SUSTAINABLE DEVELOPMENT GOAL 15

LIFE ON LAND

Teacher's Manual

Teacher's Manual on SDG 15 by R. Pretorius, M. Nicolau, L. Sibiya, Z. Kom, L. Brandli, A. Salvia, B. Rebelatto, A. Raszkowski, J. Eustachio, and J. Pohlman

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1. Introduction to the SDGs

Readers (teachers) will be empowered to

- provide the link between the SDGs and the MDGs
- explain the origin and overall aim of the SDGs
- name and briefly discuss the five priority areas of the SDGs
- position SDG 15 within the framework of Agenda 2030

The Sustainable Development Goals (SDGs) are the central component of the 2030 Agenda for Sustainable Development, as agreed on by the United Nations (UN) in September 2015. The 2030 Agenda consists of a set of 17 interlinked goals (United Nations, 2015), with associated targets and indicators, which are to be achieved by 2030.

The 2030 Agenda was developed as an action plan with the purpose of boosting the development of humanity in five priority areas: People, Planet, Prosperity, Peace and Partnerships, as well as continuing the progress made with the Millennium Development Goals (MDGs), which were in force during the years 2000 to 2015. The MDGs consisted of eight international development goals and were supported with 21 individual targets. Compared to the MDGs, the SDGs have a more comprehensive scope, rely more on collective action and are more detailed, with the message very clear that success will depend on the active support and participation of every nation (Feeny, 2020).

The SDGs provide a framework within which global approaches can be planned and implemented to secure a fair, healthy and prosperous future for the current and future generations (Morton et al., 2017). A key element is that all the SDGs are closely interconnected, and that failure to take this into account will lead to a highly ineffective way to address the sustainability dilemma the world is facing (Van Soest et al., 2019). According to Van Soest et al. (2019), there are key interactions across all areas of critical importance for the SDGs but lie especially within the area of People, as well as between

the areas of People and Prosperity, and between the areas of People and Planet. Figure 1 presents the set of 17 SDGs of the 2030 Agenda.

Figure 1: The 17 Sustainable Development Goals
Source: United Nations (n.d.)

In a certain way, the SDGs emerged from the MDGs and with the intention of going beyond them. For instance, while the MDGs had one goal for environmental sustainability (MDG 8), the 2030 Agenda has three goals dedicated exclusively to this aspect, namely one on climate action (SDG 13), one on life below water (SDG 14) and one on life on land (SDG 15).

This manual specifically deals with SDG 15 – life on land, which is one of the SDGs falling within the area of Planet. Officially SDG 15 is formulated as “Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, and halt biodiversity loss” (United

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Nations, 2024a). SDG 15 foregrounds the important role played by stewardship of the terrestrial ecosystems in the achievement of sustainable development. The existence of SDG 15 can be ascribed to the fact that all indicators pointed toward a drastic decline in life on land at the stage when the SDGs were conceptualised (Schipper et al., 2008; Tittenstor et al., 2014).

Considering the accelerating biodiversity loss experienced worldwide, the theme of terrestrial biodiversity conservation features very prominently in SDG 15 (Diaz et al., 2019).

The ideas featuring in SDG 15 largely link directly to priorities that emerged as part of previous conventions and agreements on biodiversity (Krauss, 2022). These include the *Convention on Biological Diversity*, the *United Nations Convention to Combat Desertification* and the *Convention on International Trade in Endangered Species* (Sayer et al., 2019). As a result, SDG 15 to a large extent draws on existing data and measures, which has advantages for long-term analysis but the disadvantage of keeping to business as usual practices.

Supplementary resources

- Feeny, S. (2020). Transitioning from the MDGs to the SDGs: Lessons learnt? In S. A. Churchill (Ed.), *Moving from the millennium to the sustainable development goals* (pp. 343–351). Palgrave Macmillan.
- Krauss, J. E. (2022). Unpacking SDG 15, its targets and indicators: Tracing ideas of conservation. *Globalizations*, *19*(8), 1179-1194.
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Examples of questions for assessment

1. Introduction to the SDGs

- Name the five areas of critical importance to which the 17 SDGs are linked and explain why these are referred to as the 5 Ps.
- Explain the link between the MDGs and the SDGs.
- Explain how the SDGs differ from the MDGs.
- Explain how SDG 15 fits into the SDGs, and how this compares to the MDGs.

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2. Defining SDG 15

Readers (teachers) will be empowered to

- define SDG 15 and list its targets and indicators
- explain the significance of SDG 15
- list and explain five advantages of SDG 15
- discuss the interdependencies between SDG 15 and the other SDGs
- discuss the implications of the interdependencies between SDG 15 and the other SDGs
- explain the challenges involved in achieving SDG 15 and discuss examples of actions to overcome these challenges

SDG 15 consists of 12 targets through which UN member states have found consensus on a broad range of topics relating to biodiversity and its conservation (Krauss, 2022). As shown in table 1, there are nine outcome targets for SDG 15 and those cover a wide range of issues.

Target 15.1 is about protecting terrestrial ecosystems and specifically important biodiversity sites, through the practice of sustainable forest management (target 15.2), bringing land degradation to an end (target 15.3) and conserving the biodiversity of mountains (target 15.4). Combating species extinction (target 15.5), promoting access and benefit-sharing of genetic resources (target 15.6), eliminating illegal wildlife trafficking (target 15.7), preventing invasion by alien species (target 15.8) and incorporating biodiversity values into planning (target 15.9) complete the outcome targets. The targets focused on means of implementation include increasing the funding available for biodiversity (target 15.a) and the sustainable management of forests (target 15.b), as well as capacity-building to combat the illegal poaching and trafficking of wildlife (target 15.c).

Following Liu et al. (2019), the 12 targets of SDG 15 can be clustered into three main themes, with some of the targets featuring as part of more than one of these themes:

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1. Sustainable forest management: targets 15.1, 15.2, 15.4 and 15.b. This aims to maintain and enhance the value of all types of forests for the benefit of present and future generations.
2. Halt and reverse land degradation: targets 15.1, 15.3, 15.4, 15.5 and 15.6. The focus of this theme is on the proportion of degraded land, monitoring efforts to combat desertification and restoring degraded land.
3. Conservation of biodiversity: targets 15.7, 15.8 , 15.9. 15.a and 15.c. This theme focuses on the conservation of important biodiversity sites and species, and measures to curb the loss of biodiversity.

Table 1: Targets and indicators of SDG 15

	Targets	Indicators
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.	15.1.1 Forest area as a proportion of total land area 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type
15.2	By 2020, promote the implementation of sustainable management of all types of forests, halt deforest-ation, restore degraded forests and substantially increase afforestation and reforestation globally.	15.2.1 Progress towards sustainable forest management
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.	15.3.1 Proportion of land that is degraded over total land area
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.	15.4.1 Coverage by protected areas of important sites for mountain biodiversity 15.4.2 Mountain Green Cover Index
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.	15.5.1 Red List Index
15.6	Promote fair and equitable sharing of the benefits arising from the utilisation of genetic resources and promote appropriate access to such resources, as internationally agreed.	15.6.1 Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits
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.	15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked

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	Targets	Indicators
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.	15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species
15.9	By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.	15.9.1 Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020
15a	Mobilise and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	15.a.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
15b	Mobilise 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.b.1 Official development assistance and public expenditure on conservation and sustainable use of biodiversity and ecosystems
15c	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.	15.c.1 Proportion of traded wildlife that was poached or illicitly trafficked

Source: Sayer et al. (2019)

Supplementary resources

- Krauss, J. E. (2022). Unpacking SDG 15, its targets and indicators: Tracing ideas of conservation. *Globalizations*, *19*(8), 1179-1194.
- Liu, S., Bai, J., & Chen, J. (2019). Measuring SDG 15 at the county scale: Localization and practice of SDGs indicators based on geospatial information. *ISPRS International Journal of Geo-Information*, *8*(11), 515.

2.1 Significance of SDG 15

The significance of SDG 15 stems from the fact that while terrestrial ecosystems are vital to sustain human life, contribute significantly to the global GDP and have a variety of cultural, spiritual and economic values (United Nations, 2023), phenomena such as

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growing population numbers, urbanisation, infrastructure and industrial development and agricultural expansion are increasingly influencing landscapes, lowering habitat size and quality and resulting in ecological degradation (Küfeoğlu, 2022). The resulting escalations, which are observed in terms of the loss of forests, the degradation of land and the extinction of species, are therefore posing a significant threat to both the Planet and People dimensions of the SDGs (United Nations, 2023). The magnitude and severity of the impact of these human activities on terrestrial ecosystems become clear when considering that the overall pace of the resulting extinction of species suggests that we have entered a sixth major extinction event (Bradshaw et al., 2021).

Forests can be used as an example to illustrate the significance of SDG 15 in a more direct way (United Nations, 2023). Since forests function as some of the earth's largest carbon and biodiversity reservoirs, they fulfil a crucial role to mitigate climate change and also to provide goods, services and livelihoods to people. While this is the case, almost 100 million hectares of net forest area have been lost worldwide over the past two decades (United Nations, 2023). The major culprit is agricultural expansion – acting as the driver of almost 90% of global deforestation. However, the frontiers of forest loss are shifting, since some countries indeed show the political will to reduce forest loss, whereas others do not. In this regard Weisse et al. (2024) report notable reductions in forest loss in Brazil and Colombia, but sharp increases occurred in Bolivia, Laos and Nicaragua.

With reference to figure 2, showing the loss in tropical primary forest from 2000 to 2023, the loss in 2023 totalled almost 3.7 million hectares. This is the equivalent of losing almost 10 soccer fields of forest per minute (Weisse et al., 2024). While this represents a 9% decrease in comparison with 2022, the rate in 2023 was almost equal to that of 2019 and of 2021. All this loss of forest produced a total of 2.4 gigatonnes (Gt) of carbon dioxide being emitted into the atmosphere. This is equivalent to almost half of the annual emissions caused by the burning of fossil fuel emissions in the United States of America.

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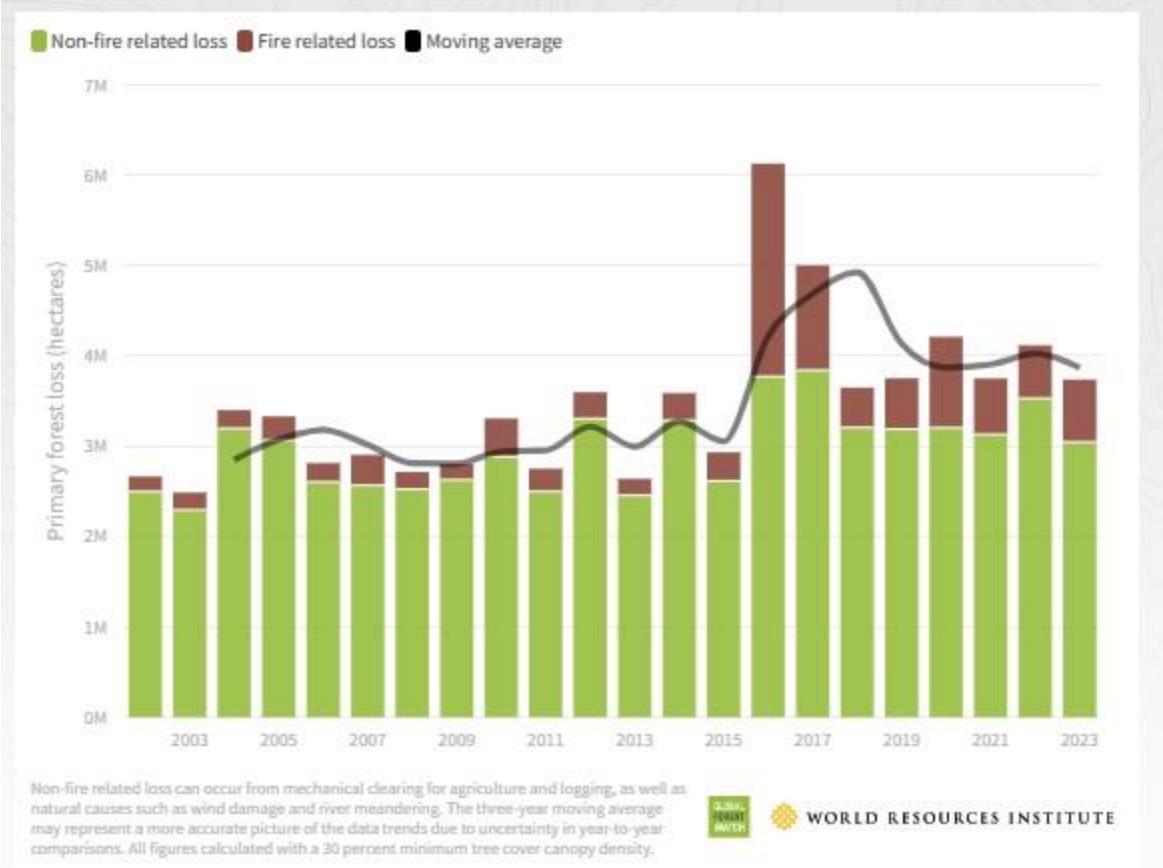

Figure 2: Tropical primary forest loss, 2000 – 2023
Source: Weisse et al. (2024)

It is important to realise that although forests have been used as an example, all terrestrial ecosystems provide goods and services and are also responsible for, among other things, capturing carbon, preserving soil, protecting biodiversity and decreasing the risk of natural disasters (Küfeoğlu, 2022). The overall protection and conservation of terrestrial ecosystems are thus important since they contribute significantly to address the issue of human-induced climate change, and adaptation and mitigation efforts. Table 2 provides a diagrammatic representation and overview of important trends associated with each of the three thematic areas of SDG 15, and serves to enhance understanding of the significance of this SDG, while also illustrating its scope.

Table 2: Observations and trends on the three main thematic areas of SDG 15

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Sustainable forest management	Land degradation	Biodiversity conservation
• Forests cover ±30% of the earth and contain ±80% of terrestrial animals, plants and insects. • Forests help prevent climate change by removing CO_2 from the air, maintaining the balance of gases and humidity in the atmosphere, conserving watersheds and reducing impacts of natural catastrophes. • Nearly 100 million hectares of net forest area have been lost over the past two decades. • Global forest coverage declined from 4.2 billion hectares in 2000 to 4.1 billion hectares in 2020. • Cropland results in 49.6% and livestock grazing in 38.5% of the loss in forest cover. • Global and regional efforts to sustain forest ecosystems are essential, in particular for developing countries and the tropics.	• Land degradation occurs on various scales and mostly through aridity, erosion by salinisation, soil organic carbon loss and vegetation degradation. • Land degradation affects living conditions of ±2/5 of the global population and reduces global economic output by ±1/10. • Degradation of the earth's land surface by anthropogenic activities affects 1-6 billion hectares globally. • Annual economic losses due to degradation of terrestrial (and marine) ecoservices, as a result of global land use changes, range from US$4.3 to 20.2 trillion. • Multiple actions at international level are required to address land degradation and involve attention to the ecological stability of land systems, soil, inland water resources and vegetation.	• An average 68% drop in mammal, bird, fish, reptile and amphibian populations has occurred since 1970. Much of this is due to habitat destruction by unsustainable agriculture/logging. • The risk of species extinction is increasing at a rate unprecedented in human history. • The Red List, measuring the extinction risk of species, reveals a 9.32% deterioration from 2000 to 2022. • Climate change is expected to take the leading role as the driver of biodiversity loss in coming decades. • To conserve and sustainably use biodiversity, actions such as reversing net habitat loss, transforming land management and moving to sustainable agriculture are required. • Despite national planning processes increasingly reflecting the value of biodiversity, the progress is too slow.

Source: Kleynman & Mitlachr (2018), Prăvălie (2021), UNEP (2021), United Nations (2023), Willemen et al. (2020), WWF (2021)

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Supplementary resources

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2.2 Interdependencies of SDG 15

In the context of the many interactions between the SDGs, the SDGs that are focused on biodiversity (SDGs 14 and 15) appear to be of prime importance in progressing towards attaining sustainable development and the SDGs. In most instances, progress with SDGs 14 and 15 contributes to the achievement of various other SDGs (Pham-Truffert et al., 2020). These two biodiversity-focused SDGs therefore act as multipliers to realise co-benefits for other Goals, and furthermore contribute to supressing the effect of negative interactions between some SDGs (Pham-Truffert et al., 2020). Measures to implement SDGs 14 and 15 will therefore most likely lead to multiple co-benefits across the entirety of Agenda 2030, while entailing some risks or trade-offs at the same time.

Terrestrial ecosystems, their services and biodiversity (all related to SDG 15) play critical and interdependent roles in influencing several of the SDGs, such as poverty, health, education, gender equality, climate change and other dimensions of well-being (Timko et al., 2018). Attempts to increase agricultural productivity (SDG 2) in rural areas serve as an illustrative example. Such attempts can lead to increases in deforestation (SDG 15), which can negatively affect local livelihoods (SDG 1) and increase inequalities (SDG 10). Several trade-offs and synergies can therefore be identified in the interdependencies

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between SDG 15 and the other SDGs, with conflicting priorities which may emerge, especially in terms of policy- and decision-making.

Table 3: Interdependencies between SDG 15 and the other SDGs

	Biodiversity and healthy ecosystems can be regarded as "the wealth of the poor" and are linked to an estimated 50 to 90% of the livelihoods of poor rural and forest-dwelling people.
	Biodiversity feeds into food security in various ways, for example by buffering agricultural production against threats such as weather extremes, pest outbreaks and plant diseases.
	The benefits of biodiversity and ecosystems for health are numerous. For example, ecosystems mitigate noise and air pollution, while biodiversity is the primary source of a large number of medical drugs.
	Children who have the opportunity of playing freely in natural environments develop awareness, reasoning, as well as observational skills and generally show improved mental and physical health.
	Due to inequalities between women and men in access, control and ownership of land and natural resources, women generally depend more on local access to nature and are more vulnerable to environmental degradation than men.
	Natural riparian ecosystems contribute to clean and reliable water supply by regenerating drinking water, replenishing groundwater and buffering against negative impacts on groundwater.
	Biological processes such as pollination, disease control and water supply are key to the production of renewable biofuels and depend on well-preserved, biodiversity-rich ecosystems.
	Healthy ecosystems support the provision of ecosystem services that are central to economic activities. Examples include raw materials for construction and cultural services for ecotourism.
	Short-term costs related to respecting or even building ‘with’ the natural environment lead to greater long-term savings and returns as a result of higher durability and resilience against natural hazards.
	If designed in collaboration with local stakeholders and communities, conservation measures can provide employment opportunities, thereby supporting poverty reduction and increased equality within a country.

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	Biodiversity supports the functioning of cities and specifically contributes to improved air quality, reduction of water runoff and flooding and provision of green areas for recreation.
	The maintenance of biodiversity and ecosystems is essential to achieve the shift to sustainable approaches to activities as hunting, forestry, agriculture, mining, production, trading, etc.
	The oceans and terrestrial ecosystems are significant carbon stores, absorb around half of the anthropogenic CO_2 emissions and act as buffers against climate change and extreme weather.
	There is a high degree of connectivity between marine and terrestrial ecosystems in that many impacts occurring in the marine environment (e.g. eutrophication and plastic pollution) originate on land, which highlights the need for integrated resource management.
	Many conflicts, ranging from international to regional to community level, are intensified through environmental degradation and/or disputes over natural resources, but these can have a multitude of causes.
Hil 	Official development assistance and the use of private funds for biodiversity conservation strengthens the means of implementation of the SDGs and supports the global partnership for sustainable development.

Source: Obrecht et al. (2021)

While table 3 provides examples to illustrate the interdependence between SDG 15 and each of the other SDGs, forests can be used as a specific example to illustrate these interdependencies and to highlight associated implications in terms of synergies, challenges and opportunities, as well as the trade-offs between different sectors which need to be considered in policy- and decision-making. Three policy- and decision-making clusters can be distinguished, each defined by a set of closely related SDGs. Following Timko et al. (2018), the three clusters can be grouped as follows:

- Forests, ecosystem services and livelihoods (SDGs 2, 3, 6, 7, 13, 15)
- Forests and the green economy (SDGs 1, 8, 9, 11, 12, 15)
- Forests, rights, justice, equality and inclusion (SDGs 5, 10, 15, 16)

Concerning the ecosystem services and livelihoods cluster, policy- and decision-makers have to deal with trade-offs between demands for land, water and energy and the goal to achieve global food security (HLPE, 2017). The challenge is to feed a world population of 9 billion by 2050 (SDG 2) in a way that is resilient to climate change (SDG 13) while limiting deforestation at the same time (SDG 15). Agricultural expansion (SDG 2), which is the most important driver of tropical deforestation (SDG 15), serves as an example. The problem is that agriculture is a major consumer of water, and forests are critical in the hydrological cycle (SDG 6).

