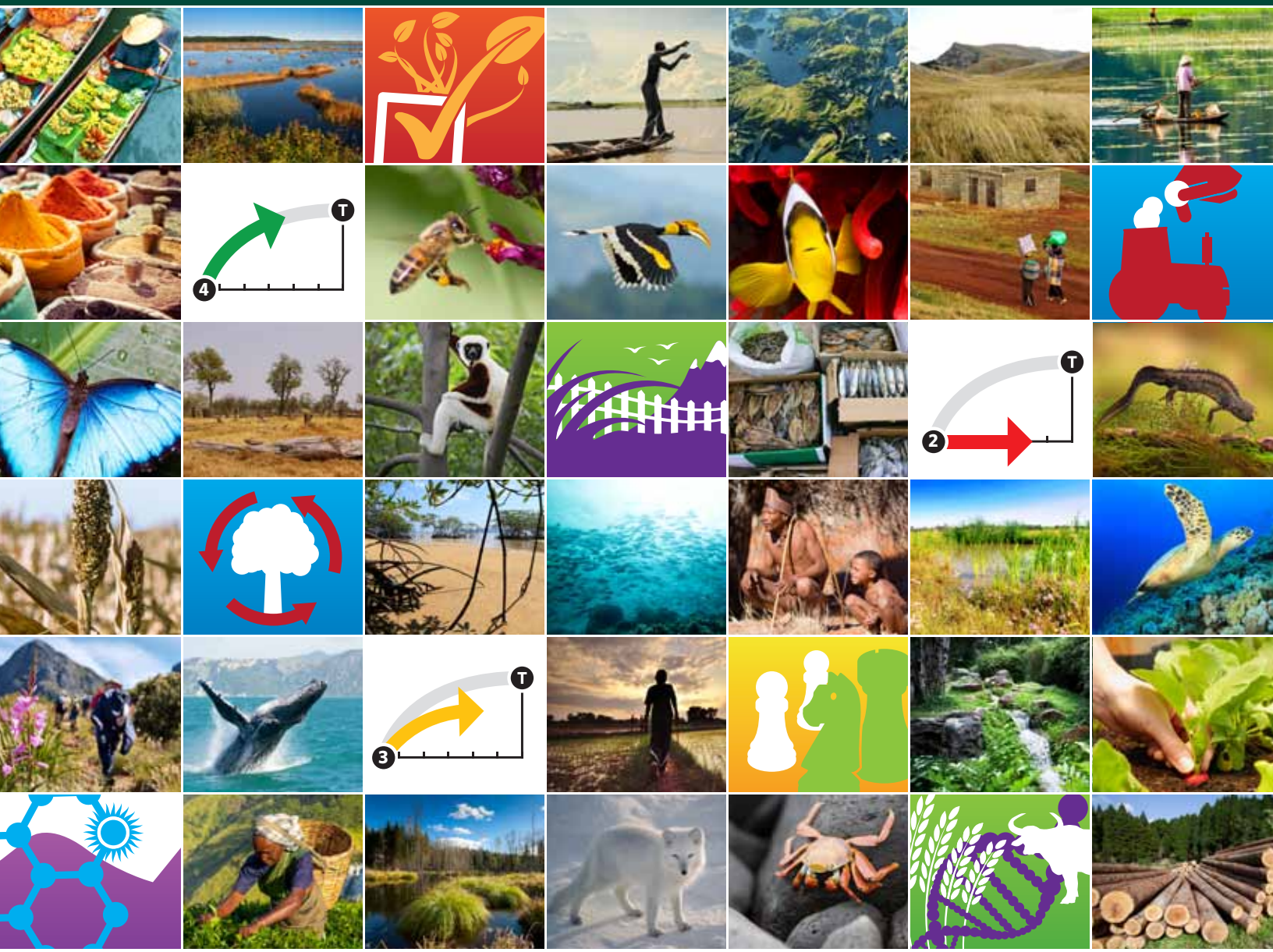
Global Biodiversity Outlook 4

A mid-term assessment of progress towards the implementation of the Strategic Plan for Biodiversity 2011–2020



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GBO-4 has been prepared by the Secretariat of the Convention on Biological Diversity with the support of the GBO-4 Advisory Group and the SBSTTA Bureau, and in close collaboration with numerous partner organizations and individuals from Governments, non-governmental organizations and scientific networks that have generously contributed their time, energy and expertise to the preparation of GBO-4. As such GBO-4 is a product of the collective efforts of this community. The sheer number of organizations and people involved in GBO-4 makes it difficult to thank all contributors by name and doing so runs the risk that some may be overlooked. We sincerely apologize to anyone who may have been unintentionally omitted.

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Drafts of the main GBO-4 report as well as the technical underlying studies were made available for peer review. The preparation of the report was greatly enhanced by the comments received during this peer-review process.

GBO-4 was written and edited by Tim Hirsch, Kieran Mooney, Robert Höft, and David Cooper. Braulio F. de Souza Dias provided guidance. Its production was managed by Robert Höft, Kieran Mooney, David Cooper, and David Ainsworth. In addition many Secretariat staff, interns and consultants provided input and feedback on GBO-4 as well as participated in the preparation of the underlying technical studies, including, Joseph Appiott, Didier Babin, Jennifer Bansard, Katherine Blackwood, Mateusz Banski, Charles Besancon, Catherine Bloom, Lijie Cai, Adam Charette Castonguay, Monique Chiasson, Annie Cung, David Coates, Edwin Correa, Gilles Couturier, Olivier de Munck, Matthew Dias, David Duthie, Joshua Dutton, Amy Fraenkel, Kathryn Garforth, Sarat Babu Gidda, Beatriz Gómez -Castro, Julie Freeman, Jennifer Gobby, Jacquie Grekin, Oliver Hillel, Lisa Janishevski, Elena Kennedy, Sakhile Koketso Kerri Landry, Jihyun Lee, Markus Lehmann, Andre Mader, Manoela Pessoa de Miranda, Ian Martin, Johany Martinez, Praem Mehta, Leah Mohammed, Brianne Miller, Jessica Pawly, Aliya Rashid, Chantal Robichaud, Cristina Romanelli, Nadine Saad, Atena Sadegh, Djeneba Sako, Catalina Santamaria, Simone Schiele, John Scott, Mitchell Seider, Junko Shimura , David Steuerman, Andrew Stevenson, , Gisela Talamas, Tristan Tyrrell, Ardeshir Vafadari, Paige Yang, Atsuhiro Yoshinaka, Yibin Xiang and Tatiana Zavarzina.

While the Secretariat has taken great care to ensure that all statements made in GBO-4 are backed up by credible scientific evidence, it assumes full responsibility for any errors or omission in this work.

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Forewords

The international community is increasingly aware of the link between biodiversity and sustainable development. More and more people realize that the variety of life on this planet, its ecosystems and their impacts form the basis for our shared wealth, health and well-being.

This positive trend must be expanded as part of our efforts to counter worrying evidence of biodiversity loss, which has its greatest impact on the poor and ultimately affects all societies and economies.

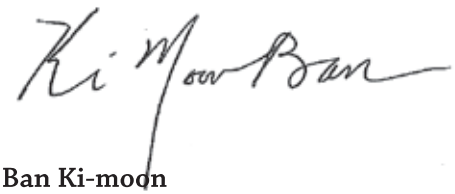
During the first years of the 2011–2020 United Nations Decade on Biodiversity, Parties to the Convention on Biological Diversity made great strides in addressing loss. Still, much more action is needed to meet the Aichi Biodiversity Targets.

This Global Biodiversity Outlook 4 demonstrates that with concerted efforts at all levels, we can achieve the goals and targets of the Strategic Plan for Biodiversity 2011–2020. Success will significantly contribute to the broader global priorities of eliminating poverty, improving human health and providing energy, food and clean water for all.

I urge Member States and stakeholders everywhere to take GBO4's conclusions into account in their planning, recognize that biodiversity contributes to solving the sustainable development challenges we face, and redouble efforts to achieve our shared goals.

This is all the more important at this critical time, as the world intensifies action to meet the Millennium Development Goals, craft a successor agenda for sustainable development, and adopt a meaningful legal climate change agreement—all by the year 2015.

I commend this publication to all those interested in an action-oriented approach to halting the loss of biodiversity and setting the world on course to the future we want.



Ban Ki-moon
Secretary-General, United Nations

The responsible management of our planet's biodiversity is motivated not only by a shared sense of responsibility to future generations. The factors prompting policymakers to safeguard biodiversity are increasingly economic in nature.

Biodiversity is a cornerstone of developed and developing economies. Without healthy concentrations of biodiversity, livelihoods, ecosystem services, natural habitats, and food security can be severely compromised.

Take deforestation as an example. Although halting deforestation may carry costs in terms of lost agricultural and logging opportunities, these are far outweighed by the value of the ecosystem services provided by forests. This report finds that reducing deforestation rates have been estimated to result in an annual benefit of US$183 billion in the form of ecosystem services. In addition, many households in developing countries, especially in Asia, derive as much as 50–80 per cent of annual household income from non-timber forest products.

Action to reduce negative impacts on biodiversity can support a broad range of societal benefits, and lay the groundwork for the socio-economic transition to a more sustainable and inclusive model of development. Under this model the economic value of biodiversity is directly accounted for, providing policymakers with very real incentives to ensure that our forests, oceans, rivers and the rich variety of species contained within them are responsibly managed.

Global Biodiversity Outlook 4 provides us with an opportunity to take stock of our progress, and recommit ourselves to bringing ecosystems back from dangerous thresholds of degradation and exploitation. This necessitates a dismantling of the drivers of biodiversity loss, which are often embedded deep within our systems of policy-making, financial accounting, and patterns of production and consumption.

The 20 Aichi Biodiversity Targets ultimately aim at achieving a 2050 vision of a world without biodiversity loss or degradation of ecosystems. As part of the Strategic Plan for Biodiversity 2011–2020, they form the basis of a challenging but achievable roadmap for the remainder of the UN Decade of Biodiversity—one that can advance global efforts to value, conserve, and make wise use of biodiversity by all sectors of society, and for the benefit of all people.

Achim Steiner
United Nations Under-Secretary-General
and UNEP Executive Director

In Nagoya, Japan, in 2010, the international community made a commitment to future generations and adopted the Strategic Plan for Biodiversity 2011–2020 and 20 Aichi Biodiversity Targets. This watershed moment was a recognition that biodiversity is not a problem to be solved, but essential for sustainable development, and the foundation for human well-being.

Four years later, as we approach the mid-way mark of the United Nations Decade on Biodiversity, Global Biodiversity Outlook 4 provides an important measure of how we are faring. The good news is that Parties are making progress, and concrete commitments to implement the Aichi Biodiversity Targets are being taken.

However, GBO4 also shows us that this effort needs to be redoubled if the Strategic Plan for Biodiversity 2011–2020 is to be implemented and the Aichi Biodiversity Targets achieved. Additional pressures will be placed on the life-support systems of our planet by a greater population, by climate change, and land degradation. The work of the Parties will need to overcome these.

GBO4 shows us that action does not come from 'silver bullet' solutions, but from those strategies that simultaneously address the multiple causes of biodiversity loss. The actions needed are varied: integrating the values of biodiversity into policy, changes in economic incentives, enforcing rules and regulations, involving indigenous and local communities and stakeholders and the business sector and

conserving threatened species and ecosystems. Our efforts can and must be strengthened by understanding the critical links between biodiversity and sustainable development. Measures required to achieve the Aichi Biodiversity Targets also support the goals of greater food security, healthier populations and improved access to clean water and sustainable energy for all. The Strategic Plan for Biodiversity 2011–2020 is a strategy for sustainable development. We must continue our efforts to not only achieve the mission of the Strategic Plan for Biodiversity, but the social, economic and environmental goals of sustainable development, and to achieve human well-being in harmony with nature.

Braulio Ferreira de Souza Dias
Executive Secretary, Convention on Biological Diversity

Executive Summary

Background

Published almost at the halfway point of the 2011–2020 Strategic Plan for Biodiversity, this fourth edition of the Global Biodiversity Outlook (GBO-4) provides a timely report: on progress towards meeting the 20 Aichi Biodiversity Targets and potential actions to accelerate that progress; on prospects for achieving the 2050 Vision on 'Living in Harmony with Nature'; and on the importance of biodiversity in meeting broader goals for sustainable human development during this century.

Key messages

There has been significant progress towards meeting some components of the majority of the Aichi Biodiversity Targets. Some target components, such as conserving at least 17 per cent of terrestrial and inland water areas, are on track to be met.

However, in most cases this progress will not be sufficient to achieve the targets set for 2020, and additional action is required to keep the Strategic Plan for Biodiversity 2011–2020 on course. Key potential actions for accelerating progress towards each target are listed below.

Extrapolations for a range of indicators suggest that based on current trends, pressures on biodiversity will continue to increase at least until 2020, and that the status of biodiversity will continue to decline. This is despite the fact that society's responses to the loss of biodiversity are increasing dramatically, and based on national plans and commitments are expected to continue to increase for the remainder of this decade. This may be partly due to time lags between taking positive actions and discernable positive outcomes. But it could also be because responses may be insufficient relative to pressures, such that they may not overcome the growing impacts of the drivers of biodiversity loss

Each of the Aichi Biodiversity Targets cannot be tackled in isolation, as some targets are strongly dependent on other targets being achieved. Actions towards certain targets will have an especially strong influence on the achievement of the rest. In particular there are targets relating to addressing the underlying causes of biodiversity loss (generally those targets under Strategic Goal A), developing national frameworks for implementing the Aichi Biodiversity Targets (Target 17), and mobilizing financial resources (Target 20).

Meeting the Aichi Biodiversity Targets would contribute significantly to broader global priorities addressed by the post-2015 development agenda; namely, reducing hunger and poverty, improving human health, and ensuring a sustainable supply of energy, food and clean water. Incorporating biodiversity into the sustainable development goals, currently under discussion, provides an opportunity to bring biodiversity into the mainstream of decision making.

Plausible pathways exist for achieving the 2050 vision for an end to biodiversity loss, in conjunction with key human development goals, limiting climate change to two degrees Celsius warming and combating desertification and land degradation. However, reaching these joint objectives requires changes in society including much more efficient use of land, water, energy and materials, rethinking our consumption habits and in particular major transformations of food systems.

Analysis of the major primary sectors indicates that drivers linked to agriculture account for 70 per cent of the projected loss of terrestrial biodiversity. Addressing trends in food systems is therefore crucial in determining whether the Strategic Plan for Biodiversity 2011–2020 will succeed. Solutions for achieving sustainable farming and food systems include sustainable productivity increases by restoring ecosystem services in agricultural landscapes, reducing waste and losses in supply chains, and addressing shifts in consumption patterns.

Summary of progress and key actions related to the Strategic Plan for Biodiversity 2011–2020

The following summarizes the conclusions of GBO-4 and includes the recent trends, current status and projections to 2020 relating to the five overarching goals of the Strategic Plan for Biodiversity 2011–2020 and their corresponding Aichi Biodiversity Targets, and identifies some key potential actions that would accelerate progress towards the targets, if more widely applied.

This report brings together multiple lines of evidence derived from a wide range of sources. It draws upon targets, commitments and activities of countries as reported in national biodiversity Strategies and action plans (NBSAPS) and national reports, as well as Parties' own assessments of progress towards the Aichi biodiversity Targets. It takes into account information on the status and trends of biodiversity reported by Parties and in the scientific literature, and makes use of indicator-based statistical extrapolations to 2020 as well as longer term model based scenarios.

Strategic Goal A

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

Recent trends, current status and projections

Based on the limited evidence available, public awareness of biodiversity and its importance appears to be increasing in both the developed and developing world, although it remains at a low level in some countries (Target 1). Important progress has been achieved in incorporating biodiversity values into planning processes and strategies to reduce poverty. There has also been progress when it comes to integrating natural capital into national accounts. Wide variations among countries remain, but international initiatives are helping to reduce these differences (Target 2). Governments continue to provide subsidies harmful to biodiversity, and while agricultural subsidies are increasingly shifting towards positive incentives for conserving biodiversity, the evidence on whether these incentives will achieve their aims is inconclusive (Target 3). While natural resources are being used much more efficiently to produce goods and services, this progress is overwhelmed by our greatly increased total levels of consumption. It is unlikely that ecosystems can be kept within safe ecological limits given current patterns of consumption (Target 4).

Key potential actions that could accelerate progress towards this goal, if more widely applied

- Coherent, strategic and sustained communication efforts, strategies and campaigns to increase awareness of biodiversity and its values, and of ways to support its conservation and sustainable use.

- Better use of the social sciences, including an understanding of the social, economic and cultural drivers motivating behaviour and their interplay, in order to improve the design of communication and engagement campaigns and of relevant policies.

- The further compilation of environmental statistics and building environmental-economic accounts, including developing and maintaining national accounts of biodiversity-related natural resource stocks (such as forests and water) and where possible, integrating these into national financial accounts.

- Developing and implementing policy plans, including priorities and timelines, leading to the removal, phasing out, or reform of harmful subsidies in cases where candidate incentives and subsidies for elimination, phase-out or reform are already known, taking timely action.

- Better targeting and integration of agri-environmental schemes and other policy instruments towards desired biodiversity outcomes.

- Strengthening partnerships among companies and industry associations, civil society and government agencies, in an accountable and transparent manner, to promote sustainable practices that address biodiversity.

Strategic Goal B

Reduce the direct pressures on biodiversity and promote sustainable use

Recent trends, current status and projections

Loss of forest habitats in some regions, for example the Brazilian Amazon, has been significantly slowed. However, deforestation in many other tropical areas of the world is still increasing, and habitats of all types, including grasslands, wetlands and river systems, continue to be fragmented and degraded (Target 5). Overfishing continues to be a major problem, with an increasing percentage of fish stocks overexploited, depleted or collapsed, and inappropriate fishing practices causing damage to habitats and non-target species. On the other hand, an increasing number of fisheries, concentrated in the developed countries, are certified as sustainable (Target 6). Increased certified forestry, especially in boreal and temperate zones, and increased adoption of good agricultural practices signify more sustainable production. Nevertheless, unsustainable practices in agriculture, aquaculture and forestry still cause substantial environmental degradation and biodiversity loss (Target 7). Nutrient pollution has stabilized in parts of Europe and North America but is projected to increase in other regions, and remains a significant threat to aquatic and terrestrial biodiversity. Other forms of pollution such as from chemicals, pesticides and plastics are increasing (Target 8). Governments are increasingly taking steps to control and eradicate invasive alien species. For example a growing number of eradications, particularly from islands, show that reversing the threat from invasive species is often feasible and effective. However the overall rate of invasions, with great economic and ecological costs, shows no sign of slowing. Preventive measures have been taken in a limited number of countries (Target 9). Multiple land and marine based pressures on coral reefs continue to increase, although some large coral areas are being incorporated into marine protected areas. Less information is available regarding trends for other ecosystems especially vulnerable to climate change, including mountain ecosystems such as cloud forest and páramos (high altitude tundra in tropical Americas) as well as low-lying ecosystems vulnerable to sea-level rise (Target 10).

Key potential actions that could accelerate progress towards this goal, if more widely applied

- Developing integrated policies to address habitat loss and degradation, covering positive and negative incentives; engagement with sectoral groups, indigenous and local communities, landowners, other stakeholders and the general public; effective protected area networks and other area based conservation measures; and enforcement of relevant regulations and laws.

- Making greater use of innovative fisheries management systems, such as community co-management, that provide fishers and local communities with a greater stake in the long-term health of fish stocks combined with the elimination, phasing out or reform of subsidies that contribute to excess fishing capacity, phasing out destructive fishing practices and further developing marine protected area networks.

- Making agriculture more efficient, including through improved targeting and efficiency of fertilizer, pesticide and water use, reducing post harvest losses and minimizing food waste, and promoting sustainable diets.

- Reducing nutrient pollution by improving nutrient use efficiency in agriculture to reduce losses to the environment, enhancing treatment and recycling of sewage and industrial waste water, eliminating phosphates from detergent's and the conservation and restoration of wetlands.

- Increasing efforts to identify and control the main pathways responsible for species invasions, including through the development of border control or quarantine measures to reduce the likelihood of potentially invasive alien species being introduced, and making full use of risk analysis and international standards.

- Sustainably managing fisheries on coral reefs and closely associated ecosystems, combined with managing coastal zones and inland watersheds in an integrated manner in order to reduce pollution and other land-based activities that threaten these vulnerable ecosystems.

Strategic Goal C

To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

Recent trends, current status and projections

Taking current commitments into account, the element of Target 11 on conserving 17 per cent of terrestrial areas by 2020 is likely to be met globally, although protected area networks remain ecologically unrepresentative and many critical sites for biodiversity are poorly conserved. The element to protect 10% of coastal and marine areas is on course to be met in coastal waters, although open ocean and deep sea areas, including the high seas, are not well covered. Inadequate management of protected areas remains widespread. Despite individual success stories, the average risk of extinction for birds, mammals and amphibians is still increasing (Target 12). Genetic diversity of domesticated livestock is eroding, with more than one-fifth of breeds at risk of extinction and the wild relatives of domesticated crop species are increasingly threatened by habitat fragmentation and climate change (Target 13).

Key potential actions that could accelerate progress towards this goal, if more widely applied

- Expanding protected area networks and other effective area based conservation measures to become more representative of the planet's ecological regions, of marine and coastal areas (including deep sea and ocean habitats), of inland waters and of areas of particular importance for biodiversity, including those that contain unique populations of threatened species

- Improving and regularly assessing management effectiveness and equitability of protected areas and other area-based conservation measures

- Developing species action plans aimed directly at particular threatened species

- Ensuring that no species is subject to unsustainable exploitation for domestic or international trade, including by actions agreed under the Convention on International Trade in Endangered Species (CITES)

- Promoting public policies and incentives that maintain local varieties of crops and indigenous breeds in production systems, including through increased cooperation with, and recognition of, the role of indigenous and local communities and farmers in maintaining in situ genetic diversity

- Integrating the conservation of the wild relatives of domesticated crops and livestock in management plans for protected areas, conducting surveys of the location of wild relatives, and including this information in plans for the expansion or development of protected area networks

Strategic Goal D

Enhance the benefits to all from biodiversity and ecosystem services

Recent trends, current status and projections

Habitats important for ecosystem services, for example wetlands and forests, continue to be lost and degraded (Target 14). However, restoration is under way for some depleted or degraded ecosystems, especially wetlands and forests, sometimes on a very ambitious scale, as in China. Many countries, organizations and companies have pledged to restore large areas. Abandonment of farmland in some regions including Europe, North America and East Asia is enabling 'passive restoration' on a significant scale (Target 15). The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization enters into force on 12 October 2014, opening up new opportunities for the fair and equitable sharing of the benefits arising from the utilization of genetic resource (Target 16).

Key potential actions that could accelerate progress towards this goal, if more widely applied

- Identifying, at the national level, with the involvement of relevant stakeholders, those ecosystems that are particularly important in providing ecosystem services, with particular attention to ecosystems upon which vulnerable groups are directly dependent for their health, nutrition and general well-being and livelihoods, as well as ecosystems that help to reduce risks from disasters.

- Reducing the pressures on and, where necessary, enhancing the protection and restoration of those ecosystems providing essential services (for example wetlands, coral reefs, rivers and forests and mountain areas as "water towers" among others).

- Identifying opportunities and priorities for restoration, including highly degraded ecosystems, areas of particular importance for ecosystem services and ecological connectivity, and areas undergoing abandonment of agricultural or other human-dominated use.

- Where feasible, making restoration an economically viable activity, by coupling employment and income generation with restoration activities.

- Putting in place, by 2015, legislative, administrative or policy measures and institutional structures for implementing the Nagoya Protocol; and undertaking associated awareness-raising and capacity building activities including by engaging with indigenous and local communities and the private sector.

Strategic Goal E

Enhance implementation through participatory planning, knowledge management and capacity-building

Recent trends, current status and projections

National biodiversity strategies and action plans are expected to be in place for most Parties by 2015 (Target 17), helping to translate the aims of the Strategic Plan for Biodiversity 2011–2020 into national actions. Traditional knowledge continues to decline as indicated by the loss of linguistic diversity and large-scale displacement of indigenous and local communities, although this trend is reversed in some places through growing interest in traditional cultures and involvement of local communities in management of protected areas (Target 18). Data and information on biodiversity are being shared much more widely through initiatives promoting and facilitating free and open access to digitized records from natural history collections and observations, including through citizen science networks; however, much data and information remain inaccessible and capacity is lacking to mobilize them in many countries (Target 19). There is insufficient data to report with confidence on progress towards the mobilization of financial resources from all sources. However, based on the data that is available, further efforts will be needed to significantly increase the financial resources, from all sources, for effective implementation of the Strategic Plan for Biodiversity 2011–2020 (Target 20).

Key potential actions that could accelerate progress towards this goal, if more widely applied

- Ensuring that national biodiversity strategies and action plans are up to date and aligned with the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets, for example by setting national targets with corresponding indicators and monitoring mechanisms, with the participation of all stakeholders

- Promoting initiatives that support traditional and local knowledge of biodiversity and promote customary sustainable use, including traditional health care initiative, strengthening opportunities to learn and speak indigenous languages, research projects and data collection using community based methodologies, and involving local and indigenous communities in the creation, control, governance and management of protected areas

- Strengthening and promoting the further mobilization of and access to data by, for example, encouraging the use of common informatics standards and protocols, promoting a culture of data sharing, investing in digitization of natural history collections and promoting citizen scientists' contributions to the body of biodiversity observations

- Establishing or strengthening monitoring programmes, including monitoring of land-use change, providing near-real time information where possible, in particular for "hotspots" of biodiversity change

- Developing national financial plans for biodiversity, as part of national biodiversity strategies and action plans, aligned, where possible, with national annual and multi-annual financial planning cycles

- Increasing national and international flows of resources for biodiversity, broadening biodiversity funding sources including by exploring innovative financial mechanisms, such as subsidy reform and payment for ecosystem services schemes, recognizing that a range of funding sources will be needed

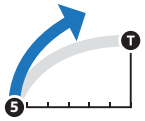
The way forward

This mid-term report on the Strategic Plan for Biodiversity 2011–2020 suggests that the majority of its targets are still achievable, if challenging to meet. Achieving these targets requires innovative and bold action in many areas, and a sustained focus on biodiversity in a wide range of policy areas for the second half of this decade. Success stories have demonstrated that effective action comes from simultaneously addressing multiple causes of biodiversity loss through monitoring and data analysis, changing economic incentives, applying market pressures, enforcing rules and regulations, involving indigenous and local communities and stakeholders and targeting conservation of threatened species and ecosystems—among many other routes to biodiversity conservation and sustainable use.

Many of the measures required to achieve the Aichi Biodiversity Targets will also support the goals of greater food security, healthier populations and improved access to clean water and sustainable energy for all. The Strategic Plan for Biodiversity 2011–2020 is thus part of the agenda for sustainable development. There is a need to accelerate our actions to seize the opportunity to live in harmony with nature.

Target 'dashboard'—A summary of progress towards the Aichi Biodiversity Targets, broken down into their components

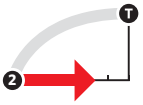
The table below provides an assessment of progress made towards individual components of each of the Aichi Biodiversity Targets, as well as the level of confidence (★★★), based on the available evidence. It aims to provide summary information on whether or not we are on track to achieve the targets. The assessment uses a five-point scale:



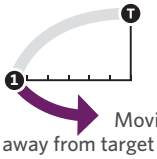
On track to exceed target (we expect to achieve the target before its deadline)

On track to achieve target (if we continue on our current trajectory we expect to achieve the target by 2020)

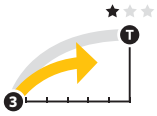
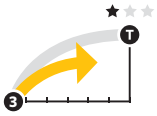
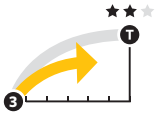
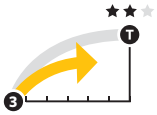
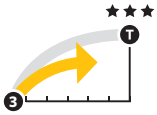
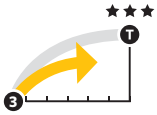
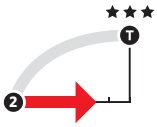
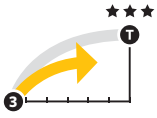
Progress towards target but at an insufficient rate (unless we increase our efforts the target will not be met by its deadline)

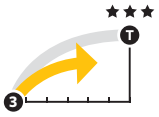
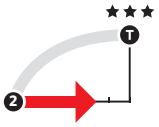
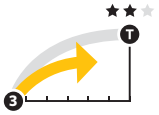
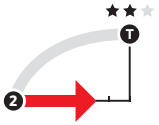
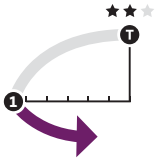
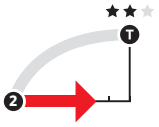
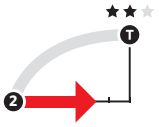
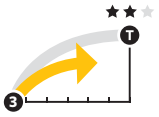
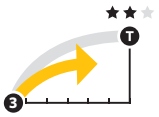
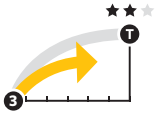


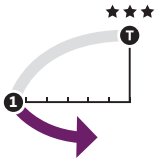
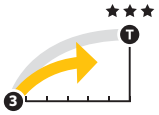
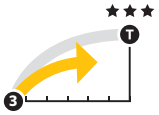
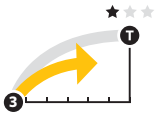
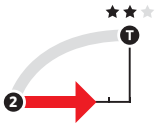
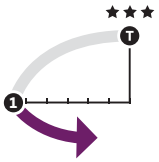
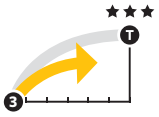
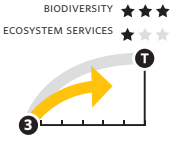
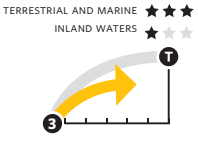
No significant overall progress (overall, we are neither moving towards the target nor away from it)

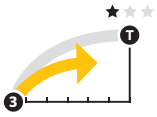
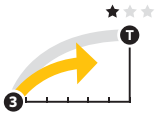
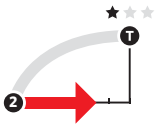
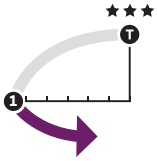
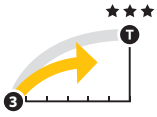
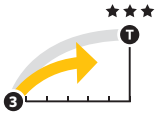
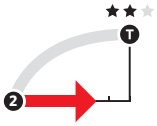
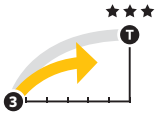
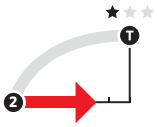
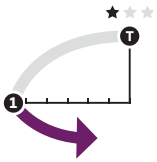
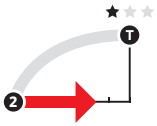


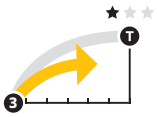
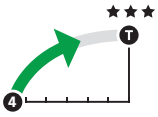
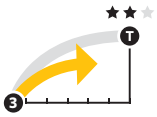
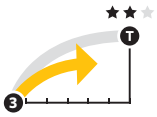
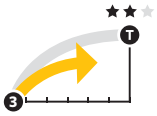
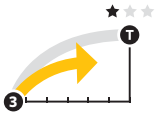
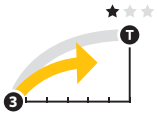
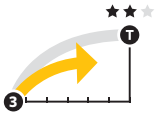
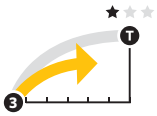
Moving away from target (things are getting worse rather than better).

	TARGET ELEMENTS	STATUS	COMMENT
TARGET 1	People are aware of the values of biodiversity		Limited geographical coverage of indicators. Strong regional differences
	People are aware of the steps they can take to conserve and sustainably use biodiversity		Evidence suggests a growing knowledge of actions available, but limited understanding of which will have positive impacts
TARGET 2	Biodiversity values integrated into national and local development and poverty reduction strategies		Differences between regions. Evidence largely based on poverty reduction strategies
	Biodiversity values integrated into national and local planning processes		The evidence shows regional variation and it is not clear if biodiversity is actually taken into consideration
	Biodiversity values incorporated into national accounting, as appropriate		Initiatives such as WAVES show growing trend towards such incorporation
	Biodiversity values incorporated into reporting systems		Improved accounting implies improvement in reporting
TARGET 3	Incentives, including subsidies, harmful to biodiversity, eliminated, phased out or reformed in order to minimize or avoid negative impacts		No significant overall progress, some advances but some backward movement. Increasing recognition of harmful subsidies but little action
	Positive incentives for conservation and sustainable use of biodiversity developed and applied		Good progress but better targeting needed. Too small and still outweighed by perverse incentives

	TARGET ELEMENTS	STATUS	COMMENT
TARGET 4	Governments, business and stakeholders at all levels have taken steps to achieve, or have implemented, plans for sustainable production and consumption...		Many plans for sustainable production and consumption are in place, but they are still limited in scale
	... and have kept the impacts of use of natural resources well within safe ecological limits		All measures show an increase in natural resource use
TARGET 5	The rate of loss of forests is at least halved and where feasible brought close to zero		Deforestation significantly slowed in some tropical areas, although still great regional variation
	The loss of all habitats is at least halved and where feasible brought close to zero		Varies among habitat types, data scarce for some biomes
	Degradation and fragmentation are significantly reduced		Habitats of all types, including forests, grasslands, wetlands and river systems, continue to be fragmented and degraded.
TARGET 6	All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches		Great regional variation, positive for some countries but data limited for many developing countries
	Recovery plans and measures are in place for all depleted species		Variable, progress in some regions
	Fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems		Some progress e.g. on long-lining used in tuna fisheries, but practices still impacting vulnerable ecosystems
	The impacts of fisheries on stocks, species and ecosystems are within safe ecological limits, i.e. overfishing avoided		Overexploitation remains an issue globally, but with regional variation
TARGET 7	Areas under agriculture are managed sustainably, ensuring conservation of biodiversity		Increasing area under sustainable management, based on organic certification and conservation agriculture. Nutrient use flattening globally. No-till techniques expanding
	Areas under aquaculture are managed sustainably, ensuring conservation of biodiversity		Progress with sustainability standards being introduced, but in the context of very rapid expansion. Questions about sustainability of expansion of freshwater aquaculture
	Areas under forestry are managed sustainably, ensuring conservation of biodiversity		Increasing forest certification and criterion indicators. Certified forestry mostly in northern countries, much slower in tropical countries

	TARGET ELEMENTS	STATUS	COMMENT
TARGET 8	Pollutants (of all types) have been brought to levels that are not detrimental to ecosystem function and biodiversity	*No clear evaluation*	Highly variable between pollutants
	Pollution from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity		Nutrient use leveling off in some regions, e.g. Europe and North America, but at levels that are still detrimental to biodiversity. Still rising in other regions. Very high regional variation
TARGET 9	Invasive alien species identified and prioritized		Measures taken in many countries to develop lists of invasive alien species
	Pathways identified and prioritized		Major pathways are identified, but not efficiently controlled at a global scale
	Priority species controlled or eradicated		Some control and eradication, but data limited
	Introduction and establishment of IAS prevented		Some measures in place, but not sufficient to prevent continuing large increase in IAS
TARGET 10	Multiple anthropogenic pressures on coral reefs are minimized, so as to maintain their integrity and functioning		Pressures such as land-based pollution, uncontrolled tourism still increasing, although new marine protected areas may ease overfishing in some reef regions
	Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning	*Not evaluated*	Insufficient information was available to evaluate the target for other vulnerable ecosystems including seagrass habitats, mangroves and mountains
TARGET 11	At least 17 per cent of terrestrial and inland water areas are conserved		Extrapolations show good progress and the target will be achieved if existing commitments on designating protected areas are implemented. Inland water protection has distinct issues.
	At least 10 per cent of coastal and marine areas are conserved		Marine protected areas are accelerating but extrapolations suggest we are not on track to meet the target. With existing commitments, the target would be met for territorial waters but not for exclusive economic zones or high seas
	Areas of particular importance for biodiversity and ecosystem services conserved		Progress for protected Key Biodiversity Areas, but still important gaps. No separate measure for ecosystem services
	Conserved areas are ecologically representative		Progress, and possible to meet this target for terrestrial ecosystems if additional protected areas are representative. Progress with marine and freshwater areas, but much further to go

	TARGET ELEMENTS	STATUS	COMMENT
TARGET 11	Conserved areas are effectively and equitably managed		Reasonable evidence of improved effectiveness, but small sample size. Increasing trend towards community involvement in protection. Very dependent on region and location
	Conserved areas are well connected and integrated into the wider landscape and seascape		Initiatives exist to develop corridors and transboundary parks, but there is still not sufficient connection. Freshwater protected areas remain very disconnected
TARGET 12	Extinction of known threatened species has been prevented		Further extinctions likely by 2020, e.g. for amphibians and fish. For bird and mammal species some evidence measures have prevented extinctions
	The conservation status of those species most in decline has been improved and sustained		Red List Index still declining, no sign overall of reduced risk of extinction across groups of species. Very large regional differences
TARGET 13	The genetic diversity of cultivated plants is maintained		*Ex situ* collections of plant genetic resources continue to improve, albeit with some gaps. There is limited support to ensure long term conservation of local varieties of crops in the face of changes in agricultural practices and market preferences
	The genetic diversity of farmed and domesticated animals is maintained		There are increasing activities to conserve breeds in their production environment and in gene banks, including through *in-vitro* conservation, but to date, these are insufficient
	The genetic diversity of wild relatives is maintained		Gradual increase in the conservation of wild relatives of crop plants in *ex situ* facilities but their conservation in the wild remains largely insecure, with few protected area management plans addressing wild relatives
	The genetic diversity of socio-economically as well as culturally valuable species is maintained	*Not evaluated*	Insufficient data to evaluate this element of the target
	Strategies have been developed and implemented for minimizing genetic erosion and safeguarding genetic diversity		The FAO Global Plans of Action for plant and animal genetic resources provide frameworks for the development of national and international strategies and action plans
TARGET 14	Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-well-being, are restored and safeguarded ...		High variation across ecosystems and services. Ecosystems particularly important for services, e.g. wetlands and coral reefs, still in decline
	... taking into account the needs of women, indigenous and local communities, and the poor and vulnerable		Poor communities and women especially impacted by continuing loss of ecosystem services
TARGET 15	Ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced through conservation and restoration		Despite restoration and conservation efforts, there is still a net loss of forests, a major global carbon stock

	TARGET ELEMENTS	STATUS	COMMENT
TARGET 15	At least 15 per cent of degraded ecosystems are restored, contributing to climate change mitigation and adaptation, and to combating desertification		Many restoration activities under way, but hard to assess whether they will restore 15% of degraded areas
TARGET 16	The Nagoya Protocol is in force		The Nagoya Protocol will enter into force on 12 October 2014, ahead of the deadline set.
	The Nagoya Protocol is operational, consistent with national legislation		Given progress that has been made, it is likely that the Nagoya Protocol will be operational by 2015 in those countries that have ratified it
TARGET 17	Submission of NBSAPs to Secretariat by (end of) 2015		For those Parties for which information is available, about 40% are expected to have completed their NBSAP by October 2014 and about 90% by the end of 2015
	NBSAPs adopted as effective policy instrument		The adequacy of available updated NBSAPs in terms of following COP guidance is variable
	NBSAPs are being implemented		The degree of implementation of updated NBSAPs is variable
TARGET 18	Traditional knowledge, innovations and practices of indigenous and local communities are respected		Processes are under way internationally and in a number of countries to strengthen respect for, recognition and promotion of, traditional knowledge and customary sustainable use
	Traditional knowledge, innovations and practices are fully integrated and reflected in implementation of the Convention ...		Traditional knowledge and customary sustainable use need to be further integrated across all relevant actions under the Convention
	... with the full and effective participation of indigenous and local communities		Efforts continue to enhance the capacities of indigenous and local communities to participate meaningfully in relevant processes locally, nationally and internationally but limited funding and capacity remain obstacles
TARGET 19	Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved		Significant effort on delivery of information and knowledge relevant to decision makers is being made, and relevant processes and institutions are in place
	Biodiversity knowledge, the science base and technologies are widely shared and transferred and applied		Improvements in analysis and interpretation of data gathered from disparate collecting and monitoring systems. However, coordination to guarantee models and technologies that can integrate this knowledge into functional applied systems needs to be improved
TARGET 20	Mobilization of financial resources implementing the Strategic Plan for Biodiversity 2011–2020 from all sources has increased substantially from 2010 levels		Limited information on many funding sources, including domestic funding, innovative financial mechanisms, and the private sector. General increase in bilateral ODA against 2006–2010 baseline.

