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# STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

## FURTHER INFORMATION RELATED TO THE TECHNICAL RATIONALE FOR THE AICHI BIODIVERSITY TARGETS, INCLUDING POTENTIAL INDICATORS AND MILESTONES

***Note by the Executive Secretary***

1. The Strategic Plan for Biodiversity 2011-2020, with its "Aichi Biodiversity Targets", was adopted by the Conference of the Parties at its tenth meeting (decision X/2) on the basis of recommendation 3/5 from the Ad Hoc Open-ended Working Group on Review of Implementation of the Convention (WGRI) and SBSTTA recommendation XIV/9[1]. Document UNEP/CBD/COP/10/27/add.1 provides information regarding the technical rationale, milestones and potential indicators for each of the Aichi Biodiversity Targets. The present document, prepared by the Executive Secretary, presents further information on these matters, including references to source materials. It also contains two tables, one which examines the characteristics of indicators agreed through decisions VII/15 and VIII/30 (annex I) and the other which compares the Aichi Biodiversity Targets with those included as part of the first Strategic Plan (annex II). The information contained in this note is intended to be a resource that Parties and stakeholders may wish to draw upon when developing strategies to implement the Strategic Plan for Biodiversity 2011-2020, and in particular in the development of national and or regional targets. This note will be updated in the future in light of the further work on the development of indicators for the new Strategic Plan envisaged in decisions X/2 (paragraph 17(g) ) and X/7 (paragraphs 3(a) and 5(a)), including examination by an ad hoc technical expert group, for the consideration of the Subsidiary Body on Scientific, Technical and Technological Advice at its fifteenth meeting, as well as the Working Group on Review of Implementation, at its fourth meeting. The present document is an updated version of the information document UNEP/CBD/COP/10/INF/12 modified in light of the final targets agreed in decision X/2 and the comments made at the tenth meeting of the Conference of the Parties.

[1] The process for revising and updating the Strategic Plan was set out in decision IX/9. In line with that decision, a draft updated and revised Strategic Plan for the Convention on Biological Diversity for the post-2010 period (UNEP/CBD/WG-RI/3/3) was prepared by the Executive Secretary for consideration by the third meeting of the Ad Hoc Open-ended Working Group on Review of Implementation of the Convention (WGRI). Similarly the proposed mission, strategic goals and targets for the Strategic Plan were made available for the fourteenth meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA) (UNEP/CBD/SBSTTA/14/10). Drawing upon SBSTTA recommendation XIV/9, the Working Group prepared for the consideration of the Conference of the Parties, at its tenth meeting, recommendation 3/5, including a draft revised and updated Strategic Plan which includes five goals and 20 targets.

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## TECHNICAL RATIONALE FOR THE GOALS AND AICHI BIODIVERSITY TARGETS OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

### *Strategic goal A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*

*Introduction:* The Millennium Ecosystem Assessment identified the following indirect drivers of change: economic, demographic, socio-political, cultural and religious, and science and technology. While drivers such as population increase or patterns of consumption (for example, of meat, energy, water and raw materials) are generally not susceptible to rapid reversal, ultimately total consumption of resources, goods and services must be brought within safe ecological limits if the 2050 Vision of the Strategic Plan is to be achieved. Therefore, strategic actions should be initiated immediately to address, over a longer term, these underlying causes of biodiversity loss. This requires policy coherence and the integration of biodiversity into all national development policies and strategies and economic sectors at all levels of government (local/municipal, state/provincial, and national/federal). Key strategic approaches to achieve this include communication, education and public awareness, appropriate pricing and incentives, and the broader use of tools such as strategic environmental assessment. Stakeholders across all sectors of government, society and the economy, including business, will need to be engaged as partners to implement these actions. Consumers and citizens must also be mobilized to contribute to biodiversity conservation and sustainable use, to reduce their ecological footprints and to support action by governments. At the international level, action to implement the Convention could be strengthened through synergies among intergovernmental bodies.

**Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.**

*Technical rationale:* Addressing the drivers of biodiversity loss requires behavioural change by individuals (e.g., to reduce waste or consumption) and by governments (e.g., to change regulations or incentives). Understanding, awareness and appreciation of the diverse values of biodiversity, are necessary to underpin the ability and willingness of individuals to make such changes and to create the "political will" for governments to act.[2],[3] Nearly all Parties indicate in their fourth national reports that they are undertaking actions related to education and public awareness, however further efforts are needed to increase overall public awareness of the various values of biodiversity. The target covers the three objectives of the Convention.

*Implementation:* Learning occurs in formal contexts of learning, such as in schools and universities, as well as in informal contexts, such as through the guidance of elders regarding the natural environment, as well as in museums and parks, and through films, television and literature. Learning also occurs through participation in events, communication materials, and other opportunities for information exchange between stakeholders. Where possible, awareness and learning about biodiversity should be linked to and mainstreamed into the principles and messages of education for sustainable development. The United Nations Educational, Scientific and Cultural Organization (UNESCO) could be one key partner in carrying out work towards this target. The key audiences for such communication, education and public awareness activities will vary between Parties, but generally could focus on regional agencies, national and local governments, business, non-governmental organizations and civil society groups. In addition to promoting awareness, information campaigns can promote behavioural change and concrete actions. The Communication, Education and Public Awareness (CEPA) programme is the main instrument under the Convention for this target.

[2] Miller, JR (2005). Biodiversity conservation and the extinction of experience. Trends in Ecology & Evolution, 20(8), 430-434.

[3] Balmford, A et al. (2009). A Global Perspective on Trends in Nature-Based Tourism. PLoS Biol, 7(6).

*Indicators and baseline information:* Possible indicators could include: the number of visits to natural history museums, zoos, botanical gardens, protected areas, and parks; the number of school biodiversity education programmes or officially accredited teaching materials; volunteer participation in relevant activities; the number of activities carried out by indigenous peoples, local communities and local citizen groups; and the development and use of lists of recommended actions for citizens, the private sector, and other stakeholders. As a secondary step, the impact of public awareness campaigns could be monitored through surveys of awareness and attitudes, such as the *eurobarometer* survey conducted in 2007 which provides a baseline for the European region. Other possible indicators could include the number of biodiversity related news articles published in national newspapers as well as changes in the demand for environmentally friendly products.

*Milestones:* Possible milestones for this target include:

- By 2011, basic public awareness campaigns about biodiversity and the steps people can take to protect it are initiated;
- By 2014, national baseline surveys are carried out and comprehensive national strategies to promote awareness of the values of biodiversity are prepared and adopted;
- By 2016, relevant educational curricula have been developed and implemented.

**Target 2. By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into nation accounting, as appropriate, and reporting systems**

*Technical rationale:* It is widely recognized that the values of biodiversity are not widely reflected in decision-making. The objective of this target is to ensure that the diverse values of biodiversity and opportunities derived from its conservation and sustainable use are recognized and reflected in all relevant public and private decision-making. For example, though numerous studies, at various scales, have illustrated the economic value of biodiversity and the ecosystem services it underpins, [4],[5] many Parties report that the absence of economic valuations of biodiversity is an obstacle to its conservation and sustainable use. Including the values of biodiversity in national and local development and poverty reduction strategies and planning processes and into nation accounting, as appropriate, and reporting systems, places biodiversity into the same decision framework as other goods and services, and would help give it greater visibility amongst policy-makers and contribute to the "mainstreaming" of biodiversity issues in decision-making processes. Reflecting the values of biodiversity in the planning processes of governments at all levels, including economic, financial, spatial planning, and the application of strategic environmental assessment, will help internalize the costs and benefits of the conservation and sustainable use of biodiversity in decision-making.

*Implementation:* Integrating the values of biodiversity into national and local development and poverty reduction strategies and planning processes as well as into national accounting, as appropriate, and reporting systems will require Parties to appropriately value biodiversity and increase coordination among government ministries and levels of government. Given different national circumstances, this integration may require capacity building as well as developing flexible approaches. Efforts to improve the valuation of biodiversity should include tools and methods that recognize social and cultural values, in addition to economic values, and should be conducted in ways that encourage the sustainable use of biodiversity at all levels. Tools to assess the values of biodiversity are now being made more widely available, including the Convention's work on economic, trade and incentive measures, as well as through the Economics of Ecosystems and Biodiversity (TEEB) study, and the UN System of Economic and Environmental Accounting (SEEA). The World Bank's experience in integrating natural capital (e.g., forests) into national accounts could be further developed and built upon to incorporate the value of biodiversity and

[4] Dasgupta, P. (2010). Nature's role in sustaining economic development. Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences, 365(1537), 5-11.

[5] The Economics of Ecosystems and Biodiversity (TEEB) Project (http://www.teebweb.org/)

ecosystem services. Tools are also available for integrating biodiversity into spatial planning exercises through the mapping of biodiversity ecosystem services and through systematic conservation planning.[6] Strategic environmental assessment and similar tools provide useful methodologies to assess impacts on biodiversity and allow for the assessment of trade-offs in decision-making. Payment for ecosystem services mechanisms and the development of private sector guidelines for the appropriate reflection of the values of biodiversity are additional implementation mechanisms which could be used to meet this target. Depending on national circumstances, such processes could be undertaken in a step wise or incremental manner by first including those values of biodiversity which are easiest to account for and then further developing or enhancing systems for integrating biodiversity values into decision-making processes.

*Indicators and baseline information:* Possible indicators for this target include: the number of countries with biophysical inventories of biodiversity and ecosystem services; the number of countries with national accounts reflecting the state of biodiversity and ecosystem services and, if appropriate, stocks and flows of natural capital; the number of countries with poverty reduction strategies and national development plans which incorporate biodiversity; and the number of companies (or their market share) with policies for biodiversity-friendly practices.[7] Baseline information for 2010 could be obtained through desk studies, from the TEEB study, from the World Business Council for Sustainable Development (WBCSD) and business and biodiversity initiatives.

*Milestones:* Possible milestones for this target include:

- By 2012, work on biophysical inventories of biodiversity and associated ecosystem services is initiated and, by 2014, a work programme for reflecting biodiversity and ecosystem values in national accounts is developed;
- By 2014, the opportunities derived from the conservation and sustainable use of biodiversity, and the fair and equitable sharing of benefits arising from the use of genetic resources, are integrated into Poverty Reduction Strategy Papers (PRSPs) and other national development plans, and are routinely included in environmental impact assessment, strategic environmental assessment and spatial planning;
- By 2018, the most important aspects of biodiversity and ecosystem services are reflected in national statistics.

**Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to minimize or avoid negative impacts and positive incentives for the conservation and sustainable use of biodiversity are developed and applied, consistent and in harmony with the Convention and other relevant international obligations , taking into account national socio-economic conditions.**

*Technical rationale:* Substantial and widespread changes to incentives, including subsidies, are required to ensure sustainability. Ending or reforming incentives, including subsidies, harmful to biodiversity is a critical and necessary first step that would also generate net socio-economic benefits. In addition, the creation or further development of positive incentives for the conservation and sustainable use of biodiversity, provided that such incentives are in harmony with the Convention and other relevant international obligations, could also help in the implementation of the Strategic Plan by providing financial or other incentives to encourage actors to undertake actions which would benefit biodiversity. Fishery subsidies that contribute to overcapacity, and overfishing globally are potential areas for reform as is the continued and deepened reform of production-inducing agricultural subsidies still prevalent in

[6] Tools available to assist biodiversity integration into spatial planning include the Integrated Biodiversity Assessment Tool (https://www.ibatforbusiness.org/)

[7] This would include such things as having policies to improve sustainability; having a biodiversity policy; having a policy of no net negative, or net positive, impact on biodiversity; or undertaking corporate environmental or ecosystem valuation

most Organisation for Economic Co-operation and Development (OECD) countries.[8] Bearing in mind the principle of common but differentiated responsibilities, this target would not imply a need for developing countries to remove subsidies that are necessary for poverty reduction programmes.

*Implementation:* Current negotiations under the Doha Trade Round aim to clarify and improve World Trade Organization (WTO) disciplines on fisheries, taking into account the importance of this sector to developing countries, and to achieve substantial reductions in trade-distorting agricultural subsidies, with special and differential treatment for developing countries being an integral part of the negotiations. These negotiations have the potential to generate high synergies with this target, and are therefore a key vehicle for achieving the target. However, as these negotiations focus on overcapacity/overfishing or trade-distorting effects of subsidies, approaches which focus specifically on subsidies that are harmful to biodiversity may be required. In addition, countries or regional groups may, where necessary, take their own initiatives to phase out and/or reform environmentally harmful incentives, including subsidies, bearing in mind the principle of common but differentiated responsibilities. The recent decision of the G20 to phase out or rationalize inefficient fossil fuel subsidies by 2020 could be taken as an example, and would also contribute to the target. A more effective use of strategic environmental assessment could also be one mechanism to help implement effective policies and actions towards this target. The Convention's work on economic, trade and incentive measures and on impact assessment are relevant to this target.

*Indicators and baseline information:* Estimates of the value of harmful subsidies, using criteria developed by WTO and OECD, would be an indicator. Baseline data is already published. Process indicators might include the successful conclusion of WTO negotiations on fisheries subsidies and on agricultural domestic support. Possible indicators for the application of positive incentive measures include the number and types of positive incentive mechanisms being developed and applied. The economic and financial values of biodiversity and ecosystem services captured via payments for ecosystem services, user fees, taxes and other mechanisms could also be used to track progress.

*Milestones:* Possible milestones for this target include:

- By 2012, transparent and comprehensive subsidy inventories and inventories of possible positive incentive measures are established by all OECD countries, and an assessment of their effectiveness against stated objectives, of their cost-efficiency, and of their impacts on biodiversity, is being initiated;
- By 2014, prioritized plans of action for the removal or reform of subsidies that are harmful to biodiversity and for the development and application of positive incentives, are prepared and adopted;
- By 2020, subsidy programmes identified in the plans of action are being effectively reformed or phased out, and positive incentive measures identified in the plans of action are being effectively phased in.

**Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.**

*Technical rationale:* Most Parties indicated in their fourth national reports that the unsustainable use or overexploitation of resources was a threat to biodiversity. Bringing the use of natural resources within safe ecological limits is an integral part of the Vision of the Strategic Plan, thus steps towards this must be taken by 2020. Reducing total demand and increasing efficiency contribute to the target and can be pursued through government regulations and/or incentives, education, and social and corporate

[8] The Economics of Ecosystems and Biodiversity. (2009) TEEB for Policy Makers, Summary, Chapter 6.

responsibility. This target will build upon, and contribute to, the achievement of the target established in the Johannesburg Plan of Implementation (para. 26) to develop integrated water resources management and water efficiency plans by 2005.

*Implementation:* Currently, many individuals, businesses and countries are making efforts to substantially reduce their use of fossil fuels, with a view to mitigating climate change. Similar efforts are needed to ensure that the use of other natural resources are within sustainable limits. Early action would involve each production- and consumption-related sector developing and implementing plans for this purpose. The target will be achieved through dialogue among sectors and stakeholders, supported by planning tools such as strategic environmental impact assessment and economic tools such as incentive measures that integrate biodiversity issues. The creation of inter-ministerial committees, nationally developed guidelines, sectoral guidelines and the promotion of ecosystem management in city districts and other local authorities could be used to help reach this target. The programme of work on the sustainable use of biodiversity, the business and biodiversity initiative as well as the work on impact assessment would be particularly relevant to this target. The Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity could also help to achieve progress towards this target. Support to indigenous and local communities for the development and implementation of community-based sustainable management plans would also contribute to the achievement of the target.

*Indicators and baseline information:* Initially, process indicators, such as the establishment of plans with clear and measurable targets, would be the main indicators. Other process indicators include the presence of strategic environmental impact assessment or similar assessment tools, and their application at multiple levels of government. One relevant outcome indicator is the Ecological Footprint (and related concepts) for which baseline data is available. Other possible indicators could include the total demand for natural resources, the proportion of products derived from sustainable sources and the number of community-based sustainable management plans.

*Milestones:* Possible milestones for this target include:

- By 2014, Governments and major private-sector actors, at sector or company level, have developed assessments of their ecological footprint, and have developed sustainability plans to reduce it;
- By 2018, Governments and major private-sector actors can demonstrate progress towards sustainability.

***Strategic Goal B. Reduce the direct pressures on biodiversity and promote sustainable use.***

*Introduction:* It is only possible to reduce or halt the loss of biodiversity if the drivers and pressures on biodiversity are themselves reduced or eliminated. With rising human population and income, the demand for biological resources is increasing, and without action this will translate into increased pressures on biodiversity. Thus, efforts are needed to decouple the indirect and direct drivers of biodiversity loss by means of technical improvements and more efficient use of land, sea and other resources, through better spatial planning. This way, the inevitable tradeoffs between production on the one hand and maintaining ecosystem functions and resilience on the other can be minimized, easing the process of securing the necessary political support and engagement of stakeholders and helping to meet legitimate human development objectives. Further, such efforts can help to identify those situations where significant biodiversity gains can be made for relatively little cost. Where multiple pressures are combining to weaken ecosystem structure, functioning and resilience, decisive action to reduce those pressures most amenable to rapid intervention should be prioritized, while longer-term efforts continue to moderate more intractable pressures, such as climate change and ocean acidification. Targeting drivers and pressures over which we have more immediate control will help ecosystems to maintain the resilience needed to prevent some dangerous “tipping points” from being reached, and allow us to better cope with those impacts of

climate change we cannot prevent in the short term. Stakeholders in each of the economic sectors will need to be engaged. Government ministries can take a leading role in their sectors while city and other local authorities can play a decisive role, especially in terms of local land use planning.

**Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.**

*Technical rationale:* Nearly all Parties report that habitat loss is the most important factor driving biodiversity loss. Largely undisturbed or primary habitat is a particular priority for reducing this loss. Degradation, which reduces the capacity of ecosystems to provide goods and services, is similarly important. Habitat fragmentation, though more difficult to quantify at a global level, is a related pressure driving biodiversity loss. While economic, demographic and social pressures are likely to mean continued habitat loss, degradation and fragmentation, particularly due to land-use change beyond 2020, the rate of change needs to be substantially reduced. While for some ecosystems it may be possible to bring the rate of habitat loss close to zero by 2020, for others a more realistic goal is to halve the rate of loss. Significantly reducing habitat degradation and fragmentation will also be required in order to ensure that those habitats which remain are capable of supporting biodiversity. Ultimately, there must be limits to the conversion or degradation of natural habitats. This is particularly the case for some ecosystems, where continued loss risks passing "tipping points" that could lead to large scale negative effects on human well-being. [9],[10],[11] The target refers to rate of loss, and should be regarded as a step towards halting the loss of natural habitats. Further it should be noted that the use of net rather than gross rates of loss could obscure the loss of mature ecosystems as a result of restoration. Whilst restoration activities can restore many of the attributes of primary ecosystems, they cannot be restored completely in the short to medium term. The emphasis of this target should be on preventing the loss of high-biodiversity value habitats, such as primary forests and many wetlands. Recent evidence suggests that the global rate of deforestation is already decreasing.

*Implementation*: Reduction in the loss and degradation of natural habitats through land use change could be achieved through improvements in production efficiency and land use planning, and enhanced mechanisms for natural resource governance combined with recognition of the economic and social value of ecosystem services provided by natural habitats. [12] In particular, catchment value (water provision), erosion control, the value of carbon sequestration by forests and wetlands, and other ecosystem services (such as denitrification by wetlands) provide contemporary incentives for reducing the net loss of these habitats, and reversing their decline. Taking a landscape-wide perspective to land use planning offers a useful way to integrate global level ecosystem services (e.g., climate change mitigation) with local level ones (e.g., biodiversity conservation, water supply and quality, timber and non-timber forest products). The programmes of work on forest, marine and coastal, inland water and dry and sub-humid lands biodiversity and the Convention's work on sustainable use are particularly relevant to this target. An initiative that could be further built upon in working towards this goal relates to the signing, by Ministers of 68 Parties to the Convention on Biological Diversity during the ninth meeting of the Conference of the Parties, of WWF's call to stop net deforestation by 2020.

*Indicators and baseline information*: In order to determine if the rate of habitat loss has been reduced, there will be a need to establish a baseline against which to gauge progress towards this goal. Relevant indicators include: trends in the extent of selected biomes, ecosystems, and habitats (forest area;

[9] Rockstrom, J., et al. (2009). A safe operating space for humanity. Nature, 461(7263), 472-475.

[10] Assessment of the Risk of Amazon Dieback. World Bank Climate and clean energy initiative. January 2010.

[11] Leadley, P., Pereira, H.M., Alkemade, R., Fernandez-Manjarrés, J.F., Proença, V., Scharlemann, J.P.W., Walpole, M.J. (2010) Biodiversity Scenarios: Projections of 21st century change in biodiversity and associated ecosystem services. Secretariat of the Convention on Biological Diversity, Montreal. Technical Series no. 50.

[12] Nelson, E., etal (2009). Modelling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales. Frontiers in Ecology and Environment 2009; 7(1): 4–11.

mangroves); trends in the abundance and distribution of selected species and the connectivity/fragmentation of ecosystems. Reasonably good data are available for some habitats, such as forests, while for other habitats improvements in data would be needed. The Degradation Initiative of the Collaborative Partnership on Forests has identified, and is further developing, common indicators for monitoring and assessing forest degradation. [13]

*Milestones*: Possible milestones for this target include:

- By 2012, common indicators for monitoring and assessing forest degradation, biomass, forest health, and forest goods have been agreed and widely used;
- By 2014, national legislation and land-use plans or zonation maps have been reviewed and updated in relation to national targets for the maintenance of natural habitats, and spatial planning tools are made available for wide use;
- By 2014, additional measures are taken, as necessary, including for example for the enhancement of land tenure, the enhancement of law enforcement and the use of incentive measures.