In terms of the cluster focused on the green economy, forests are an important source of materials to meet consumer demands for a range of commodity and differentiated goods. In this context, responsible consumption (SDG 12) and sustainable communities (SDG 11) are important considerations, linked to both the level of consumption of forest resources and the specific source of materials involved. In practice, the global demand for wood products is increasing and continues to put pressure on natural forests, and sustainably managed forests are vital to enable a move away from reliance on more carbon-intensive materials such as concrete and steel.

For the Agena 2030 principle of “leaving no one behind”, the third cluster, involving rights, justice, equality and inclusion, is very important. Historically many indigenous people and rural communities have been dispossessed from their ownership of and access to forests. This often leads to forests being subjected to higher rates of degradation and their conversion to alternative uses. The continued male-dominance in forestry is another concern, which undermines the role that this sector can play in women empowerment. Attention to and implementation of 'forest justice’ can reflect the diversity among users of forests and bring about justice for forests themselves (Boyd, 2017).

Supplementary resources

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- Obrecht, A., Pham-Truffert, M., Spehn, E., et al. (2021). Achieving the SDGs with biodiversity. *Swiss Academies Factsheet*, 16(1). doi: 10.5281/zenodo.4457298
- Timko, J., Le Billon, P., Zerriffi, H., Honey-Rosés, J., De la Roche, I., Gaston, C., Sunderland, T. C., & Kozak, R. A. (2018). A policy nexus approach to forests and the SDGs: Tradeoffs and synergies. *Current Opinion in Environmental Sustainability*, *34*, 7-12.

2.3 Advantages of SDG 15

Although not always perceived as such, 21st century people and societies (both urban and rural) rely in various ways for their livelihood on terrestrial ecosystems, including its biodiversity, and also to enhance their resilience (Sayer et al., 2021). This is in line with the views expressed by the 2018 High Level Political Forum on Sustainable Development (HLPF, 2018), pointing towards the role of, for example, vegetation acting as a sink for carbon and thereby at least partially offsetting emissions. In addition, vegetation also contributes to the mitigation of climate change in more direct ways, such as providing shade, intercepting rainwater and reducing the impacts of pollution (Alkama et al., 2022). Increasing biodiversity is important and has the advantage that it supports food systems and leads to improved resilience through food and nutrition security (Shroff & Cortés, 2020). The primary advantage of making progress towards the achievement of SDG 15 is therefore that it supports and enhances the environmental processes that are required to ensure safe and adequate water supplies (SDG 6), sustainable food systems (SDG 2) and for mitigation of climate change (SDG 13). The actions taken towards implementing SDG 15 also have the additional advantage of positive outcomes for many indigenous peoples and local communities – often viewed as at risk of being left behind in terms of the development in general and specifically in terms of sharing in the benefits associated with achieving the SDGs.

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The advantages of working towards achieving SDG 15 are often reported and reflected on in various forums, with the following list providing examples of some of the targets of SDG 15:

- Conservation and restoration of ecosystems (target 15.1) contribute to safeguarding the services provided by these ecosystems, such as capturing carbon, maintaining soil quality, providing habitats for plant and animal life, regulating water quality and controlling erosion. Working towards target 15.1 safeguards the continued availability of these services and reduces the probability of the occurrence of natural disasters such as floods and landslides.
- Actions taken to halt deforestation and to restore degraded forests (target 15.2) are important since forests are vital sequestering carbon (thus mitigating climate change), conserving and enhancing biodiversity and supporting livelihoods by economically empowering locals through the implementation of sustainable forest management practices.
- The intended contribution to combat desertification and land degradation (target 15.3) is another important advantage of SDG 15. Restoration of degraded land will lead to improvements in soil quality, set the scene for enhanced agricultural productivity and contribute to the mitigation of the impacts associated with floods and droughts.
- Working towards the reduction of natural habitat degradation, halting biodiversity loss and protecting threatened species (target 15.5) are important to provide ecosystem stability, resilience and genetic resources for future generations, and with its role of safeguarding fragile mountain ecosystems (target 15.4).
- Fair and equitable sharing of benefits derived from the utilisation of genetic resources is crucial for sustainable development (target 15.6). This will need to be facilitated through international agreements to facilitate responsible access to genetic resources so that all countries and communities can reap the benefits.
- Combating poaching and illegal trade in protected flora and fauna (target 15.7) constitutes a further advantage of SDG 15, and involves consideration of both the

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supply and demand sides of illegal wildlife products. These actions contribute to the maintenance of ecological balance and cultural heritage.

To conclude this subsection, it is clear that SDG 15 not only protects the earth's ecosystems, but also supports the well-being and livelihood of people, resilience and the achievement of sustainable development. Although significant progress has been achieved to date with the establishment of protected areas, the rehabilitation of degraded lands, the conservation of endangered species and the development of policy frameworks, much still needs to be done to ensure that future generations have a more resilient and healthy planet.

Supplementary resources

- HLPF. (2018). *2018 HLPF background note - Review of progress towards achieving SDG 15.* UN Department of Economic and Social Affairs' Office of Intergovernmental Support and Coordination for Sustainable Development (UN-DESA/OISC) in collaboration with experts from the UN Food and Agriculture Organization (FAO), the UN Environment Programme (UNEP), and the UN Development Programme (UNDP); the Secretariats of the UN Forum on Forests, the UN Convention to Combat Desertification, the UN Convention on Biological Diversity, The Ramsar Convention, and the Convention on International Trade in Endangered Species; the International Union for Conservation of Nature (IUCN) and the Wildlife Conservation Society (WCS); and with inputs from the participants of the UN-DESA Expert Group Meeting on SDG 15 convened from 14 to 15 May 2018, as a contribution to the 2018 HLPF review of SDG 15. https://sustainabledevelopment.un.org/content/documents/200087.8_Formatted_Background_NoteSDG_15.pdf

2.4 Challenges in the implementation of SDG 15

Although it is generally recognised that there are several trade-offs between SDG 15 and other SDGs – in many cases resulting from competition for land – several synergies and opportunities can be identified at the same time (Sayer et al., 2019). The main risk associated with implementing SDG 15 appears to be that emphasis on short-term priorities and a 'business as usual' approach may undermine the opportunities for integration and synergy and, as a result, that SDG 15 may be overlooked. In addition, the scale and the complexity of the issues associated with the conservation of life on land, versus the limited resource base, pose many challenges (Sayer et al., 2019). Examples of this include the impacts of population growth, the demands and expectation of economic development and the trend of increased production and consumption, which intensify the challenges for not only the maintenance but even more so the improvement of life on land.

Despite the progress reported with some of the SDG 15 targets (United Nations, 2023), several structural weaknesses in SDG 15 are apparent (Krauss, 2022) and they are creating challenges in the implementation of this SDG. First and foremost is that SDG 15 follows a disavowal strategy by reusing previously failed indicators (i.e. Aichi biodiversity targets - CBD, 2010), even phrased in the same way, while removing target dates in some cases, as for target 5.16. This highlights past non-achievement of this indicator, and removing the deadline is a step back (Silva & Topf, 2020). Another criticism is that the SDG 15 targets raise questions about the extent to which protection of biodiversity for nature's sake versus a people-centred and inclusive approach is at stake (Sandbrook et al., 2019). Tauli-Corpuz et al. (2020) refer to this as failure to include and recognise the rights of those living with conservation, and Menton et al. (2020) elaborate on the failure of SDG 15 to prioritise justice.

In the light of these challenges, progress in achieving the SDG 15 targets appears to be a daunting task. In this regard, Sayer et al. (2019) push for a more inclusive approach, which is at the same time proactive and outcomes-based and based on realistic scenarios. These authors emphasise the need for integration, accompanied by comprehensive political and public engagement, together with responsiveness to

divergent local contexts. There is a definite need to take locally learnt lessons on the SDGs and to feed these into policies at higher levels, thus promoting a bottom-up approach. Sayer et al. fear that without adopting these types of changes, SDG 15 risks stagnating into a sectoral, top-down approach. Furthermore, it has to be acknowledged that since conservation and development are interdependent phenomena, safeguarding life on earth largely depends on actions taken in support of all the other SDGs as well. Table 4 provides a synopsis of the specific challenges to achieve SDG 15, and the actions required to address them.

Table 4: Examples of specific challenges in achieving SDG 15, and actions required to overcome them

Specific challenge	Required actions
Disavowal strategy, falling back on previous failures	Using more realistic scenarios
Protection of biodiversity for nature's sake only	Push for an outcomes-based approach, while being more proactive
Lack of people-centred approach	More focus on and consideration of people and their rights
Non-inclusive approach	Push for a more inclusive approach
Top-down approach	Bottom-up approach

Source: Krauss (2022); Sayer et al. (2019)

Supplementary resources

- Krauss, J. E. (2022). Unpacking SDG 15, its targets and indicators: Tracing ideas of conservation. *Globalizations*, *19*(8), 1179-1194.
- Sayer, J., Sheil, D., Galloway, G., Riggs, R. A., Mewett, G., MacDicken, K. G., Arts, A. K., Boedhihartono, J. L., & Edwards, D. P. (2019). SDG 15 Life on land–the central role of forests in sustainable development. In P. Katila, C. J. Pierce Colfer, W. De Jong, G. Galloway, P. Pacheco, & G. Winkel (Eds), *Sustainable development goals: Their impacts on forest and people* (pp. 482-509). Cambridge University Press.

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Examples of questions for assessment

2.1 Defining SDG 15 – introduction

- What are the main groups in which the targets of SDG 15 can be divided?
- List the targets belonging to each of these main groups.

2.2 Significance of SDG 15

- Explain the contribution of forests to sustain human life and ecosystems.
- Which human activities are threatening the existence of forests?
- What is the status of the progress in achieving SDG 15 by 2030?
- Briefly explain the comprehensive scope and importance of SDG 15 with reference to three main thematic areas covered by this SDG.

2.3 Interdependencies of SDG 15

- Select any three SDGs and briefly explain how they interact with SDG 15. Use examples from your region/country to illustrate your explanation.
- How is SDG 15 interconnected with the other SDGs? What other SDGs do you think will be most directly affected if SDG 15 is not achieved?

2.4 Advantages of SDG 15

- What will the main advantages be for the world if the goal to protect, restore and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss can be achieved?
- Select any two of the targets of SDG 15 and explain the specific advantages which will result with these targets being achieved. Link these to advantages for your specific region/country.

2.5 Challenges in the implementation of SDG 15

- What are the main weaknesses of SDG 15 and how are they creating challenges for the implementation of this SDG?

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- Explain how the interdependencies of SDG 15 with all the other SDGs are a challenge to the achievement of SDG 15. Select two SDGs to use as examples to illustrate your answer.
- What are the difficulties in implementing SDG 15 in your region/country? Which are the main barriers? How can they be overcome?

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3. Overview of various crises that have a negative impact on the achievement of SDG 15

Readers (teachers) will be empowered to

- identify the major crises that have a negative impact on the achievement of SDG 15
- explain how the major crises prevent the achievement of SDG 15
- describe how the impact of current crises on the achievement of SDG 15 differs regionally

Historically, crises have formed the basis of the catalyst that initiates significant social, political and economic change in society (United Nations, n.d.). A global or regional crisis also demonstrates exactly how interdependent and interlinked all the components of sustainable development are and this extends to the achievement of the SDGs by 2030. Further, as the impact of most global and regional crises transcends national and international borders, the international community in collaboration with governments must work together to develop common solutions to mitigate the impact of the crisis by facilitating structural transformation that will enable and encourage success in the pursuit of achieving the SDG targets by 2030 (United Nations, 2022). To achieve the Goals, many developing nations are finding themselves with limited resources because of the consequences of climate change, COVID-19 and conflicts (including war), which have negatively impacted economic equality (United Nations, 2022). These three global crises would have a major impact on the achievement of life on land (SDG 15) by 2030.

SDG 15 is about reducing the challenges of life on land within and among countries. It has nine targets to be achieved by 2030, including combatting drought/desertification, preserving and advancing the sustainable use of terrestrial ecosystems, reversing land degradation and reducing loss of biological diversity. The number of governments integrating biodiversity values into their national reports and accounting systems has

been increasing steadily. An estimated 90% of countries had set national targets by December 2022 to help them achieve the various targets for SDG 15 (United Nations, 2023), but by 2024 only roughly one-third of countries claimed to be on course to meet or surpass their national goals.

Supplementary resource

- United Nations. [n.d.]. *The Sustainable Development Goals (SDGs). SDG 15 – Climate Action*. https://www.un.org/sustainabledevelopment/climate-change/

3.1 Climate change

Over the last decade, climate change has been one of the main drivers of land degradation and biodiversity loss globally. The world is currently facing the largest biodiversity extinction events since the dinosaur age (United Nations, n.d.). The current global population growth and land-use/land-cover changes, coupled with climate change, are a significant challenge to achieving the targets of SDG 15 that are specifically aimed at restoring and promoting sustainable use of terrestrial ecosystems, reversing land degradation and reducing biodiversity loss by 2030 (United Nations, 2022). Humanity has made great strides in social and economic progress over the last century, but these have come at the expense of the earth's natural resources. Human actions are the main causes of large terrestrial losses. For example, in 2015, forests extended over approximately four billion hectares or 31% of the world's land surface. While global deforestation rates declined in recent years, from 7.3 million hectares in 2000 to 3.3 million hectares in 2015, they remain disturbingly high (UNDP, 2021). The primary driver of deforestation remains the conversion of forests to agricultural land. Increased agricultural production is the direct cause of about 90% of worldwide deforestation. However, forest degradation is rising worldwide, primarily due to unsustainable use, frequently fuelled by poverty or inadequate land management.

Climate change, in addition to human actions, is the earth's greatest existential threat. Rising global temperatures are causing extreme weather events and increased greenhouse gas emissions from the usage of fossil fuels. The effects include forest losses, increased desertification, land degradation and biodiversity loss. The global forest area continues to decrease due to temperature extremes, from 31.9% in 2000 to 31.2% in 2020, resulting in a net loss of 100 million hectares (United Nations Development Programme (UNDP), 2021).

Supplementary resources

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3.1.1 Impact of climate change in Africa

The African economy and the population's livelihoods depend on land; this has strong links with agriculture (SDG 1), climate (SDG 13) and poverty (SDG 1). Temperature extremes, variations in rainfall patterns and recurrent severe weather situations are not only a one-time episode for a fragile African region. The average temperature of the African continent is anticipated to rise by 3 to 6 °C, which is more than the global increase in average temperatures (IMF, 2020). The sub-Saharan African region is one of the regions in the world that is most vulnerable to climate change, due partly to the continent's fragile ability to adapt to or mitigate climate change (Serdeczny et al., 2017; Ofori et al., 2021). Climate change poses a significant threat to Africa's ecosystems and extinction of numerous species or biodiversity. The increasing rate of deforestation, degradation of

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land and species extinction is worsening, posing a serious threat to the environment and human health.

The detrimental impact of variations in climate change on life on land results in a faster rate of biodiversity loss, which aggravates the adverse environmental circumstances in Africa (UNDP, 2021). As a result, SDG 15 and the other SDGs of Agenda 2030 will not be met unless we make a significant adjustment to our interaction with the natural environment. A range of models estimate that by 2100, climate change will have reduced the productive capacity of Africa's lakes by 20–30%, resulting in the extinction of over 5 000 plant species and causing the loss of over 50% of several birds and species of mammals (UNDP, 2021). To achieve the goal of assuring a land degradation-neutral world by 2030, it is necessary to prevent new land degradation and restore at least 1 billion degraded hectares of land lost (United Nations, n.d.).

Supplementary resources

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3.1.2 Impact of climate change in Latin America

Climate change poses significant challenges to the achievement of SDG 15 in Latin America. Projections point to mean temperatures increasing by up to 4.5 °C compared to pre-industrial levels by the end of this century, terrestrial biodiversity being threatened by species range shifts and the Amazon rainforest being further degraded especially due to droughts in the region (Reyer et al., 2017). Through deforestation and desertification, millions of people have been affected over the last decades, and while the extent varies from country to country, deforestation is a prevalent issue across many countries in Latin America and the Caribbean (LAC) (ECLAC, 2021). The decline in green areas is combined with land use changes and land management challenges, leading to water imbalances.

Among the targets of SDG 15, target 15.3 (combatting desertification and restoring degraded land) and target 15.5 (addressing degradation of natural habitats and halting biodiversity loss) are in a more critical situation and are hindered by climate change impacts. Even though the LAC region contains 40% of the biodiversity and more than 25% of the world's forests (CAF, 2023), desertification and land degradation through droughts or floods reduce the productivity of land, exacerbate soil erosion and diminish biodiversity, posing significant challenges. Climate change also accelerates habitat loss and species extinction, threatening the integrity of ecosystems and the services they provide. Additionally, changing climatic conditions can alter the distribution of forest species and disrupt ecosystem functions, further challenging forest conservation and management efforts. Protecting and restoring natural habitats is essential for maintaining

biodiversity and ecosystem resilience in the face of climate change, and forests play a key role in climate change mitigation (FAO, 2023).

In addition to these targets, climate change is significantly affecting mountain communities and ecosystems (target 15.4), especially in the Andes, home to some of the fastest-disappearing ice packs in the world due to shrinking glaciers (UNEP, 2023).

Supplementary resources

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3.1.3 Impact of climate change in Europe

Climate change has increasingly affected Europe's ability to meet SDG 15, which is focused on protecting, restoring and promoting the sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification and halting and reversing land degradation and biodiversity loss. The varying impacts of climate change, including extreme weather events, rising temperatures and shifting climatic zones, challenge these conservation efforts across multiple fronts (Hlásny et al., 2021).

The conservation and restoration of terrestrial and freshwater ecosystems (target 15.1) are crucial for maintaining Europe's environmental health and biological diversity. In countries such as Finland, climate change has led to altered rainfall patterns, affecting freshwater systems and necessitating adaptive management strategies to maintain water quality and ecosystem integrity. Similarly, in southern European nations such as Spain, increased temperatures and changing precipitation patterns stress freshwater

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ecosystems, pushing endemic species to the brink and requiring enhanced conservation measures (Koutroulis et al., 2018).

Forests cover a significant portion of Europe and are essential carbon sinks; however, climate change threatens these critical ecosystems. To end deforestation and restore degraded forests (target 15.2), countries such as Germany have implemented robust forestry management practices and reforestation projects designed to increase forest resilience against climate-induced stresses such as pests, fires and storms (Yousefpour et al., 2020). Despite these efforts, the increasing rate of climate change continues to challenge the restoration of these vital ecosystems.

Desertification and land degradation (target 15.3) are significant issues, particularly in Mediterranean countries. In Greece, for example, prolonged droughts and over-exploitation of agricultural land have led to soil erosion and decreased agricultural productivity (Tsesmelis et al., 2022). Initiatives to restore these lands are crucial for preventing further desertification and promoting land stability, yet ongoing climate variability complicates these restoration efforts.

The conservation of mountain ecosystems (target 15.4) is another area where climate change has had a marked impact. In Alpine regions, rising temperatures have led to glacier retreat and altered hydrological cycles, which in turn affect water availability downstream during dry periods. Efforts to preserve these ecosystems are vital not only for biodiversity, but also for the millions of people relying on them for water, food and recreation (Brighenti et al., 2019).

Protecting biodiversity and natural habitats (target 15.5) is increasingly challenging because species and habitats are under pressure from climate change. In the UK, shifting temperatures have altered habitats of many native species, leading to declines in some populations and the northward migration of others. This necessitates dynamic conservation strategies that can adapt to a changing climate (Didham et al., 2007).

Ensuring the protection of genetic resources and fair sharing of benefits (target 15.6) is essential for maintaining biodiversity. Countries such as Norway have focused on protecting genetic diversity through seed banks and other conservation programmes that

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store genetic material for future restoration and research, a critical resource as species populations adapt to changing conditions (Lee, 2023).

