide comprehensive information on biodiversity for UN organisations and affiliated groups.

4. The biodiversity data brought together under BIP are the primary mechanism for monitoring progress towards the Strategic Plan for Biodiversity 2011-2020 and the 20 Aichi Biodiversity Targets.[5]

Conceptual and methodological tools

5. The BIP utilises a range of methods to collect and compile the data needed to measure progress against targets identified in the Strategic Plan for Biodiversity 2011-2020 and the 20 Aichi Biodiversity Targets. A range of concepts and methodologies are used.

6. Some of the methodologies used for collecting the data for the BIP, and biodiversity indicators more generally include:

    1. Personal interviews (for the 'biodiversity awareness' indicator).

    2. Trade monitoring (such as the 'status of species in trade' indicator).

    3. Species surveys (e.g. using transects, plots, traps, camera 'traps') to determine the occurrence of species for examining population trends (e.g. wildlife picture index indicator).

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[1] Convention on Biological Diversity, 2003 http://www.cbd.int/convention/articles/default.shtml?a=cbd-02
[2] Millennium Ecosystem Assessment – Biodiversity Synthesis. World Resources Institute, Washington, DC. http://www.unep.org/maweb/documents/document.354.aspx.pdf
[3] Pisupati, B. and Rubian, R. (2008) *MDG on Reducing Biodiversity Loss and the CBD's 2010 Target*, United Nations University – Institute of Advanced Studies Report, UNU-IAS, Japan.
[4] http://www.bipindicators.net/about
[5] Strategic Plan for Biodiversity 2011-20, including Aichi Biodiversity Targets https://www.cbd.int/sp/

4. Measurement of land cover or habitats via remote sensing and on-ground field survey (such as for the 'extent of forest types' indicator), including change over time and condition.

5. Measurement of impacts of pollution on marine biodiversity (such as the 'cumulative human impacts on marine ecosystems' indicator).

6. Use of land (e.g. national parks, agriculture, forestry, etc.) from administrative data or from farm surveys.

7. The concepts and definitions are outlined in the supporting documentation. Key definitions and classifications used are the IUNC Red List categories and protected area classification.

8. The System of Environmental-Economic Accounting (SEEA) Central Framework adopted as international statistical standard by the United Nations Statistical Commission in 2012[6] and the SEEA Experimental Ecosystem Accounting welcomed by the Statistical Commission as "an important first step in the development of a statistical framework for ecosystem accounting"[7], represent important statistical frameworks to support the measurement of a wide range on indicators including many BIP indicators and to integrate biodiversity with social and economic data. Efforts are under way to align the BIP indicators with SEEA definitions and classifications.

9. The Framework for the Development of Environment Statistics and its Basic and Core Sets of Environment Statistics, adopted by the Statistical Commission as the framework to strengthen environment statistics programmes in countries provide an organizational structure and a minimum set of statistics to measure biodiversity[8].

Existing and new indicators

10. The relevant MDG is Goal 7 Ensure environmental sustainability. There is no specific indicator directly linked to biodiversity. Existing indicators related to biodiversity are:

    7.1 Proportion of land area covered by forest.

    7.6 Proportion of terrestrial and marine areas protected.

    7.7 Proportion of species threatened with extinction.

11. Another MDG closely related to biodiversity is:

    7.4 Proportion of fish stocks within safe biological limits.

12. The BIP was established after the development of the MDGs and associated indicators. Most of the proposed indicators in BIP are now operational to some extent. Two of the indicators from BIP are being used to monitor progress towards the MDG environmental sustainability targets. These are:

    1. The coverage of protected areas (developed by UNEP-WCMC); and

    2. The Red List Index (developed by IUCN, BirdLife International, and the Zoological Society of London).[9]

13. The FDES and the SEEA do not propose any indicators, but the use of the SEEA-EEA would enable biodiversity measures to be compared with a range of environmental and economic data. What these might be would need to be the focus of a dialogue between biodiversity specialists and environmental accountants, among others. Dialogue is underway to bring together the two communities.

Data requirements, challenges and limitations

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[6] Statistical Commission – Report on the forty-third session (28 February-2 March 2012)
[7] Statistical Commission – Report on the forty-forth session (26 February-1 March 2013)
http://unstats.un.org/unsd/statcom/doc13/2013-Report-E.pdf
[8] http://unstats.un.org/unsd/statcom/doc13/BG-FDES-Environment.pdf
[9] BIP Indicators for the post-2015 Development Agenda
http://www.bipindicators.net/news/bipindicatorsforpost2015sdgoals

14. The BIP currently provides data on 17 of the 20 Aichi Biodiversity Targets. The BIP aims to have complete coverage of all 20 targets. The timing of this will depend upon future partnerships and funding.

