Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011-2020

Important information about this document: *This document is written in the form of a draft of the Information Document that will be submitted to the 11th meeting of the CBD Conference of Parties (COP 11), 8-19 October 2012 in Hyderabad, and will result from the High Level Panel on Global Assessment of Resources for implementing the Strategic Plan for Biodiversity 2011-2020. However, this early version is submitted only as input to the first in-person meeting High Level Panel on 2nd-3rd August 2012, at UNEP-WCMC in Cambridge.* **As a draft input from WCMC/ICF GHK this document has not been reviewed by the panel or otherwise. It should therefore not be further disclosed, referenced or quoted in any way**

Comments on this document are welcome and should be submitted by 13th August to *ResourcesAichiTargets@unep-wcmc.org*

Executive Summary

[To be added to final draft]

I. INTRODUCTION

1.1 Context – the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets

1.   The tenth meeting of the Conference of the Parties (COP 10) to the Convention on Biological Diversity (CBD) in 2010 saw Parties adopt the Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets (Decision X/2). The mission of the Strategic Plan is to take effective and urgent action to halt the loss of biodiversity by 2020. The Plan contains the Aichi Biodiversity Targets, which are 20 headline targets for 2015 or 2020 guided by five strategic goals. The targets provide an incentive for global action as well as a flexible framework to be implemented at the national and regional levels according to national circumstances and priorities.

2.   For some Parties, a number of the targets or thresholds may have already been reached, or may not be relevant to their national circumstances. Most Parties, however, will need to set and implement corresponding targets at the national and/or regional level. In order to do this, many Parties have called for a greater mobilization of resources (financial, human and technical) to enable them to reach the targets. However, the amount of resources required to achieve the targets is currently unknown.

3.   The High-Level Panel on Global Assessment of Resources for implementing the Strategic Plan for Biodiversity 2011-2020, co-sponsored by the governments of the United Kingdom (UK) and India, was therefore established to conduct an assessment of the resources needed to achieve the 20 Aichi Targets. It complements other work to study the potential costs of achieving the various targets, including the assessment on the funding needs for the sixth replenishment of the Global Environment Facility (GEF-6) which is also underway following a decision at COP 10 (Decision X/26). To support the work of the panel, the Government of the UK commissioned a project to provide an aggregated estimate of the costs and investment needs of meeting the targets. This work was contracted to UNEP-World Conservation Monitoring Centre (UNEP-WCMC) and ICF GHK. In order to assess the costs, the targets were grouped by the CBD Secretariat into 'clusters'. The assessment of the costs for each cluster has been undertaken by experts, with support from the CBD Secretariat, the Government of the UK and UNEP-WCMC.

1.2 Existing assessments of resource needs

4.   While there is a range of work available on the current level of finance available for biodiversity conservation and on the costs of overall loss of biodiversity and ecosystems, there have been few detailed estimates and assessments prepared in recent years on the global costs of, and resources required for, biodiversity conservation and sustainable use.

5.   COP 10 in 2010 adopted decision X/26 which called for a full assessment of the amount of funds required to support the implementation of commitments under the CBD for the sixth replenishment period of the Global Environment Facility (GEF). The preliminary report of the assessment of needs for GEF-6 was considered at the fourth meeting of the Ad hoc Open-ended Working Group on the Review of Implementation of the Convention (WG-RI 4). WG-RI 4 requested the expert group to further develop the report for COP 11, taking into account views of Parties, observers and organizations and the work conducted by the High-Level Panel on Global Assessment of Resources. The preliminary conclusion of the expert group on the estimated total during the GEF-6 period (2014-2018) is between US$ 74 billion and US$ 120 billion, with *actual* financing needs being in a range US$ 16 billion and US$ 40 billion, with a most likely estimate of US$ 27 billion. [*To be updated*] These estimates do not cover all costs needed to implement the Strategic Plan and achieve the Aichi Biodiversity Targets, particularly as the assessment was based on GEF-eligible countries and activities and is therefore not a full global assessment.