Part I
Introduction

This Outlook is the fourth in the series of global assessments of the state of biodiversity produced by the Secretariat of the Convention on Biological Diversity (CBD) (see Box 0.1). The Third Global Biodiversity Outlook (GBO-3), published in 2010, presented some stark messages for the global community.[1]

At the heart of GBO-3 was the conclusion that the target adopted by countries in 2002 to reduce significantly the rate of biodiversity loss by 2010 had been missed.

GBO-3 found that all major pressures on biodiversity were increasing. These included:

- Loss, degradation and fragmentation of natural habitats
- Overexploitation of biological resources
- Pollution, in particular the buildup of nutrients such as nitrogen and phosphorus in the environment
- The impacts of invasive alien species on ecosystems and the services they provide to people
- Climate change and acidification of the oceans, associated with the buildup of greenhouse gases in the atmosphere.

GBO-3 also warned that some ecosystems were being pushed towards critical thresholds or tipping points. If these thresholds were passed, there was a real risk of dramatic loss of biodiversity and degradation of a broad range of services on which people depend for their livelihoods and well-being. The poor would suffer the earliest and most severe impacts, but ultimately all societies and economies would be affected.

GBO-3 concluded, however, that biodiversity loss could still be slowed and, in time, even halted, if Governments and society took coordinated action at a number of levels. This meant addressing the underlying causes or drivers of biodiversity loss, often embedded deep within our systems of decision-making, financial incentives and patterns of production and consumption. It also meant understanding and minimizing the pressures on biodiversity and ecosystems, and targeting measures directly at conservation and restoration of ecosystems critical to the survival of species and the provision of important services.

The Strategic Plan for Biodiversity 2011–20 and the Aichi Biodiversity Targets

The conclusions from GBO-3 formed the background to the Strategic Plan for Biodiversity 2011–2020, agreed at the tenth meeting of the CBD Conference of Parties (COP10) in Nagoya, Japan in 2010.[3]

The basis of the Strategic Plan is that biodiversity loss can only be effectively addressed with

simultaneous and coordinated action at a number of levels, each of which is essential to achieve a lasting impact and to set us on a sustainable path to keep human societies within the limits of the planet's biological resources. The Strategic Plan includes an ambitious yet achievable set of 20 targets (the Aichi Biodiversity Targets), most with an end-point of 2020, ultimately aimed at achieving a 2050 vision of a world where biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people (see Figure 0.1).

The Strategic Plan includes five interdependent Strategic Goals, addressing:

- The **underlying causes** or indirect drivers of biodiversity loss, including the lack of awareness of biodiversity and its values; the incorporation of those values into accounting systems, and decisions on economic development and planning; the subsidies and financial incentives that influence decisions affecting biodiversity; and patterns of consumption and production that determine how natural resources are used to meet the demands of our everyday lifestyles

- The **pressures or direct drivers** on biodiversity, including habitat loss, degradation and fragmentation; overexploitation of biological resources with a particular emphasis on overfishing; unsustainable forms of production in key activities such as agriculture, aquaculture and forestry; pollution especially focusing on the buildup of nutrients; the introduction and establishment of invasive alien species; and the multiple pressures on ecosystems, such as coral reefs, especially vulnerable to the impacts of climate change

- Actions aimed at **safeguarding ecosystems, species and genetic diversity** through direct interventions such as increasing the coverage, effectiveness and representativeness of protected areas and other area-based conservation measures in terrestrial, inland water and marine ecosystems; measures specifically targeting species at risk of extinction; and maintaining genetic diversity especially in plants and animal species used for crops and livestock, and their relatives in the wild

- The safeguarding and enhancement of the **benefits of biodiversity and ecosystem services** to human societies through conservation and restoration of ecosystems especially important for the provision of essential services such as those related to fresh water and contributing to health and livelihoods; improving and restoring the resilience of ecosystems important for adaptation to and mitigation of climate change; and implementing globally-agreed norms for the equitable sharing of benefits from access to and use of genetic resources, for example through commercialization of drugs and other products, derived from biodiversity

- The means to **enhance the implementation** of all other goals within the Strategic Plan, through development and application of national strategies

Box 0.1. The Convention on Biological Diversity (CBD)

The Convention on Biological Diversity is one of the three 'Rio Conventions', emerging from the UN Conference on Environment and Development, also known as the Earth Summit, held in Rio de Janeiro in 1992. It came into force at the end of 1993, with the following objectives: "The conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding." There are currently 194 Parties to the Convention (193 countries and the European Union).[2]

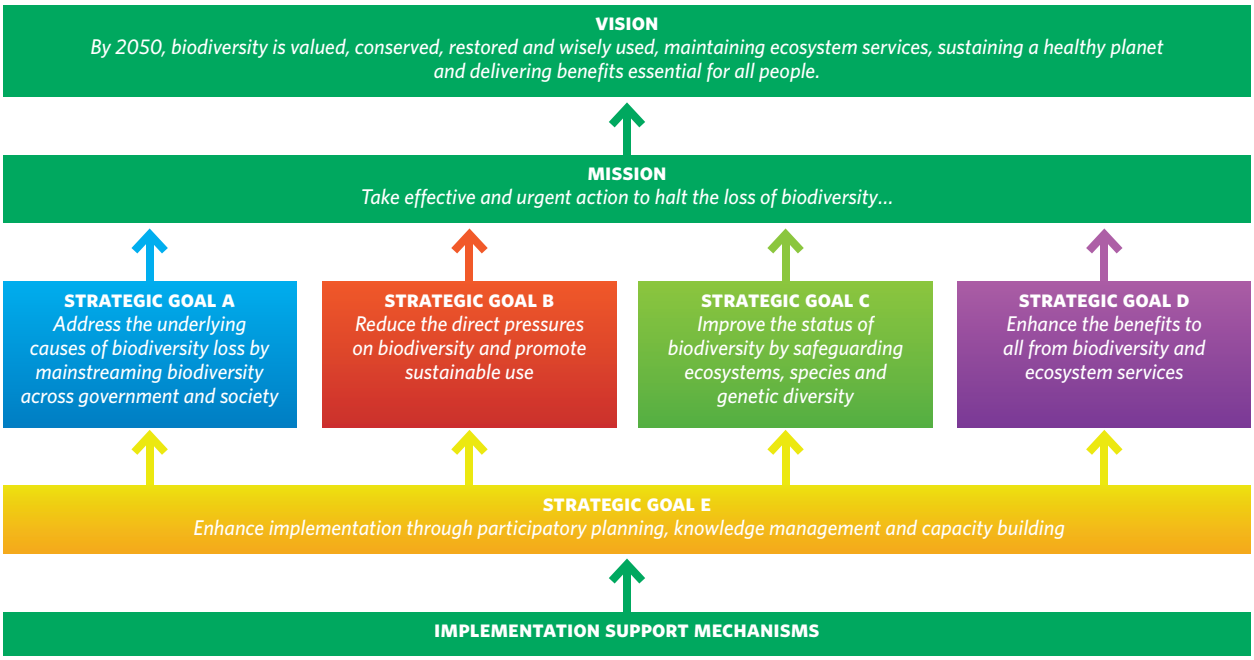


Figure 0.1. This diagram shows the structure of the Strategic Plan for Biodiversity 2011–2020. Progress towards a 2050 Vision is achieved through a 2020 Mission. In turn, the Mission is addressed through five Strategic Goals under which the 20 Aichi Biodiversity Targets are organized, and supported by implementation mechanisms. The Strategic Plan serves as a flexible framework for the establishment of national and regional targets and it promotes the coherent and effective implementation of the three objectives of the Convention on Biological Diversity.

and action plans on biodiversity; through respecting traditional knowledge and involving local and indigenous communities; through effective sharing and application of data, information and knowledge relating to biodiversity; and through adequate resourcing to support the actions needed to implement the plan

The Strategic Plan for Biodiversity 2011–2020 is now accepted as the overarching framework for action on biodiversity, and the United Nations General Assembly designated the period 2011–2020 as the United Nations Decade on Biodiversity. In 2012, the General Assembly encouraged all parties, stakeholders, institutions and organizations to consider the plan and its targets in the elaboration of the post-2015 United Nations development agenda, taking into account the social, economic and environmental pillars of sustainable development.[4]

Other biodiversity-related conventions recognizing the importance of the Strategic Plan include the Convention on International Trade in Endangered Species of Wild Fauna and Flora, the Convention on the Conservation of Migratory Species of Wild Animals, the Convention on Wetlands of International Importance, the International Treaty on Plant Genetic Resources for Food and Agriculture and the World Heritage Convention.[5]

About GBO-4

The Fourth Global Biodiversity Outlook (GBO-4) is published almost at the halfway point towards the 2020 deadline set for most of the Aichi Biodiversity Targets. It is therefore an appropriate opportunity to review progress towards the goals of the Strategic Plan, and to assess what further action governments may need to take to achieve the targets they collectively committed to in 2010.

GBO-4 addresses a range of questions relating to the achievement of the Strategic Plan for Biodiversity including available pathways towards the 2050 Vision for biodiversity and its relevance to

the forthcoming Sustainable Development Goals. Over the following pages, progress towards each of the 20 Aichi Biodiversity Targets is also addressed, including:

- An overall assessment of the likelihood of reaching each component of the target based on our current trajectory

- A summary of the recent trends, current status and future projections relating to the targets

- Examples of actions and issues helping to illustrate both the progress made and the challenges still faced

- Key actions available to governments to help achieve each target. Where these actions contribute to several targets is also indicated

This report brings together multiple lines of evidence derived from a wide range of sources (see Box 0.2). It draws upon targets, commitments and activities of countries as reported in national biodiversity strategies and action plans (NBSAPS) and national reports, as well as Parties' own assessments of progress towards the Aichi biodiversity Targets. It takes into account information on the status of trends of biodiversity reported by Parties and in the scientific literature, and makes use of indicator-based statistical extrapolations to 2020 as well as longer term model based scenarios. GBO-4 is underpinned by a detailed assessment by a group of international experts as well as a scenario assessment related to different economic sectors. Both of these have been compiled as technical volumes accompanying GBO-4.[6] GBO-4 has also considered the results of the High Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity.[7]

Just as GBO-3 played a major role in developing the Strategic Plan for Biodiversity and the Aichi Biodiversity Targets, GBO-4 provides evidence that should prompt renewed action by governments, the international community and all stakeholders to achieve the goals of the Plan. Its conclusions can inform not only the CBD at its upcoming meeting on how to chart new actions for the coming years, but also governments developing the post-2015 development agenda and sustainable development goals, whose success will depend crucially on the state of biodiversity and ecosystem services in the decades ahead.

Box 0.2. Sources of information for GBO-4

The fourth edition of the Global Biodiversity Outlook and its underlying technical reports[8] draw upon several sources of information, thus providing multiple lines of evidence to the assessment of progress and the identification of actions to accelerate progress:

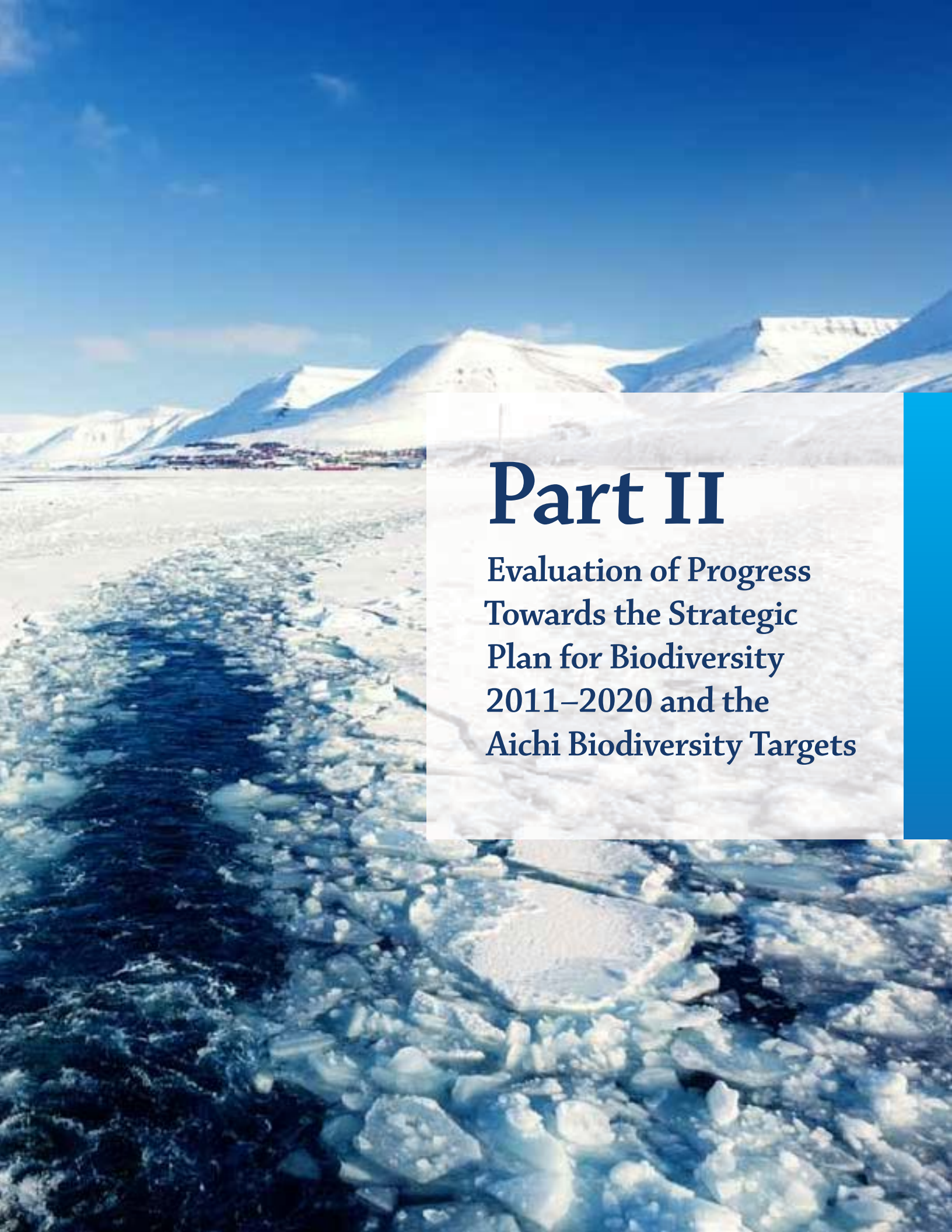
National Biodiversity Strategies and Action Plans (NBSAPS) are the principal instruments for implementing the Convention at the national level. The Convention requires countries to prepare a national biodiversity strategy or equivalent instrument, and to ensure that this strategy is mainstreamed into the planning and activities of all those sectors whose activities can have an impact, whether positive or negative, on biodiversity (see the assessment of Target 17 for further information). NBSAPs provide important information on national targets and commitments and on the activities planned to achieve them. GBO-4 draws upon the information provided in 26 NBSAPs that have been updated since 2010.

National Reports are periodic reports provided by Parties to the Convention on Biological Diversity. These reports address a number of issues including the status and trends of biodiversity at the national level, the implementation of national biodiversity strategies and action plans, the mainstreaming of biodiversity, as well as the successes and challenges encountered. The fifth national reports, due in 2014, have a particular focus on assessing progress made towards the implementation of the Strategic Plan for Biodiversity. They provide information on the status and trends of biodiversity in each country as well as activities underway and planned, including case studies. Many Parties provide a self-assessment of progress towards the Aichi Targets (see Part III of GBO-4). For countries that have not yet updated their NBSAPs, the national reports provide important information on national targets and commitments under development.

Indicator-based extrapolations of recent and current trends to 2020. The assessment of progress towards the Aichi Biodiversity Targets in GBO-4 is informed by recent trends in 55 biodiversity-related indicators and their statistical extrapolation to 2020. These indicators were selected from over 170 candidate indicators, including those identified by the Convention,[9] according to criteria of relevance, scientific credibility, and temporal and geographical coverage.

Model-based scenarios to 2050. Numerous socio-economic scenarios up to 2050 and beyond were examined to inform the assessment of potential progress towards the 2050 Vision of the Strategic Plan. The scenarios also helped to identify actions for the achievement of the Aichi Biodiversity Targets as well as the feasibility of simultaneously meeting other socio-economic goals, including those for food security and climate mitigation, and for mainstreaming biodiversity considerations in productive sectors.

Scientific literature and other reports. GBO-4 also draws upon an extensive review of the published and peer-reviewed scientific literature to inform the assessment of current trends and future prospects as well as the identification of promising actions to achieve the Aichi Biodiversity Targets.



Part II

Evaluation of Progress Towards the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets

Strategic Goal A

Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society

TARGETS 

Achieving this goal is critical to all other parts of the Strategic Plan for Biodiversity. It demands policy coherence and the integration of biodiversity into decisions at all levels. Failure to address the underlying causes of biodiversity loss would threaten to undermine many positive actions resulting from policies directly targeting conservation and sustainable use. GBO-4 has identified important progress towards some of the targets included in this goal, for example on awareness of biodiversity in some countries, in the integration of biodiversity into some systems of national accounting and planning, and on the creation of positive financial incentives for protecting biodiversity and ecosystem services. This progress varies greatly among countries and regions, however. It is also still counterbalanced by negative drivers such as widespread subsidies harmful to biodiversity, and continuing unsustainable patterns of production and consumption. Stepping up action to address these underlying causes will be essential if the Aichi Biodiversity Targets are to be achieved.

TARGET 1

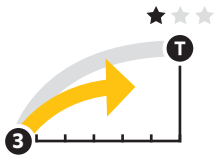
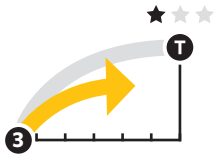
Awareness of biodiversity increased

By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.

Why this target is important[10]

Addressing the direct and underlying drivers of biodiversity loss will require behavioral change by individuals, organizations and governments. Understanding, awareness and appreciation of the diverse values of biodiversity help to underpin the willingness of individuals to make such changes. Public awareness also underpins the political will for governments to act. Meeting this target requires that people are aware not only of the values of biodiversity in an abstract way, but know the concrete contributions of biodiversity to their lives, as well as the actions that can be taken to conserve and sustainably use biodiversity.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
People are aware of the values of biodiversity	
People are aware of the steps they can take to conserve and sustainably use biodiversity	

Recent trends, current status and future projections

Based on geographically limited survey results, public awareness of biodiversity and its importance appears to be increasing in both developed and developing countries, although with considerable variation. Surveys such as the Biodiversity Barometer (see Box 1.1) show a high variation in the awareness of biodiversity and its values among people in different countries and regions. Such surveys suggest that while people are aware that biodiversity is important for human well-being, they do not necessarily view biodiversity protection as an important contribution to human wellbeing. With important national differences, survey respondents see biodiversity loss as a global problem but not one that is of great local concern. People are still not certain which actions have a negative impact on biodiversity, and fewer still are able to connect specific actions to biodiversity protection.[11]

Analysis of the national reports submitted to the CBD suggests that the majority of countries are taking steps to increase public awareness of biodiversity. Fewer reports provide evidence of programmes that focus on the actions that individuals can take to conserve and sustainably use biodiversity. Some examples of what countries have done to promote such actions are given in Box 1.2.

For the few countries where recent trends are available, projections for 2020 would suggest a continuing improvement, but not to a level where this target could be considered reached (see Figure 1.1). There is low confidence in this conclusion because of the limited data, but a wide consensus among Parties to the CBD that more needs to be done to improve awareness of biodiversity and its values.

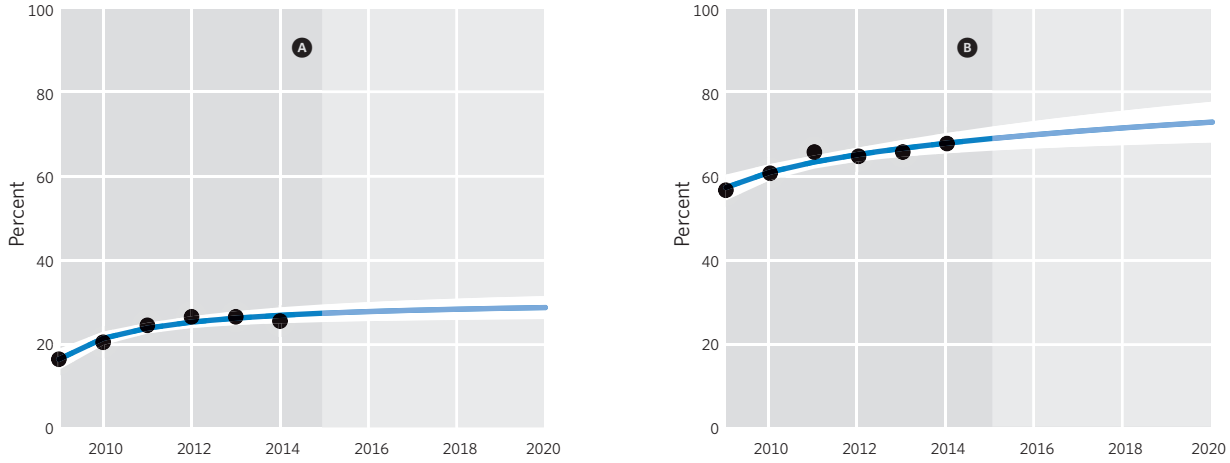


Figure 1.1. Statistical extrapolations to 2020 for the percentage of respondents giving A correct definitions of biodiversity and B the percentage of respondents that had heard of the term biodiversity ("Biodiversity Barometer"). Both show a significant increase in the trend between 2010 and 2020. The extrapolation assumes underlying processes remain constant and are based on data from Germany, France, the United Kingdom and the United States of America. The solid line represents the model fit for the period with data and the extrapolation, dots represent data points and the shaded band illustrates the 95% confidence interval.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 1, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Facilitating and encouraging the engagement of citizens in biodiversity issues, including activities to monitor biodiversity (*Target 19*) and to promote its conservation and sustainable use (*Targets 4 to 15*)

- Developing and implementing coherent, strategic and sustained communication efforts, strategies and campaigns, with messages and techniques adapted appropriately for different target audiences, drawing upon social-marketing expertise, and publicising nationally relevant examples or case studies on the importance of biodiversity

- Integrating awareness and understanding of biodiversity and its values, including for human wellbeing into national educational curricula, taking into account approaches related to Education for Sustainable Development (ESD)

- Making better use of the social sciences, including in developing a greater understanding of the social, economic and cultural drivers motivating behavioural change and their interplay, in order to improve the design of communication and engagement campaigns and of relevant policies (*Targets 2, 3, and 4*)

- Undertaking periodic, consistent and comparable assessments of biodiversity awareness, understanding, and willingness to take actions to conserve and sustainably use biodiversity, and the extent to which any desired behavioural change has been achieved, to provide a basis for more targeted efforts

Box 1.1. Union for Ethical Bio Trade (UEBT)—Biodiversity Barometer results in 2013

Since the first edition of the Biodiversity Barometer in 2009, the global research organization IPSOS, on behalf of UEBT, has interviewed 31,000 consumers in 11 countries. Some highlights of the surveys include:[12]

- **Brazil**: There is 96% awareness of biodiversity in Brazil. Correct definitions of biodiversity are slowly rising. Awareness is driven by documentaries, school and advertising.

- **China**: 94% of respondents had heard of biodiversity and 64% could define biodiversity correctly. This is the highest rate measured in any country.

- **France**: 95% of respondents have heard of biodiversity. There is high overall awareness of sustainability: 98% are aware of sustainable development, deforestation, endangered species and fair trade.

- **Germany**: Results show a strong increase in consumer awareness of biodiversity: from 29% in 2009, to 48% in 2013. 91% of respondents know of related terms like 'preservation of ecosystems'.

- **United Kingdom**: There is high awareness of ethics and trade (over 80%), but slightly less awareness of environmental terms (around 70%).

- **United States of America**: Biodiversity awareness is slowly rising among consumers (48% in 2009 to 54% in 2013). Correct definitions amongst respondents went from 26% to 39%.

Box 1.2. Some national approaches to public engagement on biodiversity

Belgium: The campaign 'I give life to my planet' aims to engage people with biodiversity by inspiring individuals to take small and simple steps that will have long-term positive impacts. The campaign presents tools and information about potential actions—for each day or week of the year—relating to issues including overconsumption, over-exploitation, awareness of biodiversity values and invasive species. By 2014, nearly 24,000 people had signed up to more than 87,000 actions for biodiversity. The campaign is a close collaboration between the Royal Belgian Institute of Natural Sciences, the Ministry for Public Health, Food Chain Safety and the Environment and several partners at the regional, provincial, local and NGO-level.[13]

Benin: The Ministry of Environment of Benin initiated a project '12 gestes pour la biodiversité' (12 actions for biodiversity). The project presents information in the form of a wall calendar, and a booklet showing a set of actions that can be carried out each month, as well as some of the important international days. The product has been used in schools and linked to capacity development activities. Plans are under way for an SMS text messaging service and other ways of spreading the message through social networks.[14]

India: The Science Express Biodiversity Special (SEBS) is a mobile exhibition mounted on a specially designed train for creating awareness about biodiversity and other environmental issues in the country. The first phase of SEBS was launched on World Environment Day on 5th June 2012, and was the brand ambassador of the CBD's COP-11 meeting hosted by India in Hyderabad in October 2012. The SEBS, during its first phase from June to December 2012, travelled to 51 locations and received over 2,300 000 visitors, including students and teachers from 7,000 schools. The second phase of SEBS travelled from New Delhi and visited 62 stations from October to April 2013.[15]

Japan: The Japanese Committee for the United Nations Decade on Biodiversity (UNDB-J), established in 2011 by a range of stakeholders to promote action to achieve the Aichi Biodiversity Targets, operates a 'My Declaration' programme to help people understand the connections they have with biodiversity, and to take positive action in their everyday lives. Participants choose from a list of five actions and make a declaration explaining their choice. During 2012, the programme was used at 91 events including national meetings and regional seminars, attended by a total of around 20,000 people.[16]

TARGET 2

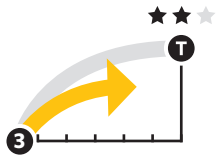
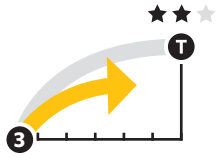
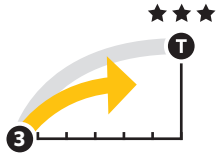
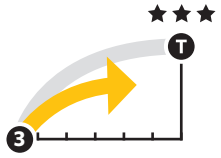
Biodiversity values integrated

By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into national accounting, as appropriate, and reporting systems.

Why this target is important

One of the persistent challenges related to the conservation and sustainable use of biodiversity is to include it as a significant consideration when decisions are being taken on economic development and reducing poverty. Without such 'mainstreaming', the best conservation measures can be jeopardized as development activities may threaten habitats and contribute to other pressures on biodiversity. A key step towards meeting this challenge is to ensure that the values of biodiversity to economies and livelihoods, often ignored in conventional accounting, are incorporated in the strategies and processes that drive decisions about development.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Biodiversity values integrated into national and local development and poverty reduction strategies	
Biodiversity values integrated into national and local planning processes	
Biodiversity values incorporated into national accounting, as appropriate	
Biodiversity values incorporated into reporting systems	

Recent trends, current status and future projections

Important progress has been achieved recently in incorporating biodiversity values into planning processes and strategies to reduce poverty, and integrating natural capital into national accounts. Wide variations among countries remain, but international initiatives are helping to reduce these differences.

Of 54 poverty reduction strategies examined in a study, nearly one third (30 per cent) showed a high level of recognition of the importance of biodiversity in development strategies.[17] In a different study around half of all countries that responded to a survey had systems of environmental-economic accounting, a framework for integrating statistics on the environment and its relationship with the economy.[18] An increasing number of developing countries are incorporating natural capital into their accounting systems, including eight members of the World Bank's WAVES partnership (see Box 2.1).[19] However, the great majority of studies assigning monetary values to biodiversity (88 per cent) have been carried out in high income or upper middle income countries.[20]

Around seventy per cent of the latest national reports submitted to the CBD include information suggesting some progress towards this target. These include the development of policies taking biodiversity into account in land use and spatial planning, local development and poverty reduction plans. Relatively little attention is given to the integration of biodiversity into national accounting and reporting systems. An example of how Kenya has accounted for the ecosystem services provided by its forests is given in Box 2.2.

Bringing all these factors together, GBO-4 concludes that while important progress has been made towards achieving all components of Target 2, significant additional actions are required to meet the target by the 2020 deadline.

Box 2.1. The World Bank's WAVES Partnership

In 2010, the World Bank initiated the WAVES partnership (Wealth Accounting and the Valuation of Ecosystem Services). Its main objective is "to promote sustainable development by ensuring that natural resources are mainstreamed in development planning and national economic accounts". WAVES helps countries to adopt and implement the System of Environmental-Economic Accounting (SEEA)—Central Framework, to develop an ecosystem accounting methodology. By 2014, eight countries had received support from WAVES to implement natural capital accounts. Botswana, Colombia, Costa Rica, Madagascar, and the Philippines were the first countries under the WAVES partnership, each applying natural capital accounting to particular sectors and economic indicators (Table 2.1).[21] In 2013, Guatemala, Indonesia and Rwanda joined the partnership.

Table 2.1. Accounts being implemented by WAVES partners.

COUNTRY	ACCOUNTS	PROGRESS
Botswana	Water, land and ecosystems, mineral and energy and macroeconomic indicators of sustainable development	Detailed water accounts for 2010–11 and 2011–12.
Colombia	Water and forests	Water and forest accounts developed.
Costa Rica	Water and forests	Established tec hnical working groups for both the water and forest accounts
Madagascar	Mining, water and forests/protected areas and coastal	—
Philippines	Water, mineral, mangroves, land and ecosystem (at two identified sites) and macroeconomic Indicators of Sustainable Development.	Land cover change matrixes (for the two identified sites). Water use supply and use table

Key actions for the future

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 2, if more widely applied. They would also contribute to the other targets shown in parentheses:

- Assessing existing and planned policies, across government, affecting biodiversity, and identifying opportunities and options for addressing biodiversity concerns

- Widely sharing information on the values of biodiversity and related ecosystem services to enable the better reflection of biodiversity in decision making across sectors (*Target 19*)

- The further compilation of environmental statistics and building environmental-economic accounts, including by further developing and maintaining national accounts of biodiversity-related natural resource stocks (such as forests, and water) and where possible, integrating these into national financial accounts (*Target 5*)

- Reflecting the values of biodiversity in spatial planning and resource management exercises including through the mapping of biodiversity and related ecosystem services (*Targets 5, 6 and 7*)

- Integrating biodiversity into environmental assessment processes and making wider use of strategic environmental assessment (*Target 4*)

Box 2.2. Kenya's forest accounts[22]

One of the main objectives of Kenya's initiative to build a forestry account was to capture information on the following:

- Value added to forest products through the manufacturing sector
- Provision of goods (timber and non-timber) to the subsistence economy (also referred to as the non-monetary economy)
- Supply of a set of cultural services to residents of and visitors to Kenya
- Supply of a set of ecosystem services that regulate ecological processes

A preliminary assessment concluded that the value of the forestry sector value chain to the economy of Kenya was at least three times larger than currently estimated by Kenya National Bureau of Statistics (KNBS), accounting for some 3.6 per cent of the national economy. The value was most likely underestimated as it did not consider some ecosystem services.

Some key policy recommendations from the forestry accounting exercise included:

- Reducing the loss of ecosystem services, especially regulating services, as the cost of not doing so was 4.2 times higher than the actual cash revenue from deforestation
- Ensuring that Kenya has in place a fully functioning forest resource account in order to fully capture the various benefits provided by the forest
- Encouraging investment in the forestry sector in order to increase efficiency in production, especially in sawn timber and charcoal production
- Promoting adequate regeneration after harvest and an increased forest plantation growth in the long term, together with better coordination of regulating institutions, producers and consumers of forest products
- Mainstreaming the use of instruments and incentives such as payment for ecosystem services, trading and insurance schemes

TARGET 3

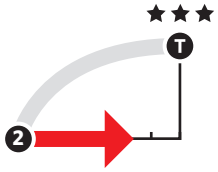
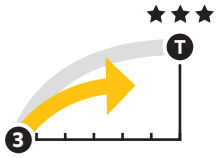
Incentives reformed

By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations, taking into account national socio-economic conditions.

Why this target is important

Incentives created by government regulations and programmes have a powerful influence on behaviour affecting biodiversity, from private individuals to large corporations. A well-designed system of positive incentives can encourage better stewardship of land, inland waters and oceans; conversely the best conservation policies can easily be undermined by incentives that encourage overexploitation of resources. Reforming these incentives is critical to addressing underlying causes of biodiversity loss.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Incentives, including subsidies, harmful to biodiversity, eliminated, phased out or reformed in order to minimize or avoid negative impacts	
Positive incentives for conservation and sustainable use of biodiversity developed and applied	

Recent trends, current status and future projections

Incentives relating to biodiversity take many forms, but global information on non-financial incentives is limited. For this reason, the assessment of progress towards this target concentrates mainly on trends relating to financial incentives, including both subsidies harmful to biodiversity and positive incentives rewarding behaviour that benefits biodiversity.

Subsidies in the fisheries sector, especially relating to fuel use, continue to encourage overcapacity, and if not reformed, phased out or eliminated will lead to continued declines in marine fish populations and ecosystems. Fisheries subsidies also create trade distortions, harming livelihoods in regions such as Africa where subsidies are relatively low.[23] Eliminating or reforming all harmful fishing subsidies would save billions of dollars per year, and increase both the size and value of catches in the long term.[24]

There is some evidence that agricultural subsidies are progressively moving away from support for production towards incentives intended to reward farming practices that safeguard the environment (see Figure 3.1).[25] However, agri-environmental schemes are not always effective in achieving their aims in conserving biodiversity.[26] Subsidies promoting biofuel use contributed to a four-fold increase in production of bioethanol and a tenfold increase in biodiesel production in the past decade, with some significant negative impacts on biodiversity (see box 3.1).[27]

Actions taken as part of the REDD+ climate change mitigation mechanisms[28] have the potential to bring considerable benefits to biodiversity and to contribute to the attainment of several Aichi Biodiversity Targets. However, if carbon storage is maximized at the expense of biodiversity they could potentially have undesirable impacts (see Box 3.2).[29]

The most recent national reports to the CBD provide little evidence of actions to remove subsidies harmful to biodiversity. Much more emphasis is put on positive incentives for conservation and sustainable use of biodiversity for example through tax incentives to landowners who enter into contractual arrangements for formal protection of their lands (South Africa), tax benefits for landowners who donate land for conservation (Canada) and support for municipalities that formulate local biodiversity strategies (Japan). An example of using price incentives to encourage more sustainable use of fertilizers in India is given in Box 3.3.

Overall, progress towards this target shows a very mixed picture. While there is increasing recognition of the need to remove harmful subsidies, there is limited action to phase them out and some backward steps in creating new ones. The development and application of positive incentives, especially for agricultural practices that protect the environment, are steps in the right direction, but on the current trajectory are not judged sufficient to meet this component of the target by 2020.

