

Report

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The 2030 Agenda and Ecosystems

A discussion paper on the links between the Aichi Biodiversity Targets and the Sustainable Development Goals



IN COLLABORATION WITH

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This Discussion Paper should be considered as a basis for dialogue, and we are very interested in the feedback from you as a reader. We have the intention to finalise it during the beginning of 2017.

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Cover image: Market day in Auki, Malaita, Solomon Islands. Image ©: P. Malmer

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Summary

The 2030 Agenda for Sustainable Development recognizes that sustainable management of natural resources is relevant to achieving all the Sustainable Development Goals (SDGs), and therefore the crucial role of biodiversity and ecosystem services in the well-being of both people and our planet. To accomplish the 2030 Agenda, there is however a need for improved mainstreaming of enhanced conservation and sustainable use of ecosystems and biodiversity in development decisions, sectors and actions.

The paper strengthens the message that, if effectively implemented, the conservation of biodiversity and ecosystem services can lead to substantial gains in many facets of sustainable development.

An analysis of the wording of both the Aichi Biodiversity Targets and the SDG Goals and Targets shows that a strong overlap between the two processes. Using a scoring system based on whether Aichi Biodiversity Target elements are directly, indirectly or not considered across all SDG Goals and Targets, it was found that three of the Aichi Biodiversity Targets (2, 16 & 20) are fully covered under the SDGs, while only one (17) is not covered at all. All elements of five Targets (3, 5, 6, 12 & 18) are indirectly considered in the SDGs, while the elements of one (11) are either indirectly covered or absent. The elements of each of the remaining nine are either directly or indirectly considered.

There are notable omissions from the SDG suite, including the broader role of biodiversity and ecosystem function and the need to address drivers and pressures in order to maintain the flow of ecosystem services. This includes raising awareness of the values of biodiversity, effectively addressing perverse incentives, pollution, the concept of safe ecological limits within sustainable use, and the breadth of roles of traditional knowledge, culture and practices.

The analysis highlights that Aichi Biodiversity Target (ABT) 14 has the greatest relevancy to the SDG Goals and Targets, followed by ABT19. ABT15 also has strong linkages at the SDG Goal level. Despite the indirect nature of the linkages, the role of sustainable consumption and production and the need to protect ecosystems to support the provision of ecosystem services in the SDGs mean that ABTs 7 and 11 also have strong linkages. From the other perspective, unsurprisingly SDGs 14 and 15 have the strongest linkages with the Aichi Biodiversity Targets.

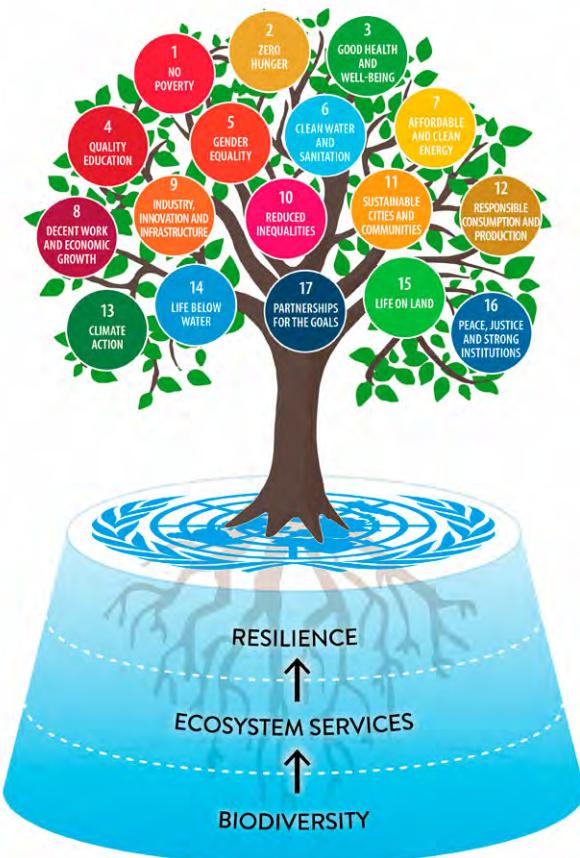


Figure 1. Biodiversity provides the basis for Earth's natural life-support systems, delivering ecosystem services on which we all depend, such as food, water purification, and climate regulation, and relevant for the achievement of all SDGs. Illustration: J. Lokrantz/Azote for SwedBio/SRC, 2016

However, the level of ambition and the target years do not always coincide, and the compatibility of the environmental targets with some of the more economic-focused targets may lead to conflicting actions. The need to emphasise the relevancy of sustainable environmental management when attempting to mainstream across sectors is therefore stressed.

The analysis helps to understand the synergies of the 2030 Agenda and the Strategic Plan for Biodiversity 2011–2020, and it is also important to have an inclusive process for developing the post-2020 Strategic Plan for Biodiversity, in light of the 2030 Agenda. However, it is recommended that a more extensive in-depth mapping of the current Aichi Biodiversity Targets against the SDGs is undertaken to review the degree of overlap and identify elements of the current Strate-



Local produce at Tamu Kianggeh, Brunei. Image ©: Bernard Spragg/Flickr

gic Plan for Biodiversity that are not covered under the SDGs. The post-2020 Strategic Plan should retain a high degree of overlap that explicitly references the links between the new CBD biodiversity targets and the SDGs, and may be seen as constituting detailed objectives that support achievement of the SDGs or they could even be formulated as milestones targets for the SDGs.

The Aichi Biodiversity Targets that have not been met by 2020, new and emerging issues, and any conflict caused by competing and contrasting objectives should be reviewed and addressed as far as possible. Ultimately, the post-2020 Strategic Plan for Biodiversity should be complementary in its support to the co-achievement of related global agreements including the 2030 Agenda on Sustainable Development, the Paris Agreement on Climate Change, the New Urban Agenda, the Addis Ababa Action Agenda on Financing for Development and the Sendai Framework for Disaster Risk Reduction 2015–2030.

Definitions

Biodiversity (biological diversity) means 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.¹

Ecosystem means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.²

Ecosystem services are the benefits that people receive from ecosystems. Some of these, such as the Provisioning services (or goods) like food, timber and fresh water, are well-known and routinely included in assessments. Others, such as the Regulating services of carbon storage and sequestration, watershed protection, storm protection and pollination, Supporting services, *i.e.* the natural processes such as nutrient cycling and primary production, or the Cultural services of recreation and spiritual values, are often overlooked because they are to a lesser extent traded in the market and internalized in traditional cost-benefit analyses.³

Resilience is the capacity of a system – be it a forest, city or economy – to deal with change and continue to develop.

Social-ecological systems are linked systems of people and nature. The term emphasizes that humans must be seen as a part of, not apart from, nature — that the delineation between social and ecological systems is artificial and arbitrary.

1 Article 2 of the Convention on Biological Diversity

2 Ibid

3 MA. 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC, USA; TEEB. 2009. The Economics of Ecosystems and Biodiversity for National and International Policy Makers. TEEB, Geneva, Switzerland.

The 2030 Agenda and Biodiversity

In 2015, the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (SDGs) were adopted by world leaders at an historic UN Summit⁴. Over the next fifteen years, these new Goals, that universally apply to all countries, will mobilize efforts to end all forms of poverty, fight inequalities and tackle climate change and environmental protection.

Under the Convention on Biological Diversity (CBD), the Strategic Plan for Biodiversity 2011–2020 and its 20 Aichi Biodiversity Targets were agreed upon by the 196 country parties. This report demonstrates why biodiversity is important for the 2030 Agenda and the synergies between the

Aichi Biodiversity Targets and the SDGs. In addition, it shows how the 2030 Agenda can contribute to the implementation of the current Strategic Plan for Biodiversity 2011–2020 and vice versa, and considers a possible process for the development of a post-2020 framework. It should be emphasised that both should occur in synergy, owing to the importance of not losing momentum in the implementation of the present Strategic Plan and efforts to meet the Aichi Biodiversity Targets by 2020.

Healthy ecosystems – the basis for social and economic development

Biodiversity provides the basis for Earth's natural life-support systems, delivering ecosystem services on which we all depend, such as food, water purification, and climate regulation. In addition, biodiversity is a central component of belief systems and cultural identities worldwide. There is a strong

⁴ <https://sustainabledevelopment.un.org/content/documents/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>

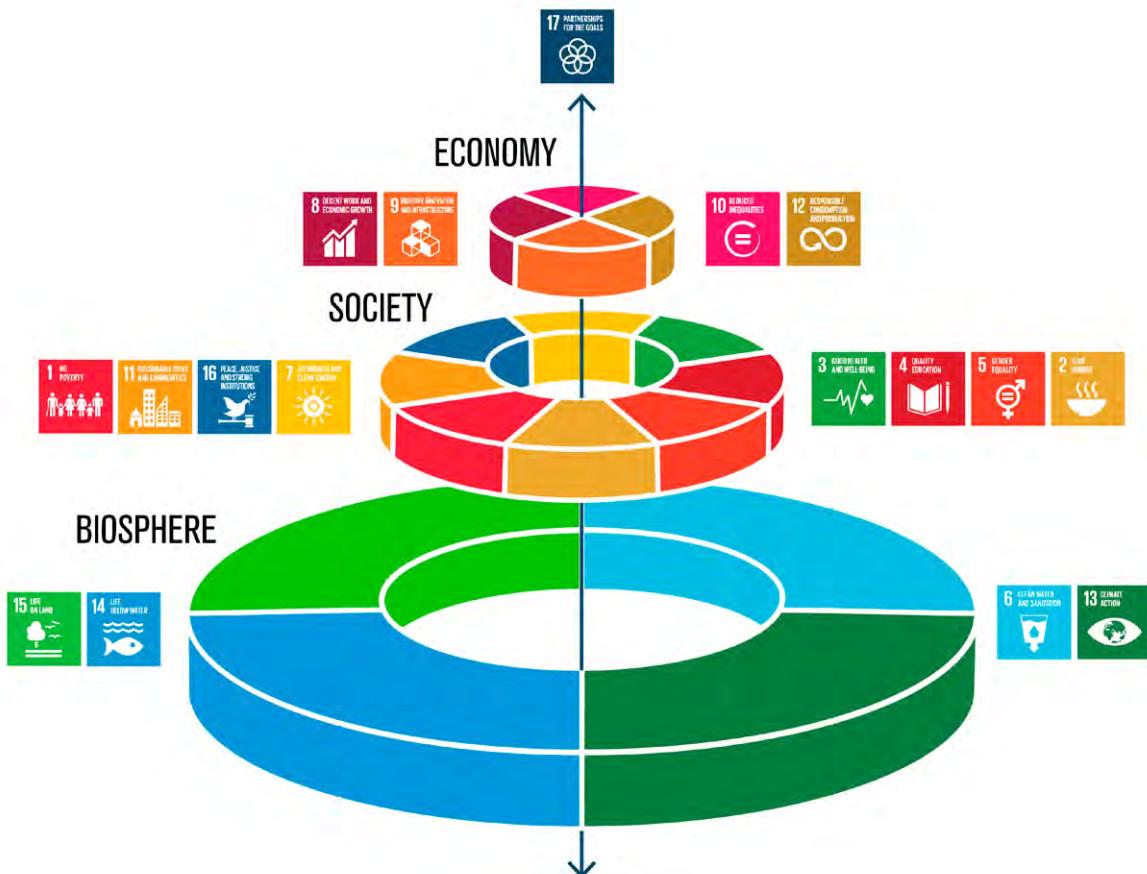


Figure 2. Economy and society are dependent on a healthy biosphere. Source: J. Lokrantz/Azote, in Rockström & Sukhdev (2016)⁵ and Folke et al. (2016)⁶.

⁵ <http://www.stockholmresilience.org/research/research-news/2016-06-14-how-food-connects-all-the-sdgs.html>

⁶ Folke, C., R. Biggs, A. V. Norström, B. Reyers, and J. Rockström. 2016. Social-ecological resilience and biosphere-based sustainability science. *Ecology and Society* 21(3):41.<http://dx.doi.org/10.5751/ES-08748-210341>

relationship between biodiversity and an ecosystem's resilience – meaning the capacity to deal with change and continue to develop.^{7,8}

Healthy and resilient ecosystems are the basis for economic and social development, as Figure 2 illustrates⁹. Loss of biodiversity has potentially devastating effects on food security, business and social wellbeing all over the world. Four of the eight worst global risks are linked to ecosystem changes¹⁰. The rural poor in particular depend heavily on their local ecosystem services for their livelihoods, and the impacts of ecosystem degradation and biodiversity loss affect them severely.

Sound management of biodiversity and ecosystem services is often a highly cost-effective way to achieve both mitigation and adaptation to climate change.^{11,12} Strategies to halt ecosystem degradation now will decrease future costs of restoration, reduce the need for expensive manufactured substitutes to ecological systems, and reduce the costs of responding to humanitarian crises.¹³ Taking insufficient action to address biodiversity loss will risk losing current and future benefits that could become vital in the future.