**Target 6: By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem-based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.**

*Technical rationale:* Overexploitation, including that which results from illegal, unreported and unregulated (IUU) fishing, is the main pressure on marine ecosystems globally, leading to the loss of biodiversity and ecosystem structure.[14] Global marine capture fisheries are yielding lower harvest and contributing less to the global economy than they could do under stronger policies to manage fish stocks in a way that is sustainable. The World Bank estimates that this situation represents a lost profitability of some $50 billion per year and puts at risk some 27 million jobs directly and the well-being of more than one billion people.[15] The main drivers of overexploitation, such as subsidies leading to over capacity, generally reflect governance failure at international, regional and national levels. Better management of harvested marine resources, such as through the increased use of ecosystem-based approaches and the establishment of recovery plans for depleted species, is needed to reduce pressure on marine ecosystems and to ensure the sustainable use of marine resource stocks. For example it is estimated that the global fishing fleet is currently 2.5 times larger than what the oceans can sustainably support. However, models suggest that, for some fisheries, on average, modest (~10%) reductions in catch could halve the pressure on marine ecosystems while also contributing to the long-term profitability and sustainability of fishing.[16] (Where fisheries are already managed sustainably, no further reductions in fishing pressure may be needed, while in some areas greater reductions might be warranted.) Such a reduction in fishing pressure would substantially diminish the likelihood of fishery collapses. Other examples of destructive harvesting and management practices include bottom trawling and dynamite fishing, which physically damage marine environments, such as coral reefs and seamounts, which serve as habitats for marine biodiversity.

*Implementation:* The specific target should be regarded as a step towards ensuring that all marine resources are harvested sustainably, are within safe ecological limits and that fisheries have no significant adverse impacts on threatened species of vulnerable ecosystems. Actions that build upon existing initiatives such as the Code of Conduct for Responsible Fishing could help to ensure this. Actions taken to reach this target would help to ensure implementation, with respect to marine living resources, of the United Nations Convention on the Law of the Sea and its 1995 Implementation Agreement of its

[13] Collaborative Partnership on Forests: http://www.fao.org/forestry/cpf/degradation/en/
[14] Worm, B., et al. (2006). Impacts of Biodiversity Loss on Ocean Ecosystem Services. Science, 314(5800), 787-790.
[15] The Economics of Ecosystems and Biodiversity. (2009) TEEB for Policy Makers, Summary.
[16] Worm, B., et al. (2009). Rebuilding Global Fisheries. Science, 325(5940), 578-585.

Provisions relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks.[17] Progress towards this target would also contribute to fisheries targets set during the 2002 World Summit on Sustainable Development[18] and build upon the diverse approaches and tools agreed upon there: the Ecosystem Approach; the elimination of destructive fishing practices; the establishment of representative networks of marine protected areas; and time/area closures for the protection of nursery grounds. This target would also contribute to the Johannesburg Plan Of Implementation (JPOI).[19] In situations where fisheries are shared by several countries in a region, mechanisms, such as multilateral strategies, may need to be developed to allow for a coordinated approach to resource management. The programme of work on marine and coastal biodiversity is the most relevant to this target, along with the sustainable use cross-cutting issue.

*Indicators and baseline information:* Indicators to measure progress towards this target include the Marine Trophic Index, the proportion of products derived from sustainable sources and trends in abundance and distribution of selected species. However, for several of these indicators, additional data would assist with monitoring progress. Other possible indicators include the proportion of collapsed species, fisheries catch, catch per unit effort, and the proportion of overexploited stocks. Baseline information for several of these indicators is available from the work conducted by the Food and Agriculture Organization of the United Nations.[20] Possible process indicators could include the incidence of cooperation with the scientific bodies of Regional Fisheries Management Organizations.

*Milestones:* Possible milestones for this target include:

- By 2012, Parties should have taken steps to address the management of fishing capacity for international fisheries requiring urgent attention, with priority being given to those harvesting transboundary, straddling, highly migratory and high seas stocks which are overexploited, depleted or recovering;
- By 2012, Parties should have eliminated destructive fishing practices;
- By 2012, Parties should develop or update national assessments of fishing capacity and national plans for the management of fishing capacity, in line with the Ecosystem Approach, in order to halve the pressure on marine ecosystems by 2015 and end overfishing in both domestic and foreign waters by 2020;
- By 2012, Parties should have submitted alternative fishing plans that comply with the principles of sustainability (economic and ecosystem) and should have begun to implement them so that, by 2020, they are fulfilling their goal to eliminate destructive fishing practices;
- By 2012, Parties have taken steps to address the management of international fisheries requiring urgent attention, with priority being given to transboundary, highly migratory and high seas stocks that are significantly overfished;

[17] Target 31(b) of the Johannesburg Plan of Implementation reads: Ratify or accede to and effectively implement the relevant United Nations and, where appropriate, associated regional fisheries agreements or arrangements, noting in particular the Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks17 and the 1993 Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas;

[18] Targets adopted in the Johannesburg Plan of Implementation include: the application by 2010 of the Ecosystem Approach; to establish representative networks of marine protected areas by 2012; to put into effect the international plans of action of the FAO, in particular the International Plan of Action for the Management of Fishing Capacity by 2005 and the International Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing by 2004.

[19] In particular Target 16 of the plan which states "To achieve sustainable fisheries, the following actions are required at all levels: (a) Maintain or restore stocks to levels that can produce the maximum sustainable yield with the aim of achieving these goals for depleted stocks on an urgent basis and where possible not later than 2015" (http://www.un.org/esa/sustdev/documents/WSSD_POI_PD/English/POIToc.htm).

[20] Food and Agriculture Organization (2009). The State of World Fisheries and Aquaculture 2008. FAO Fisheries and Aquaculture Department, Rome.

- By 2012, Parties should develop or update national assessments of fishing capacity and national plans for the management of fishing capacity, in line with the Ecosystem Approach, in order to halve the pressure on marine ecosystems from unsustainable fishing by 2015;
- By 2012, Parties should have taken all actions relevant to a responsible Flag State, especially with respect to its fishing vessels operating on the high seas;
- By 2012, Parties have prohibited subsidies that contribute to overcapacity and overfishing through the implementation of a transparent and enforceable mechanism; [21]
- By 2012(2014), Parties have agreed, through appropriate Regional Fisheries Management Organizations, arrangements, or through the Food and Agriculture Organization, to collect, exchange and publish basic fisheries data necessary for the proper management of fisheries;[22]
- By 2015, Parties should have restored stocks to levels that can produce maximum sustainable yield; [23]
- By 2015, pressure on marine ecosystems from fishing is halved at the global level;
- By 2015, Parties should have restored XX per cent of fish stocks to levels that can produce maximum sustainable yield;
- By 2015, Parties are implementing measures for the sustainable management of bycatch and have reduced the level of discard by 50 per cent;

**Target 7: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.**

*Technical rationale:* The ecologically unsustainable consumption of water, use and run-off of pesticides and excess fertilizers, and the conversion of natural habitats to uniform monocultures, amongst other factors, have major negative impacts on biodiversity inside and outside of agricultural areas, as well as on forest, inland water and coastal ecosystems. The increasing demand for food, fibre and fuel will lead to increasing losses of biodiversity and ecosystem services if issues related to sustainable management are not addressed. [24],[25] On the other hand, sustainable management not only contributes to biodiversity conservation but can also deliver benefits to production systems in terms of services such as soil fertility, erosion control, enhanced pollination and reduced pest outbreaks, as well as contributing to the well-being and sustainable livelihoods of local communities engaged in the management of local natural resources.

*Implementation:* Criteria for sustainable forest management have been adopted by the forest sector and there are many efforts by governments, indigenous and local communities, NGOs and the private sector to promote good agricultural, aquaculture and forestry practices and to apply law and governance mechanisms. While, as yet, there are no universally-agreed sustainability criteria, given the diversity of production systems and environmental conditions, each sector and many initiatives have developed their own criteria which could be used pending the development of a more common approach. In addition, customary use of biodiversity by indigenous and local communities can often offer lessons of wider applicability and could be enhanced by increasingly delegating governance and management responsibility to the local level. Similarly, the use of certification and labelling systems or standards could be promoted as part of this target. The Addis Ababa Principles and Guidelines for the Sustainable Use of Biodiversity developed under the Convention on Biological Diversity could serve as a framework for developing further sustainability criteria. The application of the Ecosystem Approach would also assist with the implementation of this target. The programmes of work on agricultural, forest, inland water, marine and coastal, dry and sub-humid lands biodiversity, and the Convention's work on sustainable use,

[21] WTO Pledge 2005 Hong Kong Ministerial Text.

[22] Cf UN Fish Stocks Agreement, Annex I, Article 3.

[23] Johannesburg Plan of Implementation paragraphs. 30-32.

[24] Tilman, D., etal., 2001. Forecasting agriculturally driven global environmental change. Science 292, 281–284.

[25] Steinfeld, H. et al. (2006) Livestock's Long Shadow: Environmental Issues and Options. Food and Agricultural Organization of the United Nations. Rome.

as well as the International Initiatives on Soil Biodiversity and on Pollinators are particularly relevant to this target.

*Indicators and baseline information:* Relevant indicators for this target include: the area of forest, agricultural and aquaculture ecosystems under sustainable management; the proportion of products derived from sustainable sources; and trends in genetic diversity of domesticated animals, cultivated plants and fish species of major socioeconomic importance. Other possible indicators could include: the Ecological Footprint and related concepts; the extent of the use of good agricultural practices; the quality of forest governance; and the proportion of products derived from sustainable sources. Existing sustainability certification schemes could provide baseline information for some ecosystems and sectors.

*Milestones:* Possible milestones for this target include:

- By 2012, all Parties have identified or developed and promoted sustainability criteria and/or good practices for agriculture, aquaculture and forestry;
- By 2015, the area of agriculture, aquaculture and forestry managed according to sustainability criteria has doubled.

**Target 8: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity.**

*Technical rationale:* Nearly all Parties indicated in their fourth national reports that pollution was posing a threat to biodiversity. Nutrient loading, primarily of nitrogen and phosphorus, is a major and increasing cause of biodiversity loss and ecosystem dysfunction, particularly in wetland, coastal and dryland areas, including through eutrophication and the creation of hypoxic "dead zones" associated with severe losses of valuable ecosystem services. [26],[27],[28],[29] Humans have already more than doubled the amount of "reactive nitrogen" in the biosphere, and business-as-usual trends would suggest a further increase of the same magnitude by 2050. This target is consistent with, and complementary to, work under the Rotterdam and Stockholm Conventions and the target established in the Johannesburg Plan of Implementation (para. 23) to achieve, by 2020, a situation where chemicals are used and produced in ways that lead to the minimization of significant adverse effects on human health and the environment.

