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THE IDENTIFICATION OF SCIENTIFIC AND TECHNICAL NEEDS FOR THE ATTAINMENT OF THE TARGETS UNDER STRATEGIC GOAL C OF THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

Note by the Executive Secretary

I. INTRODUCTION

1. In paragraph 1 of decision XI/13 B, the Conference of the Parties requested the Executive Secretary to prepare information on:

(a) Scientific and technical needs related to the implementation of the Strategic Plan for Biodiversity 2011-2020 and its Aichi Biodiversity Targets;

(b) Existing policy support tools and methodologies developed or used under the Convention and their adequacy, impact and obstacles to their uptake, and gaps and needs for further development of such tools and methodologies;

(c) The adequacy of observations, and of data systems, for monitoring the biodiversity attributes addressed in the Aichi Biodiversity Targets; and

(d) Options for assessing the effects of the types of measures taken in accordance with the provisions of the Convention;

and to report on progress on these matters to a meeting of the Subsidiary Body on Scientific, Technical and Technological Advice prior to the twelfth meeting of the Conference of the Parties.

2. Accordingly, the Executive Secretary, through notification SCBD/STTM/DC/ac/81207 (2013-005) of 21 January 2013, invited the views of Parties and relevant organizations on these issues.

3. Eleven Parties (Argentina, Australia, Bolivia, Bulgaria, Canada, China, Colombia, Mexico, the European Union, France and the United Kingdom) and eight organizations (BirdLife, Conservation International, the Global Biodiversity Information Facility (GBIF), the Group on Earth Observations Biodiversity Observation Network (GEO-BON), the International Union for Conservation of Nature (IUCN), the Japan Civil Network for the United Nations Decade on Biodiversity, the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and the United Nations

* UNEP/CBD/SBSTTA/17/1.

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Environment Programme World Conservation Monitoring Centre (UNEP-WCMC)) responded to this notification.

4. The present note, prepared on the basis of these and other inputs, contains for each target under Strategic Goal C of the Strategic Plan for Biodiversity 2011-2020: general observations and considerations regarding the adequacy of policy support tools; the adequacy of data, observations and indicators; and the effects of the types of measures taken in accordance with the provisions of the Convention on Biological Diversity; and on that basis draws conclusions on scientific and technical needs related to the implementation of the Strategic Plan and to each of these targets.

5. A draft of this note was subjected to peer-review from 27 June to 15 July 2013. Comments from 20 Parties (Canada, Cook Islands, European Union, Fiji, Guatemala, Japan, Kiribati, Marshall Islands, Mexico, Micronesia (Federated States of), Nauru, Nepal, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu) and two organizations (Food and Agriculture Organization of the United Nations and the International Union for Conservation of Nature) were received and are reflected in this note.[1]

II. SCIENTIFIC AND TECHNICAL NEEDS FOR THE ATTAINMENT OF THE TARGETS UNDER STRATEGIC GOAL C

Target 11: By 2020, at least 17 per cent of terrestrial and inland water, and 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscapes and seascapes.

11.1 Elements of Target 11

6. Target 11 is a contribution towards ensuring that ecosystems, species and genetic diversity are safeguarded in both the land and seascape by ensuring that key habitats are protected. Protected areas are a cornerstone of conservation actions and as such are one of the main tools at a country's disposal to reduce habitat loss. 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. Particular emphasis is needed to protect critical ecosystems and for increased attention to the representativity and management effectiveness of protected areas, as well as connectivity, particularly where migration between relevant areas is critical to species or population survival.

7. Target 11 refers to protected areas and other types of effective area-based conservation measures. The management objectives of protected areas can vary from strict protection to those that allow sustainable use consistent with nature conservation. In addition to protected areas, indigenous and local community conserved areas (ICCAs) as well as private protected areas may be included in the total area protected, provided other conditions are met. The programme of work on protected areas and successive decisions of the Conference of the Parties have accorded recognition to ICCAs. Further, the reporting framework adopted by the Conference of the Parties in decision X/31 for the programme of work on protected areas provides for reporting on ICCAs.

8. Reaching this target will require that several conditions are fulfilled. Specifically the area conserved should:

[1] Comments were provided by experts in their individual capacity. 14 Pacific Island States made a joint submission prepared at the margins of the Regional Workshop for the Pacific Countries on the Preparation of the Fifth National Report (Nadi, Fiji, 22-26 July 2013).

(a) Increase: Globally, this should be at least 17 per cent for terrestrial (including inland water) areas and 10 per cent for marine areas;

(b) Include areas of particular importance for biodiversity, such as Key Biodiversity Areas (an umbrella term which can include Important Plant Areas, Important Bird Areas, Alliance for Zero Extinction Sites etc.), areas supporting threatened species, restricted-range species or ecosystems, intact species assemblages or areas of outstanding biological processes (e.g. migratory sites or upwellings), threatened biomes and habitats, areas with particularly important habitats (high conservation value areas, sensitive marine areas, ecologically and biologically significant marine areas, areas with high endemism etc.), and areas which are important for the continued provision of ecosystem services (such as areas important for water supply, erosion control, sacred sites, etc.);

(c) Be ecologically and genetically representative: Protected area systems should contain adequate samples of the full range of existing ecosystems and ecological processes and genetic diversity;

(d) Be effectively and equitably managed – with planning measures in place to ensure ecological integrity and the protection of species, habitats and ecosystem processes, with the full participation of indigenous and local communities, and such that costs and benefits of the areas are fairly shared;

(e) Be well-connected – to the wider landscape or seascape using corridors and ecological networks to allow connectivity, adaptation to climate change, and the application of the ecosystem approach.

11.2 Existing policy support tools and methodologies, their adequacy, impact, obstacles to their uptake, and gaps

Policy support tools and methodologies to help achieve Aichi Biodiversity Target 11

9. There are two general types of policy support tools associated with this target: tools designed to assist with the identification of areas that are of a high priority to protect, and tools to assist with the establishment and management of protected areas.

10. The elements of the programme of work on protected areas provide an overarching global framework which supports the development of participatory, ecologically representative and effectively managed national and regional systems of protected areas.[2] As such the programme of work on protected areas is the main instrument for attaining this target. Under the Convention on Biological Diversity, a number of policy support tools have been developed to implement the programme of work on protected areas and as such are highly relevant to Target 11. These include e-learning curricula, a comprehensive database of documents and tools created by the Secretariat and partners relevant to protected areas, as well as several volumes of the CBD technical series.[3] With regards to the identification of areas important for conservation, the ongoing work related to the identification of ecologically and biologically significant

[2] The updated Global Strategy for Plant Conservation with its Objective II pertaining to protected areas provides a related framework.