The elimination of poaching and trafficking of protected species (target 15.7) remains a challenge across Europe. While countries such as Romania have made strides in combating illegal logging and the wildlife trade, climate change exacerbates these issues by stressing animal populations and increasing their vulnerability to exploitation (Troneci, 2024).

Preventing the spread of invasive alien species (target 15.8), which can be facilitated by climate change as new areas become hospitable to non-native species, is critical. Italy, for example, has seen an increase in invasive plant species in its northern regions, which compete with native flora, altering local ecosystems (Lazzaro et al., 2020).

The integration of ecosystem and biodiversity values into national and local planning (target 15.9) is essential for sustainable development. France has pioneered the incorporation of ecological considerations into urban planning, ensuring that development does not encroach unduly on natural habitats and that green spaces are preserved within city environments (Angelo, 2021).

Increasing financial resources to support conservation and sustainable use of ecosystems and biodiversity (target 15.a) is crucial. The European Union allocated funds through various frameworks in support of conservation across the continent, focusing on national and transnational initiatives (Davies et al., 2021). Similarly, financing and incentivising sustainable forest management (target 15.b) is vital for maintaining forest health and productivity. Sweden has implemented financial incentives for sustainable logging practices and replanting of trees to ensure that forestry operations contribute to, rather than prevent, ecological balance (Kaniecka, 2023).

As Europe strives to meet the goals outlined in SDG 15, it faces the continuous and evolving challenge of adapting its environmental policies and practices to the realities of climate change. Each target under SDG 15 is affected by these climatic shifts, requiring a multifaceted approach involving policy reform, technological innovation and international cooperation. Examples from various European countries illustrate both the

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broad challenges and specific actions being taken to adapt and mitigate the effects of climate change on terrestrial ecosystems and biodiversity (Trane et al., 2023). These efforts highlight the need for integrated and proactive environmental management to sustain and restore Europe's natural landscapes in the face of ongoing climate change (Leal Filho et al., 2024).

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3.2 COVID-19 pandemic

The COVID-19 pandemic has influenced numerous sectors of society beyond the health emergency with a negative impact on all 17 SDGs (United Nations, 2020). In terms of SDG 15, one of the most prominent and immediate implications of COVID-19 was likely

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the changes in the policy adopted in response to the global pandemic, such as the restricted budgetary sanction, the transfer of SDG-related environmental funds to other pandemic relief sectors, the suspension of forest restoration programmes due to travel restrictions and the simplification of environmental regulations, which had a greater impact on forest protection and maintenance operations (Yuan et al., 2023). The pandemic's direct or indirect effects on the achievement of SDG 15 by 2030 vary globally, with developing regions such as sub-Saharan Africa, Central and Southern Asia, as well as Latin America and the Caribbean experiencing the worst of the crisis (López-Feldman et al., 2020). For example, countries in sub-Saharan Africa such as South Africa and Kenya announced budget cuts that had an immediate effect on agencies that uphold environmental laws and regulations to combat temperature increases.

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3.2.1 Impact of COVID-19 in Africa

In 2020 the World Health Organization (WHO, 2020) announced that COVID-19 was another major global crisis with a devastating impact on the achievement of the SDG 15 Agenda 2030. Africa has been facing challenges with the management of biological invasions of pathogenic agents, particularly zoonotic pathogens, to mitigate their negative

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impacts on biodiversity and achieve the SDG 15 targets before the COVID-19 pandemic (Odey et al., 2021). Therefore, COVID-19 influenced the SDGs negatively, and policy-makers had challenges in accomplishing these Goals by 2030. Since the Goals overlap, the SDG 15 dilemma has a domino effect on other Goals, especially SDG 13 (climate action), SDG 3 (good health and well-being), SDG 2 (zero hunger) and SDG 14 (life below water).

SDG 15 focuses mainly on protecting and restoring land resources and achieving this goal by 2030. Encouraging the sustainable use of land and ecosystems is vital to our livelihoods on earth. The COVID-19 pandemic in Africa negatively affected the ecotourism industry, which is closely linked to nature ecology. Countries like South Africa, Kenya and Botswana faced a complete shutdown for about a year, and this had negative effects on environmental-related benefits and job creation in the future (African Union & Africa CDC, 2020).

However, the short-term benefits of the pandemic included preventing deforestation, reducing poaching and protecting the forest ecosystem. However, over the years ahead, unemployment may cause more local people to slash trees to make an income and livelihood. Protecting and restoring land resources is the primary goal of SDG 15 and achieving its essential targets by 2030 will be necessary to make this a reality.

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3.2.2 Impact of COVID-19 in Latin America

Like the African context, the COVID-19 pandemic impacted the LAC region with combined effects in SDG 15 and other Goals. The challenges interconnect with some of the Goal targets, especially those emphasising the conservation, restoration and sustainable use of terrestrial ecosystems and forests.

Firstly, the pandemic disrupted conservation activities and fieldwork across Latin America. Travel restrictions, social distancing measures and lockdowns hindered the ability of researchers to access protected areas and conduct crucial monitoring and enforcement activities (Powlen et al., 2023). Without adequate monitoring and enforcement, protected areas become more vulnerable to illegal logging, poaching and habitat destruction, threatening biodiversity and the services that ecosystems provide (Sharma et al., 2023). Furthermore, the pandemic has prompted shifts in governmental priorities and policies in Latin America. Governments have understandably focused on public health responses and economic recovery efforts, potentially diverting attention and resources away from biodiversity conservation initiatives. Budget cuts and reallocation of funds affect funding for protected area management, conservation projects and environmental enforcement agencies (target 15.9).

On the other hand, amidst these challenges, the pandemic also presented opportunities for rethinking conservation strategies in Latin America (ECLAC, 2020). It underscored the interconnectedness between human health, ecosystem health and biodiversity conservation, highlighting the importance of proactive measures to prevent future pandemics and address underlying drivers of disease emergence. Changes in human behaviour, due to lockdowns and movement restrictions, altered land use patterns and reduced human pressure on some ecosystems; even though these effects were temporary, behaviour change was triggered and represented a support to post-COVID recovery (Dialogue Earth, 2021).

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3.2.3 Impact of COVID-19 in Europe

The COVID-19 pandemic significantly impacted Europe's progress towards achieving SDG 15. The effect of the pandemic on environmental conservation efforts, resource allocation and policy prioritisation created new challenges and exacerbated existing pressures on terrestrial and freshwater ecosystems.

During the pandemic, the conservation and restoration activities of terrestrial and freshwater ecosystems (target 15.1) faced delays and reductions in many European countries. For example, in France, lockdown measures and restrictions on movement hindered routine conservation operations, leading to the neglect of protected areas and delayed restoration projects. These ecosystems, which are vital for biodiversity and human well-being, have suffered due to reduced management and oversight (Destoumieux-Garzón et al., 2022; Or et al., 2022).

There were varied impacts on deforestation and forest degradation (target 15.2) across Europe. In countries such as Romania, reduced oversight and the diversion of law enforcement resources to pandemic-related duties led to an increase in illegal logging activities. The cessation of community and conservationist monitoring activities allowed for unchecked exploitation, setting back efforts to restore and manage forest resources sustainably (Bošković et al., 2021).

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The pandemic also influenced efforts to combat desertification and restore degraded land (target 15.3). In Spain, projects aimed at reversing land degradation and desertification (Martínez-Valderrama et al., 2022) experienced significant slowdowns as resources were reallocated to immediate public health needs. The momentum for large-scale restoration projects waned, with long-term implications for land productivity and ecosystem health (Gontariuk et al., 2021).

Mountain ecosystems (target 15.4), such as those in the Alps and the Carpathians, experienced both positive and negative impacts. Reduced tourism during lockdowns lessened immediate environmental pressures, such as waste generation and habitat disruption. However, the reduction in conservation funding and activities threatened ongoing efforts to preserve these fragile ecosystems (Lenart-Boroń et al., 2022).

Protecting biodiversity and natural habitats (target 15.5) became more challenging as the pandemic strained resources and shifted governmental focus. In the United Kingdom, conservation projects saw budget cuts and postponements, impacting wildlife monitoring and protection initiatives critical for maintaining biodiversity (Gibbons et al., 2022). Moreover, access to genetic resources and the fair sharing of benefits (target 15.6) were also affected, as international and national research collaborations faced delays. For instance, in Germany, restrictions on travel and fieldwork hindered biodiversity research projects (Böhmer et al., 2020), affecting the collection and sharing of genetic resources essential for scientific advancement and conservation.

Efforts to eliminate the poaching and trafficking of protected species (target 15.7) saw setbacks due to reduced patrolling and monitoring. Countries such as Italy observed an increase in poaching incidents, as the redirection of law enforcement resources towards pandemic-related emergencies led to decreased oversight of protected areas (Natali et al., 2024).

The prevention of invasive alien species (target 15.8) encountered new challenges during the pandemic. In countries such as Greece, reduced human resources and disrupted management activities allowed invasive species (Vourdoubas, 2023) to spread more rapidly. Financial resources intended for the conservation and sustainable use of

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ecosystems and biodiversity (target 15.a), in turn, were significantly impacted and funds across Europe were diverted to address the health crisis, leaving less available for environmental initiatives. This reallocation impacted projects from local conservation efforts in Bulgaria to large-scale biodiversity projects across the continent (Marinelli et al., 2021).

Similarly, financing and incentivising sustainable forest management (target 15.b) were adversely affected. In Sweden, for example, financial support for sustainable forestry practices (Saxena et al., 2021) faced cuts as economic resources were prioritised for pandemic relief efforts, potentially delaying progress towards sustainable forest management goals (Jakobsson et al., 2021).

The COVID-19 pandemic has clearly shown that while immediate crises can divert attention and resources from long-term environmental goals, they also highlight the importance of resilient and sustainable management of natural resources. Examples from various European countries illustrate both the setbacks and the complex interdependencies between health crises and environmental sustainability (Fenner & Cernev, 2021). Moving forward, it is crucial to integrate lessons learnt during the pandemic into strengthening the resilience of conservation efforts against future global disruptions, ensuring that progress towards SDG 15 is not only regained, but also accelerated (Mofijur et al., 2021).

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3.3 Conflict

Conflict can have unanticipated effects on the habitat of wildlife and biodiversity. Armed conflict frequently impedes biodiversity and ruins habitats for plants and animals. The loss of habitat and widespread use of herbicides, wildlife deaths from landmines, hunting for military use, opportunistic poaching, direct targeting of preservation experts by armed groups, pest outbreaks brought on by aggravated environmental conditions and increased wildlife mistreatment by displaced peoples all have aggressive effects.

There are a number of indirect impacts of conflict, for example the opportunity costs of conflict on the protection of biodiversity is not always quantified. It is, however, clear that during conflict, budget allocations are directed towards preparing for the conflict and the resultant budget reallocations may well degrade the trajectory of investment in the economy, and the enforcement of biodiversity conservation locally, nationally or internationally (Rist, Norström & Queiroz, 2024).

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Supplementary resources

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3.3.1 Impact of conflict in Africa

In addition to the COVID-19 pandemic and climate change, perpetual political pressures, wars and conflicts in the region, most African countries are finding it challenging to achieve most of the SDGs by 2030. Regarding the inadequate progress of SDG 15, several reports (Akinola & Liaga, 2023; Saliu et al., 2023) highlight that conflicts and wars in Africa continue to cause substantial and widespread losses in forest cover, biodiversity and land degradation. In ways that are still unclear, wars and conflict have affected both the environment and the lives of humans.. The Horn of Africa continues to rank among the world's least stable regions due to conflict and instability tendencies (Fulgence, 2015).

There is a growing occurrence of conflict between humans and wildlife in the urban and rural regions of Africa as the demand for sharing ecosystem services increases. Looking at regional crises, for instance, the ongoing conflict in the Democratic Republic of the Congo (DRC) around the Great Lakes in the eastern part of Africa resulted in a prominent loss of wildlife and land degradation because of the collapse of institutions, the uncontrolled wilderness and the unchecked abuse of common assets like minerals, wood and bush meat (Achille et al., 2023; Otukoya, 2024). Data from Africa indicates that 46% of the continent's land and 65% of its people are affected by land degradation, which costs the continent US$9.3 billion yearly. Expanding public-private collaborations is

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essential to mobilise and direct resources for enhancing sustainable land, forest and ecological diversity management in the direction of an environmentally conscious and sustainable recovery (Masolele et al., 2024).

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3.3.2 Impact of conflict in Latin America

Global and regional conflicts can have an effect on the attainment of SDGs in Latin America. These conflicts encompass a range of issues, including armed conflicts, political tensions, resource disputes and socio-economic inequalities, all of which can directly and indirectly affect the conservation, restoration and sustainable use of terrestrial ecosystems and biodiversity in the region (Jiang et al., 2023).

One of the most direct impacts of conflicts – including geopolitical and socio-ecological ones - on biodiversity in Latin America is habitat destruction and degradation resulting from armed conflicts and associated activities such as deforestation, illegal mining and land grabbing (Interpol, 2022). Conflict zones often experience high levels of insecurity and weakened governance, which are favourable for deforestation and wildlife trafficking practices (SWP, 2021).

Furthermore, conflicts, crime and illicit activities can disrupt conservation efforts and impede the implementation of biodiversity conservation projects and protected area management initiatives. Conflicts can also exacerbate environmental degradation and ecosystem fragmentation, leading to loss of biodiversity and ecosystem services, further compromising conservation efforts (Crisis Group, 2023).

Supplementary resources

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3.3.3 Impact of conflict in Europe

Conflicts and wars have dramatically hindered progress in achieving SDG 15 in Europe. These disturbances, by disrupting environmental management and conservation efforts, exacerbate existing challenges related to the preservation and restoration of natural ecosystems (Leal Filho et al., 2024).

In conflict zones, conserving and restoring terrestrial and freshwater ecosystems (target 15.1) often become secondary concerns for immediate human survival needs. For instance, in Ukraine, ongoing conflicts have led to significant damage to freshwater ecosystems due to pollution from military activities and the displacement of communities, which further strains limited natural resources (Krasnokutska et al., 2024). The physical destruction of habitats disrupts the ecological balance, impacting both biodiversity and local communities dependent on these ecosystems for their livelihoods (Leal Filho et al., 2024).

Deforestation and forest degradation (target 15.2) are accelerated by conflicts, particularly through the exploitation of forest resources for military purposes or as emergency revenue sources (Daiyoub et al., 2023). In the Balkans, during past conflicts, large areas of forest were cleared to deny cover to opposing forces or were destroyed by artillery fires (Leal Filho et al., 2024). Post-conflict nations such as Bosnia and Herzegovina have struggled with the dual challenge of restoring these forests and managing landmines left in forested areas, which continue to pose a significant risk to both human and animal life (Laćan & McBride, 2014).

Desertification and land degradation (target 15.3) are worsened by the destructive nature of warfare, which often leads to unsustainable land management practices. In regions such as Eastern Ukraine, the heavy machinery used in combat and the numerous trenches dug for defence purposes have led to soil compaction, reducing agricultural viability and increasing susceptibility to erosion. In this perspective, the conservation of mountain ecosystems (target 15.4) is similarly jeopardised by military operations, which tend to use such regions for strategic advantages. The Carpathian Mountains, spanning multiple European countries, have experienced various degrees of military activity over

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the decades (Havlíček et al., 2018), leading to habitat fragmentation and disruption of wildlife corridors, which are crucial for the survival of many mountain species.

Protecting biodiversity and natural habitats (target 15.5) becomes nearly impossible in wartime. The chaos and breakdown of governance structures lead to reduced monitoring and enforcement of conservation laws. For example, the conflict in the Caucasus region has caused significant biodiversity loss due to both direct destruction from military actions and increased poaching and illegal logging as government attention is diverted (Stoett, 2019).

Access to genetic resources and fair sharing of benefits (target 15.6) are also compromised as conflict regions become inaccessible to researchers and conservationists. This is evident in places such as the conflict zones in the Balkans, where ongoing tensions hamper conservation efforts and the sustainable management of genetic resources, which are essential for long-term ecological research and development. Moreover, eliminating the poaching and trafficking of protected species (target 15.7) is extremely challenging during conflicts. Law enforcement capacity often decreases as resources are redirected to immediate security concerns. This situation is mirrored in the Dinaric Alps, where increased poaching during conflict periods has threatened the survival of several endemic and endangered species (Álvarez, 2019).

The integration of ecosystem and biodiversity values into governmental planning (target 15.9) is severely disrupted by conflicts. War diverts attention and resources away from environmental planning and governance, often leading to ad hoc decisions that further degrade the natural environment. Post-conflict recovery efforts in nations such as Serbia and Croatia have had to address this by reintegrating biodiversity considerations into national recovery and development plans (Hulme, 2022).

Overall, conflicts significantly impede progress towards achieving SDG 15 in Europe by directly damaging natural resources and diverting attention from environmental to immediate survival issues. Post-conflict recovery offers a critical window to realign national policies with SDGs, but this requires substantial international support and a committed return to peace and stability.

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Examples of questions for assessment

3.1 Overview of global crises that have a negative impact on the achievement of SDG 15

- Name at least three global crises that affect the achievement of the SDG 15 targets in your region.

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- How can governments address the challenges related to life on land and reduce biodiversity loss?

3.2 Climate change

- What is the major driver of terrestrial loss in the world and how is this aggravated by climate change?
- List a few actions that have been taken in your region to address climate change as related to biodiversity loss.

3.3 COVID-19

- During the COVID-19 pandemic, resources in your region were probably directed to dealing with the pandemic. Within this context, identify and explain at least one negative and one positive impact these actions had on life on land.

3.4 Conflict

- Explain the negative impact of conflict on life on land in your region.
- Select a specific conflict within your region and speculate on the biodiversity loss in the region due to conflict.

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4. Progress towards the achievement of life on land targets by 2030

Readers (teachers) will be empowered to

- develop an understanding of regional differences in achieving SDG 15
- discuss the various factors that have a negative impact on the achievement of the various targets of SDG 15

SDG 15 focuses on conservation and sustainable use of forests, other terrestrial ecosystems and biodiversity, including halting desertification and land degradation and combatting illegal trade in endangered species. SDG 15 is one of the more ambitious and wide-ranging SDGs. There are, however, distinct regional variances in terms of the achievement of the various targets for SDG 15 due to the way in which each region is able to mitigate the crisis.

Supplementary resource

- Our World in Data Team. (2023). *SDG tracker: Measuring progress towards the Sustainable Development Goals.* https://ourworldindata.org/sdgs [Accessed 20 March 2024].

4.1 Regional progress in Africa

Forests, biodiversity and land resources play vital roles in achieving most of the SDGs and driving a greener, more inclusive and resilient Africa (SDG Center for Africa, 2019). However, challenges such as climate change, the COVID-19 pandemic and ongoing conflicts have forced vulnerable populations to resort to actions that harm ecosystems (AU et al., 2022). The loss and degradation of forests and biodiversity will adversely affect approximately 30% of Africa's total population (United Nations, 2023). Among nature-dependent individuals in Africa (about 53%, or 249 million people), reliance on nature extends to energy, livelihoods, housing materials and water, aligning closely with SDGs 6, 7, 8 and 11 (Fedele, 2021).

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Forest and wood resources contribute up to 6% of Africa's GDP (excluding North Africa) and supply 80% of energy in certain countries (ECA, 2014). Over 62% of Africa's population depends directly on ecosystem services for sustenance—food, water, energy, health and livelihoods. Interestingly, the pandemic temporarily eased environmental pressure due to reduced economic activities (AU et al., 2022).