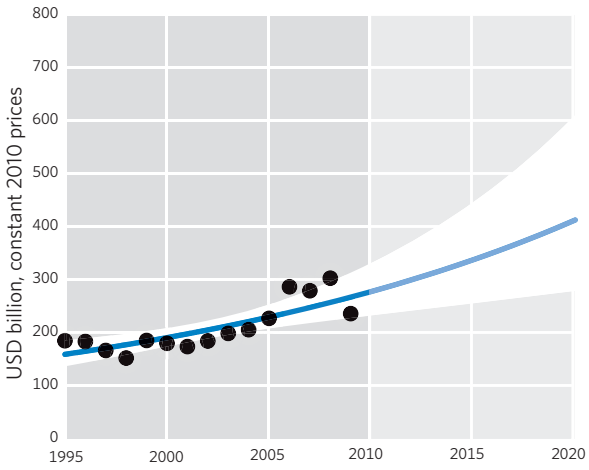


Figure 3.1. Statistical extrapolation of WTO green box spending to 2020. 'Green box' refers to agricultural subsidies including environmental protection and regional development programmes that do not distort trade and do not involve price support. The extrapolation assumes underlying processes remain constant. The solid line represents the model fit for the period with data and the extrapolation, dots represent data points and the shaded band illustrates the 95% confidence interval.[30]

Box 3.1. Increase in biofuel production

The rapid increase in biofuel production has been stimulated by subsidies aimed at meeting targets for reducing dependence on fossil fuels (see Figure 3.2).[31] Removing or reforming bio-energy subsidies so that they take into account the full impacts of biofuel crops on greenhouse gas emissions, land use change and biodiversity is important in ensuring that they do not have unintended negative impacts.

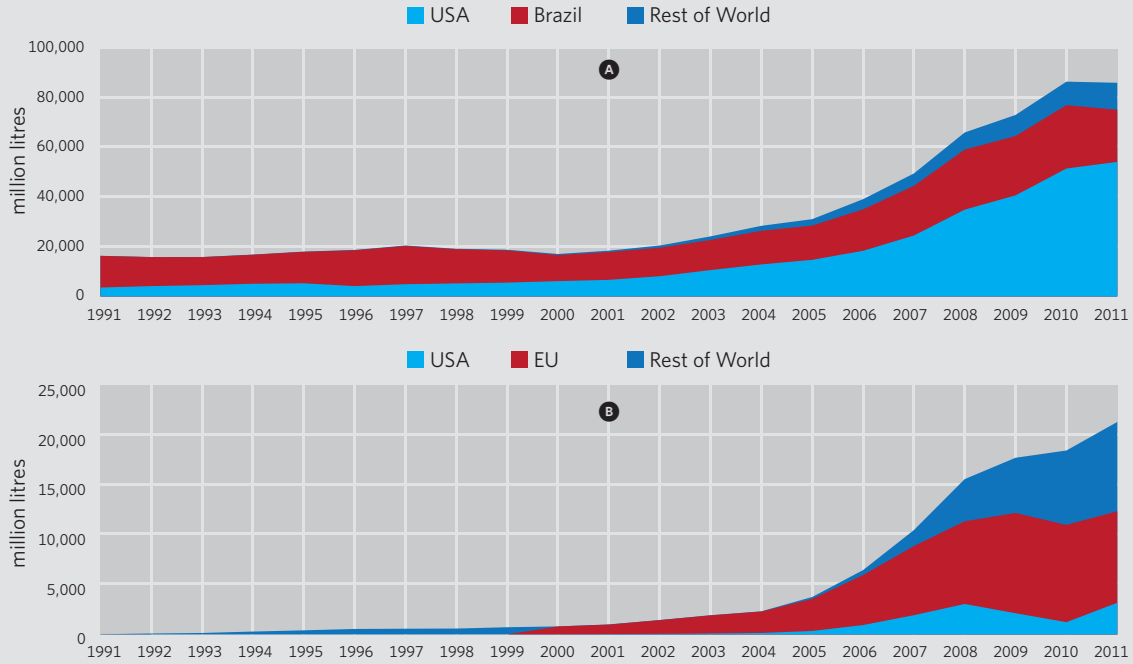


Figure 3.2. Development of A World Ethanol Production, 1991–2012. B World Biodiesel Production, 1991–2012.

Box 3.2. REDD+ and biodiversity[32]

The REDD+ mechanism was launched by the UN Framework Convention on Climate Change (UNFCCC) in 2007 and its methodology was finalized by the UNFCCC in 2013. Its scope includes the reduction of emissions from deforestation, reductions of emissions from forest degradation, the conservation of forest carbon stocks, the sustainable management of forests, and the enhancement of forest carbon stocks.

A number of initiatives to help implement REDD+ have been established, among them UN-REDD. At the end of 2011, total support to countries implementing UN-REDD programmes totalled US$ 108.1 million. By 2014, 18 countries were partners of UN-REDD, receiving support for national programmes, and a further 31 countries were also receiving support. For the period 2011–2015, the aim of the UN-REDD Programme is to support countries in the development and implementation of their REDD+ strategies in order to speed up their REDD+ readiness. Another initiative, the BioCarbon Fund Initiative for Sustainable Forest Landscapes was launched in 2013 at the UNFCCC COP19 in Warsaw, with funding pledges from Norway, the United Kingdom, the United States and Germany. Funding for the first year of this initiative will exceed US$ 280 million.

REDD+ mitigation mechanisms carry both opportunities and risks for biodiversity. Opportunities include slowing habitat loss (Target 5) and recovery of degraded forest ecosystems (Target 15), while risks include displacement of land use change to other ecosystems including savannahs and grasslands, and afforestation or reforestation with non-native species or forests with low species diversity.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 3, if more widely applied: They would also contribute to other targets, shown in parentheses:

- Undertaking national, and, as appropriate, regional, analytical studies to identify candidate incentives, including subsidies, for elimination, phase-out or reform, as well as opportunities to promote the design and implementation of positive incentive measures (*Target 2*)

- Developing policy plans, including a prioritized list of measures, with timelines, leading to the eventual removal, phase-out, or reform of harmful incentives, including subsidies, and the introduction, or strengthening, of positive incentives for the conservation and sustainable use of biodiversity (*Target 17*)

- In cases where candidate incentives and subsidies for elimination, phase-out or reform are already known, taking timely policy action (*Targets 6 and 7*)

- Making greater use of social incentives (for example, the establishment of awards or recognition programmes promoting behaviours beneficial to biodiversity)

- Better targeting and integration of agri-environmental schemes and other policy instruments towards desired biodiversity outcomes (*Targets 4 and 7*)

Box 3.3. Fertilizer subsidy reform in India

The Government of India is taking steps to encourage balanced fertilizer use so as to maintain soil biodiversity and to sustain and increase the rate of agricultural productivity. A recent reform of fertilizer pricing has been brought into effect to liberalize the prices of potassium and phosphate while increasing the price of urea by 10%. This is to encourage the use of potassium, phosphorus and micro-nutrient based fertilizers while reducing the use of urea which has more damaging effects on the environment.[33]

TARGET 4

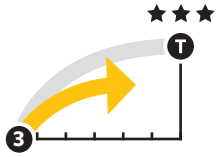
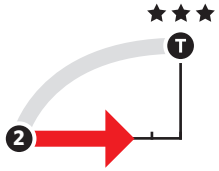
Sustainable production and consumption

By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.

Why this target is important

Underlying all the direct pressures on biodiversity is the unsustainable demand for natural resources generated by our present patterns of producing and consuming goods and services. With a rising human population and increasing per capita consumption, such pressures can only increase unless there is a determined effort to make production and consumption more sustainable. To meet the objective of keeping the impacts of natural resource use well within safe ecological limits, actions must address the efficiency of using resources, and limit total demand for goods and services.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Governments, business and stakeholders at all levels have taken steps to achieve, or have implemented, plans for sustainable production and consumption...	
... and have kept the impacts of use of natural resources well within safe ecological limits.	

Recent trends, current status and future projections

While natural resources are being used much more efficiently to produce goods and services, this progress is overwhelmed by our greatly increased total levels of consumption. If current trends continue the intensity of resource use is expected to decrease further in the short term, that is more goods and services will be produced using fewer resources per unit of output.[34] Figure 4.1 shows that natural resource use per person, and per dollar of the economy, has become more efficient in recent decades, with the exception of water use.

However even with this it is unlikely that maintaining current patterns of consumption can keep ecosystems within safe ecological limits by 2020. Overall use of resources is projected to continue to increase in absolute terms until 2020. Humans are appropriating between 30 and 40 per cent of the entire planet's plant production, more than double the amount appropriated a century ago.[35] The ecological footprint of our societies continues to grow,[36] and use of fresh water is rising unsustainably.

Urban populations account for a large portion of humanity's ecological footprint, and this is projected to increase further. Having more than half the global population, cities account for around three quarters of the world's resource consumption. With the urban population forecast to double by 2050, new urban infrastructure will place huge demands on resources, and the decisions made by subnational governments and urban citizens therefore have great implications for the achievement of sustainable production and consumption (see Box 4.1).

The recent adoption of the 10-Year Framework Programmes on Sustainable Consumption and Production, led by the United Nations Environment

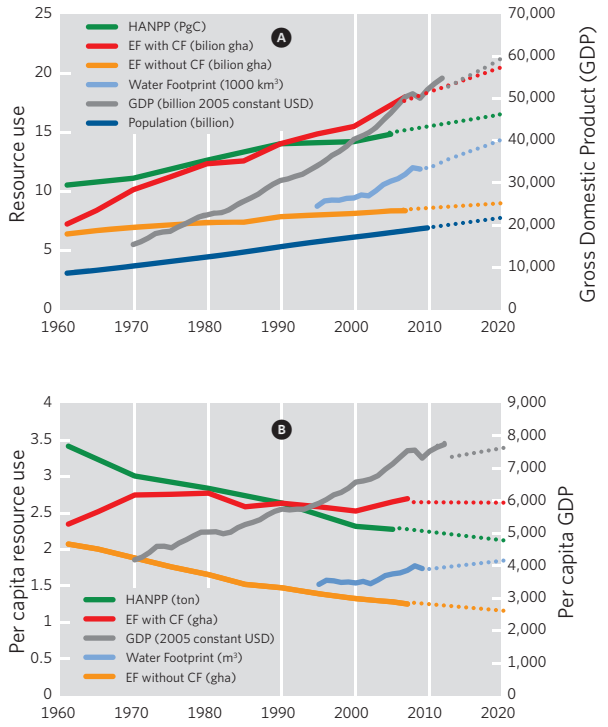


Figure 4.1. These graphs demonstrate that all indicators of resource use are rising in absolute terms, even though the intensity of resource use in most cases is decreasing (i.e. efficiency is improving), measured both in terms of resources per person and resources per dollar of the economy. However use of water is increasing both in absolute terms and in intensity. Key: A Extrapolations of currents trends of population, Gross Domestic Product (GDP), Ecological Footprint (with and without the Carbon Footprint component), Water Footprint and Human Appropriation of Net Primary Production; B per capita extrapolations of current trends of GDP (secondary axis), Ecological Footprint (with and without the Carbon Footprint component), Water Footprint and Human Appropriation of Net Primary Production, C extrapolations of currents trends of intensity resource use of Ecological Footprint (with and without the Carbon Footprint component), Water Footprint and Human Appropriation of Net Primary Production intensities (resource use per unit GDP).[38]

Programme, may help to accelerate progress towards this target.[37] Further about seventy per cent of countries provided information through their fifth national reports on progress towards this target. Generally the actions that have been taken have tended to focus on creating enabling environments to facilitate sustainable production. Some of the different types of action taken include the development of laws related to environmental impact assessment (Mongolia), the development of "green fees" related to tourism (Palau), and the formulation of guidelines for different sectors (Belgium, Japan, South Africa, Uganda). Few countries refer to progress or actions related to keeping the impacts of the use of natural resources within safe ecological limits or on issues associated with consumption.

GBO-4 can report progress towards part of this target as steps are being taken in many areas to implement plans for more sustainable production and consumption (see for example Box 4.2 and certification schemes under Target 7), although not on a scale that would achieve this element of the target by 2020. There is, however, ample evidence that we are currently moving in the wrong direction regarding the objective of keeping the impacts of natural resource use within safe ecological limits, especially with regard to water use.

Box 4.1. Cities and Biodiversity

Subnational governments have a great potential to influence the implementation of the Convention on Biological Diversity (CBD). Since 2007 the majority of the world's population has lived in cities[43] and urban people are responsible for about three quarters of the world's consumption of resources[44] .The 'top 600' cities alone account for more than half of global GDP, and their dominance of global production is predicted to increase.[45] The global urban population as a whole is due to increase from 3.5 billion urban dwellers worldwide in 2010, to 6.3 billion in 2050[46]. The urban infrastructure required for this unprecedented increase is more than double the world's current infrastructure and, in order for this to be accomplished, we will need to build as much infrastructure as we have built over the past 4,000 years.[47] Given this a growing number of organizations, governments and other institutions are recognizing that the mode of urbanization will determine the sustainability of not only cities but the planet as a whole.[48]

With these formidable challenges to sustainability and biodiversity, come opportunities. Cities have the vast majority of wealth, knowledge institutions, communication networks, and direct contact with people. These factors allow city governments to affect rapid change. Environmental impact assessments and similar studies by local governments can often generate high-resolution data, often in places where biodiversity loss is most severe. Some subnational governments, such as the State and City of São Paulo in Brazil have quantified their ecological footprint in order to determine their local effect on the global environment and identify ways to reduce it.[49]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 4, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Strengthening partnerships among companies and industry associations, civil society and government agencies, in an accountable and transparent manner, to promote sustainable practices that address biodiversity

- Developing incentives, regulations and guidelines to encourage business development in sustainable production and consumption (*Target 3*)[39]

- Promoting action on the demand side by raising awareness about environmental impacts (Target 1)[40]

- Encouraging companies and local authorities to calculate and disclose their environmental and biodiversity-related externalities (footprints) to enable them to identify priorities for reducing impacts

- Establishing government sustainable procurement policies that are in line with the objectives of the CBD

- Developing sector specific sustainable production and consumption plans (*Targets 6 and 7*)[41]

- Gathering more data and establishing harmonized indicators to measure effectiveness and track progress of policies on sustainable consumption and production (Target 19)[42]

- Promoting the inclusion of conservation and sustainable use in corporate sustainability plans

Box 4.2. The European Union's Sustainable Timber Action programme

Starting in March 2013 the EU Timber Regulation (EUTR) makes it unlawful in the EU to import timber harvested illegally anywhere in the world. The goal of the Sustainable Timber Action (STA) programme is to use public procurement to increase awareness in Europe about the human and environmental issues caused by deforestation and forest degradation in developing countries, and about the impact of unsustainable consumption and production of forest products on climate change, biodiversity and people dependent on forests. STA has developed a toolkit for sustainable timber procurement, and has enabled the establishment of the European Sustainable Tropical Timber Coalition, a coalition of European local governments who aim to use public procurement to boost the market for sustainable tropical timber.[50]

Strategic Goal B

Reduce the direct pressures on biodiversity and promote sustainable use.

TARGETS

It is only possible to reduce or halt the loss of biodiversity if the drivers and pressures on biodiversity are themselves reduced or eliminated. GBO-4 is able to report only limited progress towards targets aimed at reducing the direct pressures on biodiversity. In some tropical regions there has been significant success in reducing previously high rates of deforestation, but habitats around the world continue to be destroyed, degraded and fragmented. Overfishing remains a major threat to marine ecosystems, although an increasing number of fisheries especially in developed countries are moving towards more sustainable management. Successes in limiting pollution from excessive use of nutrients in some regions are currently outweighed by rising nutrient pollution in parts of the developing world. Important progress has been made in identifying invasive alien species and the pathways by which they are spread, but this has not so far had an impact in reducing the actual number of invasions. The one target within this goal with a deadline set at 2015, reducing multiple pressures on coral reefs, is certain to be missed.

TARGET 5

Habitat loss halved or reduced

By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.

Why this target is important

The destruction and degradation of natural habitats represents the single most important driver of biodiversity loss.[51] Economic, demographic and social pressures are likely to lead to continued conversion of habitats, but reducing the rate of that loss is critical to implementing the Strategic Plan. Preventing further fragmentation of habitats is also essential to avoid species populations becoming isolated and to enable essential movements across landscapes and aquatic environments. This is especially important in the face of climate change.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
The rate of loss of forests is at least halved and where feasible brought close to zero	★★☆ T 3
The loss of all habitats is at least halved and where feasible brought close to zero	★★☆ T 2
Degradation and fragmentation are significantly reduced	★★☆ T 1

Recent trends, current status and future projections

Globally rates of deforestation are declining but are still alarmingly high. The loss of forest habitats in some regions, for example the Brazilian Amazon, has significantly slowed in recent years, through a combination of policies targeting multiple drivers of deforestation (see Box 5.1). Significant gain in forest area has been reported in some areas, with especially high rates of gain in China and Vietnam.[52] However, deforestation in many other tropical areas of the world is still increasing.[53] Deforestation in Southeast Asia is mainly attributed to large-scale agro-industry, especially oil palm plantations, while in other areas increased demand for land for local food production is a major driver.[54]

While data is scarce for other terrestrial habitats, grasslands and savannas continue to witness large-scale conversion to intensive agricultural and other uses.[55] While no globally-agreed measure exists for the extent of coastal and freshwater wetlands, the majority of relevant studies suggest high rates of decline for global wetland area.[56] The total area of land remaining in natural or semi-natural conditions has shown a downward trend in recent decades and would decline further by 2020 if recent trends continue.[57] Coastal habitats such as mangroves continue to be lost through activities such as aquaculture, land reclamation and urban development, but global trends are difficult to discern due to variable data.[58]

Habitats of all types, including forests, grasslands, wetlands and river systems, continue to be fragmented and degraded (see Figure 5.1).[59] While data on habitat degradation are not available on a global scale, populations of wild birds specializing in habitats such as grasslands and forests in North America and Europe show a decline of around one fifth since 1980, an indicator of long-term degradation.[60] Extrapolations based on current trends suggest this decline will continue but that the rate will slow by 2020.[61] While there is a trend towards removing small dams in some industrialized countries, rates of new large dam construction are increasing rapidly in South America, Asia and Africa, threatening further fragmentation of freshwater habitats.[62]

Most countries have set national targets relating to habitat loss, although few specify the scale of reduction being sought. About sixty per cent of the national reports analysed for GBO-4 suggest that progress is being made on reducing loss of habitats. Less information is available regarding national action to reduce fragmentation and degradation.[63]

Overall, while GBO-4 can report limited progress towards this target with respect to tropical forests in some regions, indicators suggest a highly variable picture in different parts of the world and among different biomes, with data still scarce for many types of ecosystems.

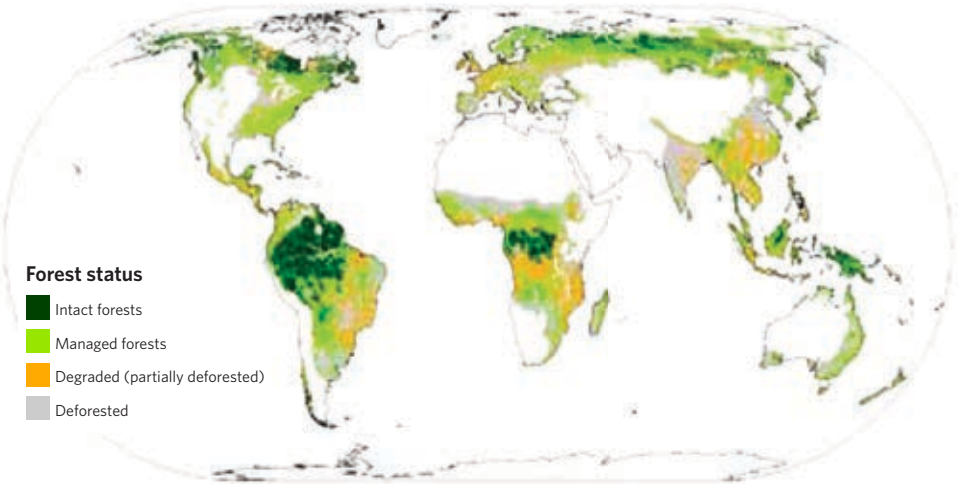


Figure 5.1. The extent of deforestation and forest degradation worldwide[69]. Intact forests refers to unbroken expanses of natural ecosystems greater than 50,000 hectares. Managed forests refer to forest that is fragmented by roads and/or managed for wood production. Degraded or partially deforested refers to landscapes where there has been a significant decrease in tree canopy density. Deforested refers to previously forested landscapes which have been converted into non-forest.

Box 5.1. Pathways for reductions in habitat loss

Between the end of the 20th century and 2004 the Brazilian Amazon and Atlantic Forest had very high and rapidly rising deforestation rates. However with the use of a broad range of actions, corresponding to the Aichi Biodiversity Targets and Strategic Goals, deforestation rates have been greatly reduced (see Figure 5.2).

The rapid decline in deforestation in the Brazilian Amazon is the result of a wide range of interrelated public and private policy initiatives, coordinated through the Action Plan for the Prevention and Control of Deforestation in the Amazon launched in 2004.[71] The action plan was a cross-ministry initiative, coordinated by the President's office. It includes a range of activities that relate to a number of Aichi Biodiversity Targets across all of the Strategic Goals, as indicated in the list below:

- Monitoring of land-cover (*Target 19*), both near real time coarse resolution and annual high resolution satellite monitoring. The information generated through this monitoring was made publicly available
- Enforcement campaigns by Brazil's environmental agency to crack down on illegal deforestation and logging, with interventions informed by near-real time monitoring. Businesses and stakeholders have also implemented plans to reduce deforestation to within safe limits.
- Incentive measures (*Target 3*), including restricting credit for rural landowners with the highest rates of deforestation.
- Expansion of protected areas and demarcation of indigenous lands[72,73] (*Targets 11, 18*). Approximately 40% of natural vegetation is legally protected by parks and indigenous reserves. From 2002 to 2009, the Brazilian Amazon Protected Area network expanded by 60%; a large part of these new areas were created in regions of intense land conflict to act as green barriers against deforestation, establishing a new protected area paradigm.[74]

In addition, as people have become more aware of the values of biodiversity (*Target 1*), NGO and business initiatives have implemented moratoria on soya and meat produced on recently-cleared land. Public prosecutors have also acted to require the industry to exclude deforesters from their supply chains (*Target 4*).

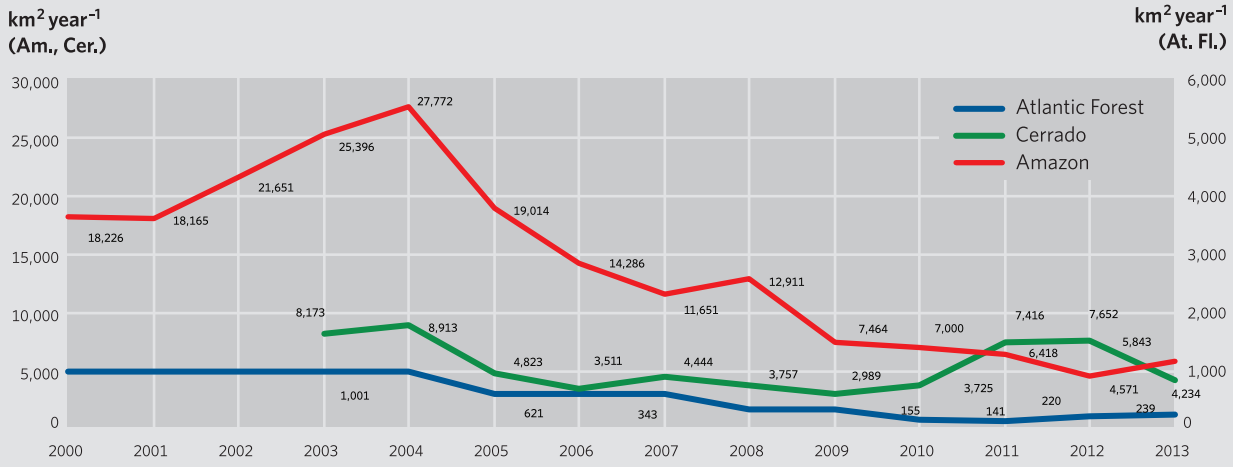


Figure 5.2. Deforestation trajectories in Brazil's major biomes. Recent efforts have reduced Amazon deforestation in 2013 by 70% below the historical 1996–2005 baseline of 19,600 km² per year. Deforestation in the Cerrado has remained high. Deforestation has steadily declined in the Atlantic Forest despite a slight increase in 2013.[70]

Action to control deforestation, and also to require restoration, takes place in the framework of the Law of Native Vegetation Protection (LNVP)—previously known as Brazil's Forest Code—which requires the maintenance of sensitive areas such as riversides, hilltops and slopes as well as a certain proportion of private property under native vegetation.

By combining these different approaches the government of Brazil was able to address both the underlying and direct causes of habitat loss and bring about positive change. However despite the progress that has been made in reducing deforestation in the Brazilian Amazon and Atlantic Forest, challenges remain including balancing competing demands for expanding agricultural production and enforcing forest conservation. This is particularly the case for the Cerrado biome where, unlike the Amazon and Atlantic forests, deforestation rates remain high.[75] Conversion of Cerrado vegetation has occurred in over 50% of the biome and continues at a rate of 5000 km^2 per year (average for 2003–2013).[76] However, it has been shown that projected increases in agricultural production in Brazil could be easily accommodated within the existing area devoted to crops and pasturelands with plausible increases in the productivity of those lands, while also allowing for forest restoration.[77]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 5, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Identifying at the national level the direct and indirect causes of habitat loss with the greatest impact on biodiversity, to inform policies and measures to reduce loss

- Developing a clear legal or policy framework for land use or spatial planning that reflects national biodiversity objectives (*Target 2*)

- Aligning existing incentives to national objectives for land use and spatial planning, and, the use of further incentives to reduce habitat loss, degradation and fragmentation, including as appropriate, payments for ecosystem services and REDD+ mechanisms (*Target 3*)[64]

- Facilitating a sustainable increase or intensification in the productivity of existing agricultural land and rangeland, within a land use or spatial planning framework, combined with more moderate meat consumption and reduced waste from food systems, with a view to reducing the demand for conversion of natural habitats (*Target 7*)[65]

- Engaging with and supporting indigenous and local communities, landowners, other stakeholders and the general public in activities to conserve biodiversity, to reduce illegal and unplanned land use change to prevent access to products produced from illegally sourced commodities and illegally cleared land, including by addressing issues related to commodity supply chains (*Targets 1, 4 & 18*)[66]

- Developing effectively-managed protected area networks and other area based conservation measures, identified as being among the most effective instruments for conserving forests and other habitats (*Target 11*)[67]

- Monitoring land use and land-cover, including, where possible, near-real-time monitoring to inform enforcement actions, as well as regular comprehensive assessments of land use and land-cover change (*Target 19*)

- Implementing law enforcement activities for relevant laws and regulations relating to habitat protection and conservation[68]

TARGET 6

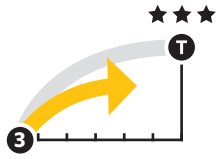
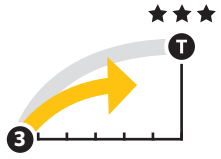
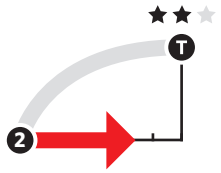
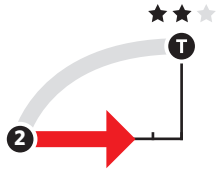
Sustainable management of aquatic living resources

By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.

Why this target is important

Overexploitation of fish and other marine and inland water organisms is a significant pressure on biodiversity. Unsustainable harvesting threatens not just marine and inland water biodiversity, but the profitability of fishing businesses around the world and the livelihoods of millions dependent on the resources of the ocean and inland waters. Finding and applying management approaches that avoid unsustainable fishing practices and that enable stocks to recover are therefore essential elements in a strategy to conserve and sustainably use biodiversity.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
All fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches	
Recovery plans and measures are in place for all depleted species	
Fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems	
The impacts of fisheries on stocks, species and ecosystems are within safe ecological limits, i.e. overfishing avoided	

Recent trends, current status and future projections

Globally there is relatively little information on the management and harvest of aquatic invertebrates and plants, and there is little globally-consistent information on inland water fisheries. For these reasons, this assessment focuses mostly on marine fisheries.

Overfishing continues to be a major problem, with around 30% of fish stocks defined as overfished. FAO figures show a small improvement for 2011 (28.8 per cent "overfished") compared to 2008 (32.5 per cent "overfished") (see Figure 6.1).[78] However, recent decades show an overall declining trend for fisheries within biologically sustainable levels (see figures 6.1 and 6.2).

While recent studies provide a range of estimates on the status and trends of global marine fisheries, the overall conclusions are broadly similar. For instance, Worm et al. (2009) showed that 63% of 166 assessed fish stocks (the majority of which were well managed, developed country fisheries) have lower biomass levels than required to obtain maximum sustainable yield (MSY).[79] However, these assessed stocks were found to have the potential to recover where low exploitation rates were maintained, although rebuilding had not yet led to overall biomass recovery, nor reversed the general trend of increasing depletion of many individual stocks. Branch et al. (2011) reported that 28–33% of assessed stocks are overexploited, including 7–13% which are collapsed. They also reported that the proportion of fished stocks that are overexploited or collapsed has remained stable in recent years, and that rebuilding efforts for these fisheries have reduced exploitation rates.[80] In a recent study of over 1793 previously unassessed fisheries, Costello et al. (2012) found that 64% of these fisheries had lower stock biomass than required to support MSY, including 18% that were collapsed. While all the stocks studied were on a declining trend, 64% of them could potentially increase sustainable harvest if they were rebuilt.[81]

Persistent overfishing has a severe impact on marine biodiversity, driving the collapse and local extinction of several species, and reducing the total biomass of predator fish species by more than half (52 per cent) between 1970 and 2000.[82] Destructive fishing practices such as dynamite fishing and bottom trawling in vulnerable habitats, continue to cause damage to coral reefs, seagrasses, cold water corals and sponge grounds.[83] Unselective gear results in the capture of large quantities of non-targeted species (bycatch), estimated at some 40% of total global catch, and including over 600,000 marine mammals and 85,000 turtles a year, with serious consequences for the conservation of some species including seabirds.[84]

On the positive side, in some regions where exploitation rates have been significantly reduced, depleted stocks have rebounded, as in the case of the Northeast Atlantic (see Box 6.1, Figure 6.4). There has also been a marked trend towards

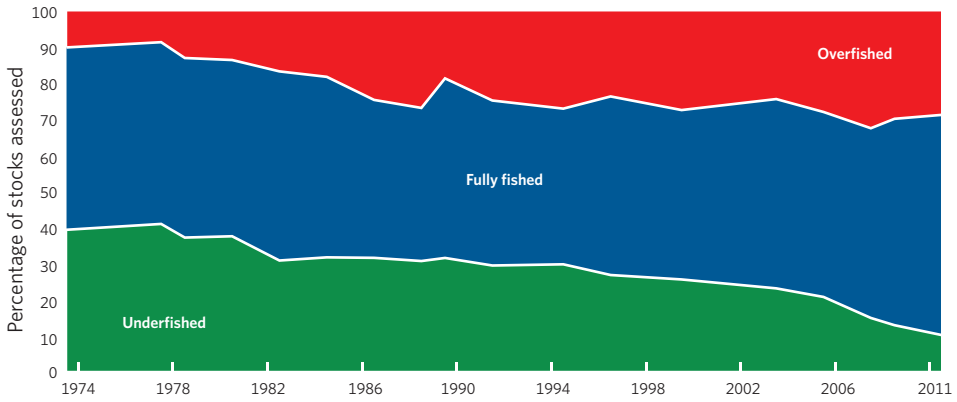


Figure 6.1: Global trends in the state of world marine fish stocks between 1974 and 2011.[94]

certification of sustainably-managed fisheries. The number of fisheries certified by the Marine Stewardship Council (MSC) increased by more than 400 per cent from 2008–13, now accounting for some 9% of wild fisheries.[85] However, MSC-certified fisheries are concentrated in developed countries (see Figure 6.3).

Management systems such as Individual Transferable Quotas (ITQ) that give fishing businesses a stake in the long-term health of fish stocks, can be effective in improving catch trends, but they need to be designed carefully to avoid unwanted socio-economic impacts.[86] Co-management of fisheries involving local communities help to give legitimacy to fishery regulations, especially in small-scale fisheries in developing countries, and can lead to successful outcomes (see Box 6.2).

There has been some progress at the global level in the past decade in terms of establishing global policies and setting out guidance for improved fisheries, although there is relatively little comprehensive information on the implementation of these measures. For example UN General Assembly Resolutions 61/105 and 64/72 oblige countries that fish on the high seas to take specific measures to avoid significant adverse impacts on vulnerable marine ecosystems.[87,88] Guidelines for sustainable fisheries include the FAO Code of Conduct on Responsible Fishing and the FAO International Guidelines on Bycatch Management and Reduction of Discards[89,90] and the EU Common Fisheries Policy which was recently updated in 2013.[91] Some regional fisheries management organisations have also taken measures to address bycatch and discards, although widespread progress is still lacking in this area.[92]

National action in the form of periodic freshwater fishing bans (China and Mongolia), fisheries management plans (Niue) and sustainable seafood initiatives (South Africa) are among the measures included in the latest reports from CBD Parties. Around sixty per cent of these reports include information suggesting that some progress is being made towards the attainment of this target.[93]

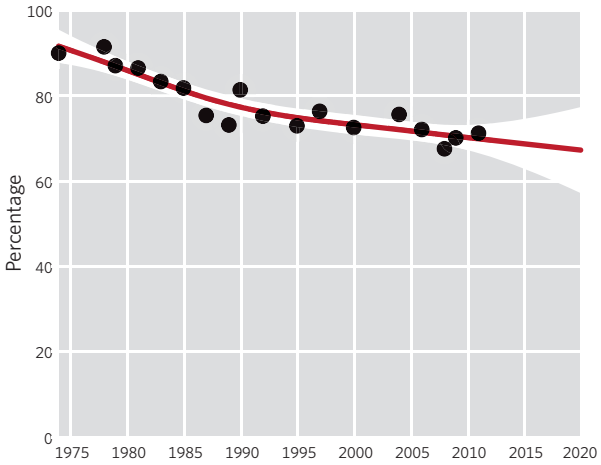


Figure 6.2: Proportion of fish stocks within safe biological limits, based on data from the FAO, with extrapolation to 2020 assuming underlying processes remain constant. The solid line represents the model fit for the period with data and the extrapolation, dots represent data points and the shaded band illustrates the 95% confidence interval.[96]

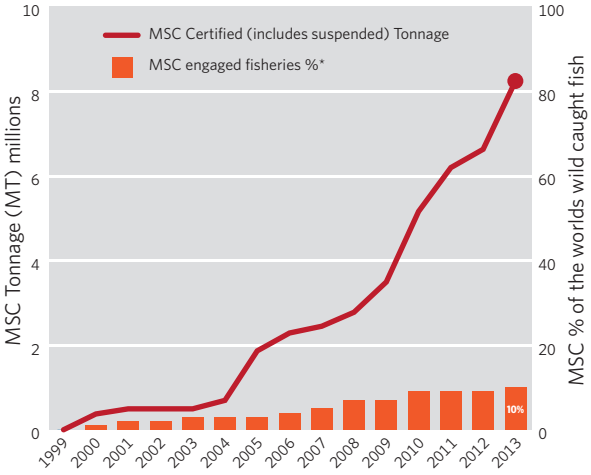


Figure 6.3. Trend in Marine Stewardship Council (MSC) certified fisheries.[100] There has been a substantial increase in the tonnage of certified fish caught and some 10% fisheries are MSC certified.

Overall, based on current trends, the proportion of fish stocks within safe ecological limits is projected to decline slightly at least until 2020 though there is uncertainty around the exact trajectory. Some progress towards sustainable management and stock recovery in some areas is overwhelmed by continuing unsustainable practices in fishing worldwide. Significant changes in policy and practice are therefore required if this target is to be met.

Box 6.1. Moves towards sustainability in North East Atlantic fisheries[97]

From the late 19th Century, the United Kingdom led the development of industrialized fisheries. As a result fisheries around the British Isles were severely overexploited by the late 20th Century. This situation is changing throughout the northeast Atlantic, including around the UK, where the proportion of fish stocks that are being harvested sustainably and are at full reproductive capacity has shown an increasing trend since 1990 (see Figure 6.4). This sustainability indicator reached a maximum in 2011, at 47% of the 15 stocks for which accurate time series data are obtainable from stock assessment reports. Many of these indicator stocks are being fished at or within the rate that will provide long-term maximum sustainable yield (MSY). The benefits of a push towards sustainability can be seen in stocks for which long-term management plans based on the MSY principle have been applied. In the North Sea, for example, haddock, herring and Norway lobster are currently being fished with increased landings and incomes for fishermen and coastal communities. The proportion of fish stocks being harvested sustainably may further increase following reforms to the European Union's Common Fisheries Policy (CFP) which came into effect in January 2014 and introduced a legally binding commitment to fish at sustainable levels, achieving MSY by 2015 where possible, and by 2020 at the latest. These measures may help to buffer the adverse impacts of climate change and promote resilience within the marine ecosystem and fishing communities.

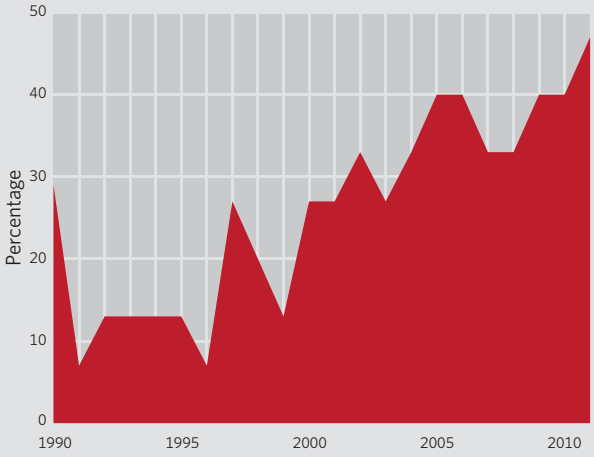


Figure 6.4. The percentage of UK fish stocks harvested sustainably and at full reproductive capacity, 1990 to 2011.[95]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 6, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Promoting and enabling dialogue and enhanced cooperation and information exchange between fishing and conservation communities and the corresponding national agencies and associations;

- Making greater use of innovative fisheries management systems, such as community co-management, that provide fishers and local communities with a greater stake in the long-term health of fish stocks (*Target 18*)

- Eliminating, reforming or phasing out those subsidies which are contributing to excess fishing capacity (*Target 3*)

- Enhancing, in each country, monitoring and enforcement of regulations to prevent illegal, unregulated and unreported fishing by flag-vessels

- Phasing out fishing practices and gear which cause serious adverse impacts to the seafloor or to non-target species (*Targets 5 and 12*)

- Further developing marine protected area networks and other effective area based conservation measures, including the protection of areas particularly important for fisheries, such as spawning grounds, and vulnerable areas (*Targets 10 and 11*)

Box 6.2. Community governance and management of fisheries

Fisheries regulations need to be viewed as legitimate by stakeholders, in order to gain their support and compliance. Devolution of governance to indigenous and local communities, shared governance, and co-management arrangements are a means to attain this legitimacy, and have contributed to successful fisheries management outcomes, especially in small-scale fisheries in developing countries. For example, coastal communities have demonstrated the ability to responsibly steward and manage marine ecosystems through a network of several hundred Locally Managed Marine Areas (LMMAs) in the South Pacific, as have similar initiatives in Madagascar, Kenya, Spain, and Japan, among others.[98] Initiatives such as these can also help to make progress towards a number of Aichi Biodiversity Targets, including Targets 11 and 18.