*Implementation*: The better control of sources of pollution, including efficiency in fertilizer use and the better management of animal wastes, coupled with the use of wetlands as natural filtration plants where appropriate, can be used to bring nutrient levels below those that are critical for ecosystem functioning, while also allowing for increased fertilizer use in areas where it is necessary to meet soil fertility and food security needs. The EU has successfully promoted regulations to this end, and the evidence suggests that similar approaches are feasible in other developed and emerging economies. [30],[31] Similarly, the development of national water quality guidelines could help to limit pollution and excess nutrients from entering freshwater and marine ecosystems. This target is relevant to several programmes of work but, in

[26] Diaz, R. J., & Rosenberg, R. (2008). Spreading Dead Zones and Consequences for Marine Ecosystems. Science, 321(5891), 926-929. doi: 10.1126/science.1156401.
[27] Phoenix, G. K., et al. (2006). Atmospheric nitrogen deposition in world biodiversity hotspots: the need for a greater global perspective in assessing N deposition impacts. Global Change Biology, 12(3), 470-476.
[28] Hicks, K., et al. (2009). Global Assessment of Nitrogen Deposition Effects on Terrestrial Plant Diversity: a synthesis.
[29] Galloway, J. N., et al. (2008). Transformation of the Nitrogen Cycle: Recent Trends, Questions, and Potential Solutions. Science, 320(5878), 889-892.
[30] Bobbink, R., (in press) Global Assessment of Nitrogen Deposition Effects on Terrestrial Plant Diversity: a synthesis. Ecological Applications.
[31] Ju, X., et al. (2009). Reducing environmental risk by improving N management in intensive Chinese agricultural systems. Proceedings of the National Academy of Sciences of the United States of America, 106(9), 3041-3046.

particular, to those dealing with inland water biodiversity and marine and coastal biodiversity and the Convention's work on impact assessment.

*Indicators and baseline information*: Relevant indicators include nitrogen deposition and water quality in freshwater ecosystems. Other possible indicators could be the Ecological Footprint and related concepts, total nutrient use, nutrient loading in freshwater and marine environments, and the incidence of hypoxic zones and algal blooms. Data which could provide baseline information already exists for several of these indicators, including the incidence of marine dead zones (an example of human-induced ecosystem failure) and the global aerial deposition of reactive nitrogen.

*Milestones*: Options for milestones for this target include:

- By 2014, Parties have developed national assessments of the impact of nutrient loading and other pollution on ecosystems and have developed strategies and polices to reduce such pollution;
- By 2015, most ecosystems show declining nutrient loads and levels of other pollutants.

**Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment**

*Technical rationale:* Invasive alien species are those alien species which threaten ecosystems, habitats or species (Article 8(h)). They are a major threat to biodiversity and ecosystem services, as identified by most Parties in their fourth national reports. They often have a particularly detrimental effect in island ecosystems. In some ecosystems, such as many island ecosystems, invasive alien species are the leading cause of biodiversity loss. In addition, invasive alien species can pose a threat to food security, human health and economic development. Increasing trade and travel means the threat is likely to increase unless additional action is taken.[32]

*Implementation:* Pathways for the introduction of invasive alien species can be addressed through improved border controls and quarantine, including through better coordination with national and regional bodies responsible for plant and animal health, as well as through early warning mechanisms, rapid response measures and management plans. Given the multiple pathways for invasive species introductions and that multiple alien species are already present in many countries it will be necessary to prioritize control and eradication efforts to those species and pathways which will have the greatest impact on biodiversity and/or which are the most resource effective to address. Work initiated by the International Plant Protection Convention, the International Organization for Animal Health (OIE), and the World Trade Organization's Committee on the Agreement for the Application of Sanitary and Phytosanitary Measures and its Standards and Trade Development Facility, could also be built upon when taking actions to meet this target. The Global Invasive Species Programme has also developed several tools. Of the Convention's programmes of work, that dealing with invasive alien species is the most relevant to this target, however, given the particularly acute impact of invasive alien species on island ecosystems, the programme of work on island biodiversity is also relevant. Actions to implement the International Convention for the Control and Management of Ships' Ballast Water and Sediments, a convention adopted through the International Maritime Organization which seeks to prevent the spread of organisms carried in ships' ballast water, could also help to achieve progress towards this target.

*Indicators and baseline information:* Process indicators for this target could include the number of countries with national invasive species policies, strategies and action plans, and the number of countries which have ratified international agreements and standards related to the prevention and control of

[32] Hulme, P. E. (2009). Trade, transport and trouble: managing invasive species pathways in an era of globalization. Journal of Applied Ecology, 46(1), 10-18.

invasive alien species. One outcome-oriented indicator is trends in invasive alien species while other possible indicators could include the status of alien species invasion, and the Red List Index for impacts of invasive alien species. While well-developed and globally-applicable indicators are lacking, some basic methodologies do exist which can serve as a starting point for further monitoring or provide baseline information.[33] The work undertaken by the Global Invasive Species Programme, as well as by IUCN's Invasive Species Specialist Group, could be useful starting points in this regard. Further, many countries do have data on invasions and pest outbreaks and therefore national-level targets might be developed.

*Milestones:* Options for milestones for this target include:

- By 2014, potential pathways for invasive alien species are identified using a risk assessment framework, and lists of the most harmful invasive species are developed,
- By 2014 action plans are developed and relevant legislation is reviewed;
- By 2016, actions have been taken to address the most important introduction pathways and the most serious invasions;.
- By 2020, the measures which have been put in place have been assessed to determine their impact.

**Target 10: By 2015 the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.**

*Technical rationale:* In addition to warming caused by the greenhouse effect, increased atmospheric $CO_2$ leads to ocean acidification. [34],[35] Both pressures need to be considered in elaborating policy response options to climate change for coral reefs and other vulnerable ecosystems. However, given ecological and policy inertias, it is important to urgently reduce the other anthropogenic pressures on these vulnerable ecosystems, such as land-based pollution/sedimentation, unsustainable harvesting and physical pressures, so as to increase their resilience to climate change and ocean acidification. Given this urgency a deadline for 2015 has adopted for this target.

*Implementation:* By addressing those anthropogenic pressures which are most amenable to rapid positive changes, it may be possible to give vulnerable ecosystems time to cope with the pressures caused by climate change. This would include activities such as reducing pollution, overexploitation and harvesting practices which have negative consequences on ecosystems. Multiple programmes of work, including those on climate change and biodiversity, and marine and coastal biodiversity, are relevant to this target.

*Indicators and baselines:* Indicators for this target include the Marine Trophic Index, the incidence of human-induced ecosystem failure, the health and well-being of communities who depend directly on local ecosystem goods and services, and trends in coral bleaching. Other possible indicators include the Ecological Footprint and related concepts. Process indicators could include the number of plans, programmes and strategies related to the protection and management of marine and coastal ecosystems.

[33] McGeoch, M. A., et al. (2010). Global indicators of biological invasion: species numbers, biodiversity impact and policy responses. Diversity and Distributions, 16(1), 95-108.
[34] Hoegh-Guldberg, O., et al. (2007). Coral Reefs Under Rapid Climate Change and Ocean Acidification. Science, 318(5857), 1737-1742.
[35] Secretariat of the Convention on Biological Diversity (2009). Scientific Synthesis of the Impacts of Ocean Acidification on Marine Biodiversity. Montreal, Technical Series No. 46.

*Milestones*: Options for milestones for this target include:

- By 2012, assess the integrity of coral reefs and pressures arising from land-based pollution/sedimentation as well as from unsustainable fishing and recreational and other activities, and develop a strategy to minimize these;
- By 2012, identify vulnerable marine ecosystems, and undertake assessment of fishing impacts on such ecosystems, and of fishing activities on target and non-target species and to assess, on the basis of the best available scientific information, whether individual bottom fishing activities would have significant adverse impacts on vulnerable marine ecosystems;[36]
- By 2014, fully implement the strategy to minimize pressures on coral reefs arising from land-based pollution/sedimentation as well as from unsustainable fishing and recreational activities.

***Strategic goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity***

*Introduction***:** Whilst longer term actions to reduce the underlying causes of biodiversity are taking effect, immediate actions, such as those related to protected areas, species recovery programmes, land use planning approaches, and other targeted conservation interventions in the broader land- and seascape, can help conserve biodiversity and critical ecosystems. These might focus on culturally-valued species and key ecosystem services, particularly those of importance to the poor, as well as on threatened species. For example, carefully sited protected areas could prevent the extinction of endangered species by protecting their habitats, allowing for future recovery.

**Target 11: 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 landscape and seascape.**

*Technical rationale:* Well governed and effectively managed protected areas are a proven method for safeguarding both habitats and populations of species and for delivering important ecosystem services. [37,38,39,40,41] Currently, some 13 per cent of terrestrial areas and 5 per cent of coastal areas are protected, while very little of the open oceans are protected. The current target of 10 per cent protection for each ecological region has been achieved in approximately 55 per cent of all terrestrial eco-regions.[42] Therefore reaching this target implies a modest increase in terrestrial protected areas globally, with an

[36] This milestone would contribute to the implementation of the United Nations General Assembly resolutions 61/105 and 64/72.

[37] Ervin, J., etal. 2010. Making Protected Areas Relevant: A guide to integrating protected areas into wider landscapes, seascapes and sectoral plans and strategies. CBD Technical Series No. 44.

[38] Secretariat of the Convention on Biological Diversity (2008). Synthesis and Review of the Best Available Scientific Studies on Priority Areas for Biodiversity Conservation in Marine Areas beyond the Limits of National Jurisdiction. Technical Series No. 37.

[39] Secretariat of the Convention on Biological Diversity (2008). Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet. Technical Series No. 36.

[40] Secretariat of the Convention on Biological Diversity (2008). Implementation of the CBD Programme of Work on Protected Areas: Progress and Perspectives. Abstracts of Poster Presentations at the Second Meeting of the Ad Hoc Open-ended Working Group on Protected Areas, 11–15 February, 2008 in Rome, Italy Technical Series no. 35.

[41] Langhammer, P.F. et al. (2007) Identification and Gap Analysis of Key Biodiversity Areas: Targets for Comprehensive Protected Area Systems. IUCN World Commission on Protected Areas Best Practice Protected Area Guidelines Series No. 15. IUCN, Gland, Switzerland. http://data.iucn.org/dbtw-wpd/edocs/PAG-015.pdf.