[3] CBD Technical Series 13 - Technical advice on the establishment and management of a national system of marine and coastal protected areas;
CBD Technical Series 15 - Biodiversity issues for consideration in the planning, establishment and management of protected area sites and networks;
CBD Technical Series 24 - Closing the gap: Creating ecologically representative protected area systems;
CBD Technical Series 27 - Synthesis and review of the best available scientific studies on priority areas for biodiversity conservation in marine areas beyond the limits of national jurisdiction;
CBD Technical Series 35 – Implementation of the CBD programme work on protected areas: Progress and perspectives;
CBD Technical Series 36 - Protected areas in today's world: Their values and benefits for the welfare of the planet;
CBD Technical Series 44 - Making protected areas relevant: A guide to integrating protected areas into wider landscapes, seascapes and sectoral plans and strategies);
CBD Technical Series 64 - Recognizing and supporting territories and areas conserved by indigenous and local communities.

marine areas, including the training manual for the description of ecologically and biological significant areas in open-ocean waters and deep-sea habitats, is also relevant to this target.

11. FAO, as a specialized intergovernmental agency, also has guidelines and tools which can assist with the establishment and management of protected areas, such as the FAO technical guidelines on marine protected areas and fisheries and the FAO voluntary guidelines on the responsible governance of tenure. Non-governmental and intergovernmental organizations have also developed a wide range of tools that are relevant to the attainment of Target 11. IUCN has produced guidelines for applying protected areas management categories and for protected areas legislation, as well as a protected areas management effectiveness information module, and developed a toolkit entitled "Enhancing Our Heritage" in collaboration with UNESCO. IUCN's Best Practice Protected Area Guidelines Series presents guidelines for protected areas related to ecological restoration, staff training, sacred natural sites, sustainable financing, indigenous and local communities, sustainable tourism, and transboundary protected areas.[4] The Nature Conservancy produced a quick guide series highlighting how to plan for protected area systems, expand them into wider land and seascapes, and how to conduct gap and management effectiveness assessments. The Joint Research Centre of the European Commission in collaboration with other international organizations developed the Digital Observatory for Protected Areas (DOPA). DOPA integrates regional data sets to assess the state of and pressures on protected areas that provide means for both decision makers and park managers to assess, monitor and forecast biodiversity in protected areas.

12. With regard to the identification of sites or areas important for conservation, a number of organizations maintain lists of sites that are important to protect for conservation purposes. Examples of these lists include Important Bird Areas supported by BirdLife International, Alliance for Zero Extinction sites, Important Plant Areas supported by Plantlife, and High-Biodiversity Wilderness Areas, which generally refer to a larger scale, supported by Conservation International. IUCN has also produced guidance on identification and gap analysis of key biodiversity areas (Langhammer et al. 2007) and is now conducting a wide consultation to revise the methodology to identify key biodiversity areas. This global consultation aims to standardize all existing approaches and data under a common framework agreed and supported by all key stakeholders; building on and respecting current approaches. In addition, IUCN has developed and published a methodology for identification and mapping of freshwater key biodiversity areas (Holland et al. 2012). The World Database on Protected Areas, maintained by IUCN and UNEP-WCMC, provides a global list of the world's protected areas. UNEP-WCMC and IUCN have also produced the Indigenous and Community Conserved Areas Registry listing those areas where governance is by local communities or jointly by communities and with government or the private sector. However, this database is still in need of development. Given that Target 11 also calls for protected areas to be integrated into the wider landscapes and seascapes, the various tools developed for spatial and land-use planning are relevant to this target, as are those related to strategic environmental impact assessment.

13. Useful tools and instruments have also been developed at the regional level, including the Pacific Strategy on Nature Conservation and Protected Areas. Synergetic planning processes which incorporate biodiversity elements, for example in Joint National Action Plans on climate change and disaster risk management, have also proven supportive.

The application of existing policy support tools and methodologies

14. The expansion of the terrestrial area covered by protected areas has been one of the greatest environmental successes. The various tools and methodologies developed under the Convention and by various non-governmental and intergovernmental organizations have likely had a significant impact on this success, and a great deal of them have been used by Parties to help implement the programme of work on protected areas or to develop their own national protected areas policies.

[4] For a full list of Best Practice Guidelines developed by IUCN's World Commission on Protected Areas see http://www.iucn.org/about/work/programmes/gpap_home/gpap_capacity2/gpap_bpg/.

15. The programme of work on protected areas, by providing an overarching framework for action on this issue, has been particularly useful. Currently, more than 100 Parties have developed action plans for the programme of work on protected areas while more than 40 countries have completed a comprehensive ecological gap analysis and a further 20 have them under way.

16. An adequate representation of protected areas in inland waters has yet to be achieved. The Ramsar Convention on Wetlands, and its guidance on the identification, establishment and management of wetlands protected areas, provides a major source of tools and guidance, particularly through its "wise use" handbooks.[5] While a great deal of progress has been made in recent years to develop and expand marine protected areas, major efforts will be required to achieve the marine component of Target 11. To date the majority of marine protected areas have been established in coastal areas. Relatively few have been established in exclusive economic zones and in areas beyond national jurisdiction, except for areas closed to bottom fisheries by regional fisheries management bodies. This suggests that there has been relatively little application of the protected areas tools in the marine environment.

Obstacles to the use of existing policy support tools and methodologies

17. One of the main obstacles to the use of the policy support tools and methodologies described above, in particular those developed under the Convention, is that they often do not reach those people who could make most use of them. Tools and methodologies may remain unknown to protected areas managers and local communities due to a lack of exposure to them, particularly if they are not available in their local languages. Also, even where tools and methodologies are available to protected area managers, they may in some cases lack the capacities to use them.