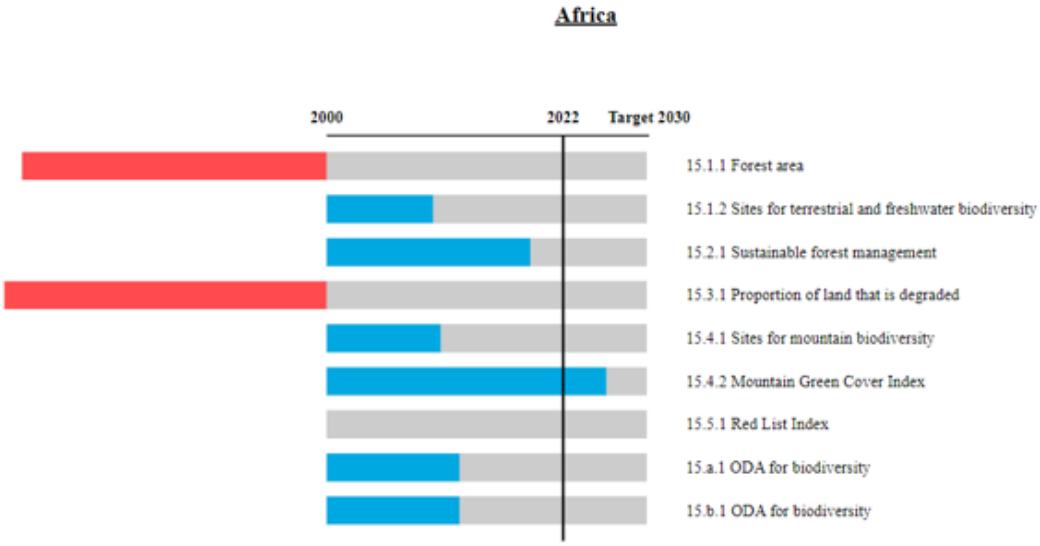

Figure 3: Africa's progress towards achieving SDG 15

Source: African Union (2024)

Figure 3 provides a generalised progress report on SDG 15 for the whole of the African region. Note, however, that there are substantial differences between the various sub-regions in Africa in terms of the achievement of each of the targets (figure 4).

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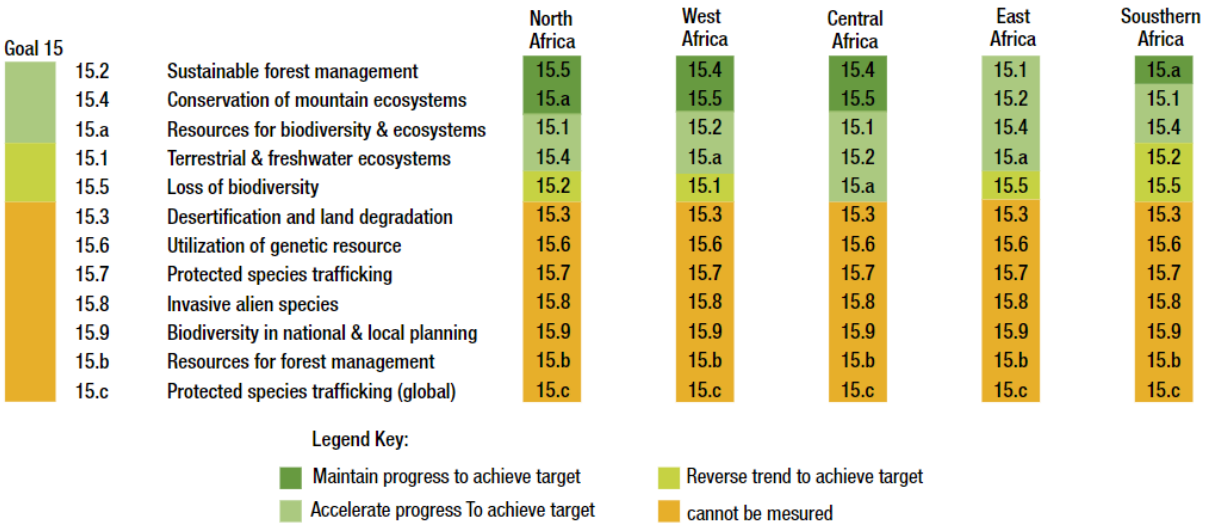

Figure 4: Expected achievements of SDG 15 targets by region in Africa

Source: African Union (2024)

Targets that have shown negative progress

Indicator 15.1.1, aimed at expanding forest areas, is off track. By 2022, Africa's forest area was 21.3%, below the global 31.2% average. From 2015 to 2020, forest cover decreased by 0.7%, from 656 to 637 million hectares (FAO, 2020), contrasting with increases in Asia, Europe and northern America. Africa experienced the highest net forest loss rate from 2010-2020, largely due to land conversion for agriculture (FAO, 2021). Forest cover varies across regions; Central Africa had the most at 44.3% and North Africa had the least at 3.5% (figure 5).

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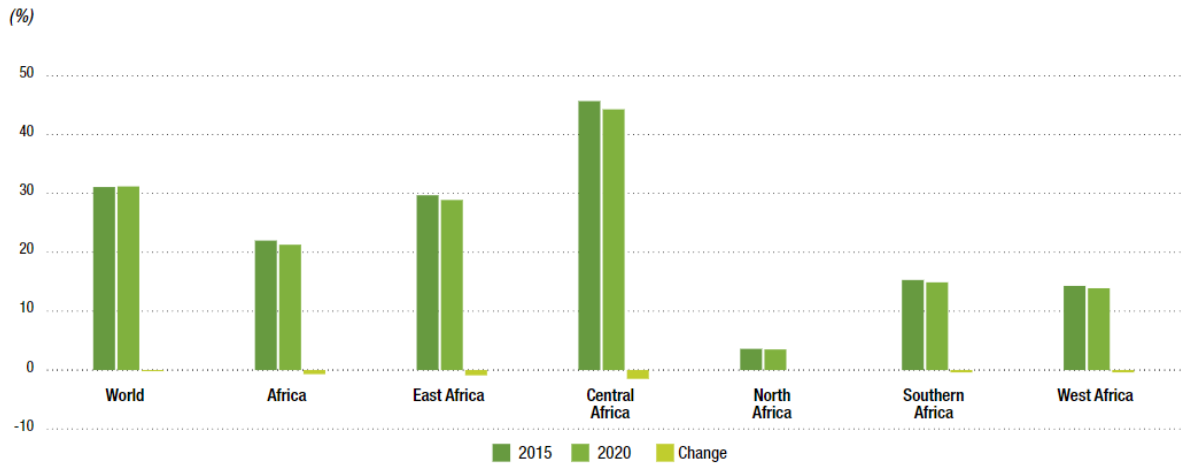

Figure 5: Forest areas as a proportion of total land area

Source: AU et al. (2022)

Indicator 15.3.1, aimed at reducing land degradation, is off track with negative trends. Africa faces widespread land degradation due to climate change, population growth, insecure land tenure and unsustainable practices. This affects 46% of the continent, costing $9.3 billion annually and impacting 485 million people (AGNES, 2020). As of May 2022, 45 African nations were among 129 countries striving for land degradation neutrality under the United Nations Convention to Combat Desertification programme that reflects a global effort to address and reverse land degradation (United Nations, 2015).

Targets that must accelerate progress

Forest loss (target 15.2) in Africa exceeds the global average and is rising, as depicted in figure 6 through five sub-indicators. These indicators are colour-coded: green for progress, yellow for no change and red for decline. While the above-ground biomass stock remains stable continent-wide, other indicators reflect general improvement. However, West Africa sees a reduction in forest areas under protection and management plans. North Africa also reports a decrease in certified forest areas, indicating a need for enhanced forest management strategies in these regions.

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Region	Forest area annual net change rate	Above-ground biomass stock in forest (t/ha)	Proportion of forest area within legally established protected areas	Proportion of forest area under a long-term forest management plan	Forest area certified
World	●	●	●	●	●
Africa	●	●	●	●	●
North Africa	●	●	●	●	●
West Africa	●	●	●	●	●
Southern Africa	●	●	●	●	●
Central Africa	●	●	●	●	●
East Africa	●	●	●	●	●

Figure 6: Dashboard of indicators for target 15.2 in Africa

Source: FAO (2020)

From 2000 to 2020 (figure 7), protected mountain biodiversity areas (indicator 15.4.1) in Africa saw notable growth. North Africa's coverage rose from 16% to 27.6%, and the rest of Africa (excluding North Africa) went from 33.2% to 41.7% (FAO, 2022a). This marks significant strides in conserving and sustainably managing mountain ecosystems.

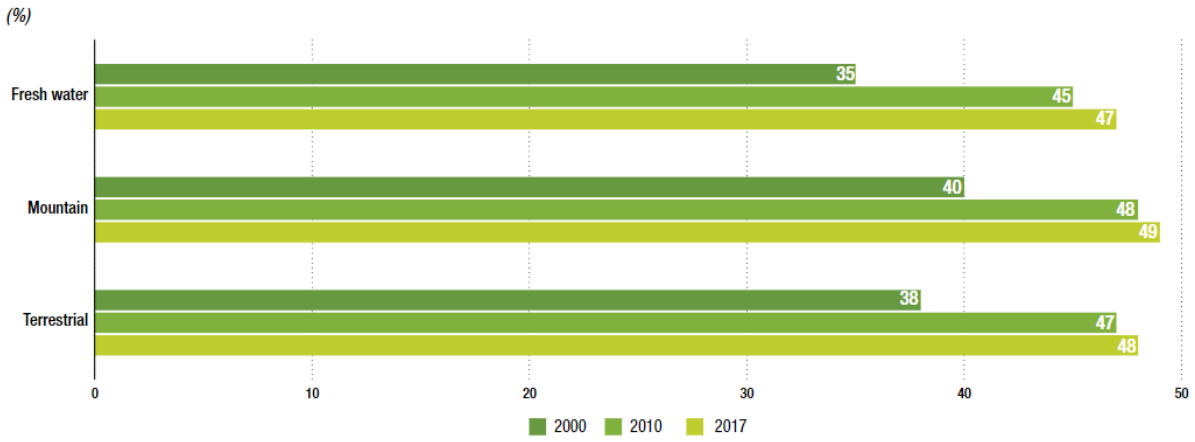

Figure 7: Proportion of key biodiversity areas covered by protected areas in Africa

Source: FAO (2020)

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Target 15.a is designed to mobilise and significantly increase financial resources from all sources to conserve and use biodiversity and ecosystems sustainably. Indicator 15.a.1 measures the official development assistance and public expenditure dedicated to the conservation and sustainable use of biodiversity and ecosystems. According to figure 8, the total official development assistance supporting biodiversity in Africa rose from $345 million in 2000 to $2.77 billion in 2018, with notable variations across different regions (United Nations, 2023). To meet the biodiversity targets, it is estimated that financing will need to increase to approximately $700 billion annually to stop the global decline in biodiversity by 2030 (Deutz et al., 2020). In a bid to escalate efforts and commitment, 17 African nations are among the 93 countries worldwide that have pledged to implement urgent actions within the next decade to set nature and biodiversity on a recovery trajectory by 2030. The primary challenge lies in ensuring that these signatories honour their pledges. To this end, countries are actively seeking and adopting innovative financing mechanisms for biodiversity and forest conservation. These include conservation trusts, green and blue bonds, and debt-for-nature, climate, or sustainability swaps.

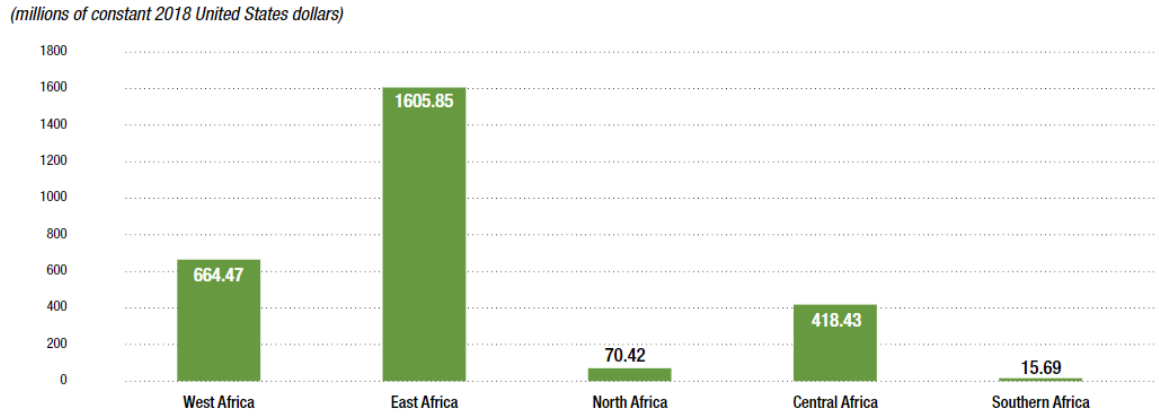

Figure 8: Total development assistance for biodiversity, by donor countries

Source: OECD (2021), cited in AU et al. (2022)

Target 15.b aims to mobilise substantial resources from all sources and levels to finance sustainable forest management, providing incentives to developing countries for

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conservation and reforestation. Indicator 15.b.1 tracks the official development assistance and public expenditure for these purposes.

The 2021 Glasgow Leaders' Declaration on Forests and Land Use is a significant commitment, with over 100 global leaders, including 33 from Africa, pledging in excess of $20 billion in public and private funds to halt forest loss by 2030 (Conant & Van der Mark, 2021). To ensure that these funds are utilised effectively, it is crucial that this declaration be supported by robust monitoring and accountability mechanisms. This will play a key role in the restoration and sustainable management of land, forests and biodiversity.

Targets that are on track

Indicator 15.4.2 deals with the Mountain Green Cover Index. In Africa, the proportion of mountain green cover grew marginally between 2000 and 2018, illustrating progress towards the conservation of the environment (figure 9). However, there are notable differences between subregions, ranging from 95.2% in East Africa to 32.7% in North Africa (AU et al., 2022).

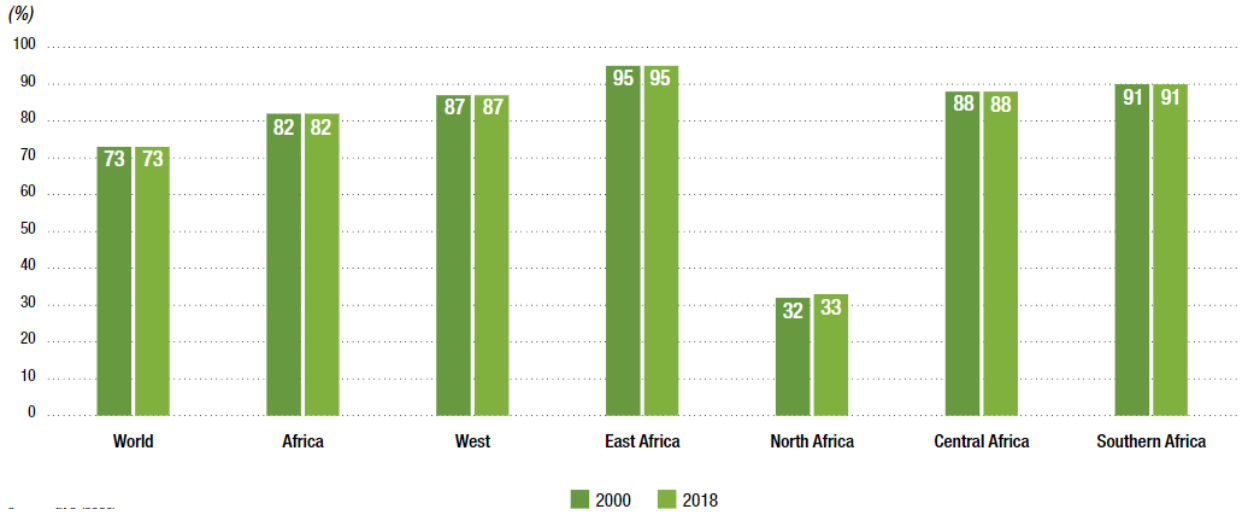

Figure 9: Proportion of mountain green cover land versus areas of mountains by subregions in Africa

Source: FAO (2020)

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Supplementary resources

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4.2 Regional progress in Latin America and the Caribbean

The examination of the SDGs discussed here stems from the deliberations within the Forum of the Countries of Latin America and the Caribbean on Sustainable Development. This forum operates under the auspices of the Economic Commission for Latin America and the Caribbean (ECLAC).

While deforestation rates vary across countries and subregions, it remains a pressing issue throughout most Latin American and Caribbean nations. The decline in forest coverage, accompanied by shifts in land use and management practices, has led to decreased large-scale evapotranspiration, resulting in water imbalances and shortages.

The natural resources of Latin America and the Caribbean play crucial roles in regional and global food, water and energy security. They also contribute to the regulation of pollination, climate, air quality and human health. Despite the potential for sustainable utilisation of these resources, there have been considerable shortcomings in their management and exploitation. Moreover, there is a growing agricultural bias in the region's export structure, which comes at the expense of forest ecosystems (Agenda 2030 LAC, n.d.(a)).

Major forest area depletion has occurred in Latin America, the Caribbean and sub-Saharan Africa over the past two decades, primarily due to the conversion of forests into agricultural land for farming and grazing purposes. Least developed countries are particularly vulnerable to these losses in forested areas. Forests play a crucial role in supporting the livelihoods and well-being of both rural and urban populations. They are instrumental in regulating the water cycle, mitigating climate change and harbouring most of the world's terrestrial biodiversity (FAO, 2022a).

The decline of forests contributes to global warming and poses a threat to wildlife, negatively impacting the livelihoods of impoverished communities and affecting land use practices such as agriculture and environmental services (FAO, 2022a). In Latin America and the Caribbean, Oceania and sub-Saharan Africa, less than one-third of forests are currently managed under formal management plans, although there is a gradual increase in this proportion (FAO, 2022a).

At global level, the annual rate of change in forest area has remained relatively stable, hovering around -0.1%. This indicates that forest loss continues, albeit at a slightly slower pace compared to the previous decade. From 2010 to 2020, forest area expanded in Asia, Europe and northern America, but significant losses were observed in Africa, southeastern Asia, and Latin America and the Caribbean. These losses are driven primarily by the expansion of crop and livestock production (FAO, 2022a). This underscores the urgent need for increased efforts to reduce deforestation and implement sustainable forest and land management practices (FAO, 2022a).

In Latin America, approximately 33% of forests are managed under collective tenure regimes, owned primarily by communities, with a large portion belonging to indigenous peoples. However, despite legal provisions, the process of formalising these rights is slow, complex and expensive. Furthermore, there is limited understanding of how the reform processes engage and benefit women (Cruz-Burga et al., 2019, Durán et al., 2018).

FAOSTAT data also covers production and trade in other tropical areas, such as the Amazon Basin, which is a vital source of protein for indigenous communities, supplying an average of 60–80% of their daily protein needs (Coad et al., 2019). For example, a 2012 study in Venezuela revealed that hunting serves mainly subsistence purposes in indigenous communities, contributing to 40–100% of their consumed meat (Coad et al., 2019).

According to FAOSTAT, Brazil nut, harvested from the *Bertholletia excelsa* tree in the Amazon Basin, is traded internationally. The main harvesting countries are Bolivia (Plurinational State of), Brazil and Peru. The global export value of Brazil nuts reached US$373 million in 2019. Between 2020 and 2021, there was positive progress in the Certified Forest Area in Latin America and the Caribbean. Regarding the progress between 2010 and 2020, it can be considered positive in the following respects: proportion of forest area under a long-term forest management plan, above-ground biomass stock in forests (tonnes/hectares) and proportion of forest area within legally established protected areas. However, the annual rate of change in forest area (target 15.2) experienced a small change with a negative impact of -0.3% in 2020, as shown in figure 10.