One specific example of community fisheries management is a community conserved area in the estuary of the Casamance river in Senegal.[99] An association uniting the fishermen of eight villages established an area called Kawawana (an abbreviation of the Djola expression *"Kapooye Wafolal Wata Nanang"* or "our patrimony, for us all to preserve"). The purpose of the area was to improve the quantity and quality of local fish catch. The fishermen demarcated their traditional fishing territory and devised a zoning system, a management plan, a surveillance system and a governing structure—all combining both traditional and modern elements. For instance, surveillance comprises both placing fetishes and patrolling for violators whose boats and gear can be legally seized. With municipal and regional government approval, Kawawana has now been in operation for about five years—on a purely volunteer basis. The results include restored fisheries and biodiversity (e.g. for twenty types of coastal fish, rare humpbacked dolphins and manatees), enhanced solidarity in the villages, and improved local diets and income. The zoning system includes a strict no-take zone coinciding with ancient sacred areas, a sustainable use zone open to everyone fishing with boats without engines; and a sustainable use zone open only to the paddling canoes of local residents.

TARGET 7

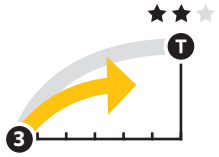
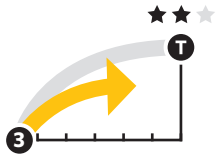
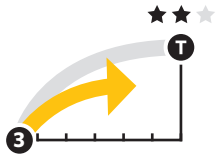
Sustainable agriculture, aquaculture and forestry

By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.

Why this target is important

The increasing demand for food, fibre and fuel is putting ever-greater pressure on our ecosystems and biodiversity. To help ease that pressure the key sectors of agriculture, aquaculture and forestry need to adopt practices that minimize negative impacts, making their activities more sustainable over the long term. There is a need to decouple production from environmental impacts, including through the use of innovation and scientific and technical advances. This target challenges governments and businesses to define sustainable practices, and to adopt them as widely as possible.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Areas under agriculture are managed sustainably, ensuring conservation of biodiversity.	
Areas under aquaculture are managed sustainably, ensuring conservation of biodiversity.	
Areas under forestry are managed sustainably, ensuring conservation of biodiversity.	

Recent trends, current status and future projections

Unsustainable practices in agriculture, aquaculture and forestry continue to be responsible for substantial environmental degradation, including biodiversity loss.[101] This represents a challenge for the global community, with the need to find ways of meeting growing demands for resources while avoiding negative environmental impacts.

In agriculture, impacts of pollution from nutrients used as fertilizer remain high, but appear to be stabilizing in some regions (see Target 8). Indicators of farmland biodiversity, such as the condition of farmland bird populations in Europe, continue to decline, but projections indicate the rate of decline may be slowing (see Figure 7.1).

The area covered by agricultural certification schemes, for example organic and conservation agriculture, is growing, but still covers a small proportion of farmed land (see Figure 7.2).[102] The area of forestry managed sustainably under the criteria of certification schemes continued to increase, but is still very strongly concentrated in temperate and boreal regions (see Figure 7.3).[103]

Aquaculture is expanding rapidly, with large environmental impacts, and a small but growing fraction of this activity is adopting sustainability criteria (see Box 7.1).[104]

While most national biodiversity strategies and action plans examined for GBO-4 included targets or commitments relating to sustainable management of agriculture or forestry, few of these targets were quantitative.[105] Around 60% of the fifth national reports assessed provide information suggesting that some progress is being made towards the achievement of this target. Examples of the actions being taken include increased support for certification programmes (Japan, and Myanmar), the development and support of participatory forest resource management (Nepal) and the promotion of sustainable agricultural practices and organic agriculture (Niue).[106]

Scenario analysis (see Part III) and numerous studies[107] indicate that it is feasible to simultaneously protect biodiversity and achieve food security while also meeting climate mitigation and other socioeconomic objectives.

Overall GBO-4 can report progress in introducing sustainable management to areas under agriculture, aquaculture and forestry, but not to the extent that would achieve this target by 2020 given current trends.

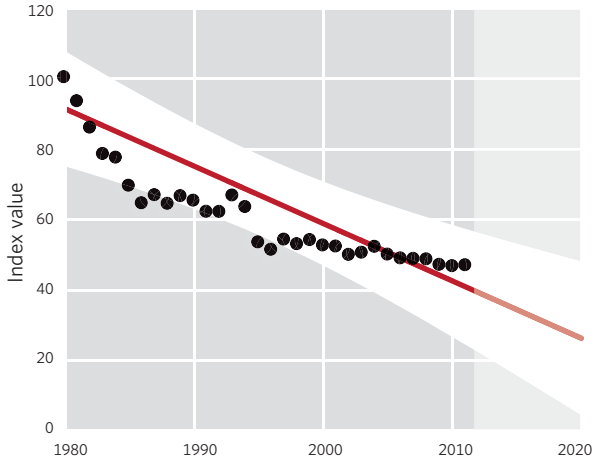


Figure 7.1. Trend in the Wild Bird Index for common farmland birds in Europe, 1980–2011 with statistical extrapolation 2011–2020 assuming underlying pressures remain constant. It suggests a continuing decline in the status of these species populations but the rate of decline may be slowing. The solid line represents the model fit for the period with data and the extrapolation, dots represent data points and the shaded band illustrates the 95% confidence interval.[108]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 7, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Making agriculture more efficient, including through improved targeting and efficiency of fertilizer, pesticide and water use (*Target* 8), and through the use of diverse and well-adapted crop varieties (*Target 13*) and the greater use and rehabilitation of ecological processes at the landscape level to replace chemical inputs and reduce water consumption ("ecological intensification") *(Targets 5, 14 and 15)*

- Reducing waste at all stages of production and consumption, including reducing post harvest losses and minimizing food waste (*Target 4*)[112]

- Promoting sustainable diets, with appropriate caloric and nutrient intake, for example through the promotion of sustainable food cultures (*Target 4*)

- Making greater use of existing certification schemes for sustainably produced goods and the further development of certification schemes to fill current gaps[113]

- Supporting customary sustainable use, for example through education, and, where appropriate, delegating governance and responsibility for land management to indigenous and local communities (*Target 18*)

- Enhancing the understanding of local farmers and fishers of the status of biodiversity and ecosystems they rely on for their agricultural production, and engaging them in the planning process (*Target 1*)

- Promoting integrated landscape-level planning, taking into account the role of biodiversity in providing ecosystem services, including services that contribute to agricultural production such as pollination, pest control, water provision and erosion control (*Targets 5 and 14*)

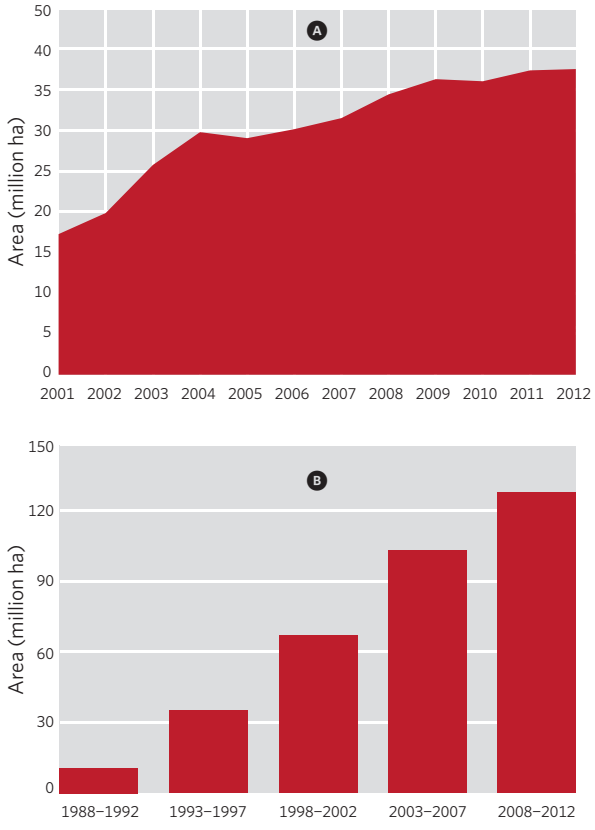


Figure 7.2. Area of agricultural land under A organic production[109] and B conservation agriculture.[110]

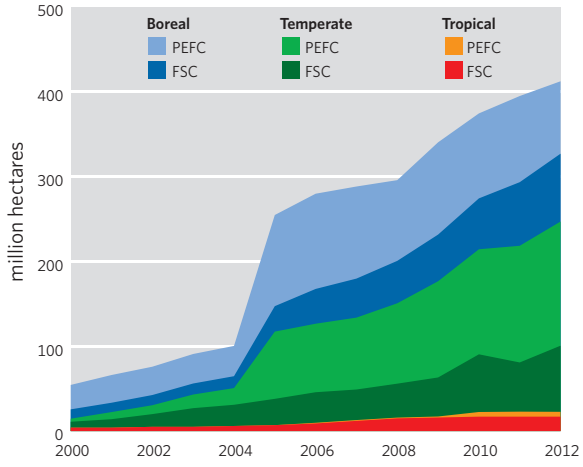


Figure 7.3. Total area of forestry under the Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) schemes in boreal, temperate and tropical regions.[111]

Box 7.1. Minimising negative impacts from aquaculture[114]

Aquaculture, the farming of fish and other aquatic species, is forecast to account for an increasing proportion of food production in coming decades. Following sustainability guidelines can significantly reduce its negative impacts on biodiversity, including:

- Giving priority to farming native species, so as to avoid possible to invasions of native habitats by escaped alien species, and species lower down the food chain (e.g. herbivorous fish rather than carnivores). This can be achieved through a combination of regulations and promoting changes in consumer preferences
- Minimizing pollution by improving management practices, for example by reducing overfeeding
- Adopting practices such as 'multitrophic aquaculture' in which seaweed can be produced for human food, fish feed and pharmaceuticals, reducing feed demand and pollution
- Using waste from one species to be converted to protein by another species, thereby reducing nutrient pollution
- Adopting enclosed systems and better waste treatment, also reducing pollution
- Minimizing the modification of habitats, especially in mangroves, maintaining ecosystem services and preserving nursery habitat for many commercially-important wild marine species

TARGET 8

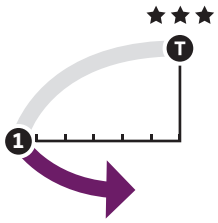
Pollution reduced

By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.

Why this target is important

Pollution, in particular the accumulation of reactive nitrogen and phosphorus nutrients in the environment, is among the most significant causes of biodiversity loss and of damage to the ecosystems on which we depend. Wetland, coastal, marine and dryland areas are especially vulnerable, through a range of impacts including the creation of marine 'dead zones' as algae build up, die and decompose and in the process deprive large areas of oxygen. The target encourages decision makers to take the necessary actions to minimize the release of these and other pollutants.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Pollutants (of all types) have been brought to levels that are not detrimental to ecosystem function and biodiversity.	*No clear evaluation—highly variable between pollutants*
Pollution from excess nutrients has been brought to levels that are not detrimental to ecosystem function and biodiversity.	

Recent trends, current status and future projections

Nitrogen and phosphorus pollution continues to pose a very significant threat to biodiversity and ecosystem services globally.[115] Measures taken in some regions to limit release of nutrients to the environment have caused a stabilization of nutrient pollution, especially in Europe and North America, but at levels that are still detrimental to biodiversity (see box 8.1). Globally, the surplus of nitrogen and phosphorus in the environment is projected to continue rising beyond 2020, with growth concentrated in Asia, South and Central America, and sub-Saharan Africa (see Figures 8.1 and 8.2).[116]

Some toxic contaminants of wildlife are declining in part due to successful international action to restrict their use, but other existing and newly-developed contaminants are still widely used (see box 8.2).[117] Other pollutants of continuing or growing concern include plastics, in particular their impacts on marine ecosystems,[118] heavy metals, endocrine disrupters[119] and pesticides, which have been implicated by some studies in damage to pollinating insect and bird populations.[120]

Overall, damage from marine oil spills has declined, due to better tanker design and improved navigation, but pollution from pipelines, mainly land-based, has increased due to ageing infrastructure.[121]

More than sixty per cent of the national reports analysed for GBO-4 indicate that countries are making progress towards achieving this target, with measures including reduction in the use of pesticides (Belgium), phasing out the use of some harmful products (Mongolia) and putting pollution monitoring systems in place (Myanmar).[122] However, the overall evaluation is that current trends are moving us further away from the target of bringing excess nutrients to levels not detrimental to ecosystem function and biodiversity. It was not possible to evaluate overall trends regarding other forms of pollutants, due to limited information.

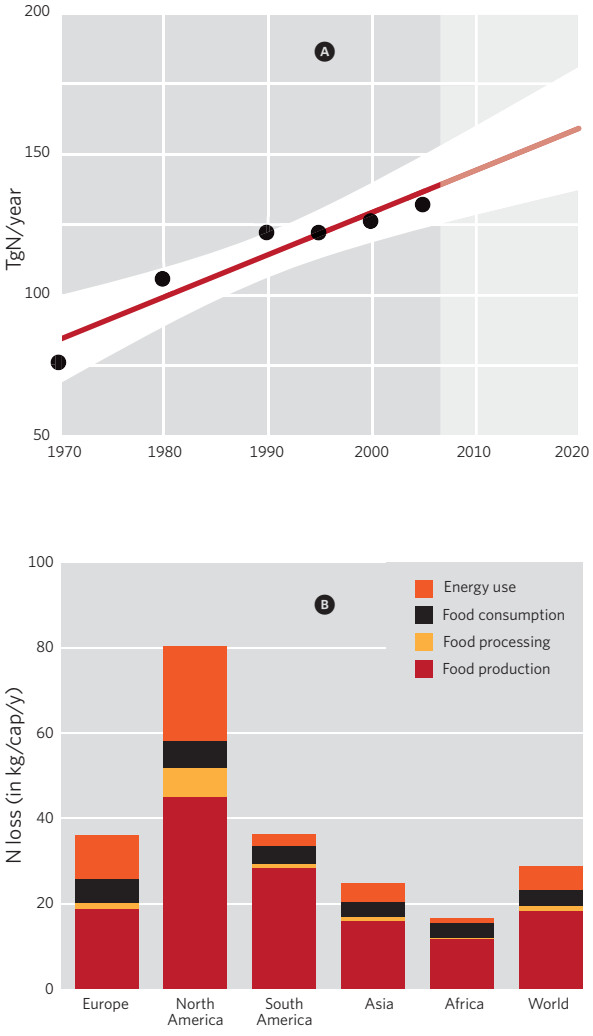


Figure 8.1. A The global surplus of nitrogen in the environment, since 1970 and with statistical extrapolations from 2010–2020, assuming underlying processes remain constant. The solid line represents the model fit for the period with data and the extrapolation, dots represent data points and the shaded band illustrates the 95% confidence interval and B The average loss of reactive nitrogen to the environment per capita per continent[124]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 8, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Developing and enforcing national water and air quality guidelines and/or concentration thresholds for different pollutants, for example by reducing the level of emissions per unit of combustion[125]

- Improving nutrient use efficiency to reduce losses to the environment, for example through coupling livestock and crop systems and minimizing emissions from animal housing and feedlots (*Target 7*)[126]

- Eliminating phosphates from detergents to reduce nutrient loss to water bodies[127]

- Enhancing treatment and recycling of sewage and industrial waste water[128]

- Conserving and restoring wetlands and other ecosystems which play an essential role in nutrient cycling, to reduce nutrient losses to the environment (*Targets 5,11, 14 and 15*)[129]

- Promoting the reuse and recycling of plastics and the use of biodegradable alternatives to reduce marine debris

Box 8.1. European nitrogen legislation

The European Union's legislation to reduce nitrogen (N) loading consists of actions to reduce atmospheric deposition and leaching of nutrients into the aquatic environment. The three most important pieces of EU legislation for reducing nitrogen loading to ecosystems are:

- The Nitrates Directive which caps the total application of N from animal manures to 170 kg N/ha and restricts application of manure and inorganic fertilizer in situations with high risk of N loss.

- The National Emissions Ceilings Directive (NECD) which caps emissions of ammonia and nitric oxide at national levels to reduce acidification and eutrophication. This directive also defines best management practices to reduce ammonia losses.

- The Urban Waste Water Treatment Directive which sets targets for efficient removal of nitrogen.

Due to these and other regulations, ammonia emissions in the European Union declined 30% between 1980 and 2011. On average, the gross nitrogen balance (an indicator of losses to the environment) decreased by 36 per cent between 1980 and 2005. Emissions reduction effects of the NECD and Nitrates Directive after the year 2000 were small. However, individual EU member states including Denmark, Belgium and the Netherlands with strict national nitrate and ammonia policies achieved higher reduction of ecosystem loadings. Nevertheless, levels generally remain well above those that cause ecological damage and total nitrogen loads to EU rivers have remained relatively high and stable since 1990, despite substantial improvements for some rivers such as the Rhine. [130]

Box 8.2. Pollutants in Arctic biodiversity

International agreements on toxic substances have made significant contributions to some pollutant reductions, as certain legacy chemicals have diminished in some Arctic wildlife populations. The Stockholm Convention on Persistent Organic Pollutants is often credited as a driving force behind lower levels of legacy persistent organic pollutants (POPs) in species. However levels can still remain high enough in some species, such as polar bear and some seabirds, to affect wildlife and human health.

Continued use of existing pollutants and emerging pollutants pose complex problems for species in the Arctic, an area of the world where ocean and atmospheric currents result in a high deposit and accumulation of substances. A variety of recently emerging, but poorly studied, contaminants, such as polybrominated diphenyl ethers (PBDEs), are increasing. In addition, mercury concentrations are increasing in parts of the Arctic, including areas in Canada and Greenland, and remain a concern, especially for top predator species. Further complicating the issue is the unpredictable interaction between contaminants and climate change, and the largely unknown sensitivities of Arctic species to contaminants.[131]

TARGET

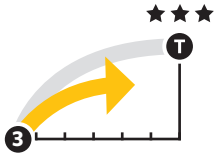
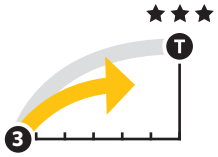
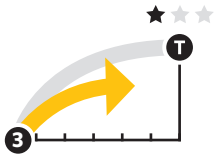
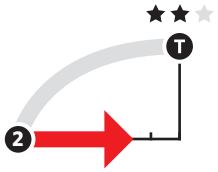
Invasive alien species prevented and controlled

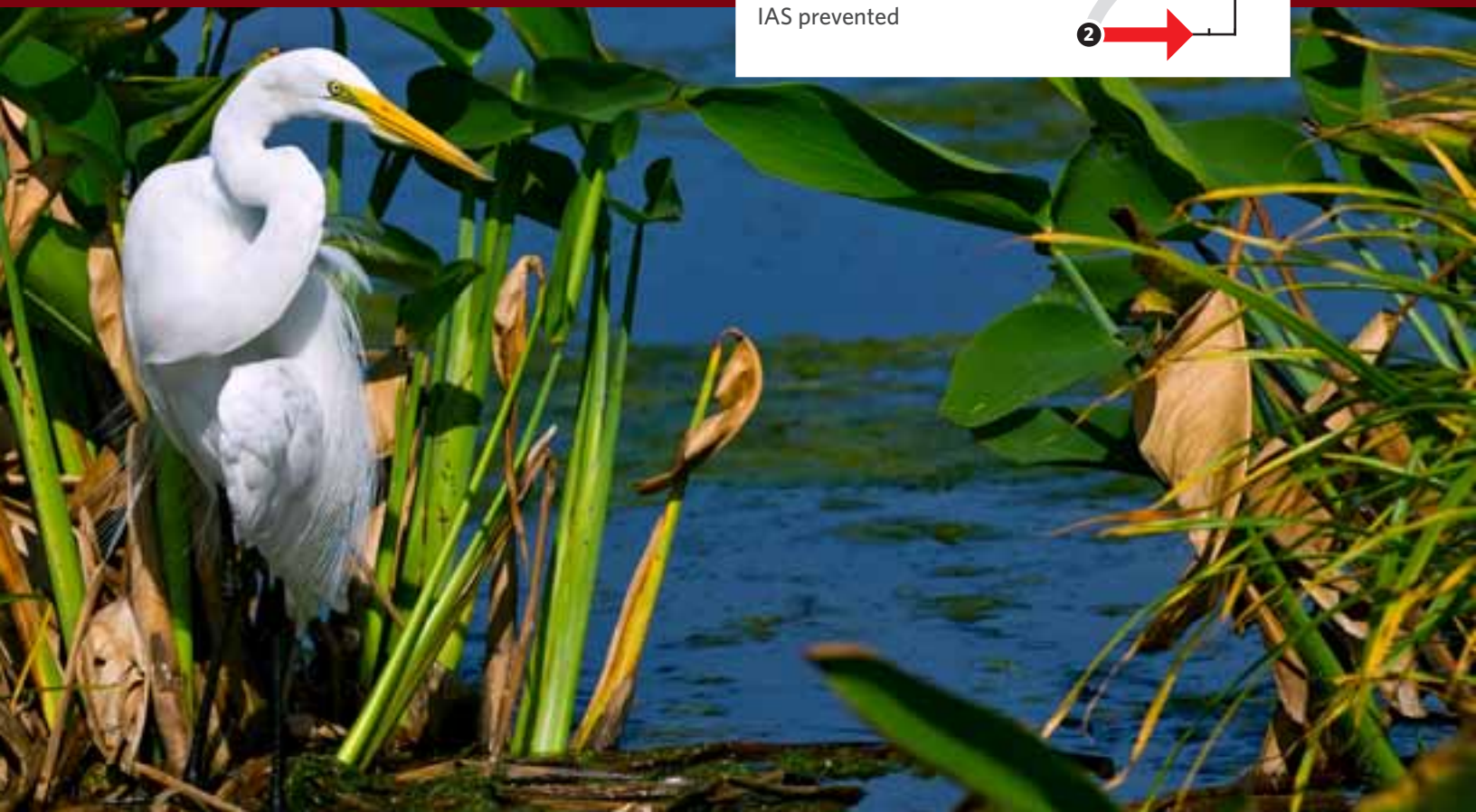
By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment.

Why this target is important

The movement of animals, plants and other organisms around the planet represents one of the greatest threats to biodiversity. Species introduced into new environments, whether deliberately or accidentally, have contributed to more than half of the animal extinctions for which the cause is known.[132] Species invasions also carry enormous economic costs.[133] Through this target, governments aim to reduce these costs to society and to biodiversity, by addressing prevention, control and eradication of invasive alien species.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Invasive alien species identified and prioritized	
Pathways identified and prioritized	
Priority species controlled or eradicated	
Introduction and establishment of IAS prevented	



Recent trends, current status and future projections

The number of invasive alien species continues to increase globally as do their impacts on biodiversity (see Figure 9.1). However, where undertaken, measures to combat invasive alien species have often had striking success, for example in New Zealand where policies are starting to turn the tide against centuries of species invasions (see Box 9.1). Eradication programmes for invasive vertebrates on islands globally have been especially successful, with 87 per cent of such campaigns achieving their objective. On the other hand, very few programmes to eradicate invasive species from mainland areas have succeeded.[134]

Progress has been made in identifying the pathways through which both terrestrial and aquatic species enter alien environments and become invasive (See Figure 9.2).[135,136] However, weak border controls in many countries prevent this knowledge from being acted upon.

Governments are increasingly taking steps to prevent, control and eradicate alien species invasions. More than half (55 per cent) of the Parties to the CBD currently have national policies relevant to tackling this major threat to biodiversity.[137] Around 60 per cent of the national reports assessed for this Outlook suggest that progress is being made towards this target. Among the actions that have been taken are efforts to eradicate various invasive alien species, such as water hyacinth (Rwanda) and mongoose (Japan), the development of black lists (Belgium and Norway) and the collection of information on invasive alien speices (Iraq). Generally the reports suggest that actions tend to be concentrated on control and eradication, with relatively few examples of actions to identify, prioritize and manage the pathways of introduction.[138]

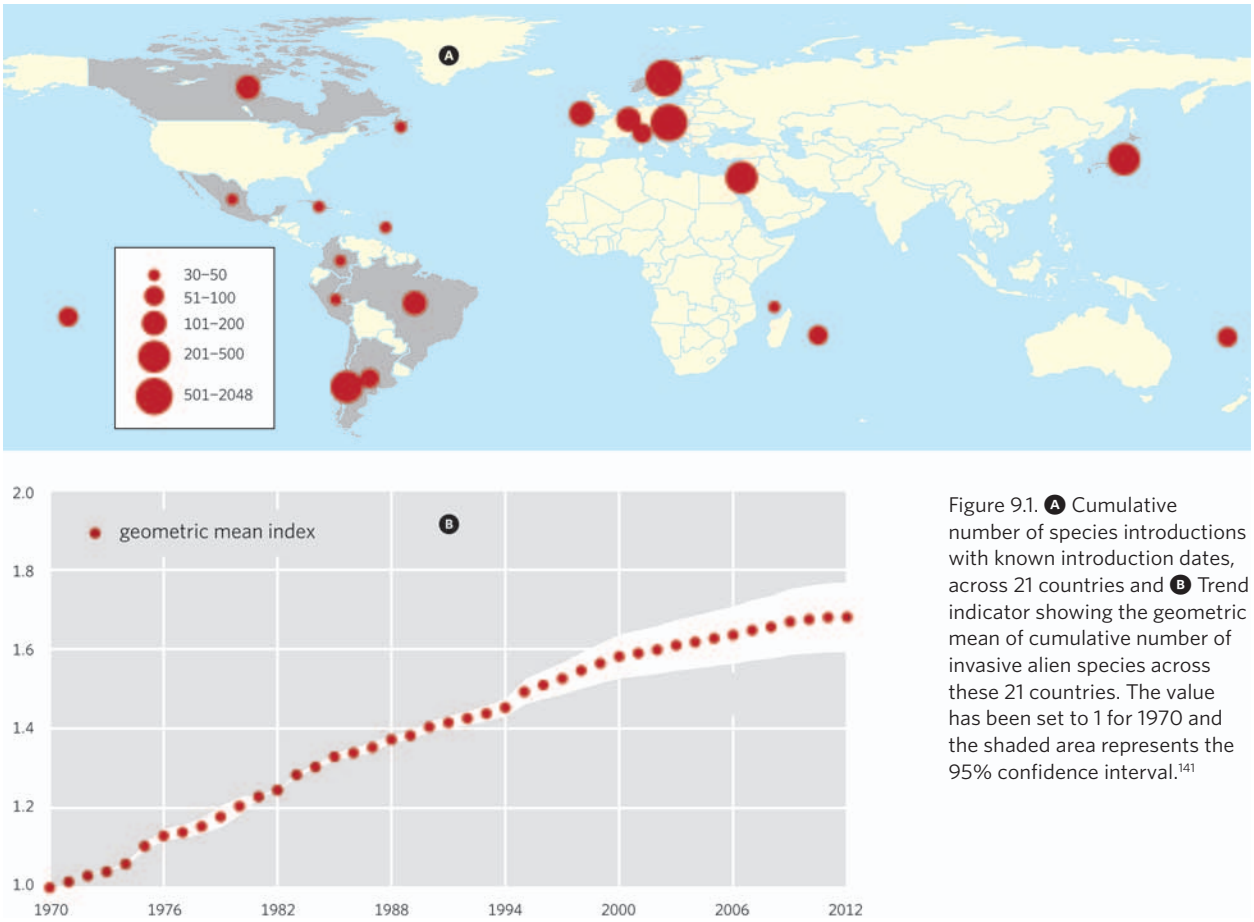


Figure 9.1. A Cumulative number of species introductions with known introduction dates, across 21 countries and B Trend indicator showing the geometric mean of cumulative number of invasive alien species across these 21 countries. The value has been set to 1 for 1970 and the shaded area represents the 95% confidence interval.[141]

Cost-effective strategies are starting to be implemented to prioritize control and eradication of invasive alien species. Nevertheless, the efforts taken so far are still overwhelmed by the global rate of alien species introductions, which shows no sign of slowing.[139] Longer-term, climate change is likely to have a significant impact on the distribution of invasive alien species in different regions (See Figure 9.3).[140]

Overall, there has been some progress towards achieving Target 9 but additional actions are required if it is to be met by the 2020 deadline.

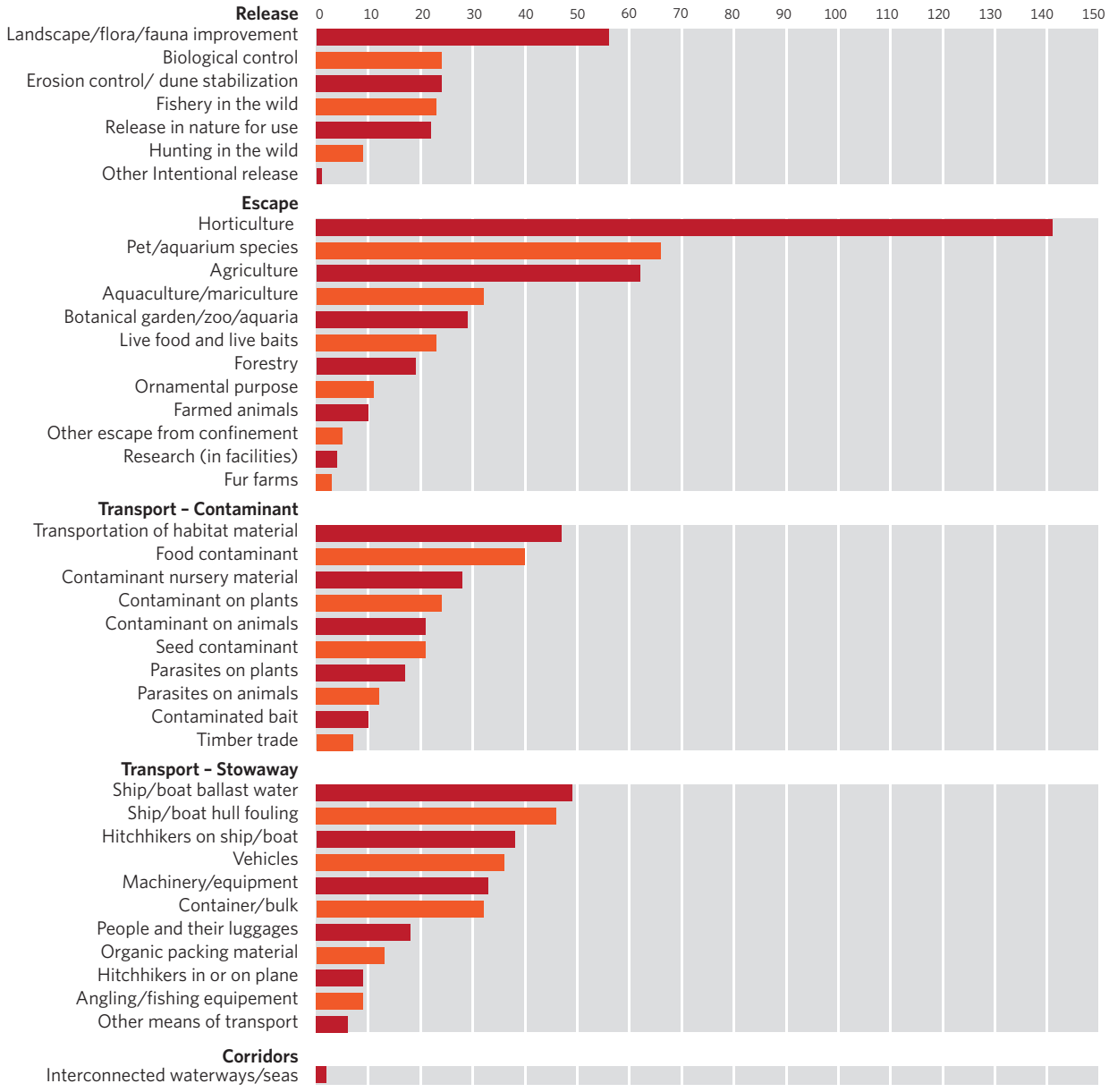


Figure 9.2. Frequencies of introduction pathways of known cases of introduction of over 500 invasive alien species profiled in the Global Invasive Species Database (GISD).[142]

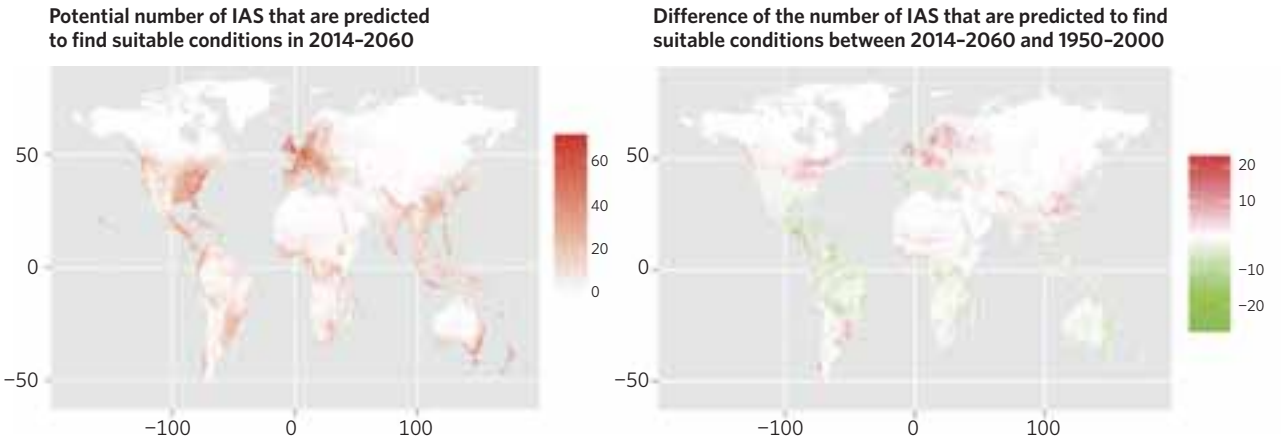


Figure 9.3. Projected changes in the occurrence of invasive alien species due to climate change based on species distribution models and future projections of climate and land use change.[143]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 9, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Raising awareness among policy makers, the general public and potential importers of alien species, of the impacts of invasive alien species, including the possible socio-economic costs and the benefits of taking action to prevent their introduction or to mitigate their impacts, such as by publicizing nationally relevant case studies (*Target 1*)[144]

- Developing lists of alien species known to be invasive (or assessing existing lists for their completeness and accuracy) and making them widely available (*Target 19*), such as through the Global Invasive Alien Species Information Partnership

- Increasing efforts to identify and control the main pathways responsible for the introduction of alien species, including through the development of border control or quarantine measures to reduce the likelihood of potentially invasive alien species being introduced and making full use of risk analysis and existing relevant international standards[145]

- Putting in place measures for the early detection and rapid response to species invasions[146]

- Identifying and prioritizing those invasive alien species with the greatest potential to cause negative impact on biodiversity that are established in the country, and developing and implementing plans for their eradication or control, prioritizing protected areas and other areas of high biodiversity value for eradication or control measures

Box 9.1. New Zealand: Turning the tide against centuries of species invasions

New Zealand is among the countries most affected by invasive alien species. European colonists intending to recreate a familiar landscape and lifestyle established a legacy of species introductions going back centuries.[147] Today, New Zealand has leveraged its isolation, as an island nation distant from major trading partners, to turn the tide on unwanted species invasions (See Figure 9.4).[148] The country's strong policy of border protection originated from the desire to protect its agriculture from pests and diseases.[149] New Zealand is also rich in endemic biodiversity. As the negative impacts of invasive species were recognized, the agricultural border protection measures translated readily to measures in support of conservation.

Even with these border control measures, many alien species have been and continue to be introduced to New Zealand, and some become invasive. New Zealand has developed tools to respond to invasions once alien species enter the country.[150] New Zealand's small size and governance structures have helped in successful implementation of these tools to prevent invasive species from spreading and establishing. Two strong legal frameworks have been implemented in New Zealand: the Hazardous Substances and New Organisms Act and the Biosecurity Act.

For protection of biodiversity from invasive species impacts, New Zealand has focused on using islands as 'arks' where threatened species can be reintroduced.[151] The country has also pioneered methods to eradicate species introduced to islands, particularly mammals, to increase the amount of pest-free land area.[152] New Zealand has eradicated non-native mammals in more than over 100 islands.