6.   To assist with the assessment of funding needs for the 6th replenishment of the Global Environment Facility (GEF) Parties were requested to assess their financial needs for implementation of the Convention during the sixth replenishment period of the GEF (GEF6), taking into account the Strategic Plan for Biodiversity 2011-2020 and the Aichi Targets, and the Strategy for Resource Mobilization with its specific missions and goals. Six countries submitted these needs assessments including Brazil, Bangladesh, Ecuador, Grenada, Micronesia and Myanmar. Their estimates of total resources needed to implement the three objectives of the CBD and the Aichi Biodiversity Targets range from US$ 52 million to $3,935million.

7.   Agenda 21, an outcome from the United Nations Conference on Environment and Development (the Rio Earth Summit) in 1992, contains an estimated average total annual cost (for 1993-2000) of implementing activities outlined in Chapter 15, Section II on the Conservation of Biological Diversity of about $3.5 billion per annum. This costing was done in 1992 and was based on a generic global assessment of activities to be undertaken in line with the CBD, such as management-related activities; data and information; and international and regional cooperation and coordination.

8.   It is difficult to aggregate the actual level of funding provided for biodiversity and ecosystem services. Recent estimates suggest that the global scale of funding for biodiversity and ecosystem services in 2010 was between US$ 51.5-$ 53.4 billion (Parker et al., 2012, page 28). This is significantly less than the actual estimates of costs required for biodiversity conservation and sustainable use – the cost of this is estimated to be hundreds of billions of dollars annually. For example, one estimate of the cost of a comprehensive global conservation program has been estimated at around US$ 290-385 billion per year (IUCN, 2010; James et al., 2001 in Parker and Cranford, 2012, page 19).

9.   When compared to the estimated value of the world's natural capital and ecosystem services, these figures pale in comparison. This was estimated to be on average USD 33 trillion per year (Costanza et. al., 1997 in Parker et al., 2012, page 18). More recently, the value of the loss of ecosystem services and biodiversity per annum has been estimated to be about USD 740 billion per annum, with a projection of loss (based on the current rate) to be worth USD 20 trillion from 2000 to the year 2050 (Braat and ten Brink, 2007 in Parker et al., 2012, page 18).

10.   It is clear from these global assessments that the need for funding is significantly greater than the current commitments.

1.3   The CBD resource mobilization strategy.

11.   The Strategy for Resource Mobilization provides a framework to assist Parties in establishing national targets, goals and action for enhancing international financial flows and domestic funding for biological diversity (decision IX/11). It is designed to mobilize adequate and predictable financial resources to support the achievement of the Convention's three objectives. It recognises that funding for biodiversity has been insufficient to address the rate of biodiversity loss and that the lack of sufficient financial resources continues to be one of the main obstacles to achieving the Convention's objectives. In order to achieve the overarching goal of the Strategic Plan for Biodiversity 2011-2020 to halt the loss of biodiversity by 2020 and to meet the Aichi Biodiversity Targets, it was agreed that a significant increase in resources (financial, human and technical) will be required and that these resources will need to be mobilised from a variety of sources, including existing as well as new and innovative sources. There is therefore a need to understand the required level of investment and ongoing costs to implement and meet the Aichi Biodiversity Targets to feed into the ongoing work to implement the Strategy for Resource Mobilization.

12.   In 2010 at COP 10, Parties reiterated their support for implementation of the Strategy for Resource Mobilization and reflected the need for mobilization of resources under Target 20 of the Aichi Biodiversity Targets (decision X/2, annex). At this time, Parties also adopted indicators for monitoring the implementation of the Strategy for Resource Mobilization and decided to adopt further targets for resource mobilization aligned with these indicators at the eleventh meeting of the Conference of the Parties (COP 11) in 2012 (decision X/3, paragraph 8).

1.4 The mandate of the High Level Panel

13.   The establishment of the High-Level Panel on Global Assessment of Resources for Implementing the Strategic Plan for Biodiversity 2011-2020, co-sponsored by the Governments of India and the United Kingdom, was welcomed by the fourth meeting of the Ad Hoc Open-Ended Working Group on Review and Implementation of the Convention (WGRI-4) [UNEP/CBD/WG-RI/4/L.7 paragraph 5] and invited to report to the eleventh meeting of the Conference of the Parties (COP11) that will be held 8-19 October 2012, in Hyderabad, India.