[42] There are several classification schemes for ecoregions. One of these schemes is that developed by the WWF which identifies 825 terrestrial, 426 freshwater ecoregions and 229 coast and shelf marine ecoregions across the world.

increased focus on representivity and management effectiveness.[43] It further implies that major efforts to expand marine protected areas would be required. A focus on representivity is crucial as current protected area networks have gaps, and some fail to offer adequate protection to many species and ecosystems. These gaps include many sites of high biodiversity value such as Alliance for Zero Extinction sites and Important Bird Areas[44],[45],[46]. Particular emphasis is needed to protect critical ecosystems such as tropical coral reefs, sea-grass beds, deepwater cold coral reefs, seamounts, tropical forests, peat lands, freshwater ecosystems and coastal wetlands.

*Implementation:* Protected areas should be integrated into the wider land- and seascape, and relevant sectors, bearing in mind the importance of complementarity and spatial configuration. In doing so, the Ecosystem Approach should be applied taking into account ecological connectivity and the concept of ecological networks, including connectivity for migratory species (through, for example, "fly-ways" for migratory birds). Protected areas should also be established and managed in close collaboration with, and through equitable processes that recognize and respect the rights of indigenous and local communities, and vulnerable populations.[47] These communities should be fully engaged in governing and managing protected areas according to their rights, knowledge, capacities and institutions, should equitably share in the benefits arising from protected areas and should not bear inequitable costs. IUCN'S Guidelines for applying protected area management categories recognizes four broad types of governance of protected areas, any of which can be associated with any management objective. These categories include governance by government, shared governance, private governance, and governance by indigenous peoples and local communities. These cut across all categories of protected areas. Other effective area-based conservation measures may also include restrictions on activities that impact on biodiversity, which would allow for the safeguarding of sites in areas beyond national jurisdiction in a manner consistent with the jurisdictional scope of the Convention as contained in Article 4. Work towards this target could also be linked to the more specific targets under the programme of work on protected areas and the Global Strategy for Plant Conservation. The World Parks Congress is a further resource which can be drawn upon when taking actions towards this target. Protected areas could be complemented by limits to processes and activities harmful to biodiversity that are under the jurisdiction or control of Parties, including in areas beyond national jurisdiction, while ensuring that such limits do not infringe on the rights of indigenous or local communities, or vulnerable populations.

*Indicator and baseline information***:** Relevant indicators to measure progress towards this target are the coverage of sites of significance for biodiversity covered by protected areas and the connectivity/fragmentation of ecosystems. Other possible indicators include the overlay of protected areas with ecoregions, the governance and management effectiveness of protected areas, trends in the extent of selected biomes, ecosystems and habitats, the Marine Trophic Index, and water quality in aquatic ecosystems. Strong baseline information, from sources such as the World Database of Protected Areas, Alliance for Zero Extinction, Integrated Biodiversity Assessment Tool, IUCN Red List of Threatened

[43] Fiona Leverington, Marc Hockings and Katia Lemos Costa (2008). Management effectiveness evaluation in protected areas: Report for the project 'Global study into management effectiveness evaluation of protected areas', The University of Queensland, Gatton, IUCN WCPA, TNC, WWF, AUSTRALIA.

[44] Some 20% of 3,896 threatened vertebrates are not included in any protected (Rodrigues et al 2004, Bioscience 54: 1092-1100) and only 39% of the area of Important Bird Areas (10,993 sites critical for conservation of the world's birds) and 42$ of the area of Alliance for Zero Extinction sites (561 sites holding the last remaining population of highly threatened mammal, bird, amphibian, reptile or conifer species) currently have any formal protection (Butchart et al 2010, Science 10.1126/science.1187512).

[45] Ricketts, T.H. et al. (2005) Pinpointing and preventing imminent extinctions. Proceedings of the National Academy of Sciences of the U.S.A. 102: 18497–18501.

[46] Butchart, S.H.M. et al. (2010) Global biodiversity: indicators of recent declines. Science 328: 1164–1168.

[47] The In-depth review of the implementation of the programme of work on protected areas (UNEP/CBD/SBSTTA/14/5) identified, *inter alia*, slow progress in the implementation of the Programme, and particularly of Element 2 concerning governance, participation, equity, and benefit-sharing.

Species and the IUCN World Commission on Protected Areas, already exists for many of these indicators.

*Milestones:* Milestones for this target included in the Programme of Work on Protected Areas are:

- By 2012, in the marine area, a global network of comprehensive, representative and effectively-managed national and regional protected area systems is established;
- By 2012, all protected areas are effectively and equitably managed, using participatory and science-based site planning processes that incorporate clear biodiversity objectives, targets, management strategies and monitoring and evaluation protocols;
- By 2015, all protected areas and protected area systems are integrated into the wider land- and seascape, and relevant sectors, by applying the Ecosystem Approach and taking into account ecological connectivity, likely climate change impacts and, where appropriate, the concept of ecological networks.

**Target 12: By 2020, the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.**

*Technical rationale:* Though some extinctions can occur naturally, as a result of human action current rates of extinction are some 100 to 1000 times the background extinction rate. While reducing the threat of human-induced extinction requires action to address the direct and indirect drivers of change, imminent extinctions of known threatened species (these are mostly vertebrates and higher plants) can in many cases be prevented by protecting the sites where such threatened species (identified in the IUCN Red List of Threatened Species) are located, combating particular threats, and *ex situ* conservation. Therefore the task of halting extinction is possible from a scientific perspective by 2020 through a combination of site-focused initiatives. There would be additional biodiversity benefits from the protection of the habitats and other species contained therein. *Ex situ* measures could complement *in situ* protection. Progress towards this target would help to reach several of the other targets contained in the Strategic Plan, including Target 13.

*Implementation*: Numerous types of actions can be taken to implement this target. Sites already identified through the Alliance for Zero Extinction could be protected, supplemented by additional work to identify, locate and protect threatened species. Additional actions which directly focus on species include the implementation of species recovery and conservation programmes, *ex situ* conservation measures as well as the re-introduction of species to habitats from which they have been extirpated. Actions taken under CITES to ensure that no species is threatened by international trade also contribute to the achievement of this target. This target is relevant to most of the Convention's programme of work on protected areas and is in line with the Global Strategy for Plant Conservation as well as with the Global Taxonomy Initiative.

*Indicators and baseline information*: One relevant indicator for this target is the change in status of threatened species. The IUCN Red List, which classifies species as being extinct (EX), Extinct in the wild (EW), Critically endangered (CR), Endangered (EN), Vulnerable (VU), Near threatened (NT), or Least Concern (LC), provides strong baseline information for this target.

*Milestones*: Options for milestones for this target include:

- By 2012, information on the occurrence and distribution of globally threatened species has been reviewed and, where necessary, updated and the status of ecosystems in which they occur has been assessed;
- By 2012, conservation measures have been taken to prevent imminent extinctions;
- By 2014, preliminary national Red List assessments have been conducted;

- By 2016, a strategy for the prevention of extinctions of all nationally threatened species is in place.

**Target 13: By 2020, the loss of 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.**

*Technical rationale:* The genetic diversity of cultivated plants and farmed or domesticated animals and of wild relatives is in decline as is the genetic diversity of other socio-economically and culturally valuable species. As such the genetic diversity which remains needs to be maintained and strategies need to be developed and implemented to minimize the current erosion of genetic diversity. While substantial progress has been made in safeguarding many varieties and breeds through *ex situ* storage in genebanks, less progress has been made *in situ*. *In situ* conservation, including through continued cultivation on farms, allows for ongoing adaptation to changing conditions (such as climate change) and agricultural practices. In addition, both *in situ* and *ex situ* conservation of wild relatives of crop plants and other socio-economically valuable species, as well as selected wild species of plants and animals, should be improved inside and outside protected areas.

*Implementation:* The programme of work on agricultural biodiversity as well as the FAO Global Plan of Action for the conservation and sustainable use of plant genetic resources for food and agriculture, the FAO Global Plan of Action for animal genetic resources and the International Initiative on Biodiversity for Food and Nutrition provide guidance on the types of actions which can be taken to reach this target.

*Indicators and baseline information*: Indicators for this target are *ex situ* crop collections, and the genetic diversity of terrestrial domestic animals. Other indicators could include trends in the genetic diversity of cultivated plants, fish species of major socio-economic importance and the number of genebank accessions. Assessments carried out by the Food and Agriculture Organization[48] could provide baselines for assessments towards this target.

*Milestones*: Options for milestones for this target include:

- By 2014, programmes for *in situ* conservation of crop and livestock genetic diversity and other socio-economically valuable species, as well as for selected wild species of plants and animals, are included in national biodiversity strategies and action plans.

***Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services.***

Biodiversity underpins the services provided by ecosystems to humankind. This includes essential services such as the provision of food, clean water, the removal of wastes and the mitigation of the impacts of extreme events. While all people benefit from ecosystem services, some are more directly dependent on them for their livelihoods and well-being. Biodiversity and ecosystems also play an increasingly important role in combating climate change and its impacts. Ecosystems are being modified often to increase the proportion of provisioning services delivered in a given time (e.g., for food, wood, etc.) or to make them more suitable for other human requirements (e.g., water regulation for transport, irrigation), thereby typically decreasing their potential to deliver other services (regulating, cultural). Wise management of ecosystems aims to ensure the continuous delivery of a range of services or co-benefits. The potential for the delivery of ecosystem services in degraded systems is small and hence the benefits for human societies limited. This Strategic Goal is to enhance the delivery of ecosystem

[48] Food and Agriculture Organization (2007). The State of the World's Animal and Genetic Resource for Food and Agriculture. Commission on Genetic Resources for Food and Agriculture of the United Nations. Rome.

services through the promotion of management for multiple ecosystem services and the restoration of degraded systems. Efforts should focus on maintaining and, wherever possible, restoring terrestrial, freshwater and marine ecosystems to ensure the provision of valuable ecosystem services, contributing to the achievement of the Millennium Development Goals and to climate change mitigation and adaptation.

**Target 14: By 2020, ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities and the poor and vulnerable.**

*Technical rationale:* All terrestrial, freshwater and marine ecosystems provide multiple ecosystem services. However some ecosystems, such as those that provide ecosystem services related to the provision of water, are particularly important in that they provide services that are essential for human wellbeing and specifically for the lives and livelihoods of women, and indigenous and local communities, including the poor and vulnerable. Accordingly, priority should be given to safeguarding or restoring such ecosystems, and to ensuring that people, especially women, indigenous and local communities and the poor and vulnerable, have adequate and secure access to these services.

*Implementation*: Ecosystems which provide essential services and that contribute to local livelihoods should be identified through participatory processes at local, national and global levels and in accordance with Article 10 of the Convention. Tools for mapping ecosystem services and for the valuation of ecosystem services are now available and/or are being tested. The resulting information should be integrated into development plans to ensure that these ecosystems receive the necessary protection and investments. Sound distribution and recognition of property rights, including traditional and customary rights, can contribute to ensuring adequate and equitable access to ecosystem services.[49]

*Indicators and baseline information*: Indicators for this target include the health and well-being of communities who depend directly on local ecosystem goods and services and biodiversity for food and medicine. Other possible indicators could include the status and trends of linguistic diversity, numbers of speakers of indigenous languages, and other indicators of the status of indigenous and traditional knowledge.