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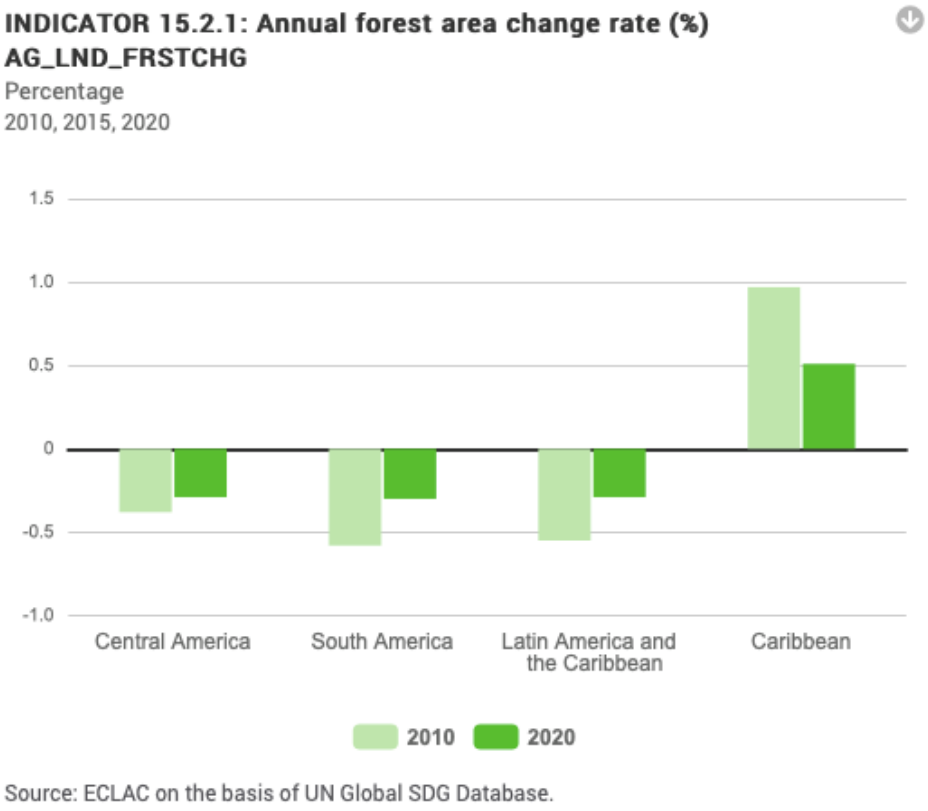

Figure 10: Annual forest area change rate

Source: 2030 Agenda in Latin America and the Caribbean (2020)

4.3 Regional progress in Europe

European countries have made noteworthy strides in meeting the SDG 15 targets, which focus on life on land, encompassing the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems. These efforts are evident in various national and regional projects aimed at preserving biodiversity and enhancing ecosystem services, and are summarised in table 5.

Table 5: Regional progress in European countries, SDG 15

SDG 15 targets	Examples of regional progress in European countries

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15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, particularly forests, wetlands, mountains and drylands.	Germany: Extensive conservation programmes for the Black Forest and Bavarian Alps (Bieling et al., 2010; Brackhane et al., 2019). UK: Restoration of peat bogs and wetlands across Scotland and Northern England (Horsburgh et al., 2022).
15.2 By 2020, promote the sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally.	Sweden: High rates of afforestation and sustainable forestry practices (Petersson et al., 2022). Spain: Reforestation initiatives in areas prone to desertification like Andalusia (Hetemäki et al., 2022).
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.	Italy: Anti-desertification projects in Sicily and Sardinia (Santini, 2008). France: Programmes to restore soil health in the Loire Valley and other agricultural regions (Yousry et al., 2022).
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.	Switzerland: Conservation strategies in the Alps focusing on biodiversity and sustainable tourism (Paunović & Jovanović, 2017). Austria: Protection of Alpine ecosystems through national park expansions (Job et al., 2020).
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.	Netherlands: Recovery plans for native species and habitats, such as the heathlands (Van Strien et al., 2016). Finland: Conservation efforts for the Saimaa ringed seal (Kunnasranta et al., 2021).
15.6 Promote fair and equitable sharing of the benefits arising from the utilisation of genetic resources and promote appropriate access to such resources, as internationally agreed.	Denmark: Policies ensuring that benefits from genetic resources are shared fairly, focusing on both local and international agreements (Ovaska et al., 2021).

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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.	Belgium: Stringent enforcement of EU regulations on wildlife trafficking, particularly in major ports like Antwerp (Broussard et al., 2023).
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.	Ireland: National strategy to control invasive species such as the zebra mussel and Japanese knotweed (Bowen, 2021).
15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts.	Germany: Incorporation of natural capital and ecosystem services into national accounting and policy-making processes (Brandon et al., 2021).
15.a Mobilise and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems.	European Union: Funding mechanisms like the LIFE programme supporting biodiversity projects across member states (Davies et al., 2021; Hermoso et al., 2022).
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.	European Union: Funding and technical support for anti-poaching initiatives in Africa and Asia, reflecting global support from European countries (Lemaître & Hervé-Fournereau, 2020).

One notable example is Germany, which has implemented extensive conservation programmes for the Black Forest and the Bavarian Alps, showcasing a commitment to protecting and restoring critical ecosystems (Bieling et al., 2010; Brackhane et al., 2019). Similarly, the United Kingdom has focused on the restoration of peat bogs and wetlands across Scotland and Northern England, essential for maintaining biodiversity and regulating water systems (Horsburgh et al., 2022).

Sweden and Spain have also prioritised forest health, with Sweden achieving high rates of afforestation and sustainable forestry practices (Petersson et al., 2022). Spain, in

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response to desertification challenges, has initiated reforestation projects in Andalusia, aiming to mitigate the effects of land degradation and promote ecological recovery (Hetemäki et al., 2022).

Efforts extend beyond forests, with countries like Italy and France addressing broader land and soil degradation. Italy has embarked on anti-desertification projects in regions like Sicily and Sardinia (Santini, 2008), and France focuses on restoring soil health in agricultural areas such as the Loire Valley (Yousry et al., 2022).

Mountain ecosystems, too, receive attention, with Switzerland and Austria enhancing conservation strategies in the Alps. Switzerland emphasises biodiversity and sustainable tourism (Paunović & Jovanović, 2017), and Austria has expanded national parks to protect alpine ecosystems (Job et al., 2020).

Addressing biodiversity and habitat degradation, the Netherlands and Finland have implemented recovery plans for native species such as the heathlands and the Saimaa ringed seal, respectively (Van Strien et al., 2016; Kunnasranta et al., 2021). Meanwhile, Denmark has developed policies ensuring fair and equitable sharing of benefits from genetic resources, aligning with international agreements (Ovaska et al., 2021).

Countries like Belgium and Ireland have taken decisive actions against wildlife trafficking and invasive species. Belgium enforces EU regulations to curb wildlife trafficking (Broussard et al., 2023), and Ireland has a national strategy to control invasive species such as the zebra mussel and Japanese knotweed (Bowen, 2021).

Moreover, Germany has integrated ecosystem and biodiversity values into its national planning and policy-making, incorporating natural capital and ecosystem services into its development strategies (Brandon et al., 2021). The European Union complements these national efforts with funding mechanisms like the LIFE programme, supporting biodiversity projects across member states (Davies et al., 2021; Hermoso et al., 2022), and also provides global support for anti-poaching initiatives, reflecting a commitment to sustainable development and conservation on a broader scale (Lemaître & Hervé-Fournereau, 2020). These examples illustrate a robust and varied approach across

European nations towards achieving SDG 15, reflecting a concerted effort to safeguard our planet's terrestrial and freshwater ecosystems for future generations.

Supplementary resources

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Examples of questions for assessment

4. Progress towards the achievement of life on land targets by 2030

- Provide a general overview of the achievement of the various SDG 15 targets and indicators for your region/country.

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- Identify the major component of biodiversity loss in your region/country, link this to a specific target and explain the progress in achieving this target in your region/country.
- Which targets in your region/country have shown negative progress in achieving SDG 15?
- Which targets in your region/country have shown positive progress in achieving SDG 15?
- Are there specific efforts in your region/country to accelerate the achievement of the SDG 15 targets and indicators? Explain.

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5. Case studies

Readers (teachers) will be empowered to

- identify good practices in various regional case studies in achieving SDG 15
- develop and apply a local project aimed at achieving SDG 15
- use the knowledge presented in regional case studies to adapt to a more sustainable way of living

In this section we present examples of best practices applied in different countries around the world to support the implementation of SDG 15. These practices take different approaches: from educational measures to social policies, and agriculture management to nutrient deficiencies, as shown in table 6. Additional examples can be found on the United Nations Sustainable Development Goals Knowledge Platform. Following the table, a selection of case studies in Africa, Latin America and Europe are presented.

Table 6: Best practices as reflected in case studies on achievement of SDG 15

Name and geographical coverage	Objective/description	Related SDGs	Source
Investing in Green and Resilient Recovery in Barbados Caribbean	This partnership supports Barbados in implementing reforms that strengthen green economic development and fiscal resilience, promote low carbon economic recovery and enhance climate and disaster resilience. The aim is to accelerate Barbados' economic recovery and climate resilience by supporting government's national blue, green and resilient development economic recovery response. This initiative is structured to support the country's economic recovery and support the transition onto a resilient pathway. This will be achieved by adopting reforms that enhance the efficiency and effectiveness of public expenditures, strengthen fiscal sustainability and address Barbados' significant climactic challenges.	1, 2, 6, 7, 9, 12, 13, 14, 15, 17	https://www.barbadosparliament.com/
Low Water Footprint Initiative (LWFi) for Dairy Industry China	Yili Group has breakdown water use in all sectors of its value chain with full life cycle assessment and is the first company in the dairy industry to propose the Low Water Footprint Initiative. This initiative is in line with SDG 6: by 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity, implement	6, 12, 13, 15	www.yili.com

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	integrated water resources management at all levels, including through transboundary cooperation as appropriate.		
KANAFRIK Africa's First Sustainable store New York and Côte D'Ivoire	Since 2020 when the first store KANAFRIK Abidjan was opened, conscious actions have been implemented by creating a refill station in the store for clients to learn how to reuse and recycle. The store also offers reusable bags and pouches instead of single-use plastic and they encourage customers to return their empty jars after using KANAFRIK products. They also offer free KANAFRIK products each time a customer brings back five empty jars. KANAFRIK products sold in the United States via KANAFRIK New York are in reusable and recycle packaging and all natural. The store encourages consumers to be mindful and start taking sustainable action while starting their clean beauty journey with KANAFRIK.	5, 8, 9, 12, 13, 15	www.kanafrik.com
Children's environmental training programme "AGUA-DALAJARA" Latin America and the Caribbean	Environmental training workshops are designed and implemented in all elementary schools in Guadalajara City. Children are taught the importance of taking care of water and the environment, as well as the consequences if they don't do so. The educational model is based on emotions and experiences. Emotions show the consequences of human activities and harmful habits in the environment, thus generating a permanent change of habits that allow them to influence their families and social environment where they live. The target audience is children in elementary schools, between 6 and 12 years old (middle childhood).	6, 11, 12, 13, 15, 17	https://www.facebook.com/CICEJXXVIII?mibextid=ZbWKwL
Keeping Our Heads Above Water in the Race for Sustainability Global	The Green Climate Fund (GCF) recognises the urgent need for a comprehensive approach to water security, especially given climate change. It emphasises the importance of early warning systems and risk assessment tools, critical water infrastructure, flood and drought management, integrated water resources management, climate resilience, WASH programme and capacity building. To completely tackle water risks, private finance must be encouraged and options beyond conventional financial tools explored, like bonds. The GCF has already mobilised US$2.8 million for water security projects, guided by its sector-specific thematic areas. These funds have been allocated to a total of 38 projects across 58 countries. GCF's water projects recognise that water knows no boundaries. All water projects make up 51% of all water security, with 17% dedicated to agriculture and food security, 9% to ecosystems and ecosystem services and 7% to early warning and early actions. The remaining activities are invested in energy, infrastructure, health and well-being initiatives. This comprehensive approach ensures that every aspect of water security is addressed, promoting a sustainable future for all.	1, 6, 13, 14, 15, 17	https://www.greenclimate.fund/
Plant One, Emit Zero India	Plant One, Emit Zero is a climate reversal campaign that will lead to the planting of 10 million trees and creating a forest in a year in India by students. The carbon footprint needs to be reduced by 45% by 2030, so that climate neutrality can be achieved by 2050. The average tree absorbs an average of 20 pounds of carbon each year for its first 20 years of life. Planting them is thought to be the best nature-based climate change solution.	13, 15, 17	www.sdg2030.in
Eco-pedagogical Microforest	The Microforestation action is rooted at neighbourhood scale, aimed at integrating both regulative and social-cultural ecosystem services. In line with the principles of the UN Agenda 2030, the Eco-pedagogical Microforest of San Lorenzo neighbourhood, Rome, demonstrates that even a small patch of nature can increase young people's biospheric values, influencing pro-environmental	3, 4, 11, 15, 16, 17	Sapienza University

Rome, Itay	behaviours and actions, enhancing well-being. The process, from co-design to co-realisation, explores an easy to handle and fast-growing Microforest to be planted within the size of a neighbourhood. Given that the first eco-pedagogical goal is to attract and educate very young people, schoolchildren, on the cause of the environment and increase connectedness with nature, the project envisages the involvement of very young people, the schoolchildren community, from the early steps of the process through an eco-pedagogical pathway.		

Over the years, examples of good practices have been applied in different countries around the world that support the achievement of the various indicators as set by SDG 15. These practices take different approaches and are reflected in the selection of case studies from the three regions.

5.1 Africa

In this section on Africa, we discuss three initiatives that contribute to the achievement of SDG 15. Considering that SDG 15 focuses on protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably managing forests (target 15.2), combating desertification, reversing land degradation and addressing the challenges of biodiversity loss (targets 15.3 and 15.5), the three case studies will reflect initiatives in this context. We will look at case studies in Ethiopia, the Democratic Republic of the Congo (DRC) and South Africa.

5.1.1 Case 1 - Democratic Republic of the Congo (DRC): Biodiversity conservation in regions of armed conflict: Protecting World Heritage

The DRC is located in central Africa. It borders Tanzania, Uganda, Rwanda and Burundi to the east, Zambia and Angola to the southeast, the Central African Republic to the southwest and Congo (Brazzaville), the Angolan exclave of Cabinda and Atlantic coastline in the west (figure 11) (Government of DRC, 2014). The majority of the population is involved in subsistence farming activities to support their livelihoods and not for commercial purposes. Africa is home to 17% of the world's forests and 31% of the world's woods in the Sahel and other places. The forest covers the great majority of the Congo Basin, which is the second largest tropical rainforest complex globally after the

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Amazon. The forests cover over 60% of the country, an estimated 134 million hectares. They are home to a great deal of rare biodiversity: the DRC is ranked sixth in the world for the diversity of its fauna and flora (Verweijen & Marijnen, 2021).

Figure 11: Location of DRC and neighbouring countries

Source: Government of DRC (2014)

The extensive forest known as the equatorial rainforest covers most of the Congo Basin. Half of Africa's tropical rainforest is found in the DRC's forests. The exceptional biodiversity of the Congolese woodlands, home to numerous rare species including the mountain gorilla, bonobo and okapi, served as justification for the addition of five protected areas to the World Heritage List between 1979 and 1996. These five sites (Kahuzi-Biega, Virunga National Parks, Salonga National Park, Okapi Wildlife Reserve and Garamba National Park) were added to the List of World Heritage in Danger sites between 1994 and 1999 due to threats that could negatively impact their World Heritage qualities.

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In 2000, to safeguard the integrity of the five World Heritage Sites in the DRC during a prolonged period of armed conflict, the UNESCO World Heritage Center, the Congolese Institute for Nature Conservation (ICCN), under the direction of the Ministry of Environment, Nature Conservation and Tourism, as well as conservation NGOs launched the programme Biodiversity Conservation in Regions of Armed Conflict (UNESCO, 2021). The project aimed to keep the five sites' Outstanding Universal Value intact and to work toward the best possible circumstances for their removal from the List of World Heritage in Danger.

Strategy of the programme

At the beginning of the programme in 2000, the forest biodiversity had been degraded as follows (UNESCO, 2021):

- There was a high demand for fuelwood and charcoal that led to deforestation by the pygmy communities and constant poaching of animals for livelihoods.
- High levels of forced migration of refugees from armed conflict to live off the land have had severe impacts on forests and wildlife.
- The leading cause of wildlife loss in the Congo Basin is the commercial bush meat trade. In the DRC alone, over a million tons of bush meat are consumed each year.

The programme was implemented with a focus on conservation biodiversity in regions of armed conflict in order to protect World Heritage in the DRC. The programme intervention consisted of the following approaches:

- to preserve the five sites' Outstanding Universal Value
- to strive toward the creation of favourable circumstances for the five World Heritage in Danger sites to be removed
- to oversee and manage the protected regions
- to maintain the integrity of the five World Heritage Sites over an extended period of war
- to increase local communities' contribution to biodiversity conservation

Results and impact of the programme

The programme was divided into three phases (UNESCO, 2021):

- *Phase 1 (2000-2005):* The programme's initial phase was centred on upholding conservation efforts in the five sites and creating a "Diplomacy of Conservation", or diplomatic and political backing for the sites' preservation. The programme has made every effort to get the cooperation of the various parties involved in the conflict, relying on the World Heritage Convention.
- *Phase II (2005-2010*): Within the second phase of the programme, the initiative continued to carry out Diplomacy of Conservation while assisting with the implementation of emergency action plans in the five Congolese parks. For the three pilot sites, i.e. Kahuzi-Biega and Virunga National Parks, as well as the Okapi Wildlife Reserve, emergency action plans have been created considering the high security threats associated with the existence of armed groups in the Eastern Congo. A community conservation approach has been applied in Garamba National Park.
- *Phase III (2010 – 2013):* In the last phase, a significant event during the third phase was the high-level meeting that took place in Kinshasa, DRC, on 14 January 2011, between UNESCO and the Congolese government (UNESCO, 2021). The purpose of the meeting was to investigate methods for improving the defence of the five Congolese sites listed as endangered on the World Heritage List. The adoption of the Kinshasa Declaration, which commits the Congolese government to carrying out the corrective measures determined by the World Heritage Committee for the rehabilitation of the Outstanding Universal Value of the endangered sites in the DRC, with UNESCO's support, is a noteworthy outcome of this meeting.

Challenges experienced

In 1999, the Congolese Institute for Nature Conservation appealed for international mobilisation to preserve the five Congolese sites threatened by the generalisation of the Great Lakes conflicts. The five parks faced several management and conservation challenges at the time of the property inscription:

- The monetary difficulties have significantly lowered the management's efficacy and the level of preservation required to ensure the parks' species survival and the sustainability of their ecosystems.
- It was reported that significant sections of the parks were never visited by the understaffed guards due to logistical difficulties, and poaching activity increased.
- The region's armed struggle and political unrest, which have forced thousands of people to flee their homes, pose a grave threat to the integrity of the forest resources, and the parks' large mammal populations have decreased sharply.

Since the parks lack a designated buffer zone, one of the main management responsibilities is to encourage neighbour populations to cooperate in the preservation of the land, especially in areas with high population densities.

Lessons learnt

Despite the multitude of challenges that the programme experienced in the five parks, there was a clear need for targeted approaches to deal with these obstacles. The key lesson that developing countries within the equatorial forest and particularly African countries in the Congo Basin can learn from the DRC case study is the biodiversity conservation achieved in regions of armed conflict and protection of World Heritage Sites. The rehabilitation of the Outstanding Universal Value of the endangered sites in the DRC strengthens its credibility, ensuring the efficient conservation of Congolese natural heritage sites and empowering indigenous communities to manage nature ecosystems sustainably by putting in place a participatory management approach.

Sustainability and possibility for replication

The programme can be replicated in areas where biodiversity conservation is a challenge due to armed conflict. Therefore, the sustainability and possibility for replication of the case study in other parts of developing countries is realistic.

Supplementary resources

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5.1.2 Case 2 - Ethiopia: Programme of Landscape Restoration in the Lake Tana sub-basin in the Ethiopian Highlands

The Federal Democratic Republic of Ethiopia is situated on the Horn of Africa, bordered by Kenya in the south, Eritrea in the north, Somalia and Djibouti in the east and Sudan in the west (see figure 12). Ethiopia covers an area of 1 112 000 km^2, has a population of over 110.14 million and is a melting pot of old Middle Eastern and African traditions (FDRE, 2017). Rising temperatures and altered rainfall patterns due to climate change are exacerbating drought and flooding. Africa has the most potential for restoration of any

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continent, with over 700 million hectares of damaged landscapes that are available for restoration; nevertheless, progress is still being made slowly. Several local land restoration initiatives that seek to stop land degradation, mitigate climate change by sequestering carbon, or enhance the local climate have arisen in response to continuous environmental change (Pedercini et al., 2021). The United Nations designated 2021 to 2030 as the Decade of Ecosystem Restoration in recognition of the stress humans place on important ecosystems. This initiative aims to raise awareness of the significance of ecosystem restoration while also supporting efforts to stop global environmental deterioration. Some organisations have therefore taken up the objective of planting billions of trees in African drylands and other regions of the world in the decades to come to repair millions of hectares of land (e.g. the Bonn Challenge, the African Forest Landscape Restoration effort (AFR100) (IUCN, 2021; GPFLR, 2021).

