Biodiversity in the post-2015 development agenda and Sustainable Development Goals (SDGs): Ecosystem goods and services for human well being

- Background paper for the Trondheim Conference -

Outline

I. Starting point: Biodiversity in the post-2015 development agenda

A. Mandate

Eleventh meeting of the Conference of the Parties to the Convention on Biological Diversity

The Conference of the Parties (COP) to the Convention on Biological Diversity (CBD), noting the intergovernmental process on sustainable development goals, which is open to all stakeholders, established in the outcome document of the Rio+20 Conference in the context of the United Nations development agenda beyond 2015, and stressing the importance of integrating biodiversity into these processes, noting the relevance of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets (Decision XI/22, preamble), encouraged Parties and all partners, institutions, organizations and processes concerned to consider the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets in developing the post-2015 development agenda and in the process of establishing sustainable development goals under the United Nations General Assembly (Decision XI/22, paragraph 7), and requested the Executive Secretary to collaborate with the United Nations Department of Economic and Social Affairs, the secretariats of the Rio conventions and other multilateral environment agreements, and international organizations and specialized agencies involved in poverty eradication, human health, food security and gender issues, in the process of developing Sustainable Development Goals (SDGs) (Decision XI/22, paragraph 11 (c)).

Rio+20

Rio+20 reinstated as the overarching objectives and essential requirements for sustainable development:

- Poverty eradication;

- Changing unsustainable and promoting sustainable patterns of consumption and production;

- Protecting and managing the natural resource base of economic and social development;

- Promoting sustained, inclusive and equitable economic growth, social development, and environment protection;

- Strengthening international cooperation (United Nations, 2012a).

Rio+20 also reaffirmed the critical role of biodiversity and ecosystem services for sustainability and human well-being. The conference highlighted that the severity of global loss of biodiversity was undermining global development by affecting food security and nutrition, provision of and access to water as well as human health.

The Rio+20 outcome document, The Future We Want, essentially reaffirmed past global commitments on sustainable development, including on biodiversity conservation and

sustainable use. The conference called on the international community to tackle implementation gaps causing destruction of ecosystems, growing inequalities and unsustainable economic growth. In an effort to facilitate the achievement of sustainable development, the conference called for global SDGs building on the Millennium Development Goals experience (United Nations, 2012a).

B. Current consideration of biodiversity in the ongoing processes for the post-2015 development agenda

Description of ongoing processes

Work to develop the post-2015 development agenda is ongoing in several processes and activities within the UN system (UNTT, 2013). Many of these processes are mandated to produce reports as their outputs. The processes include the discussions and consultations on the post-2015 development agenda, working on a follow-up to the Millennium Development Goals (MDGs), and the process to develop the Sustainable Development Goals (SDGs). Both informal and formal processes shape the emerging post-2015 development agenda.

The Secretary-General (SG) has established a UN System Task Team (UNTT; co-chaired by UN Department of Economic and Social Affairs and United Nations Development Programme) to support system-wide preparations. The UNTT comprises some 60 UN agencies, engaged in providing analytical thinking and substantive inputs, including the Secretariat of the Convention on Biological Diversity and UNEP, which is developing a conceptual framework and approach for embedding environmental sustainability into SDGs. The SG has also appointed a High-level Panel of Eminent Persons on the Post-2015 Development Agenda (HLP) tasked to report their recommendations in May 2013. As requested by Rio+20, the Open Working Group of the United Nations General Assembly on Sustainable Development Goals was established to submit a report to the 68th session of the United Nations General Assembly to be held in September 2013, containing a proposal for SDGs for consideration and appropriate action. (UNTT, 2012)

In addition, the processes shaping the post-2015 development agenda are informed by several converging streams of work, including the expert committee on a sustainable development financing strategy reporting to the SG in September 2014 and the work of the Interagency Expert Group on MDGs.

Furthermore, national consultations and global thematic consultations on eleven development themes were launched. The United Nations is supporting a process of national consultations in more than 55 countries. A number of civil society organizations are engaged in global coalitions such as the Independent Research Forum (IRF2015) (UNTT, 2012; UNDG, 2013).

Each of these processes provides opportunities for the biodiversity community to actively engage in these discussions, in particular those at the national level.

Assumptions with regard to the form of outcome of the ongoing processes for a post-2015 development agenda

It is expected that the two processes, the process working on a follow-up to the MDGs, and the process to develop the SDGs, will merge and result in a common set of goals (UNOWG, 2013; HLP, 2013).

The Rio+20 outcome document underscored that the SDGs should be action-oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries while taking into account different national realities, capacities and levels of development and respecting national policies and priorities (United Nations, 2012a). This leads to the assumption that there will be around six SDGs in total.

While the outcome of the SDG process cannot be prejudged at the moment, the SDGs are expected to be hierarchically structured. Global goals may be underpinned by targets and timelines as well as a core set of measurable indicators, as outlined in paragraph 250 of the Rio+20 outcome document. The goals and targets would allow for their adaptation to national and sub-national circumstances (TST, 2013). The MDG process has shown that while broad goals are a good way to express a common vision and aspirations, specific time-bound targets and meaningful indicators of progress enable their implementation through the development of policies, institutional action and investment. Successful implementation also requires transparent measurement and performing data systems (UNDP, 2006; HLP, 2013).

While the SDGs are expected to be framed by a vision of the world in 20 to 30 years (TST, 2013), for targets and indicators, a 10 to 15 year timeframe is expected. For the purposes of this paper, 2030 is assumed as end date for the targets.

Relevant experience from the Millennium Development Goals

The turn of the century Millennium declaration and its framework of eight global goals and 18 targets (21 targets since 2007) – the MDGs – focused on ending extreme poverty and hunger, ensuring health and education for all as well as ensuring environmental sustainability and international cooperation. The Rio+20 conference stated that the development of the SDGs "should not divert focus or effort from the achievement of the MDGs" (UN, 2012). Therefore, the development of the SDGs will build on the MDGs and the experience gained during their development and implementation.

For the overall structure of the SDGs in general

Many have argued that the MDGs did not capture the full breadth of the issues addressed in their broader framework, the Millennium declaration, such as governance, peace and security, equality and demographic change. Also, the MDGs include environmental sustainability only on a minimal level (UNDG 2010, 2013; Vandemoortele, 2012). Therefore, the SDGs should address the broader underlying issues enabling sustainable development.

Furthermore, the MDGs were frequently criticized as oversimplifying political or complex issues. For example, framing hunger in the MDGs rather than the more specific concepts of food security and nutrition is seen to have hindered tackling the problem universally and at its roots (UNDG, 2013). The SDGs should therefore frame issues at the most effective level of precision.

In addition, the MDGs were criticized for not capturing the links which exist between the issues covered by different goals. However, progress in each MDG contributes to progress in the other goals. The SDGs should therefore reflect interlinkages between goals more clearly (UNDP, 2006; UNDG, 2010).

MDG success is founded on national actions and dependent on country level achievements, in both developed and developing countries, respecting common but differentiated responsibilities and respective capabilities (UNDP, 2006). In particular, progress with some MDGs and other development experiences show that effective national policies strengthen civil society and governance in general; mainstream environmental considerations into the development framework and use instruments that attribute a monetary value on the environment to provide incentives for effective environmental management (UNDG, 2010).

For biodiversity-related SDGs specifically

The very fact that an environmental sustainability goal was part of a global development framework has helped to bridge the environment and development divide. For example, fora concerned with the effectiveness of development aid addressed all dimensions covered by the MDGs, interdisciplinary interagency-working groups were established and a large majority of countries have integrated MDG 7 in their national development plans and strategies (UNDP 2006; UNDG 2010).

The MDG process, through country-level assessments, has helped to foster the recognition of the value of ecosystems to development. Country level assessments of ecosystem services value to national budget helped make the case on investments in environmental sustainability.