14.   The main objectives of the High Level Panel are:

   i)   At the global level, to provide as robust an assessment as possible of the resources needed to achieve the 20 Aichi Targets in the timeframe up to COP-11 recognizing that a comprehensive assessment may not be possible, but a credible assessment of current knowledge will be valuable;
   ii)   to present the cost estimates derived in the context of knowledge about the benefits of biodiversity and current funding streams to help frame and stimulate discussion around meeting these resource needs; and
   iii)   to provide recommendations on future work which would help Parties better understand how they can finance the Strategic Plan for Biodiversity 2011-2020.

1.5 Relationship to other processes

15.   In addition to the GEF 6 needs assessment, and country needs assessment described above, there are a range of other processes that are relevant to the assessment of resource requirements for meeting the Aichi Targets. The High Level Panel, and its underpinning research projects, has sought to engage with these and to draw on relevant approaches and information from them as far as possible.

1.5.1 CBD-related meetings on biodiversity and finance

16.   Articles 20 and 21 of the Convention contain provisions on financial resources for biodiversity and mechanisms for their delivery. In order to support implementation of Articles 20 and 21 and the achievement of the Convention's objectives more broadly, the eighth Conference of the Parties in 2006 decided to undertake an in-depth review of the availability of financial resources, including through the financial mechanism and develop a draft strategy for resource mobilization in support of the achievement of the objectives of the Convention for its ninth meeting (decision VIII/13).

17.   A number of informal consultations were held on the development of the draft strategy for resource mobilization over 2007-2008. The ninth Conference of the Parties (COP 9) then adopted the Strategy for Resource Mobilization in 2008 (decision IX/11). It decided that the implementation of this strategy would be reviewed at subsequent meetings of the Conference of the Parties.

18.   Decision IX/11 also invited Parties to come forward with new and innovative financing mechanisms in support of the Strategy for Resource Mobilization. In accordance with this decision, the Secretariat organized an International Workshop on Innovative Financial Mechanisms in 2010 in collaboration with The Economics of Ecosystems and Biodiversity (TEEB) Secretariat. The workshop explored opportunities for bringing new and innovative thinking on biodiversity finance into the CBD process, assessed the status of knowledge and related use concerning innovative financial mechanisms, and developed policy options concerning innovative financial mechanisms.

19.   The tenth Conference of the Parties (COP 10) in 2010 reviewed implementation of the Strategy for Resource Mobilization and requested the Executive Secretary to organize regional and sub-regional workshops to assist with the development of county-specific resource-mobilization strategies (decision X/3). A number of regional and sub-regional workshops were held in accordance with this decision which aimed to develop effective regional action plans for implementing the Strategy for Resource Mobilization and identify innovative financial mechanisms to support implementation of the Strategic Plan for Biodiversity and the Aichi Targets.

20.   Most recently, a global dialogue seminar on scaling up finance for biodiversity, co-hosted by the Governments of Ecuador, Sweden, Norway and India together with Japan as the President COP 10, was held from 6 to 9 March 2012 in Quito, Ecuador. The purpose of this meeting was to explore and contribute to understanding and seek to clarify areas of convergence and divergence regarding ways to scale up the mobilization of financial resources to support the achievement of the Aichi Targets.

1.5.2 Other ongoing assessments

21.   Other ongoing assessments (though not an exhaustive list) are summarised below:
[This will be updated and references added]

Conservation International- Guidance for estimating cost of achieving the Aichi Biodiversity Targets
Conservation International has developed a methodology to assist countries with the process of identifying their funding needs, by providing step-by-step guidance for estimating the costs of implementing the Aichi Targets at a national scale, and at different levels of detail depending on time and resources available. This will be piloted in a number of countries.

UNDP-EC project on biodiversity finance.
UNDP have launched a project with EC funding that will develop new methodologies for county-based, bottom up approaches to: 1) advance biodiversity mainstreaming 2) determine finance flows and needs (looking also at use efficiency/effectiveness, role of policy environment, finance gap analyses etc. and 3) deploy appropriate financing mechanisms to fill the funding gap. The methodologies will be piloted in 8 countries using synergistic opportunities through the support provided by UNDP and UNEP to governments in the development of next generation NBSAPs.

IUCN-biodiversity finance flows
IUCN has conducted a Swiss-funded project looking at biodiversity finance flows. The report is currently under review by the Swiss government and will be circulated shortly.