The Ethiopian government committed in 2014 to restoring 15 million hectares of degraded landscapes by 2030 as part of its national green growth strategy and to encouraging global action on climate change and biodiversity (FDRE, 2017). As part of the global Bonn Challenge, pledges have been made to repair 350 million hectares of degraded lands globally (IUCN, 2021). The African Forest Landscape Restoration Initiative (AFR100 2021), which intends to restore 100 million hectares of land on the continent, includes Ethiopia's obligations by the year 2030. According to FDRE (2017), the majority of Ethiopia's workforce is employed in the agriculture and forestry industries, which account for 43% of her nation's GDP.

In the case study on Ethiopia, SDG 15 (target 15.2) serves as a basis for examining trade-offs and synergies with other SDGs to conduct a multi-level analysis of the challenges associated with forest landscape restoration. The aim is to restore the landscape in the Lake Tana sub-basin in the Ethiopian highlands where continued deforestation and soil erosion are caused by agricultural expansion, overgrazing, climate change and fuelwood collection (target 15.3).

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Figure 12: Location of Ethiopia and neighbouring countries

Source: Freeworldmaps (2005-2021)

Strategy of the programme

In this context, the programme supported strengthening the country's ability to lessen the degradation of forest landscapes, especially in the most vulnerable regions, by introducing a multilevel approach that involved both grassroots communities and major stakeholders. This was done in response to the challenges in restoring the forest landscape in the sub-basin of Lake Tana, with the help of a collaborative effort. The project was scheduled to begin in December 2022 and run through to December 2026. The Dutch Research Agenda is contributing funding to this initiative, together with the theme of "SDG Interactions and Policy Interventions in Developing Countries" as one of

the 17 SDGs that many governments, corporations and civil society organisations are working to achieve. Forest landscape restoration is a multi-level study of interactions with SDG 15 (target 15.9): the obstacle of landscape restoration in Ethiopia's highlands (Battistelli & Issayas, 2022)

Results and impact of the programme

In line with SDG 15, target 15.3, the following results and impacts were established (Nature Based Solutions, n.d.):

- The joint programme activities supported landscape restoration in the Lake Tana sub-basin by strengthening reafforestation, combating desertification and increasing the number of trees planted.
- Based on landscape prioritisation, the programme showed that Ethiopia's highlands have a great chance of meeting increased restoration targets. With interventions, 4 million rural households might benefit from over 17 million hectares of land that the exercise targeted for tree-based restoration, resulting in the annual sequestration of 178 million tonnes of CO_2 equivalent and the conservation of 160 million tonnes of soil (Pedercini et al., 2021).
- Policy-makers have pledged to restore both local and national ecosystems due to the pressing need to reverse these detrimental and destructive trends. By preserving, repairing and encouraging the sustainable use of terrestrial ecosystems, managing forests responsibly and halting desertification, the local community in the Lake Tana sub-basin is dedicated to restoring ecosystems. The government established the Forest Landscape Restoration Initiative (AFR100) in 2015 and intends to restore 100 million hectares by 2030 (FAO & WRI, 2021).
- Enhance and expand the financial prospects derived from agroforestry and the sustainable reforestation of damaged forest areas. Ethiopia plans to surpass its initial goal of 7 million hectares of afforestation and replanting to raise its ambition.
- It is anticipated that the initiative will help the communities by imparting knowledge on how to improve their sustainable income-generating prospects, rehabilitate degraded landscapes and conduct environmentally friendly agriculture (2021–2026).

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Challenges experienced

The following are some of the challenges encountered with this programme:

- The programme had to deal with forest landscape restoration due to agricultural expansion, overgrazing and fuelwood collection, which has led to ongoing deforestation and soil erosion.
- The project faces land deterioration, which affects food security and downstream water quantity.
- There were complications with the programme in deciding on suitable forest landscape restoration solutions that suit regional settings and different stakeholders' interests, as well as the uncertainty around the success metrics for FLR.
- The programme also suffers from anticipated trade-offs and misalignment between instruments used by one stakeholder. Nonetheless, because trade-offs will be more frequent and connected to politics, misalignment between the tools of various agencies is more difficult to resolve.

In response to the challenges of forest landscape restoration in the Lake Tana sub-basin, recognising the need to reverse this trend, numerous governments and other stakeholders in Ethiopia's highlands actively participate in forest and landscape restoration programmes.

Lessons learnt

The joint programme implemented in the Lake Tana sub-basin was hindered by several challenges, but overcoming these obstacles required the development of specific solutions, to achieve landscape restoration for the local communities and increasing soil fertility. Addressing the primary concern of SDG 15, which is affordable solutions to mitigate climate change, biodiversity loss, food and water security and disaster impacts was the most engaging lesson to be learnt from the case study. The Lake Tana sub-basin is an important and pertinent study for understanding how integrative landscape management and restoration may address multiple SDGs simultaneously because of this combination of challenges that reinforce one another.

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Sustainability and possibility for replication

The joint programme directly or indirectly supported forest landscape restoration for farmers to increase crop productivity (food security) (SDG 2), reduce poverty (SDG 1), improve the conserved and sustainable use of oceans and marine resources for sustainable development (SDG 14) and combat the increase in global temperatures, which have already reached 1.1 °C, due to increasing global greenhouse gas emissions, which reached record highs in 2021 (SDG 13). The case study programme in the Lake Tana sub-basin can easily be replicated within local regions and other countries in Africa to support the drive to improve life on land by 2030.

Supplementary resources

- Battistelli, F., & Issayas, T. (2022). *New project promotes integrated water resources management in Ethiopia's Tana sub-basin*. https://www.wri.org/update/new-project-promotes-integrated-water-resources-management-ethiopias-tana-sub-basin
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https://www.nature-basedsolutions.com/page/1063/integrated-water-resources-management-in-ethiopia%E2%80%99s-tana-subbasin

- Pedercini, F., Dawson, I. K., Kindt, R., Tadesse, W., Moestrup, S., Abiyu, A., ... & Graudal, L. (2021). *Priority landscapes for tree-based restoration in Ethiopia*. ICRAF Working Paper No 320. Nairobi, World Agroforestry. https://dx.doi.org/10.5716/WP21037.PDF

5.1.3 Case 3 - South Africa: Project of Kruger to Canyons rangeland restoration

This project is located in South Africa's Savanna Biome and includes the following major ecosystem types: tropical grasslands and savanna; temperate grasslands; mixed mountain and highland systems; tropical dry and deciduous forest (Department of Forestry, Fisheries and the Environment, 2025). The project is situated in South Africa's provinces of Mpumalanga and Limpopo on the shared rangelands of the Kruger to Canyons (K2C) Biosphere Reserve (figure 13).

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Figure 13: South African provinces of Mpumalanga and Limpopo and the shared rangelands of the Kruger to Canyons (K2C) Biosphere Reserve

Source: KTC BR (n.d.)

From the Kruger National Park in the east to the Blyde River Canyon in the west, the K2C biosphere reserve encompasses a landscape of significant global biodiversity. It features a remarkably diverse suite of land uses, from formal conservation to peri-urban, urban, intensive commercial agriculture, subsistence agriculture and livestock farming. The first project instance consists of 6 432 hectares of communal rangelands owned by the Mnisi and Amashangana tribal authorities. The first conservation agreement between Conservation South Africa (CSA) and the Ahitiriheleni and Nhlanganani grazing organisations was signed in 2018, marking the beginning of the project. As a UNESCO Biosphere Reserve, the whole K2C biosphere is recognised as a region of High Conservation Value (KTC BR, n.d.).

Strategy of the programme

The "tragedy of the commons", in which communal lands are overused for livestock grazing and knowledge of sustainable grazing practices has lapsed, is the reason behind unrestricted grazing. This is primarily because of the legacy of apartheid, the segregation of indigenous people into their ancestral homelands, and the inequality of land ownership. The goal of Conservation South Africa (CSA) is to assist livestock producers in implementing and growing rangeland practices that promote the preservation and robustness of savanna ecosystems. The main project activity was to switch from continuous grazing to planned rotational-rest grazing for cattle in livestock management. The livestock farmers accomplish this collectively by implementing kraaling, or the technique of confining cattle or other livestock in an enclosure overnight for protection, and strategic herding methods that complement the grazing plan that they have jointly agreed to and put into action.

The K2C programme had the following objectives (KTC BR, n.d.):

- restoring and rehabilitating degraded rangelands to buffer against drought and soil erosion
- lessening risks to protected tree species and stopping the loss of biodiversity
- increasing the number of hectares of current production forest land where IFM4 practices are anticipated to occur as a result of project operations
- decreasing human-wildlife conflict at the Kruger and Canyons zones

Results and impact of the programme

By restoring the rangelands' ecological function, the project's activities will increase the communities' ability to withstand the effects of climate change. By generating new job opportunities, developing skill sets and increasing environmental awareness, the project will also have a positive impact on the long-term well-being and standard of living of the communities in the project region.

- Project actions are expected to assist a certain number of internationally endangered species by reducing threats, compared to the no-project scenario (350 individuals of African wild dogs, or *Lycaon pictus*).
- The project is a component of CSA's initiatives to accomplish local employment development and value chain enhancements through community-led sustainable rangeland management.
- Compared to the no-project scenario, an estimated 82 300 hectares of non-forest land are likely to experience enhanced land management practices due to project operations. 1 518 community members are anticipated to have enhanced knowledge and abilities due to training received as part of project activities. In addition, 760 women from the community will receive training as part of the initiative.
- The project was expected to improve the livelihood of about 18 000 community members and to improve the livelihoods or income of 9 000 women. As a result of the project, women and girls are expected to have access to quality education.

Challenges experienced

Among the most significant challenges encountered with this programme are the following (KTC BR, n.d.):

- The principal risk is not changing the intensity of grazing, which can be brought on by an unfavourable climate, a lack of involvement from stakeholders, or customs that dictate the retention of older male animals.
- Some community farmers do not comply with agreed-upon restoration actions (managing herd characteristics, planned grazing).
- In community systems, the ownership of and rights to land are complicated issues. The land is owned by the state and does not have a title deed of private ownership; instead, it is governed by the Tribal Authorities and recognised by the Community Property Rights Act 11 of 2004. Owning livestock is ingrained in cultural customs. Consequently, the requirement for shared property for cattle grazing is deeply ingrained and difficult to abandon.
- In addition to their lack of ownership of sizable herds of cattle, the project also revealed that women and young people face discrimination in the benefits distribution process. Every employee of CSA is conversant with the organisation's non-discrimination standards and adheres to them in all interactions with stakeholders. Additionally, following the gender plan, CSA staff members promote gender equality.

Lessons learnt

To achieve SDG 15, the communal rangelands of the K2C Biosphere Reserve in the Mpumalanga and Limpopo provinces of South Africa are a remarkable testament to the power of resilience in the face of adversity. Through collaboration and innovation, the people of Ahitiriheleni and Nhlanganani grazing associations have demonstrated that, despite extremely challenging circumstances, it is possible to find hope and create a brighter future for the biosphere reserve.

Sustainability and possibility for replication

This project's contribution to the achievement of SDG 14 (conserve and sustainably use the oceans, seas and marine resources for sustainable development) is critical to sustain

biodiversity regions for freshwater, marine, terrestrial and alpine environments worldwide. This is especially relevant in the light of the increased intensity of climate change (SDG 13) and to fulfil the obligations made under the Paris Agreement regarding mitigation and adaptation efforts. The project can easily be replicated with regional applications for other countries in Africa to support the drive to halt biodiversity loss and reduce land degradation.

Supplementary resources

- United Nations Educational, Scientific and Cultural Organization (UNESCO), UNICEF and World Bank. (2021). *The state of the global education crisis: A path to recovery*. https://documents1.worldbank.org/curated/en/416991638768297704/pdf/The-State-of-the-Global-Education-Crisis-A-Path-to-Recovery.pdf
- KTC BR. [n.d.]. *Kruger to Canyons Biosphere Region – Partnering to achieve a sustainable future for all life in the KTC Biosphere Reserve.* https://kruger2canyons.org/
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5.2 Latin America

This section deals with case studies selected in Brazil, the Andes and Amazonia regions, and Argentina, aiming to highlight good practices adopted in these regions by presenting their results, impacts and the lessons learnt. Furthermore, each case study seeks to address the main goal of SDG 15, which includes initiatives to restore the biome (Brazil),

establishing and efficiently managing protected areas and indigenous lands (Andes and Amazonia) and expanding protected areas and supporting sustainable agriculture (Argentina).

5.2.1 Case 1 - The Atlantic Forest Restoration Pact (Brazil)

The Pact for the Restoration of the Atlantic Forest, launched in April 2009, is a collaborative national initiative involving various stakeholders dedicated to restoring this biome. It strategically brings together public and private entities, governments, businesses, the scientific community and landowners to coordinate efforts and resources towards biodiversity conservation and restoration in the 17 states where the Atlantic Forest is located.

The main goal of the Pact is to recover 15 million hectares by 2050, including annual results of targets and monitoring.

To join the Pact, institutions must sign a formal agreement and adhere to its protocols, which outline its goals, strategies and management system. Membership is voluntary, and the criteria and procedures for joining are established by the Coordination Council.

Figure 14: Location of Brazil in South America (Wikimedia Commons 2021a)

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Strategy of the programme

The Pact for the Restoration of the Atlantic Forest serves as a catalyst for forest restoration efforts in the 17 states where the Atlantic Forest is located. Its strategy is determined by the Coordination Council based on the priorities of each period. Currently, the movement focuses on three main areas: Certified Territories, Communication and Training, and Multidimensional Monitoring.

Certified Territories are key areas in the Atlantic Forest where coordinated efforts among stakeholders accelerate ecological restoration. Led by Regional Units of the Pact, this initiative aims for concrete and lasting results in native vegetation restoration. The Pact supports these efforts through the Restoration Showcase platform, facilitating regional collaboration and activities like seedling donation campaigns and carbon stock certification.

Communication and Training within the Pact focuses on producing educational materials and initiatives to promote public participation in ecological restoration during the Decade of Ecological Restoration. It mobilises NGOs, companies, research centres, public bodies and landowners to disseminate information about best practices, provide technical knowledge and offer training initiatives for Regional Units.

Multidimensional Monitoring involves using field and remote sensing techniques to assess ecological restoration processes in the Atlantic Forest. It tracks various environmental, social and economic dimensions such as seedling growth, fauna presence, soil erosion control and pollinator return. Social and economic aspects like job creation, income generation and land appreciation are also monitored, along with engagement of local society and landowners and increased agricultural productivity.

Results and impact of the programme

The PACT is a multi-sector coalition that brings together over 300 organisations to restore the Atlantic Forest. The Trinational Network for Atlantic Forest Restoration is a cross-border movement covering the tri-national Upper Paraná Atlantic Forest ecoregion in Argentina, Brazil and Paraguay, with over 60 organisations. Members of both collectives

have over 30 years of experience in restoration in various socio-economic and ecological contexts.

In one of the most recent studies, 740 000 hectares of areas undergoing natural regeneration of native vegetation in the biome were identified through remote sensing. Overall, it is estimated that the recovery of at least 1 million hectares has already occurred, as of 2020 (Crouzeilles et al., 2019).

The approach also involves identifying strategic areas to coordinate efforts and generate opportunities and significant results in ecological restoration in priority territories. In terms of communication, content production for social media, development of publications and educational materials, such as the series of booklets "Restoration Know-How" and the podcast "Forest Sound", are ways to promote good practices and engage society in the United Nations Decade on Ecosystem Restoration (2021-2030).

Simultaneously, to ensure the monitoring of progress, the movement applies field and remote sensing techniques to track the ecological restoration process in mapped areas. The encouragement of the restoration chain is also achieved through tools like the Restoration Showcase platform, developed in partnership with other sector agents, which has allowed the mapping and integration of different chain links since 2020. The initiative helps to understand the sector's importance in generating employment and income for various segments of society (PACTO, 2022a).

AXIS - CERTIFIED TERRITORIES

- Restoration Showcase: Online platform by SOBRE and the Brazil Coalition on Climate, Forests, and Agriculture, with support from the Alliance for the Restoration of the Amazon, to share information on ecological restoration organisations in Brazil by biomes, state, municipality and roles.
- Survey of Actors: Evaluation of the restoration chain in 5 municipalities each in Espírito Santo and Minas Gerais, and 2 municipalities in Bahia, including seed collection, seedling production, planting, maintenance, monitoring and consulting

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services for forest restoration projects. 163 actors found in 5 states. Support: SOS Mata Atlântica.

- Pact Challenge: Aims to restore 1 million hectares by 2025 through 8 strategic lines. Support: Arapyaú Institute.

AXIS - COMMUNICATION AND TRAINING

- Regional Units Training: Conducted in 2021 with 10 thematic modules by specialists to promote knowledge exchange among Regional Units. Restoration Knowledge series being developed from this training, consisting of thematic booklets. 5 regional meetings held for experience exchange.
- Communication efforts: Educational materials, events, social media presence and "Tom da Mata" podcast.
- Article: "Gender Inclusion in Ecological Restoration" by Ludmila Pugliese et al., published in *Restoration Ecology*, discusses the oversight of human and gender diversity in restoration projects.
- Results: Promotion of events, partnerships, meetings, research development and relationship with postgraduate programmes from the 2021 report of the PACTO.

AXIS - MULTIDIMENSIONAL MONITORING

- Success of ecological restoration actions in the Atlantic Forest measured in environmental, social and economic dimensions, using field techniques and remote sensing. Monitoring includes growth of planted seedlings, presence of fauna, soil erosion control and socio-economic aspects like job creation and land valuation.
- Protocols: Development of remote sensing and socio-economic monitoring protocols. Support: TNC and TNC Brazil.

Links with SDG 15 targets and indicators

The Atlantic Forest Restoration Pact is linked to SDG 15, which focuses on protecting, restoring and promoting sustainable use of terrestrial ecosystems, sustainably managing forests, combating desertification and halting and reversing land degradation and

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biodiversity loss. Here are some links between the Pacto and SDG 15 targets and indicators:

- **Target 15.2 (promote sustainable management of forests, halt deforestation, restoring degraded forests and increase afforestation and reforestation):** The Atlantic Forest Restoration Pact directly contributes to this target by focusing on the restoration of the Atlantic Forest, which involves restoring degraded forests and increasing afforestation and reforestation efforts in the region.
- **Target 15.3 (combat desertification, restore degraded land and soil and achieve and a land-degradation-neutral world):** Pacto contributes to this target by working to restore degraded land and soil in the Atlantic Forest region, thus helping to achieve a land degradation-neutral world.
- **Target 15.9 (integrate ecosystem and biodiversity values into planning):** The Pacto's efforts to restore the Atlantic Forest contribute to integrating ecosystem and biodiversity values into planning and development processes at national and local levels.
- **Indicator 15.1.1 (forest area as a proportion of total land area):** The Pacto's activities contribute to increasing forest area in the Atlantic Forest region, thus positively impacting this indicator.
- **Indicator 15.3.1 (proportion of land that is degraded over total land area):** The Pacto's restoration efforts aim to reduce the proportion of degraded land in the Atlantic Forest region, contributing to this indicator's improvement.

Sustainability and possibility for replication

The Atlantic Forest Restoration Pact serves as a model for sustainable, collaborative and effective ecological restoration initiatives, with the potential to be replicated in other regions facing similar challenges. By sharing lessons learnt and best practices, the Pact can inspire similar initiatives around the world. Below are some examples of these:

- **Long-term vision:** The Pact's focus on ecological restoration aligns with the long-term sustainability of the Atlantic Forest biome. By aiming to restore 15 million

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hectares by 2050, it demonstrates a commitment to a sustainable future for the region.

- **Multi-stakeholder engagement:** The Pact engages a wide range of stakeholders, including governments, NGOs, businesses and local communities. This multi-stakeholder approach increases the likelihood of long-term success and sustainability by fostering partnerships and shared responsibility.
- **Scientific basis:** The Pact's actions are based on scientific research and best practices in ecological restoration. This ensures that restoration efforts are effective and sustainable over the long term.
- **Monitoring and evaluation:** The Pact emphasises the importance of monitoring and evaluating restoration efforts. This allows for adaptive management, ensuring that actions are effective and can be adjusted as needed.
- **Socio-economic benefits:** The Pact recognises the importance of socio-economic factors in restoration efforts. By incorporating social and economic considerations into its work, the Pact enhances its sustainability and replicability.