Gaps in policy support tools and methodologies

18. Despite the large volume of guidance on protected areas, a number of gaps do exist. These include guidance for the better recognition and/or integration of indigenous and community conserved areas (although this has improved in recent years, notably through IUCN guidance) in national protected area networks. Similar guidance related to integration of private reserves as well as inland water ecosystems in national protected area systems could help Parties to make progress towards Target 11. Tools for developing systems or policies for ensuring the equitable management of protected areas, and practical guidance on integrating protected areas into the wider landscapes and seascapes, would also help Parties in taking actions to achieve this target. Additional guidance could also be provided on policy support tools to safeguard protected areas threatened by industrial activities such as mining, or road and dam construction, including guidelines for raising public awareness and best practices for mitigating threats to the integrity of protected areas. There is also a need for additional guidance on the steps that can be taken to assess the effectiveness of marine protected areas. Additional guidance on participatory or community management would also be useful.

19. Given the large number of organizations working on issues related to protected areas, gaps which currently exist may be filled in the near future. For example IUCN has ongoing work related to private protected areas, as well as a Green List for Protected Areas, a Red List of Ecosystems and a new framework for key biodiversity areas. Additional gaps relate to:

(a) Designation and management of protected areas in the open oceans and deep seas;

(b) Design and management of protected areas and protected area networks under scenarios of climate change, especially those that exceed an average 2 degrees warming for this century.

[5] http://www.ramsar.org/cda/en/ramsar-pubs-handbooks-handbooks4-e/main/ramsar/1-30-33%5E21323_4000_0__.

11.3 The adequacy of observations, and of data systems, for monitoring the biodiversity attributes addressed in Aichi Biodiversity Target 11 and the use and development of indicators for the target

Ability to assess/measure the status of progress towards the target at global, regional, national and subnational levels

20. The following operational indicators were identified in the annex to decision XI/3 A:

(a) Trends in coverage of protected areas;

(b) Trends in extent of marine protected areas, coverage of key biodiversity areas and management effectiveness;

(c) Trends in protected area condition and/or management effectiveness including more equitable management;

(d) Trends in representative coverage of protected areas and other area-based approaches, including sites of particular importance for biodiversity, and of terrestrial, marine and inland water systems;

(e) Trends in the connectivity of protected areas and other area-based approaches integrated into landscapes and seascapes;

(f) Trends in the delivery of ecosystem services and equitable benefits from protected areas.

In addition to these indicators identified primarily for Target 11, indicators for others targets are also available to complement the information and enable statements with a high degree of confidence.

21. UNEP-WCMC and ICUN have developed the Protected Planet Report showing progress made in reaching goals and targets in the programme of work on protected areas as well as progress towards Aichi Biodiversity Target 11. Information on protected areas is also accessible through the World Database on Protected Areas (WDPA). Constraints include: boundaries are often poorly delineated; the date of designation is missing for many protected areas; other area-based conservation approaches are not reflected; though the situation is improving many protected areas are mapped only as points; and a lack of mechanisms to reflect updates made to national/regional data sets.

22. Information on protected area management effectiveness (PAME) is accessible through the PAME database, but coverage is incomplete and biased. Globally, 29 per cent of the area protected has been assessed for management effectiveness and 23 per cent of countries have reached the target agreed in decision X/31 of 60 per cent of the total area under protection assessed by 2015. In addition, 46 per cent of countries have reached the target set in goal 4.2 of the programme of work on protected areas to assess 30 per cent of protected areas. The portion of protected areas for which management effectiveness has been assessed is highest in Africa and Latin America, followed by Asia and Europe. Information on equitable management is limited, though some information on governance is captured in the WDPA. On community-based approaches, further data are needed.

23. There are multiple methods for assessing ecological representativeness, the most common of which is global protected area coverage of ecoregions. At a species level, distribution range maps are now increasingly available for a growing number of taxa. Modelling based on environmental and biological data can help refine range polygons. There is, however, a lack of data for assessing species-level representativeness. Observation systems on primary biotic data (e.g. GBIF) can also provide information to assess representativeness against this target. While such data are typically patchy, modelling approaches can add value to these. Likewise, macroecological modelling of turnover in compositional diversity for lesser-known, yet highly diverse, biological groups could be undertaken by linking fine-scaled environmental surfaces with best-available locality records from GBIF. Genetic and phylogenetic data could also potentially be integrated into the above analyses (thereby linking to Target 13).

24. Data are scarce concerning ecological processes that are operating at landscape or seascape scales and which are necessary to sustain biodiversity within protected areas. Potential synergies with Target 5 exist.

25. The indicators enable a solid basis for statements about progress towards the attainment of Target 11. Improvements should be made, particularly by increasing the number of protected areas for which management effectiveness has been assessed and by improving information on other area-based conservation measures such as community-conserved areas.

Areas where enhanced monitoring/better data/additional observations/additional indicators would make a significant difference in our ability to monitor progress in order to guide appropriate/targeted action

26. There are a number of areas where further and or more consistent monitoring, data observations and indicators would enhance our ability to monitor progress towards Target 11. These include:

(a) Filling gaps in information on pressures on protected areas;

(b) Filling gaps in information on protected area management effectiveness;

(c) Filling gaps in information on protected area biodiversity outcomes through the collection of data on species population trends over time inside and outside protected areas;

(d) Improving information on other area-based conservation measures;

(e) More detailed and systematic assessment of the social and governance aspects of protected area management;

(f) Improvement in species range maps to reflect actual areas of occupancy within species ranges;

(g) Effective management of protected areas in open oceans and deep sea areas within and beyond national jurisdiction.

Limitations in making these enhancements

27. There are a number of issues that limit our ability to address the issues identified above. These include:

(a) Lack of resources to assess and monitor protected area management effectiveness;

(b) Lack of data on the size and extent of indigenous and community conserved areas, as well as general information on these areas, including their status, management type, habitat information, indicators etc.;

(c) Lack of data on the size and extent of private reserves;

(d) Legal considerations regarding the status of land considered to be community-conserved areas;

(e) Lack of data for species population trends over time inside and outside of protected areas and lack of resources to assess such data;

(f) Lack of agreement to third-party assessments of the effectiveness of other area-based conservation measures;

(g) Lack of access to Internet / information technology infrastructure necessary to access information on species, ecosystems and threats at the level of protected areas and the regional level required for science-based conservation;

(h) Fragmentation, restricted access to and limited interoperability of existing data;

(i) Lack of bidirectional information exchange systems to ensure communication between park managers and decision makers;

(j) Lack of indicators on pressures on protected areas;

(k) Lack of a regional vision on protected areas;

(l) Lack of resources to map species' areas of occupancy in addition to extent of range;

(m) Absence of directly comparable sites with and without protection to measure the effectiveness of protection measures;

(n) Lack of technical assistance, e.g. for remote management, for effectively managing protected areas in exclusive economic zones.