Nature Conservancy/TNC- regional needs assessment

TNC is a partner with UNDP on the regional needs assessment study on sustainable finance for LAR and the Caribbean. Though their work on the Global Challenges (e.g. Micronesia Challenge, Coral Triangle, Caribbean Challenge), they have also complied financial needs assessment for the objectives of these Challenges, mainly focusing on Protected Areas (but also new elements around target 11).

II.   APPROACH TAKEN

2.1 Organisation of work

22.   The High Level Panel was co-sponsored by the governments of the United Kingdom and India. Representatives from both governments, along with the CBD Secretariat, have thus been closely engaged in facilitating the work of the panel.

23.   The High Level Panel met on 3rd August, 2012, hosted by the United Nations World Conservation Monitoring Centre. In addition to this physical meeting, the panel met by teleconference on [*dates to be inserted]* and were engaged on an ongoing basis in discussions with teams conducting the underpinning research.

24.   Prior to its first meeting, the panel had a one day open consultation on 2nd August 2012. This was attended by observers from the Global Environment Facility (GEF); the GEF 6 needs assessment team; UNDP, UNEP and the World Bank; and was webcast to Parties and other stakeholders. Parties were invited to send comments by e mail during and after the consultation meeting. In the interests of openness and transparency documents from panel meetings and documents related to the underpinning research were made available on the CBD website for information and comment.

2.2 Underpinning research

25.   UNEP-WCMC and ICF GHK were contracted by the UK Department for Environment, Food and Rural Affairs to work with the high-level panel to provide an aggregated estimate of the investment and on-going expenditure needed to meeting the Aichi Biodiversity Targets; and broadly, to deliver:

- A common framework, methodology and approach for an integrated assessment
- Analysis of the type and scale of actions necessary for achieving each target
- An initial aggregated assessment of resource requirements, and proposals on next steps.

This assessment of resource requirements attempts to aggregate work by a number of different 'cluster groups'. The clusters were defined by the CBD Secretariat and separate projects worked to assess the resource requirements for these targets or group of targets. Some of these projects were separate contracts awarded by the UK Department of Environment, Food and Rural Affairs; whilst others were pre-existing efforts, or assessments conducted by the CBD Secretariat. These clusters are listed in the table below:

	Target(s)
Awareness and behaviour change	1
Macroeconomics	2, 3, 4
Marine	6, 7, 10, 11
Water, pollution and ecosystem services	5, 8, 14
Agriculture	7
Invasive alien species	9
Genetic diversity	13
Forest-related targets	5, 7, 11, 15
Protected areas and endangered species	11, 12
Enabling activities	16, 17, 18, 19, 20

More information on the methodologies for this research are in section IV. Results are presented and discussed in sections V and VI.

2.3   Scope of Information document   *[to be added in final draft*]

III   ESSENTIAL CONTEXT

3.1   Interactions and overlaps between targets

26.   Some of the targets are inter-related and likely to benefit from joint programmes of activity that contribute to more than one Target. In these cases it is important to recognise these overlaps and to avoid double counting. Where there are overlaps between different Target clusters, the synthesis team provided guidance to clusters about these and how they should be addressed. The importance of dialogue between cluster leads was emphasised, to ensure consistent and non-overlapping approaches. By taking an approach of defining the programmes of action assumed to contribute to the delivery of the targets, and by comparing these across clusters it was hoped that it would be possible to avoid double counting and ensure a consistent approach across Targets. Examples of overlaps and inter-relationships include:

- Targets 1-4 and 16-20 relate to awareness raising, macro-economic changes and enabling activities that will help to contribute to most of the other targets;

- There are links between Target 7 – sustainable agriculture, Target 8 – pollution and Target 10 – coral reefs;

- Target 11 – protected areas links with a variety of other targets (e.g. Target 5 – habitat loss, Target 6 – fisheries, Target 10 – coral reefs; Target 12 – protected areas; Target 15 – ecosystem restoration);

- Target 12 – threatened species also links with several other targets (e.g. Target 5 – habitat loss, Target 9 – IAS, Target 10 – coral reefs; Target 11 – protected areas; Target 13 – genetic diversity).