However, while there has been good progress on goals of reversing extreme poverty, ensuring access to drinking water, primary education with parity between girls and boys, reducing global malaria deaths and spread of tuberculosis, as well as ensuring access to HIV aids treatment, the goal of reversing the trend in loss of biodiversity by 2010 was not met. The annually issued global MDG report tracking world-wide progress towards the MDGs points out that biodiversity is still being lost, even as more areas of the earth's surface are protected (United Nations, 2012b). While this conclusion is no surprise to the biodiversity community that understands that a broader action base addressing threats and drivers of biodiversity is required to fulfill MDG 7, it can leave policymakers perplexed. The global MDG report further carries the message that most important sites for species conservation remain unprotected, a substantial proportion of species are threatened, the status of many more species is deteriorating; overexploitation of marine species has reached a new peak of over 30%. Only the indicators on protected areas, the

reduction of ozone-depleting substances and access to water showed success in the MDG framework (UNDG, 2010). Therefore, it could be argued that a universal goal or target of the SDGs addressing the loss of biodiversity and the depletion of ecosystems and the goods and services they provide is urgently needed.

Furthermore, in the MDG discussion, the biodiversity target has very often been understood by the development community and others as a proxy for environmental sustainability. It went largely unrecognized in the MDG process that biodiversity and the ecosystem goods and services it underpins are critical to each of the issues which the MDGs aim to address (UNDP, 2006; UNDG, 2010), including ending poverty, hunger and disease, and improving the health of children and mothers (CBD 2009), as will also be elaborated in more detail in the next chapter. The development of the SDGs should therefore consider the relevance of biodiversity and ecosystem services for each single goal and target and ensure the inclusion of relevant elements.

It was also found that gaps with regard to measurement, monitoring, and data systems exist, which hinder progress on MDG 7. These gaps were only partially addressed in the MDG process and related actions (UNDP, 2006; Ghanimé, 2013).

For example, early in the MDG process, only the protected area database was available as global data set to track progress on the biodiversity target. The indicator on protected areas was a compromise as it represents tracking efforts on a policy response that does not directly measure progress on biodiversity loss. However, in country level reporting, the protected areas indicator —number and area covered by—is the global indicator most often adopted and adapted in country tailoring of targets (UNDP, 2006). Protected areas is also one of the only two indicators of biodiversity that have made their way into some progressive accounting of natural capital in wealth; the other being non-timber forest products (World Bank, 2006). No biodiversity indicators have so far been used to track progress on any of the development goals be it the reduction of extreme poverty and hunger (MDG 1); or the reduction of child mortality (MDG 4).

In 2007, the proportion of species threatened with extinction, derived from the changes in the IUCN red list index and the living planet index of WWF, was added to the MDG framework. No other global biodiversity indicator was up to par in communicating how the world is doing in maintaining or restoring biodiversity. It was found that the set of indicators for tracking and communicating progress on environmental sustainability is an imperfect match between the commitments adopted under key global environmental conventions and incomplete international data sets (UNDP, 2006). The SDG process needs to address these gaps and develop and incorporate appropriate indicators.

Consideration of biodiversity in the ongoing discussions

Overall considerations which will also benefit biodiversity

There is widespread appetite for fundamental and transformative change in the ongoing UN-led consultations and processes on the post-2015 development agenda. “Transformative change” in existing production and consumption processes, management of natural resources and mechanisms of governance is seen as a precondition to achieve inclusive, people-centered, sustainable global development. Transformative change is understood to require a broad approach to development, based on social justice, structural transformation, economic diversification and growth (UNTT, 2012).

The Rio+20 process and follow up discussions noted repeatedly that the predominant economic model of consumption, compounding pressures on environmental thresholds, is not sustainable. Therefore, a renewed green, human and sustainable economy is called for which maintains the planet’s resources, in order to achieve sustainable and more equitable economic prosperity. This approach envisages change integrating fundamental principles of human rights, equality and core dimensions of inclusive social development, environmental sustainability, inclusive economic development and peace and security (UNTT, 2012). There are also calls for broader ways to frame environmental sustainability such as notions on natural capital, ecosystem services, ecological footprint, and planetary boundaries which cut across sectors (UNDG, 2013).

In this context, a number of voices suggest that measures of GDP are not giving an adequate portrait of societal prosperity and well-being. Some forward thinking advances in measuring human progress differently reflect people’s perceptions of well-being (Stiglitz, Sen, Fitoussi, 2009 and TST, 2013).

The vision of the HLP, to end extreme poverty in all its forms in the context of sustainable development, therefore follows a more inclusive approach. The eradication of poverty and environmental sustainability are regarded as two sides of the same coin (TST, 2013). The prevailing view is supportive of a converging development agenda for maintaining health of the planet and pursuing a development servicing people’s lives.

Specific consideration of biodiversity

Environmental damage and natural resource scarcity in particular are more than ever recognized as threatening people’s health and livelihoods. Therefore, participants in the ongoing consultations call for actions on the environmental impacts that they can see and feel. The HLP highlights protection of the global environment as one of the four key areas on which progress is needed to achieve this vision: Biodiversity appears to be persistently perceived in this context of conservation. There is little direct reference to biodiversity and the convention’s strategic plan, but many references to the dimensions or components of biodiversity and the essence of the

CBD. A fluid understanding of biodiversity is gaining ground, which is referring to nature, planet, ecosystems, often without mentioning the term biodiversity.[1]

Furthermore, environmental sustainability is perceived as inextricably linked to poverty reduction, human well-being; the interconnectedness of people, government and business; renewed care for human rights and wise use of accessible technology to engage people. (UNDG, 2013). The HLP therefore discusses people centered and planet-sensitive development, grounded in a commitment to address global environmental challenges, strengthen resilience and improve disaster preparedness capacities (HLP, 2013).

The thematic consultations on environmental sustainability in the post-2015 development agenda also point out that the integration of the social, economic and environmental dimensions of sustainable development leads to multiple benefits. Integration requires, however, breaking down the perception of ecosystems, biodiversity, water, energy, oceans and other environmental dimensions as well as other development issues such as poverty, food security, gender, health, and education, and related policies, as unconnected silos (GCES, 2013).

The analysis of responses from over 60 countries regarding Sustainable Development Goals priority areas places food security and sustainable agriculture on top of the list, followed by water and sanitation, energy, education, and poverty eradication. Biodiversity has a central role to play in most of these areas. Countries also recognized "Biodiversity" as such as one of the top twenty priority areas (UN, 2012c).

Where are we with SDG proposals?

The wide consultations, and the engagement of civil society and research coalitions in the process has generated multiple suggestions for goals and targets; these proposals are compiled in an e-inventory http://www.sustainabledevelopment2015.org. However, at this stage, in the official consultations, only general contributions are heard; there are no proposed goals and targets on the table yet.

II. Contribution of biodiversity and ecosystem services to sustainable development

A. Background arguments: contribution of biodiversity and ecosystem services to sustainable development

The importance of biodiversity

Successful implementation of sustainable development requires action which is based on the understanding that biodiversity is more than natural resources, including food, fibre, fuel, and

[1] Personal observation of the co-author.

medicinal plants, which are essential for human development and are provided both from managed agricultural ecosystems and less managed "natural" ecosystems.

In "The Future We Want", countries reaffirmed the importance of biodiversity and its critical role in maintaining ecosystems that provide essential services that serve as critical foundations for sustainable development and human well-being, poverty eradiation, sustained economic development and the resilience of societies, allowing them to adapt to and cope with risk and change. The contribution of biodiversity and in particular ecosystem services to the prevailing themes discussed for the post-2015 development agenda will be considered in the next section.

The Rio+20 outcome document highlights the importance of biodiversity conservation in building and maintaining resilience of ecosystems, and ultimately, societies. "The Future We Want" refers to "resilience in the face of new and emerging challenges" generally, and "resilience to climate change and natural disasters" specifically. The concept of resilience, taken from the field of ecology and often applied to systems theory, is increasingly being applied to "social-ecological systems" in terms of: analyzing the ability of these systems to adapt to change (Walker et al. 2004); maintaining system function in the event of a disturbance, and doing so over longer temporal scales; or reorganizing (adapting) in response to a crisis (Martin-Breen and Anderies 2011). Looking at resilience is a useful approach firstly to analyzing the social and economic pressures on ecosystems, and secondly to help formulate policy and actions that can help ensure ecosystems remain robust and continue to provide critical services.[2]

A mind-shift is needed in development circles from considering biodiversity mainly as a "safeguard and do no harm approach", to one of using, enhancing and restoring biodiversity for human well-being and the sustainability of societal and economic development. Maintaining the diversity, quantity and quality of ecosystem goods and services depends on societal, institutional and individual choices made in development processes.