Rising anthropogenic pressures on the world's ecosystems

Substantial gains in human well-being and economic development have taken place in the last century, but at the expense of

ecosystem degradation¹⁴. Anthropogenic pressures on the Earth system have reached a scale where the risks of abrupt global environmental change can no longer be discounted. The planetary boundaries framework for global sustainability identifies nine Earth system boundaries that together delineate a safe operating space for humanity, helping to secure the future for human well-being and development: climate change; changes in biosphere integrity (biodiversity loss and extinctions); altered biogeochemical flows (interference with the nitrogen and phosphorus cycles); stratospheric ozone depletion; ocean acidification; freshwater use; land-system change; introduction of novel entities (human-made new substances); and atmospheric aerosol loading.^{15,16}

At least four of nine planetary boundaries have now been crossed as a result of human activity: climate change, loss of biosphere integrity, land-system change, and altered biogeochemical cycles (phosphorus and nitrogen). Two of these, climate change and biosphere integrity, are what the scientists call “core boundaries”. Significantly altering either of these would “drive the Earth System into a new state.”^{17,18}

The extinction of species is taking place at an accelerating speed. Nearly a quarter of the planet's plant species are threatened with extinction¹⁹ while global populations of fish, birds, mammals, amphibians and reptiles declined by 58% between 1970 and 2012 and this could increase to 66% by 1970 to 2020²⁰. One recent study under the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) shows that 40% of pollinator species, such as bees and butterflies, face a risk of extinction, with potential devastating consequences for food and livelihoods since 75% of our food crops are dependent on pollinators²¹.

- 7 Elmqvist T, Folke C, Nyström M, Peterson G, Bengtsson J, Walker B and Norberg J. 2003. Response diversity, ecosystem change, and resilience. *Frontiers in Ecology and the Environment* 1(9): 488-494.
- 8 Huitric M (Ed.), Walker B, Moberg F, Österblom H, Sandin L, Grandin U, Olsson P and Bodegard J. 2009. Biodiversity, Ecosystem Services and Resilience – Governance for a Future with Global Changes. Background report for the scientific workshop “Biodiversity, ecosystem services and governance – targets beyond 2010” in Tjärnö, Sweden, 4–6 September 2009. Albaoco, Stockholm, Sweden.
- 9 Folke, C., Jansson, Å., Rockström, J., Olsson, P., Carpenter, S., Chapin, F., Crépin, A.S., Daily, G., Danell, K., Ebbesson, J., Elmqvist, T., Galaz, V., Moberg, F., Nilsson, M., Österblom, H., Ostrom, E., Persson, Å., Peterson, G., Polasky, S., Steffen, W., Walker, B., Westley, F. (2011) Reconnecting to the Biosphere. *AMBIO*, 0044-7447. Doi: 10.1007/s13280-011-0184-y
- 10 WEF. 2014. Global Risks 2014. World Economic Forum, Cologny, Switzerland.
- 11 CCCD. 2009. Closing the Gaps: Disaster risk reduction and adaptation to climate change in developing countries. Secretariat of the Commission on Climate Change and Development, Ministry for Foreign Affairs, Stockholm, Sweden
- 12 Trumper, K., Bertzky, M., Dickson, B., van der Heijden, G., Jenkins, M., Manning, P. 2009. The Natural Fix? The role of ecosystems in climate change mitigation. UNEP-WCMC, Cambridge, UK.
- 13 CBD. 2014. Resourcing the Aichi Biodiversity Targets, An Assessment of Benefits, Investments and Resource needs for Implementing the Strategic Plan for Biodiversity 2011–2020, Second Report of the High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011–2020. Secretariat of the Convention on Biological Diversity, Montréal, Canada.

- 14 MA. 2005. Millennium Ecosystem Assessment. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC, USA.
- 15 Rockström, J., Steffen, W., Noone, K., et al. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14, 32. <http://www.ecologyandsociety.org/vol14/iss2/art32/main.html>.
- 16 Steffen et al. 2015. Planetary Boundaries: Guiding human development on a changing planet. *Science*, January 2015.
- 17 Rockström, J., Steffen, W., Noone, K., et al. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14, 32. <http://www.ecologyandsociety.org/vol14/iss2/art32/main.html>.
- 18 Steffen et al. 2015. Planetary Boundaries: Guiding human development on a changing planet. *Science*, January 2015.
- 19 CBD. 2010. Global Biodiversity Outlook 3. Secretariat of the Convention on Biological Diversity, Montréal, Canada.
- 20 WWF. 2016. Living Planet Report 2016. Risk and resilience in a new era. WWF International, Gland, Switzerland.
- 21 IPBES. 2016. Summary for policymakers of the assessment report of the intergovernmental science-policy platform on biodiversity and ecosystem services (IPBES) on pollinators, pollination and food production. IPBES, Bonn Germany. http://www.ipbes.net/sites/default/files/downloads/pdf/SPM_Deliverable_3a_Pollination.pdf

Crop and livestock genetic diversity continues to decline, as well as traditional knowledge and practices associated with biodiversity and ecosystem services²². Humans increasingly depend on fewer crops to cater for their survival, creating a system that is more vulnerable and less resilient to changes.

Causes of biodiversity loss include a lack of policy coherence, pollution, overexploitation such as overfishing, and other unsustainable practices in agriculture, forestry and fisheries. Agriculture accounts for 70% of the projected loss of terrestrial biodiversity, and a growing world population will put further pressure on food production systems through rapidly raising food demand. Addressing trends in food production

²² CBD. 2010. Global Biodiversity Outlook 3. Secretariat of the Convention on Biological Diversity, Montréal, Canada.

Well functioning ecosystems are relevant to achieve all the Goals, exemplified here with reference to targets that are especially important.

*Read more about the targets at: un.org/sustainable-development/sustainable-development-goals

Goal 1. Biodiversity is crucial for all humanity and essential for the poorest as it contributes directly to economic development and local livelihoods. (See targets 1.4 & 1.5)

Goal 7. Biofuels and hydropower investments increase access to clean energy but can put pressure on biodiversity and ecosystems. (See target 7.2)

Goal 8. Biodiversity and ecosystem services are crucial for long-term sustainable economic growth. (See targets 8.4 & 8.9)

Goal 9. Many future innovations will be nature based. Biodiversity and healthy ecosystems provide cost-effective natural infrastructure, such as wetlands for bio-filtration and improved water quality, or forests for storm and water management. (See targets 9.1, 9.4, 9.5 & 9.a)

Goal 2. A rich biodiversity is the foundation of food security. Crop varieties and animal breeds are based on genetic diversity, and biodiversity upholds basic functions such as pollination, soil fertility and pest control. (See targets 2.1, 2.3, 2.4, 2.5 & 2.a)

Goal 3. Functioning ecosystems help mitigate the spread and impact of certain types of air, water and soil pollution. Many medicines originate from natural substances. A varied diet from a diversity of crops and animals is more nutritious. (See target 3.9)



Goal 13. Biodiversity and ecosystem services have a key role in mitigating and adapting to climate change. Mainstreaming them in Nationally Determined Contributions (NDCs) under the UNFCCC offers an opportunity. (See targets 13.1, 13.a & 13.b)

Goal 14. This goal explicitly deals with marine and coastal ecosystems and biodiversity. Sound management of these ecosystems is essential for the sustainable use of ocean resources. (See all targets under Goal 14)

Figure 3. Biodiversity and ecosystem services are relevant for all SDGs. Source: Adapted from various sources including CBD Secretariat²³ and Sida²⁴.

²³ CBD. 2016. Biodiversity and sustainable development: technical note. UNEP/CBD/COP/13/10/ADD1. Secretariat of the Convention on Biological Diversity, Montréal, Canada.

²⁴ Sida. 2016. Agenda 2030 and Ecosystems. Sida, Stockholm, Sweden.

and consumption is therefore crucial, especially when striving to eradicate hunger.²⁵

Biodiversity and ecosystem services are relevant for all SDGs

Biodiversity is a cross-cutting issue and relevant for the

achievement of all the SDGs, see Figure 3. Paragraph 33 of the Agenda 2030 document focuses entirely on biodiversity, ecosystems and related matters, and biodiversity and ecosystems feature prominently in the 2030 Agenda. The analysis below demonstrates the degree to which the Aichi Biodiversity Targets are integrated in the SDGs.

25 CBD. 2014. Global Biodiversity Outlook 4. Secretariat of the Convention on Biological Diversity, Montréal, Canada.

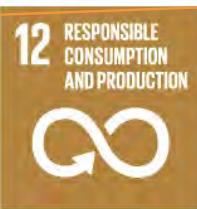
Goal 4. Addressing the drivers of biodiversity loss requires behavioural change; awareness and learning about the values of biodiversity are therefore important. (See targets 4.7 & 4.b)

Goal 5. Understanding the different roles of men and women is essential when working with natural resources. Strengthening women's rights and access to natural resources are often critical for food security. (See targets 5.1, 5.5 & 5.a)

Goal 6. Biodiversity and healthy ecosystems contribute to the provision of clean drinking water and regulate water availability, including during the extremes of drought and flood. Natural water infrastructure including the conservation and restoration of ecosystems, such as forested watersheds and wetlands, is part of an integrated approach to water management. (See targets 6.3, 6.4, 6.5 & 6.6)



Goal 10. Analysis of who benefits from ecosystems, and who bears the burden of negative impacts, is needed to reduce inequality within and among countries. (See targets 10.1, 10.2, 10.5, 10.6 & 10.b)



Goal 11. Biodiversity and ecosystem services are essential in urban planning, underpinning functions such as water and food supply, regulating temperature, and reducing flooding and other disaster risks. Nature-based solutions will become increasingly important as the world's urban population rapidly grows. (See targets 11.3, 11.4, 11.7, 11.a & 11.b)



Goal 12. Healthy ecosystems provide us with ecosystem services that are the basis for sustainable consumption and production. Sustainable consumption and production is also needed in order to ensure their long-term availability. (See targets 12.2, 12.4, 12.8 & 12.a)

Goal 15. This goal explicitly deals with terrestrial ecosystems and biodiversity. Achievement of this Goal underpins success for all the SDGs. (See all targets under Goal 15)

Goal 16. Most poor people's livelihoods depend on access to natural resources. Equity in access to these benefits, and to justice and accountable institutions, are vital to exercise rights to food, water, etc. (See targets 16.3, 16.5, 16.6, 16.7 & 16.8)

Goal 17. The Addis Ababa Action Agenda on Financing for Development refers to the CBD and its strategy for resource mobilisation that includes phasing out harmful subsidies, and introducing positive incentives and mechanisms such as Payment for Ecosystem Services, Green Markets, and synergies with climate financing, along with safeguards considering e.g. access to resources and livelihoods. (See e.g. target 17.7)

The role of biodiversity in the SDGs

The following section provides a summary of the role of biodiversity and ecosystems in each of the SDGs. Where relevant, individual SDG Targets that were identified as having a particular dependence on ecosystems are provided in boxes below each SDG. Targets *in italics* are considered to have a tangential link, and are not discussed further in the analysis.

Goal 1. End Poverty in all its forms everywhere

Biodiversity and healthy ecosystems provide a main source of livelihoods for many of the world's poorest, and also have a key role in reducing the risks of and impacts from natural disasters.²⁶

As mentioned above, biodiversity also plays a crucial role in sustaining the resilience of ecosystems to cope with disturbance and change. By safeguarding critical resources and ecosystem functions, the chances of 'riding through' shocks – such as extreme events – increase²⁷. This is of critical importance considering future uncertainty and limited understanding of the vulnerability generated by anthropogenic change.

In many traditional cultures, resilience is embedded in knowledge and practices. For instance, farmers safeguard food security and incomes by spreading their risks when planting many different kinds of crops and varieties along with home gardens and using a range of different non-timber forest products. This diversity serves as a base and insurance for livelihoods.²⁸

The international study *The Economics of Ecosystems and Biodiversity* (TEEB) has studied the welfare loss associated with ecosystem degradation, see Box 1.

Box 1. The Economics of Ecosystems and Biodiversity

The Economics of Ecosystems and Biodiversity (TEEB) study found that ecosystem damage carries costs for business and society. For example, they estimated that competition between highly subsidised industrial fishing fleets coupled with poor regulation and weak enforcement of existing rules has led to over-exploitation of most commercially valuable fish stocks, reducing the income from global marine fisheries by US\$50 billion annually, compared to a more sustainable fishing scenario. However, some positive trends are also visible. Green products and services represent a new market opportunity – global sales of organic food and drink have recently been increasing by over US\$5 billion a year, reaching US\$46 billion in 2007; the global market for eco-labelled fish products grew by over 50% between 2008 and 2009; and ecotourism is the fastest-growing area of the tourism industry with an estimated increase of global spending of 20% annually.²⁹

The importance of biodiversity for ending poverty is also explicitly recognized in Target 15.9, which calls for the integration of biodiversity and ecosystem values into national and local planning, development processes, poverty reduction strategies and accounts.