[*To be updated]*

27.   A further concern is that there may be conflicts between some of the Targets. For example, achieving sustainable agriculture may have negative effects on yields, suggesting a need to increase the farmed area and potentially conflicting with other Targets that seek to protect or increase the area of other habitats. It is important to be aware of these potential conflicts. *[To be updated based on final reports from clusters and experience in aggregation]*

3.2 Assessment of baseline

28. A comprehensive assessment of resource requirements for the CBD Strategic Plan and Aichi Biodiversity targets would require assessment of:

  a) The **total levels of investment or on-going expenditures** required to meet the Targets; and

  b) The **additional levels of investment or on-going expenditures** required to meet the Targets, compared to current levels.

29. Given the wide range of different actors involved at international, national and sub-national level, a detailed analysis of current levels of expenditure and hence a detailed assessment of additional requirements will not be possible for most Targets. For this report it has proved more feasible in most cases to examine the overall requirements of meeting the targets, and to provide an assessment, quantified as far as possible, of the additional action required compared to current levels (i.e. an estimate of the extent of current progress in meeting the targets). [*To be updated in subsequent drafts depending on what has been achieved*] More analysis on this is in sections V and VI.

3.3 Interpreting cost assessments

30. Though the primary mandate of the High Level Panel and its underpinning research is the Global Assessment of financial resources needed to achieve the Aichi Targets- it is clear that cost estimates should be presented and considered in light of the substantial local, regional and global benefits – including benefits both to society and the economy, that would be provided from the targets being met. In addition, whilst estimates costs are likely to appear high, these should be considered in relation to a wide consideration of the means that these might be met, including through innovative financing mechanisms and financing synergies. These issues are discussed in more detail throughout this report and addressed in particular in sections V and VI.

IV METHODOLOGY

4.1 General approach

31. The Aichi Targets are diverse in their scope and requirements, and meeting them will require a range of different activities with varying resource needs. The cluster leads have therefore applied a range of different methods to assess these resources requirements. In order to promote a consistent approach and to facilitate synthesis and aggregation of the results, a common methodological framework was established, which included shared guidelines which have been followed by the different cluster groups.

32. A global assessment of the investment and on-going expenditure required to meet the Aichi Targets is a challenging undertaking, for a number of reasons:

  - The Targets themselves are not specified in a form that facilitates such analysis – they are bold and ambitious, yet often defined in an imprecise way that presents challenges for costing;
  - We can expect variations in approaches to meeting the Targets in different countries and regions, which present challenges for assessing resource needs;
  - There are gaps in data and evidence both on the requirements of the Targets and the resources needed for the activities required; and
  - Limited time and resources were available for the assessment, which took place between June and August 2012.

33.   Because of these different factors, it was recognised at the outset that the assessment was unlikely to provide a comprehensive or fully robust assessment of the investment and on-going expenditure required to meet the Targets. Instead, a pragmatic approach was adopted, in order to provide a plausible first assessment of the likely magnitude involved, which will provide a basis for discussion and can be refined through later analysis.

34.   The project could not prejudge how countries will aim to meet the Aichi targets, and therefore it was not possible or appropriate to specify a detailed global operational plan for meeting them. Instead, the cluster groups sought to define plausible scenarios consistent with Target implementation, in consultation with experts, which provide a broad indication of the scale of activity required globally while recognising the varying needs and cost structures of different countries. Given the uncertainties and information and resource constraints, the aim was to define a credible and transparent approach, recognising the uncertainties involved, to allow ranges of resource requirements to be estimated and present them for discussion and refinement over time.

35.   The approach for each Target cluster involved:

- **A review of the Targets and their context, needs and expectations**, through literature review and consultation with global experts/stakeholders;

- **Analysis of the type and scale of the actions required** to meet the Targets, through a literature and web review and consultations with selected experts, stakeholders and national authorities;

- **Identification of data on the per unit requirements of relevant actions**, through literature review and interviews;

- **Definition of a broad global programme of activity consistent with meeting the Targets**, in appropriate units, based on available evidence;

- **Specifying appropriate factors and ratios for up-scaling of** investment and on-going expenditures, taking account of any relevant variations between countries and regions (e.g. according to economic and environmental factors and needs); and

- **Assessment of the investment and on-going expenditure required to meet the Targets,** specifying ranges where necessary, and assessing additional resource savings as far as possible, and distinguishing between one-off investments and recurrent expenditures**.**

36.   Since not all of the resource requirements were fully quantifiable for all Targets, it was necessary to apply a **combination of quantitative and qualitative analysis** in some cases. Given the uncertainties involved, the analysis has sought to define clearly the **assumptions and methods employed** and data gaps encountered, identifying where the estimates could be refined with further evidence and analysis.