However, there is wide agreement that current global consumption, production, and land-use patterns are unsustainable and risk negative impacts on Earth's "life-support system" (including the functioning of ecosystems and the services they provide and maintaining ecosystem resilience and adaptive capacity), thereby reducing social and environmental capacities to achieve sustainable development.

The safe operating space that allows for innovation, development, and prosperity without harming the planet and its support systems, can be defined by applying the concepts of tipping points and planetary boundaries. Planetary boundaries generally relate to: safe global levels for

[2] As an example, Australia is integrating resilience thinking into land and natural resource management in order to: better understand dynamics of social-ecological systems; conduct "foresighting" on new pressures and shocks; determine implications for governance arrangements; and understand intersections between human, social, and natural capital. Catchment management authorities are encouraged to employ resilience frameworks in revising their management plans (Australian State of the Environment 2011).

the use of non-renewable resources; safe global usage of ecosystems, the biosphere, and biodiversity; and the Earth's capacity to absorb and dissipate waste flows. (Rockström et al., 2009; Rockström et al., 2013). Planetary boundaries are also analyzed in terms of the dynamic interactions between their parameters (Rockström et al., 2009). For example, how does land degradation and biodiversity loss interact with changes to climate systems, and what further challenges emerge from these interactions not only for the boundaries themselves, but also for societies? The planetary boundaries concept sounds the alarms, so to speak, regarding the business as usual trajectory.

Ultimately, the loss of biodiversity impacts negatively on all people. However, the loss of biodiversity may have particularly severe, and sometimes more immediate, impacts on the poor and vulnerable and on women and children. As biodiversity is lost, there is a risk that some thresholds will be passed undermining the functioning of the earth system. Conversely, the conservation and sustainable use of biodiversity contributes to sustainable development and adaptation to climate change. The SDG framework is an opportunity to reinstate that biodiversity contributes to human well-being but also that biodiversity – as an essential element of Earths' life support system – needs protection to ensure sustainability.

Efficiencies in implementing sustainable development and biodiversity conservation goals will result from effective mainstreaming. This will mean that investments will have greater impact, costs will be lowered, and coordination among institutions will be improved. Moreover, the effort to integrate biodiversity and development goals in practice will reveal synergies and tradeoffs and provide a basis for proactively resolving them. This is a particularly important consideration given the magnitude of financing required to fulfill global development goals (SDGs) and meet the goals of the CBD, UNFCCC and UNCCD, all of which are presently defining financial needs and confronting difficult negotiations to mobilize necessary funding from public and private sources.

The role of biodiversity in the themes discussed for the post-2015 development agenda

From the previous section it becomes clear that the integration of biodiversity, in particular in its function of underpinning ecosystem services, into the future sustainable development framework is essential, while it is critical to ensure at the same time that development policy and practice do not undermine efforts to maintain biodiversity and the ecosystem services it underpins. The following offers a short analysis of how biodiversity cuts across the sustainable development agenda, including some themes recently discussed under the post-2015 development agenda thematic consultations.

In terms of basic needs, biodiversity contributes across the thematic areas of food and nutrition, health, environmental sustainability, and water, resulting in direct benefits for: combating food insecurity and malnutrition; developing efficient and sustainable production systems for agriculture and fisheries; increasing resilience of livelihoods against shocks and crises;

improving rural economies and household incomes; and helping to reduce externalities that impact land degradation, water cycles and genetic diversity.

In particular, genetic diversity supports the resilience of farming systems. It also provides options for farmers to help increase production levels through improved breeds and varieties as well as the conservation of traditional crop varieties, local landraces, and wild relatives. Maintaining habitats for pollinators or conserving soil biodiversity to improve nutrient availability around agricultural areas increases crop productivity and brings direct economic gains. These investments in biodiversity and genetic diversity support local livelihoods, help reduce poverty and improve food security.

There are fundamental interlinkages between biodiversity, ecosystem services, human health, and development. Ecosystem services provide food, water, and clean air, cultural and spiritual services, and they help regulate disease and climate. The loss of biodiversity threatens human health by undermining ecosystem resilience and reducing genetic diversity (Campbell et al., 2012; Langlois et al., 2012). It reduces the availability of traditional foods and medicines, directly impacting food and nutritional security as well as drug development. Land degradation and resulting impacts to ecosystems influence vector-borne disease, emerging infectious disease including pandemics, and water-related disease. Changes in land-use often impact the water cycle, with implications for sanitation and access to clean drinking water. Furthermore, habitat loss undermines ecosystem resilience leading to increased vulnerabilities to disturbances and is an underlying cause of emerging infectious diseases. Non-communicable diseases such as heart disease, lung disease, and diabetes are leading causes of mortality. Efforts to preserve the genetic diversity of food crops and conserve natural areas can contribute to the preventative health measures used to treat these diseases by improving nutrition, providing spaces for physical exercise, and integrating the “value of nature” into health policy (UNEP and CBD, 2012). Additionally, epidemiological surveillance is improved by considering ecological and biodiversity indicators.

The availability of water is essential to crop and livestock production, health, sanitation, and energy production, and it supports industries central to economic development. Access by vulnerable populations, women, and children to clean water and factors that may constrain their access also raise questions of equality. Additionally, water-related hazards account for 90% of all natural hazards (World Water Assessment Programme, 2012), with significant implications for mortality rates and national budgets. Ecosystems are central in regulating the water cycle, and therefore ecosystem restoration, forest and wetlands conservation, as well as land-use that reduces soil erosion, are cost-effective solutions to achieving sustainable water security.

Maintaining the functioning of ecosystems that provide water-related services provides mutually-supportive opportunities for managing impacts of climate change, sequestering carbon, addressing desertification, cycling nutrients, storing water and recharging aquifers, filtering

pollutants, increasing resilience to disasters, and providing natural infrastructure solutions for sustainable cities.

There are numerous co-benefits between biodiversity, development and employment, and poverty reduction. For example, South Africa's Working for Water and Working on Fire programmes illustrate how job creation can mutually support land management initiatives to improve water availability, conserve biodiversity, control invasive species, reduce fire-related risks, and alleviate poverty. The added value of these programmes includes public education and awareness as well as reducing the social and economic costs of fire, invasive species, and water scarcity.

Ecosystems provide bioenergy and hydropower, and regulating services such as water flow and climate regulation offer co-benefits to the energy sector. For example, land degradation, loss of water catchments, and sedimentation represent threats to water resources upon which all types of energy projects are dependent. At the same time, energy projects are often key drivers of biodiversity loss, impacting land-cover, changing water courses, and contributing sources of pollution. As these environmental impacts affect the livelihoods of surrounding and downstream communities, they are frequently sources of conflict. The UN's Sustainable Energy for All Initiative, which includes promoting clean energy access for all, ensuring modern energy access, doubling energy efficiency, and doubling the share of renewable energy sources, could have significant benefits for biodiversity and ecosystems (However, over-reliance on biofuels could have negative impacts on biodiversity). For instance, reducing dependence on fuel wood and charcoal decreases pressures on forests, not only benefiting biodiversity conservation but also helping to maintain the services that forest ecosystems provide. There are also important health and gender dimensions to consider, including respiratory diseases due to poor indoor air quality and threats to women's security when collecting firewood alone.

The arguments presented in this chapter are intended to illustrate the value and economics of biodiversity and the ecosystem it underpins to decision-makers. In sum, in order to reframe the relationship between biodiversity and development within a transformative development agenda, it is necessary to aim for win-win outcomes for biodiversity, economies, livelihoods, and human well-being, while the functioning and resilience of ecosystems are maintained.