*Milestones*: Options for milestones for this target include:

- By 2014, information on the services provided by ecosystems and the benefits received by local and indigenous communities is compiled and reviewed through respectful and participatory processes;
- By 2014, national strategies or policies for enhanced and equitable provision of and access to essential ecosystem services are developed as a contribution to poverty reduction and sustainable development strategies.

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

*Technical rationale:* The conservation, restoration and sustainable management of forests, soils (especially peatlands), freshwater and coastal wetlands and other ecosystems are proven, cost-effective, safe and immediately-available means to sequester carbon dioxide and prevent the loss of other

[49] The Economics of Ecosystems and Biodiversity. (2009) TEEB for Policy Makers, Summary, Chapter 4.

greenhouse gases. [50],[51] Deforestation, wetland drainage and other habitat change lead to the emission of carbon dioxide, methane and other greenhouse gases. For example, the world loses approximately 13 million hectares of forests annually, including 6 million hectares of primary forests and, in the process, biodiversity is reduced, greenhouse gases are released and the livelihoods of millions of people, including indigenous peoples and local communities, are threatened.[52] However, in many countries, degraded landscapes represent immense opportunity for both biodiversity restoration and carbon sequestration. For example, the World Resources Institute (WRI) and IUCN recently estimated the global potential for forest landscape restoration to be at 1 billion hectares, or about 25 per cent of the current global forest area. Recent scientific analyses indicate that the biodiversity potential of restored secondary forest is substantial. [53],[54] Forest landscape restoration, including of carbon-rich tropical peatlands, would also have significant co-benefits for climate change mitigation and adaptation. Preliminary analysis indicates that, by 2030, the restoration of degraded forest lands will make the same (or perhaps as much as double) contribution to the reduction of greenhouse gases as that which could be expected from avoided deforestation (70 Gt of $CO_2$ emissions). Restored landscapes and seascapes can improve resilience including adaptive capacity of ecosystems and societies, and can contribute to climate change adaptation and generate additional benefits for people, in particular indigenous and local communities and the rural poor.

*Implementation:* Restoration activities, such as forest and wetland landscape restoration, are already underway in many parts of the world. Consolidating policy processes and the wider application of these efforts could contribute significantly to the achievement of the objectives of the Convention, and generate significant synergies with the UNFCCC, the UNCCD and the UNFF. Appropriate incentive schemes (such as the "REDD-plus" schemes under discussion in the context of the climate change negotiations, and additional schemes for other terrestrial, freshwater and coastal ecosystems) could reduce, or even reverse, these land use changes and, with appropriate safeguards, including respect for local land and resource rights, could also deliver substantial co-benefits for biodiversity[55] and local livelihoods. Monitoring is being developed as an integral part of these schemes. The Convention's work on biodiversity and climate change is particularly relevant to this target as are many of the programmes of work.

*Indicators and baseline information:* Relevant indicators include the extent of native habitat types, the Ecological Footprint and related concepts as well as trophic integrity of all relevant ecosystems. Other possible indicators could include the storage of carbon and other GHG (using UNFCCC inventories supplemented by scientific assessments) and assessments of vulnerability and adaptive capacity. In addition to biomass indicators, it is important to consider degradation and restoration metrics.

*Milestones:* Options for milestones for this target include:

- By 2012, indicators on degradation and restoration have been developed and agreed;
- By 2014, information on the potential contribution of all ecosystems to carbon storage and sequestration is compiled and reviewed, and a national strategy for the enhancement of the

[50] Campbell, A., etal. (2009). Review of the Literature on the Links between Biodiversity and Climate Change: Impacts, Adaptation and Mitigation. Secretariat of the Convention on Biological Diversity. Technical Series No. 42.
[51] Secretariat of the Convention on Biological Diversity (2009). Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the Second Ad Hoc Technical Expert Group on Biodiversity and Climate Change. Technical Series No. 41.
[52] Food and Agriculture Organization of the United Nations (2006). Global Forest Resources Assessment 2005: Progress towards sustainable forest management. FAO, Rome.
[53] Edwards, D., etal (2009). The Value of Rehabilitating Logged Rainforest for Birds. Conservation Biology, 23(6), 1628-1633.
[54] Thompson, I., etal. (2009). Forest Resilience, Biodiversity, and Climate Change. A synthesis of the biodiversity/resilience/stability relationship in forest ecosystems. Secretariat of the Convention on Biological Diversity, Montreal. Technical Series No. 43.
[55] Venter, O., et al (2009). Harnessing Carbon Payments to Protect Biodiversity. Science, 326(5958), 1368.

contribution of biodiversity (including habitat, population, species and genetic diversity) to ecosystem resilience and carbon storage has been prepared and adopted, taking into account provisions under the United Nations Framework Convention on Climate Change and its Kyoto Protocol, as well as the United Nations Convention to Combat Desertification and its 10-year strategic plan and framework to enhance the implementation of the Convention (2008–2018);

- By 2014, a national plan for ecosystem restoration is in place and being implemented;
- By 2014, information on the potential contribution of biodiversity and the maintenance of ecosystem services to resilience and adaptive capacity in the face of impacts from climate change, is generated, compiled and reviewed; improved tools and methods for supporting ecosystem-based adaptation have been developed and disseminated; and countries have begun integrating ecosystem restoration into national adaptation strategies and other relevant instruments;
- By 2014, national plans for ecosystem restoration are integrated into national biodiversity action plans and other national strategies (including REDD-plus) and are being implemented;
- By 2014, tools and methods for supporting ecosystem-based adaptation have been developed and disseminated; and countries have begun integrating ecosystem restoration into national adaptation strategies and other relevant instruments.

**Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.**

*Technical rationale:* The third objective of the Convention provides for "the fair and equitable sharing of the benefits arising out of the utilization of genetic resources…". Genetic resources, whether from plant, animal or micro-organisms, are used for a variety of purposes ranging from basic research to the development of products. Users of genetic resources may include research institutes, universities and private companies operating in various sectors such as pharmaceuticals, agriculture, horticulture, cosmetics and biotechnology. The Convention, in its Article 15, sets out principles and obligations of Parties related to access to genetic resources and the fair and equitable sharing of benefits arising out of the utilization of genetic resources, on the basis of prior informed consent and mutually-agreed terms.

*Implementation:* The Bonn Guidelines on access to genetic resources and the fair and equitable sharing of the benefits arising from their utilization, adopted in 2002, guide both the providers and users of genetic resources in the application of the access and benefit-sharing provisions of the Convention. They were adopted to assist Parties when establishing administrative, legislative or policy measures on access and benefit-sharing and/or when negotiating contractual arrangements for access to genetic resources and benefit-sharing. At its tenth meeting, the Conference of the Parties to the Convention on Biological Diversity adopted the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. Given that this protocol is an international regime the initial target is for its ratification and entry into force by 2015.

*Indicators and baseline information*: An indicator of access and benefit sharing (ABS) is under development. Possible measures could include the number of countries Party to the international regime, the number of countries with national ABS frameworks/legislation; the number of ABS agreements; the number of technical assistance programmes available for strengthening national ABS programmes; and, potentially, the value of benefits shared. Other possible indicators include the number of competent national authorities established to address issues related to access and benefit sharing as well as the number of academic collaboration projects on ABS.

*Milestones*: Options for milestones for this target include:

- By 2012, the international regime on access and benefit sharing enters into force;
- By 2014, all countries have developed the domestic policies and initiated relevant measures in line with the Convention, and the international regime on access and benefit sharing, as appropriate.

***Strategic goal E. Enhance implementation through participatory planning, knowledge management and capacity building***

*Introduction.* Most actions under the Convention are initiated and carried out at the national or sub-national levels, and will be delivered through the implementation of national biodiversity strategies and action plans. National strategies need to integrate new national targets consistent with this Strategic Plan and implemented through action plans involving all sectors of government, society and the economy. This will also require improvements in knowledge and how it is disseminated, as well as substantial increases in capacity in all countries, especially developing countries and countries with economies in transition and, particularly, in the least developed countries and small island developing states. Progress towards this strategic goal will contribute to all of the other strategic goals and targets contained in this Strategic Plan.

**Target 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing, an effective, participatory and updated national biodiversity strategy and action plan.**

*Technical rationale:* National biodiversity strategies and action plans (NBSAPs) are the key instrument for translating the Convention and decisions of the Conference of the Parties into national action. For this reason it will be essential that Parties have developed, adopted and commenced implementing as a policy instrument an updated NBSAP which is in line with the goals and targets set out in this Strategic Plan by 2015. To date, 171 Parties have prepared national biodiversity strategies. COP has adopted consolidated guidance for the development, updating and revision of NBSAPs (Decision IX/8). In line with this decision, NBSAPs should catalyze a number of strategic actions in countries including: Integration of biodiversity in broader national strategies (see target 2); CEPA; ensuring availability of information and knowledge for action, including through national CHM nodes; ensuring availability of appropriate tools for implementation; providing capacity building and facilitating access to financial resources; and ensuring monitoring, reporting and review, including identification and use of indicators as appropriate.

*Implementation:* The planning process would of necessity involve dialogue with, and full and effective participation of, all sectors of society, including indigenous and local communities, and at all levels of government. Participatory stakeholder involvement throughout the design, planning and implementation of an NBSAP is essential to ensure that the plans will be effective. A revised NBSAP should not be a static planning document but a dynamic process that allows individual Parties to identify their needs, priorities and opportunities for biodiversity in light of their broader national goals. Where appropriate, regional and sub-national strategies should be developed. The target for 2015 implies that, not only are NBSAPs developed through a participatory approach, but that they are used as effective tools for mainstreaming biodiversity across government and society. As all programmes of work, cross-cutting issues and initiatives developed under the Convention provide guidance on how the three objectives of the Convention can be implemented, they are all relevant to this target.

*Indicators and baseline information:* Indicators to measure progress towards this goal could include: the number of countries with revised NBSAPs; the number of stakeholders who participate in the revision and updating process of NBSAPs; national assessments of NBSAP implementation; the number of countries with national CHM websites; the number of visitors per year to national CHM websites; and the quality of content and on-line services national CHM websites offer, as well as web user feedback. Most of this information can be easily gathered through the existing national reporting process.

*Milestones:* Consistent with the proposed multi-year programme of action, possible milestones for this target include:

- By 2012, each Party has adopted a set of national targets to contribute to the global targets of this Strategic Plan and has begun to incorporate these into its national biodiversity strategy;
- By 2014, each Party has adopted an up-to-date, effective, participatory, and operational national biodiversity strategy which contributes to the Strategic Plan with responsibilities allocated among sectors, levels of government, and other stakeholders, and has coordination mechanisms in place to ensure implementation of the actions needed.

**Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.**

*Technical rationale:* In line with Article 8(j) of the Convention, traditional knowledge, innovations and practices should be respected, protected, maintained and promoted, and used in local ecosystem management, drawing upon experiences of customary use, with the approval of relevant communities. Likewise, in line with Article 10(c), customary use of biological resources that is compatible with conservation and sustainable use, should be protected and encouraged. The rights of indigenous and local communities over their traditional knowledge, innovations, practices and related biological resources, along with their rights to practice and pass on traditional knowledge, innovations and practices should be respected.

*Implementation:* The guidance developed as part of the Convention's cross-cutting issue on traditional knowledge, innovations and practices (Articles 8(j) and 10(c) and related provisions) provides advice on how this target can be implemented. Capacity building and programmes for the recognition and mainstreaming of Articles 8(j) and 10(c) and related provisions should be strengthened and implemented.

*Indicators and baseline information*: Indicators include the status and trends of linguistic diversity and numbers of speakers of indigenous languages. Other indicators for the status of indigenous and traditional knowledge are under development. While information on indigenous languages is limited, some national information is available and the work being conducted by UNESCO on endangered languages could serve as a starting point in developing an information baseline. The open-ended Working Group on Article 8(j) and Related Provisions is also investigating two additional indicators, one on the status and trends in land use change in the traditional territories of indigenous and local communities, and the other on the status and trends of the practice of traditional occupations. Once developed, these indicators could also help to monitor progress towards this goal.

*Milestones*: Options for milestones for this target include:

- By 2012, a gender-sensitive review of the use of traditional knowledge, innovations and practices, and of the status and trends of customary use of biological resources, as they relate to the conservation and sustainable management of biodiversity, has been carried out in collaboration with indigenous and local communities;
- By 2014, adequate measures to respect and protect traditional knowledge and customary sustainable use and the rights of indigenous and local communities over their traditional knowledge, innovations and practices, have been put in place;
- By 2016, a strategy to promote traditional knowledge, innovations and practices, with the approval of the knowledge holders, and in line with their rights, as it relates to the conservation and sustainable management of biodiversity, has been developed and put in place.

**Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.**

*Technical rationale:* Each country needs access to information to identify threats to biodiversity and determine priorities for conservation and sustainable use. While nearly all Parties report that they are taking actions related to monitoring and research, most also indicate that the absence or difficulty in accessing scientific information is an obstacle to the implementation of the goals of the Convention. Action taken to reach this target will also benefit the other targets of the Strategic Plan by encouraging new research, the development of new technologies and improved monitoring. Such actions will strengthen the policy-science interface and will contribute to the fulfilment of the other elements of the Strategic Plan.

*Implementation:* For knowledge that is already available, access could be improved through the further development of the clearing-house mechanism at national and global levels. Relevant information includes biodiversity-related data as well as tools and methodologies for biodiversity conservation, sustainable use and benefit sharing, and case-studies of their use. Further efforts are also needed, at multiple scales, to improve biodiversity-related knowledge and reduce uncertainties around the relationship between biodiversity change, ecosystem services and impacts on human well-being. With regards to the sharing of technologies related to biodiversity, this should be consistent with Article 16 of the Convention. This requires substantial investment in global and national biodiversity observation networks, implementation of the Global Taxonomy Initiative, and further investment in research, including modelling and participatory research. Improvements are also needed in the science-policy interface.

*Indicators and baseline information:* An indicator for technology transfer is under development. Possible process indicators include: the number of countries with national clearing-house mechanisms; visitors/per year at each national CHM website; a globally agreed set of status and trends metrics; extent of data coverage for global biodiversity indicators and measures; and the use of biodiversity-related information in the fifth and sixth national reports.

*Milestones:* Options for milestones for this target include:

- By 2012, a review of the relevant knowledge and technologies available in-country and of the gaps in knowledge and technologies necessary to implement the Convention, has been carried out;
- By 2014, a national clearing-house mechanism is established, together with a strategy to improve access to knowledge and technologies.

**Target 20: 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.**

*Technical rationale:* Most countries indicate in their fourth national reports that limited capacity, both financial and human, is a major obstacle to the implementation of one or more of the three goals of the Convention. National investment to strengthen capacity is poorly documented globally. However, in at least some biodiversity-rich countries, such as Mexico, that are documented, investment is increasing, and diversifying. [56] Estimates for total current financing of biodiversity is of the order of US$36-38 billion

[56] PRPG Salcido, IA Quiroz, RR Ramírez, Biodiversity Conservation. 18, 1421 (2009), quoted in Rands *et al* (2010)

annually with around US$ 20-22 billion being spend in developed countries and around US$ 15-16 billion being spend in developing countries. Of this, some US$ 24 billion is from domestic government spending (around US$ 16 billion in developed countries and around US$ 8 billion in developing countries). Market-based spending on biodiversity is currently rather limited. International financing for biodiversity conservation has been increasing and has been estimated to have grown by approximately 38 per cent in real terms since 1992.[57] Despite this increase, the capacity for implementing the Convention, in terms of trained staff and financial resources, is limited in most countries, especially in developing countries, and in particular the least developed countries and small island developing states. Currently, it is estimated that international financing for biodiversity, as reported to the OECD, is approximately US$ 3.1 billion per year.[58]

A number of studies have attempted to estimate the funding needs for biodiversity. Some of the most well document estimates have focused on the costs associated with protected area networks both at a regional and global scale. Estimates focussing on protected areas generally fall in the range of $20 billion to $50 billion a year. [5960] It is estimated that spending on tropical terrestrial protected areas needs to increase from about $1 billion per year to about $13 billion per year[61], while an additional $6-20 billion a year is needed for marine protected areas. [62],[63] Estimates that also include maintenance of biodiversity outside protected areas or for total ecosystem protection in the context of climate change mostly fall in the range of US$ 300–400 billion per year. [64], [65], [66]

The capacity which currently exists in countries needs to be safeguarded and increased from current levels, in line with the process laid out in the Strategy for Resource Mobilization, in order to enable countries to meet the challenges of implementing the Convention's revised Strategic Plan. The fulfilment of this target will also have implications on the feasibility of achieving the other 19 targets contained in the revised Strategic Plan. While a full and precise costing of the actions needed to implement the revised Strategic Plan is not available, a rough comparison of estimates of current financing with the estimates on financing needs provided above reveals that, while existing financing is in the order of a tens of billions of dollars a year (including international aid flows in the order of a few billion dollars a year), total needs are of the order of a few hundreds of billions of dollars a year (including a tens of billions for protected areas a year). A recent review concludes "Scaling up successful approaches requires much greater investment in biodiversity conservation, by at least an order of magnitude".[67] A proportionately greater

[57] P. Gutman, S. Davidson, A Review of Innovative International Financial Mechanisms for Biodiversity Conservation with a Special Focus on the International Financing of Developing Countries' Protected Areas (World Wide Fund for Nature, Gland, Switzerland, 2008), quoted in Rands *et al* (2010)

[58] Butchart, S. H. M., Walpole, M., Collen, B., van Strien, A., Scharlemann, J. P. W., Almond, R. E. A., Baillie, J. E. M., et al. (2010). Global Biodiversity: Indicators of Recent Declines. Science, 328(5982), 1164-1168.

[59] Bruner, A.G., R.E. Gullison & A. Balmford. 2004. Financial needs for comprehensive, functional protected area systems in developing countries. BioScience 54: 1119-1126.

[60] James A, Gaston K and Balmford A (2001) Can we afford to conserve biodiversity? *Bioscience.* 51, 43-52

[61] Brooks, TM, Wright, SJ and Sheil, D. (2009), Evaluating the Success of Conservation Actions in Safeguarding Tropical Forest Biodiversity. Conservation Biology, 23: 1448–1457.

[62] Bruner, A., Naidoo, R. and Balmford, A. (2008). Review of the economics of biodiversity loss: Scoping the science – Review of the costs and priorities for action. The Economics of Ecosystems and Biodiversity.

[63] Balmford, A., Gravestock, P., Hockley, N., McClean, C. J., & Roberts, C. M. (2004). The worldwide costs of marine protected areas. Proceedings of the National Academy of Sciences of the United States of America, 101(26), 9694-7.

[64] James A, Gaston K and Balmford A (2001) Can we afford to conserve biodiversity? *Bioscience.* 51, 43-52

[65] Berry. P (2007) Adaptation options on natural ecosystems. A report to the UNFCCC Secretariat. Environmental Change Unit, Oxford. UK.

[66] IUCN (2007) Saving biodiversity – an economic approach. In Knee, A (editor).

[67] Rands, M. R. W., Adams, W. M., Bennun, L., Butchart, S. H. M., Clements, A., Coomes, D., Entwistle, A., et al. (2010). Biodiversity Conservation: Challenges Beyond 2010. Science, 329(5997), 1298-1303.

increase is required in developing countries as compared to developed countries. This might be achieved through a combination of aid flows, domestic spending, and market mechanisms.[68] Meeting the MDG-related commitment for aid flows to reach 0.7 per cent GNI implies a doubling of aid and would also imply a doubling (or greater) of biodiversity-related aid, if the current percentage of aid that is biodiversity-related remains constant. Substantial increases in market-related mechanisms may be realized given the additional resources which are expected to become available through mechanisms such as "REDD-plus", and schemed related to ecosystem-based adaptation to climate change, and payment for ecosystem services.

*Implementation*: This target should be seen as a common commitment by donors and recipient countries to take action, as appropriate, to both increase development cooperation funds available for biodiversity relevant activities, consistent with the Paris Declaration, and also to give appropriate priority in the use of those funds. It does not necessarily require the earmarking of funds by those donors which provide budget-wide support to developing countries. It assumes that developed countries will comply with their commitments under the Monterey Consensus. In accordance with the Convention, financing will be from both domestic and international sources, including innovative financing mechanisms, in line with the Convention's Strategy for Resource Mobilization adopted at the ninth meeting of the Conference of the Parties to the Convention on Biological Diversity. Financing that is envisaged to become available for reducing emissions from deforestation and forest degradation is expected to provide substantial biodiversity co-benefits. Financing envisaged for adaptation also has a potential to become available for biodiversity-friendly ecosystem-based adaptation. Funds already committed for these purposes, as part of the Copenhagen Accord, are at least an order of magnitude higher than funds currently committed for biodiversity.[69] The increase in capacity included as part of this target should be conducted bearing in mind the provisions of Article 20 of the Convention and on the resources needs assessment to be conducted and reported on by Parties during the eleventh meeting of the conference of the Parties in 2012.