Following its success on smaller islands, New Zealand has developed 'mainland islands', which allow the technologies developed for the irradiation of invasive species on smaller islands to be applied in a larger landscape context. Some of these technologies use mammal-proof fences to create enclosures within larger landscapes, and others use sustained pest control methods to maintain pest density at close to zero for agricultural or biodiversity benefits.[153] There are currently over 25 fenced, and 100 unfenced 'mainland islands', across New Zealand. By increasing pest control connectivity among these sites it is predicted that pest control may be scaled up to the entire country with appropriate governance guidance.[154]

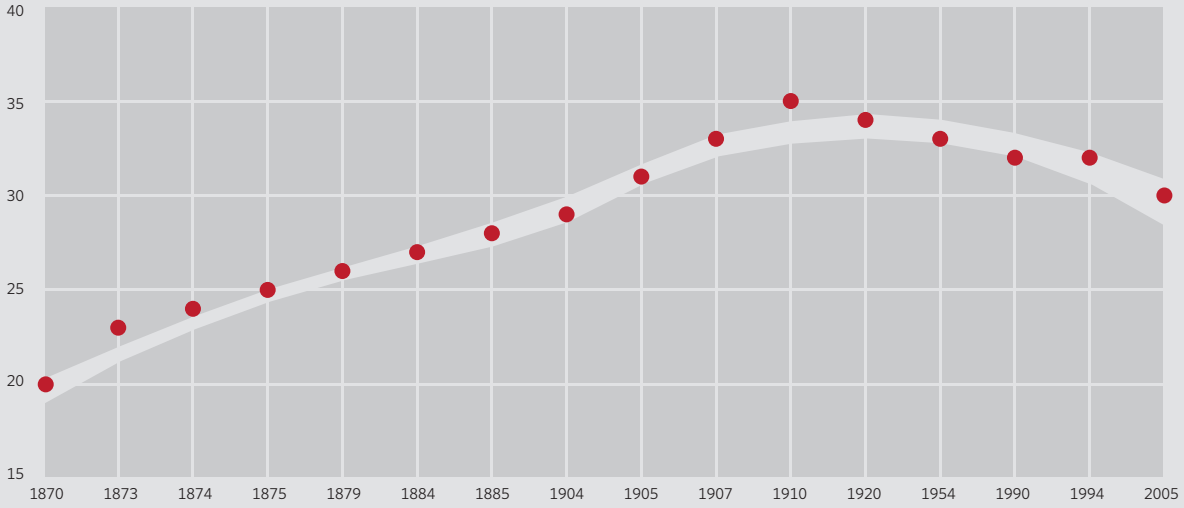


Figure 9.4. Number of non-native mammal species in New Zealand between 1876 and 2005. Dots represent data points and the shaded band illustrates the 95% confidence interval.[155]

TARGET 10

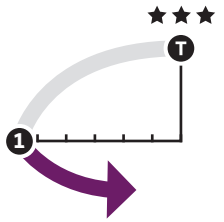
Ecosystems vulnerable to climate change

By 2015, the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.

Why this target is important

Climate change and ocean acidification (which is due to increased atmospheric carbon dioxide) are becoming increasingly serious threats to ecosystems and the services they provide. Some habitats including coral reefs, mountains and rivers are especially vulnerable to one or both of these pressures. While mitigating climate change is clearly the key long-term priority, urgent measures to relieve other pressures can make these ecosystems more resilient, protecting their biodiversity and the livelihoods of millions of people who depend on them. The urgency of this action was reflected in the decision to make 2015 the deadline for meeting this target, instead of 2020 as with most of the other targets.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Multiple anthropogenic pressures on coral reefs are minimized, so as to maintain their integrity and functioning.	
Multiple anthropogenic pressures on other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.	*Not evaluated — Insufficient information available to evaluate the target for other vulnerable ecosystems including seagrass habitats, mangroves and mountains*

Recent trends, current status and future projections

Multiple pressures on coral reefs, including pressures from both land-based and marine activities, continue to increase. This makes it unrealistic to believe that the target will be met by 2015 as agreed by Parties to the CBD. The percentage of reefs rated as threatened increased by nearly one-third (30 per cent) in the decade to 2007, the latest period assessed. Overfishing and destructive fishing methods are the most pervasive threats, affecting around 55 per cent of reefs. Coastal development and pollution from land, including nutrients from farming and sewage, each affect about one-quarter of reefs. Around one-tenth suffer from marine-based pollution. Local pressures are most severe in Southeast Asia, where nearly 95 per cent of coral reefs are threatened.[156]

Large marine protected areas (MPAs) already in place or pending establishment offer opportunities for better protection of coral reefs. Where well-enforced and combined with land-based protection measures, MPAs have succeeded in rebuilding reef fish stocks and even helping corals to recover after bleaching.[157] However, to date some MPAs have proven ineffective in easing pressure on reefs, with only some 15 per cent reducing the threats from fishing.[158]

A recent study of the Caribbean suggests that effective action to reduce greenhouse gas emissions, combined with management of local threats such as overfishing and poor water quality, would create favourable conditions for coral reefs to regenerate by the end of this century, and survive the impacts of ocean acidification (see Figure 10.1).[159]

While assessment for GBO-4 has focused on coral reefs, other ecosystems especially vulnerable to climate change include mountain ecosystems such as cloud forest and *páramos* (high altitude tundra in tropical Americas) as well as low-lying ecosystems vulnerable to sea-level rise.

Few national biodiversity strategies and action plans (NBSAPs) or national reports to the CBD include specific measures to reduce multiple pressures on coral reefs and other ecosystems vulnerable to climate change. Exceptions include Brazil, Finland and Japan, which have all established targets to reduce human-induced pressures on vulnerable ecosystems.[160]

Box 10.1. Reducing local threats through private coral reef management

Local human-created threats pose the greatest risk to coral reefs in Southeast Asia. However, reef management in the region is often limited by lack of resources. One approach for overcoming this challenge is the use of private sector resources for coral reef conservation. The establishment of the Sugud Islands Marine Conservation Area (SIMCA) in Sabah, Malaysia was initiated by owners of the sole dive resort situated within SIMCA, for the purpose of protecting the area's coral reefs and marine environment. Reef Guardian, a conservation organization, manages conservation activities to reduce local threats to the coral reefs within SIMCA. These include enforcement patrols to regulate illegal fishing, turtle monitoring and conservation, coral reef and environmental monitoring, sewage and wastewater treatment, removal of coral predators (crown of thorns), and conducting education programmes for schoolchildren to raise awareness about marine conservation. Reef Guardian's conservation work is funded by conservation fees charged to visitors to the dive resort, as well as donations and grants. Coral cover and fish abundance are greater within SIMCA compared to fished areas, and the number of turtle nestings shows an increasing trend through time.[161]

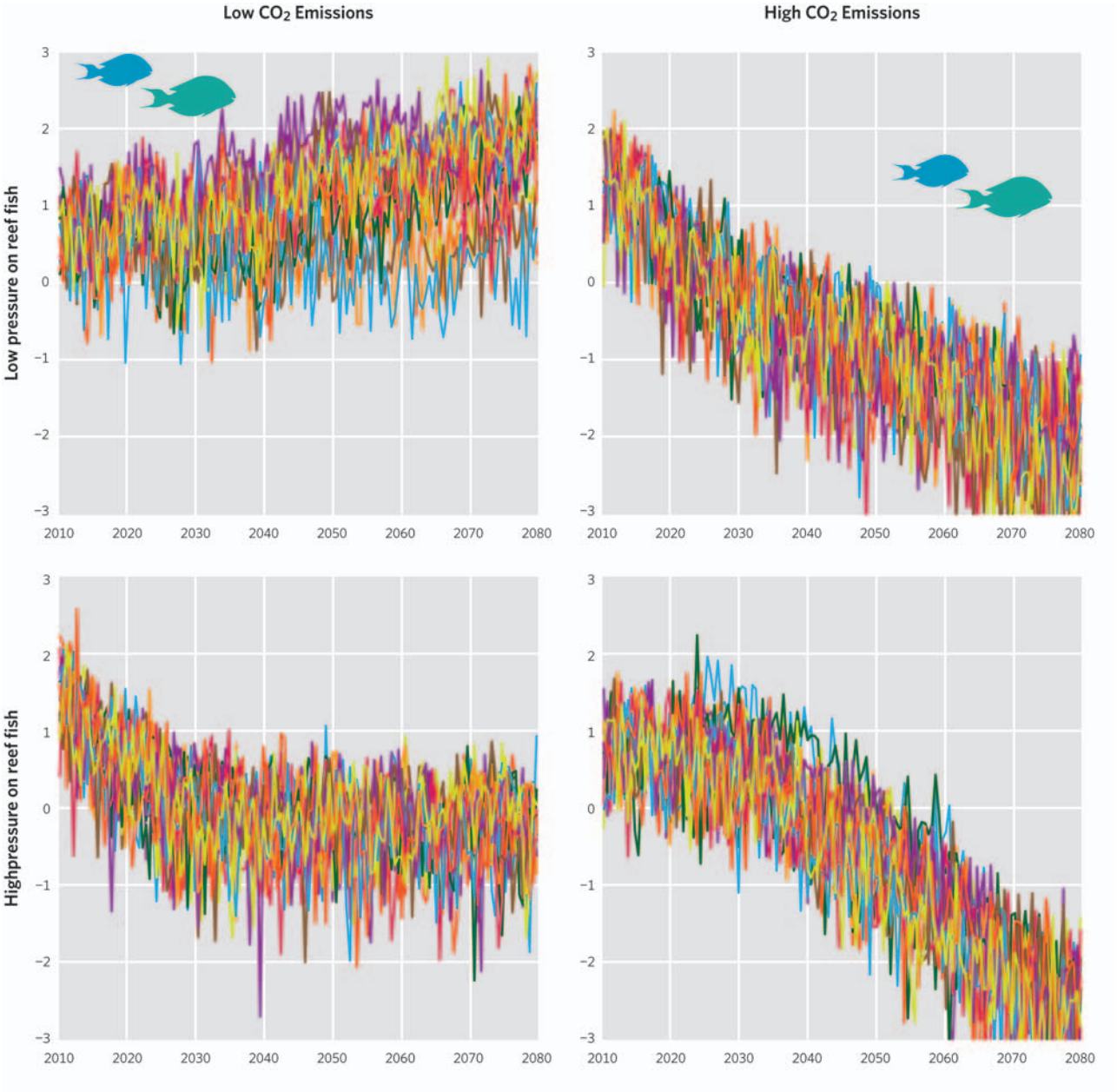


Figure 10.1. How early action can buy time for coral reefs. In scenarios of high greenhouse gas emissions, failure to control overfishing leaves Caribbean corals unable to maintain their skeletons by the 2020s due to ocean acidification, while protection of grazing fish such as parrotfish delays that situation by around a decade. With compelling action to curb greenhouse gas emissions, corals are still left in a vulnerable condition by the 2030s if overfishing is not addressed, whereas combined action on emissions and overfishing offers Caribbean reefs good conditions to regenerate for the rest of this century.[162]

Actions to Enhance Progress Towards the Target

As noted, the 2015 deadline for meeting this target will not be met. It is therefore especially urgent that countries and relevant institutions take action to achieve the target at the earliest opportunity and before 2020. Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 10, if more widely applied. Such measures would enhance the resilience of coral reefs and closely associated ecosystems through ecosystem-based adaptation to enable the continued provisioning of goods and services. They would also contribute to other targets, shown in parentheses:

- Sustainably managing fisheries on coral reefs and closely associated ecosystems (such as mangroves and seagrass systems), including by empowering local and indigenous communities and individuals involved in local fisheries (*Target 6*)

- Managing coastal zones and inland watersheds in an integrated manner in order to reduce pollution and other land-based activities that threaten coral reefs (*Target 8*)

- Increasing the spatial coverage and effectiveness of marine and coastal protected and managed areas in coral reefs and closely associated ecosystems (*Target 11*)

- Managing coastal development to ensure that the health and resilience of coral reef ecosystems are not adversely impacted and promoting sustainable coral reef tourism, including through the use of guidelines for tourists and tour operators

- Maintaining sustainable livelihoods and food security in reef-dependent coastal communities and provide for viable alternative livelihoods, where appropriate (*Target 14*)

- At a national level, identifying other ecosystems that are vulnerable to climate change and related impacts, implementing measures to improve their resilience, and monitoring their effectiveness

Strategic Goal C

To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity

TARGETS 11 12 13

Accompanying longer-term actions to address underlying causes of biodiversity loss and the pressures described in the previous sections, direct interventions to safeguard ecosystems, species and genetic diversity are an essential part of the policy mix required to prevent biodiversity loss. There are contrasting trends in progress towards the targets within this strategic goal. The area of land and coastal waters protected for biodiversity is likely to reach the thresholds set by governments in 2010, if current commitments for new protected areas are realized by the target date of 2020. However, significant additional measures are needed if these areas are to be representative of ecological regions and areas of particular importance for biodiversity, well connected, well managed and carry the support of local populations. Although actions to support particular threatened species have proven effective in preventing extinctions, these have not been enough to reverse the overall trend towards extinction for many species groups. Success in this regard will be highly dependent on further progress to address underlying causes and direct pressures. Actions to conserve the genetic diversity of plants through ex situ collections have advanced some aspects of this goal, but threats remain significant for the genetic diversity of domesticated plants and animals, and their wild relatives.

TARGET 11

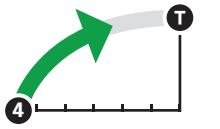
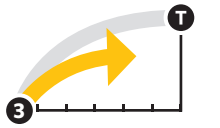
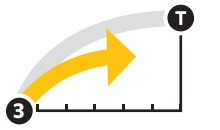
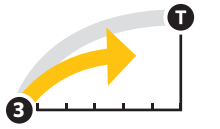
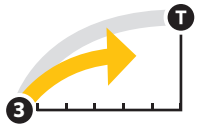
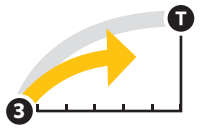
Protected areas

By 2020, at least 17 per cent of terrestrial and inland water areas and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

Why this target is important

As human activities come to dominate ever-increasing areas of the planet's land and water surface, governments have recognized the need to enlarge the network of protected areas and other effective area-based conservation measures, as a means to reconcile development with conservation of biodiversity. This target represents a modest increase in the proportion of land protected, and a more ambitious increase for marine protected areas which begin from a much lower level. The target also recognizes that biodiversity will not be safeguarded simply by establishing more protected areas. They need to represent the diversity of the planet's ecological regions and include the most critical sites for threatened species, they need to be connected, to be effectively managed and to command the support of local populations.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
At least 17 per cent of terrestrial and inland water areas are protected.	★★★ 
At least 10 per cent of coastal and marine areas are protected	★★★ 
Areas of particular importance for biodiversity and ecosystem services protected	BIODIVERSITY ★★★ ECOSYSTEM SERVICES ★☆☆ 
Protected areas are ecologically representative	TERRESTRIAL AND MARINE ★★★ INLAND WATERS ★☆☆ 
Protected areas are effectively and equitably managed	★☆☆ 
Protected areas are well connected and integrated into the wider landscape and seascape	★☆☆ 

Recent trends, current status and future projections

The terrestrial area of the planet protected for biodiversity is increasing steadily, and designation of marine protected areas is accelerating (see Figures 11.1, A and B). Nearly a quarter of countries have already passed the target of protecting 17 per cent of their land area.[163] At the current rate of growth, the percentage targets would be met for terrestrial areas by 2020 and this is reinforced by existing commitments to designate additional terrestrial protected areas.[164] Overall, the extrapolations suggest that the marine target is not on course to be met. However, progress is higher in coastal areas, while open ocean and deep sea areas, including the high seas, are much less covered.[165]

The protected area network is becoming more representative of the world's diverse ecological regions, but around one-quarter of terrestrial regions and more than half of marine regions have less than five per cent of their area protected (see Figures 11.1, C to E).[166] Further today's protected areas will not be adequate to conserve many species whose distributions will shift in the future due to climate change.[167]

Although 17 per cent of the world's river length were within protected areas in 2010, the effectiveness of that protection is less certain due to upstream and downstream impacts (see Box 11.1).[168]

A minority of protected areas enjoy effective management, although this appears to be improving over time according to the limited information available.[169] Further actions are needed to ensure that protected areas are effectively and equitably managed.[170]

Recent national biodiversity strategies and action plans indicate that most countries have targets relating to improvement of protected area coverage, although relatively few address issues of ecological representativeness, connectedness or management effectiveness.[171] Almost all fifth national reports assessed for GBO-4 suggest that some progress is being made towards the attainment of this target. Among the actions being taken by countries include plans for the establishment of new protected areas (Azerbaijan, Nepal, New Zealand and Pakistan), and undertaking vulnerability assessment of existing protected areas (Dominica) among other things.[172]

Box 11.1. Protecting inland water ecosystems: special challenges

There are few targeted protected areas for inland waters and in many cases where protection does exist (for example on Ramsar sites) upstream areas are not protected or managed in a way that will effectively abate threats. Furthermore, the pervasiveness of barriers such as dams can prevent fish movement into and out of protected areas. Regional-scale assessments of the coverage and effectiveness of protected areas have shown that freshwater habitats are not only under-protected, but that the placement of protected areas is ineffective for conserving these habitats and their species. For inland waters, climate change could exacerbate the negative effects of drying conditions that are currently natural in many temporal river systems. It will be essential to protect refugia in order to maintain individuals that can repopulate a wider range of habitats when more favourable conditions are restored after seasonal or prolonged droughts. Minimizing and managing upstream and downstream threats from changes in human land use, expansions of dams and water extraction will also be critical for protected areas to be effective for inland waters and the species that they support.[173]

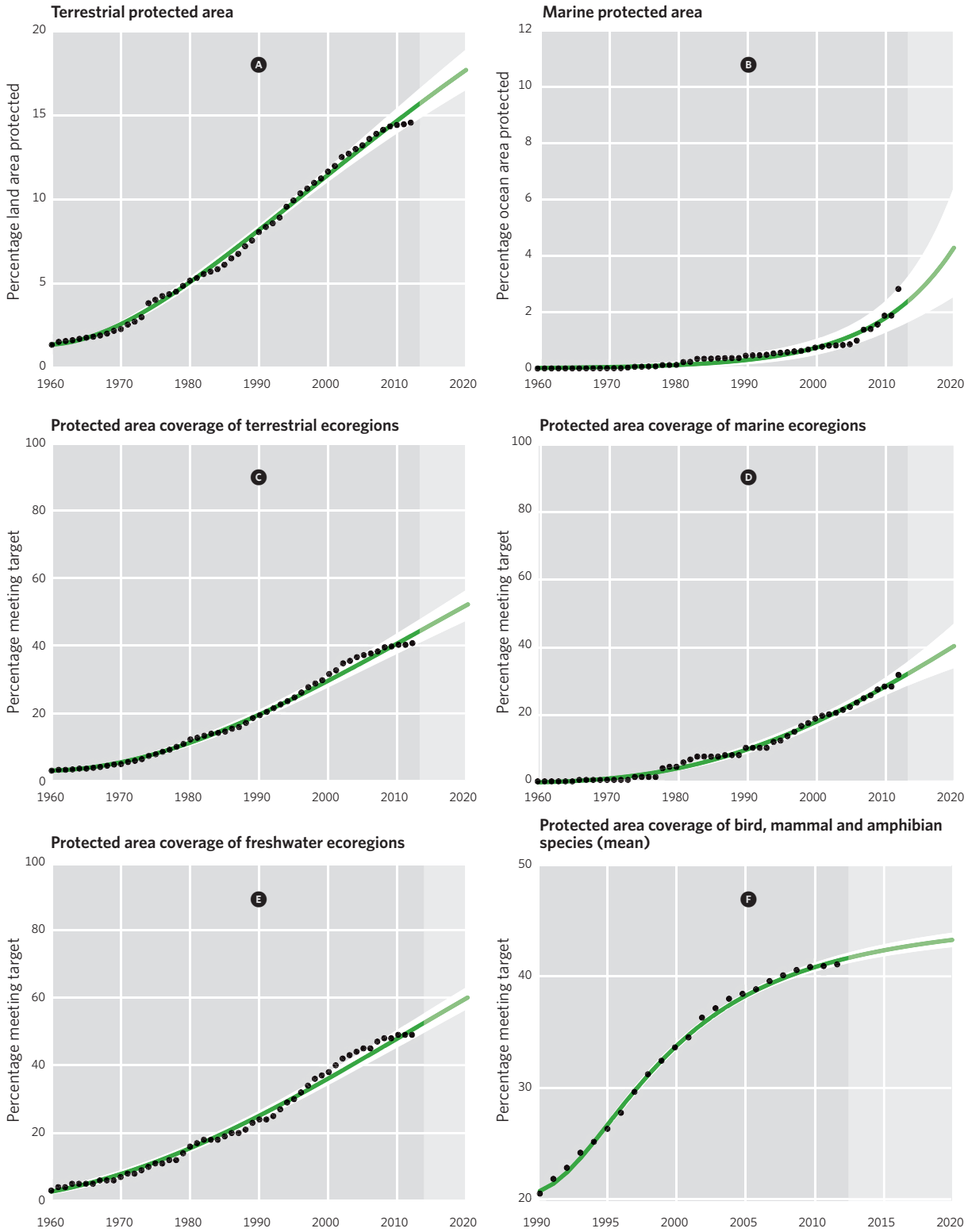


Figure 11.1. Recent trends and extrapolations to 2020, assuming constant underlying processes, in the cumulative percentage of global terrestrial Ⓐ and marine Ⓑ area covered by protected areas, suggesting a continued and significant increase in the underlying trend for both, with marine protected areas increasing at an accelerating rate; in the percentage of terrestrial Ⓒ, marine Ⓓ and freshwater Ⓔ ecoregions that meet a threshold level of protection (17% for terrestrial; 10% for marine and freshwater), all showing a significant increase; and in the coverage of the distributions of bird, mammal and amphibian species by protected areas Ⓕ, also increasing but at a decelerating rate. The solid lines represents the model fit for the periods with data and the extrapolations, dots represent data points and the shaded bands illustrates the 95% confidence intervals.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 11, if more widely applied. They would also contribute to the other target, shown in parentheses:

- Expanding protected area networks and other effective area based conservation measures to become more representative of the planet's ecological regions, of marine and coastal areas (including deep sea and ocean habitats), of inland waters and of areas of particular importance for biodiversity

- Improving and regularly assessing management effectiveness and equitability of protected areas and other area-based conservation measures

- Implementing adequate protection for inland water environments through additional measures to protect rivers upstream and downstream from existing terrestrial protected areas, and to maintain connectivity to enable migration within river basins

- Enhancing cooperation with indigenous and local communities in the creation, control and management of protected areas (*Target 18*) (see Box 11.2.)

- Designing and managing protected areas and the connections between them with a view to addressing the impacts of climate change on shifting species distributions

Box 11.2. Co-management of a national park in Thailand

In Ob Luang National Park, Northern Thailand, indigenous communities and park authorities are engaged in a process to achieve a more equitable and effective management of the protected area (a component of Target 11). The park, established in 1991, overlapped with the ancestral lands of Karen and Hmong indigenous communities. While Thailand's 2007 constitution allows indigenous peoples and local communities to manage their natural resources, they are not legally allowed to live in protected areas. Being restricted in using their customary farming areas in the park caused severe conflict between officials and community members during the late 1990s.

To address the tensions and concerns, a pilot project for joint management in Ob Luang National Park was set up in 2005, and since 2009 a voluntary open-ended co-management process has been in place. This involves mapping and land demarcation of farmland surveys of conflict areas, discussions about problems encountered by the villagers, and collaborative monitoring of actual land use practices by indigenous peoples. Indigenous peoples are also admitted to meetings of park's management committees and informed and consulted on the work plans.

The joint management approach has clearly had visible positive effects, such as reduced tensions between the government and communities, increased protection of forests and watersheds, and improved livelihood security for indigenous peoples and local communities. Based on the positive experiences in Ob Luang, there is interest among the National Park authorities and communities to explore the expansion of the joint management approach to other protected areas in Thailand. Major progress has been achieved in moving from conflict to collaboration, benefiting both biodiversity and people. An important further step is to revise relevant national laws to support innovative collaborative management of protected areas for effective implementation of Target 11.[174]

TARGET 12

Reducing risk of extinction

By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Why this target is important

Reducing the threat of human-induced extinction requires action to address the direct and indirect drivers of change. Achievement of this target is therefore highly dependent on most of the other Aichi Biodiversity Targets. Nevertheless, imminent extinctions of known threatened species can in many cases be prevented by protecting the sites where such threatened species are located, by combating particular threats, and through *ex situ* conservation.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Extinction of known threatened species has been prevented	★☆☆ T 2
The conservation status of those species most in decline has been improved and sustained.	★★★ T 1

Recent trends, current status and future projections

Multiple lines of evidence give high confidence that based on our current trajectory, this target would not be met by 2020, as the trend towards greater extinction risk for several taxonomic groups has not decelerated since 2010. Despite individual success stories, the average risk of extinction for birds, mammals, amphibians and corals shows no sign of decreasing (see Figure 12.1). Nevertheless, dedicated conservation efforts have demonstrably prevented the extinction of several species in these groups, and further action might prevent some extinctions that would otherwise occur by 2020.[175]

The rate of increase in observed extinctions of birds and mammals has apparently slowed over the past 50 years, although lags in reporting time may lead to an underestimate of recent extinctions. For some groups such as freshwater fish, the number of observed extinctions has continued unabated for the past century.[176]

Short-term future projections of the extinction risk of species as a result of projected habitat loss generally predict a worsening situation. However, under some scenarios in which natural habitats are protected and restored, and greenhouse gas emissions are reduced, extinctions both globally and locally may be significantly reduced in the longer term.[177]

One positive trend related to this target is that an increasing proportion of sites critical to the survival of threatened species are being included within protected areas, although 75 per cent of such sites remain inadequately covered by protected areas (see Figures 12.1, D and E).

About two thirds of national reports assessed for GBO-4 suggest that some progress is being made towards the attainment of this target. Reported actions include reducing the threat from poaching (South Africa), breeding programmes for particular species (Japan), providing protected status for some species (Mongolia, and Nepal) and the development of species red lists (Morocco).[178]

Box 12.1. Preventing extinction of vultures in South Asia

Once present in numbers ranging over tens of millions across India, Pakistan, Bhutan, Nepal and Bangladesh; vultures today are on the brink of extinction. Since the 1990s the vulture population has witnessed one of the most dramatic declines of a wild species in human history. Across the Indian subcontinent, the populations of three formerly common species of vultures—Oriental White-backed Vulture (*Gyps bengalensis*), Long-billed Vulture (*Gyps indicus*) and Slender-billed Vulture (*Gyps tenuirostris*)—have declined precipitously. Extensive studies have identified the cause of declines to be *Diclofenac,* an anti-inflammatory drug commonly used for treating domestic livestock that is highly toxic to vultures, causing death due to kidney failure. In response to the crisis, the Indian government has approved an alternative vulture-safe drug, *Meloxicam*, and has established a directive to phase out *Diclofenac* within a stipulated time frame—starting with a ban on its veterinary use in 2006. Despite this, there is mounting evidence that *Diclofenac* continues to be available and used for veterinary purposes, resulting in a continuation of vulture deaths and losses in valuable ecosystems services in the region.[181]

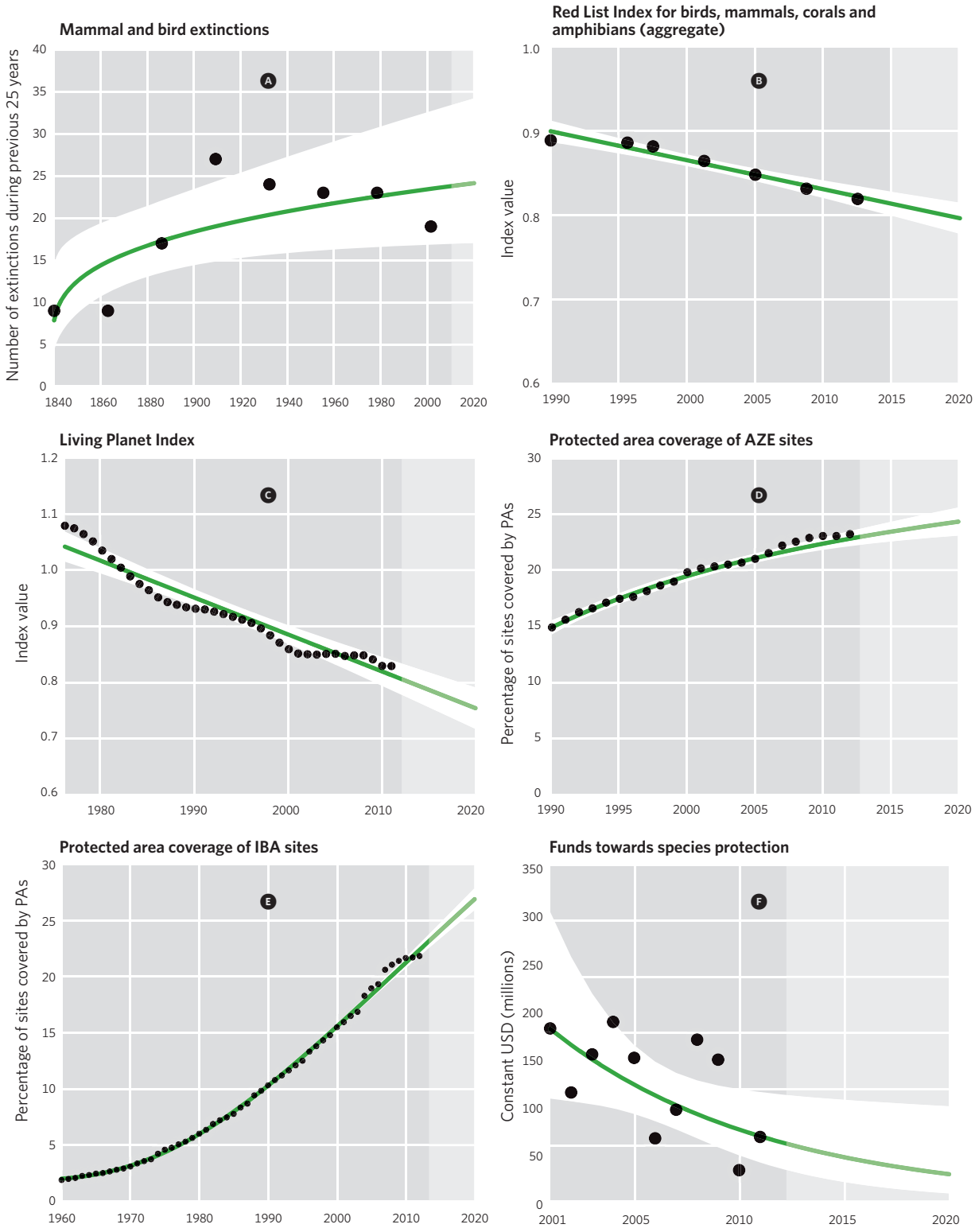


Figure 12.1. Recent trends in key measures of the extinction, extinction risk and conservation status of species, with extrapolations to 2020 assuming constant underlying processes: A observed extinction rates of birds and mammals, showing a rising trend;[179] B the aggregate Red List Index of birds, mammals, amphibians and corals—significant decrease suggesting a continuing movement towards extinction; C the Living Planet Index, with a significant decrease reflecting declines in species populations; D protected area coverage of sites whose protection could avert the extinction of known threatened species: Alliance for Zero Extinction sites (AZEs) and E Important Bird and Biodiversity Areas (IBAs), with significant increases suggesting progress towards averting future extinctions, although 75% of such sites remain inadequately covered by protected areas;[180] and F funds for the protection of species showing no significant change in the underlying trend between 2010 and 2020. The solid lines represents the model fit for the periods with data and the extrapolations, dots represent data points and the shaded bands illustrates the 95% confidence intervals.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 12, if more widely applied. Reducing the risk of species extinctions depends crucially on taking actions directly relevant to the achievement of several other targets, shown in parentheses:

- Identifying and prioritizing species for conservation activities based on assessments of species conservation status (*Target 19*)

- Filling gaps in existing national, regional and global species conservation status assessments (*Target 19*)

- Developing and implementing species action plans that include specific conservation actions aimed directly at particular threatened species, for example through restrictions on trade, captive breeding and reintroductions

- Developing more representative and better-managed protected area systems prioritizing sites of special importance to biodiversity, especially those that contain unique populations of threatened species, (*Target 11)*

- Reducing loss, degradation and fragmentation of habitats (*Target 5*), and actively restoring degraded habitats (*Target 15*)

- Promoting fishing practices that take account of the impact of fisheries on marine ecosystems and non-targeted species (*Target 6*)

- Controlling or eradicating invasive alien species and pathogens (*Target 9*), especially crucial to avoid extinctions of species on islands and those with small global ranges

- Reducing pressures on habitats through sustainable land-use practices (*Target 7*)

- Ensuring that no species is subject to unsustainable exploitation for domestic or international trade, including by taking actions agreed under the Convention on International trade in Endangered Species (CITES), and taking measures to prevent and deter illegal killing and trade and reducing demand for products derived from such actions (*Target 4*)

TARGET 13

Safeguarding genetic diversity

By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

Why this target is important

Genetic diversity offers options for increasing the resilience of agricultural systems and for adapting to changing conditions, including the escalating impacts of climate change. Genetic diversity is also an important component of cultural heritage. Maintaining this diversity requires conservation of the many varieties of cultivated plants and breeds of domesticated livestock bred by farmers over thousands of years and of the wild relatives of crops whose traits may be essential for future plant breeding and thereby underpin food security.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
The genetic diversity of cultivated plants is maintained	★★★ T 3
The genetic diversity of farmed and domesticated animals is maintained	★★★ T 3
The genetic diversity of wild relatives is maintained	★★☆ T 2
The genetic diversity of socio-economically as well as culturally valuable species is maintained	*Insufficient data to evaluate this component*
Strategies have been developed and implemented for minimizing genetic erosion and safeguarding genetic diversity	★★★ T 3

Recent trends, current status and future projections

Ex situ collections of genetic resources continue to improve, particularly for plants, and there are increasing activities to conserve genetic resources in their production environment.[182] Major initiatives on *ex situ* conservation include the Svalbard Global Seed Vault, which in 2014 stored more than 824,000 seed samples of over 4,700 species and the Millennium Seed Bank Partnership which currently stores nearly two billion seed samples of over 33,000 species.

About two thirds of the fifth national reports assessed for GBO-4 provide information which suggests that some progress is being made towards the attainment of this target. National action as documented in these reports to the CBD has focused primarily on conserving the genetic diversity of cultivated plants with few reports providing information on measures to conserve the genetic diversity of livestock or crop wild relatives. An example of national action includes China's National Crop Germplasm Bank, containing 423,000 accessions, and its Southwestern Germplasm Bank of Wild Species containing 108,000 accessions from 12,800 wild species.[185]

Considerable crop genetic diversity continues to be maintained on farms, in the form of traditional crop varieties. However, there is currently limited support to ensure long term conservation of local varieties of crops in the face of changes in agricultural practices and market preferences that are tending, in general, to promote a narrowing genetic pool. The wild relatives of domesticated crop species are increasingly threatened by habitat loss and fragmentation and climate change, and few protected areas or management plans address these threats.[186] Erosion of traditional crops and their wild relatives is greatest in cereals, followed by vegetables, fruits and nuts and food legumes.[187]

Genetic diversity of domesticated livestock is eroding, with more than one-sixth of the 8,200 assessed breeds (16%) at risk of extinction.[188] Based on recent trends and assuming current pressures continue, this proportion is projected to increase further by 2020 (see Figure 13.1).

The FAO Global Plans of Action for plant and animal genetic resources provide frameworks for the development of national and international strategies and action plans for minimizing genetic erosion and vulnerability and safeguarding genetic diversity.[189] However, existing conservation efforts have important gaps.