4.2 Methodological Issues

37.   The methodological framework identified a series of key methodological issues and proposed a common approach to each of them. These issues are summarised below.

Top-down *vs* bottom-up assessments

38.   The resources required to meet the Targets could potentially be assessed on a country-by-country basis ("bottom-up approach") or by assessing the costs of global programmes of activity ("top-down approach"). The Targets are to be implemented through National Biodiversity Strategies and Action Plans (NBSAPs), potentially involving diverse approaches and activities. However, assessing the resources required to meet the Targets in all countries using such a detailed bottom-up approach was impractical given the time and resources available. The analysis therefore defined a series of generalised scenarios for global assessment, broadly defining a programme of activities at global level that could deliver the Targets. For some Targets (e.g. the "macro-economic" Targets 2-4) this involved identifying common actions that could be undertaken by all countries and estimating the average resource requirements for each country; analysis for some other Targets was based on

alternative means of assessment and aggregation – for example the approach to Target 12 (endangered species) involved detailed assessment of the resources required to conserve a substantial sample of bird species.

39.   It is recognised that the activities actually undertaken in pursuit of the targets are likely to differ by country, as are the costs of these activities. As far as possible, the assessment sought to understand differences in the types of activities and levels of costs in different parts of the world. Because the approach for most Targets has been relatively broad rather than highly detailed, some caution is needed in interpreting the results. It will be helpful to compare and contrast these global estimates with country-by-country analyses such as those proposed by UNDP and the CBD Secretariat.

Types of Resource Needs

40.   Whether reported as investments or on-going expenditure the economic costs of meeting the targets include:

- **Costs of biodiversity action** – the resources required to undertake the activities required to meet the targets. These include the expenditure on labour, materials, equipment and energy used in delivering biodiversity conservation activities.

- **Administrative and transaction costs** – the resource required to manage and support programmes of biodiversity action. These may fall on both the public and private sectors – e.g. costs incurred by the authorities in administering incentives to farmers and those incurred by farmers in entering schemes and complying with their administrative requirements.

- **Opportunity costs** – the opportunities or revenues foregone as a result of actions to conserve biodiversity. These may include, for example, reductions in crop yields through sustainable agriculture, foregone timber revenues through forest protection, or foregone development opportunities from formation of protected areas.

41.   Comprehensive assessments of economic costs should take account of all of these elements. In practice, however, the full opportunity costs of biodiversity action are often difficult to assess. As this study focuses on the resources required to meet the Targets, it has included **opportunity costs only to the extent that they are reflected in actual expenditures and resource needs.** This will be the case where compensation is paid for income foregone for actions to conserve biodiversity, for example through incentive payments for sustainable agriculture, land purchases or management agreements for the creation of protected areas, or compensation payments for foregone fishing rights. There may be other examples where biodiversity conservation actions may give rise to opportunity costs where there is no financial expenditure or resource requirement – for example where protected areas limit local development activity without the payment of compensation to landowners.   In these cases opportunity costs have been identified and examined qualitatively as far as possible.

42.   The assessment has attempted to analyse all of the resources required, including investments and expenditures by a range of **public sector** and **private sector** actors, while seeking to avoid double counting (e.g. where private sector actions are funded through grants and incentives).

Unit level of assessment

43.   The investment and expenditure requirements have been estimated by selecting appropriate units and identifying appropriate unit level data for up-scaling to global level. Because the Targets vary widely in the types of actions they involve, a variety of different units have been be used, such as the resource requirements per country, per hectare, per project or per species.

Differences in analytical approach

44.   The analyses have employed a variety of analytical approaches, which include:

- Specification of appropriate programmes of activity through **expert/ stakeholder judgement** – for many of the Targets (e.g. T1, T2, T3, T4, T13) the cluster leads have sought to identify – through consultation with experts and stakeholders - an appropriate programme of activities that is consistent with Target delivery, and assess the resources required to deliver the required actions;

- **Modelling of required actions** – for Targets 6 (fisheries) and 11 (marine protected areas), existing models have been applied to analyse the costs of action;

- **Extrapolation from existing expenditures** – Target 6 (fisheries) has estimated the costs of fisheries management by extrapolating from current expenditures, assuming that a 25% increase in management expenditures are needed;

- **Regional mapping of activities** – for Target 7 (sustainable agriculture), regional mapping of management actions is proposed as a means of estimating costs.