11.4 Assessing the effects of the types of measures taken in accordance with the provisions of the Convention

28. Protected areas are generally seen as the primary tool for the conservation of biodiversity. Significant efforts and investments have therefore gone into the establishment and/or enhancement of ecologically representative and well-connected protected area networks, their effective and equitable management, and their integration into the wider landscapes and seascapes. Over 50 per cent (108 of 192) of country Parties have prepared action plans for the implementation of the programme of work on protected areas. The UNESCO Man and the Biosphere Programme, the Ramsar Convention on Wetlands and the World Heritage Convention as well as regional protected area programmes have contributed significantly to the promotion of effective management with a view to maximizing conservation outcomes.

29. Nevertheless, linking the measures undertaken in response to, or in accordance with, Target 11 with biodiversity outcomes is challenging. In its report on forest protected areas, WWF found that key ingredients to achieve beneficial outcomes for biodiversity conservation include the existence and implementation of a monitoring and evaluation programme that ensures adaptive management; the capacity and means to manage its critical ecosystems, species and cultural values; appropriate staff numbers; and the possession of clear documents of legal gazettement. In addition, assessments of the effectiveness of measures may benefit from independent scientific assessments of the status of biodiversity in protected areas.

30. Information on biodiversity outcomes is also captured, in part, in management effectiveness assessments but will be better informed by the work of the IUCN WCPA/SSC Joint Task Force on Biodiversity and Protected Areas.

11.5 Conclusions from previous sections to enable identification and prioritization of scientific and technical needs related to the implementation of Target 11

Adequacy of guidance and tools in support of implementation at national level

31. The programme of work on protected areas provides guidance on the elements addressed in the target, and many organizations have contributed to the significant number of tools covering most aspects of the target as well as providing support to the implementation of the target at national or (sub)regional level. Additional guidance and tools are needed for the management of marine areas in open oceans and deep sea areas within and beyond national jurisdiction, for the effective protection of inland waters ecosystems, and for the design of management of protected area systems under climate change.

Adequacy of data and information for monitoring progress at different scales

32. Information on protected area coverage and on ecological representativity is good though some gaps exist globally. Information on management effectiveness and equitability is gradually becoming available, with over a quarter of the area protected having been covered. Information on connectivity is complex as it varies by species. Information on other effective area-based conservation measures may be available at national level and is only gradually being reported globally. Information on the integration of protected areas into the wider landscapes and seascapes is limited. There is still no global map of the

extent of wetland ecosystems. Without such a map it will be impossible to ensure adequate representation of protected areas in inland waters.

Effectiveness of actions taken

33. Protected area coverage has increased and many countries surpass the overall numerical target on land or in territorial waters. Increasing attention is being paid to the qualitative attributes of protected areas: there is need to enhance the representativity of protected area systems as well as their connectivity and integration in the wider landscapes and seascapes, to ensure that key areas for biodiversity are included. There is also a need to enhance the effectiveness and equitability of management. There is a need to expand protected area coverage in open oceans and deep sea areas within and beyond national jurisdiction.

Summary conclusion

34. While scientific and technical improvements can be made in many areas, these issues do not appear to hinder achievement of the target. Rather, the limitations are on capacities and financial resources to implement the national protected areas action plans, adequate representation of protected areas in inland waters, and policy guidance on management of marine areas beyond national jurisdiction.

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.

12.1 Elements of Target 12

35. Though some extinctions are the result of natural processes, human actions have greatly increased current extinction rates. Reducing the threat of human-induced extinctions requires action to address the direct and indirect drivers of change (see the Aichi Biodiversity Targets under Goals A and B of the Strategic Plan for Biodiversity 2011-2020) and can be long-term processes. However, imminent extinctions of known threatened species can in many cases be prevented by protecting important habitats or other means of addressing the specific direct causes of decline. Target 12 relates specifically to known threatened species and has two components:

(a) Preventing extinction: Preventing further extinction entails that those species which are currently threatened do not move into a worse threat status,[6] or even become extinct;

(b) Improving the conservation status of threatened species: An improvement in conservation status would entail a species increasing in population to a point where it moves into a lower threat status;

36. The Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) play a pivotal role in fostering action towards achieving this target, as do a number of other international processes and other species-focused multilateral agreements, including at the regional level.

12.2 Existing policy support tools and methodologies, their adequacy, impact, obstacles to their uptake, and gaps

Policy support tools and methodologies to help achieve Aichi Biodiversity Target 12

37. Target 12 relates to the prevention of extinction of known threatened species. As such this target is relatively broad in scope, as threatened species and extinctions can occur in all ecosystem types and can be caused by various pressures. Similarly, numerous types of actions can be taken to implement this target and include both direct and indirect conservation actions. What actions are best suited will depend largely on the species concerned, the causes of its decline, its life history and characteristics, and national

[6] References to the conservation status in this section refer to the IUCN Red List Categories and Criteria. The IUCN Red List of Threatened Species is the most comprehensive and widely-used information source on the global extinction risk of species.

circumstances. As a result there are multiple policy support tools and methodologies that are relevant to this target. Generally tools relevant to this target can be divided into three categories: those related to the identification and documentation of threatened species, tools which describe strategies for avoiding extinction or improving the conservation status of species, and tools to support the reintroduction or reestablishment of species which have been become extirpated or extinct in the wild.

38. Several of the thematic programmes of work and cross-cutting issues under the Convention on Biological Diversity provide frameworks which can be used to help meet Target 12, in particular, the programme of work on protected areas, the Global Strategy for Plant Conservation and the Global Taxonomy Initiative. Other relevant CBD guidance includes the ecosystem approach, the guiding principles on invasive alien species and the climate change adaptation database.

39. With regards to the identification of threatened species, many countries have national tools or processes in place for such purposes. For example many countries have endangered species legislation, and a number of Parties have national Red List processes. At the global level, under the Convention on Biological Diversity, CBD Technical Series 22 provides guidelines for the rapid ecological assessment of biodiversity in inland water, coastal and marine areas while the Global Strategy for Plant Conservation and the Global Taxonomy Initiative also provide relevant guidance. In addition, a number of non-governmental and intergovernmental organizations have developed tools to identify and/or document threatened species. These include, but are not limited to, the numerous tools related to the IUCN Red List of Threatened Species, BirdLife's Data Zone, Conservation International's Rapid Assessment Program, as well as various tools developed by the Convention on Migratory Species and the Convention on International Trade in Endangered Species of Wild Fauna and Flora.