15. The take-up of BIP indicators varies by country according to the indicator in question. Indicators derived from satellite imagery (such as for the 'nitrogen deposition' indicator) provide global coverage. For other indicators, coverage is restricted to a handful of countries (such as for the 'area of agricultural systems under sustainable management' indicator).

16. Likewise, the availability as well as temporal and spatial extent of data varies according to the indicator. This ranges from total coverage of spatial extent and full availability (for example, again from satellite imagery) through to more limited spatial coverage, extent and restricted availability (for example, measuring trends from scientific bird surveys for North America and Europe only). For most of the indicators, there are many countries with several years of data and good spatial coverage.

17. As with any dataset, there are statistical limitations and the data within the BIP is no exception. The data is supplied to the BIP by international organisations who obtain information from national sources. For most indicators the data can usually be disaggregated. Information on data quality and measures of uncertainty are available and a preliminary inspection indicates the data are fit-for-purpose (i.e. measure broad scale trends).

18. The issue of data quality and its description are perhaps best illustrated by example. There are the identified sources of uncertainty associated with the IUCN Red List Index values and trends.[10] Briefly, the Red List Index contain uncertainties associated with:

   (i) the inadequate, incomplete or inaccurate knowledge of a species' status;

   (ii) delays in the knowledge about a species becoming available for assessment;

   (iii) inconsistency between species assessments; and

   (iv) species that are too poorly known for Red List Criteria to be applied are assigned to the Data Deficient category and excluded from the calculation of the Red List Index.

19. The main limitations outlined for the IUCN Red List Index relates to the relatively broad measures of status and available resources to allow the Index to be updated once every four years; that it only captures one aspect of biodiversity; and that it doesn't capture the potentially deteriorating status of common species.

20. Some data sources support a range of biodiversity indicators. These include data provided by UN-affiliated organisations, such as the UNEP (WCMC) and FAO; by IUCN-affiliated organisations and by the Red List; WWF; BirdLife International and universities. For a more developed list of data sources which contributed to the biodiversity indicators coordinated by the BIP, please refer to the BIP website.[11]

21. The SEEA and the SEEA-EEA have the potential to provide a broader set of indicators showing how the status of biodiversity affects the social and economic systems as well as the reverse (how social and economic systems affect biodiversity). The possibility of developing a global baseline for a few biodiversity indicators is currently being explored.

Conclusion

22. The BIP is a CBD-mandated organisation for addressing the Aichi Biodiversity Targets. It brings together over forty relevant, international organisations working on various aspects of biodiversity. Given the data sources provided for each indicator, along with information on uncertainties, the BIP indicators appear to be as robust as possible. It should be noted that the BIP does not exert influence over the data that it collects, or dictate the methodology used by contributing organisations.

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[10] Indicators for Monitoring the MDG – definitions, rationale, concepts and sources – 7.7 Proportion of species threatened with extinction. http://mdgs.un.org/unsd/mi/wiki/7-7-Proportion-of-species-threatened-with-extinction.ashx
[11] BIP Indicators http://www.bipindicators.net/indicators.

23. While the BIP is currently the best source of information on biodiversity there is little integration of biodiversity with economic data. The SEEA provides a way forward in this regard in particular the development of a baseline for biodiversity for 2015 based on modeling combined with data collected by countries provides a promising approach for globally comparable measures of biodiversity across countries to monitor ecosystem trends and condition.

Preparation of note

This note was prepared by the Australian Bureau of Statistics, Centre of Environment Statistics and edited by UNSD.