Profile of investments and ongoing expenditures

45.   Meeting the Targets involves a combination of one off **investments** and on-going **annual expenditures**. The analysis has made a clear distinction between these two types of categories of resource requirement, as well as combining them to estimate the total and annual resources required over the eight year period between 2013 and 2020.

Gross and net resource requirements – revenues and cost savings

46.   The assessment has sought to assess the net level of resource requirement of biodiversity actions, taking account of any changes in revenues, as well as any potential cost savings alongside the analysis of investment and expenditure requirements. For example, the assessment for sustainable agriculture has examined changes in crop revenues as well as management costs, and the net changes in government expenditure compared to existing forms of support.

Adjustment

47.   Unit levels of financial resource requirements to carry out biodiversity actions may vary between different countries for various reasons, such as differences in incomes and wage rates or variations in crop yields. These variations have been examined on a case by case basis, and where necessary unit resource requirements have been adjusted to take account of variations between countries.

Currency

48.   All investment and expenditure needs are expressed in US$ at 2012 prices.

Ranges and scenarios

49.   In most cases there is more than one possible approach to meeting the Target, and different ranges of resource requirement depending on the interpretation of the Target and the level of ambition in the approach proposed. Therefore different scenarios – for example involving low/medium/highly resourced approaches and/or different types of action – have been defined in each case.

Benefits and funding opportunities

50.   The focus of the work of the cluster groups was on the resources required to meet the Aichi Targets, and a detailed assessment of the benefits or funding opportunities was beyond the scope of the work. However, in presenting estimates of resource needs, it is important to recognise that meeting the Targets will deliver substantial benefits to society and the economy, and to give consideration to the potential sources of funding. In presenting their assessments, each of the cluster

groups was therefore asked to provide a brief review of available evidence of the benefits of meeting each Target and the potential sources of funding, illustrating this with examples as far as possible.

Data sources and coherence with other assessments

51. The assessments have drawn on a wide range of different data sources, many of which are specific to individual Target clusters. There are also some common sources which have informed the work of all of the clusters, such as guidance provided by the CBD Secretariat on the interpretation of each Target, and draft guidance published by Conservation International (2012) on estimating the cost of achieving the Aichi Biodiversity Targets[1].

52. A key source is also the GEF 6 Needs Assessment, which presents an analysis of the requirements of each Target to inform the funding needs for the sixth replenishment of the Global Environment Facility.[2] That assessment does not provide a full analysis of the resources required to meet the Targets, since the GEF is only able to fund certain types of activities and is restricted to developing countries and countries with economies in transition. However, because of the importance of GEF as a source of funding for meeting the Aichi Targets, it is important that this assessment is consistent with the GEF 6 needs assessment as far as possible. Therefore the cluster leads have been working closely with those involved in the GEF 6 needs assessment to share information and develop common approaches as far as possible, and the analysis for each Target has been adapted to achieve coherence with the GEF 6 needs assessment where appropriate.

V   GLOBAL ASSESSMENT OF INVESTMENT AND ONGOING EXPENDITURE NEEDS OF ACHIEVING THE AICHI TARGETS

5.1   Synthesis of the resource needs assessment

53. Considerable progress has been made on estimating the resource needs associated with delivering several of the Targets. In some cases, however, further analysis is necessary to determine what proportion of the expenditure is related to up-front investment and what proportion is related to recurrent expenditure (e.g. where only global annual resource needs have been identified). For others, the analysis is still on-going and it has not yet been possible to arrive at quantitative estimates.

54. A summary of progress across the different targets is shown in Table 5.1 below. In some cases it has been necessary to split a target into different subcomponents (e.g. Target 5, Target 7, Target 11).

55. A complete summary of the current estimated resource needs across each of the targets is given in Table 5.2 below. These have been grouped according to the different Strategic Goals of the Aichi Biodiversity Targets.