Investments in biodiversity can buffer against uncertain and accelerating future environmental change, and maintain and enhance future development options. Conservation and sustainable use of biodiversity are important, not just for the range of services that ecosystems currently provide, but also because of their insurance and potential option values for mitigating risks, and for development opportunities. Thus healthy, functional and resilient ecosystems are increasingly being seen as a 'life insurance' policy for many communities, providing benefits across sectors, including disaster risk reduction, food security, sustainable water management, and diversification of livelihoods. Failing to invest in biodiversity now will increase the risks and costs in the future.

SDG1 Targets with most relevant links to ecosystems:

- 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and

²⁶ CBD. 2016. Biodiversity and sustainable development: technical note. UNEP/CBD/COP/13/10/ADD1. Secretariat of the Convention on Biological Diversity, Montréal, Canada.

²⁷ Elmqvist T, Folke C, Nyström M, Peterson G, Bengtsson J, Walker B and Norberg J. 2003. Response diversity, ecosystem change, and resilience. *Frontiers in Ecology and the Environment* 1(9): 488-494.

²⁸ SwedBio. 2009. Contributing to Resilience: Results and experience from the SwedBio Collaborative Programme 2003–2008, Swedish Biodiversity Centre, Uppsala, Sweden.

²⁹ TEEB. 2010. *The Economics of Ecosystems and Biodiversity: Mainstreaming the Economics of Nature: A synthesis of the approach, conclusions and recommendations of TEEB*.

financial services, including microfinance

- 1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture

Biodiversity is essential to food provision and is an important determinant of food quality. The different crop varieties and animal breeds used in agriculture around the world are derived from the world's genetic diversity. In addition, biodiversity directly supports agriculture systems by helping to ensure soil fertility, pollination and pest control.

"A well-managed agricultural system delivers food but also other benefits such as pollination, flood control and erosion control. Protecting biodiversity and ecosystem services enhances long-term food security. Healthy ecosystems ensure productive agriculture and nutritious food."

FAO, 2016

More than 3 billion people – almost half of the world's current population – live in rural areas. Roughly 2.5 billion of these rural people derive their livelihoods from agriculture³⁰. This includes the diverse practices of cultivating crops, raising livestock, farming or catching fish, gathering fruits and other trees crops. An increasing world population will put further pressure on food production systems through rapidly rising food demand – expected to increase by 70% by 2050 – in order to eradicate hunger in a world populated by 9 billion people by 2050.³¹

Local food production plays a critical role in sustaining livelihoods, contributing to food security and food sovereignty, promoting rural development and reducing the amount of money people have to spend on purchasing food. Important sources of nutrition come from wild foods and a diversity of species, varieties and breeds. For instance, marine resources provide essential sources of protein, fats and minerals for many coastal and inland populations. Forest products provide important foods such as honey, bushmeat and fruits. A report by the CBD and WHO (2015) noted that such wild foods are particularly important to households during periods of shock, for example when there is famine caused by droughts, crop failure or civil unrest.³²

30 FAO. 2013. Statistical Yearbook, 2013, World Food and Agriculture, Food and Agriculture Organisation of the United Nations, Rome, Italy. <http://www.fao.org/docrep/018/i3107e/i3107e01.pdf>

31 FAO 2006. World agriculture towards 2030/2050: Interim Report. FAO, Rome, Italy

32 FAO 2006. World agriculture towards 2030/2050: Interim Report. FAO, Rome, Italy

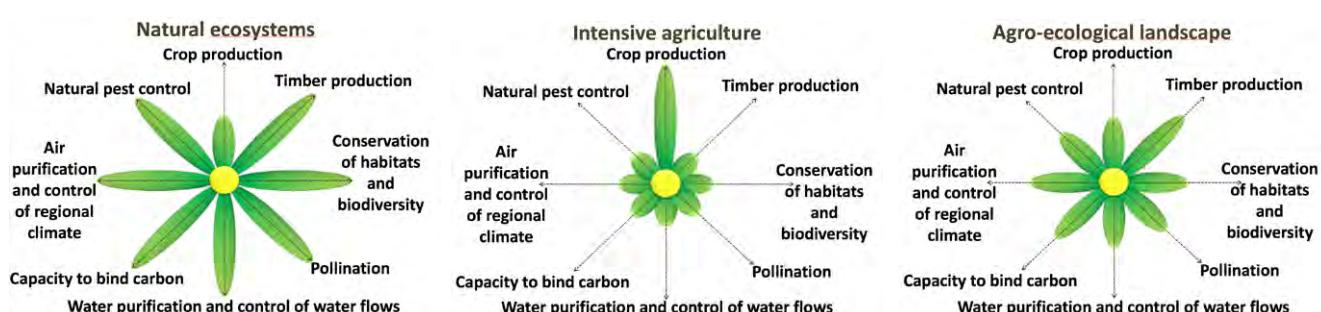


Figure 4. Land use changes impact on the capacity to deliver ecosystem services. A broad array of services from different ecosystems such as forests, croplands and wetlands, are critical to ensure fresh water, stable climate, pollination and long term sustainable food production. The diagrams illustrate how land use planning can ensure sustained ecosystem services together with a diversity of food. Image: Crimella/Schultz in Schultz 2016, TemaNord 016:525³³

33 Schultz, M., Häggblom, M., Lindblad, C., Roth, E., Thrainsson, S., Vihervaara, P. & Vik, N. 2016. Framing a Nordic IPBES-like study: Introductory Study including Scoping for a Nordic Assessment of Biodiversity and Ecosystem Services, based on IPBES methods and procedures. TemaNord 2016:525. <https://www.diva-portal.org/smash/get/diva2:932688/FULLTEXT01.pdf>

Research shows that the degree of diversification within cropping systems can have important effects on crop productivity. Yields can reduce between 3 to 57% for major crops grown in short rotation sequences and monocultures as compared to those in extended rotation sequences that included multiple crop species³⁴. Lower productivity in less diverse rotations was attributed to numerous interactive factors, including increased prevalence and greater damage from insect pests and weeds, soil compaction, nutrient depletion and loss of fertility, and reduced soil water availability.³⁵

Sustainably producing food for a growing world population will therefore require several challenges to be met,³⁶ such as:

- remaining within the safe operating space of the planetary boundaries, particularly with regards to the rate of loss of biodiversity, land-use change, freshwater use, interference with the global nitrogen and phosphorus cycles, and climate change;
- the conservation and sustainable use of biodiversity, including agricultural diversity of seed varieties, livestock breeds and diversified farming systems;
- increasing the productivity of agricultural landscapes while strengthening biocultural diversity and maintaining ecosystem resilience, by preserving flows of ecosystem services (soil fertility, and the production of nutritious foods, fibres, energy crops, medicine and construction materials) through the innovative integration of traditional and modern practices for managing land, water, crops and livestock (e.g. animal health care, natural pest control, water conservation and storage techniques);
- strengthening food sovereignty, including right to productive resources and food, and social cohesion and equity.³⁷

SDG2 Targets with most relevant links to ecosystems:

- 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations,

³⁴ Bennett, A.J., Bending, G.D., Chandler, D., Hilton, S. & Mills, P. 2012. Meeting the demand for crop production: the challenge of yield decline in crops grown in short rotations Biological Reviews 87: 52–71. See more at: <http://elementascience.org/article/info:doi/10.12952/journal.elementa.000041#sthash.bxD0g0Q.dpuf>

³⁵ Liebman, M. & Schulte, L.A., 2015. Enhancing agroecosystem performance and resilience through increased diversification of landscapes and cropping systems. *Elem. Sci. Anth.* 3: 000041 doi: 10.12952/journal.elementa.000041 - See more at: <http://elementascience.org/article/fetchArticleInfo.action?articleURI=info%3Adoi%2F10.12952%2Fjournal.elementa.000041#sthash.Dq1NQ0q5.dpuf>

³⁶ Rockström, J. & Schultz, M. 2011. Contributing to Resilience. Chapter in Djoghlaf, A. and F. Dodds. 2011. *Biodiversity and Ecosystem Insecurity: A Planet in Peril*. Earthscan, London, UK.

³⁷ Windfuhr, M. and Jonzén, J. 2005 *Food Sovereignty. Towards democracy in localized food systems*. Working paper. ITDG Publishing, Bradford, UK.

including infants, to safe, nutritious and sufficient food all year round

- 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment
- 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality
- 2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed
- 2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries
- 2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round

Goal 3. Ensure healthy lives and promote well-being for all at all ages

There is increasing recognition of the link between biodiversity and human health. The use of herbal medicine remains an integral part of many cultures, and many of the plant species used have verified healing properties. Between 25% and 50% of commercial drugs originate from natural substances.³⁸

An evaluation by the World Health Organisation concluded that there is a need for sustainable use and cultivation of me-

³⁸ Kingston, D.G.I., 2011. Natural products drug discovery: Challenges and strategies in the era of the convention on biological diversity. Abstracts of Papers of the American Chemical Society 241



Traditional medicines are based on natural resources and form integral parts to many cultures. From: Xi'an, China - Traditional Medicine Market.
Image © Joel/Flickr

dicinal plant species in order to protect them³⁹. Protection of biodiversity, in particular in forest ecosystems, is important not only to avoid the risk of extinction of known medicinal plants, but also to protect plant species that could have future medicinal value.

Intact ecosystems and biodiversity help mitigate the spread and impact of pollution, by both sequestering and eliminating certain types of air, water and soil pollution⁴⁰.

Urban biodiversity and access to natural spaces are also increasingly important in a world with ever-increasing city dwelling populations. The review by the CBD & WHO (2015) highlighted the ability to interact with green spaces and the species that live within them as a recognised form of enhancing well-being for billions of people on the planet.⁴¹

As concluded by the Lancet Commission on Health and Climate change, 2015⁴², ecosystems and their services also contribute to human health in multiple ways when they act as buffers, increasing the resilience of social-ecological system to climate-induced hazards and disasters.

³⁹ WHO. 2003. WHO guidelines on good agricultural and collection practices(GACP)for medicinal plants. WHO, Geneva, Switzerland.

⁴⁰ CBD. 2016. Biodiversity and sustainable development. Technical note UNEP/CBD/COP/13/10/ADD1. CBD, Montreal, Canada

⁴¹ WHO and CBD, 2015. Connecting Global Priorities, Biodiversity and Human Health, Summary of the State of Knowledge Review. CBD, Montreal, Canada.

⁴² [http://www.thelancet.com/journals/lancet/article/P11S0140-6736\(15\)60854-6/fulltext](http://www.thelancet.com/journals/lancet/article/P11S0140-6736(15)60854-6/fulltext)

In summary, biodiversity can actually be considered as the foundation for human health as it underpins the functioning and resilience of the ecosystems on which we depend for nutritious food and clean water; climate regulation; floods and disease control; as well as aesthetic, recreational and spiritual enrichment.

SDG3 Targets with most relevant links to ecosystems:

- 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Education systems provide a vital channel for raising awareness on the importance of biodiversity for sustainable development⁴³. Addressing the direct and underlying drivers of biodiversity loss will ultimately require behavioural change by individuals, organisations and governments. Understanding, awareness and appreciation of the diverse values of biodiversity, underpin the willingness of individuals to make the necessary behaviour changes and to take action to create the “political will” for governments to act. There are a variety of communication and outreach vehicles which could be used to support this learning, including capacity development and empowerment, public awareness, and action learning.

⁴³ CBD. 2016. Biodiversity and sustainable development. Technical note UNEP/CBD/COP/13/10/ADD1. CBD, Montreal, Canada

Biodiversity and cultural diversity are closely linked. Global analyses have established that areas of high biological diversity co-occur with areas of high diversity of languages and cultures. This association between biological and cultural diversity is encapsulated in the term “biocultural diversity”. The term denotes three key concepts: (1) the diversity of life includes human cultures and languages; (2) biological diversity and cultural diversity share common links; and (3) these links have developed over time through mutual adaptation and possibly co-evolution.⁴⁴

Biocultural diversity recognises that the indigenous peoples and local communities in many biodiversity hotspots and world heritage sites are integral to shaping and maintaining biodiversity values^{45, 46}. Linguistic diversity is a well-recognised carrier of localised knowledge as a critical aspect of cultural diversity. It is also adapted as a proxy indicator for traditional knowledge related to biodiversity. Also, culinary practices and, more generally, food-based practices are increasingly looked at as a manifestation of how biological and cultural diversity are blended^{47, 48} and can be the source of innovation and alternative development trajectories⁴⁹. Local seed varieties have been a vital part of the rituals and traditions of indigenous peoples and local communities over generations. For these communities, seed is sacred. Local and indigenous farmers are continuously breeding and adapting their own highly diverse and nutritious varieties of crops as base for their food and cultures. Diversity is one of the most critical aspects of resilience. If a particular variety is affected by a shock in the climate, the remaining varieties of seeds and crops will ensure that the farmer still reaps a yield that year; this is also part of their insurance value.