Supplementary resources

- Crouzeilles, R., Santiami, E., Rosa, M., Pugliese, L., Brancalion, P. H. S., Rodrigues, R. R., ... Pinto, S. (2019). There is hope for achieving ambitious Atlantic Forest restoration commitments. *Perspectives in Ecology and Conservation*, *17*(2), 80-83. https://doi.org/10.1016/j.pecon.2019.04.003
- Pacto pela Restauração da Mata Atlântica. (2022a). *Pacto completa 13 anos de mobilização pela restauração da Mata Atlântica*. https://www.pactomataatlantica.org.br/pacto-completa-13-anos-de-mobilizacao-pela-restauracao-da-mata-atlantica/
- Pacto pela Restauração da Mata Atlântica. (2022b). *Relatório 2021.* https://www.pactomataatlantica.org.br/wp-content/uploads/2022/03/Relatorio_2021_PACTO.pdf

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5.2.2 Case 2 - Andes Amazon Fund

The Andes Amazon Fund (AAF) is a collaborative grant programme that aids in conserving the Andes and Amazon regions in Peru, Colombia, Ecuador, Bolivia, Suriname and Brazil. This is achieved by establishing and managing protected areas and indigenous lands efficiently.

Since 2015, the AAF has collaborated with local partners to protect the biodiversity, ecosystems and environmental well-being of the Andes and Amazon regions. Together, they facilitated the creation of over 11 million hectares of new protected areas and indigenous lands, fostering the flourishing of local cultures and nature. They have invested in implementing effective management practices in 110 protected areas, covering more than 25 million hectares to date.

Figure 15: Location of Peru, Colombia, Ecuador, Bolivia in South America (Wikimedia Commons, 2021b)

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The AAF's grantmaking centres on two primary strategies. Firstly, it aims to establish new protected areas and indigenous lands with legal recognition. Secondly, it seeks to implement effective management systems for these newly designated areas and to explore longer-term financing options to ensure their protection.

The AAF achieves its objectives by providing grants to non-profit organisations that assist in the technical and outreach efforts required to formally protect important sites. Up to now, the fund's grantees have been active in Peru, Colombia, Bolivia, Ecuador, Brazil and Suriname.

Results and impact of the programme

Results from 2015-2021:

- 127 areas with new formal protection; 111 894 hectares protected; $17,000,000 invested in protected area management
- 97 protected areas established: 98 084 hectares
- 47 regional/municipal conservation areas: 55 907 hectares
- 44 community-based conservation areas: 3 174 hectares
- 6 nationally protected areas: 39 108 hectares
- 30 indigenous lands secured: 13 706 hectares
- 8 indigenous reserves: 6 Resguardos (Colombia), 2 Reservas Indígenas (Perú)
- 22 titled indigenous community lands

Chiribiquete: National Park expansion - 14 867 hectares

Chiribiquete, now one of South America's largest national parks, safeguards 4.2 million hectares of Amazonian rainforest in southern Colombia. This area, mostly unexplored, presents an almost surreal landscape characterised by massive tepuys—flat-topped mountains—and domes rising from the dense rainforest. These geological formations are estimated to be around 2 billion years old and are believed to have held sacred significance for indigenous peoples. The park's lowland rainforest boasts one of the highest rates of plant diversity in the northern Amazon.

The AAF contributed US$1 million to the Colombian National Park Service to support the management of Chiribiquete. Additionally, the fund is collaborating with the local organisation FCDS to monitor and combat deforestation in the park's surrounding areas.

Yavari Tapiche: Indigenous Reserve - about 1 million hectares

Indigenous reserves in Peru are designated by the government to protect indigenous peoples, particularly those living in voluntary isolation or initial contact. These groups are considered vulnerable both in terms of their immune systems and their cultures. The Yavarí Tapiche Indigenous Reserve, spanning about 1 million hectares, is one such reserve offering stringent protection to one of the Amazon's most pristine and vulnerable regions, both biologically and culturally.

The AAF is collaborating with the Ministry of Culture of Peru to support the initial protection of the Indigenous Reserve from illegal activities. Strategies include aerial monitoring, community awareness campaigns and the establishment and equipping of control posts staffed by protection agents.

Bajo Paragua: Municipal Conservation Areas - 1 137 374 hectares

The Bajo Paraguá Municipal Protected Area in San Ignacio covers a vast 983 000 hectares of Chiquitano and Amazonian Forest. Adjacent to this area, the Bajo Paraguá-Concepción Municipal Conservation Area protects a further 154 386 hectares of Amazonian, Chiquitano, and floodplain forests to the northwest. Together, these areas create a connectivity corridor spanning over 4 million hectares. They play a crucial role in combating deforestation in the Chiquitano ecosystem, which has lost 10% of its tree cover in less than two decades and has been severely affected by fires in recent years.

The AAF collaborated with the grantee Fundación Natura Bolivia to organise fire prevention workshops and training sessions for local communities within and around the area. They distributed fire gear and safety supplies, and established a community monitoring mechanism to conserve forests and biodiversity.

Los Otorongos: Conservation Concession - 5 390 hectares

Conservation concessions involve the long-term protection of publicly owned land by non-profit institutions or other entities in exchange for investments in conservation and sustainable development.

Los Otorongos is an area of humid forests located within the buffer zone of Río Abiseo National Park and adjacent to the Gran Pajaten Biosphere Reserve. This area was granted to an association of local community members in San Martín and holds significant ecological value for its protection of various threatened species of flora and fauna, including the jaguar, the South American tapir and the red cedar.

Through support from the AAF, partners conducted a workshop to establish a management plan for Los Otorongos for the next five years. Additionally, the local community received training on how to use GPS tracking and drones effectively to monitor and report deforestation in the area.

Links with SDG 15 targets and indicators

The AAF's support for the establishment and management of protected areas, promotion of sustainable land use practices and conservation efforts directly contribute to the SDG 15 targets and indicators.

Sustainability and possibility for replication

The sustainability of the AAF's initiatives lies in its focus on long-term conservation efforts and partnerships with local communities and governments. By supporting the establishment and effective management of protected areas, the fund helps protect biodiversity and ecosystems, which in turn contributes to sustainable development and climate resilience.

One key aspect of the fund's sustainability is its emphasis on building local capacity and ownership. By working closely with local organisations and communities, the fund helps ensure that conservation efforts are tailored to local needs and priorities, making them more likely to be successful in the long term.

Another factor contributing to the sustainability of the AAF's work is its focus on partnerships and collaboration. By partnering with governments, NGOs and other stakeholders, the fund is able to leverage resources and expertise, making its conservation efforts more effective and scalable.

In terms of replicability, the AAF's model can serve as a valuable example for other regions and organisations looking to implement similar conservation initiatives. By demonstrating the effectiveness of its approach and sharing best practices, the fund can help inspire and inform conservation efforts around the world.

Supplementary resources

- Andes Amazon Fund. [n.d.]. https://www.andesamazonfund.org/
- Andes Amazon Fund. (2022). *Impact report*. https://www.andesamazonfund.org/wp-content/uploads/2022/02/AndesAmazonFund_ImpactReport.pdf

5.2.3 Case 3: Restoring the delicate balance: The Pampas National Park in Argentina

The Iberá project aims to restore the Iberá wetlands in northeastern Argentina, one of the world's largest freshwater wetlands. It covers over 1.3 million hectares and is home to diverse wildlife, including over 360 bird species and large mammals such as jaguars. Since the late 1990s, efforts by the Conservation Land Trust–Argentina and Tompkins Conservation have acquired over 160 000 hectares in the Iberá watershed to expand protected areas and support sustainable agriculture.

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Figure 16: Location of Argentina in South America (Wikimedia Commons, 2021c)

Strategy of the programme

Historically, Iberá suffered from degradation due to cattle ranching and non-native plantations, leading to the disappearance of several native species. The project's primary goal is to enhance conservation protection for the Iberá Natural Reserve, designated in 1983, with boundaries following the Iberá drainage basin. The region has potential for a strong local economy based on sustainable natural resource use, primarily ecotourism. Many species have recovered, but more progress is needed (Initiative 20x20, n.d.).

The creation of Iberá National Park was a collaborative effort by Rewilding Argentina, The Conservation Land Trust Argentina and Tompkins Conservation, which purchased 15 8 000 hectares of old cattle ranches bordering Iberá Provincial Park. These areas, which include unique habitats not found in the park itself, were transformed into a national park on 5 December 2018.

Results and impact of the programme

Infrastructure was developed to facilitate public access, including the construction of gravel roads, signage for a scenic route and improvements to provincial routes. The park's

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development also focused on creating gateways, campgrounds and lodges, showcasing local architecture and materials.

The park's conservation efforts include reintroducing locally extinct species and managing invasive species. This work is part of a broader initiative to restore the region's wildlife and ecological processes.

The park's promotion as a tourist destination has been a priority, with efforts to position it nationally and internationally. This has led to partnerships with government agencies, NGOs and media to showcase Iberá as a premier nature tourism destination in Argentina.

Community involvement has been central to the project, with initiatives to train local leaders and entrepreneurs in nature-based tourism. This has led to the formation of associations and cooperatives, such as the Iberá Cooks and Iberá Artisans, which promote local products and cultural heritage.

Overall, the creation and development of Iberá National Park have not only contributed to conservation efforts, but have also led to the revitalisation of local economies and communities, making it a model for sustainable development and nature-based tourism.

The production of nature is based on four main pillars that manage to move the economy of the towns closest to the Iberá and also impact others further away. In total, more than 20 towns and more than 200 000 inhabitants of the province benefit directly and indirectly from this activity that generates significant income and revalues the identity of Corrientes, while also caring for the resource for future generations.

The four pillars of nature production are as follows:

- **Territory:** This involves a protected area large enough to represent all its landscapes, free from threats. The "park" category is considered the best, as it is publicly owned and does not allow extractive uses. It should also have adequate public infrastructure to ensure a quality visit. It is essential for this park to always be open to the public.

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- **Complete ecosystems:** A park should have all its species, especially its top predators (such as jaguars, giant otters, pumas and crowned eagles), and herbivores in sufficient numbers to be balanced and sustainable over time. Rewilding, as a conservation tool, helps bring back extinct species by reintroducing or translocating them to form new self-sustaining populations.
- **Tourist destination:** It is essential for the park to be known on a national and international scale to attract more visitors. This involves positioning it by highlighting its virtues. Additionally, it must have appropriate public infrastructure and an easily recognisable "territorial brand".
- **Communities:** Communities surrounding a park that has complete and functional ecosystems and is open to the public benefit directly. Local entrepreneurs and employees who provide tourist services and work in the protected area are always its most committed guardians and contribute to local development. Rural communities neighbouring a protected area positioned as a tourist destination have greater access to services and more opportunities to achieve greater well-being.

Links with SDG 15 targets and indicators

The Iberá project's approach to ecosystem restoration and the incorporation of local communities into nature-based tourism contribute to integrating ecosystem and biodiversity values into local planning and development, aligning with this several targets and indicators of SDG 15.

Sustainability and possibility for replication

The Iberá project demonstrates a strong commitment to sustainability through its multifaceted approach to conservation, community engagement and economic development. Several aspects of the project make it a model that could be replicated in other regions:

- **Conservation and rewilding:** The project focuses on restoring ecosystems and reintroducing native species, which enhances biodiversity and ecosystem

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services. This approach can be applied to other areas facing similar challenges of habitat degradation and species loss.

- **Community involvement:** Engaging local communities in conservation and sustainable development initiatives is key to the project's success. By providing training, creating job opportunities and promoting local products and services, the project has helped improve livelihoods and fostered a sense of stewardship among residents.
- **Economic diversification:** The project has successfully promoted nature-based tourism as a sustainable economic activity. By highlighting the region's natural and cultural heritage, the project has attracted visitors and generated income for local businesses, reducing dependency on traditional industries like cattle ranching.
- **Partnerships and collaboration:** The project's success is also attributed to partnerships between government agencies, NGOs, private organisations and local communities. This collaborative approach has maximised resources, shared expertise and ensured the project's long-term viability.
- **Infrastructure development:** Investing in infrastructure such as roads, gateways and visitor facilities has improved access to the park and enhanced the visitor experience. This infrastructure is crucial for attracting tourists and supporting local businesses.
- **Education and awareness:** The project has prioritised environmental education and awareness-raising activities, which are essential for building a culture of conservation and ensuring the project's sustainability over time.

Supplementary resources

- Initiative 20x20. [n.d.]. *Future Iberá National Park*. https://initiative20x20.org/restoration-projects/future-ibera-national-park
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5.3 Europe

5.3.1 Poland: Comprehensive protection of biodiversity (related targets: 15.2, 15.5, 15.6, 15.8, 15.9)

Background

Poland is bordered by seven other countries and has a terrestrial area of 312 000 km^2. In addition, the country boasts marine areas more than 33 000 km^2 (EU, 2024b). Geographically the northern part (Baltic Coast) of the country has several lagoons and the Masurian Lake District. The Sudete and Tara Mountains are located to the south of Poland (figure 18).

Figure 17: Physical map of Poland

Source: https://www.freeworldmaps.net/europe/poland/map.html

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In 2024, approximately 39.6% of Poland land was dedicated protected areas, and this was significantly higher than the European Union (EU) average of 26.4%. This impressive statistic extends to the protection of its marine waters, 21.87% of which are classified as protected, surpassing the EU value of 12.1% (EU, 2024b). The dedication of Poland to protecting biodiversity extends to the protection of 438 species and their 81 habitats (EU, 2024b).

Economically, Poland is the largest economy in Central Europe and one of the fastest-growing economies within the EU. With a GDP of approximately US$688 billion and a per capita GDP, PPP of about US$47,000 (as of 2022), the country demonstrates robust economic potential and resilience. However, it faces challenges such as high unemployment rates, particularly among young people and in rural areas, as well as regional disparities between urban centres and rural regions. Poland also grappled with the challenges posed by the COVID-19 pandemic, implementing measures to contain the spread of the virus while mitigating its economic impact, and these challenges extended to the continued protection of biodiversity in a drive to meet the targets of SDG 15.

Actions undertaken to improve the implementation of SDG 15

- **Development of conservation task plans for Natura 2000 sites**: The basis for effective protection of Natura 2000 areas was established by developing high-quality conservation task plans for them, which are compulsory planning instruments prepared for Natura 2000 sites. Natura 2000 is a network of protected areas established across the EU to conserve biodiversity and ensure the sustainable use of natural resources. It was created under the EU Birds Directive and the EU Habitats Directive, both adopted in 1992.
- **Comprehensive project for the protection of species and natural habitats in areas managed by the State Forests National Forest Holding:** The main objectives include improving or restoring appropriate habitat conditions, securing habitats for the occurrence and breeding of endangered species populations, reducing threats, as well as limiting the spread of invasive alien species.

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- **Forest promotional complexes:** These showcase the variability of habitat conditions, the diversity of species composition in the forest and its multifunctionality.

Comprehensive protection of the European bison in Poland: The main objectives of the project are to increase the range of the European bison's occurrence within the area managed by the State Forests National Forest Holding and beyond, thin out existing populations, improve living conditions (meadows, watering holes, orchards, fields, infrastructure), monitor populations and habitats, improve health status, veterinary care and genetic pool protection of the European bison, maintain herds in enclosures, shape public awareness of the needs and methods of protection and conservation of the species, as well as principles of behaviour in areas where this species occurs (Statistics Poland, 2024).

Results and impact of the programme

In Poland, between 2018 and 2021, the total area of legally protected areas exceeded 10.1 million hectares, which is 32.3% of the country's surface area, compared to the EU average of 25.9% in 2021. 1% of Poland's territory consists of the area of 23 national parks. A significant portion of legally protected areas in Poland, including all national parks and some landscape parks, is part of the Natura 2000 network. The Natura 2000 network covers 19.6% of the country's land area, slightly exceeding the European average of 18.6%. In 2021, 2 200 hectares of land were reclaimed (700 more than in 2018), while the area of reclaimed land remained stable between 2018 and 2021 at 600 hectares. The level of reclamation and development of devastated and degraded lands remains unsatisfactory, accounting for 3.6% (2.5%) and 0.9% (0.8%), respectively, of the total area of devastated and degraded lands, which amounts to 62 000 hectares. It is also worth noting that the remediation process was completed on an area of 351 out of 1 395 hectares. Poland is home to the world's largest population of European bison, whose protection dates to the 16th century (since 1947, Poland has been maintaining the *European bison pedigree book*, which contains a detailed list of all bison living in captivity and the number of bison living in the wild).

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Lessons learnt

- Developing high-quality conservation task plans for protected areas, such as those within the Natura 2000 network, is crucial for ensuring their effective protection. This involves comprehensive planning and coordination to address various conservation challenges and prioritise actions.
- Achieving SDG 15 requires collaboration among various stakeholders, including government agencies, conservation organisations, local communities and private sector entities. Partnerships and cooperation enhance the effectiveness of conservation efforts and facilitate the sharing of knowledge and resources.
- Restoring and improving habitat conditions is essential for maintaining biodiversity and supporting the survival of endangered species. This includes securing habitats, enhancing biodiversity and addressing threats such as invasive species.
- Raising public awareness about the importance of biodiversity conservation and promoting sustainable behaviours is key to achieving SDG 15.

Possibility for replication

Other countries can develop their own versions of conservation task plans tailored to their specific contexts and biodiversity conservation needs. These plans should prioritise the protection of critical habitats and species while considering local ecological, social and economic factors.

Countries can create their own networks of protected areas modelled after Natura 2000. This involves designating areas of ecological significance and implementing legal frameworks to ensure their conservation and sustainable management.

Like the comprehensive project for the protection of species and natural habitats managed by State Forests National Forest Holding in Poland, other countries can initiate projects focused on habitat restoration, species conservation and the management of threats such as invasive species. This may involve collaboration between government agencies, NGOs, local communities and other stakeholders.

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Forest promotional complexes can serve as models for showcasing the ecological and economic benefits of sustainable forest management practices. Other countries can establish similar initiatives to raise awareness about the importance of forests, promote biodiversity conservation and support local livelihoods.

Projects aimed at comprehensive protection of flagship species, such as the European bison in Poland, can be replicated in other countries with threatened or iconic species. This involves a multi-faceted approach that includes habitat restoration, population monitoring, veterinary care, genetic management and public awareness campaigns.

Supplementary resources

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5.3.2 Germany: Berlin's City Tree Campaign (related targets: 15.2, 15.6, 15.9)

Background

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A total of nine countries border Germany (figure 18), which boasts a land area of 358 000 km^2 and a further 56 000 km^2 of marine area that extends from the Atlantic to the Baltic Oceans. Aligned with EU laws, Germany protects 471 species and 93 habitats (EU, 2024a). The country has an impressive history of biodiversity conservation and has made huge strides in developing policy that would ensure a pollutant-free environment (United Nations, 2021). For many decades in Germany nature conservation was often confined to rural areas, but as issues of biodiversity protection began to appear on the political agendas across the country, urban planning of German cities since the 1970s has increasingly been complemented by a systematic policy of “biotope protection”. The focus was initially on the walled city island of West Berlin, but subsequently across the whole of Berlin (Lachmund, 2013) and this initiative has since been extended to other cities in Germany.

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Figure 18: Physical map of Germany including the location of Berlin

Source: https://www.freeworldmaps.net/europe/germany/germany-map.jpg

In 2024 and 2025, Germany's economic landscape is marked by cautious optimism amidst challenges and opportunities. Key drivers of this growth include decreasing inflation and rising wages, which will bolster real incomes and private consumption. However, challenges such as high interest rates may weigh on residential investment and dampen export demand for investment goods. Nonetheless, there are promising signs of resilience. Non-residential investment is expected to gradually pick up, propelled by factors such as high corporate savings and investment needs related to the relocation of supply chains,

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digitalisation and the expansion of renewable energy. Additionally, rising public investment and fiscal incentives for green investments are anticipated to further bolster this trend.

Germany's political landscape is influenced by broader European and global dynamics, including issues such as the COVID-19 pandemic, economic recovery, climate change, migration and geopolitical tensions. These factors interact with domestic political considerations, shaping the priorities and decision-making of German policymakers (World Bank, n.d.(a); OECD, 2023a; EU, 2024a), and this impact will also be evident in the political agendas related specifically to SDG 15.