40. There are many tools for addressing the main pressures on biodiversity related to Strategic Goals B (reducing direct pressures on biodiversity and promoting sustainable use) and C (improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity). Examples of these tools are discussed in the documents addressing those strategic goals.

41. The Red List assessments provide a useful source for identifying the key threats to particular species. Where habitat change is a major threat, habitat protection through protected areas is an important approach to prevention of extinction. The maps developed by the Alliance for Zero Extinction provide a useful tool in this regard.

42. Tools to support species recovery and conservation programmes are also relevant to this target. No such specific programme of work has been directly developed under the Convention on Biological Diversity, but a number of tools have been developed under the Convention and by other organizations. For example, the Convention on Migratory Species has developed guidelines on the preparation of national single species action plans for migratory waterbirds. Trade regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are based on prescribed risk estimates (non-detriment findings) of the likelihood of decline or extinction of species resulting from harvest and international trade. With regards to the reintroduction of species which have become locally extinct, IUCN has developed Guidelines for Reintroductions and Other Conservation Translocations.

Application of existing policy support tools and methodologies

43. The level of use of the tools that have been developed depends on a number of factors, including the life history and characteristics of the species concerned, the causes of its decline, and national circumstances. Given this range of factors, it is difficult to determine what the overall level of use of the tools relevant to this target has been. Numerous case studies and examples exist where species on the verge of extinction have had their conservation status improved as a result of interventions of various types and it is clear that without such interventions the state of biodiversity would be worse than it currently is. However, the degree to which the various tools relevant this target have been used in these activities is unclear. Given the broad and general nature of the policy support tools, methodologies and frameworks developed under the Convention on Biological Diversity, it is likely that those resources

developed by more species-focused organizations have been more widely used for specific species conservation actions than those developed under the Convention.

Obstacles to the use of existing policy support tools and methodologies

44. As with other targets, the limited knowledge of existing tools and the limited resources with which to apply them, especially at the local level, are likely the main obstacles to the use of the tools relevant to this target. Further, some countries do not have endangered species legislation, and in all areas of the world, not all threatened species are known.

Gaps in policy support tools and methodologies

45. There are a number of gaps in the policy support tools and methodologies related to this target. Examples of these gaps include the need to coordinate existing species management approaches, the need to better address extinction pressures associated with illegal harvest and trade, and the need to develop assessment methodologies for those species not currently reflected in Red Lists, such as fungi and invertebrates, and then use that information to develop recovery plans. In addition, there is a need for tools for the gathering of information on the threat status of species at population levels.

12.3 The adequacy of observations, and of data systems, for monitoring the biodiversity attributes addressed in Aichi Biodiversity Target 12 and the use and development of indicators for the target

Ability to assess/measure the status of progress towards the target at global, regional, national and subnational levels

46. The following operational indicators were identified in the annex to decision XI/3 A:

(a) Trends in extinction risk of species;

(b) Trends in abundance of selected species;

(c) Trends in distribution of selected species.

47. These indicators provide robust information on extinction risk and population trends globally and for biogeographic regions and major biomes. Gaps in taxonomic or geographic coverage are gradually being filled, including through analysis of statistically representative subsamples.

48. National Red List Indices (RLIs) can be calculated either by disaggregating the global indices, or by repeatedly assessing extinction risk at the national scale. Examples of both approaches are currently being prepared for publication or have already been published. Many countries have compiled national red lists which form the basis of the latter approach (see www.nationalredlist.org), but so far few have done this twice or more using consistent methods. As they increasingly do so, however, many more national RLIs will become available.

49. There are 515 national Red Lists recorded for different taxa. These are from 122 countries; 43 are available online (see http://www.nationalredlist.org/). There is some inconsistency in the application of the Red List Categories and Criteria for some taxonomic groups at a national level. National RLIs have been calculated for Australia, Denmark, Finland, Paraguay, Sweden, and Venezuela.

50. Many indicators of the trends in the abundance and distribution of selected species exist, particularly for vertebrate species. Generally good data exist for birds. The Living Planet Index provides a weighted indicator of population trends.

51. Thus, the indicators enable a solid basis for statements about progress towards Target 12 at different scales, including indicators on pressures and responses – though the taxonomic and geographic coverage should be increased.

Areas where enhanced monitoring/better data/additional observations/additional indicators would make a significant difference in our ability to monitor progress in order to guide appropriate/targeted action

52. Assessments of the conservation status of additional taxa (i.e., currently uncertain or unknown status), and reassessments are needed. Perhaps plants and arthropods are the most significant and important challenge. Testing, calibration and use of rapid approaches to assess conservation status to supplement IUCN Red List assessments and enable targeted conservation action while awaiting more thorough assessments are also needed. Priorities for information collection might be on key functional groups (e.g. pollinators) and groups of socioeconomic importance (e.g. species used for bushmeat, species threatened by trade, and crop wild relatives), as well as marine species.

Limitations in making these enhancements

53. The ability to enhance monitoring is limited by a lack of resources to undertake expert assessments (especially in a rapid manner), a lack of understanding and recognition of rapid assessment approaches and a lack of assurance that resources will enable future rapid assessments. Often, there is also a lack of taxonomic certainty, and a lack of sufficient scientific information on monitoring methods and on the relevance of the results obtained to population persistence.

12.4 Assessing the effects of the types of measures taken in accordance with the provisions of the Convention

54. Measures to prevent the extinction of threatened species are generally the last of a series of measures aimed at avoiding a species moving into the Endangered or Critically Endangered categories. At this point, measures aim to conserve the habitats in which the species occur (e.g. by designating AZE (Alliance for Zero Extinction) sites[7] and/or to stabilize the population through targeted measures (e.g. by reducing the major threats, breeding programmes, *ex situ* conservation measures). Generally, measures that avoid species falling into these categories ("upstream measures") are preferable, and these can include the designation of protected areas, establishment of corridors and other ways to connect habitats, protection of breeding areas and other ways of ensuring sufficient habitat size of adequate quality for the species as well as monitoring and surveillance (e.g. GRASP,[8] MIKE[9]), surveillance of species in trade (CITES, TRAFFIC[10]) or agro-environmental measures (e.g. mowing restrictions to conserve ground orchids). Direct measures to reduce pressures on populations can include reducing exploitation to sustainable levels and control of other influencing factors (e.g. fire, invasive species, pollution).