SDG4 Targets with most relevant links to ecosystems:

- 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable develop-

ment, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and

of culture's contribution to sustainable development

- 4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries

Goal 5. Achieve gender equality and empower all women and girls

Recognizing women's roles as key land and resource managers is central to sustainable development. Just as the impact of biodiversity loss is disproportionately felt by poorer communities, there are also disparities along gender lines. Biodiversity loss can perpetuate gender inequalities by reducing the ability of women and children to attend schools or hold other roles within society by increasing the time spent performing certain tasks, such as collecting valuable resources including fuel, food and water⁵⁰.

“Women are the custodians of seed savings, ensuring food security and genetic diversity”

Sabrina Nafisa Masinjila, African Centre for Biodiversity. Source: Farming matters 12/2015

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- 44 Maffi, L., Woodley, E. 2010. Biocultural Diversity Conservation: A Global Sourcebook .Earthscan.
- 45 Hill, R., Cullen-Unsworth, L.C., Talbot, L.D. & McIntyre-Tamwoy, S. 2011. Empowering Indigenous peoples' biocultural diversity through World Heritage cultural landscapes: a case study from the Australian humid tropical forests, International Journal of Heritage Studies, 17 (6): 571-591
- 46 Maffi, L., & Woodley, E. 2010. Biocultural diversity conservation: A global sourcebook. Earthscan, London, UK.
- 47 <http://www.stockholmresilience.org/research/research-news/2015-04-21-recipes-for-resilience.html>
- 48 Bridgewater, P., Arico, S. & Scott, J. 2007. Biological Diversity and Cultural Diversity: The Heritage of Nature and Culture through the Looking Glass of Multilateral Agreements, International Journal of Heritage Studies, 13:4-5, 405-419, DOI:
- 49 Van Oudenoven, F.J.W. & Haider, L.J. 2012. Imagining alternative futures through the lens of food: The Afghan and Tajik Pamir Mountains. La Revue d'Ethnoecologie 1 (2).

Strengthening women's rights and access to resources such as biodiversity and land are not only human rights issues, but also critical factors for food security. Women constitute 43% of the total agricultural labour force in developing countries⁵¹. In this aspect, understanding of the different roles of men and women in the family and the community in terms of labour, tenure rights and decision-making processes, is es-

50 CBD. 2016. Biodiversity and sustainable development. Technical note UNEP/CBD/COP/13/10/ADD1. CBD, Montreal, Canada

51 CBD 2016. International Day for Biodiversity materials. CBD, Montreal, Canada.

sential when working with social-ecological landscapes and their natural resources. Rural women and men have different roles, responsibilities, and knowledge, in managing agricultural biodiversity resulting in different needs, priorities, and concerns. Generally – but not always – men are more involved in agriculture, for commercial purposes, whereas women often work with subsistence crops, vegetable gardens, and small livestock. Women are often crucial for local seed systems, and women collect plants and animals to feed and cure their families. Women, therefore, play an important role in maintaining biodiversity and the related local and traditional knowledge.⁵²

SDG5 Targets with most relevant links to ecosystems:

- *5.1 End all forms of discrimination against all women and girls everywhere*
- *5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life*
- *5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws*

Goal 6. Ensure the availability and sustainable management of water and sanitation for all

Ecosystems can play a vital role as natural water infrastructure that can help provide sustainable and low-cost solutions for pressing water problems. Water-related ecosystem services, including the sustainable supply of clean freshwater, are delivered through ecosystem functions underpinned by biodiversity and healthy ecosystems. For example, they contribute to providing clean drinking water and regulate the availability of water, including in the extremes of drought and flood. Ecosystems also help to reduce pollutants.

The conservation and restoration of ecosystems is increasingly seen as part of an integrated approach to water management. Restoring ecosystems, such as forested watersheds and wetlands, is one means of ensuring the continued availability and quality of water. There is a need for an ecosystem-based

52 World Bank, FAO & IFAD. 2009. Gender in agriculture sourcebook. The World Bank, Food and Agriculture Organisation, and International Fund for Agricultural Development, Washington DC, USA.

paradigm of water governance, encouraging land-use practices that explicitly take account of the multifunctional roles of water.^{53,54}

SDG6 Targets with most relevant links to ecosystems:

- *6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally*
- *6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity*
- *6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate*
- *6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes*

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all

The increasing production of cash crops like biofuels is raising the demand for land worldwide, creating a new pressure on ecosystems through land cover changes. Agricultural land is increasingly subjected to being “grabbed” (bought/leased at very large scale) by countries or companies, with demand for renewable energy as a main driver. One example is the clearing of tropical forests in Indonesia for oil palm plantations, which has caused extensive environmental damage and loss of biodiversity. This makes food security into an increasing challenge, for example in Africa, where already most of the world’s undernourished people are living. It is important to emphasize pro-poor solutions that consider ecological, social and equity aspects when working with the linkages to energy and climate change.

Options for minimising the impacts on biodiversity should be considered in efforts to increase renewable energy schemes to address the energy challenge. For instance, hydro-

53 CBD. 2016. Biodiversity and sustainable development. Technical note UNEP/CBD/COP/13/10/ADD1. CBD, Montreal, Canada

54 Rockström, J., M. Falkenmark, T. Allan, C. Folke, L. Gordon, A. Jägerskog, M. Kummu, M. Lannerstad, M. Meybeck, D. Molden, S. Postel, H. H. G. Savenije, U. Svedin, A. Turton, O. Varis. 2014. The unfolding water drama in the Anthropocene: Towards a resilience-based perspective on water for global sustainability. *Ecohydrology* 7(5): 1249-1261.

electric schemes should allow for fish migrations as well as the traditional fishing practices of local communities, and bird flyways should not be hindered by wind turbines.

SDG7 Targets with most relevant links to ecosystems:

- 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Healthy ecosystems are the basis for economic and social development, as biodiversity supports the delivery of ecosystem services on which we all depend⁵⁵. Conservation, sustainable use and resource efficiency are all vital for ensuring the long-term availability of ecosystem services. Healthy ecosystems also contribute to green jobs. The International Labour Organisation (ILO) describes green jobs as decent jobs that contribute to preserve or restore the environment, be they in traditional sectors such as manufacturing and construction, or in new, emerging green sectors such as renewable energy and energy efficiency⁵⁶. Tourism is a growing economic sector and sustainable tourism can contribute to conservation and sustainable use of biodiversity. The industry also benefits from healthy ecosystems, as they are often tourist destinations.

SDG8 Targets with most relevant links to ecosystems:

- 8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead
- 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Biodiversity and healthy ecosystems can provide reliable and cost-effective green infrastructure that can be resilient to

⁵⁵ Folke, C., Jansson, Å., Rockström, J., Olsson, P., Carpenter, S., Chapin, F., Crépin, A.S., Daily, G., Danell, K., Ebbesson, J., Elmquist, T., Galaz, V., Moberg, F., Nilsson, M., Österblom, H., Ostrom, E., Persson, Å., Peterson, G., Polasky, S., Steffen, W., Walker, B., Westley, F. (2011) Reconnecting to the Biosphere. AMBIO, 0044-7447. Doi: 10.1007/s13280-011-0184-y

⁵⁶ http://www.ilo.org/global/topics/green-jobs/news/WCMS_220248/lang--en/index.htm

shocks from a changing climate⁵⁷. Examples include coastal zone and river margin habitats (e.g. mangrove forests) that provide flood risk protection and stormwater management; and urban green spaces that help protect against heat stress and air pollution, provide local food, and protect biodiversity.

SDG9 Targets with most relevant links to ecosystems:

- 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
- 9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities
- 9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States

Goal 10. Reduce inequality within and among countries

While inequality can take many forms, it can be reduced by permitting all members of society access to basic services and the sustainable use of natural resources, and allowing people to build their own resilience. Energy independence and food security are important facets of reducing inequality. In addition, disaster risk reduction through the effective management of ecosystems means that shocks can be borne without severe loss of livelihoods and well-being. Further analysis is needed to understand who are the beneficiaries from ecosystems⁵⁸, and who bears the burden of negative impacts in order to reduce inequality within and among countries.

SDG10 Targets with most relevant links to ecosystems:

- 10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average.1 Develop quality,

⁵⁷ Das, S., Crépin, A.-S. Mangroves can provide protection against wind damage during storms. Estuarine, Coastal and Shelf Science (2013), <http://dx.doi.org/10.1016/j.ecss.2013.09.021> <http://www.stockholmresilience.org/research/research-news/2013-12-10-shelter-from-the-storm.html>

⁵⁸ Daw, T., Brown, K., Rosendo, S. & Pomeroy, R. 2011. Applying the Ecosystem Services Concept to Poverty Alleviation: The Need to Disaggregate Human Well-Being. Environmental Conservation 38 (4): 370-379. doi:10.1017/S0376892911000506. <http://www.stockholmresilience.org/research/research-news/2011-11-10-ecosystem-services-but-for-whom.html>

reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all

- *10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status*
- *10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the implementation of such regulations*
- *10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions*
- *10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes*

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Biodiversity is essential for the functioning and well-being of cities and other human settlements, underpinning the core natural resources, such as water and food supply, regulating temperature and absorbing pollution, reducing disaster risk, and providing healthy urban environments. Urban planning that integrates consideration of the role of biodiversity will be extremely important as urban populations grow over the coming years.⁵⁹

According to the Cities and Biodiversity Outlook⁶⁰ (CBO) – the world's first scientific assessment of global urbanization trends and the role of biodiversity and ecosystem-based management for human well-being – 70 percent of the world's population is expected to become urban by 2050. The growth is expected to take place mainly in areas that currently have limited financial, knowledge and infrastructural resources, and often affecting biodiversity-rich areas. Africa is the world's most rapidly urbanizing continent, with current estimations showing an eight-fold increase in urban land cover over the period 2000–2030. The rapid urbanization will pose significant challenges to meet several basic needs

such as food and fresh water provisioning, and to support a development built on equity, sustainable resource consumption, and rich biodiversity.

At the same time there are unprecedented opportunities for 'greening', innovation, and joint collaboration among actors. The CBO concludes that more than 60 percent of the area projected to be urban in 2030 has yet to be built. Integrating ecological knowledge in the future design of urban landscapes will be essential.

SDG11 Targets with most relevant links to ecosystems:

- *11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries*
- *11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage*
- *11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations*
- *11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities*
- *11.a Support positive economic, social and environmental links between urban, per-urban and rural areas by strengthening national and regional development planning*
- *11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels*

Goal 12. Ensure sustainable consumption and production patterns

Healthy ecosystems are the basis for sustainable consumption and production. In turn, sustainable consumption and production is needed in order to minimize negative effects on biodiversity and ensure the long-term availability of the benefits that healthy ecosystems provide. Failing to recognize the links between ecosystems and consumption and production patterns leads to problems with economic externalities, where the costs of harm and damage are not reflected in product prices, and are not corrected by market adjustments

59 CBD. 2016. Biodiversity and sustainable development. Technical note UNEP/CBD/COP/13/10/ADD1. CBD, Montreal, Canada

60 Elmqvist, T., Fragkias, M., Goodness, J., Güneralp, B., Marcotullio, P.J., McDonald, R.I., Parnell, S., Schewenius, M., Sendstad, M., Seto, K.C. & Wilkinson, C. (Eds.) Urbanization, Biodiversity and Ecosystem Services: Challenges and Opportunities. Springer, Dordrecht, www.cbobook.org



Urban vegetation cools buildings, provides food and prevents flooding. Namba Parks, Osaka, Japan. Image ©: Amanda Peterson/Flickr

(such as the “polluter pays” principle). If the links are recognized, the sustainable use of biodiversity and ecosystem services can underpin continued economic development that is equitable, and resilient against shocks such as climate change and financial market fluctuations.

Interestingly, as discussed by Lenzen et al. (2012)⁶¹, species threats driven by consumption and exerted through international supply chains are growing significantly, and they conclude that in many developed countries the consumption of goods such as coffee, tea, sugar and textiles cause larger threats to biodiversity abroad than their domestic species threats.

SDG12 Targets with most relevant links to ecosystems:

- 12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries
- 12.2 By 2030, achieve the sustainable management and efficient use of natural resources
- 12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment
- 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
- 12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production
- 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities

61 Lenzen, M, et al. 2012. International trade drives biodiversity threats in developing nations. *Nature* 486: 109-112

Goal 13. Take urgent action to combat climate change and its impacts

Sustainable development policies and actions need to be emphasized even further in the light of climate change. Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems⁶², see Box 2.