B. The CBD and sustainable development

The Convention on Biological Diversity is one of the three sustainable development conventions to emerge from the 1992 "Earth Summit" in Rio de Janeiro. The CBD arose from the international dialogue on sustainable development that begun in 1984 with the World Commission on Environment and Development (known as the Brundtland Commission). The negotiations for the CBD commenced not only to address concerns over the rapid loss of biodiversity, but also based on the realization that biodiversity plays a fundamental role in supporting human life (Cooper and Noonan-Mooney, 2013).

'Biodiversity' is defined by the CBD as 'the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems." As such the Convention is holistic, covering all aspects of biodiversity, and was the first international treaty to acknowledge the role of biodiversity in sustainable development.

The CBD has three objectives: the conservation of biological diversity; the sustainable use of its components; and the fair and equitable sharing of benefits arising out of the utilization of genetic resources. The "2010 Biodiversity Target" was also supported by 2002 Johannesburg Summit on Sustainable Development and incorporated into the framework of 2015 Targets for the Millennium Goals as "reduce biodiversity loss, achieving a significant reduction by 2010".

The CBD Conference of the Parties has frequently highlighted the linkages between biodiversity, ecosystem functioning, ecosystem services and human well-being, building on the work of the 2005 Millennium Ecosystem Assessment, and more recently on The Economics of Ecosystems and Biodiversity (TEEB). Thereby it shed new light on the CBD's preambular language on the importance of biodiversity for meeting the food, health, and other needs of the world's growing population and on biodiversity's social, economic, scientific, cultural, and other values.

C. The Strategic Plan for Biodiversity 2011-2020 and sustainable development

In decision X/2, the tenth meeting of the Conference of the Parties (COP), held from 18 to 29 October 2010, in Nagoya, Aichi Prefecture, Japan, adopted the Strategic Plan for Biodiversity, including 20 Aichi Biodiversity Targets, for the 2011-2020 period. The Strategic Plan was adopted as the overarching framework on biodiversity, not only for the biodiversity-related conventions, but for the entire United Nations system. The Strategic Plan contains a broad vision and mission, which is further specified in five Strategic Goals. The timeframe for the vision, mission and goals is 2050. The 20 Aichi Biodiversity Targets are to be achieved in 2020.

Both the vision of the Strategic Plan for Biodiversity and its mission emphasize the role that biodiversity and ecosystem services play for sustainable development, referring explicitly to essential elements such as poverty eradication and human well-being. The vision is that "by 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people". The mission of the Strategic Plan is "to take effective and urgent action to halt the loss of biodiversity in order to ensure that by 2020 ecosystems are resilient and continue to provide essential services, thereby securing the planet's variety of life, and contributing to human well-being, and poverty eradication. To ensure this, pressures on biodiversity are reduced, ecosystems are restored, biological resources are sustainably used and benefits arising out of utilization of genetic resources are shared in a fair and equitable manner; adequate financial resources are provided, capacities are enhanced, biodiversity issues and values mainstreamed, appropriate policies are

effectively implemented, and decision-making is based on sound science and the precautionary approach".

The importance of the Strategic Plan for Biodiversity 2011-2020 was reaffirmed in the Rio+20 outcome document, thereby emphasizing the role that the plan plays for the wider United Nations System, and the whole international community and civil society, worldwide, to achieve the world we want. The Rio+20 outcome document stresses the urgency to halt and reverse loss of biodiversity, highlighting the importance of implementation of the Strategic Plan for Biodiversity and its Aichi Biodiversity Targets. The references to biodiversity in the Rio+20 outcome document concur with the Strategic Plan for Biodiversity and its 20 Aichi Biodiversity Targets, with specific references to the substance of Aichi Biodiversity Targets 4, 6, 7, 8, 11, and 14.

Targets and indicators

The Strategic Plan for Biodiversity takes on the challenge of mainstreaming biodiversity across government and society, by making it the first of its five strategic priorities and devoting four of its twenty Aichi Biodiversity Targets to it. In order to achieve the mainstreaming agenda, reliable and systematic collections of data on the status and trends of ecosystems, associated ecosystem services, and underlying biodiversity, including statistical information, are necessary. It is precisely for this reason that Aichi Biodiversity Target 2 also calls for the incorporation of biodiversity values into national accounting, as appropriate, and reporting systems more generally.

There is no single measurement that captures the current status or trends in global biodiversity. A range of indicators has been developed under the CBD to provide scientifically rigorous assessments of trends in the state of the various components of biodiversity. The CBD COP, in decision XI/3, agreed on a set of indicators which should be used as part of the mid-term review of progress towards the Aichi Biodiversity Targets.

National implementation

While the CBD is an international environmental agreement it is primarily implemented through national level action. The goals and targets of the Strategic Plan comprise both: (i) aspirations for achievement at the global level; and (ii) a flexible framework for the establishment of national or regional targets. Parties are invited to set their own targets within this framework, taking into account national needs and priorities, while also bearing in mind national contributions to the achievement of the global targets. National biodiversity strategies and action plans (NBSAPs) are the principal instruments for implementing the CBD at the national level. Aichi Biodiversity Target 17 calls for Parties to develop, adopt as a policy instrument, and commence implementing, an effective, participatory and updated NBSAP by 2015. NBSAPs reflect how a country intends to fulfill the objectives of the Convention in light of specific national circumstances, and the steps it plans on taking (Cooper and Noonan-Mooney, 2013).

By the end of 2011, 175 countries and the European Union (over 90 per cent of the total Parties to the Convention) have developed their national biodiversity strategies and action plans or equivalent instruments and are implementing them. Some 40 Parties have revised their national biodiversity strategies and action plans, and most others are in the process of doing so, in the light of the new Strategic Plan for Biodiversity 2011-2020 (Cooper and Noonan-Mooney, 2013).

In particular, recently developed and updated NBSAPs were found to have a strong emphasis on the mainstreaming of biodiversity into other sectors and cross-sectoral plans and policies (Prip and Gross, 2010). They aim to mainstream biodiversity at various levels: integration into cross-sectoral policies and strategies (finance, national development, poverty eradication); integration of biodiversity into economic sectors (including through different government ministries); and integration into spatial planning, at all levels of government, especially at provincial/state and municipal levels. Therefore, NBSAPs can be seen as both concrete examples for the national implementation of internationally agreed targets and for the integration of biodiversity and development objectives.

Of the 14 recently-developed NBSAPs analyzed ahead of the eleventh meeting of the COP in 2012, most highlight the link between biodiversity and human well-being in their vision or mission statements and several identify biodiversity as natural capital on which societal and economic well-being depend. Examples for NBSAPs which reflect broader national development and environment objectives include those developed by Namibia (positioned as a contribution to national development and Vision 2030) and Rwanda (integrated biodiversity issues into its Economic Development and Poverty Reduction Strategy). The NBSAPs of Madagascar and Viet Nam are closely linked to the poverty reduction plans of those countries, the NBSAP of Cambodia to its framework for achievement of the Millennium Development Goals. Namibia and the Philippines coordinated their NBSAPs with their development plans. In Indonesia, the planning authority led the development of the NBSAP which facilitated the later incorporation of the NBSAP into the Medium-Term Development Plan (Cooper and Noonan-Mooney, 2013).

Means of implementation

At its meeting in Bali, Indonesia, in March 2013, the HLP stressed the need for strengthened means of implementation. The Strategic Plan for Biodiversity 2011-2020 offers effective means of implementation. The CBD COP has developed a strategy for resource mobilization, including preliminary targets for international financial flows. In addition, the CBD provides support mechanisms for research, monitoring, and assessment, mechanisms for capacity-building and education, as well as global and regional partnerships.

More importantly than ever before, there is a need to make connections, exchanges, and cross-fertilizations between knowledge systems: between informal, including traditional, knowledge and scientific knowledge, in particular to better identify and utilise relevant and feasible sustainable practices, and interdependencies between people and nature; and between natural and social sciences.