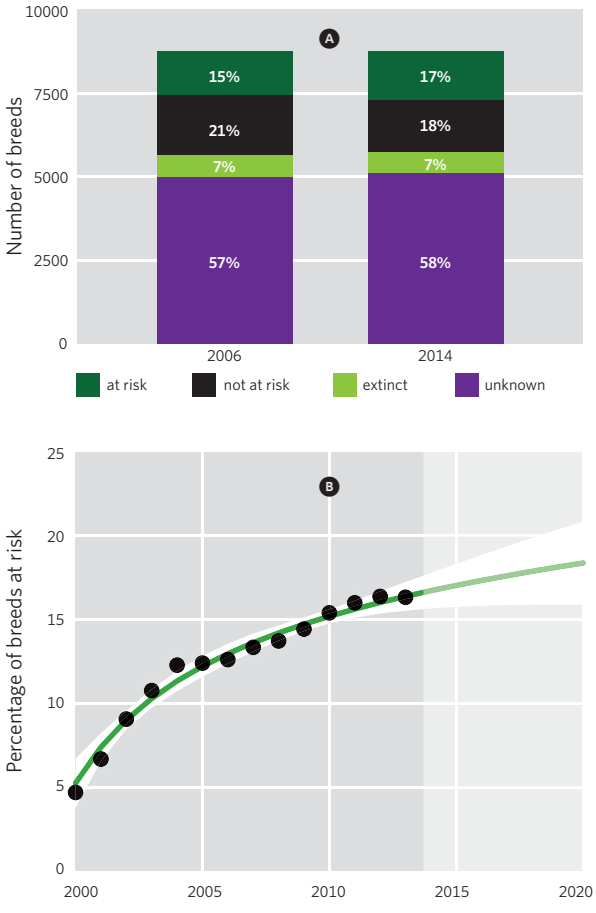


Figure 13.1. A Number of the world's terrestrial animal breeds reported to the FAO by risk status,[190] and B the percentage of breeds classified as at risk, including extrapolation to 2020 assuming constant underlying processes. The solid lines represents the model fit for the periods with data and the extrapolations, dots represent data points and the shaded bands illustrates the 95% confidence intervals.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 13, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Promoting public policies and incentives to maintain local varieties of crops and indigenous breeds in production systems (*Targets 2, 3 and 7*), including through increased cooperation with, and recognition of, the role of indigenous and local communities and farmers in maintaining genetic diversity *in situ* (see Box 13.1)

- Enhancing the use and maintenance of genetic diversity in plant and animal breeding programmes, and raising awareness of the importance of genetic diversity and its contribution to food security (*Targets 1 and 7*)

- Integrating the conservation of the wild relatives of domesticated crops and livestock in management plans for protected areas, conducting surveys of the location of wild relatives, and including this information in plans for the expansion or development of protected area networks (*Target 11*)

- Maintaining support for national and international *ex situ* conservation, such as genebanks of plant and animal genetic resources including *in vitro* conservation

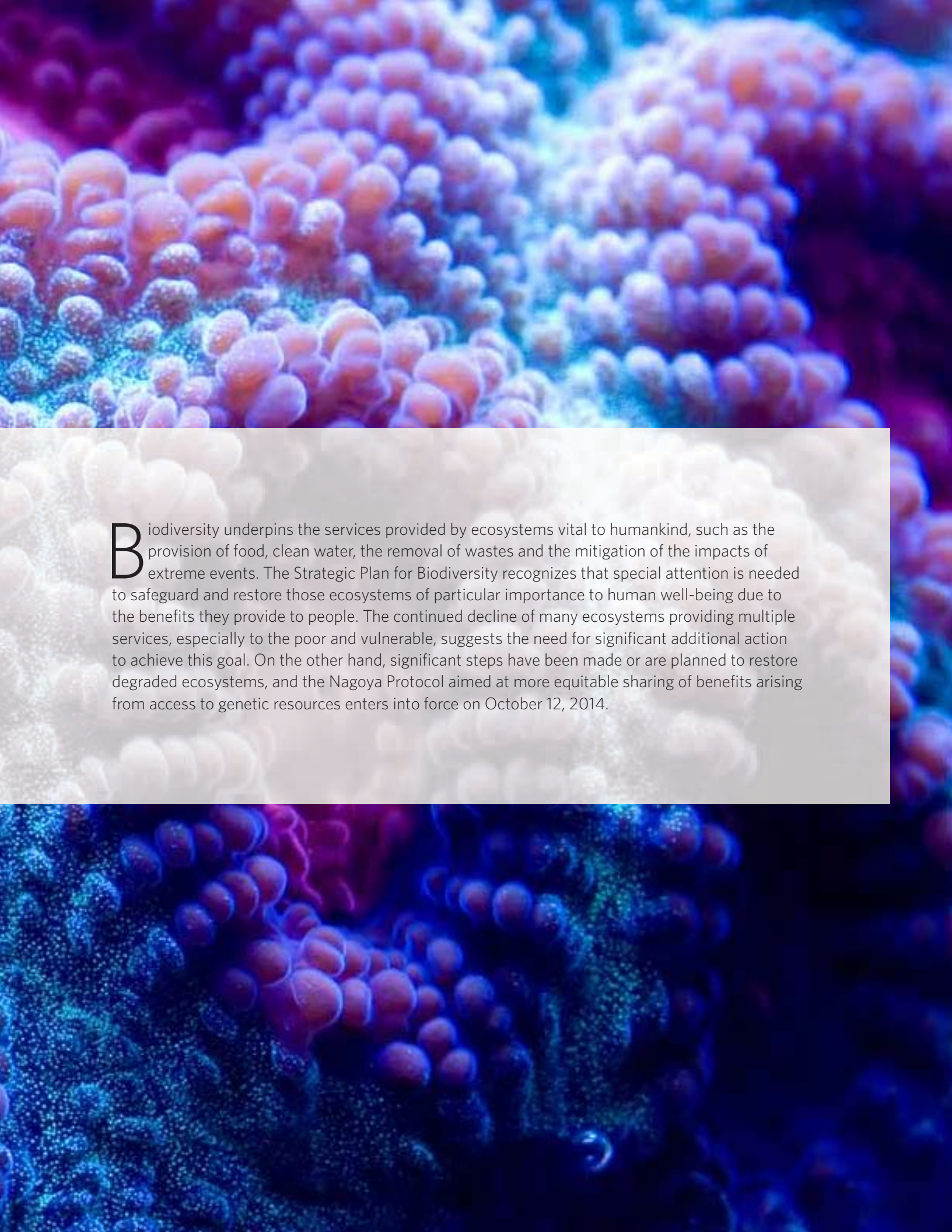
Box 13.1. Maintaining traditional crop diversity on small family farms

In one study, data from 27 crop species from five continents were drawn together to determine overall trends in diversity of crop varieties on farms. Measurements of richness, evenness, and divergence showed that considerable crop genetic diversity continues to be maintained on farms, in the form of traditional crop varieties. The research suggested that in some cases, diversity may be maintained as a form of insurance to meet future environmental changes or social and economic needs. In other cases, farmers were apparently selecting varieties to service a diversity of current needs and purposes. It underscores the importance of a large number of small farms adopting diverse strategies regarding crop varieties, as a major force that maintains crop genetic diversity on farms.[191]

Strategic Goal D

Enhance the benefits to all from biodiversity and ecosystem services

TARGETS 14 15 16



Biodiversity underpins the services provided by ecosystems vital to humankind, such as the provision of food, clean water, the removal of wastes and the mitigation of the impacts of extreme events. The Strategic Plan for Biodiversity recognizes that special attention is needed to safeguard and restore those ecosystems of particular importance to human well-being due to the benefits they provide to people. The continued decline of many ecosystems providing multiple services, especially to the poor and vulnerable, suggests the need for significant additional action to achieve this goal. On the other hand, significant steps have been made or are planned to restore degraded ecosystems, and the Nagoya Protocol aimed at more equitable sharing of benefits arising from access to genetic resources enters into force on October 12, 2014.

TARGET 14

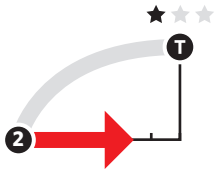
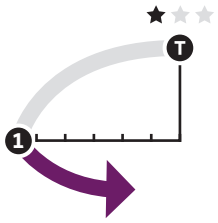
Ecosystem services

By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities and the poor and vulnerable.

Why this target is important

All terrestrial, freshwater and marine ecosystems provide multiple ecosystem services. However some ecosystems are particularly important in that they provide services that directly contribute to human health and wellbeing by providing services and goods to fulfill daily physical, material, cultural and spiritual needs. This target directs attention towards the need for policies to focus specifically on restoring and safeguarding such ecosystems, thus linking biodiversity conservation with goals related to sustainable development and the needs of the poor, women and indigenous and local communities.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded ...	
... taking into account the needs of women, indigenous and local communities, and the poor and vulnerable.	

Recent trends, current status and future projections

Habitats important for ecosystem services, for example wetlands and forests, continue to be lost and degraded. Recent sub-global assessments have confirmed the global trend in the decline of services provided to people by ecosystems. For example, the United Kingdom National Ecosystem Assessment in 2011 concluded that some 30 per cent of ecosystem services were declining, largely as the result of declines in the extent and condition of habitats providing those services. However, such assessments have also identified scenarios in which ecosystem services would improve in the longer term.[192]

The state of marine ecosystems as measured by the Ocean Health Index, falls far short of their potential to provide for human needs through a wide variety of services including food provision, recreation, coastal protection and carbon storage (see Box 14.1).[193] The decline of Arctic sea ice, linked to climate change, presents particular challenges to northern local and indigenous communities (see Box 14.2).

A number of countries are taking action to safeguard ecosystems providing essential services such as water provision to urban populations (see Box 14.3). However, few have set national targets explicitly addressing this global target. About two thirds of the recent national reports assessed for GBO-4 contain information which suggests that some progress is being made towards the attainment of this target. The types of actions taken include the development of management plans for ecosystems, the maintenance of critical watersheds or the development of plans for their management. In the national reports there was little mention of the needs of women, indigenous and local communities and the poor and vulnerable being taken into account.[194]

Overall, available evidence shows little sign of progress towards meeting this target by the deadline of 2020, and in the case of services of particular importance to local and indigenous communities, women, the poor and vulnerable, trends appear to be moving in the wrong direction.

Box 14.1. The Ocean Health Index

The Ocean Health Index uses a portfolio of ten public goals (artisanal fishing opportunities, biodiversity, coastal protection, carbon storage, clean waters, food provision, coastal livelihoods and economies, natural products, sense of place and tourism and recreation) for measuring the overall condition of marine ecosystems within Exclusive Economic Zones (EEZ).[195] Each of these goals is assessed by considering their present status and trends, the pressures on them and their resilience. The overall index is then determined by averaging these different scores, giving the same weight to each. In 2013 the index score for the ocean within Exclusive Economic Zones (EEZ) was 65 out of 100, providing an important benchmark and indicating substantial room for improvement across the goals. Index scores vary greatly by country, ranging from 41 to 94.

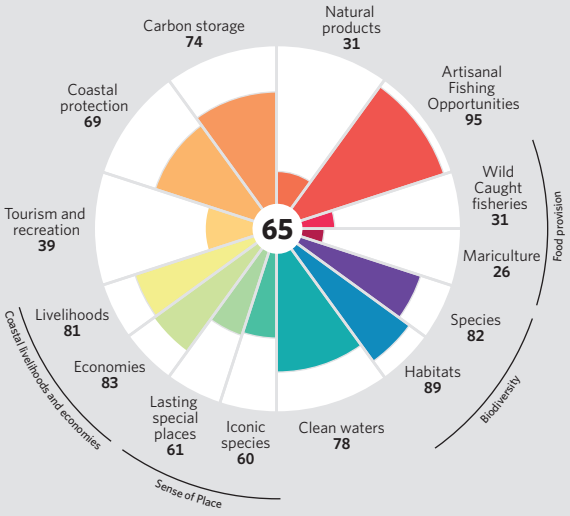


Figure 14.1. The Ocean Health Index score (inner circle) and individual goal scores (coloured petals) for global area-weighted average of all countries.[196]

Box 14.2. The decline of Arctic sea ice habitat and its impact on ecosystem services

Disappearing sea ice is affecting the building blocks of life in the Arctic Ocean with changes resonating throughout entire food webs. These changes affect everything from ice-dependent algae to birds, fish, marine mammals and human communities that rely on sea ice for travel, food, economic opportunities and cultural activities.

Such changes in environments and wildlife have implications for northern people's food security and for wildlife and habitat management. Adaptation is already occurring, with some indigenous peoples adjusting to different hunting seasons. But the knowledge and reliability of these environments that indigenous and local peoples hold is being tested by the nature of the rapid changes underway.

Safeguarding sea ice habitat and associated biodiversity is connected to climate change. International cooperation is increasingly needed to fully address the conservation challenges that face Arctic biodiversity.[197]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 14, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Identifying, at the national level, with the involvement of relevant stakeholders, those ecosystems that are particularly important in providing ecosystem services, with particular attention to ecosystems upon which vulnerable groups are directly dependent for their health, nutrition and general well-being and livelihoods, as well as ecosystems that help to reduce risks from disasters, employing, as appropriate, integrated assessment and/or participatory appraisal methodologies (*Target 19*)

- Improving monitoring of the status of ecosystems that are particularly important and of the essential services that they provide to facilitate targeted actions (*Target 19*)

- Removal of perverse subsidies and other forms of public support for infrastructure that destroys, fragments or degrades ecosystems (*Targets 2 and 3*)

- Reducing the pressures on and, where necessary, enhancing the protection and restoration of those ecosystems providing essential services (for example wetlands, coral reefs, rivers and forests and mountain areas acting as "water towers" among others) (*Targets 5, 6, 7, 8, 9, 10 and 15*)

- Investing in and making better use of traditional knowledge, about ecological systems, processes and uses held by indigenous and local communities, and promoting customary sustainable use (*Target 18*)

Box 14.3. Restoring rivers to protect urban water supplies in South Africa

South Africa's second largest city, Durban, faces major water security challenges. Durban's water comes mainly from the greater uMngeni catchment, where industry and intensive agriculture combine with challenges such as failing waste water treatment and water-thirsty invasive plants, to compromise the quantity and quality of water delivered to Durban. The eThekwini Municipality's Water and Sanitation Department, together with the KZN Regional Office of the Department for Water Affairs, Umgeni Water, the uMgungundlovu District Municipality, the Msunduzi Local Municipality and the South African National Biodiversity Institute (SANBI), have spearheaded the establishment of a partnership to foster better collaboration and coordination of ecological infrastructure investments aimed at improving water security in the greater uMngeni catchment. The uMngeni Ecological Infrastructure Partnership, launched in 2013, comprises 36 government and civil society organisations, 17 of which have signed a memorandum of understanding. On the same day of the MoU signing, three pilot projects on restoring ecological infrastructure were launched (Palmiet River Rehabilitation Project, Bayne's Spruit Rehabilitation Project, and Save the Midmar Dam Project). Lessons from the uMngeni Ecological Infrastructure Partnership are helping to inform investment in the maintenance and restoration of ecological infrastructure in other parts of South Africa, through partnerships at the landscape scale.[198]

TARGET 15

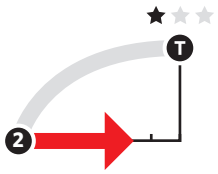
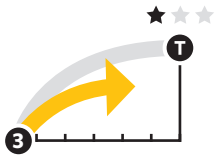
Ecosystem restoration and resilience

By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.

Why this target is important

The reversal of habitat loss, fragmentation and degradation, through ecosystem restoration, represents an immense opportunity for both biodiversity restoration and carbon sequestration. Restored landscapes and seascapes can improve resilience, including the adaptive capacity of ecosystems and societies, contributing to climate change adaptation and generating ecosystem services and associated benefits for people, in particular indigenous and local communities and the rural poor.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Ecosystem resilience and the contribution of biodiversity to carbon stocks have been enhanced through conservation and restoration	
At least 15 per cent of degraded ecosystems are restored, contributing to climate change mitigation and adaptation, and to combating desertification	

Recent trends, current status and future projections

The science and practice of ecosystem restoration has advanced significantly in recent decades, providing a range of tools and techniques that greatly increase the likelihood of success, for example in the choice of seeds for planting, control of grazing, and management of water, fire and invasive species.[199]

Restoration is under way for some depleted or degraded ecosystems, especially wetlands and forests, sometimes on a very ambitious scale, as in China (see Box 15.1).[200] Many countries, organizations and companies have pledged to restore large areas (see Figure 15.1).[201] Abandonment of farmland in some regions including Europe, North America and East Asia is enabling 'passive restoration' on a significant scale (see Box 15.2).

A number of countries have set targets related to ecosystem restoration. For example Belgium, Belarus, Brazil, Dominica, Japan, Malta, the United Kingdom of Great Britain and Northern Ireland and the European Union, have set targets to restore at least 15 per cent of degraded lands while Australia has a target to restore 100,000 ha by 2015, Iraq has a target to restore 100,000 ha by 2020, and Namibia has a target to restore 15 per cent of priority areas by 2022.[202] About three quarters of the national reports assessed for GBO-4 suggest that some progress is being made towards the attainment of this target.[203]

The combined initiatives currently under way or planned may put us on track to restore 15% of degraded ecosystems, but it is hard to assess and we cannot be confident that this part of the target will be met by 2020 on our current trajectory. Despite restoration and conservation efforts, there is still a net loss of forests, a major global carbon stock, suggesting no overall progress on this component of the target.

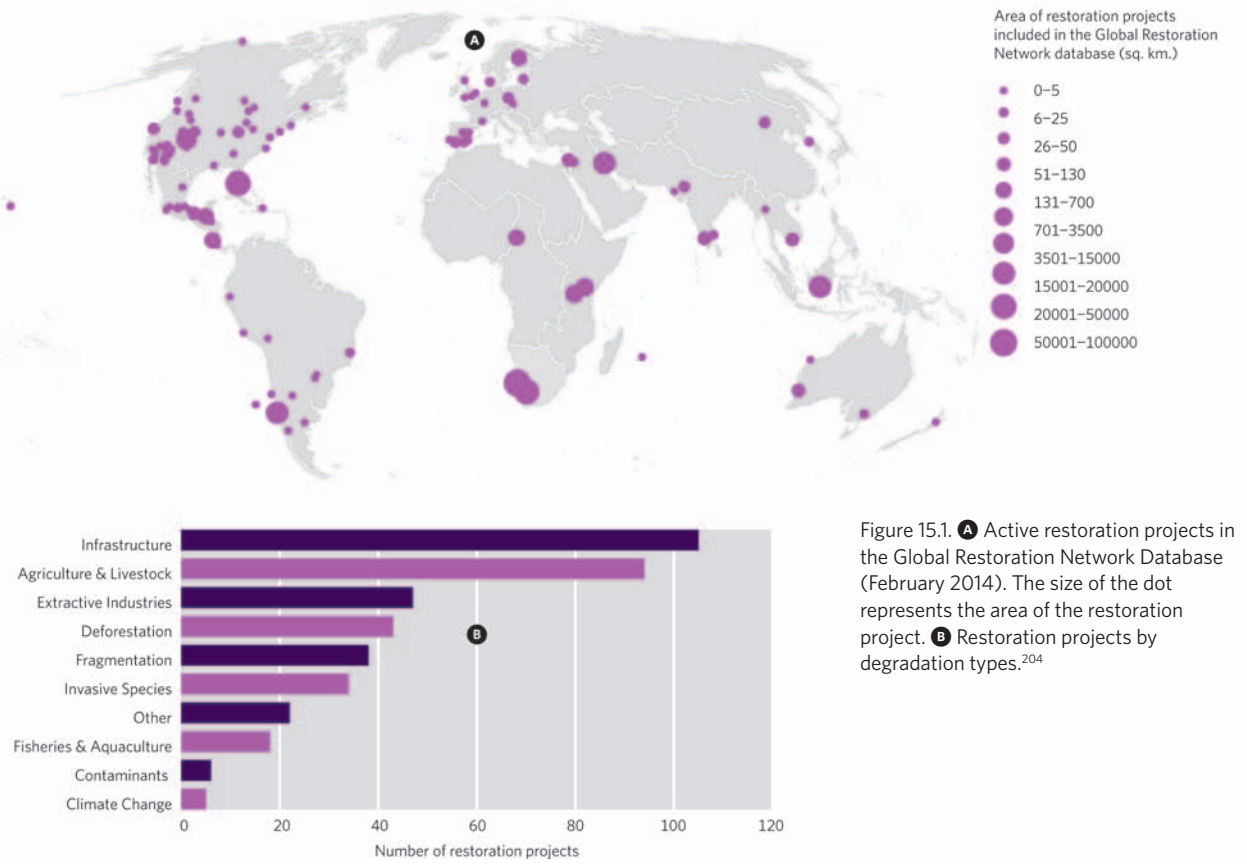


Figure 15.1. A Active restoration projects in the Global Restoration Network Database (February 2014). The size of the dot represents the area of the restoration project. B Restoration projects by degradation types.[204]

Box 15.1. Ecosystem restoration in China

Desertification, sandstorms and floods in China have been attributed to extensive land degradation in the country, including in the upper reaches of the two largest rivers of China, the Yangtze River and the Yellow River.[205] Pilot projects were initiated in 1999 and subsequently extended, including the Natural Forest Resources Conservation Program and the Restoring Farmland into Forest Program. More than USD 80 billion has been invested in these key ecological projects. Logging has been prohibited in most natural forests, and cultivated land on areas with slopes of more than 25 degrees have to be terraced or restored with vegetation that will protect against erosion.[206] To compensate for the loss of agricultural fields, farmers receive subsidies and grain. They also keep all the profits arising from restored forests and pastures.[207] Since 2001, ecological conditions of key project regions have improved. Forest resources across the country have increased consistently with reforestation of 482,000 km^2 and forest coverage increased by 23% over that of a decade ago. The current forest coverage rate has reached 20.4%, nearly 4% more than a decade ago. The forest reserves have reached 13.72 billion m^3, over 20% more than a decade ago. These projects have also enhanced restoration of habitats and contributed to a rise in the population of wild species.[208] However, there are indications that although the local population recognizes the need for environmental rehabilitation,[209] some habitats could be degraded if the state subsidies are eliminated.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in this report, the following actions are effective and would help to accelerate progress towards Target 15, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Developing a comprehensive land-use mapping and planning approach which provides for the protection, and if necessary, the restoration of native vegetation on vulnerable sites (eg: waterways, coastal areas, sloping land, hilltops), enables increased ecological connectivity, and, as appropriate, specifies minimum areas for native vegetation (*Targets 5 and 11*)

- Identifying opportunities and priorities for restoration, including highly degraded ecosystems, areas of particular importance for ecosystem services and ecological connectivity, and areas undergoing abandonment of agricultural or other human-dominated use, taking into full account the current use of land, including by indigenous and local communities (*Target 14*)

- Environmental permitting procedures and market instruments such as wetland mitigation banking, payments for ecosystem services and appropriate non market based mechanisms (*Targets 2 and 3*)

- Increasing the contribution of biodiversity to carbon sequestration through state or private sponsored passive and active afforestation programs, such as the REDD+ mechanism

- Where feasible, making restoration an economically viable activity, by coupling income generation with restoration activities (*Targets 2 and 3*)

- Promoting an integrated landscape approach with stakeholder engagement with a view to promoting large scale restoration while also meeting the long-term socioeconomic needs of local communities, for example, by providing support for sustainable increases of agricultural and rangeland productivity in neighboring areas and generating employment (*Target 7*)

Box 15.2. Agricultural abandonment and rewilding in the European Union[210]

The European landscape is marked by millennia of human pressure on the land. Over the last few decades, as market competition increased globally, agriculture became less profitable for European farmers in areas that are both less productive and harder to cultivate. This led to substantial rural depopulation since the mid 20th century, feeding a "circle of decline" of remote agricultural areas, only tempered by the subsidies system of the European Common Agricultural Policy. Between 1990 and 2000, nearly half a million hectares were converted from agriculture to (semi) natural areas. Future scenarios predict that the aging rural population in remote areas will not be replaced, hence increasing the contraction in Europe's farmland area on semi-natural grasslands and mountain areas. Some scenarios project a further decrease of up to 15% in the total agricultural area of the EU27 by 2030, consistent with projections of up to 20% loss in the area used by the main food crops in developed countries by 2050.The areas projected to be abandoned are mainly located in mountain ranges, but also more generally in central Europe, Northern Portugal and Southern Scandinavia (see Figure 15.2).

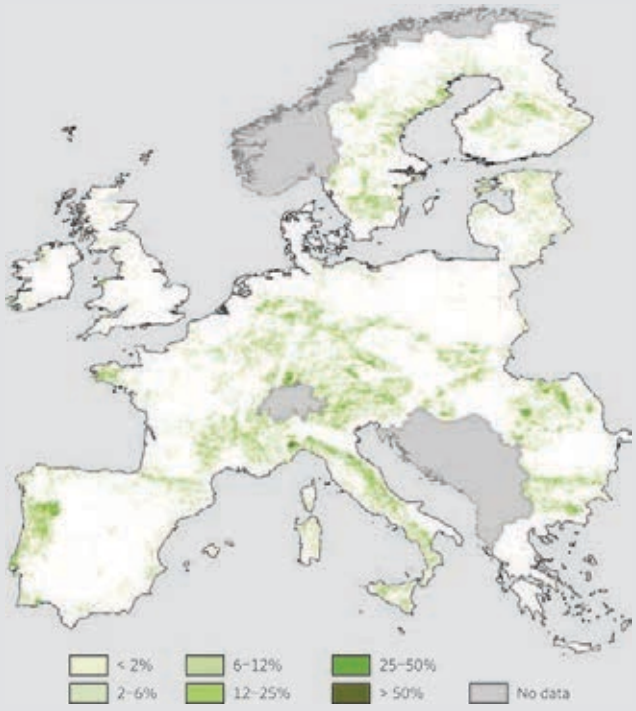


Figure 15.2: Areas projected for transition from agriculture to forest or semi-natural habitats 2000–2030. Figures are percentage of the area of each 100km2 grid cell.[211]

Rewilding aims at restoring natural ecological succession, leading to self-sustaining ecosystems and ecosystem processes, and emphasizes process-based conservation approaches. Most European arable land would need 12 to 20 years to go from abandoned to (semi) natural, but some areas would require more than 40 years, to which another 15 to sometimes over 50 more years must be added until forest becomes the dominant cover. Moreover, the withdrawal of agriculture might leave land vulnerable to species invasions and fire. These limits to 'passive restoration' can be overcome by active measures in early post-abandonment stages, such as the localized establishment of seed banks or even the reinforcement or reintroduction of disturbance agents, for example grazing and browsing animals, and prescribed burning.

A recent review, identified 60 bird species, 24 mammal species and 26 invertebrate species that would benefit from land abandonment and rewilding while another 101 "loser" species were identified. Europe is currently witnessing a wildlife comeback, especially of species of European megafauna, most of which were locally extinct in many regions, such as Iberian ibex, Eurasian elk, roe deer, red deer, wild boar, golden jackal, and grey wolf. Nonetheless, land abandonment has also been identified as a threat to some bird species such as the Barnacle goose, white stork, lesser kestrel, saker falcon, bearded vulture, and eastern imperial eagle. Still, the impacts of rewilding on farmland-associated species will likely be attenuated by their adaptation to alternative habitats and by the maintenance of habitat mosaics at regional scales.

TARGET 16

Access to and sharing benefits from genetic resources

By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.

Why this target is important

The fair and equitable sharing of the benefits arising out of the utilization of genetic resources is one of the three objectives of the Convention on Biological Diversity. The Nagoya Protocol, adopted in 2010, provides a transparent legal framework for the effective implementation of this objective. The Protocol covers genetic resources and associated traditional knowledge, as well as the benefits arising from their utilization by setting out core obligations for its contracting Parties to take measures in relation to access, benefit-sharing and compliance.

Bringing this Protocol into force and making it operational within countries is an important target for implementing the Strategic Plan on Biodiversity and for achieving the third objective of the Convention.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
The Nagoya Protocol is in force	
The Nagoya Protocol is operational, consistent with national legislation.	

Recent trends, current status and future projections

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization enters into force on 12 October 2014 following its ratification by 51 Parties[212] to the Convention on Biological Diversity (see figure 16.1). Thus this component of the target has been met in advance of the deadline set. This opens up new opportunities for the fair and equitable sharing of the benefits arising from the utilization of genetic resources.

Examples are already available of agreements following the principles of the Nagoya Protocol, in which providers of genetic resources receive benefits arising from the use of these resources. There are also many examples of access and benefit sharing agreements which provide benefits to indigenous and local communities from the development of products and services derived from the use of their traditional knowledge concerning local plant and animal species (see Box 16.1).

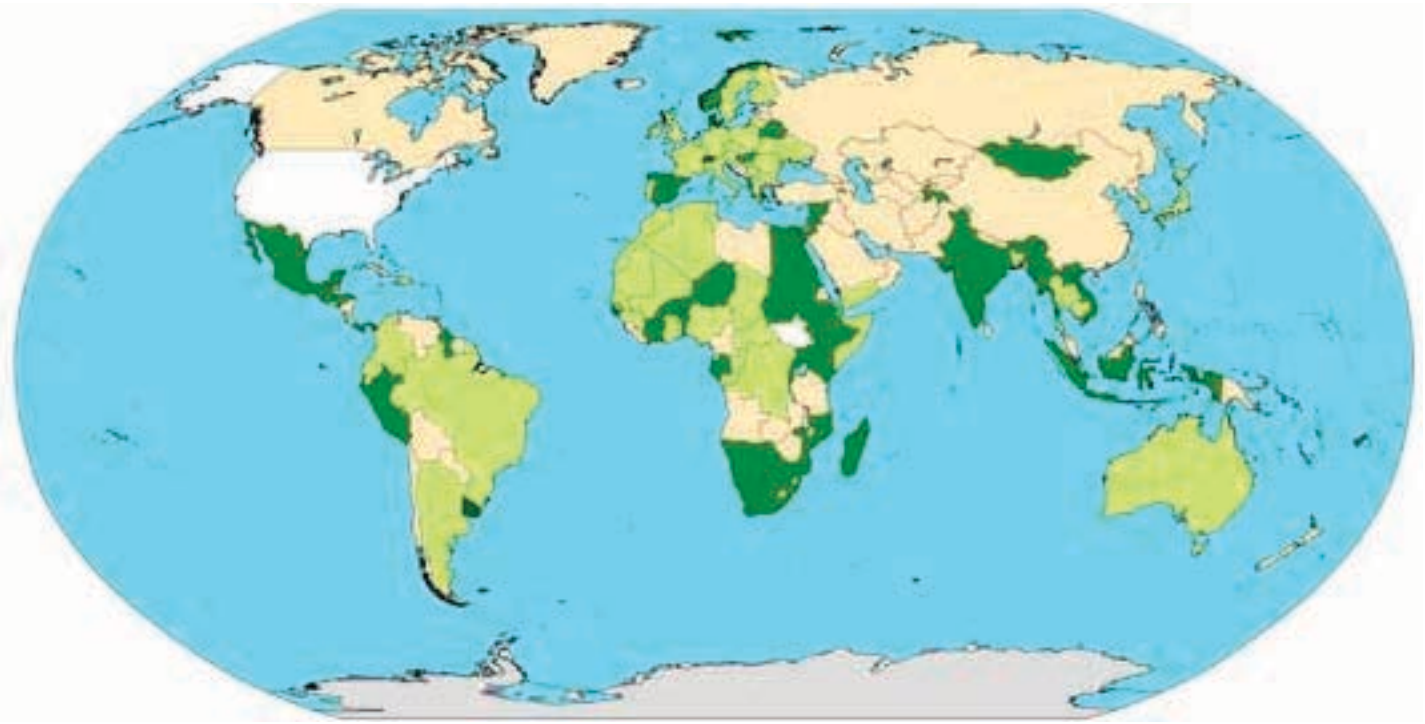


Figure 16.1 The Parties to the Convention on Biological Diversity that had ratified, approved or acceded to the Protocol by 14 July 2014, thereby enabling it to enter into force (dark green) or have signed it (light green).

Box 16.1. Access and benefit sharing in action—Researching traditional bone-healing techniques in the Cook Islands

Dr Graham Matheson, a medical researcher from the Cook Islands, observed the traditional application of plant-based extracts for treatment of bone fractures and other medical and therapeutic applications, by members of his community, friends and family. In 2003 he developed a proposal for the investigation and potential commercialization of medical and therapeutic remedies and cosmetic applications based on those plant extracts and reached a benefit-sharing agreement with the recognized indigenous representative body—the Koutu Nui. This led to the establishment of the company 'CIMTECH' which incorporates the Koutu Nui as a shareholder.[213]

The Koutu Nui shareholding value is estimated to be at least $150,000. The research income to CIMTECH includes: $264,000 in grants received from the Australian Government, and $74,000 from University of New South Wales. It also includes employment of 12 people on a part time basis in the Cook Islands, $560,000 in pre-seed investment in 2010 and a further $800,000 in 2011 for research and development. The project is expected to contribute to the local economy through the laboratory and processing facility in Raratonga, as well as through sales, marketing and tourism, including use of products in spas and hotels.

Matheson and CIMTECH have filed for a number of patents covering three distinct areas: bone and cartilage treatment, wound healing, and skin care treatments. Preliminary production and processing of essential oil solutions has begun and a skincare line called "Te Tika" has been launched.[214]

Actions to Enhance Progress Towards the Target

The following actions would support the full achievement of Target 16

- For countries that have not yet done so, to deposit their instrument of ratification, acceptance, approval or accession to the Nagoya Protocol as soon as possible to ensure full participation in the Protocol
- Putting in place, by 2015, legislative, administrative or policy measures and institutional structures for implementing the Nagoya Protocol
- Making national information available through the ABS Clearing House (see Box 16.2)
- Undertaking awareness raising and capacity building activities, including by engaging with indigenous and local communities and the private sector

Box 16.2. The Access and Benefit-sharing Clearing-house

Article 14 of the Nagoya Protocol establishes an ABS Clearing-House as part of the clearing-house mechanism of the Convention. The Secretariat of the CBD is currently implementing the pilot phase of the ABS Clearing-House. Once fully operational, the ABS Clearing-House will serve as a means for Parties to share information related to access and benefit-sharing, including relevant legislative, administrative and policy measures, national focal points and competent national authorities, and permits or their equivalents, among other things. The ABS Clearing-House will play a key role in enhancing legal certainty and transparency and in promoting compliance. Having a fully functional ABS Clearing-House by the time of entry into force is essential for making the Protocol operational, and will significantly contribute towards achieving Aichi Target 16.[215]

Strategic Goal E

Enhance implementation through participatory planning, knowledge management and capacity-building

TARGETS

This goal within the Strategic Plan aims to create the enabling environment for the other targets to be effectively addressed. In this respect, an important and necessary step has been the drawing up and revising of national biodiversity strategies and action plans, which most countries will have completed by the target date of 2015. However, the level of implementation of these plans remains to be proven, and it will be crucial to use them as a way of turning the Aichi Biodiversity Targets into reality at national level. Respect for and inclusion of traditional knowledge in biodiversity action also remains variable, with some indicators suggesting a continued erosion of cultural diversity for example through the loss of indigenous languages. Important progress has been made in the sharing of and access to data, information and knowledge on biodiversity, but capacity to share and use that knowledge remains an obstacle. An overriding concern relating to the entire Strategic Plan is the lack of any sign of a substantial increase in resources towards its implementation.

TARGET 17

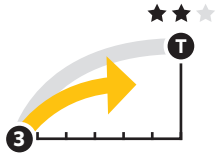
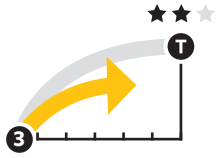
Biodiversity strategies and action plans

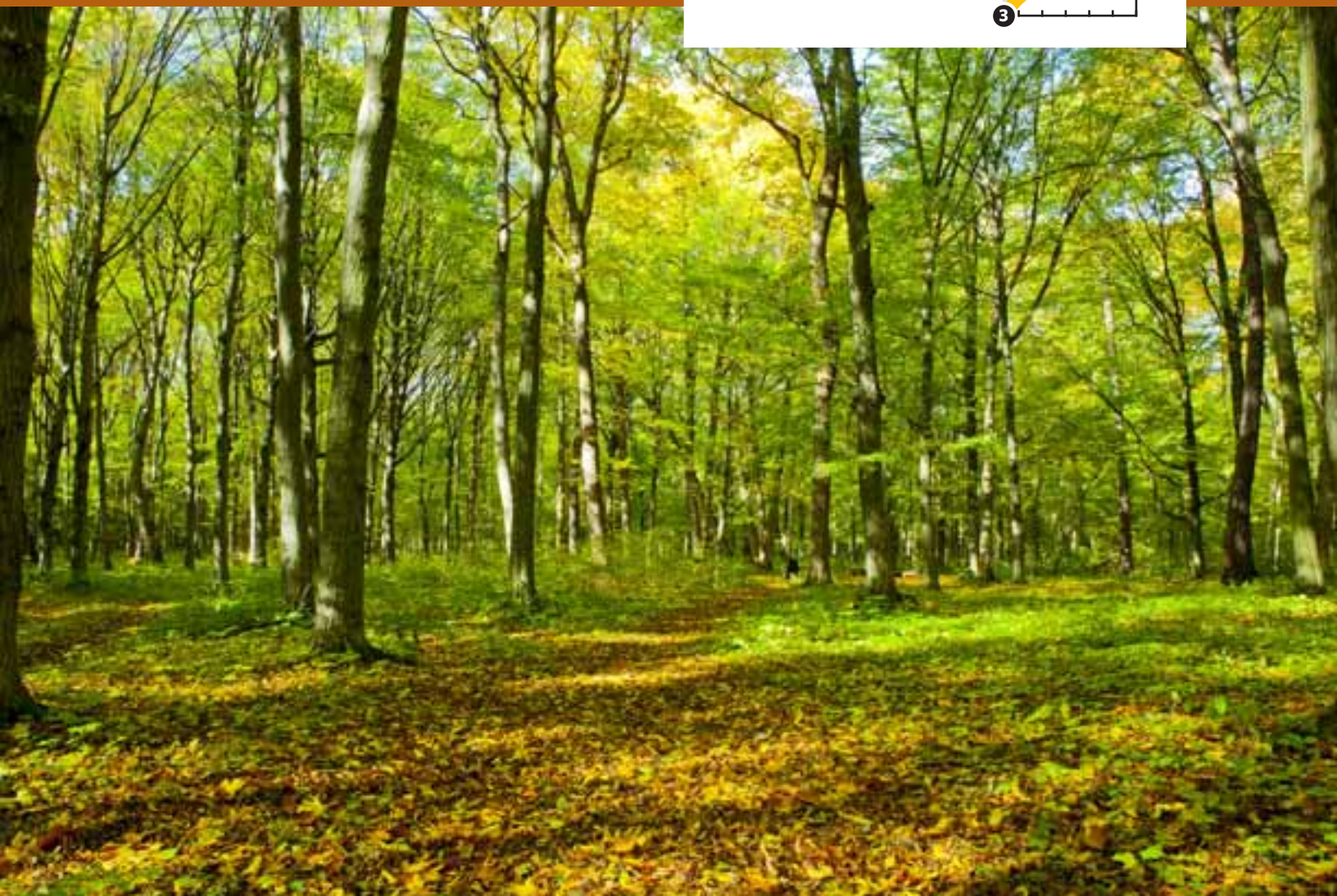
By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.

Why this target is important

National biodiversity strategies and action plans (NBSAPs) are the key instrument for translating the Convention on Biological Diversity and the decisions of its Conference of the Parties into national action. The attainment of this target would, therefore, facilitate the achievement of all of the Aichi Biodiversity Targets.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Submission of NBSAPs to Secretariat by (end of) 2015	
NBSAPs adopted as effective policy instrument	
NBSAPs are being implemented	



Recent trends, current status and future projections

179 of the 194 Parties to the Convention have developed NBSAPs, at least 57 of which are still current. Parties are currently updating their NBSAPs in line with the Strategic Plan for Biodiversity 2011–2020. Twenty six had done so by August 1, 2014. For other Parties for which information is available, more than 40% are expected to have completed their NBSAP by October 2014 and about 90% by the end of 2015. This part of the target is, therefore, expected to be largely met by the deadline.

However, the adequacy of available updated NBSAPs in terms of following the guidance set by the CBD's Conference of the Parties (COP) is variable. The degree to which countries are implementing their updated strategies and action plans is also variable, suggesting that, while progress can be reported on these components of the target, they will not be achieved by 2015.

Box 17.1. Examples of processes to revise national biodiversity strategies and action plans (NBSAPs)

Japan: Japan's fifth NBSAP was finalized in September 2012. An inter-ministerial committee drafted the revised NBSAP and the Central Environmental Council conducted interviews with sectors including NGOs, businesses and local authorities. Local briefings and consultation meetings were also organized on this draft and public comments on the draft NBSAP were invited prior to it being finalized.