These effects of climate change severely aggravate existing development challenges. The poorest countries and the poorest people are most vulnerable to the effects of climate change. IPCC predicts that changes in rainfall patterns and rising temperatures in some countries in Africa may lead to up to a 50% reduction in yields from rain-fed agriculture by 2020.⁶³

The central aim of the Paris Agreement⁶⁴ is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change.

Biodiversity and ecosystem services have a key role and potential in adaptation to and mitigation of climate change. All parties are to undertake and communicate ambitious efforts as nationally determined contributions (NDCs) to the global response to climate change. The opportunity for mainstreaming biodiversity and nature-based solutions into climate change mitigation and adaptation at national contexts is sizeable.

62 IPCC, 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland.

63 IPCC, 2007: Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland.

64 UNFCCC, 2015. Adoption of the Paris Agreement. FCCC/CP/2015/L.9/Rev.1 <https://unfccc.int/resource/docs/2015/cop21/eng/l09r01.pdf>

Box 2. Climate Change and Ecosystems⁶⁵

Impacts from recent climate-related extremes, such as heat waves, droughts, floods, cyclones and wildfires, reveal significant vulnerability and exposure of some ecosystems and many human systems to current climate variability.

Climate change affects marine life. Ocean acidification will increase for centuries if CO₂ emissions continue, and will strongly affect marine ecosystems. Marine organisms will face progressively lower oxygen levels and high rates and magnitudes of ocean acidification, and coral reefs and polar ecosystems are highly vulnerable. Coastal systems and low-lying areas are at risk from sea-level rise, which will continue for centuries even if the global mean temperature is stabilised.

On land, climate change is projected to undermine food security. For wheat, rice and maize in tropical and temperate regions, climate change without adaptation is projected to negatively impact production.

In urban areas, climate change is projected to increase risks for people, assets, economies and ecosystems, including risks from heat stress, storms and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, sea-level rise, and storm surges.

Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions, which, together with adaptation, can limit climate change risks. Examples of actions with co-benefits include sustainable agriculture and forestry; and protection of ecosystems for carbon storage and other ecosystem services. There is increasing recognition of the value of social (including local and indigenous), institutional, and ecosystem-based measures and of the extent of constraints to adaptation.

Living vegetation, dead plant matter and the top two metres of soils together have been estimated to contain between 2,850 and 3,050 gigatonnes of carbon (Gt CO₂). Significant amounts of carbon (over 2,000 Gt) are also stored at depths greater than 2 m in peatland soils and permanently frozen ground (permafrost), as pointed out by, and this compares with around 830 Gt C that are out in the atmosphere in the form of greenhouse gases⁶⁶.

There are a number of possible win-win options for climate, environment and development (see Box 3), related to increasing the flow of ecosystem services and helping disadvantaged groups deal with future impacts of climate change – strategies that can lead to risk reduction and can also contribute to attempts to promote a transition to sustainable poverty alleviation in rural communities⁶⁷. Nature-based approaches or solutions, ecosystem-based approaches, ecosystem-based adaptation – more or less synonymous – are often cost-efficient measures and flexible in dealing with a constantly changing climate and its associated risks because they promote more resilient social-ecological systems. Examples include the restoration of forest ecosystems as part of larger landscape management; land degradation neutrality (LDN)⁶⁸ with a combination of avoiding or reducing the rate of land degradation and increasing the rate of recovery through sustainable land management; and protected areas that capture and store carbon by sequestering carbon dioxide from the atmosphere. A mechanism that can be used for this is REDD+ (Reduce Emissions from Deforestation and forest Degradation, and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks).

However, these solutions can be both opportunities and risks⁶⁹. Key concerns, to be taken into consideration as safeguards, are the potential impacts on different elements of biodiversity, and their effects on the rights and livelihoods of different individuals and groups in society. Issues of empowerment, equity and gender are particularly acute for indigenous peoples and traditional communities, given their close interdependence with their local environments. Developing, implementing and providing coherence to biodiversity and social safeguards across national and international institutions is necessary for addressing unintended impacts of financing mechanisms. Safeguards can play a key role in improving equity and trust relationships among distinct stakeholders.

65 IPCC. 2014. Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC, Geneva, Switzerland.

66 CBD. 2015. Opportunities to address climate change and support biodiversity through better management of ecosystems. CBD Briefing note. Prepared by UNEP-WCMC on behalf of the Secretariat of the Convention on Biological Diversity, Montreal, Canada.

67 CCCD. 2009. Closing the Gaps: Disaster risk reduction and adaptation to climate change in developing countries. Secretariat of the Commission on Climate Change and Development, Ministry for Foreign Affairs, Stockholm, Sweden

68 UNCCD. 2014. Land Degradation Neutrality: Resilience at Local, National and Regional Levels. UNCCD, Bonn, Germany.

69 Ituarte-Lima, C., Schultz, M., Hahn, T. & Cornell, S. 2012. Safeguards in scaling-up biodiversity financing and possible guiding principles. UNEP/CBD/COP/11/INF/7. SwedBio at the Stockholm University, Sweden.

Box 3. Sustainable ecosystem management

– poverty alleviation, mitigation and adaptation.

Sound management of biodiversity and ecosystem services is often a highly cost-effective way to adapt to climatic change. Healthy functioning ecosystems that can provide ecosystem services essential for human well-being, e.g. water regulation, pollination and erosion control, and are a prerequisite to handle adaptation to climate change. Examples include:

- Agriculture: Maintaining diversity of local varieties, crops and agricultural systems contributes to risk distribution, decreased vulnerability, and increases the ability of the agricultural system to adapt. Increased levels of organic matter in soil contribute to increased harvests and improved ecosystem services, such as nutrient cycling and water retention, and it also sequester large amounts of CO₂.
- Coastal zones: Conservation of mangrove forests and coral reefs is a cost-efficient measure to protect coastal zones against weather-related catastrophes (storms and typhoons). It also benefits biodiversity and fisheries since spawning grounds for fish are preserved, and it is favourable for tourism.
- Forested mountain areas are important as water sources, but also for their capacity to absorb and moderate the consequences of flooding (and increased water flows from glacial melting).
- Wetlands have a buffering effect (e.g. against drought and flooding), as well as a rich species diversity, and also contribute to other ecosystem services such as removal of nitrogen from agricultural runoff.⁷⁰

SDG13 Targets with most relevant links to ecosystems:

- 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- 13.2 Integrate climate change measures into national policies, strategies and planning
- 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- **13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of**

⁷⁰ SwedBio. 2009. Contributing to Resilience: Results and experience from the SwedBio Collaborative Programme 2003–2008, Swedish Biodiversity Centre, Uppsala, Sweden

meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible

- 13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development

Humans are causing unprecedented damage to the oceans and the animals living in them⁷¹, on the verge of driving marine ecosystems to an unprecedented extinction unlike anything in the fossil record. This in turn can disrupt ocean ecosystems for millions of years⁷². Today, 31% of assessed commercially-important marine fish stocks worldwide are overfished⁷³.

Climate change impacts includes modifications of the geographic distribution of species and warmer water species moving towards the poles, ocean acidification and changes in coastal conditions that affect habitat, and inland fisheries and aquaculture may face higher mortality due to heat waves, water scarcity and competition for water.⁷⁴

Globally, approximately 800 million people depend on fisheries and aquaculture for their livelihoods⁷⁵. Fisheries and aquaculture supply 17% of global animal protein in people's diets and support the livelihoods of some 12% of the world's population⁷⁶. Sustainable and productive fisheries and aquaculture improve food and nutrition security, increase income and improve livelihoods, promote economic growth and protect our environment and natural resources⁷⁷.

⁷¹ McCauley, D.J. et al. 2015. Marine defaunation: Animal loss in the global ocean. *Science* 347 (6219)

⁷² Payne, L. et al. 2016. Ecological selectivity of the emerging mass extinction in the oceans. *Science* 353 (6305): 1284-1286

⁷³ FAO. 2016. The State of World Fisheries and Aquaculture 2016. Contributing to food security and nutrition for all. FAO, Rome, Italy.

⁷⁴ HLPE. 2014. Sustainable fisheries and aquaculture for food security and nutrition. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. FAO, Rome, Italy.

⁷⁵ WorldFish. 2016. WorldFish and the Sustainable Development Goals. Accessed: 12 November 2016. <http://www.worldfishcenter.org/landing-page/worldfish-and-sustainable-development-goals>

⁷⁶ FAO. 2016. The State of World Fisheries and Aquaculture 2016: Contributing to food security and nutrition for all. FAO, Rome, Italy.

⁷⁷ WorldFish. 2016. Why Fish?. Accessed: 12 November 2016. <http://www.worldfishcenter.org/why-fish>



Among the seven principal tuna species, 41% of stocks were considered to be fished at biologically unsustainable levels in 2013⁷⁹. Image © TheAnimalDay.org/Flickr

79 FAO. 2016. The State of World Fisheries and Aquaculture 2016: Contributing to food security and nutrition for all. FAO, Rome, Italy.

As we enter the Anthropocene, changes to marine ecosystems, such as coral reefs, can have profound and often unexpected alterations to ecosystem services they provide⁷⁸. Therefore, key drivers like fishing, nutrient pollution and global warming need to be kept within acceptable levels or “safe operating spaces”. This is challenged by socio-economic factors, including globalized drivers of change such as trade, human migration, and land-use change. As a result, adaptive and multi-level governance that involves individuals, organisations, and institutions at multiple levels is necessary to keep pace with the escalating speed of change in the Anthropocene.

SDG14 Targets with most relevant links to ecosystems:

- 14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution

- 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
- 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels
- 14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics
- 14.5 By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information
- 14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new

78 Norström, A.V., Nyström, M., Jouffray, J-B., Folke, C., Graham, N.A.J., Moberg, F., Olsson, P. & Williams, G.J. 2016. Guiding coral reef futures in the Anthropocene. *Front Ecol Environ* 14(9): 490–498, doi:10.1002/fee.1427

such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organisation fisheries subsidies negotiation

- 14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism
- 14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries
- 14.b Provide access for small-scale artisanal fishers to marine resources and markets
- 14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of *The Future We Want*

Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification and halt and reverse land degradation and halt biodiversity loss

The targets under this SDG directly refer to terrestrial ecosystems and biodiversity. The CBD has been encouraging strategic actions to mainstream biodiversity within and across sectors, in particular agriculture, forestry, fisheries, aquaculture and tourism. Some of the recommendations on mainstreaming measures include the use of economic valuation tools and environmental assessments that consider the potential impacts on biodiversity and ecosystem services. National indicators and accounting for the values of ecosystems in national statistics, both for understanding status and measuring performance, provide one way of integrating ecosystems into societies' operations, recognised in Aichi Biodiversity Target 2.

Regarding national metrics and accounting, increasing concern is raised about the fact that the gross domestic product, the most widely used measure of economic health, does not capture what most people believe are the essence of welfare

or human well-being.⁸⁰ For example, we need a set of indicators to just measure wealth⁸¹. As a complement to GDP, attempts have been made internationally to develop aggregate measurements of welfare that take social, economic, and ecological factors into account, for example Inclusive Wealth, Genuine Savings, Human Development Index, Happiness Index, etc. In all these cases, aggregation has to be done carefully and transparently to demonstrate what is behind the numbers.

SDG15 Targets with most relevant links to ecosystems:

- 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements
- 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally
- 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world
- 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development
- 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species
- 15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed
- 15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products
- 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species

⁸⁰ www.happyplanetindex.org; Costanza, R., Kubiszewski, I., Giovannini, E., Lovins, H., McGlade, J., Pickett, K.E., Vala Ragnarsdóttir, K., Roberts, D., De Vogli, R. & Wilkinson, R. 2014. Time to leave GDP behind. *Nature* 505 (7483)

⁸¹ Stiglitz, J., Sen, A., and Fitoussi, J.P., 2009. Report of the Commission on the measurement of economic performance and social progress. <http://www.stiglitz-sen-fitoussi.fr/en/index.htm>

- 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts
- 15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems
- 15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation
- 15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

Making the link between the sustainable use of natural resources and a human rights approach is vital. Maintenance and improvement of ecosystem services, and attention to equity in access to the benefits of these services, are important for upholding economic, social and cultural rights. The state of ecosystems determines people's scope for sustainable natural resource management and has direct consequences for the possibilities of individuals and collectives to exercise environment-related human rights⁸² including the rights to food⁸³, water and sanitation⁸⁴, and cultural rights⁸⁵.

82 For examples of environmental rights, see e.g. Bruch, C., Coker, W., & Van Arsdale, C. 2001. Constitutional environmental law: Giving force to fundamental principles in Africa. *Columbia Journal of Environmental Law*, 26, 131–211.

83 For a discussion on food security, see e.g. Barthel, S., Crumley, C., Svedin, U. 2013. Bio-cultural refugia—Safeguarding diversity of practices for food security and biodiversity, *Global Environmental Change*, 23(5), 1142–1152.