Challenges around the sustainability issue are best tackled through cross-sectoral, integrated approaches and with support across agencies. This requires change to overall policy frameworks and an institutional landscape responsive to change. This means for biodiversity, sector-based and development communities to work outside their comfort zone. Collaborating in interdisciplinary teams to solve multidimensional problems is the best method available to implement actions to provide a better future for people and the planet.

D. Other concepts under the CBD relevant for sustainable development

Over time, the CBD COP has considered a number of cross-cutting issues that are relevant for fostering the objectives of the CBD and has helped to translate a number of scientific concepts into politically-recognized guidance, such as the ecosystem approach. The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. It is based on the application of appropriate scientific methodologies focused on levels of biological organization which encompass the essential processes, functions and interactions among organisms and their environment (Cooper and Noonan-Mooney, 2013). It recognizes that humans, with their cultural diversity, are an integral component of ecosystems, and is therefore central to sustainable development.

The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. As described by the COP, the ecosystem approach is the primary framework for action for the 193 Parties of the CBD. By conceptualising ecosystem services, the CBD COP highlighted the links between biodiversity and human development, thereby "modernizing" the concept of sustainable use as contained in the objectives of the CBD (Morgera and Tsioumani, 2011).

Language barriers in documenting problems and solutions are often identified as hampering advances in biodiversity mainstreaming. The increasing use of the ecosystem services approach is a strong case for optimism, as use of an economic language provides common ground for discussions between conservation and development. Biodiversity needs also to permeate policy development circles, and the public dialogues, for greater impact.

III. Biodiversity building blocks for sustainability and SDGs: Concrete elements for the development of Sustainable Development Goals

This section outlines concrete principles and practical elements which allow for the reflection of the role of biodiversity and ecosystem services in sustainable development. It illustrates elements that can be provided as input to the political process of developing the SDGs, including elements for specific goals, targets and indicators.

Structure, goals and targets

When the SDG discussions will be integrated with the post-2015 development agenda, difficult negotiations are expected, as differences in world views, value systems and strategic interests as well as the fluidity in the concept of sustainable development will make it difficult for country negotiators to reach consensus (Pinter 2013). One potential cause of complication is confusion between the goals as such and the means by which those goals will be achieved, including process, actions, and actual development. To avoid this complication, a clear structure is required for the SDGs, which allows targets and corresponding indicators to contribute to the achievement of the goals. Global goals should be defined in a way that allows countries to tailor the means to achieve the goals to their national circumstances. The integration of biodiversity in the SDGs can follow different structural approaches. In one proposed approach, one or more environmental goals constitute, together with separate social and economic goals, the set of SDGs. In another approach, the goals are focused on development, but include specific environmental/biodiversity targets. These targets may also be composite targets which integrate environmental/biodiversity elements with economic and social aspects.

In the first approach each goal is focused only on one dimension of sustainable development, and underpinned by specific targets of the same dimension. This approach helps to ensure that the three dimensions are equally addressed on the same level. A specific, separate environmental goal on biodiversity would increase the visibility of biodiversity in the post-2015 development agenda.

In the second approach, biodiversity target(s) under a broader development goal is intended to ensure that the goal is achieved in a way compatible with the conservation and sustainable use of biodiversity. This emphasizes the fundamental role of biodiversity in the achievement of the broader development goal. It supports the integration of three dimensions of sustainable development, as it highlights the co-dependency between biodiversity and development. Furthermore, this approach may be well placed to avoid negative consequences on biodiversity from development. At the same time, integrating biodiversity as target of a goal or even only an element of a target, instead of biodiversity representing its own goal, may reduce the visibility of biodiversity in the future Development Agenda of the United Nations.

Biodiversity could be integrated into SDGs in various ways. The process for the development of the SDGs is at an early stage, and the outcome of this process cannot be prejudged. However, for the purposes of considering how biodiversity may be integrated into the SDG framework, different types of SDG may be envisaged, each with different linkages to biodiversity (developed further from ODI 2013;TST 2013; OWG 2013). For example, it may be decided that some SDGs should be related: (Type 1) to constituents or determinants of human well-being that directly depend on, and impact, biodiversity and ecosystems: such as sustainable food security ("food for all"), water security, universal clean energy and medicines; (Type 2) to constituents or determinants of human well-being that do not directly depend on, or impact, biodiversity and

ecosystems, such as education, equality, gender equity, governance, participation or human rights; (Type 3) to underlying global "life support systems" such as healthy and productive ecosystems and also (Type 4) to overarching concepts that encompass multiple dimensions of sustainable development such as poverty eradication, "green economy", human well-being, etc. These types are closely interrelated, and the link to biodiversity should, for each type, be ideally realized at the appropriate level in the structure of the SDGs, including goals, targets and indicators. The "life support systems" (Type 3) directly underpin, and at the same time can be negatively affected by, the determinants of well-being (Type 2). Types (1) (2) and (3) underpin the achievement of goals related to broader concepts (Type 4).

While Type 3 goals would represent goals focused only on the environmental dimension of sustainable development, and Type 4 goals would represent broader development goals with environment-related targets under them, Type 1 and Type 2 goals represent a mixed form.

A number of proposals have been made already which relate to the four types presented above. Food security (a Type 1 goal), for example, has a particularly direct and two-way link to biodiversity. Biodiversity is essential to the continued provision of food, and is an important determinant of its quality. Biodiversity is the source of our crops and livestock as well as fish and other wild food sources. A nutritious diet requires a diversity of these plants and animals. The provision of these goods depends on functioning agricultural and other ecosystems. Essential processes such as pollination, nutrient cycling and the regulation of pests and diseases all depend on biodiversity – on the interactions among a diverse range of organisms. The genetic diversity of crops and livestock allows not only adaptation to current needs, but also the adaptability to meet future demands, including those resulting from climate change, and the potential for further increases in yields that will be necessary to meet expected food demands. On the other hand, food production, through agriculture as well as fisheries has major impacts on biodiversity through land use, nutrient use, pollution etc. Similarly, there are direct and two-way linkages between water security and biodiversity.

Biodiversity may be integrated into potential SDGs related to food security through targets, indicators or both. Targets and indicators should relate not only to production (yield, quantity) but also to nutritional quality including diversity, as well as to distributional and sustainability aspects. These could relate to the maintenance of important components of agricultural biodiversity such as pollinators, or to limiting pesticide use and improving fertilizer use efficiency. The most relevant Aichi Targets in this regard include Targets 7, 8 and 13.

The achievement of SDGs related to constituents or determinants of human well-being that do not directly depend on, or impact, biodiversity and ecosystems, such as education, equality, gender equity, governance, participation or human rights (Type 2) is unlikely to place demands on biodiversity and ecosystems. However, an understanding of the role biodiversity and the ecosystems it underpins play for related constituents of human well-being, may inform these goals and the targets and indicators under them (e.g. the role of biodiversity for gender equality

from the perspective of food and water security). The achievement of SDGs of this type is at the same time expected to positively affect the achievement of SDGs of types more directly related to biodiversity.

Type 3 goals such as "healthy and productive ecosystems" would, in effect, be biodiversity-related goals, with supporting targets and indicators. The Vision of the Strategic Plan could provide useful elements for such a goal. All of the Aichi Targets, especially targets 5 to 15 and in particular Target 14 are relevant for this type of goal.

Efforts to develop comprehensive measures of progress towards sustainable development, as alternatives to GDP, offer opportunities for the integration of biodiversity in SDGs on broader concepts such as poverty eradication, "green economy", human well-being, and sustainable development. It is increasingly recognized that GDP (or GNP) is too narrow an indicator of human progress. Broader indicators would focus on wealth (stocks) rather than income (a flow), and encompass not only manufactured and financial assets (capital), but also natural, human and social assets. In most countries, assessments of natural capital are currently limited to tangible assets such as mineral reserves, timber stocks and fish stocks. However, efforts are underway to also measure the status of ecosystems, taking into account pollution and other forms of degradation. Aichi Target 2 calls for the biodiversity values to be integrated into such national accounting systems.