Suriname: Suriname's updated NBSAP was finalized in February 2013 and was based on the National Biodiversity Strategy finalized six years earlier. A variety of ministries were involved in the development of the NBSAP, including the Ministries of Labour, Technological Development and Environment, of Physical Planning, Land and Forest Management and of Agriculture, Animal Husbandry and Fisheries among others. Experts in different sectors were consulted on the relevance and feasibility of the proposed actions. Prior to finalizing the NBSAP a validation workshop was held.

Cameroon: As part of the process of revising its NBSAP, the country undertook country studies and stocktaking exercises which, among other things, analysed gaps between the previous NBSAP and the current situation in the country, identified the causes and consequences of biodiversity loss in Cameroon and explored the specific contributions that NGOs have made to biodiversity.[218]

Actions to Enhance Progress Towards the Target

The following actions would allow the full achievement of Target 17:

- Ensuring that the NBSAP is developed through an open, consultative and participatory process involving a wide range of rights-holders and stakeholders from across the country, including indigenous and local communities

- Ensuring that the NBSAP is adopted as an effective policy instrument recognized across the whole of government

- Ensuring that the NBSAP is up to date and aligned with the Strategic Plan for Biodiversity 2011–2020 and the Aichi Biodiversity Targets, for example by setting national targets with corresponding indicators and monitoring mechanisms, and keeping it under review once it has been developed and is being implemented, with the participation of all stakeholders

- Ensuring that the necessary institutional structures are in place to implement the NBSAP, including a mechanism for inter-ministerial and inter-sectoral coordination, and mechanisms to secure the necessary human and financial resources

Table 17.1. Ⓐ Number of countries that have developed and revised NBSAPS and Ⓑ effectiveness of updated NBSAPS (as of 27 July 2014)

	n=194	NBSAP
	Parties that have developed at least one NBSAP	**179**
	Parties that have not developed an NBSAP	**15**
Ⓐ	*Parties that have revised their NBSAP at least once*	**45**
	Parties that currently have targets in their NBSAP with timelines extending to 2014 or beyond[216]	**57**
	Parties with NBSAPs adopted since 2010	**26**

	n=26		Effectiveness of NBSAP
	Updated NBSAPs containing national targets	Yes	**22**
		No	**4**
	Updated NBSAPs clearly linking national targets to Aichi Biodiversity Targets		**8**
Ⓑ	*Updated NBSAPs containing indicators*[217]	Yes	**10**
		No	**10**
	NBSAP supported (or plan to be) by a monitoring system		**21**

TARGET

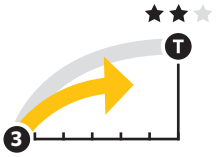
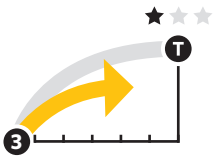
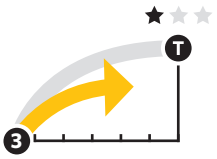
Traditional knowledge

By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.

Why this target is important

Traditional knowledge contributes to both the conservation and the sustainable use of biological diversity. This target aims to ensure that traditional knowledge and customary sustainable use is respected, protected and encouraged with the effective participation of indigenous and local communities and reflected in the implementation of the Convention. Given the cross cutting nature of this target, actions taken to fulfill it will contribute to several of the other Aichi Biodiversity Targets.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Traditional knowledge, innovations and practices of indigenous and local communities are respected	
Traditional knowledge, innovations and practices are fully integrated and reflected in implementation of the Convention ...	
... with the full and effective participation of indigenous and local communities	

Recent trends, current status and future projections

Processes are under way internationally and in a number of countries to strengthen respect for, and recognition and promotion of, traditional knowledge and customary sustainable use. Efforts to enhance the capacities of indigenous and local communities to participate meaningfully in relevant processes locally, nationally and internationally are progressing, but limited support, recognition and capacity remain obstacles.

Overall, traditional knowledge continues to decline as illustrated by the loss of linguistic diversity (see Figure 18.1 and Box 18.1) and large-scale displacement of indigenous and local communities.[219] However, this trend is reversed in some places through growing interest in traditional cultures and involvement of local communities in the governance and management of protected areas and the growing recognition of the importance of community conserved areas.[220]

More than 60% of the national reports assessed for GBO-4 indicate progress towards this target, with actions including support for traditional natural resources management (Japan, Myanmar, and South Africa) and participatory management of forests and protected areas (Nepal).[221]

While progress has been made in all components of this target, current trends as far as they can be assessed suggest that the actions taken to date are insufficient to achieve the target by 2020.

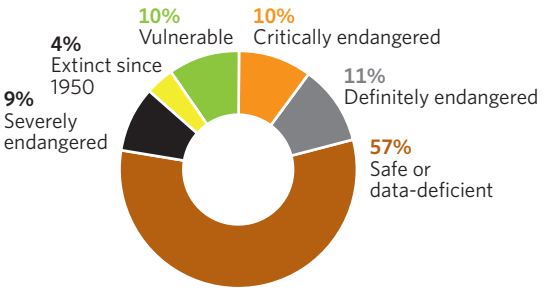


Figure 18.1. Level of threat to the world's languages. According to UNESCO's Atlas of World Languages in Danger, at least 43 per cent of languages are in danger of disappearing, based on the degree of transmission between generations.[222]

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in GBO-4, the following actions are effective and would help to accelerate progress towards Target 18, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Developing national guidelines or action plans, aligned with relevant guidance under the CBD, on recognizing and safeguarding the rights of indigenous and local communities over their knowledge

- Promoting local initiatives that support traditional and local knowledge of biodiversity and promote customary sustainable use, including traditional health care initiatives, strengthening opportunities to learn and speak indigenous languages, research projects and data collection based on traditional methodologies (*Target 19*), and involving indigenous and local communities in the creation, control, governance and management of protected areas (*Target 11*)

- Raising awareness of the importance of traditional knowledge to conservation and sustainable use of biodiversity (*Target 1*)

- Supporting and cooperating in the organization of capacity-building activities on relevant issues under the Convention for indigenous and local communities, as well as cultural awareness raising programmes

- Promoting effective participation of indigenous and local communities, at all levels, in issues related to biodiversity and of interest to them

Box 18.1. Risk to indigenous languages in the Arctic

Twenty-one northern languages have become extinct since the 1800s and ten of these extinctions have taken place since 1990, indicating an increasing rate of language extinction. Of these extinctions, one was in Finland, one in Alaska, one in Canada and 18 in the Russian Federation. Twenty-eight languages classified as critically endangered are in dire need of attention before they, too, are lost forever.

Revitalization efforts of various kinds are taking place in different regions and are strong testimony to the interest of indigenous peoples in revitalizing and promoting their languages and cultures. Revitalization programs are largely grassroots movements with a variety of activities, such as intensive summer school programs, language use in local schools and special courses aimed at adult learners.

Figure 18.2. Status of languages among linguistic families in the Arctic region.[223]

Box 18.2. Monitoring of traditional knowledge in the Philippines

Indigenous Kalanguya communities in Tinoc, Ifugao Philippines have been revitalizing customary land use and territorial management using culturally-defined ecosystems-based approaches. Tinoc is one of the pilot communities of the Philippine Traditional Knowledge Network (PTKN) where community-based monitoring of traditional knowledge is being conducted using multiple indicators, e.g. on linguistic diversity, traditional occupations, land tenure and land use change.

Data generated includes cultural mapping of multiple land and forests uses, documentation of customary tenure systems, traditional occupations, status of traditional knowledge holders and cultural transmission. The status of flora and fauna, productivity of major crops and soil fertility has also been investigated. Some findings include: contraction of watershed forests to 60 per cent of their size in 1970 due to conversion to vegetable farming and up to 30–50 per cent decline in rice yields due to weakening of traditional knowledge about soil enhancement practices as well as increased pest damage due to moving away from traditional pest control such as through synchronized farming activities.

The information gathered through the project is being used to stimulate community actions on conservation, sustainable use and customary governance over lands, forests and waters. Plans have been developed for revitalizing traditional knowledge and strengthening customary practices and law, including biodiversity management plans and demarcation of protected watershed areas and to strictly control the privatization of common lands critical for community wellbeing and biodiversity. It has led to the adoption of a covenant (by the local community and local government) to prevent environmental degradation and promote peoples' wellbeing through the revival of indigenous knowledge practices and systems of territorial management.[224]

TARGET

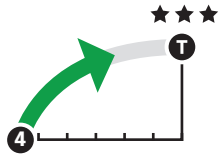
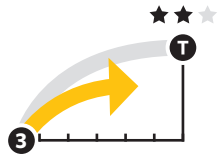
Sharing information and knowledge

By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.

Why this target is important

Biodiversity-related information is vital to identify threats to biodiversity, to determine priorities for conservation and sustainable use and to enable targeted and cost effective action. Given this, progress towards this target can contribute to the attainment of the other Aichi Biodiversity Targets. This target is a general commitment to increase the amount and quality of biodiversity relevant information and technologies available, to make better use of these in decision making, and to share them as widely as possible.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved	
Biodiversity knowledge, the science base and technologies are widely shared and transferred and applied	

Recent trends, current status and future projections

Data and information on biodiversity are being shared much more widely through a range of national, regional and global initiatives. They include networks to promote and facilitate free and open access to digitized records from natural history collections and observations, including through citizen science initiatives; collaboration to build a complete catalogue of the world's species; and the development of 'DNA barcoding' as a means of identifying species (see Figure 19.1).[225] However, much data and information remain inaccessible and capacity is lacking to mobilize them in many countries.

The need for more coordinated efforts to monitor biodiversity, using standard or harmonized protocols is recognized in the work of the Group on Earth Observations Biodiversity Observation Network (GEO BON), envisaging a global network to link *in situ* and remotely sensed information. GEO BON is developing a set of Essential Biodiversity Variables (EBVs) aimed at improving the efficiency of monitoring by focussing observations on a limited number of key attributes.[226]

Knowledge on biodiversity has advanced tremendously in the past 20 years, and networks such as DIVERSITAS have helped to bring scientists together to collaborate on research of relevance to society and decision making. This process is further enhanced with the establishment of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), whose programme of assessments, knowledge generation, capacity building and policy tools aims to enable better informed decisions at all scales.

Countries have made considerable investments in improving national information and monitoring systems on biodiversity, and in international data-sharing infrastructures such as the Global Biodiversity Information Facility (see Box 19.1) and its national nodes, and through regional initiatives (see Box 19.2).

With the advances made in building systems to share data, information and knowledge on biodiversity, a significant part of this target is judged to be on track. However, to meet all components of the target, further efforts are needed on investment in data mobilization and the coordination of models and technologies that can be readily applied to decision making.

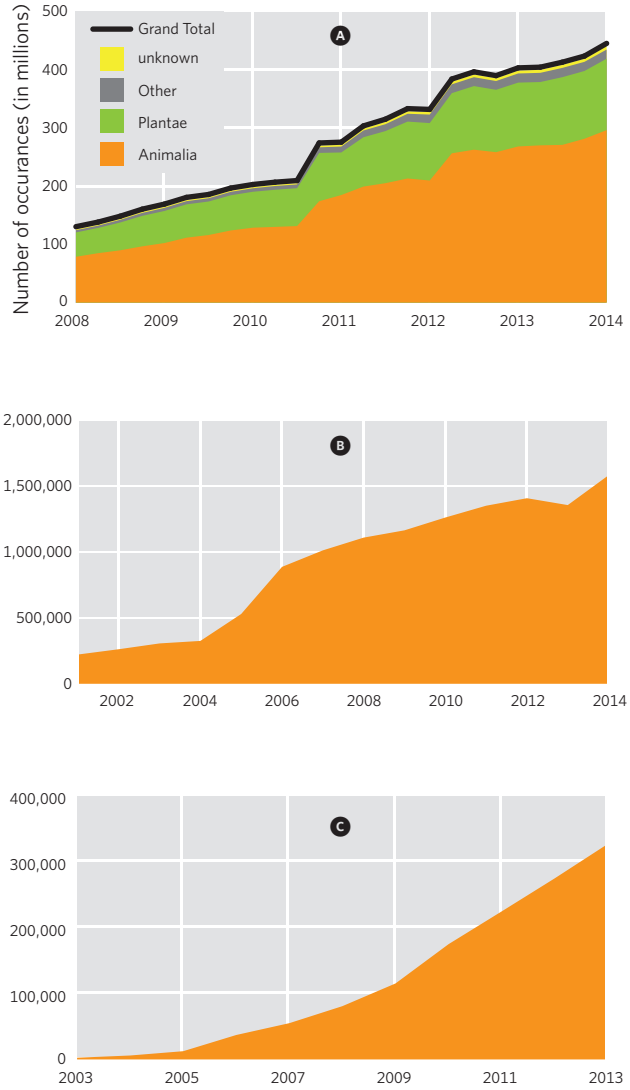


Figure 19.1. Growth in A Species occurrence records published through the Global Biodiversity Information Facility,[227] B Species covered in the Catalogue of Life annual checklist[228] and C Number of animal species represented in the Barcode of Life Data System global reference library.[229]

Box 19.1. The Global Biodiversity Informatics Outlook: Delivering biodiversity knowledge in the information age[230]

The Global Biodiversity Informatics partnership has developed the Global Biodiversity Informatics Outlook (GBIO) as a framework and concept to promote mobilization, access, use and analysis of primary data and distilling policy-relevant information. It identifies the need for organized activity based on four focus areas:

- Creating a culture of shared expertise, robust common data standards, policies and incentives for data sharing and a system of persistent storage and archiving of data.
- Mobilizing biodiversity data from all available sources, to make them promptly and routinely available. Data should be gathered only once, but used many times. This includes data in all forms from historic literature and collections to the observations made by citizen scientists; from the readings of automated sensors to the analysis of the genetic signatures of microbe communities.
- Providing the tools to convert data into evidence by enabling those data to be discovered, organizing them into views that give them context and meaning. This includes major collaborative efforts to improve the accuracy of data and their fitness to be used in research and policy; to provide a taxonomic framework; and to organize information about the traits of species and the interactions between them.
- Generating understanding of biodiversity and our impacts upon it, by applying the evidence in models, tools for visualization and identifying gaps to prioritize future data gathering.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in this report, the following actions are effective and would help to accelerate progress towards Target 19, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Developing inventories of existing biodiversity information as a means of identifying knowledge gaps and defining research priorities, and making greater use of existing national and international research networks to help address these

- Strengthening and promoting the further mobilization of and access to data by, for example, encouraging the use of common informatics standards and protocols, promoting a culture of data sharing (for example, requirements for publicly-funded research and recognition for the publication of datasets), investing in digitization of natural history collections and promoting citizen scientists' contributions to the body of biodiversity observations;

- Facilitating the use of biodiversity related information by decision makers at national and local levels

- Establishing or strengthening monitoring programmes, including monitoring of land-use change, providing near-real time information where possible, in particular for "hotspots" of biodiversity change,

- Engaging indigenous and local communities as well as relevant stakeholders in information collection and use, including through support for community-based monitoring and information systems (*Target 18*)

- Supporting communities of practice and stakeholders in relevant skill fields, and strengthening cooperation among relevant national institutions, national and regional centres of expertise in biodiversity and other relevant stakeholders and initiatives

- Ensuring that relevant biodiversity information is made available in a way that it can be easily accessed and improving national, regional and international Clearing House Mechanisms, strengthening thematic information-based services and establishing interconnections in order to contribute to the development of a global biodiversity knowledge network

Box 19.2. Sharing information on the forests of the Congo Basin: Observatoire des Forêts d'Afrique Centrale (OFAC)

In Central Africa, data availability about the state of the forests and forest biodiversity has always been a critical issue. Under the authority of COMIFAC (*Commission Ministérielle des Forêts d'Afrique Centrale*), the OFAC (*Observatoire des Forêts d'Afrique Centrale*) is a unique regional observatory to monitor forest resources spanning 10 countries, and 187 million hectares of rain forests). OFAC annually collects, verifies and harmonizes general data on forests through a network of partners and disseminates information through a web-based information system. This data is analysed by experts to produce the "State of the Congo Basin Forests" reports (SOF), including information on forest cover, biodiversity and other issues. Recently OFAC became part of the global Digital Observatory for Protected areas (DOPA) conceived as a set of 'critical biodiversity informatics infrastructures' to provide users such as park managers, decision makers and observers with the means to assess, monitor and possibly forecast the state of and pressures on protected areas at the global scale.[231]

TARGET

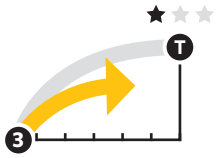
Mobilizing resources from all sources

By 2020, at the latest, the mobilization of financial resources for effectively implementing the Strategic Plan for Biodiversity 2011–2020 from all sources, and in accordance with the consolidated and agreed process in the Strategy for Resource Mobilization, should increase substantially from the current levels. This target will be subject to changes contingent to resources needs assessments to be developed and reported by Parties.

Why this target is important

The overall objective of this target is to increase the amount of resources available to implement the Strategic Plan for Biodiversity. The fulfillment of this target will have implications on the feasibility of achieving the other 19 targets contained in the Strategic Plan.

SUMMARY OF PROGRESS TOWARDS THE TARGET

TARGET ELEMENTS (BY 2020)	STATUS
Mobilization of financial resources implementing the Strategic Plan for Biodiversity from all sources have increased substantially from 2010 levels	

Recent trends, current status and future projections

In its first assessment the High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011–2020 concluded that the cost of attaining the twenty Aichi Biodiversity Targets would be somewhere between US$ 150 billion and US$ 440 billion per year.[232] However the Panel also noted that these figures needed to be regarded as broad approximation of the resources required to attain the targets rather than exact estimates. The second assessment of the High Level Panel concluded that the available evidence broadly supports these estimates but that for some targets the estimates may be conservative.[233] Both assessments concluded that most of the investments required to attain the targets will deliver multiple benefits and should not be financed from biodiversity budgets alone and that many activities could be jointly funded through budgets for agriculture, forestry, fisheries, water, pollution control and climate action as these benefits would extend to biodiversity.

Other estimates related to funding, both at the national level (See box 20.1) and in relation to specific Aichi Biodiversity Targets (see Box 20.2), have also been undertaken. These estimates generally support the conclusion that there is currently a significant funding gap related to the implement the Strategic Plan.

There is limited information on domestic funding in support to biodiversity. However some estimates suggest that globally it is around US$ 20 billion a year or more.[234] More than 30 Parties have reported on domestic biodiversity funding through a preliminary reporting framework developed under the Convention.[235] While this information does not allow for a comprehensive global assessment of domestic biodiversity funding at this stage, most of these countries report stable or moderately increasing levels of domestic funding over recent years (see, for example, Box 20.3). There is also limited information related to resources provided through other channels such as the private sector and non-government organizations, as well as through innovative financial mechanisms.

There has been a general increase in bilateral biodiversity-related official development assistance (ODA) against the 2006–2010 baseline. The amount of resources devoted to activities that have biodiversity marked as a principle objective has remained relatively flat between 2006 and 2012. The general increase in bilateral biodiversity related ODA over this time period is largely attributable to an increase in ODA marked as targeting biodiversity as a "significant" objective (see Figure 20.1). While there was a small decline in biodiversity-related aid in 2012, overall, aid to developing countries reached an all-time high in 2013.

Multilateral ODA is also a significant source of funding for biodiversity however there is limited information on the total amount of funds provided through this channel. One example of multilateral ODA is the funding provided through the Global Environment Facility (GEF). The amount of resources to the GEF has been increasing over time, with a particularly large increase between GEF-4 and GEF-5. However the amount of resources provided specifically to the biodiversity focal areas has remained relatively flat in absolute terms since GEF-3 (See Figure 20.2). During the GEF-6 replenishment meeting donor countries pledged to provide US$ 4.43 billion to support developing countries over a four year period, in preventing the degradation of the global environment, including US$ 1.30 billion for biodiversity.[236]

Recent trends and the limited information available, suggest that while some progress has been made towards this target, progress to date is not sufficient to meet the target by 2020.

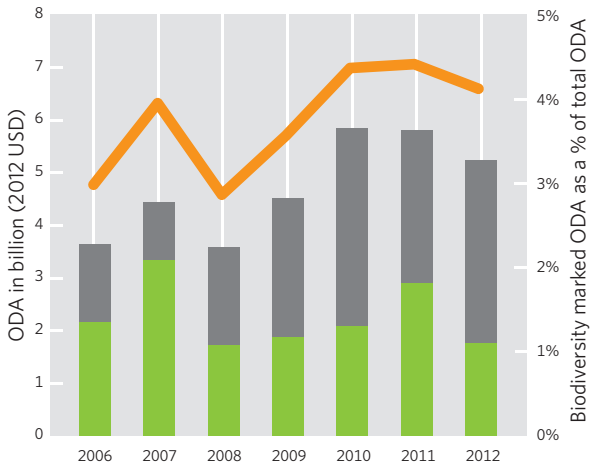


Figure 20.1. Biodiversity marked official development assistance (ODA) between 2006 and 2012 in billions of USD (2012 constant prices) and as a percentage of total ODA.[237] Principal official development assistance refers to funding which is provided specifically to address issues related to biodiversity. Signifigant official development assistance refers to funding which may have other primiairy pruposes but is nontheless relevant to biodiversity.

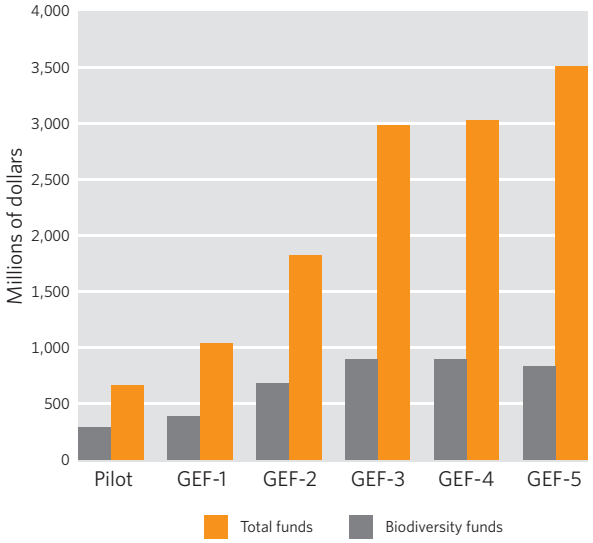


Figure 20.2. Total GEF funding and the funds for the biodiversity focal area between the pilot phase and GEF-5 expressed in millions of dollars as of September 2013. Where possible multifocal areas funds have been disaggregated and attributed to the biodiversity focal areas as appropriate.[238]

Box 20.1. Evidence of funding gaps in the United Kingdom[239]

The costs for meeting the United Kingdom´s environmental targets for "biodiversity, landscape, climate change mitigation, flood risk management, farmland historic environment, soil quality, water quality, resource protection and public access" was estimated based on the established UK targets and current agri-environment payment rates, and assumes management on all 16,2 million hectares of agricultural and forestry land in the UK. The total costs are estimated to reach 1.986 billion per year [US$ 2.906 billion per year], which is three times the existing annual agri environment budget. Furthermore it is stated that costs are probably significantly underestimated.

Actions to Enhance Progress Towards the Target

Based on the various lines of evidence used in this report, the following actions are effective and would help to accelerate progress towards Target 20, if more widely applied. They would also contribute to other targets, shown in parentheses:

- Articulating the various values of biodiversity for the economy and society through national, and where relevant, sub-national, assessments (*Targets 1 and 2)* This should include assessment of the co-benefits of investments in biodiversity, and of the long-term costs of inaction

- Developing national financial plans for biodiversity, as part of NBSAPs (*Target 17*), aligned, where possible, with national annual and multi-annual financial planning cycles. The plans should clearly identify funding needs, gaps and priorities to allow for more targeted resource use

- Integrating biodiversity in national development plans and/or national plans for development cooperation (*Target 2*);

- Broadening biodiversity funding sources including by exploring innovative financial mechanisms, such as subsidy reform and payment for ecosystem services schemes (*Target 3*), recognizing that no single source of funding will be sufficient to meet the full needs (see Box 20.4)

Box 20.2. Funding needs for reducing the extinction risk of birds[240]

An assessment considering the costs of improving the conservation status of threatened bird species (specifically, to "downlist" each by one IUCN threat category) estimated, that for 1115 globally threatened species the costs would be between US 0.875 and 1.23 billion over the next decade. 12% of this need is currently being funded. When globally threatened species on the IUCN Red List beyond birds were considered the estimated costs increased to between US 3.41 to 4.76 billion per year over this decade. The costs of effectively protecting all Important Bird Areas (IBA) would be US 65.1 billion annually. Also protecting sites important for other taxa would increase this to US 76.1 billion annually. These estimates support the general conclusion that funding increases of an order of magnitude are needed.

Box 20.3. Biodiversity funding in India

India has undertaken a detailed assessment of the amount of funding that it provides to biodiversity conservation. The assessment considered various sources of funding including direct core and non-core funding from the Ministry of Environment and Forests as well as indirect peripheral funding, which comprises resources that are allocated by other ministries and departments that have an impact on biodiversity conservation. The funding provided through peripheral sources was calculated using a multiplier that expressed how directly related to biodiversity conservation the resource use was. Resources provided through state governments were also considered. The assessment found that during 2013–2014 more than USD 1.48 billion was spent on biodiversity conservation, 55% at the state level, 20% through the Ministry of Environment and Forests, and 25% through 24 other ministries and departments at the national level (see Figure 20.3). Core funding from central government increased from 2006 to 2013, with funds after 2010 showing an increase of about 30% compared to the 2006–2010 baseline.[241]

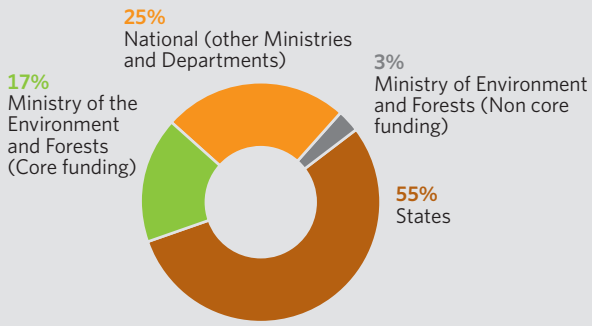


Figure 20.3: Funding provided to biodiversity conservation during 2013–2014, through different channels expressed as a percentage of total biodiversity funding.

Box 20.4. Raising resources through environmental payments: Water fund in Cauca Valley, southwestern Colombia

Valle del Cauca (Cauca Valley) is a high productive and fertile region, with a huge number of sugarcane producers. Sugarcane is also an important export and domestic crop for the country. This region lies in a very rich hydrological system containing important watersheds supplying water to 900,000 people residing in the cities, including the city capital Cali. This region is quite sensitive to climate factors causing water scarcity during the summer. A water fund was implemented to secure biodiversity and water-related services benefits, particularly reduction in sedimentation and maintenance of water flows. Activities carried out through investments by the fund include conserving at least 125,000 hectares of the natural ecosystems and improving management of the landscape. These activities will benefit 920,000 people downstream and sugar cane production.[242]

Part III
Synthesis

This final part of GBO-4 provides a synthesis of progress across the Aichi Biodiversity Targets towards 2020 and also explores the prospects for achieving the 2050 Vision of the Strategic Plan as well as the contribution to the broader sustainable development agenda

Summary of progress towards the goals of the strategic plan and the Aichi Biodiversity Targets

This sub-section provides an overview of progress towards the implementation of the Goals of the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, based on two specific sources of information: (1) extrapolations of current trends towards the five goals of the Strategic Plan according to a set of indicators, and (2) information provided by Parties to the CBD through their fifth national reports to the Convention. These sources formed part of the assessment of progress towards the individual components of all the targets provided in the preceding sections, and collated in the target 'dashboard' shown on page 18. Complementing the target-by-target expert assessments, the combined indicators, extrapolations and national reports help to provide a synthesis of progress towards the implementation of the Strategic Plan for Biodiversity, its Strategic Goals and the Aichi Biodiversity Targets.

Extrapolations of current trends

Several of the target assessments in the previous section of this Outlook and the underlying technical report[243] include graphs showing extrapolation of trends in indicators to 2020, based on past data and using statistical techniques to take the projection forward to the date when most Aichi Biodiversity Targets have their end point. These are not predictions, as they assume that all the drivers remain constant, and they cannot take account of possible changes in policies or behaviour. However, they give an indication of where some trends are likely to lead, if recent drivers and practices continue without change.

In all, 55 indicators were chosen that had relevance to the 20 Aichi Biodiversity Targets. Figure 21.1 shows a synthesis of all of these indicators, grouped according to the Strategic Goals and whether they represent the actual state of biodiversity, the pressures upon biodiversity or policy responses. The overall message of these indicators remains similar to the situation analysed in GBO-3: in general, positive responses to biodiversity issues are increasing (19 out of 32 response indicators); but indicators of pressures on biodiversity also show a projected increase (six out of seven pressure indicators); and projections of the state of biodiversity show a significant deterioration (13 of 16 state indicators) between 2010 and 2020 – all assuming that current drivers remain constant. Across the five strategic goals, the messages of these extrapolations can be summarized as follows:

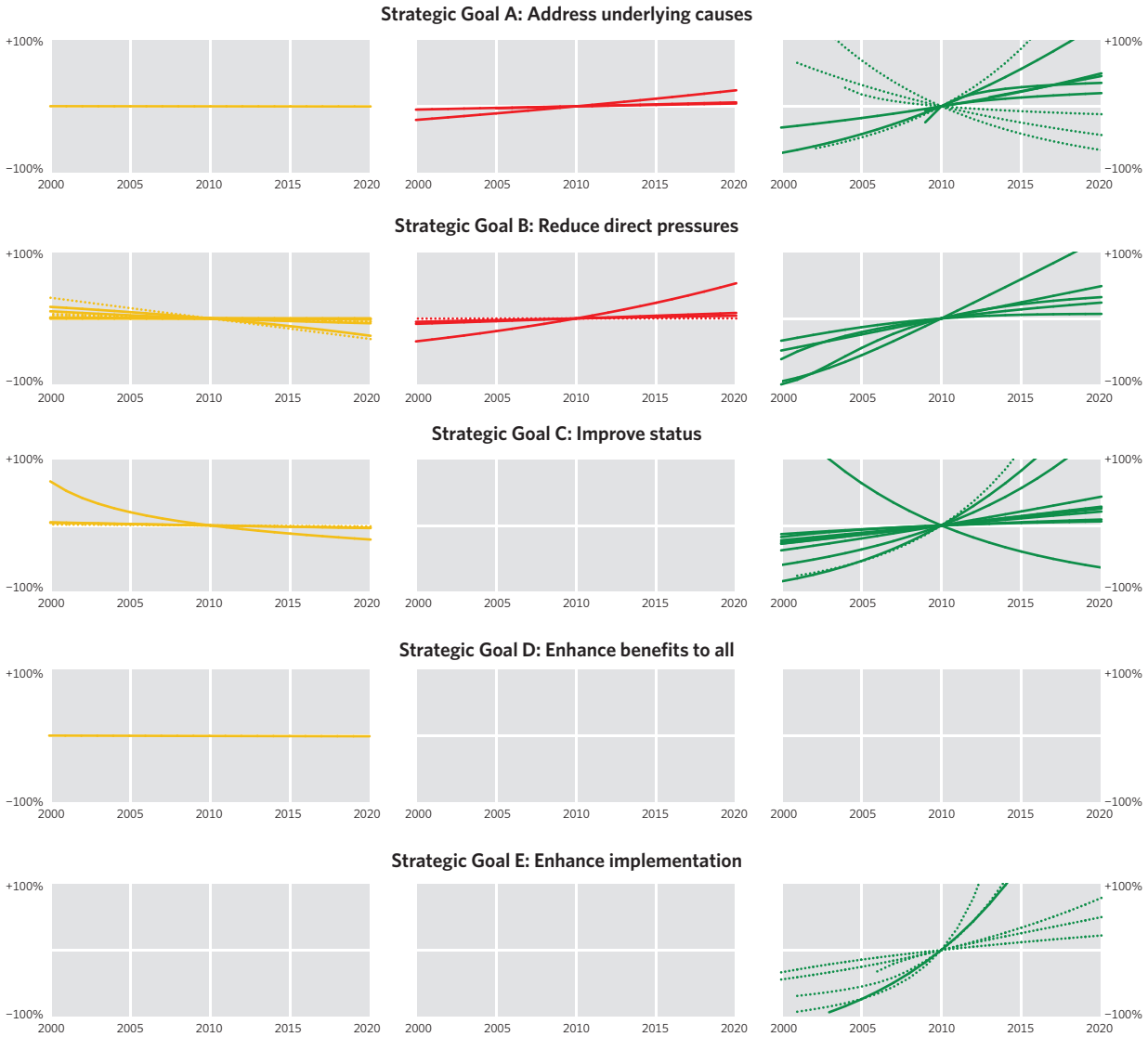


Figure 21.1. Trends in indicators from 2000 and projected to 2020 for the five Strategic Goals of the Strategic Plan for Biodiversity 2011-2020. State measures (the left column) are coloured orange, pressure measures (the middle column) are coloured red, and response measures (the right column) are coloured green. For state and response indicators, a decline over time represents an unfavourable trend (falling biodiversity, declining response) whereas for the pressure indicators a decrease over time represents a favourable trend (reducing pressure). A dashed line represents a non-significant trend, whereas a solid line represents a significant projected change between 2010 and 2020. These graphs suggest generally negative trends for both the state of biodiversity and pressures upon it, despite positive trends in the responses made to conserve and sustainably use biodiversity. Where indicators were not available for extrapolation the graphs were left blank.[244]

Strategic Goal A (Addressing underlying causes)

The targets in this goal focus mainly on responses to the underlying drivers of biodiversity loss. The response indicators relating to Goal A, for example on measures to promote sustainable consumption and production, show a positive trend. However, the extrapolations show a continuing increase in all of the indicators of pressures relating to the goal: the ecological footprint, the water footprint and human appropriation of net primary productivity (the proportion of the planet's plant growth used by people). These contrasting trends may indicate time lags in the impacts of positive changes – or that moves towards sustainable practices are still outweighed by contrasting pressures.

Strategic Goal B (Reducing direct pressures)

Indicators within this goal also show the contrast between improving responses, increasing pressures and declining state of biodiversity. While certification of sustainability is increasingly being used for forest products and fisheries, pressures of fishing effort, nitrogen use and invasive species are all projected to increase until 2020. Eleven separate measures of the state of habitats and species relating to this goal show a continuing decline.

Strategic Goal C (Improve status of biodiversity)

Two indicators of the state of biodiversity within this goal, the Living Planet Index and the Red List Index, show current declines and an extrapolation of continuing decline to 2020 based on current drivers. On the other hand, responses with positive trends include the coverage of protected areas, including their effectiveness, ecological representativeness, and degree of protection for key biodiversity sites.

Strategic Goal D (Enhance benefits)

Very few quantitative indicators directly cover the targets within this strategic goal. The only indicator directly relevant to this Strategic Goal that was available for this assessment is the Red List Indicator for pollinators which showed that these species are on average moving closer towards extinction, suggesting that this ecosystem service is in decline. However there are some indicators for the other Strategic Goals that provide evidence of progress towards the targets under this Strategic Goal. These include indicators relating to habitat extent, fishing and other pressures. The current status of these indicators suggests that ecosystems and the service they provide are in decline and are projected to continue declining up to 2020.

Strategic Goal E (Enhance implementation)

All indicators used for this goal related to responses and include indicators on the availability of data and knowledge, funding for conservation and development assistance. All of these showed recent increases, indicating positive action towards the goal, and projected continuing increases to 2020.

Conclusions

These indicators complement the more comprehensive assessments summarized in the previous section. The set of indicators is more comprehensive than those available for GBO-3, but they provide only a partial picture of progress towards the Aichi Biodiversity Targets. The indicators, and their statistical extrapolations to 2020, suggest that the impacts of responses supporting biodiversity conservation and sustainable use cannot yet be discerned in the form of reduced pressures or improved state of biodiversity. Part of this may be explained by time lags between the actions taken and the positive outcomes they will eventually bring about—but it also suggests that actions need to be stepped up and accelerated if the goals of the Strategic Plan are to be achieved.

Information from the Fifth National Reports

The fifth national reports that have been assessed for GBO-4 (64 in total by July 2014) provide an additional line of evidence of the progress that has been made towards the attainment of the Aichi Biodiversity Targets. These reports reinforce the overall assessment that while progress is being made towards the achievement of all targets, it is insufficient on current trajectories to meet the targets by the 2015 and 2020 deadlines (see Figure 21.2). Also, consistent with the results from the indicators, the information in the national reports suggests that most progress has been made in relation to Aichi Biodiversity Targets 11, 16 and 17, relating to protected areas, on the Nagoya Protocol on access and benefit sharing, and national biodiversity strategies and action plans; while progress is particularly limited for targets 3 and 10, relating to reform of incentives and pressures on ecosystems vulnerable to climate change and ocean acidification.