84 See the human rights to water and sanitation in courts worldwide, WASH United and WaterLex, <http://www.righttowater.info/new-publication-the-human-rights-to-water-and-sanitation-in-courts-worldwide/>

85 Cultural rights include indigenous peoples' rights to their traditional knowledge, Coombe, R 1998 (b), Intellectual Property, Human Rights & Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity, *Indiana Journal of Global Legal Studies*, Vol. 6, No. 1, pp. 59-115. For trends to respect traditional knowledge and practices in the national implementation of the Strategic Plan for Biodiversity 2011–2020, see Annex "Indicative List of Indicators for the Strategic Plan for Biodiversity 2011–2020, UNEP/CBD/COP/DEC/XI/3, 5 December 2012

People are most likely to become involved in sustainable management when they have clear rights to resources and are confident of future access to these resources⁸⁶. Experience has demonstrated that exclusionary approaches to natural resources management can undermine those same rights of affected communities, and violate civil and political rights⁸⁷. Security of tenure is a critical component in determining how rural people can secure their livelihoods and alleviate poverty.

Effective environmental governance requires disaggregating the benefits people derive from ecosystems into how these benefits are distributed in different sections of society. Equity and legal assessments can contribute in the process of selecting and analysing legal, policy and economic instruments⁸⁸. Analysis is always needed that reveals who derives which benefits from ecosystems, and how such benefits contribute to the well-being of the poor⁸⁹. In particular, attention is needed to assess the benefits received by those individuals and collectives in relatively disadvantaged positions or with differentiated individual and collective rights due to e.g. socio-economic aspects, gender, ethnicity, geography, and livelihood conditions⁹⁰.

The efficient participation and active involvement of rural communities, natural resource managers and food producers in the development of new models of sustainable use are essential. Likewise, building on existing knowledge and governance systems in policy-making, which have developed over time and entailed adaptive responses to change and continued learning, can enhance and strengthen resilience.

86 Ostrom E. 1990. Governing the Commons: The evolution of Institutions for Collective Action. *Political Economy of Institutions and Decisions*

87 Campese, J., Sunderland, T.C.H., Greiber, T., Oviedo, G. (eds.) 2009. Rights-based approaches: Exploring issues and opportunities for conservation, CIFOR & IUCN, Bogor, Indonesia

88 See e.g. McDermott, M., Mahanty, S. And Schreckenberg, K., 2013. Examining equity: A framework for evaluating equity in payments for ecosystem services. *Environmental Science and Policy* 33, pp.416–427; Ituarte-Lima, C., McDermott, C.L. & Mulyani, M., 2014. Assessing equity in national legal frameworks for REDD+: The case of Indonesia. *Environmental Science & Policy*.

89 See e.g. Daw, T., Brown, K., Rosendo, S. and Pomeroy, R., 2011. Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human well-being. *Environmental Conservation* 38 (4), 370–379. For more information on for example on gender dimensions, see Monsen, J. H. (2007), Gender and Biodiversity: A New Approach to Linking Environment and Development. *Geography Compass*, 1: 149–162. doi:10.1111/j.1749-8198.2007.00011.x.

90 See e.g. Daw, T., Brown, K., Rosendo, S. and Pomeroy, R., 2011. Applying the ecosystem services concept to poverty alleviation: the need to disaggregate human well-being. *Environmental Conservation* 38 (4), 370–379. For more information on for example on gender dimensions, see Monsen, J. H. (2007), Gender and Biodiversity: A New Approach to Linking Environment and Development. *Geography Compass*, 1: 149–162. doi:10.1111/j.1749-8198.2007.00011.x

A lesson from these experiences is that there must be a legal and policy environment to support citizens and community ownership in order for it to be effective.⁹¹

Respect for and promotion of indigenous and local knowledge helps in the realisation of human rights, self-determined development, and culturally appropriate pathways for strengthening local resource management, livelihoods and well-being. Inclusion of indigenous peoples and local communities and their knowledge in decision-making contributes to increased attention and respect for the knowledge, and thus for support to its influences on practices and policies. In policy-making, one can build on existing knowledge and governance systems, which have developed over time and may entail adaptive responses to change and continued learning. This can enhance and strengthen social-ecological resilience.

SDG16 Targets with most relevant links to ecosystems:

- 16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all
- 16.5 Substantially reduce corruption and bribery in all their forms
- 16.6 Develop effective, accountable and transparent institutions at all levels
- 16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels
- 16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance

Goal 17. Strengthen the means of implementation and revitalise the Global Partnership for Sustainable Development

Finance

Targets under Goal 17 include domestic resource mobilisation such as taxes, and overseas development aid (ODA). The Addis Ababa Action Agenda of the Third International Conference on Financing for Development links to the CBD and its Aichi Biodiversity Targets in paragraph 17, 63 and 64. It reinforces the need to protect and preserve our planet and natural resources and biodiversity, and acknowledge the critical importance of biodiversity and the sustainable use of its components in poverty eradication and sustainable development. It also emphasises the need to change behaviour, to commit to coherent policy, financing and trade to protect,

⁹¹ <http://www.stockholmresilience.org/research/insights/2016-11-16-insight-3-adaptive-governance.html>

manage and restore our ecosystems, including marine and terrestrial ecosystems, and to promote their sustainable use and build resilience.

A resource mobilisation strategy has been developed under the CBD to support the implementation of the 20 Aichi Biodiversity Targets. This strategy includes both ODA and country-specific Biodiversity Financing Mechanisms such as Payment for Ecosystem Services, Biodiversity Offsets,



Maintaining agricultural biodiversity increases resilience to shocks. There are more than 250,000 plant varieties available for agriculture, but less than 3% are currently in use.⁹² Image ©: Scott Kelleher/Flickr

⁹² FAO. 1997. The State of the World's Plant Genetic Resources for Food and Agriculture. FAO, Rome, Italy.

Green Markets, synergies with climate financing, Fiscal Reforms such as green taxation and elimination of harmful subsidies. Safeguards within these mechanisms have been developed for biodiversity and resilience, rights, access to resources and livelihoods, and governance.

To understand needs and gaps related to resources to reach the Aichi Biodiversity Targets, a High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011–2020 was convened⁹³. Among its recommendations, the Panel noted that the monetary and non-monetary benefits of biodiversity conservation and sustainable use frequently outweigh the costs, and biodiversity provides insurance and option values for many around the world. However, there is a need to increase investments substantially to bridge financing gaps. As a result, appropriate investments can strengthen the provision of ecosystem services on which vulnerable communities depend. This includes countries investing in institutions and policy frameworks, direct conservation and sustainable use actions, incentives and economic instruments. Enhancing synergies, addressing trade-offs and promoting alignments across sectoral policies are prerequisites for effective implementation of the Aichi Biodiversity Targets and of major importance for resource mobilisation.

Technology, and Capacity-building

The targets under Goal 17 emphasise north-south, south-south and triangular cooperation.

Trade

Some vital aspects on trade are not well addressed in the 2030 Agenda and SDG17. Trade and the markets are decoupled from ecosystem stewardship. Sustainable development depends on making the links visible between international trade, markets and sustainable local social-ecological systems. There is a need to develop governance options that can bring transparency and effective interventions to maintain the system in a sustainable state. An example of a situation where this has not happened is the world's fisheries. Fisheries represent one of the last major wild extractive endeavours undertaken at a global scale. However, according to the Food and Agricultural Organisation of the UN (FAO), three-quar-

ters of the world's fisheries are already fished maximally or over-exploited⁹⁴. This unsustainable situation has arisen largely due to irresistible global trade opportunities, market institutions that are decoupled from ecosystem dynamics, and a growing population that is hungry for fish, both for food and for animal feed. In a local system, local fishers would feel the impacts of overfishing directly, and have to reduce their fishing activities – a vital balancing feedback between the ecosystem and the local economy. These kind of ecologically-relevant feedbacks are not only missing in the present market system, where consumers are very far removed from producers, both geographically and in long supply chains, but are, in fact, blocked by current trade institutions.^{95, 96}

On a more positive note, SDG17 does emphasize several systemic issues that are important for sustainable use of biodiversity and ecosystems. These include policy and institutional coherence, multi-stakeholder partnerships and the need for data, monitoring and accountability.

SDG17 Targets with most relevant links to ecosystems:

- 17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries
- 17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed
- 17.8 Fully operationalize the technology bank and science technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology

⁹³ HLP. 2014. Resourcing the Aichi Biodiversity Targets, An Assessment of Benefits, Investments and Resource needs for Implementing the Strategic Plan for Biodiversity 2011–2020. Second Report of the High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011–2020. CBD, Montreal, Canada

⁹⁴ FAO. 2016. The State of World Fisheries and Aquaculture 2016. Contributing to food security and nutrition for all. FAO, Rome, Italy.

⁹⁵ Deutsch, L., Troell, M., Limburg, K. and Huitric, M. 2011. Global Trade of Fisheries Products: implications for marine ecosystems and their services in Ecosystem Services and Global Trade of Natural Resources: Ecology, Economics and Policies. Routledge, London, UK.

⁹⁶ <http://www.stockholmresilience.org/5.1f74f76413071d337c380004627.html>

Analysis of Aichi Biodiversity Targets in SDGs and Targets

An analysis of the wording of both the Aichi Biodiversity Targets and the SDGs and their Targets shows that there is strong overlap between the two processes in terms of elements covered. If effectively implemented, this overlap strengthens the message that effective conservation of biodiversity and ecosystem services can lead to substantial gains in many facets of sustainable development.

To undertake the text analysis, keywords of the Aichi Biodiversity Targets were identified and each rated for their degree of reference in the SDG Goals and Targets – either direct, indirect or no reference. The results were then combined to give an overall score for each Aichi Biodiversity Target using a five-point system between 1 (completely absent in the SDGs) and 5 (fully considered within the SDGs). Table 1 provides a summary, and the complete results are provided in the Annex.

Table 1. Scoring of the degree of overlap between the SDG Goals and Targets and the Aichi Biodiversity Targets. (5= 😊 , 4= 😃 , 3= 😎 , 2= 😐 , 1= 😞)

Aichi Biodiversity		SDG score
Goal	Target	
A. Addressing the underlying causes of loss	1. Understand values	😊
	2. Mainstream biodiversity	😊
	3. Address incentives	😐
	4. Sustainable production	😊
B. Reduce the direct pressures	5. Halve rate of loss	😐
	6. Sustainable fisheries	😐
	7. Manage within limits	😊
	8. Reduce pollution	😊
	9. Reduce invasive species	😊
	10. Minimise reef loss	😊

Aichi Biodiversity		SDG score
Goal	Target	
C. Improve the status	11. Protected areas	😐
	12. Prevent extinctions	😐
	13. Conserve gene pool	😊
D. Enhance the benefits	14. Restore ecosystems	😊
	15. Enhance resilience	😊
	16. Implement Nagoya Protocol	😊
E. Enhance implementation	17. Revise NBSAPs	😞
	18. Respect and conserve traditional knowledge	😐
	19. Improve knowledge	😊
	20. Mobilise resources	😊

Table 1 shows that many of the elements covered by the Aichi Biodiversity Targets are contained across the full suite of SDG targets. However, there are some clear omissions. The following summarises notable gaps or weak connectivity to the Aichi Biodiversity Targets (ABTs) in the SDGs:

- ABT1: Awareness of the values of biodiversity and action to conserve and use it sustainably is implicit, but not explicitly mentioned.
- ABT3: While there is a focus on addressing perverse subsidies linked to specific environment-based economic sectors, there is no consideration of other activities which are often government subsidised and can greatly affect ecosystem function, e.g., large-scale infrastructure developments leading to pollution or the introduction of invasive alien species. There are no targets on direct positive incentives for sustainable natural resource management.
- ABT4: Keeping the impacts of use of natural resources well within safe ecological limits is only implicitly covered.
- ABT5: The measurable aspect of the Aichi Biodiversity Target (halving the rate of loss) is not given. The loss of natural habitats, in particular in the marine environment, is not well addressed.
- ABT6: The SDG Targets only address the unsustainable use of fish populations, whereas ABT6 also covers the harvesting of marine invertebrates and plants, as well as any other marine life or habitats negatively affected by such harvesting.
- ABT7: The SDGs lack the explicit qualification that sustainable agriculture, aquaculture and forestry must ensure the conservation of all biodiversity in these ecosystems, not just achieving sustainability regarding the resource itself.
- ABT8: Pollution is not linked to ecosystem health.
- ABT9: The identification and management of invasive alien species pathways is not specifically mentioned.
- ABT10: Coral reefs and other vulnerable ecosystems are not specifically mentioned.
- ABT11: Protection focuses on the sustained provision of ecosystem services, and protected areas across all terrestrial biomes are not comprehensively covered. There is indirect mention of the 17% global terrestrial target. Connectivity and management are not specifically mentioned.
- ABT12: Non-economic marine species are not considered.
- ABT13: Socio-economically and culturally-important species are not included.
- ABT14: Consideration of indigenous peoples and local communities focuses on their economic livelihood and receiving education, while ecosystem function is only tangentially covered by economic considerations.