There are strong arguments that all four types of goals are relevant to biodiversity integration and could be pursued in the development of and negotiations on the SDGs to ensure that biodiversity is appropriately integrated in the SDGs. In addition, some thought should be given to the process of prioritizing proposals for SDGs as criteria for selecting SDGs are discussed: clear links to MDGs, a goal representing a priority for a broad number of countries or a goal addressing targets and groups so far not covered by existing goals (TST, 2013). From a biodiversity perspective it could be argued that goals and targets related to biodiversity are fundamental to the achievement of most other goals. In addition, as will be illustrated below, biodiversity-related elements are readily available and in many cases are supported by means of implementation.

Framework and principles

Goals and targets are commonly set within a broader framework, as the example of the Millennium Declaration and the MDGs shows. Rio+20 defined as basis for a framework for the SDGs Agenda 21 and the Rio principles (UN, 2012, para. 246). The consideration of biodiversity should also be part of this framework.

Depending on which type of goal presented in the previous section will form the final SDGs, an element which could also be used to further develop the framework for the SDGs is the definition of sustainable development. A recent opinion piece in the journal "Nature", suggested that sustainable development be defined as "development that meets the needs of the present while safeguarding Earth's life-support system, on which the welfare of current and future

generations depends" (Griggs et al., 2013). Central to this notion of Earth's "life-support system" are the concepts of planetary boundaries, resilience, and ecosystem services, reinforcing the argument that environmental integrity should be at the core of the development agenda (Boltz et al. 2012). Compared with the commonly used definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs", the definition by Griggs et al. therefore emphasizes in particular the role of biodiversity and ecosystem services as life-support system.

Goals

Goals are expression of common shared values and of a vision of the world we want. The MDGs have shown that clear, simple and measurable global goals can be important drivers of change. There are great challenges in defining concrete SDGs given the fluidity of the concept, leading to varied interpretations. The following sections will address potential elements for goals contained in the Strategic Plan for Biodiversity and its Aichi Biodiversity Targets as well as elements and ideas contained in proposals presented in discussion fora and academia. The development of goals from the biodiversity perspective addresses the intersection of global environmental change and sustainable development, and as suggested by Reid et al., focusses on the functioning of the Earth system and its relationship to human actions (Reid et al., 2010; Pinter, 2013).

The Strategic Plan for Biodiversity contains a number of elements which are readily available for integration into one or more of the SDGs. The incorporation of existing goals and targets into the SDGs has multiple benefits, not only ensuring policy coherence and building on existing implementation processes (TST, 2013), but also using the political will of 193 Parties to the CBD. As discussed above, the vision of the Strategic Plan for Biodiversity integrates all three dimensions of sustainable development at a sufficiently high level of abstraction, as it refers to "sustaining a healthy planet and delivering benefits essential for all people". Therefore, it could serve as a Type 3 goal or serve as part or target of a Type 4 goal that conserves biodiversity and ensures ecosystem functioning as the foundational base of human well-being.

Aichi 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", could also provide elements for a Type 3 SDG. While the target focuses on ecosystem services, it explicitly highlights their role as a basis for human health, livelihoods and well-being, which in turn are crucial elements of sustainable development. The target also integrates the concept of equity by emphasizing the needs of different groups such as women, indigenous and local communities, and the poor and vulnerable. Examples for Aichi Targets that could support Type 3 goals as targets are Targets 5, 10, 11, 12, 13 and 15.

Other proposals in the context of the development of the SDGs also provide opportunities for integrating biodiversity into the SDGs. For example, the goal proposed by Griggs et al. on

healthy and productive ecosystems, to "sustain biodiversity and ecosystem services through better management, valuation, measurement, conservation and restoration" could be considered as a source for a potential Type 3 goal (Griggs et al., 2013). However, the way this goal is phrased, with a focus on activities and process, may make it difficult to achieve the clarity, simplicity, and measurability required from goals. Reframing the goal in a way that it expresses the desired status may result in a goal very similar to the vision of the Strategic Plan for Biodiversity. Management, valuation, measurement, conservation and restoration could each form targets of this goal.

A related proposal evolves from discussions among Member States of the United Nations Forum on Forests (UNFF). They consider the necessity for specific cross-cutting goal on natural resources, including forests, energy, water, land, biodiversity and oceans. Natural resources are thereby understood as providers of a wide range of services that go beyond purely environmental services and touch upon the livelihoods of people, their future, their environment and their economic life. The cross-cutting goal would be intended to highlight the value of natural resources not only for the environment, but also for economic and social development, and peace and security. UNFF Member states envisage that the goal would be supported by targets on natural resources which reflect the outcomes of major UN conferences and meetings, such as the global objectives on forests (UNFF, 2013). At the Tenth Session of UNFF, some Member States proposed that a goal could in particular target sustainability at the landscape level.

Proposals for Type 1 goals that address development areas of basic needs and well-being such as food, nutrition, water and energy, could include "sustainable food and nutrition security by 2040". Targets of this goal could consist in "increasing sustainable agriculture yields by X%" or "agricultural production with 75% of the current energy consumption". Aichi Targets 5, 6, 7, 8, 9 and 13 could serve as targets.

Targets

As global, biodiversity specific targets, a concrete, measurable target similar to limiting the carbon-dioxide concentration in the atmosphere to 350ppm or global temperature rise to 2 degrees Celsius above pre-industrial levels, could be aimed for. In setting a target, representing a stock reserve or corresponding threshold or tipping point, would offer the benefit of a global target and an explicit countdown index. However, no such figure is readily available. Additional research is needed towards similar scientifically based thresholds in biodiversity. Some threshold levels put forth in current proposals are that the global extinction rate should not exceed ten times the natural background rate, or that at least 70% of species in any ecosystem and 70% of forest cover should be retained (Griggs et al., 2013).

As for proposals for elements of SDGs, the Strategic Plan for Biodiversity and its Aichi Biodiversity Targets contain readily available elements for targets. These elements can be part of targets for all types of goals - separate environment or biodiversity-focused goals, integrated

goals or goals focused on development themes without direct relationship to the environmental dimension. In particular, Aichi Biodiversity Targets 5, 11, 12 and 15, which contain quantified measures for achievement by 2020 ("at least halve the rate of loss of natural habitats", "17 per cent of terrestrial and inland waters and 10 per cent of coastal and marine areas are conserved through […] protected areas […]", "the extinction of known threatened species has been prevented" "restoration of at least 15 per cent of degraded ecosystems") can be used as a starting point to define intermediary outcomes for a SDG timeline, that may be 20 or 30 years.

Some of the Aichi Biodiversity Targets also make a contribution to sustainable development and go beyond the biodiversity focus, as they contribute to the achievement of other multilateral environmental agreements. Aichi Biodiversity Target 15, in particular, aims to contribute to climate change mitigation and adaptation and to combating desertification, thereby achieving synergies with the UNFCCC and the UNCCD. An integrated target from the perspective of the three Rio Conventions could therefore build on the target that "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". In addition, Aichi Biodiversity Targets 1-4, which address the underlying causes of biodiversity loss, also provide valuable elements for targets and may underpin a Type 4 goal. In aiming at broader changes in governance and society, the achievement of those goals will enable and significantly contribute to sustainable development. This would be in line with the perspective that the SDGs should address the root causes of changes and the social, economic and environmental drivers towards long term sustainability (TST, 2013).

At the same time, a Type 2 goal such as "education for all" would, with the right indicators, benefit biodiversity, for example by achieving Aichi Target 1. Furthermore, the Aichi Biodiversity Targets provide elements for the inclusion of broader issues, which are crucial to sustainable development, into the targets of the SDGs. For example, Aichi Biodiversity Target 18 provides an example for integrating the role of traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and may therefore also serve as a target under a Type 2 goal.

Indicators and measurability

Measurable targets and indicators have been amply demonstrated to be essential to any action and outcome oriented development agenda, as they enable the development of transition pathways and strategies, turning strategies into policies and plans, guiding implementation, monitoring progress and learning from results. Establishing sustainable development indicators has therefore for many countries and institutions, been an opportunity to move environmental issues higher up the policy agenda alongside economic and social issues (UNECE/OECD/Eurostat, 2008). Indicators are a powerful tool to draw attention to actual actions required and therefore present an opportunity to highlight the role of biodiversity for the

SDGs. Related metrics can be integrated at the level of indicators, especially in thematic areas where biodiversity is unlikely to enter at the level of goals and targets.