*Indicator and baseline information*: Official development assistance (ODA) provided in support of the Convention is one indicator for this target. Additional indicators could include the resources provided to developing countries which are dispersed through mechanisms other than official development assistance. Another possible indicator includes the number of officials and experts qualified on biodiversity-related matters. Data related to official development assistance are already available and could serve as a baseline for gauging progress towards this goal

*Milestones:* Options for milestones for this target include:

- By 2014, all countries have developed country-specific strategies for resource mobilization as part of the process of updating their national biodiversity strategies and action plans.[70];

[68] Parker C & Cranford M (2010) The Little biodiversity finance book – a guide to proactive investment in natural capital. Global Canopy Programme, Oxford, UK.

[69] The recent Copenhagen Accord refers to scaled up, new and additional funding to enable and support enhanced action on mitigation, including substantial finance to REDD-plus, adaptation, capacity-building, technology development and transfer. The commitment is to provide resources (via public and private, bilateral and multilateral, and alternative sources of finance) ranging from $10 billion a year in the short term ("Fast Track") to $100 billion a year by 2020 to address the needs of developing countries.

[70] WGRI recommendation 3/8 paragraph 2.

## Annex I: Characteristics of indicators agreed through decisions VII/15 and VIII/30

| Headline Indicator | Specific Indicator developed through 2010 BIP | Number of data points | Years of baseline & subsequent points | Scale | Type of review[71] |
|---|---|---|---|---|---|
| **Trends in extent of selected biomes, ecosystems, and habitats** | Trends in extent of forest area | 11 (12) | 1948-2005 (2010) | Global, regional, national | 3 |
| | Trends in extent of mangroves | 4 | 1980-2005 | Global, regional | 1 |
| | Trends in extent of corals | 36 | 1968 (Indo-Pacific); 1971 (Caribbean) | Global, regional | 1 |
| | Trends in extent of seagrass beds | 8 | 1930-2005 | Global with regional case studies | 3 |
| **Trends in abundance and distribution of selected species** | Living Planet Index | 38 | 1970-2007<br>(annual) | Global; system; biome; habitat; regional; thematic subset | 1 |
| | Global Wild Bird Index | 27 | 1980-2006 (annual) | Regional; pilot studies | 1 |
| **Coverage of protected areas** | Coverage of protected areas | 138 | 1872-2009<br>(annual) | Global; regional; national; biome; IUCN category; system (marine, coastal, terrestrial) | 3 |
| | Overlays with biodiversity | 20 | 1990-2009<br>(annual) | Global; regional; national; biome; IUCN category | 1, 2 |
| | Management effectiveness | variable<br>(7000 sites; 3000 with accessible data) | 1991-2009<br>(variable) | 30% of IBA area protected in 77 countries (70% still need protection) | 2 |
| **Change in status of threatened species** | Red List Index | Birds = 5<br>Mammals = 2<br>Amphibians = 3<br>Reptiles = 3<br>Fishes = 2<br>9 invert groups<br>3 plant groups | variable | Global; regional; habitat; convention | 1 |
| **Trends in genetic diversity of domesticated animals, cultivated plants, and fish species of major socioeconomic importance** | *Ex situ* crop collections | 3 | 1996-2008 | Global - 3 datasets (FAO SWR)<br>Regional - EURISCO | 3 |
| | Genetic diversity of domesticated animals | | | | 3 |

[71] 1= Peer review through existing journal publication; 2 = Manuscript in preparation for publication in peer reviewed journal; 3 = Institutional review process undergone; 4 = No formalized review process

| Headline Indicator | Specific Indicator developed through 2010 BIP | Number of data points | Years of baseline & subsequent points | Scale | Type of review[72] |
|---|---|---|---|---|---|
| **Area of forest, agricultural and aquaculture ecosystems under sustainable management** | Area of forest under sustainable management: certification | multiple | Since the start of certification | global | 4 |
| | Area of forest under sustainable management: degradation & deforestation | | | | 4 |
| | Agricultural ecosystems under sustainable management | | | | 4 |
| **Proportion of products derived from sustainable sources** | Status of species in trade | 3 | 1990, 2000, 2008 | global | 1 |
| | Sustainable fisheries | multiple | 1950's to 2006 | global | |
| | Wild Commodities index | 3 | 1990, 2000, 2008 | global | 4 |
| **Ecological Footprint and related concepts** | Ecological Footprint and Biocapacity | 150+ (nations) and global | 1961 - 2005 | Global and national (subnational Footprints being developed)) | 1 |
| **Nitrogen deposition** | Nitrogen deposition | Annual | 1860-2050 | Global, regional, ecosystem type | 3 |
| **Trends in invasive alien species** | Invasive Species (IAS) | Baseline | 1850 onwards for some, under collection for others | Some global, others national | 1, 2 |
| **Marine Trophic Index** | Marine Trophic Index | | | | 1 |
| **Water quality of freshwater ecosystems** | Water quality | | | | 3 |
| **Trophic integrity of other ecosystems** | | | | | |
| **Connectivity / fragmentation of ecosystems** | River fragmentation | Single snapshot | 2005 | Global, by river basin (292 larger river basins) | 1 |
| | Forest fragmentation | Baseline | 2005, plus potential earlier points from remote sensing | Global | 4 |

[72] 1= Peer review through existing journal publication; 2 = Manuscript in preparation for publication in peer reviewed journal; 3 = Institutional review process undergone; 4 = No formalized review process

| Headline Indicator | Specific Indicator developed through 2010 BIP | Number of data points | Years of baseline & subsequent points | Scale | Type of review[73] |
|---|---|---|---|---|---|
| **Incidence of human-induced ecosystem failure** | | | | | |
| **Health and well-being of communities who depend directly on local ecosystem goods and services** | Health & well-being | Baseline for some metrics, better developed for others | Not yet known | Regional case studies | 4 |
| **Biodiversity for food and medicine** | Nutritional status of biodiversity | Not known | Not known | Not known | 4 |
| | Biodiversity for food & medicine | Baseline | 2008-9, with some backcasting | Global<br>National, across all regions | 4 |
| **Status and trends of linguistic diversity and numbers of speakers of indigenous languages** | Status & trends of linguistic diversity | | | | 4 |
| **Other indicator of the status of indigenous and traditional knowledge** | | | | | |
| **Indicator of access and benefit-sharing** | | | | | |
| **Official development assistance provided in support of the Convention** | Official development assistance | | | | 4 |
| **Indicator of technology transfer** | | | | | |

[73] 1= Peer review through existing journal publication; 2 = Manuscript in preparation for publication in peer reviewed journal; 3 = Institutional review process undergone; 4 = No formalized review process

## Annex II: Comparison of the Aichi Biodiversity Targets with those contained in the first Strategic Plan.

| 2020 Aichi Biodiversity Targets | 2010 Biodiversity Targets |
|---|---|
| ***Strategic goal A. Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society*** | |
| **Target 1: By 2020, at the latest, people are aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.** | |
| **Target 2. By 2020, at the latest, biodiversity values have been integrated into national and local development and poverty reduction strategies and planning processes and are being incorporated into nation accounting, as appropriate, and reporting systems.** | |
| **Target 3: By 2020, at the latest, incentives, including subsidies, harmful to biodiversity are eliminated, phased out or reformed in order to 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.** | |
| **Target 4: By 2020, at the latest, Governments, business and stakeholders at all levels have taken steps to achieve or have implemented plans for sustainable production and consumption and have kept the impacts of use of natural resources well within safe ecological limits.** | Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and Production areas managed consistent with the conservation of biodiversity. |
| | Target 4.3: No species of wild flora or fauna endangered by international trade. |
| ***Strategic Goal B. Reduce the direct pressures on biodiversity and promote sustainable use.*** | |
| **Target 5: By 2020, the rate of loss of all natural habitats, including forests, is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced.** | Target 5.1: Rate of loss and degradation of natural habitats decreased. |
| **Target 6: By 2020, all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.** | Target 4.2: Unsustainable consumption, of biological resources, or that impacts upon biodiversity, reduced. |
| **Target 7: By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity.** | |
| **Target 8: By 2020, pollution, including from excess nutrients, has been** | Target 7.2: Reduce pollution and its impacts on biodiversity |

| | |
|---|---|
| **brought to levels that are not detrimental to ecosystem function and biodiversity.** | |
| **Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment.** | Target 6.1: Pathways for major potential alien invasive species controlled. |
| | Target 6.2: Management plans in place for major alien species that threaten ecosystems, habitats or species. |
| **Target 10: By 2015 the multiple anthropogenic pressures on coral reefs, and other vulnerable ecosystems impacted by climate change or ocean acidification are minimized, so as to maintain their integrity and functioning.** | Target 8.1: Capacity of ecosystems to deliver goods and services maintained. |
| | Target 7.1: Maintain and enhance resilience of the components of biodiversity to adapt to climate change |
| ***Strategic goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity*** | |
| **Target 11: By 2020, at least 17 per cent of terrestrial, inland-water and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape.** | Target 1.1: At least 10% of each of the world's ecological regions effectively conserved. |
| | Target 1.2: Areas of particular importance to biodiversity protected |
| **Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.** | Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups |
| | Target 2.2: Status of threatened species improved. |
| **Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socio-economically as well as culturally valuable species is maintained and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.** | Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained. |
| ***Strategic goal D: Enhance the benefits to all from biodiversity and ecosystem services.*** | |
| **Target 14: By 2020 ecosystems that provide essential services, including services related to water, and contribute to health, livelihoods and well-being, are restored and safeguarded, taking into account the needs of women, indigenous and local communities and the poor and vulnerable.** | Target 8.2: biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained. |
| **Target 15: By 2020, ecosystem resilience and the contribution of biodiversity to carbon stocks has been enhanced, through conservation and restoration, including restoration of at least 15% of degraded ecosystems, thereby contributing to climate change mitigation and adaptation and to combating desertification.** | |
| **Target 16: By 2015, the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization is in force and operational, consistent with national legislation.** | Target 10.1: All transfers of genetic resources are in line with the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture and other applicable agreements. |

| | |
|---|---|
| | Target 10.2: Benefits arising from the commercial and other utilization of genetic resources shared with the countries providing such resources. |
| ***Strategic goal E. Enhance implementation through participatory planning, knowledge management and capacity-building*** | |
| **Target 17: By 2015, each Party has developed, adopted as a policy instrument, and has commenced implementing, an effective, participatory and updated national biodiversity strategy and action plan.** | |
| **Target 18: By 2020, the traditional knowledge, innovations and practices of indigenous and local communities relevant for the conservation and sustainable use of biodiversity, and their customary use of biological resources, are respected, subject to national legislation and relevant international obligations, and fully integrated and reflected in the implementation of the Convention with the full and effective participation of indigenous and local communities, at all relevant levels.** | Target 9.1 Protect traditional knowledge, innovations and practices |
| | Target 9.2: Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit sharing |
| **Target 19: By 2020, knowledge, the science base and technologies relating to biodiversity, its values, functioning, status and trends, and the consequences of its loss, are improved, widely shared and transferred, and applied.** | Target 11.2: Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4. |
| **Target 20: 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.** | Target 11.1: New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20. |

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