- ABT15: The role of ecosystems as carbon sinks is absent, as is the 15% target on restoring degraded ecosystems.
- ABT17: While there are targets relating to improving policies for sustainable development, there is no mention of appropriate biodiversity planning at the national level.
- ABT18: The use of traditional knowledge and practices for broader conservation and sustainable use objectives is not considered
- ABT19: There is no mention of information sharing on broader-level biodiversity status and trends, nor of suitable management planning

Figures 6 and 7 show how frequently the focus of the individual Aichi Targets match to the suite of SDG Goals and Targets. ABT14 (ecosystem function, ecosystem services, gender, indigenous and local communities, poor and vulnerable) has the greatest linkage to the SDGs, with its focus referred to in both SDG Goals (8 points of overlap) and Targets (12 mentions in the text of the 169 Targets). ABT15 (enhance resilience) and ABT19 (improve knowledge) have the next highest relevance, referred to in 5 SDG Goals. At the level of the SDG Targets, the focal themes of ABT7 (manage within limits), ABT11 (protected areas) and ABT19 (improve knowledge) are all referred to 10 times. Only ABT17 (NBSAPs) does not have any overlap with the SDGs.

Examining the linkages evident in the wording from the other direction, Figure 8 shows that the focus of SDGs 14 (life in water) and 15 (life on land) have the strongest links to the Aichi Biodiversity Targets. It should also be stated that, as noted in the discussion above, biodiversity and ecosystem services have a broader relevancy to the thematic focus of each SDG, that is not necessarily demonstrated solely by a comparative analysis of these texts.

The wording of the SDGs is not always consistent with regards to conservation issues. For instance, consideration of “ecosystem services” only appears once (SDG 15.1), whereas the more economically-framed “natural resources” is a more common term. This exemplifies the need to pay attention to the language used when working in a cross-sectoral manner.

The SDG targets are not always SMART (Specific, Measureable, Ambitious, Realistic, Time-bound)⁹⁷, with the magni-

⁹⁷ Perrings, C., S. Naeem, F. Ahrestani, D.E. Bunker, P. Burkhill, G., Canziani, T., Elmquist, R. Ferrati, J. Fuhrman, F. Jaksic, Z. Kawabata, A. Kinzig, G. M. Mace, F. Milano, H. Mooney, A.-H. Prieur-Richard, J. Tschirhart, W. Weisser. 2010. Ecosystem Services for 2020. *Science* 330:323-324.

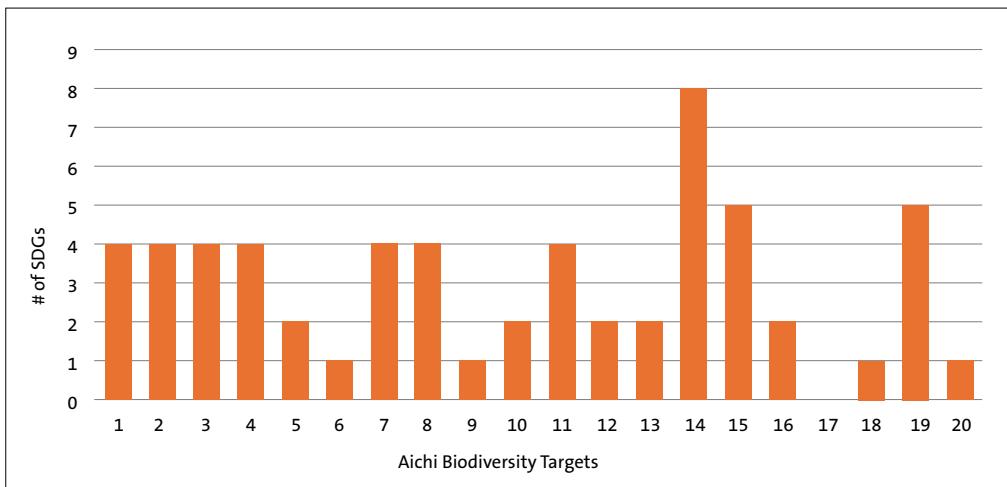


Figure 6. The links between the Aichi Biodiversity Targets and the SDG Goals. The height of each bar represents the number of times that the wording of Goal text was found to coincide with the focus of that Aichi Biodiversity Target.

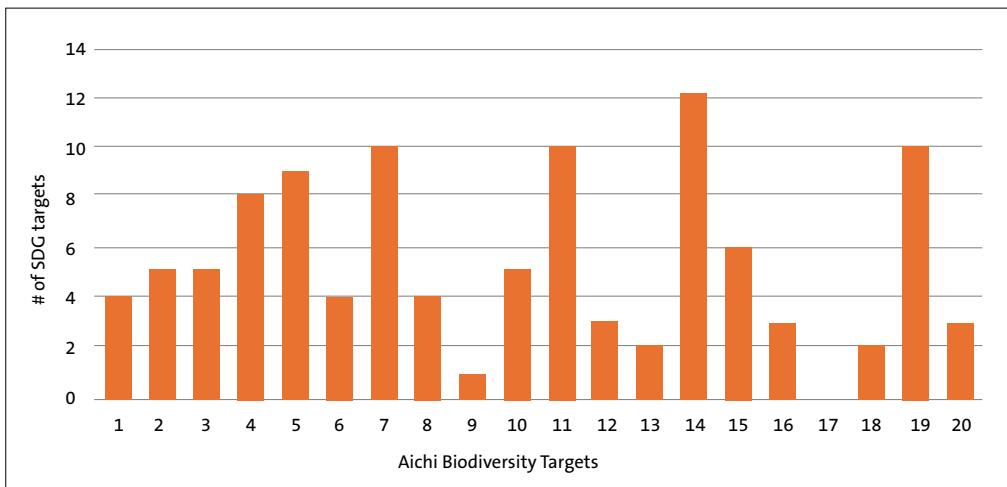


Figure 7. The links between the Aichi Biodiversity Targets and the SDG Targets. The height of each bar represents the number of times that the wording of SDG Target text was found to coincide with the focus of that Aichi Biodiversity Target.

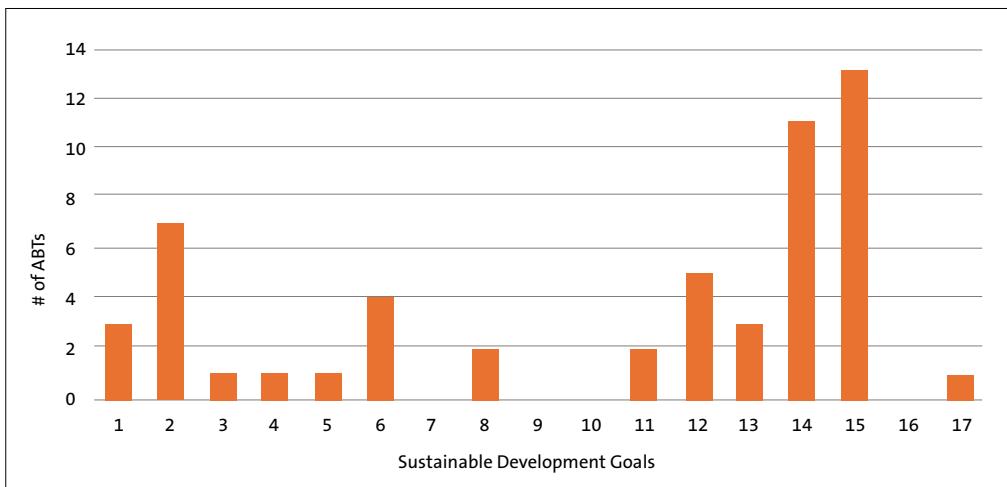


Figure 8. The links between the SDGs and the Aichi Biodiversity Targets. The height of each bar represents the number of times the focus of that SDG is relevant, based on comparative analysis of the wording of the texts.



Unsustainable consumption and production also impacts far from home. Juvenile albatross amongst marine plastic on Midway Atoll, USA.
Image ©: Kris Krug/Flickr

tude of required commitments under some targets is somewhat ambiguous by the use of imprecise terms such as “enhance” (Target 9.5), “strengthen” (Target 11.4) and “promote” (Target 13.b). Similarly, the realistic achievability of some targets by 2020 is questionable given recent reports⁹⁸. These issues should be addressed when developing a post-2020 framework under the CBD.

Even when many of the subject elements covered in the Aichi Biodiversity Targets are present in corresponding SDG Goals and Targets, the ambition level may differ, either through the time scope of the target, or the actual formulation of what is to be achieved by that year. For example, the SDG Targets 6.3, 12.4, and 14.1 aim to reduce pollution by 2030, 2020 and 2025 respectively, whereas ABT8 explicitly quantifies the degree of pollution reduction, down to levels that are not detrimental to ecosystem function and biodiversity, by 2020.

The ABT8 is hence both more demanding and requires quicker action.

The compatibility of the Aichi Biodiversity Targets and SDG Goals and Targets may be questioned, both internally and between the two target systems, and needs to be assessed further. For instance, SDG2 on ending hunger can lead to a detrimental outcome from an environmental perspective, despite the aim to achieve sustainability in agriculture in the same Goal. Similarly, both ABT9 and SDG 15.8 aim to prevent the introduction of invasive alien species, which may entail regulations in international trade, whereas SDG 17.10 is intended to stimulate global trade with as few restrictions as possible. Efforts need to continue to emphasise the relevancy of sustainable environmental management when attempting to mainstream across sectors.

⁹⁸ CBD. 2014. Global Biodiversity Outlook 4. Secretariat of the Convention on Biological Diversity, Montreal, Canada

Conclusions and Ways forward

The kind of analysis developed in this paper can help to understand the synergies of the 2030 Agenda including the SDGs, and the Strategic Plan for Biodiversity 2011–2020 including the Aichi Biodiversity Targets. In this paper, we have been building on our own analysis, as well as those of various agencies, on the links between the 2030 Agenda and biodiversity. We have presented a preliminary gap analysis of the extent to which the Aichi Biodiversity Targets are included under the SDGs, and identified what is not covered, with the aim of understanding how the SDGs can support implementation of the Aichi Biodiversity Targets and vice versa. The conclusion of this analysis is that there is a broad overlap in the subject areas covered, although the Aichi Biodiversity Targets are more explicit regarding biodiversity, with more specific and quantified targets, and some subjects are not covered under the SDGs. There are many potential synergies in implementation.

It is clear that the Aichi Biodiversity Targets contribute to the achievement of the 2030 Agenda and the SDGs. Aspects under the Aichi Biodiversity Targets, such as raising awareness about the diverse benefits we obtain from nature, and the importance of the sustainable use of ecosystems and biodiversity, are part of a suite of actions that are also required to achieve the 2030 Agenda. A recent focus under the CBD has been on strategic actions on mainstreaming biodiversity within and across sectors, with a particular focus on agriculture, forestry, fisheries and aquaculture, and tourism. These also fit well with the 2030 Agenda. The diverse values of biodiversity (intrinsic, ecological, genetic, socio-economic, scientific, educational, cultural, recreational and aesthetic) should be integrated into development strategies, in collaboration with relevant actors. Other aspects include the need to reduce harmful subsidies and introduce financial incentives for conservation and sustainable use, as well as promoting sustainable consumption and production patterns. Other important aspects are fostering appropriate governance, land tenure and resource rights, the equitable sharing of benefits from biodiversity, and the development of appropriate laws and institutions. Linking ecosystem management to adaptation and the mitigation of climate change is a necessary part of integrated solutions.

It is also clear that the SDGs can contribute to achieving the Aichi Biodiversity Targets, as they provide a wider developmental and cross-sectoral context. Conversely, the Aichi Biodiversity Targets can be seen as constituting detailed objectives that support achievement of the SDGs. The indicator

framework to monitor the SDGs should have synergies with the indicators for Aichi Biodiversity Targets, as currently discussed under the CBD, to solidly embed biodiversity mainstreaming in national and global SDG reporting.

It is also important to start thinking about an inclusive process for developing the post-2020 Strategic Plan for Biodiversity, in light of the 2030 Agenda, while not losing focus on implementation of the present Strategic Plan. It should also be noted that the second session of the UN Environment Assembly (UNEA-2) in 2015 gave a mandate for a post-2020 framework for biodiversity that should be in synergy with the content and implementation of the 2030 Agenda for Sustainable Development.⁹⁹

One possible process going forward would be to undertake a more inclusive and extensive in-depth analysis of mapping the current Aichi Biodiversity Targets against the SDGs, to review the degree of overlap and identify elements of the current Strategic Plan for Biodiversity that are not covered under the SDGs. The post-2020 Strategic Plan should retain a high degree of overlap, and explicitly reference the links between the new CBD Biodiversity Targets and the SDGs, in particular recognising where the SDGs strongly support the new Strategic Plan. The CBD Biodiversity Targets could possibly be formulated as milestones targets for the SDGs. Elements of the current Aichi Biodiversity Targets that are not well covered by the SDGs should not be eliminated from the new Strategic Plan. Rather, they should be assessed as possibly necessary components of a strategy to meet the SDGs, and then be given particular consideration in the formulation of the new Strategic Plan.