Actions undertaken to improve the implementation of SDG 15

In previous years, the city of Berlin has faced the challenge of having to remove numerous urban trees due to factors such as aging, disease and pest infestation. This loss of trees has had adverse effects on the city's climate, impacting both residents and visitors alike. However, due to limited funds allocated for tree replacement in affected areas, the situation persisted, exacerbating the negative consequences.

To address this issue, the Senate Department for Urban Development and the Environment initiated a fundraising campaign aimed at rectifying the deficit in tree planting and maintenance within the city. This campaign not only seeks to mitigate the immediate impacts of tree loss, but also strives to enhance the long-term perception and image of Berlin's urban tree canopy. The overarching objective of the campaign, set forth by 2017, was to facilitate the planting of up to 10 000 additional roadside trees annually during the spring and autumn seasons.

The City Tree Campaign operates as a collaborative effort between the Berlin Senate Department for Urban Development and the Environment and the various districts comprising Berlin. The department assumes the primary responsibility for orchestrating the campaign, involving tasks such as issuing calls for tenders, engaging tree-planting companies, managing public relations through advertising and hotlines and overseeing financial matters, including income administration, donations and pursuit of public funding. Concurrently, the districts play a crucial role by identifying suitable planting sites and providing logistical support for tree installation efforts.

Moreover, the campaign has fostered partnerships with the public and businesses to bolster financial support and expand the urban tree inventory. Motivations for participation vary, with individuals planting trees to commemorate significant life events or honour loved ones, whereas communal initiatives and corporate entities view participation as a favourable avenue for community engagement, advertising and public relations. Additionally, political figures perceive involvement in the campaign as an opportunity to demonstrate their commitment to environmental sustainability and showcase their environmental credentials to constituents.

Through collaborative efforts and multifaceted engagement strategies, the Berlin Senate Department for Urban Development and the Environment endeavours to address the pressing issue of urban tree loss, while simultaneously fostering community participation, enhancing urban green spaces and promoting environmental stewardship (Urban Sustainability Exchange, 2024a).

Results and impact of the programme

In 2016, the planting of approximately 5 000 additional urban trees in Berlin was facilitated through donations amounting to approximately €600,000. It is estimated that each tree will absorb around half a tonne of carbon dioxide (CO_2) annually, assuming an average daily consumption of 1.5 kg of CO_2 per tree. Upon extrapolation to a total of 10 000 trees, this initiative is projected to sequester approximately 5 000 tonnes of carbon annually within the city of Berlin.

The fundraising campaign has garnered substantial support from Berlin's populace, businesses and political entities since its inception. Widely portrayed in the media as an innovative strategy to foster civic engagement, the campaign has resonated with various stakeholders.

Several factors underpin the attractiveness of this project to Berlin residents. Trees enjoy widespread popularity, and the fundraising campaign simplifies the process for every citizen to contribute. By donating, individuals can actively contribute to the betterment of their city, thus enhancing their sense of civic connection. Effective public relations efforts

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have disseminated information about the campaign, thereby encouraging greater citizen participation.

The insights gleaned from orchestrating this fundraising endeavour are applicable across diverse domains. In future endeavours, the city will encourage greater citizen engagement in community initiatives and strengthen support for public service administration.

Inspiration for this initiative was drawn from a comparable fundraising campaign spearheaded by the city of Hamburg, Germany. Subsequently, numerous local authorities in Germany and international cities have expressed keen interest in emulating Berlin's City Tree Campaign. Leveraging its extensive online presence, the campaign is a model for other municipalities wanting to replicate similar initiatives worldwide.

Lessons learnt

- The success of the fundraising campaign underscores the importance of community engagement and collaboration. By involving Berlin's populace, businesses and political entities, the initiative gained substantial support and momentum. This highlights the significance of fostering partnerships and mobilising diverse stakeholders to achieve sustainable development objectives.
- Effective public relations efforts played a crucial role in disseminating information about the campaign and encouraging citizen participation. Clear and engaging communication strategies helped raise awareness about the importance of urban tree planting and its benefits for the environment and community well-being. This underscores the importance of transparent communication and public outreach in driving positive change.
- The use of donations to fund tree planting initiatives demonstrates the potential of innovative financing mechanisms in advancing sustainability goals. By leveraging public and private contributions, the initiative was able to mobilise resources effectively and achieve tangible outcomes. This highlights the importance of exploring alternative funding sources and incentivising investment in sustainable infrastructure and initiatives.

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- The success of the City Tree Campaign in Berlin serves as a model for scalability and replicability. Drawing inspiration from a similar initiative in Hamburg, the campaign has gained interest from other local authorities in Germany and international cities. The experience gained from orchestrating the campaign can be transferred to other contexts, demonstrating the potential for broader adoption and impact.
- The insights from organising the fundraising campaign are applicable across diverse domains. By sharing lessons learnt and best practices, cities can learn from one another's experiences and enhance their capacity to address sustainability challenges. This emphasises the importance of interdisciplinary learning and knowledge sharing in advancing SDG 15 and other SDGs.

Possibility for replication

The use of innovative financing mechanisms, such as donations from various stakeholders, demonstrates a viable approach for funding tree planting initiatives. By mobilising public and private contributions, similar campaigns can be implemented in other countries to support reforestation efforts and combat climate change.

Effective public relations strategies played a crucial role in raising awareness and gaining support for the campaign. Emphasising the benefits of tree planting for the environment and community well-being can engage citizens and businesses in similar initiatives elsewhere, fostering a sense of civic responsibility and connection.

The scalability and replicability of the City Tree Campaign highlight its potential for adaptation in different contexts. By drawing inspiration from successful models like Berlin's, local authorities in other countries can tailor similar campaigns to suit their unique socio-economic and environmental landscapes.

Moreover, knowledge sharing and collaboration between cities can facilitate the exchange of best practices and lessons learnt. By leveraging online platforms and networks, municipalities can learn from one another's experiences and replicate successful strategies for implementing SDG 15 initiatives.

Overall, the City Tree Campaign in Berlin serves as a compelling example of how innovative financing, effective communication and collaboration can drive progress towards SDG 15. By embracing similar approaches and adapting them to local contexts, other countries can replicate and scale up efforts to protect and restore terrestrial ecosystems for a more sustainable future.

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5.3.3 Slovenia: Ljubljana's Bee Path (related targets: 15.5, 15.6, 15.8, 15.9)

Background

Slovenia is a small Central European country bordered by Italy, Austria, Hungary and Croatia, with a small coastline along the Adriatic Sea (figure 19). Slovenia has a terrestrial area of 20 000 km² and a marine area of over 200 km². The land covered by protected areas accounts for 40.5% of the terrestrial land, and 5% of the marine waters are protected. A total of 447 species are protected, and 60 habitats are protected (EU, 2024c).

Slovenia gained independence from Yugoslavia in 1991 and has since developed into a stable and prosperous nation. The capital and largest city is Ljubljana. The country boasts a diverse landscape, from the Alpine peaks in the northwest to the Mediterranean coast in

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the southwest, along with rolling hills and vineyards in the east. This geographic diversity contributes to its rich natural beauty and makes it a popular destination for outdoor activities like skiing, hiking and water sports.

Figure 19: Physical map of Slovenia

Source: https://www.freeworldmaps.net/europe/slovenia/map.html

In Slovenia, economic conditions were expected to undergo fluctuations, with the GDP growth anticipated to decelerate to 1.4% in 2023 due to weakened domestic and external demand. However, a rebound was forecast in subsequent years, with growth rates projected to reach 1.8% in 2024 and 2.7% in 2025. This recovery is attributed to sustained disinflationary trends supporting real incomes and an improvement in global economic conditions. Slovenia has included apitourism as an important part of its economic sector. This form of tourism deals with culture and traditions of rural communities and is considered one of the most sustainable ways of development and a type of niche tourism. In the case of Slovenia, tourism connected with beekeeping as a traditional profession and with bee products in ecological, food and medicinal aspects (Woś, 2014) is significant.

Actions undertaken to improve the implementation of SDG 15

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The City of Ljubljana introduced the Bee Path in 2015, aiming to offer visitors an immersive experience highlighting the indispensable role of bees in the city's ecosystem. The path serves as an educational platform, elucidating the significance of honey in daily nutrition and delving into the deep-rooted beekeeping heritage ingrained in the city's culture. Ljubljana actively advocates environmentally sustainable beekeeping practices, exemplified by the preservation of forested areas within city limits and the strategic planting of honey-producing trees and perennial plants in public green spaces. Furthermore, the city has provided financial support to bee associations, thus enhancing the professional competence of local beekeepers.

Various initiatives and activities have been established to bolster the Bee Path's objectives, including the establishment of a city apiary in the University Botanic Gardens, planting honey plants across the city and creating honey gardens in prominent public spaces like Grba and Europe Park. Guided tourist tours and educational programmes cater to diverse age groups, including schoolchildren and the elderly, fostering awareness and understanding of beekeeping practices and the importance of bees to human survival and health.

The Bee Path also exemplifies principles of the circular economy, with partners utilising ecological and reusable materials in construction projects, such as building environmentally friendly wooden beehives with green roofs.

A primary focus of the Bee Path is on children, with beekeeping clubs established in schools to facilitate hands-on learning experiences and instil a sense of responsibility towards nature and community. Additionally, attention is dedicated to the elderly through various educational activities and lectures aimed at promoting the health benefits of honey and bee products.

The collaborative efforts of Bee Path members, including the Botanical Garden, the BIC Ljubljana, Plenik House and the Biotechnical Faculty, have fostered synergy and facilitated the creation of innovative pedagogical programmes, further enriching the educational offerings of the Bee Path. Through these initiatives, Ljubljana endeavours to cultivate a

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deeper appreciation for bees and their vital role in sustaining ecological balance and human well-being (Urban Sustainability Exchange, 2024).

Results and impact of the programme

In December 2017, Slovenia's proposal to designate 20 May as World Bee Day was officially endorsed by the UN General Assembly, marking a significant recognition of the importance of bees in global ecosystems.

The "Let's Help the City Bee" spring campaign, initiated by Slovenia, encourages urban residents to contribute to the preservation of native honeybees by planting flowers in window boxes and on balconies. This initiative aims to raise awareness about the crucial role bees play in nature.

Apitourism, a form of tourism centred on bee-related activities, has been actively promoted as part of Slovenia's efforts to capitalise on the growing interest in beekeeping and environmental tourism.

The high quality of honey and other bee products produced by local beekeepers in Slovenia is noteworthy. Honey from the city of Ljubljana consistently earns top scores in national competitions due to the absence of pesticides, free acids, heavy metal residues, or genetically modified organisms in the city's greenery.

The city's support has facilitated the development of five beekeepers' businesses, and private enterprises have also embraced environmentally friendly practices. For instance, the Park Hotel rents beehives and incorporates the honey into their popular honey pie dessert, showcasing their commitment to sustainability.

Furthermore, cultural institutions like the "Cankarjev dom" building host about 450 000 bees on their roof during the summer months, demonstrating a unique fusion of urban infrastructure and beekeeping.

Additionally, the Ljubljana pharmacy has introduced a self-aid kit for treating bee stings, further highlighting the city's dedication to bee-related initiatives and public health.

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Urban beehives and bee stands have become popular destinations for citizens, where events are organised, social networks are established and visitors gain insights into beekeeping practices and interact with beekeepers, fostering greater community engagement and appreciation for bees and their role in the environment.

Lessons learnt

- Slovenia's successful advocacy of World Bee Day serves as a prime example of raising global awareness about the importance of bees in ecosystems. This underscores the significance of advocacy efforts in earning international recognition and support for sustainable development goals.
- Initiatives like the "Let's Help the City Bee" campaign demonstrate the power of community engagement in conservation efforts. By involving urban residents in activities such as planting flowers to support native honey bees, Slovenia fosters a sense of shared responsibility and ownership over environmental conservation.
- Apitourism initiatives highlight the potential for economic diversification through sustainable tourism practices. By capitalising on the growing interest in beekeeping and environmental tourism, Slovenia harnesses opportunities to stimulate economic growth while promoting sustainable development.
- Slovenia's emphasis on the high quality of honey and bee products produced by local beekeepers highlights the importance of promoting sustainable agricultural practices. By prioritising environmentally friendly practices and ensuring product quality, Slovenia sets a standard for promoting sustainability in agricultural industries.
- Collaboration between the public and private sectors is instrumental in advancing sustainable development goals. Slovenia's support for beekeepers' businesses and collaboration with private enterprises, such as the Park Hotel, exemplifies the potential for public-private partnerships to drive sustainable economic development.

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- Innovative solutions, such as the introduction by the Ljubljana pharmacy of a self-aid kit for treating bee stings, highlight the importance of innovation and adaptation in addressing challenges related to sustainable development. By embracing innovative approaches, Slovenia demonstrates its commitment to addressing emerging issues and promoting public health.
- The popularity of urban beehives and bee stands as educational destinations underscores the importance of education and outreach in fostering community engagement and appreciation for environmental conservation. By providing opportunities for citizens to interact with beekeepers and gain insights into beekeeping practices, Slovenia promotes greater understanding and support for bee conservation efforts.

Possibility for replication

Countries can follow Slovenia's lead by proposing the designation of a specific day to raise global awareness about the importance of bees in ecosystems. This can be achieved through advocacy efforts at international level, similar to Slovenia's successful proposal to the UN General Assembly.

Countries can promote apitourism as a form of sustainable tourism, capitalising on the growing interest in beekeeping and environmental tourism. This involves developing bee-related activities and attractions, such as beekeeping tours and honey tastings, to attract tourists and support local beekeeping economies.

Governments can provide support to local beekeepers to ensure the production of high-quality bee products while promoting environmentally friendly practices. This can include financial assistance, training programmes and regulatory frameworks that incentivise sustainable beekeeping practices.

Collaboration between the public and private sectors, as seen in Slovenia's partnership with the Park Hotel and Ljubljana pharmacy, can facilitate the implementation of bee-related initiatives. Governments can encourage private enterprises to adopt environmentally friendly practices and support bee conservation efforts.

Establishing urban beehives and bee stands as educational destinations can promote greater community engagement and awareness about bees' importance. Countries can organise events, educational programmes and social networks to foster public appreciation for bees and their role in ecosystems.

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Examples of questions for assessment

- Select a case study in your country that reflects a best practice in terms of achieving the SDG 15 targets in your region. Briefly explain this case study in relation to SDG 15 and explain the best practice that is reported in this case study that will contribute to the achievement of the SDG targets.
- List some good practices that target the implementation of SDG 15.
- What could your own contribution to SDG 15 be?

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6. Examples of exercises and assessments

Readers (teachers) will be empowered to

- reflect on their understanding of the definition of SDG 15
- reflect on their understanding of the significance of SDG 15
- reflect on their understanding of the interdependencies of SDG 15
- reflect on their understanding of the challenges in implementing SDG 15
- provide an overview of the crises that have a negative impact on the achievement of SDG 15
- explain the regional differences of the impact of climate change, conflict and COVID-19 on the achievement of SDG 15
- give an introductory explanation of the regional progress in achieving SDG 15
- reflect on their lifestyle choices and the impact these have on the achievement of SDG 15
- select a suitable case study that reflects good practices in achieving SDG 15 in their own region

Based on the SDG 15 targets and concepts, this section of the manual firstly provides a set of exercises that users (professors, lecturers and teachers) can use with their students to foster ideas, solutions and new initiatives for sustainable development. The level of detail and complexity of these exercises can be regulated according to the educational level of the students. Secondly, a set of shorter assessment questions is also included. These questions cover all the sections in this manual, and require shorter, more to the point answers. For both the exercises and the assessments, you can decide if you want to use them as provided, adapt them according to your own local context and needs or use them as examples and rather develop your own exercises and assessments accordingly.

6.1 Exercises

- *Mapping the environment:* Allow students to map their local area. They need to mark off dispersal barriers like roads, invasive species populations and as many indigenous species in the area.
- *Planting a wildlife garden*: Allow students to create and plant a wildlife garden that includes bee-friendly flowers, insect hotels and ponds. Over time, students should document the biodiversity that is created by a wildlife garden.

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- *Celebrate Earth Day (22 April) and/or World Environment Day (5 June):* Assign students the task of creating an awareness campaign to address awareness of Earth Day and/or the topic of the World Environment Day. They can develop posters, videos, social media campaigns, or presentations to educate their peers and the wider community about the issue.
- *Development of an enquiry-based project:* Students can develop an enquiry-based project on topics related to life on land, for example “Why is biodiversity so important?”

6.2 Assessments

1. Introduction to the SDGs

- Name the five areas of critical importance to which the 17 SDGs are linked and explain why these are referred to as the 5 Ps.
- Explain the link between the MDGs and the SDGs.
- Explain how the SDGs differ from the MDGs.
- Explain how SDG 15 fits into the SDGs, and how this compares to the MDGs.

2.1 Defining SDG 15 - introduction

- What are the main groups in which the targets of SDG 15 can be divided?
- List the targets belonging to each of these main groups.

2.2 Significance of SDG 15

- Explain the contribution of forests to sustain human life and ecosystems.
- Which human activities are threatening the existence of forests?
- What is the status of the progress in achieving SDG 15 by 2030?
- Briefly explain the comprehensive scope and importance of SDG 15 with reference to three main thematic areas covered by this SDG.

2.3 Interdependencies of SDG 15

- Select any three SDGs and briefly explain how they interact with SDG 15. Use examples from your region/country to illustrate your explanation.

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- How is SDG 15 interconnected with the other SDGs? What other SDGs do you think will be most directly affected if SDG 15 is not achieved?

2.4 Advantages of SDG 15

- What will the main advantages be for the world if the goal to protect, restore and promote the sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation and halt biodiversity loss can be achieved?
- Select any two of the targets of SDG 15 and explain the specific advantages which will result with these targets being achieved. Link these to advantages for your specific region/country.

2.5 Challenges in the implementation of SDG 15

- What are the main weaknesses of SDG 15 and how are they creating challenges for the implementation of this SDG?
- Explain how the interdependencies of SDG 15 with all the other SDGs are a challenge to the achievement of SDG 15. Select two SDGs to use as examples to illustrate your answer.
- What are the difficulties in implementing SDG 15 in your region/country? Which are the main barriers? How can they be overcome?

3.1 Overview of global crises that have a negative impact on the achievement of SDG 15

- Name at least three global crises that affect the achievement of the SDG 15 targets in your region.
- How can governments address the challenges related to life on land and reduce biodiversity loss?

3.2 Climate change

- What is the major driver of terrestrial loss in the world and how is this aggravated by climate change?

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- List a few actions that have been taken in your region to address climate change as related to biodiversity loss.

3.3 COVID-19

- During the COVID-19 pandemic, resources in your region were probably directed to dealing with the pandemic. Within this context, identify and explain at least one negative and one positive impact these actions had on life on land.

3.4 Conflict

- Explain the negative impact of conflict on life on land in your region.
- Select a specific conflict within your region and speculate on the biodiversity loss in the region due to conflict.

4. Progress towards the achievement of life on land targets by 2030

- Provide a general overview of the achievement of the various SDG 15 targets and indicators for your region/country.
- Identify the major component of biodiversity loss in your region/country, link this to a specific target and explain the progress in achieving this target in your region/country.
- Which targets in your region/country have shown negative progress in achieving SDG 15?
- Which targets in your region/country have shown positive progress in achieving SDG 15?
- Are the specific efforts in your region/country to accelerate the achievement of the SDG 15 targets and indicators? Explain.

5. Case studies

- Select a case study in your country that reflects a best practice in terms of achieving the SDG 15 targets in your region. Briefly explain this case study in relation to SDG 15 and explain the best practice that is reported in this case study that will contribute to the achievement of the SDG targets.
- List some good practices that target the implementation of SDG 15.

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- What could your own contribution to SDG 15 be?

7. Conclusion

This manual provided an introduction to some crucial aspects of SDG 15, while also turning the focus to global crises having a negative impact on its achievement as well as its progress in three regional contexts. The case studies that we discussed highlighted some best practices in three regions of the world, namely Africa, Latin America and the Caribbean, and Europe. As part of this introduction to SDG 15, we also provided you with supplementary readings and examples of exercises and assessments. In this way you were exposed to a variety of resources and perspectives on this SDG which will enable you to develop your own insights. We trust that this has kindled your interest in SDG 15 and why it is so important. Similarly, we trust that working through this manual has empowered you to be able to present a class or a series of classes on SDG 15, and/or to be innovative and develop your own classes – based on some of the information and resources provided in this manual.

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