55. Hoffmann et al. (2010)[11] reported that one fifth of over 25,000 species of mammals, birds, and amphibians are threatened (i.e. vulnerable, endangered or critically endangered) and that on average some 50 each year move one category closer to extinction. Their analysis shows that the rate of deterioration would have been one fifth worse (i.e. 60 instead of 50 species dropping one category) in the absence of conservation measures. They conclude that current conservation efforts remain insufficient to offset the main drivers of biodiversity loss linked to agricultural expansion, logging, overexploitation, and invasive alien species.

56. The effectiveness of species conservation measures is more challenging where multiple drivers are involved (e.g. efforts to enhance resilience of corals in an environment of ocean acidification and warmer sea surface temperatures and impacted by sedimentation and pollution from land-based sources as well as potentially unsustainably fishing methods).

[7] http://www.zeroextinction.org/.
[8] Great Apes Survival Partnership, http://www.un-grasp.org/.
[9] Monitoring the Illegal Killing of Elephants, http://www.cites.org/eng/prog/mike/.
[10] http://www.traffic.org/.
[11] http://210.75.237.14/bitstream/351003/19199/1/2010e0012h.pdf.

12.5 Conclusions from previous sections to enable identification and prioritization of scientific and technical needs related to the implementation of Target 12

Adequacy of guidance and tools in support of implementation at national level

57. There is a range of guidance relevant to this target, with many organizations having developed a range of tools for preventing extinction. Furthermore, the various programmes of work under the Convention provide frameworks for reducing the main drivers of species decline. As a result the majority of issues addressed by this target are covered by existing tools and guidance.

Adequacy of data and information for monitoring progress at different scales

58. Information on threatened species is relatively good for those species which have been assessed. For the majority of threatened species, the major causes of decline are known. However, for certain taxonomic groups, information is limited (e.g. arthropods, deep-sea species etc.). The analysis in the previous section shows the need for enhancing taxonomic and geographic coverage, and for rapid approaches to assess the conservation status of species. However, as the focus of this target is on known threatened species, these gaps, while important, should not impede progress towards the attainment of the target.

Effectiveness of actions taken

59. Where conservation actions have been taken, they have often had a positive effect on the status of the target species. However, despite these actions, the conservation status of a great number of species is declining and the number of species on the Red List increases annually. This is largely because the actions taken have been of relatively small scale in comparison to the magnitude of the problem and efforts to address the underlying causes of biodiversity decline have so far been limited at the global level.

Summary conclusion

60. While there is clearly room for scientific and technical improvements in many areas, the tools available and current knowledge are not the main limiting factors in improving or sustaining the conservation status of species and avoiding extinctions. Rather the limitations are on capacities and financial resources to implement effective actions to identify and reduce the direct and indirect pressures on the affected species, to prepare and implement recovery plans, and to monitor progress.

Target 13: By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.

13.1 Elements of Target 13

61. Target 13 is the only Aichi Biodiversity Target that applies at the genetic level, although the issue of maintaining viable populations (that is, gene pools) is also relevant to Target 12. Genetic diversity is particularly relevant for food and agriculture, forging strong links between this target and the important social context of food and nutrition security and human health. Unsurprisingly, most of the monitoring, data, tools, policies and guidance are therefore within the realm of genetic resources for food and agriculture (including forest genetic resources) and progress towards this target will be highly dependent upon partners in the food and agriculture field.

62. The genetic diversity of cultivated plants and farmed or domesticated animals and of wild relatives is in decline as is the genetic diversity of some other socioeconomically and culturally valuable species. This has serious implications for food and nutrition security and sustainable agriculture. 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, particularly as it offers options for

increasing the resilience of agricultural systems and for adaptation to changing conditions (including the escalating impacts of climate change).

63. The overall purpose of this target is to maintain and safeguard genetic diversity through the development and application of strategies which allow for the different genes of a species to be sustained. This would include both *in situ* and *ex situ* conservation actions. The gene pools in question include those held within farming systems as well as their respective wild relatives. Much of the genetic diversity is held and maintained within farming systems, particularly in small-scale farming and by local communities. Maintaining the local and traditional knowledge associated with genetic diversity is therefore important to maintain the diversity and, in particular, to enable the diversity to evolve and adapt as farming systems evolve. For these reasons there are strong links to Target 18 and where possible *in situ* conservation is preferred over *ex situ* measures. Species with small populations (gene pools) or with geographically isolated and concentrated populations are particularly at risk for genetic erosion.

64. Further, this target relates to the genetic diversity of three different, but not mutually exclusive, categories:

(a) Cultivated plants and farmed and domesticated animals: Species and their breeds and varieties which have been domesticated and selectively bred by human societies for certain traits;

(b) Wild relatives: Populations of cultivated or domesticated taxa that survive in the wild or which exist in cultivated habitats (but are not necessarily being cultivated). These are part of the available gene pool and are often important potential sources of genetic material which could be used to develop new breeds or varieties. In general, more crop wild relatives exist than livestock wild relatives (because many of these have been lost), although an exception is with aquatic breeds where much of the genetic diversity is still within wild populations;

(c) Other socioeconomically as well as culturally valuable species; the genetic diversity of species which are not necessarily cultivated or domesticated but which are in use for socioeconomic or cultural reasons and are therefore important to human well-being. They include, for example, many fishery species, species used for bushmeat, species used in traditional medicines, sacred species, wild edible plants, other non-timber forest products and some ornamental plants.