As the new Strategic Plan is formulated, the compatibility between different goals and targets should be analysed, both internally within the CBD Strategic Plan, and between them and the SDGs. When apparently incompatible goals and targets are identified, guidance should be offered on how to resolve the conflict, e.g. through stated priorities. There is also a need to identify new and emerging issues that are not covered in the Aichi Biodiversity Targets nor the SDGs, building on the results of e.g. the IPBES Global Assessment and the fifth Global Biodiversity Outlook (GBO5), and possibly to formulate goals and targets regarding such issues in the new Strategic Plan.

⁹⁹ http://www.unep.org/about/sgb/cpr_portal/Portals/50152/2-17/K1607209_UNEPEA2_RES17E.pdf



Biodiversity and ecosystems provide visible and invisible services for rural and urban communities. Image ©: Neil Palmer/Flickr

The Aichi Biodiversity Targets need to be assessed regarding to what extent they have been successfully achieved, irrespective of whether they are well reflected in SDGs or not. For targets that have been met, it should be considered whether there is simply a need for a revised target year, perhaps with an increased level of ambition, or to consider an entirely new target within the same subject area, if needed. For targets that have not been met, a thorough analysis of the reasons for not achieving the expected results must be undertaken, which should guide the formulation of a new target. The level of ambition should not be lowered in such cases, which would be the case if the same target is kept with a new time scope. Given the desire to maintain the 2050 vision of the current Strategic Plan, less demanding goals and targets should not be considered acceptable.

All efforts should be made to reach the targets by the years set in the present Strategic Plan for Biodiversity. However, if not reached, there would need to be discussions on how to extend target years under the SDGs targets (we do understand that it is not possible to reopen the wording of the SDGs) and paragraph 82 of the 2030 Agenda could be used, which mentions that effective linkages will be made to the monitoring and review arrangements within all relevant United Nations conferences and processes.¹⁰⁰

¹⁰⁰ http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

Further reading

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Clean water is vital for human health and is becoming increasingly threatened due to environmental mismanagement and climate change.
Image ©: Julien Harneis/Flickr

Annex: Analysis of links between Aichi Biodiversity Targets and SDGs

The table below shows the outcomes of an analysis of the overlap between the Aichi Biodiversity Targets (ABT) and the SDG Goals and targets. Based on each ABT, the identified SDG Goals and Targets are listed.

The keywords of the ABTs are then each examined and colour-coded – Green = directly referred to in the SDGs, Orange = indirectly referred to, Red = no reference. Subsequently, a score is given between 1 (completely absent in the SDGs) and 5 (fully considered within the SDGs). The final column lists the elements of that ABT missing in the SDGs.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
Strategic Goal A: Address 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.	<p><i>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</i> 4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i> 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature</p> <p><i>Goal 13. Take urgent action to combat climate change and its impacts</i> 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i> 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.</p>	Awareness Actions	4	Awareness of the values of biodiversity and action to conserve and use it sustainably is not explicitly mentioned.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	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.	<p><i>Goal 1. End poverty in all its forms everywhere</i> 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance</p> <p><i>Goal 6. Ensure availability and sustainable management of water and sanitation for all</i> 6.5 By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i> 14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i> 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts 15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation</p>	Values in poverty plans, planning and national accounting	5	N/A
	Target 3 – By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize 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.	<p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i> 2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i> 12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i> 14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organisation fisheries subsidies negotiation</p>	Negative incentives Positive incentives	3	Negative incentives focus solely on agricultural exports, 'rationalizing inefficient fossil fuel subsidies' and fisheries. Not on unsustainable use in any other sector, development and planning, or with general environmental benefit. Positive incentives are partly and indirectly captured within general targets on financial resource mobilisation for conservation and sustainable use.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	Target 3	<p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems</p> <p>15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation</p>			
	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.	<p><i>Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</i></p> <p>8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-year framework of programmes on sustainable consumption and production, with developed countries taking the lead</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i></p> <p>12.1 Implement the 10-year framework of programs on sustainable consumption and production, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries</p> <p>12.2 By 2030, achieve the sustainable management and efficient use of natural resources</p> <p>12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p> <p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products</p> <p>15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities</p>	Sustaina- ble con- sumption & produc- tion Safe ecological limits	4	The target to keep the impacts of use of natural resources well within safe ecological limits is only implicitly covered.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
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.	<p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p> <p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p> <p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p> <p>14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <p>15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally</p> <p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p> <p>15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development</p> <p>15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p>	Halve the rate of loss and where feasible brought close to zero Habitat loss Habitat degradation Habitat fragmentation Forest habitats	3	Action called for in the SDGs is less demanding compared to ABT5 which quantifies a change in rate of loss to be achieved by 2020. Fragmentation is not addressed.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	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.	<p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p> <p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p> <p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p> <p>14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</p>	<i>Sustainable fisheries. Impacts of fisheries on stocks</i> <i>Impacts of fisheries on species.</i> <i>Impacts of fisheries on ecosystems.</i> <i>Safe ecological limits</i>	3	The SDG targets address only the unsustainable use of fish populations, whereas ABT 6 also covers the harvesting of marine invertebrates and plants, as well as any other marine life or habitats negatively affected by such harvesting. The term “maximum sustainable yield” is not equivalent to “within safe ecological limits”.
	Target 7 – By 2020 areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.	<p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i></p> <p>2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality</p> <p>2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i></p> <p>12.2 By 2030, achieve the sustainable management and efficient use of natural resources</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p> <p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p> <p>14.7 By 2030, increase the economic benefits to Small Island developing States and least developed countries from the sustainable use of marine resources, including through sustainable management of fisheries, aquaculture and tourism</p>	<i>Sustainable agriculture</i> <i>Sustainable aquaculture</i> <i>Sustainable forestry</i> <i>Ensuring conservation of biodiversity</i>	4	The SDGs lack the explicit qualification that sustainable agriculture, aquaculture and forestry must ensure the conservation of all biodiversity in these ecosystems, not just achieving sustainability regarding the resource itself.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	Target 7	<p>14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <p>15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally</p> <p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p>			
	Target 8 – By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.	<p><i>Goal 3. Ensure healthy lives and promote well-being for all at all ages</i></p> <p>3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination</p> <p><i>Goal 6. Ensure availability and sustainable management of water and sanitation for all</i></p> <p>6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i></p> <p>12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution</p>	Terrestrial pollution Marine pollution Ecosystem function Levels not detrimental to ecosystem function and biodiversity	4	The SDGs aim to reduce pollution, whereas the ABT8 explicitly quantifies the degree of pollution reduction to levels that are not detrimental to ecosystem function and biodiversity.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	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.	<i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i> 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species	Invasive alien species Identify and manage pathways	4	The identification and management of pathways is not specifically mentioned. The SDG target aims to introduce measures, whereas ABT 9 demands results of such measures by 2020.
	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.	<i>Goal 13. Take urgent action to combat climate change and its impacts</i> 13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries 13.2 Integrate climate change measures into national policies, strategies and planning 13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities <i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i> 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans 14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels	Coral reefs Other vulnerable ecosystems Climate change Ocean acidification	4	Coral reefs and other vulnerable ecosystems not specifically mentioned
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.	<i>Goal 6. Ensure availability and sustainable management of water and sanitation for all</i> 6.5 By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes <i>Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable</i> 11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage 11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting the poor and people in vulnerable situations <i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i> 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans 14.5 By 2020, conserve at least 10 percent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	Terrestrial protected areas Marine protected areas Ecologically representative Well connected Effective management	2	Protected areas are not comprehensively covered across all terrestrial biomes, and there is a focus on provision of ecosystem services instead of importance for biodiversity. No mention of 17% global terrestrial target, and indirect mention of 10% of coastal and marine areas conserved through protected areas. Connectivity, ecological representativeness and management are not specifically mentioned

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	Target 11	<p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p> <p>15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development</p> <p>15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p>			
	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.	<p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species</p> <p>15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products</p>	Threatened terrestrial species Threatened marine species	3	Non-economic marine species are not considered
	Target 13 – By 2020, the genetic diversity of cultivated plants and 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.	<p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i></p> <p>2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed</p>	Genetic diversity of cultivated crops Genetic diversity of domesticated animals Genetic diversity of other socio-economic & culturally important species	4	Other socio-economically and culturally-important species are not included

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
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.	<p><i>Goal 1. End poverty in all its forms everywhere</i> 1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance</p> <p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i> 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round 2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality</p> <p><i>Goal 5. Achieve gender equality and empower all women and girls</i> 5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws</p> <p><i>Goal 6. Ensure availability and sustainable management of water and sanitation for all</i> 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes</p> <p><i>Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all</i> 8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i> 12.2 By 2030, achieve the sustainable management and efficient use of natural resources</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i> 14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p>	Ecosystem function Ecosystem services Gender Indigenous and local communities Poor & vulnerable	4	Consideration of indigenous peoples and local communities focuses on their economic livelihood. Ecosystem function is tangentially covered by economic considerations

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	Target 14	<p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p> <p>15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally</p> <p>15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development</p>			
	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.	<p><i>Goal 1. End poverty in all its forms everywhere</i></p> <p>1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters</p> <p><i>Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable</i></p> <p>11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels</p> <p><i>Goal 13. Take urgent action to combat climate change and its impacts</i></p> <p>13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries</p> <p>13.2 Integrate climate change measures into national policies, strategies and planning</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements</p>	Ecosystem resilience Carbon stocks Terrestrial ecosystem restoration Marine ecosystem restoration	4	The role of ecosystems as carbon sinks. The 15% target is not given.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	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.	<p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i></p> <p>2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed</p> <p><i>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</i></p> <p>15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world</p> <p>15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed</p>	Access & benefit sharing	5	N/A
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.		NBSAPs	1	Specific biodiversity planning
	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.	<p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i></p> <p>2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment</p> <p>2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed</p>	Traditional knowledge respected Traditional practices respected	3	Use of traditional knowledge and practices for broader conservation and sustainable use objectives is missing.

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	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.	<p><i>Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture</i></p> <p>2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries</p> <p><i>Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all</i></p> <p>4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development</p> <p><i>Goal 12. Ensure sustainable consumption and production patterns</i></p> <p>12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production</p> <p><i>Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development</i></p> <p>14.3 Minimize and address the impacts of ocean acidification, including through enhanced scientific cooperation at all levels</p> <p>14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics</p> <p>14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries</p>	Knowledge, science & technology improved, shared and applied Information sharing on value, functions, status & trends of biodiversity	4	No mention of information sharing on broader-level biodiversity

Strategic Plan for Biodiversity 2011–2020		Sustainable Development Goals and Targets	ABT Keywords	Score	Missing elements
Goal	Target				
	Target 19	<p><i>Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development Technology</i></p> <p>17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism</p> <p>17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed</p> <p>17.8 Fully operationalize the technology bank and science technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology</p> <p>17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the Sustainable Development Goals in all countries, in particular developing countries</p>			
	Target 20 – By 2020, at the latest, the mobilisation of financial resources for effectively implementing the Strategic Plan for Biodiversity 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. This target will be subject to changes contingent to resource needs assessments to be developed and reported by Parties.	<p>Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss</p> <p>15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems</p> <p>15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation</p> <p>15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities</p>	Mobilisa-tion of financial resources	5	N/A

Biodiversity and ecosystem services are essential to achieve the 2030 Agenda for Sustainable Development. This Discussion Paper outlines the links between the Aichi Biodiversity Targets under the Convention on Biological Diversity and the Sustainable Development Goals and Targets under the 2030 Agenda.

The 2030 Agenda recognises that social and economic development depends on the sustainable management of our planet's natural resources. The Aichi Biodiversity Targets contribute to the achievement of the 2030 Agenda and the SDGs, and the two processes are mutually supportive for effective implementation. To accomplish the 2030 Agenda, there is however a need for improved mainstreaming of enhanced conservation and sustainable use of biodiversity and ecosystems in development decisions, sectors and actions.

An analysis of the wording of both the Aichi Biodiversity Targets and the SDG Goals and Targets shows strong overlap and synergy between the two processes. The kind of analysis developed in this paper can help to understand these synergies, but further in-depth analysis is needed.

SwedBio

SwedBio is a knowledge interface at Stockholm Resilience Centre contributing to poverty alleviation, equity, sustainable livelihoods and social-ecological systems rich in biodiversity that persist, adapt and transform under global change such as climate change. SwedBio enables knowledge generation, dialogue and exchange between practitioners, policy makers and scientists for development and implementation of policies and methods at multiple scales.



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