However, while data and information systems for measurement and tracking of progress are basic tools for policy makers, there are significant gaps in macro indicators that clearly link biodiversity and sustainable development. Recent research and proposals, both in the broader area of measuring societal process and prosperity and more specific measures related to biodiversity, aim to address this gap. They include proposals for a shift from accounting for income (flows) to wealth (stocks), the concepts of physical accounts and valuation, a shift from monetary based to broader assessments of human well-being. The extent to which "biodiversity" is or can be integrated into national accounts and the question of which aspects of biodiversity are or can be accounted for, the measuring of tangible resources versus supporting ecosystem processes versus the value of diversity per se are among the challenges.

Aichi Target 2 of the Strategic Plan for Biodiversity aims for further incorporation of biodiversity in national accounts as one of the means of mainstreaming biodiversity across government and society. There are novel practices in metrics that open the door to integration of biodiversity and ecosystem services in systems of national accounts and in renewed forms of measuring societal progress, such as the UN systems of national accounts, the WAVES initiative and the recent work of the UNECE/OECD EUROSTAT on indicators of sustainable development using the concepts of physical accounts and valuation.

The biodiversity research community has developed relevant indicators that inform about change in factors that matter for human well-being, see for example the work on Essential Biodiversity Variables (EBVs) by Pereira et al., 2013, but seem to have so far fallen short of identifying or developing a workable complete suite of direct, and more meaningful, measures of the contribution of biodiversity to sustainable development. There are great opportunities for the development of indicators which combine multiple metrics, for example, indicators which combine information on drivers, environmental impacts, socio-economic data and trends in biodiversity, within a spatial accounting framework, in order to show trends in human well-being. Developing biodiversity indicators which remain separate from other indicators relevant to sustainable development will reinforce the wrong perception that biodiversity is a subject unrelated to the other dimensions of sustainable development.

In this context, measuring human well-being and its sustainability, biodiversity components are valuable assets, providing both a better measure of economic well-being and of so called ‘’foundational well-being”, the critical value beyond monetary value.

The report of the commission on the measurement of economic performance and social progress (Stiglitz, Sen, Fitoussi, 2009) and the UNECE /OECD/Eurostat working group on measuring sustainable development have both strongly advocated a stock based approach to sustainability as the most relevant way of structuring a micro dashboard for sustainability. This approach

separates assets that can be monetised in a reasonable way from other assets for which separate physical measures are necessary. Example of biodiversity "*stock indicator*" is fragmentation of natural habitat. Conversion of natural habitat to other uses is an example of a "*flow indicator*". This type of framework and indicator facilitates their use in systems of national accounts.

The general approach to indicators in development circles calls for indicators amenable to performance type measurements and metrics to track progress towards targets. Monitoring of micro-variables and trends has been the more common practice in the biodiversity community. The framework used to design and select indicators for tracking progress on Aichi Target is typically inspired by a variant of DPSR addressing the following questions:

- How is the status of biodiversity changing? (state);
- Why are we losing biodiversity? (pressures and underlying causes);
- What are the implications of biodiversity loss? (benefits);
- What do we do about biodiversity loss? (response).

Response type indicators have typically stayed within the realm of the biodiversity community; increasing protected area coverage, introducing payments to farmers to conserve land. The response that would be most beneficial to biodiversity, captured in the "What are the immediate causes/pressures" *question*. The analysis of the four questions is helpful for refining a problem statement and identifying a trend, either increase or loss. Most often it assumes that losses are bad, without responding to the question of whether or not we are closer to or moving away from sustainability of life systems. The approach also deals with the symptoms of the problem not its cause.

The framework, while helpful to analyse, is not of much help for tracking "stocks" and "flows" of natural capital, be it physical or economic. The emphasis on biodiversity here is definitely physical/biological or intrinsic, rather than socio-economic.

The TEEB has made headway with valuing ecosystem services; however, we are far from being able to construct monetary value for natural capital and ecosystem services that at, the macro-level, can be reasonably compared to market prices of capital assets, with the exception of a few promising areas such as water. Given the limited state of knowledge, translating biodiversity in monetary values can introduce significant underestimation, which obviously defeats the purpose, excepting for some cases where values derived are notably higher than those incurred through the loss. It also raises questions of how to capture non-monetary benefits.

Notwithstanding, there are cases where economic values of biodiversity can be more easily derived, and related indicators. Adjusted Net Savings (ANS) is an economic indicator developed by the World Bank which measures whether a country is building its wealth or running it down. ANS is intended to be used alongside traditional macroeconomic indicators such as GDP. GDP indicates whether an economy is growing; ANS indicates whether that growth is sustainable. Protected area and non-timber value of forests is so far the biodiversity asset included in

calculation of ANS of countries. This shortcoming, essentially due to availability and quality of data is recognised by the World Bank.

National implementation

Clear, simple, measurable goals set the stage, but actual achievement on progress depends on countries favouring policies with positive outcomes on multiple fronts. The development of SDGs should be informed by policies that have contributed to positive outcomes in development spheres such as sustainable agriculture, with built-in incentives to maintain, enhance or restore natural capital assets essential to human well-being now and in the future, eliminating subsidies that contribute to overfishing, building systems that are more resilient to disasters, as well as incentives to investments supporting conservation, a sustainable use of biological systems, and restoration of degraded ecosystems. Such policy measures also demonstrate win-win outcomes for biodiversity conservation.

CBD parties report on broad range of incentive programs such as payment for ecosystem services, tax exemptions or deductibility schemes; support in commercialization, market development including certifications, subsidized insurance for economic activities such as organic farming and biodiversity banks. For example, Ecuador has a national incentive programme for the conservation of more than 882,000 hectares of native land. It has benefitted from more than 90,000 participants since 2008, with total receipts being 14 million dollars underpinning significant benefits. Another example is Spain monitoring the impacts of the main elements of agricultural policy and assessing the effectiveness of specific support mechanisms, including conditionality, on biodiversity agro-environmental measures, and encouraging the necessary changes in fishing practices to meet the challenges of sustainable fisheries management Applying Strategic Environmental Assessment to guide policy choices in development areas that are prone to bring biodiversity loss, is another example of policy measures contributing to achievement of sustainable development.

Accessible, well documented and evidence-based practical successes involving multiple actions and benefits across broader development areas, including biodiversity, are not abundant. However, there is some informative practice to draw upon in paving the way to sustainability. For example, the EU biodiversity strategy aims to anchor biodiversity objectives into other key sector policies, such as agriculture, forestry and fisheries, in order to integrate biodiversity concerns into their policies and decision-making.

The combination of public and private actions is required to reach societal goals. Moving to sustainability implies faster and better directions, and different policies to those that have lead us where we are now In most cases, to be effective open ‘’all of government” policies will provide initial societal control and leadership.

Development challenges are multidimensional and require integrated approaches. An effective global governance system integrating biodiversity and development could also work at regional,

country and/or local levels, properly tailored to fit scale of the issues, cultural premises, and level of governance. Biodiversity actions have so far focused on global agreements, with disappointing mixed results. A major challenge in the global policy architecture and substance is fragmentation both between and within multilateral environmental agreements (MEAs) that often neglect inter linkages. An improved MEA framework also needs to be part of the next global development agenda. Improvements to global environmental governance and integrated responses will be best achieved with national and subnational policies and institutional actions informed by local level processes and outcomes. These levels are where the consequences of unsustainable use of biodiversity on human well-being are most evident and more easily addressed. [The Strategic Plan for Biodiversity and its fifth Strategic Goal on enhanced participation through participatory planning, knowledge management and capacity building offers good avenues in this direction.