13.2 Existing policy support tools and methodologies, their adequacy, impact, obstacles to their uptake, and gaps

Policy support tools and methodologies to help achieve Aichi Biodiversity Target 13

65. Under the Convention on Biological Diversity, the programme of work on agricultural biodiversity and the Global Strategy for Plant Conservation are important frameworks for the development of policies in support of this target. In addition, the Global Plans of Action for plant, animal and forest genetic resources developed and adopted by the Commission on Genetic Resources for Food and Agriculture of the Food and Agriculture Organization of the United Nations are particularly relevant frameworks to support this target. Tools exist to monitor the implementation of the Global Plans of Actions and reports are made available to the Commission, including on national implementation.[12] The

[12] FAO. 2013. In situ conservation of animal genetic resources. FAO Animal Production and Health Guidelines No. 14. Rome;
FAO. 2012. Cryoconservation of animal genetic resources. FAO Animal Production and Health Guidelines No. 12. Rome;
FAO. 2012. Phenotypic characterization of animal genetic resources. FAO Animal Production and Health Guidelines No. 11. Rome;
FAO. 2011. Molecular genetic characterization of animal genetic resources. FAO Animal Production and Health Guidelines. No. 9. Rome;
FAO. 2011. Developing the institutional framework for the management of animal genetic resources. FAO Animal Production and Health Guidelines. No. 6. Rome;
FAO. 2011. Surveying and monitoring of animal genetic resources. FAO Animal Production and Health Guidelines. No. 7. Rome;
FAO. 2010. Breeding strategies for sustainable management of animal genetic resources. FAO Animal Production and Health Guidelines. No. 3. Rome;

International Treaty on Plant Genetic Resources for Food and Agriculture also provides relevant guidance in its Articles 5 and 6.

66. A range of guidance has also been developed by a very broad network of non-governmental and intergovernmental organizations and institutions. For example, CGIAR prepared a range of training and policy support materials relevant to this target and IUCN prepared an explanatory guide for the implementation of the International Treaty on Plant Genetic Resources for Food and Agriculture. Relevant national-level policies also exist although this varies among countries. The Platform for Agrobiodiversity Research has developed a framework for on-farm conservation drawing upon an analysis of a large number of field studies.

The application of existing policy support tools and methodologies

67. Reports on the State of the World's Plant/Animal Genetic Resources for Food and Agriculture, prepared by FAO on the basis of Country Reports and other sources, show that the situation is far from ideal, but that progress has been made in the implementation of many activities relevant to this target. Significant progress has been made in the *ex situ* conservation of crops, that is, the collection of seeds from different varieties for cataloguing and storage for possible future use. A number of countries or subnational jurisdictions have established gene banks, and several global initiatives have been established to catalogue plant genetic diversity. Nevertheless a large portion of the overall diversity relevant for food and agriculture, and even for some major crops, and in particular wild relatives, is still not adequately conserved by gene banks. There has been less progress with *in situ* conservation, including through sustaining or developing new varieties on farms. There is an increase in public and private associations to implement programmes or projects for *in situ* germplasm conservation.

Obstacles to the use of existing policy support tools and methodologies

68. The main obstacles to the use of the existing policy support tools and methodologies relevant to this target are the general lack of information on genetic diversity and the absence of national systems or organizations to put them into use. However, there are some positive examples of existing efforts to generate such information. The lack of data on population persistence of key wild relatives also constitutes an obstacle.

Gaps in policy support tools and methodologies

69. Given the modest progress in the *in situ* conservation of genetic resources, the development of further guidance on this issue may be warranted. Particularly the development of tools or methods, such as landscape approaches which combine attention to genetic diversity as well as habitat conservation, including as undertaken by indigenous and local communities, could be helpful in making progress towards this target. These tools and methods should build on existing instruments already adopted by countries, such as the Global Plans of Action on plant, animal and forest genetic resources.

70. Most of the existing policy support tools and methodologies focus on genetic resources for food and agriculture. However, given that Target 13 addresses other socioeconomically as well as culturally important varieties, there may be a need to develop further tools and methodologies to ensure that guidance to address these elements of the target is available, but their development should be coordinated with ongoing efforts by institutions and organizations in this field. Tools to support the *in situ* conservation of wild relatives in protected areas could be developed, for instance by analysing existing protected area coverage and identifying gaps and opportunities.

FAO. 2009. Preparation of national strategies and action plans for animal genetic resources. FAO Animal Production and Health Guidelines. No. 2. Rome.

13.3 The adequacy of observations, and of data systems, for monitoring the biodiversity attributes addressed in Aichi Biodiversity Targets 13 and the use and development of indicators for the target

Ability to assess the status of progress towards the target at global, regional, national and subnational levels

71. The following operational indicators were identified in the annex to decision XI/3 A:

(a) Trends in genetic diversity of cultivated plants, and farmed and domesticated animals and their wild relatives;

(b) Trends in genetic diversity of selected species;

(c) Trends in number of effective policy mechanisms implemented to reduce genetic erosion and safeguard genetic diversity related to plant and animal genetic resources.

72. Indicators under these headings and additional indicators are being or have been identified by FAO, in particular through its Commission on Genetic Resources for Food and Agriculture. The Commission has also developed process indicators and related targets to monitor the implementation and impact of the Global Plans of Action (GPAs).[13] Indicators for trends in the genetic diversity of livestock (domesticated terrestrial birds and mammals) include the number of locally adapted breeds, the proportion of the total population accounted for by locally adapted and exotic breeds and the number of breeds classified as at risk, not at risk and unknown.

73. One of the major constraints to effective conservation of genetic diversity is insufficient knowledge about the location, extent and distribution of diversity, and how much useful diversity is being lost. Time series data are usually still missing although the mechanisms are now generally in place to conduct re-assessments.

74. Major gaps exist in knowledge about the level of genetic diversity for other socioeconomically important wild species including medicinal plants at the *ex situ* and *in situ* levels as well as domesticated and wild fish stocks, both freshwater and marine. Some information on tree crop genetic resources is being gathered through the "State of Forest Genetic Resources" process undertaken by FAO.

75. Thus, a good basis exists for assessing status of the genetic diversity of the most important species and some others, but generally information on trends, particularly for *in situ* genetic diversity, is not yet available.

Areas where enhanced monitoring/better data/additional observations/additional indicators would make a significant difference in our ability to monitor progress in order to guide appropriate/targeted action

76. There are a number of areas where further and or more consistent monitoring, data observations and indicators would enhance our ability to monitor progress towards this target. These include:

(a) Enhanced monitoring and better data are needed for wild relatives of crops and farmed/domesticated animals and on other socioeconomically or cultural important species;

(b) Among species groups: improved attention to aquatic genetic resources, particularly in view of the rapidly expanding nature of aquaculture;

(c) Gaps in data on the role of protected areas in contributing to the achievement of Target 13;

(d) The development of a network of hotspots to monitor changes in genetic diversity.