Appendix: Table comparing existing biodiversity indicators and sources

	Description		Data sources
Aichi Biodiversity Targets	Targets	Indicators	
Strategic Goal A: Addressing the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	**Target 1:** By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably. **Target 2:** By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems. **Target 3:** By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimise or avoid negative impacts, and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio economic conditions. **Target 4:** By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.	1.Biodiversity Barometer 2.Ecological Footprint 3.Status of species in trade 4.Wild Commodities Index	1.Union for Ethical Biotrade 2.The Global Footprint Network 3.CITES/IUCN 4.UNEP-WCMC/SSC;Traffic, WWF, ZSL
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use	**Target 5:** By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced. **Target 6:** By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits. **Target 7:** By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity. **Target 8:** By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity. **Target 9:** By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated, and measures are in place to manage pathways to prevent their introduction and establishment. **Target 10:** By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	1.Red List Index 2.Extent of forests and forest types 3.Extent of marine habitats 4.Living Planet Index 5.Wild Bird Index 6.Area of forest under sustainable management: degradation and deforestation 7.Forest fragmentation 8.River fragmentation and flow regulation 9.Wildlife Picture Index 10. Wild Commodities Index 11.Marine trophic Index 12.Proportion of fish stocks in safe biological limits 13.Number of MCS certified fisheries 14.Area of forest under sustainable management: certification 15.Area of agricultural systems under sustainable management 16.Water Quality Index for biodiversity 17.Nitrogen deposition 18.Loss of reactive nitrogen to the environment 19.Trends in invasive alien species 20.Ocean Health Index 21.Cumulative human impacts on marine ecosystems	1.IUCN Red List 2.FAO 3.FAO/scientific data 4.WWF/ZSL 5.BirdLife International/RSPB 6.FAO 7.(In development – UNEP-WCMC) 8.TNC/ Umea University 9.TEAM network 10. UNEP-WCMC/ SSC; Traffic, WWF, ZSL 11.Sea Around Us Project 12.FAO 13.MSC 14.FSC 15.FAO 16.GEMS Water 17.INI 18.INI/Nitrogen Footprint 19.BirdLife International/ IUCN/ ISSG/ Monash University 20.NCEAS/ CMAP 21. NCEAS/ CMAP
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	**Target 11:** By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes. **Target 12:** By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained. **Target 13:** By 2020, the genetic diversity of cultivated plants and	1.Management effectiveness of protected areas 2.Coverage of protected areas 3.Protected area overlays with biodiversity 4.Red List Index 5.Living Planet Index 6.Wild Bird Index 7.Wildlife Picture Index 8.Ex-situ crop collections 9.Genetic diversity of terrestrial	1.UNEP-WCMC/University of Qld 2. UNEP-WCMC 3. UNEP-WCMC 4.IUCN Red List 5.WWF/ZSL 6.BirdLife International/RSPB 7.TEAM network 8.FAO

	farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.	domesticated animals	9.FAO
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services	**Target 14:** By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities, and the poor and vulnerable. **Target 15:** By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15 per cent of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification. **Target 16:** By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.	1.Red List Index 2.Biodiversity for food and medicine 3.Health and wellbeing of communities directly dependant on ecosystem goods and services 4.Nutrition indicators for biodiversity 5.Ratification status of the Nagoya Protocol	1. IUCN Red List 2.Traffic 3. UNEP-WCMC 4.FAO 5.CBD
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building	**Target 17:** By 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan. **Target 18:** By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels. **Target 19:** By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied. **Target 20:** By 2020, at the latest, the mobilisation of financial resources for effectively implementing the SP for B 2011-2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilisation, should increase substantially from the current levels.	1.Status of NBSAPS 2.Status and trends of linguistic diversity and numbers of speakers of indigenous languages 3.Index of Linguistic Diversity 4.VITEK 5.Number of maintained species inventories being used to implement the CBD 6.Official development assistance in support of the Convention	1.CBD 2.(In development – UNESCO) 3.Terralingua 4.(In development – Terralingua) 5.(In development) 6.UNEP-WCMC/OECD
MDG	Targets	Indicators	
Goal 7: Ensure environmental sustainability	Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.1 Proportion of land area covered forest 7.2 CO_2 emissions, total, per capita and per $1 GDP (PPP) 7.3 Consumption of ozone-depleting substances 7.4 Proportion of fish stocks within safe biological limits 7.5 Proportion of total water resources used 7.6 Proportion of terrestrial and marine areas protected 7.7 Proportion of species threatened with extinction	7.1 FAO 7.2 UNFCC/CDIAC 7.3 UNEP 7.4 FAO 7.5 FAO/UN Water 7.6 UNEP-WCMC 7.7 UNEP-WCMC
	Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8 Proportion of population using an improved drinking water source 7.9 Proportion of population using an improved sanitation facility	7.8 UNICEF/WHO 7.9 UNICEF/WHO
	Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	7.10 Proportion of urban population living in slums	7.10 UN-HABITAT