The next global development agenda needs to clearly give more attention to facilitating localised actions. Economic Nobel Prize winner Elinor Ostrom has demonstrated how multiple activities by multiple units at diverse scales (polycentric) can cumulatively make substantial and effective difference. There is great benefit in strengthening these local developments efforts and increasing synergies and societal learning through networks. Arguing that the core goal of a public policy is to bring out the best in humans, Ostrom called for institutions to foster innovation, learning, adapting, trustworthiness, cooperation and the achievement of more effective and sustainable outcomes at multiple scales (Ostrom, 2010).

IV. Additional questions – for discussion at Trondheim

The current global conversation on the post-2015 development agenda can become an opportunity to jumpstart a ‘’New Deal on Biodiversity”, based not on an alarming message of loss, but rather a renewed empathy pact between humans and the grounds and waters they live on and by a shift from a perception of biodiversity as the victim of development to one based on biodiversity as a solution to achieving sustainable development.

AQ1: From the perspective of your country’s circumstances, does the analysis above of the contribution of biodiversity to sustainable development, and the SDGs address the critical elements? Does the analysis adequately highlight the role of the Strategic Plan for Biodiversity? What is missing? Please provide a concise description.

AQ2: Are you actively involved in the national preparatory process of defining the post-2015 development agenda and the SDGs? If so, what are your experiences? Do you think biodiversity and its contributions to sustainable development are adequately covered and reflected in your country’s national preparatory process, and the biodiversity community adequately represented? If so, what are, in your view, the drivers/reasons for success? If not, what are the main obstacles/barriers?

AQ3: How should biodiversity be integrated into the SDGs? i.e., full integration, dedicated biodiversity target, or a hybrid approach? What are the advantages/limitations of each modality?

AQ4: Building on the answers to AQ2 above, can you identify good practices and/or lessons learnt from your experiences in engaging at the national preparatory process? Or options to upscale or replicate drivers of success, or to overcome obstacles identified?

AQ5: What could the CBD Secretariat do to strengthen the strategic inroads of the Convention's national focal points, and the biodiversity community more generally, into the SDG preparatory process, at national and at international levels?

References

Boltz, F., W. R. Turner, F. Wugt Larsen, I. Scholz, and A. Guarín. 2013. Post 2015: Reconsidering Sustainable Development Goals: Is the Environment Merely a Dimension? German Development Institute Briefing Paper, April 2013.

Campbell, K., D. Cooper, B. Dias, A. Prieur-Richard, D. Campbell-Lendrum, W. B. Karesh, and P. Daszak. 2012. Strengthening International Cooperation for Health and Biodiversity. EcoHealth. 8 (4): 407-409.

Convention on Biological Diversity 2009. Biodiversity Development and Poverty Alleviation; recognizing the role of biodiversity for human well-being. Montreal, 52 pages.

Cooper, H. D. and K. Noonan-Mooney 2013. Convention on Biological Diversity. In: Levin S.A. (ed.) Encyclopedia of Biodiversity, second edition, Volume 2, pp. 306-319. Waltham, MA: Academic Press.

Ghanimé, L. 2013. Contribution to global thematic consultation phase 1 on environmental sustainability - http://www.worldwewant2015.org/sustainability2015. Global Thematic Consultation on Environmental Sustainability in the post-2015 Development Agenda. (GCES 2013) Co-chairs summary Leadership meeting March 2013.

Griggs, D. 2013. Sustainable Development Goals for People and the Planet. Nature. 495: 305-307.

Independent Research Forum 2015. Post 2015: framing a new approach to sustainable development (March 2013)

Langlois, E.V., K. Campbell, A.H. Prieur-Richard, W.B. Karesh, and P. Daszak. 2012. Towards a Better Integration of Global Health and Biodiversity in the New Sustainable Development Goals Beyond Rio+20. EcoHealth. 9 (4):381-385.

Martin-Breen, P. and J. M. Anderies. 2011. Resilience: A Literature Review. New York: The Rockefeller Foundation.

Morgera E. and Tsioumani E. 2011. Yesterday, today, and tomorrow: Looking afresh at the convention on biological diversity. Yearbook of International Law 21.

Overseas Development Institute (ODI) 2013. How to build sustainable development goals: integrating human development and environmental sustainability.

Ostrom E. 2010. Polycentric systems for coping with collective action and global environmental change. Global Environmental Change vol 20 no 4 pp 550-557.

Pereira H.M., Ferrier S., Walters M., Geller G.N., Jongman R.H.G., Scholes R.J., Bruford M.W., Brummitt N., Butchart S.H.M., Cardoso A.C., et al. (2013) Essential biodiversity variables. Science 339: 277–278.

Pinter, L 2013. Measuring Progress Towards Sustainable Development Goals . IISD Working paper.

Prip, C., Gross, T., Johnston, S., and M. Vierros 2010. Biodiversity Planning: an assessment of national biodiversity strategies and action plans. United Nations University Institute of Advanced Studies, Yokohama, Japan.

Reid et al. 2010. Earth system science for global sustainability: Grand challenges. Science, 330 916–917.

Rockström, J., J. Sachs, M. Öhman, and G. Schmidt-Traub. 2013. Sustainable Development and Planetary Boundaries: Draft Background Paper for the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda, 15 March 2013.

Rockström et al. 2009. Planetary Boundaries: Exploring the Safe Operating Space for Humanity. Ecology and Society. 14 (2): 32.

State of the Environment 2011 Committee. Australia State of the Environment 2011. Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities. Canberra: DSEWPaC, 2011.

Stiglitz,J; Sen,A and J.P. Fitoussi. 2009. The measurement of economic performance and social progress revisited.Reflections and overview. 79 pages.

Technical Support Team (TST) to the Open Working Group on SDGs. TST issues brief: conceptual issues , prepared for the OWG meeting April 2013.

UNECE/OECD/Eurostat 2008. Measuring sustainable development.

United Nations 2012 a. The future we want. Outcome document of the Rio+20 conference on sustainable development.

United Nations 2012 b. Global Report of Progress on Millennium Development Goals.

United Nations 2012 c. Initial input of the Secretary-General to the Open Working Group on Sustainable Development Goals.

United Nations Development Group (UNDG) 2010. Thematic paper on MDG7 environmental sustainability.

United Nations Development Group (UNDG) 2013. The global conversation begins. Emerging views For a New Development Agenda.

United Nations Development Program (UNDP) 2006. Making progress on environment sustainability: lessons and recommendations from a review of over 150 MDG country experiences.

United Nations Environment Program (UNEP) 2011. Keeping track of our changing environment.

United Nations Environment Program (UNEP) and Convention on Biological Diversity. 2012. Review of Progress in the Establishment of National Targets and Updating of National Biodiversity Strategies and Action Plans since the Adoption of the Strategic Plan for Biodiversity 2011-2020. UNEP/CBD/COP/11/INF/12.

United Nations Environment Program (UNEP) and Convention on Biological Diversity. 2012. Collaborative and Mainstreaming Activities with the Health Sector: Progress Report. UNEP/CBD/COP/11/INF/27.

UN Secretary General High-Level Panel of Eminent Persons on the Post 2015 Development Agenda. (HLP) Communiqué Meeting in Bali Indonesia March 2013.

United Nations Task Team on the Post 2015 Development Agenda (UNTT) 2012. Realizing the Future We Want for All. Report to the Secretary-General.

United Nations Task Team on the Post 2015 Development Agenda (UNTT) 2013. A renewed global partnership for development.

United Nations Open Working Group (UNOWG) 2013. Co-chair Brief summary of the second OWG Concluding remarks April 19 2013. Notes.

Vandermoortele, J. 2012. Advancing the UN development agenda post 2015; some practical suggestions . Report submitted to the UN Task force regarding the post 2015 framework for development.

Walker, B., Holling, C.S., Carpenter, S. R., and A. Kinzig. 2004. Resilience, adaptability and transformability in social–ecological systems. Ecology and Society 9(2): 5.

World Bank 2005. Ensuring environmental sustainability. Measuring the progress against the 7th Millennium Development Goal.

WWAP (World Water Assessment Programme) 2012. The United Nations World Water Development Report 4: Managing Water under Uncertainty and Risk. Paris, UNESCO.