[13] http://www.fao.org/docrep/meeting/028/mg538e.pdf, paras. 19-33.

Limitations in making these enhancements

77. There are a number of issues that limit our ability to address the issues identified above. These include:

(a) Lack of resources to monitor a very large number of species and populations;

(b) Lack of capacity to contribute effectively to the assessments contributing to the State of the World's Plant/Animal Genetic Resources for Food and Agriculture;

(c) Limited awareness of the importance of crop wild relatives as well socioeconomically and culturally valuable species;

(d) Lack of participatory mechanisms to empower stakeholder engagement;

(e) Lack of economic valuation of genetic resources;

(f) Lack of coordination between government departments in charge of environment, agriculture and rural development.

78. According to the Synthesis Progress Report on the implementation of the Global Plan of Action for Animal Genetic Resources – 2012 (based on reports from 80 countries), the constraints to characterization, inventory and monitoring of animal genetic resources most frequently mentioned by countries were a lack of financial, technical and human capacity. Other constraints mentioned included the need for improved awareness on the part of stakeholders, geographical constraints (e.g. remoteness), limited coordination among stakeholders, lack of livestock-keepers' groups or associations, difficulties in obtaining data from commercial operators, gaps in policy and legislative frameworks, legal restrictions on access to data, and problems in defining concepts such as the breed.

13.4 Assessing the effects of the types of measures taken in accordance with the provisions of the Convention

79. It is difficult to generalize about the extent to which *in situ* conservation programmes are effective in meeting the objective of maintaining genetic diversity within the respective species, as effectiveness differs between different sectors of genetic resources. For forest tree species, conservation of genetic resources is achieved mainly through *in situ* activities implemented in natural ecosystems. For animal genetic resources, the term "*in situ*" conservation is generally used to refer to conservation "on-farm" or in the herds and flocks of pastoralists (although this is partly because few wild populations remain). The "unit of conservation" is usually a breed or other defined population. A conservation programme for a given breed may or may not be effective in maintaining sufficient genetic diversity within that breed, and the targeting of breeds for inclusion in conservation programmes may or may not maximize the maintenance of genetic diversity within the species. However, many countries report that they have not yet established any *in situ* conservation programmes for their animal genetic resources (about 35 per cent of the 80 countries that provided reports on their implementation of the Global Plan of Action for Animal Genetic Resources in 2012). The overall genetic diversity of a livestock species is also affected by the genetic management of breeds that are very abundant and therefore not normally targeted by conservation programmes *per se*.

80. There is some evidence that *in situ* conservation efforts do not always take into account genetic diversity and therefore may target fewer populations than are needed for effective conservation of genetic diversity.[14] Also, efforts to enable dispersal in fragmented landscapes, e.g. through corridors, have different effects on different species - and conservation actions that preserve some populations and not others will have genetic consequences. On-farm efforts to maintain crop and animal genetic diversity often depend on community organization and social networks.

[14] http://onlinelibrary.wiley.com/doi/10.1046/j.1523-1739.2003.01352.x/abstract.

81. Much progress has been made in expanding and diversifying *ex situ* collections of genetic material for some species, especially crop food species, and making this material available for ecosystem restoration efforts. But even so, these collections can still hold an inadequate range of genetic diversity for many species. Many species are not adequately represented or protected in seed banks at a global scale, especially wild relatives and other useful plant species (e.g. plant non-timber forest products or medicinal plants). Also, this approach is not normally adopted for animal genetic resources.

13.5 Conclusions from previous sections to enable identification and prioritization of scientific and technical needs related to the implementation of Target 13

Adequacy of guidance and tools in support of implementation at national level

82. Guidance related to the *ex situ* conservation of plant diversity related to food, particularly in the form of *ex situ* gene banks, is fairly well developed. By comparison, there is less guidance related to the conservation of animal genetic diversity and even less related to *in situ* conservation. Existing guidance has been developed and endorsed by the Commission on Genetic Resources for Food and Agriculture of FAO for both *in situ* and cryo-conservation but further tools and methods for *in situ* conservation may be needed. The development of tools and guidance related to the identification of wild relatives as well as species of socioeconomic and cultural importance which should be conserved is limited.

Adequacy of data and information for monitoring progress at different scales

83. While there are gaps, mechanisms are in place to generate better information related to crop and livestock genetic diversity to allow for the identification of trends which can be used to monitor progress, although in some cases probably not for a number of years. In the case of animal genetic resources, sufficient data to enable effective monitoring of progress in terms of maintaining genetic diversity are available for some breeds and some countries. At the global level, uneven data makes it difficult to monitor overall progress in this respect. A reporting system for implementing of the Global Plan of Action for Animal Genetic Resources is in place. Eighty countries participated in the first round of reporting in 2012. A second round of reporting will be organized as part of the preparation of the Second Report on the State of the World's Animal Genetic Resources for Food and Agriculture. However, data and information for most other species are inadequate at the global level.

Effectiveness of actions taken

84. Action for *ex situ* conservation through the use of seed and gene banks has been effective in terms of increasing coverage, though there is a need to scale them up and for enhanced cooperation between organizations working in the agriculture and environment sectors. There is an urgent need for *ex situ* conservation of animal genetic resources in developing countries, where hardly any gene banks exist. There is a need for greater attention to maintaining and safeguarding genetic diversity *in situ* such as through landscape approaches which combine attention to genetic diversity in various sectors/biomes (e.g. crops/livestock in agriculture, forest genetic resources and fishery/aquaculture resources). Further actions are needed to address genetic diversity of non-food resources.

Summary conclusion

85. There is clearly a need for improving the recognition, adoption and implementation at national level of the existing mechanism and tools, including those developed outside the Convention on Biological Diversity, that contribute to progress towards this target. Regarding species not strictly related to food and agriculture, more robust information on their genetic diversity and the further development of mechanisms for monitoring genetic changes at global level are also needed.

86. A major factor hindering progress towards this target lies in developing approaches to overcome market pressures to simplify crop and livestock systems (reducing genetic resources base and decline of small-scale farming systems). In parallel, improved mechanisms to incentivize on-farm conservation are needed and, where these are insufficient, other improvements in mechanisms to maintain these genetic

resources, including an appropriate balance between *in situ* and *ex situ* methods and their complementarity, so that genetic diversity lost in some circumstances (like in "simplified" crop and livestock systems and the decline of small-scale farming systems) can be maintained in alternative ways.