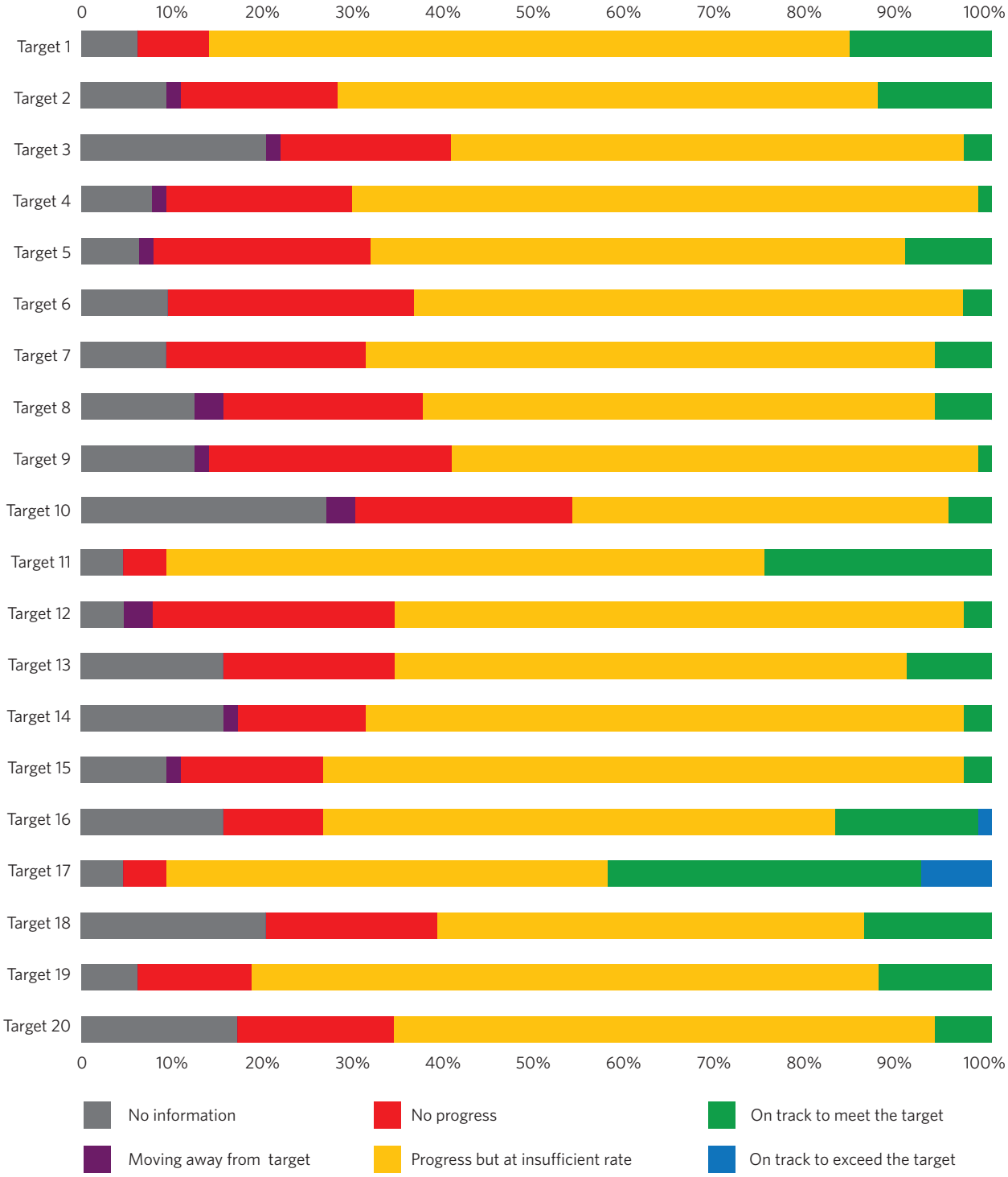


Figure 21.2. Assessment of progress towards the attainment of the Aichi Biodiversity Targets based on the information contained in 64 fifth national reports.[245] Almost 60 per cent of these reports explicitly assessed national progress towards the Aichi Biodiversity Targets. Where this is the case, the country's assessment has been applied to the same five point scale used in the target 'dashboard' shown on page 18 of this report. In the other cases the assessment has been inferred from the information contained in the report. A number of these reports did not contain information that allowed for an assessment of progress. These cases are represented in the figure as "No Information".

Interactions among the Aichi Biodiversity Targets

The Aichi Targets are deeply inter-connected but the relationships among targets vary in strength and are often asymmetric (see Figure 21.3). These interactions will vary with national circumstances and they can be positive or negative for biodiversity depending on the types of actions taken. For this reason it is useful to consider them when designing national actions to implement the Strategic Plan for Biodiversity 2011-2020. Coordinated actions that maximize the positive interactions amongst targets can potentially reduce the overall costs of implementation of a NBSAP and optimize its implementation and execution time.

Some targets mostly have impacts on other targets (downstream interactions), while others are primarily impacted by other targets (upstream interactions). In particular, actions taken to attain targets 2 (Biodiversity Values), 3 (Incentives) and 4 (Production and Consumption), 17 (Adoption of NBSAPs), 19 (Knowledge Base), and 20 (Financial Resources), potentially have large effects on other targets. These targets should therefore be seen as strategically important because they influence the achievement of a broad range of targets and Strategic Goals.

On the other hand, achieving Target 5 on reducing habitat loss, and thereby addressing the largest current pressure on terrestrial biodiversity loss, will require a concerted approach that draws upon actions focused on most of the other targets. For example, as set out in the summary of Target 5, a strategy to reduce deforestation or other land use change might require: public awareness and engagement (Target 1), a legal or policy framework for land use or spatial planning (Target 2), incentives measures, both positive and negative (Target 3), addressing commodity supply chains to restrict products from illegal or unsustainable sources (Target 4), promoting sustainable increases in the productivity of existing agricultural land and rangeland (Target 7), developing protected area networks (Target 11); engaging with indigenous and local communities (target 18), monitoring land use and land-cover (Target 19), and mobilizing resources (Target 20).

Several other targets are primarily impacted by other targets. For example, targets 12 (Species Conservation), 13 (Genetic Diversity), 10 (Vulnerable Ecosystems) and 15 (Ecosystem Restoration and Resilience) are heavily affected by actions focused on other targets, so they benefit most from progress towards all other targets, albeit indirectly. Nevertheless, implementing actions that are directly related to a particular target (e.g. implementing policies to maintain genetic diversity of livestock, or preventing further extinctions of species) are the first, urgent steps to making progress towards these targets and are amongst the actions which will produce fastest positive effects on biodiversity.

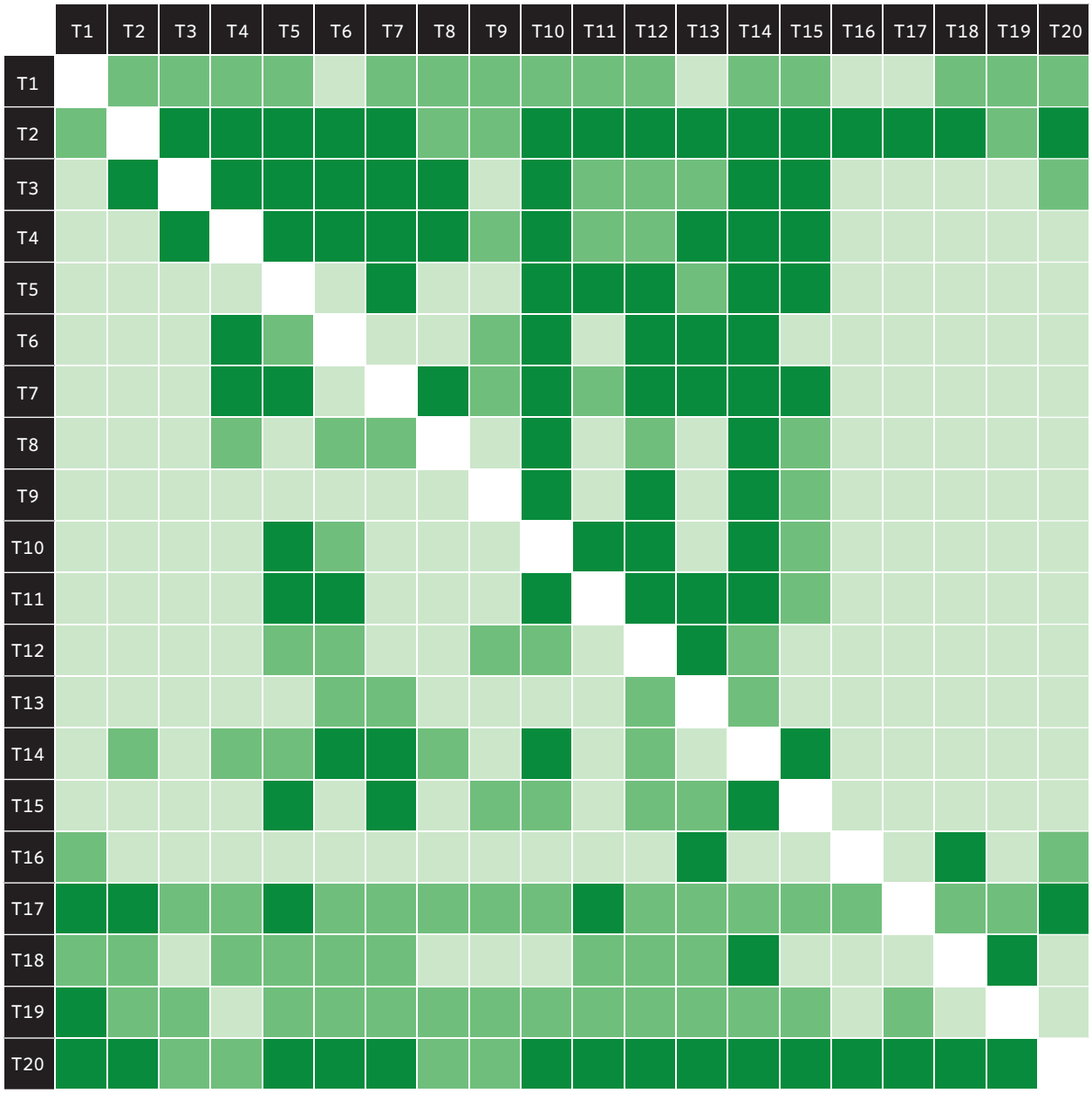


Figure 21.3. Strength of interactions between the Aichi targets, at the global level, based on expert opinion, depicted as the effect of row on column. The intensity of the color indicates the strength of the relationship (pale – low, mid – intermediate, dark – high). For example, the impact of Target 2 (T2) on Target 10 (T10) is strong, while the impact of T10 on T2 is rather weak.[246]

Achievement of the 2050 vision for biodiversity

The role of biodiversity in supporting human well-being is recognized in broad terms in the 2050 Vision of the Strategic Plan for Biodiversity 2011-2020: "*By 2050, biodiversity is valued, conserved, restored and wisely used, maintaining ecosystem services, sustaining a healthy planet and delivering benefits essential for all people*".

To help analyse the longer-term dependencies between action related to biodiversity and broader challenges facing human societies, GBO-4 looked at trends based on "business as usual" as well as plausible scenarios for simultaneously meeting biodiversity, climate and poverty reduction objectives, consistent with the 2050 Vision of the Strategic Plan.

Challenges of business as usual scenarios

Future scenarios explored in the underlying technical report[247] suggest five major challenges for the period to 2050 under a business as usual scenario. The following challenges must be addressed if the Vision of the Strategic Plan is to be attained:

- *Climate change is projected to become a major driver of biodiversity loss and ecosystem change by 2050.* Global temperature increases of 0.4 to 2.6°C by 2055 and 0.3 to 4.8 °C by 2090 would be accompanied by rising sea levels, changes in precipitation patterns, substantial loss of summer Arctic sea ice and increasing ocean acidification. These changes would have a broad range of impacts on biodiversity

at genetic, species and ecosystem levels including shifts in the distribution of species and ecosystems, changes in species abundance and increased risk of extinctions. Efforts to mitigate climate change could also have very large impacts, both positive and negative, on biodiversity.

- *Demand for fertile land is projected to increase substantially by 2050*. The combination of expanded agriculture and bioenergy in business as usual scenarios could result in a global land squeeze in which there is not sufficient room to conserve natural terrestrial habitats, leading to large declines in biodiversity.

- *Many wild fisheries are likely to collapse and aquaculture is foreseen to dominate fish production by 2050.* If harmful subsidies are not reduced and management of territorial and non-territorial marine systems do not improve, negative impacts of wild-capture marine fisheries are projected to increase substantially by 2050 in many regions, including the collapse of exploited fish populations. The large increases in global fish production foreseen for 2050 are projected to come primarily from aquaculture. This rapid expansion raises a variety of concerns including pollution, increased demand for high protein feed and competition for land or coastal areas.

- *Water scarcity is foreseen to increase in many regions of the globe by 2050.* Global water withdrawals from freshwater systems are projected to nearly double by 2050 in most business as usual scenarios. This would result in reduced water flow for freshwater ecosystems, which are highly dependent on water flow to maintain biodiversity and ecosystem functions. Water for food production currently accounts for 84% of global water consumption and dominates projected future global water consumption.

- *Combinations of drivers could push some systems beyond tipping points at regional scales by 2050.* There is evidence that several large-scale regime shifts have already started and scenarios suggest that these could cause substantial disruption of social-ecological systems. The two best understood examples are degradation of coral reefs due to combinations of pollution, destructive fishing, invasive alien species, ocean acidification and global warming, and loss of summer Arctic sea ice due to global warming. More speculative regime shifts include degradation of the Amazonian tropical humid forest due to combinations of deforestation, use of fire and global warming, and collapse of some tropical fisheries due to combinations of overfishing, pollution, sea level rise and global warming. These relatively rapid and large shifts in ecosystem structure and function at regional scale are projected to have large negative impacts on biodiversity, ecosystem services and human well-being if they are not averted.[248]

Alternative pathways to the 2050 vision

Scenarios for 2050 indicate that very substantial changes from business-as-usual trends are needed in order to address the challenges highlighted in the previous section and to meet three key global objectives: slow and then stop the loss of biodiversity; keep average global temperature increases below 2°C; and attain other human development goals. As many examples of recent environmental successes illustrate, solutions for a sustainable future will require a wide range of deep societal transformations—there is no individual, simple policy tool available to address all of these challenges.

Global scenarios developed in the context of the "Rio+20" United Nations Conference on Sustainable Development help to illustrate the diversity, complexity and feasibility of pathways to a sustainable future[249] (see Box 21.1). They provide an insight into the major transformations in development pathways that are required to meet all three objectives for 2050; and that will need to be fully engaged over the current decade in order to meet these objectives, because of the long lag times inherent in social and technical transitions and in the biological, climate and oceans systems of the Earth.

Scenarios suggest that these biodiversity goals can be attained while also reaching broader socio-economic objectives that include strong climate mitigation, improved diets and the eradication of hunger. Several indicators of biodiversity are improved in the alternative scenarios: population abundance, status of threatened species and mean species abundance, as well as the status of marine fish stocks (See Figures 21.4). Such outcomes can be achieved by various mixes of polices; the three pathways explored in the scenario analysis point to some common elements (with the emphasis on each differing among the alternative scenarios; see Box 21.1).

The actions that contribute most significantly to pathways for long-term sustainability fall into two major areas of activity and decision making.

- ***Climate change and energy systems:*** Halting deforestation and appropriately implementing reforestation could make important contributions to climate mitigation and protection of biodiversity. Major reductions in greenhouse gas emissions and improved energy efficiency are required to keep global warming below 2°C, while also reaching human development goals. Biodiversity objectives can only be attained if massive deployment of biofuels is avoided. A substantial degree of climate change by 2050 and beyond is already committed due to long lags in the Earth's climate system, so adaptation plans for biodiversity are needed. For example, adaptation will require anticipating climate change in the design of protected area systems.

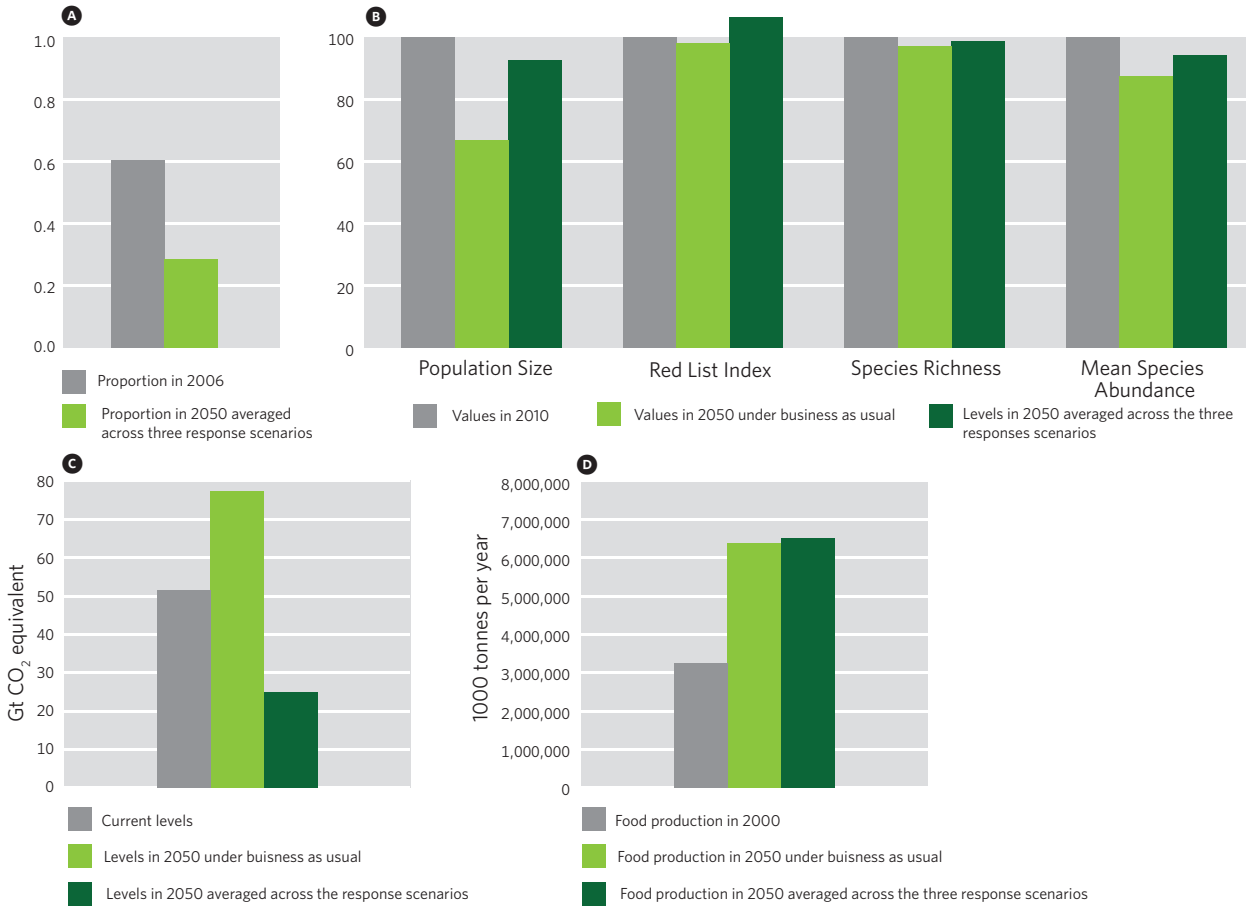


Figure 21.4 Projected future status of biodiversity, greenhouse gas emissions and food production in 2050 according to baseline and alternative socio-economic scenarios. The projections show that relative to the baseline (or "business-as-usal" trends), significant improvement can be achieved in the status of marine biodiversity Ⓐ (as indicated by proportion of fish stocks overexploited), and terrestrial biodiversity Ⓑ (according to four indicators), at the same time as reducing greenhouse gas emissions Ⓒ and improving food production Ⓓ.

- ***Food systems:*** Major transformations to food systems are among the key areas of actions for achieving sustainability. First, food waste needs to be reduced: roughly a third of harvested food is lost either in the food transport and transformation chain (primarily in developing countries) or in the home (primarily in developed countries). Second, diverse diets combined with global convergence to moderate levels of calorie and meat consumption would improve health and food security in many areas and also substantially reduce impacts on biodiversity. Third, there is a need for improved management of agriculture, aquaculture and wild-capture fisheries. Realistic changes in management of crops and livestock could substantially reduce both water consumption and pollution. Significant reductions in fishing pressure and changes in fishing techniques in most marine fisheries would lead to rebuilding of fisheries over the next one to two decades.

The analysis emphasizes the crucial importance of major changes in our systems of food production, distribution and consumption, as well as in energy use, if we are to reach a more balanced and sustainable relationship between human aspirations and the capacity of the planet to provide them. Achieving these transformational changes will thus require engagement of key economic sectors (see Box 21.2).

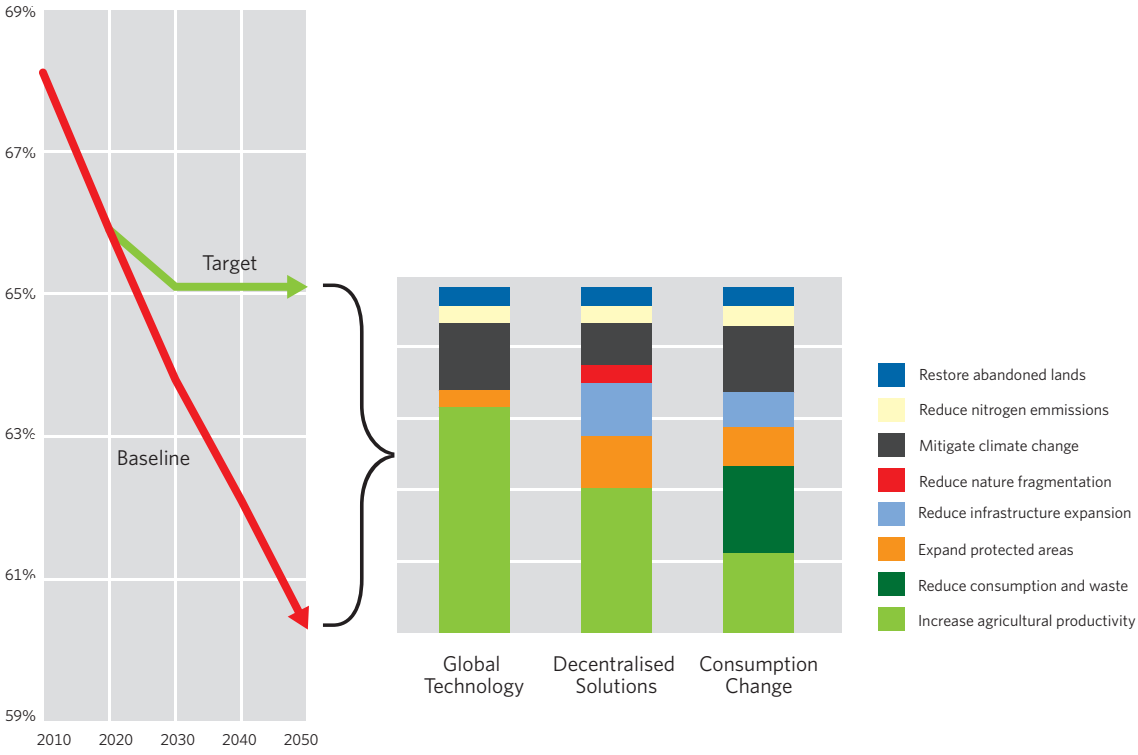


Figure 21.5 Contrasting pathways to sustainability using the Rio+20 socio-economic scenarios. The scenarios illustrated here would each reach by 2050 the goals of slowing and eventually halting biodiversity loss, while also keeping global average temperature increases within two degrees Celsius, and achieving a range of socio-economic development goals including ending hunger, providing universal access to safe drinking water, basic sanitation and modern energy sources. The goals can be reached by three different pathways (see Box 21.1)

Box 21.1. A diversity of pathways for reaching the 2050 vision: the "Rio+20" scenarios

The pathways presented here were designed to achieve a broad set of targets that are based on existing international agreements on environmental and development topics. The overarching goal with respect to biodiversity might be phrased as 'by 2050 eradicate global hunger while avoiding further biodiversity loss'. The goal is based on the CBD 2050 vision, the Aichi targets and the MDG target 1c 'Halve, between 1990 and 2015, the proportion of people who suffer from hunger'. The 2050 vision is interpreted as slowing the rate of biodiversity loss until 2030 and bringing it down to zero loss by 2050. The MDG hunger target is extended to zero hunger by 2050. These targets are accompanied by goals to limit global long-term mean temperature increase to 2°C, providing universal access to safe drinking water, basic sanitation and modern energy sources, and reducing urban air pollution and fertilizer use. This forced the analysis to take into account synergies and trade-offs with goals in other themes. The trade-offs include limited biofuel use for climate mitigation to avoid competition for land and improved fertilizer-use efficiency to reduce nitrogen emissions resulting from agricultural intensification. Synergies include reduced deforestation due to lower fuel-wood demand resulting from the transition to modern energy sources, and reduced meat consumption reduces biodiversity loss and climate change. These scenarios contrast with the "climate mitigation scenarios" contained in the fifth assessment report of the International Panel on Climate Change (IPPC). Very high rates of loss of primary habitats in the IPCC scenarios are associated with the low greenhouse emissions scenario as a result of massive deployment of bioenergy as a means of climate change mitigation and by an absence of pro-active measures to control land cover change.[250]

The following three pathways that all meet these goals are distinguished (Figure 21.5):

- *Global Technology*: Focus on large-scale technologically optimal solutions, such as intensive agriculture, and a high level of international coordination
- *Decentralized solutions*: Focus on decentralized solutions, such as agriculture that is interwoven with natural corridors and national policies that regulate equitable access to food
- *Consumption Change*: Focus on changes in human consumption patterns, most notably by limiting meat intake per capita and by ambitious efforts to reduce losses in food systems

The pathways differ in their emphasis on human behavior as leverage for change, in the relative weight of regulation versus markets, in coordination versus competition and on the characteristics and scale of the stimulation of technology.

Box 21.2. Addressing sustainability through key sectors

From the analysis above, and from further analysis carried out in parallel with GBO-4, it is clear that achieving long-term sustainability will require fundamental changes in the operation of several primary sectors of the global economy: principally agriculture, forestry, fisheries, energy, and water and sanitation.[251]

These sectors already exert significant direct pressures on biodiversity. Larger and more affluent populations mean they will be primarily responsible for the projected future losses in biodiversity and degradation of ecosystems, based on 'business as usual' scenarios. Addressing these pressures therefore requires a rethink of the way food systems operate worldwide, how energy is produced, how wood is extracted and produced, and how inland waters and oceans are managed.

These primary sectors also rely on the natural resource base to operate. Loss of ecosystems and their services harm them in different ways, incurring costs and requiring changes to their operations. Increasingly, actors within these sectors are aware of their dependence on natural resources, assess their vulnerability to changes in their natural resource base and look for ways to limit their impact and exposure. Effectively engaging these primary sectors represents a critical opportunity to advance progress towards long-term sustainability goals.

Such engagement involves embedding biodiversity concerns within sectors (mainstreaming). This is more likely to succeed when biodiversity is aligned with the core values and interests of primary producers and other actors in the value chain. This in turn requires sectors to recognize the opportunities that biodiversity provides, such as improved availability of fish and wood, improved soils for agricultural production systems and cost-effective, nature-based solutions in water management.

Four key strategies could improve, accelerate and scale up integration or mainstreaming of biodiversity concerns within sectors:

- Application of integrated approaches to reap benefits of ecosystem services across landscapes, inland water and marine environments, dealing with cross-sectoral issues, protecting the interest of smallholders and enhancing current conservation efforts

- Strengthening the biodiversity component of emerging voluntary sustainability initiatives such as standard-setting and certification within international supply chains

- Strengthening the perspective of buyers and consumers on biodiversity by raising awareness of the impacts of different products, as well as the importance of biodiversity for food security and healthy diets. Adoption of less meat intensive diets and reduction of food losses and waste can be promoted as critical steps for reducing pressure on biodiversity, while bringing additional benefits including improved health and reduced costs

- Mobilizing finance by improving the business case for biodiversity and green investments. This requires anchoring natural capital in the reporting of companies, thus influencing the decisions of executives and investors, thus shifting sectoral flows into a direction more beneficial to conservation and sustainable use of biodiversity.

These strategies require joint efforts between the private and public sectors, with governments able to influence biodiversity mainstreaming in sectors through a range of policies including: raising awareness; improved valuation, accounting and reporting of biodiversity and ecosystem services; realizing the full potential of emerging sustainability standards and certification; integrated land-use planning; payments for ecosystem services; incentives to align sector activities with biodiversity conservation and sustainable use; green taxation and reforming environmentally-harmful subsidies; and leveraging the power of consumer choice by emphasizing the health and cost benefits of choices that also benefit biodiversity.

Contribution to the Millennium Goals and the post-2015 development agenda

This Outlook is published at an opportune time to consider the critical links between biodiversity and long-term goals for human development. Progress towards the 2015 targets of the Millennium Development Goals is being assessed, and discussions are underway to develop the post-2015 United Nations development agenda.

The links between biodiversity, economic development and poverty reduction

Ecosystem services are essential for human well-being in providing food, water, energy and other benefits. These services all depend on the ecological processes of functioning ecosystems which are underpinned by biodiversity.[252]

However, the relationship between biodiversity and ecosystem services is not straightforward and depends largely on the type of ecosystem service considered. Biodiversity plays a crucial role in the provision of regulating services; examples include the role of pollinators and a large variety of predator species that reduce outbreaks of pests in agricultural fields. Furthermore, biodiversity is important to some degree for cultural services, especially for indigenous communities. However, there are often choices to be made between the delivery of one kind of service over another – management decisions that favor the provision of agricultural goods, for example, may do so at the expense of maintaining regulating services. [253]

While we all depend in different ways on biodiversity, poor and vulnerable people generally rely more directly on biodiversity than others because of their limited ability to purchase alternatives.[254] In many regions people are dependent on food, water and energy derived directly from natural areas such as forests, coral reefs, etc.[255] Biodiversity often acts as a safety net for the poor in times of crisis, although it may provide a route out of poverty in some circumstances. In the short term it is the availability of natural resources that is most beneficial to the poor, although diversity, including for example different crop varieties, is important from a risk management perspective and for sustaining benefits by ensuring resilience to shocks and longer term change.[256]

Coastal habitats such as mangroves, salt marshes, sea grasses and coral reefs provide protection from storm surges and flooding and human communities exposed to such risks are inevitably more vulnerable.[257] A recent global synthesis and meta-analysis of the contributions of coral reefs to risk reduction and adaptation across reefs in the Indian, Pacific and Atlantic Oceans reveals that coral reefs are very effective in protecting against natural hazards, by reducing wave energy by 97% on average. The study estimates, that over 100 million people worldwide may receive risk reduction benefits from reefs or bear the costs of hazard mitigation and adaptation if they are degraded.[258]

Various economic sectors rely on biodiversity and ecosystem services such as fisheries, agriculture and tourism. Yet both poverty and economic development can negatively affect global biodiversity and the provision of important ecosystem goods and services.[259] More food, water and firewood are needed to sustain on-going population growth in especially the poorer parts of the world that are not always endowed with the resources and technologies to produce these in a sustainable manner. At the same time, continuing economic growth, including growth of the global middle class, will add to the demand for products like meat, timber, bio-energy and paper. Our historical development pathway has been built on transforming natural capital (and eroding biodiversity) to fuel economic growth. Thus, under prevailing production and consumption patterns, biodiversity loss and natural resource degradation will continue unabated or accelerate without additional policies, with the poor being disproportionally affected. The provision of food, water, and energy to the poor becomes more difficult when available natural resources are not managed sustainably or degrade. The existence of thresholds and tipping points increases the risk of difficult-to-reverse negative biodiversity change with societal implications.[260]

However, there are alternative development pathways, with more promising potential futures as are illustrated in the previous section. Moreover, evidence suggests that actions to conserve biodiversity offers solutions to a range of societal challenges including climate change, food and water security, and can benefit the poor if designed appropriately.[261]

The relationships between biodiversity and development and between biodiversity and poverty reduction are not simple, and mutually beneficial outcomes are by no means assured. Measures to conserve biodiversity and reduce poverty can be complementary, although trade-offs are sometimes inevitable.[262] However, many of the underlying causes of both sustained poverty and biodiversity loss are similar and stem from the way that economic growth and development has progressed. Addressing those causes will help both agendas, and within the right enabling environment biodiversity itself can be a foundation for sustainable development and poverty reduction.

Biodiversity and the Millennium Development Goals

The Millennium Development Goals (MDGs) came into being in September 2000. They prioritize basic needs in global efforts to reduce poverty. MDG1 focuses on poverty and hunger, MDGs 2 and 3 focus on education and empowerment, MDGs 4-6 focus on health, whilst MDG7 (environmental sustainability) and MDG8 (global partnership for development) provide something of the enabling environment.

As noted in the preceding section, the relationship between biodiversity and poverty operates in two directions: biodiversity provides important opportunities for poverty reduction and economic development, while loss of biodiversity and natural resources will exacerbate current risks. For example, actions to conserve biodiversity can positively contribute to MDGs 1 and 6.

MDG1 – Eradicate Extreme Poverty and Hunger. Poor people, especially rural communities, rely more directly on biodiversity than others because of their limited ability to purchase alternatives. In many regions people are dependent on food, water and energy derived directly from natural areas such as forests and coral reefs. Biodiversity can act as a safety net for the poor in times of crisis, and it may provide a route out of poverty in some circumstances. In the short term it is the availability of natural resources that is most beneficial to the poor, although diversity, including for example different crop varieties, is important from a risk management perspective and for sustaining benefits by ensuring resilience to shocks and longer term change.

MDG6 – Combat HIV/AIDS, malaria and other diseases. Biodiversity is a source of traditional medicines relied upon by a great majority of people

in developing countries. In addition, although natural ecosystems, particularly in the tropics, often support pathogens and disease vectors, there is increasing evidence that ecosystem degradation and fragmentation is linked with increased risk for disease transmission. Biodiversity can also contribute to addressing the increasing global burden of non-communicable diseases, through its contribution to nutrition and related human microbiota.

The importance of biodiversity for development is explicitly recognized by the MDGs under goal 7 (ensure environmental sustainability) which includes the CBD biodiversity target to 'reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss'. However, in the implementation of the MDGs, and in particular through the creation of a distinct, 'separate' goal for environmental issues, the importance of biodiversity for the achievement of the other MDGs (including the high-profile goals on poverty, food, and health) has not been sufficiently recognized and promoted.

Integration of biodiversity in the post-2015 development agenda

One of the main outcomes of the United Nations Conference on Sustainable Development (Rio+20), held in Rio de Janeiro in June 2012, was the agreement by Member States to launch a process to develop a set of sustainable development goals (SDGs). The goals were to be limited in number, aspirational and easy to communicate, and address all three dimensions of sustainable development in a balanced way.

Among the key messages from the analysis for GBO-4 on this issue are:

- Biodiversity and ecosystem services can contribute to economic growth and poverty reduction. Equally, biodiversity loss has negative consequences for society, and action to reduce pressures on biodiversity can support a broad range of societal benefits.

- Meeting the Aichi Biodiversity Targets would help achieve goals for other global development priorities including poverty, hunger, health and a sustainable supply of clean energy, food and water.

- The direct contribution of the Millennium Development Goal on environmental sustainability (MDG7) to achieving the other goals was not sufficiently clear, possibly diverting attention and action away from biodiversity issues.

- The current sustainable development agenda provides an opportunity to bring biodiversity into the mainstream of the broader development agenda.

The Open Working Group (OWG), established by the General Assembly to prepare a proposal on the sustainable development goals proposes 17 such goals, each supported by targets specifying outcomes and means of implementation.[263] Two of the proposed goals address, respectively biodiversity in marine and terrestrial ecosystems, and the proposed targets under these goals draw heavily on several of the Aichi Biodiversity Targets. Biodiversity and ecosystems are also reflected under other proposed goals, notably those on food, nutrition and agriculture and on water and sanitation. Biodiversity is also important for the proposed goals on poverty eradication, health, settlements, disaster risk reduction and climate change, and references therein could be strengthened. The need for sustainable consumption and production is also reflected in the proposed goals as is more equitable access to natural resources. Notably, the proposed text calls for the integration of biodiversity values into national and local planning, development processes and poverty reduction strategies and accounts. The text also calls for enhanced policy coherence for sustainable development and the development of measurements of progress on sustainable development that complement GDP. It is expected that the SDGs will be finalized by the United Nations in 2015 as part of the post-2015 development agenda.

Conclusions

This Outlook provides a timely reminder that continuing with 'business as usual' in our present patterns of behaviour, consumption, production and economic incentives will not allow us to realize the vision of a world with ecosystems capable of meeting human needs into the future.

Since the agreement of the Strategic Plan on Biodiversity in 2010, encouraging steps have been taken around the world to tackle biodiversity loss at many levels. Nevertheless, it is clear from this mid-term review that, on their current trajectory, they will not be sufficient to meet most of the Aichi Biodiversity Targets by the deadlines committed to.

The Strategic Plan and the Aichi Biodiversity Targets remain a solid framework on which to concentrate action that will lead us towards a world in harmony with nature. They also point the way towards many actions that will meet multiple needs of human societies including the aspirations currently being discussed in the context of the Sustainable Development Goals.

The following general conclusions can be drawn from the assessment carried out for this Outlook:

- Meeting the Aichi Biodiversity Targets would contribute significantly to broader global priorities addressed by current discussions on the post-2015 development agenda: namely, reducing hunger and poverty, improving human health, ensuring a sustainable supply of energy, food and clean water, contributing to climate-change mitigation and adaptation, combating desertification and land degradation, and reducing vulnerability to disasters

- Actions to achieve the various Aichi Biodiversity Targets should be undertaken in a coherent and coordinated manner; the individual Aichi Biodiversity Targets should not be addressed in isolation. Actions towards certain targets, notably those that address the underlying causes of biodiversity loss, the development and implementation of national biodiversity strategies and action plans, the further development and sharing of information, and the mobilization of financial resources, will have an especially strong influence on the achievement of the other targets

- Attaining most of the Aichi Biodiversity Targets will require implementation of a package of actions, typically including: legal or policy frameworks; socioeconomic incentives aligned to such frameworks; public and stakeholder engagement; monitoring; and enforcement. Coherence of policies across sectors and the corresponding government ministries, is necessary to deliver an effective package of actions

- It will be necessary to broaden political and general support for the Strategic Plan for Biodiversity 2011-2020 and the objectives of the Convention. This will require working to ensure that all levels of government and stakeholders across society are aware of the multiple values of biodiversity and related ecosystem services

- Partnerships at all levels are required for effective implementation of the Strategic Plan for Biodiversity 2011-2020, to leverage broad-scale actions, to garner the ownership necessary to ensure the mainstreaming of biodiversity across sectors of government, society and the economy and to enable synergies in the national implementation of the various multilateral environmental agreements

- There are opportunities to support implementation of the Strategic Plan through enhanced technical and scientific cooperation among Parties. Further capacity-building support will also be needed, especially for developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition

- An overall substantial increase in total biodiversity related funding, is needed for the implementation of the Strategic Plan for Biodiversity 2011–2020.

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