56. Preliminary estimates for all the targets under Strategic Goal A have been completed. For the other goals, it has only been possible to estimate resource needs associated with some of the Targets at this point in the assessment. Currently the biggest gaps seem to be found under Strategic Goals D and E.

57. From the information currently available, it is likely that the Goal with the greatest resource needs is Strategic Goal B (comprising six targets), whilst the Goals which appear to have the lowest resource needs are Strategic Goal A (four targets), D (three targets) and E (four targets).. This indicates that resource needs are greatest for addressing the direct pressures on biodiversity (i.e. the direct drivers of loss such as agriculture, fisheries, forestry, pollution, invasive alien species, etc.). Other actions, related to, for instance, policy development and enabling actions appear to be less resource intensive. This information is summarised in Table 5.3.

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[1] http://www.conservation.org/Documents/CI_CBD-Finance-Methods_March-2012.pdf

[2] http://www.cbd.int/financial/COP-11-preparations/gef6needs.shtml

5.2 Variations in the resource needs assessments

58.   The assessments were conducted using various different methods and approaches. Some targets included different scenarios or levels of ambitions (typically between 2 and 3 different scenarios). Others considered different types or numbers of countries (sometimes in addition to considering different levels of ambition). The remainder provided a single preliminary estimate. There were also other variations in the way in which resource needs have been estimated. For instance:

- Resource needs estimated by some targets had already taken into account current expenditure, and only calculated additional resource requirements, whilst for others this was still pending, and in some cases may be limited to a qualitative assessment.
- Some targets had also taken into account potential cost savings associated with delivering the target, thus calculating the net resource needs as opposed to the total resource needs calculated by other targets
- Some targets considered the cumulative resource needs associated with investment
- The number of countries assumed to scale up resource needs (e.g. CBD / World Bank).

59.   These differences in some cases make it difficult to arrive at an overall assessment of the resource needs. These issues, and how they will be managed, will have to be considered in more detail, taking into account not just what is preferable, but also what is feasible across the different targets. For instance, whilst it would be preferable for all the targets to consider net resource needs (taking into account what additional expenditure is required and possible cost savings), this might not be possible for all targets (at least not quantitatively). Therefore, it might be necessary to further standardise the approach being adopted across the different targets to arrive at a more accurate and representative overall assessment of total global resource needs. Guidance on these issues was provided in the methodological framework, with the aim of promoting a consistent approach. The synthesis team will now work with the cluster leads in order to make the final estimates as consistent as possible to facilitate synthesis and aggregation.

Table 5.1 Progress on assessment of resource needs

Status	Targets
Preliminary resource needs assessment complete, including investment and recurrent expenditure breakdown	Target 1 – Awareness raising Target 2 – National accounting Target 3 – Harmful subsidies Target 4 - Sustainable consumption & production Target 6 – Fisheries Target 9 – Invasive alien species Target 11 – Marine protected areas Target 18 – Traditional knowledge
Preliminary resource needs assessment completely, but breakdown of investment vs. recurrent expenditure is still pending	Target 5 – Rate of loss (wetlands) Target 8 – Pollution Target 12 – Species protection Target 13 – Genetic diversity Target 11 – Terrestrial protected areas Target 19 – Science base Target 16 – Nagoya Protocol
Analysis on-going	Target 7 – Agriculture Target 7 – Aquaculture Target 10 – Coral reefs Target 14 – Ecosystems
Pending	Target 5 – Rate of loss (forests) Target 7 – Forestry Target 15 – Restoration of forests (carbon stocks) Target 17 – NBSAPs Target 20 – Mobilisation of financial resources

Table 5.2 Summary of preliminary cost estimates across the different targets

Target	Investment needs (US$ million)	Recurrent expenditure per annum (US$ million)	Total recurrent expenditure to 2020 (US$ million)	Total global resource needs 2013 – 2020 (US$ billion)	Further comments
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society					
Target 1 – Awareness raising	58	150 – 500	750 – 2,500	0.8 – 2.6	Based on estimating high and low cost scenarios for lower and higher income countries
Target 2 – National accounting	308 – 704	51 – 100	254 – 498	0.6 – 1.2	Based on low, medium and high cost scenarios
Target 3 – Harmful subsidies	434 – 1329	5 – 15	25 – 75	0.5 – 1.4	Based on low, medium and high cost scenarios
Target 4 - Sustainable consumption & production	95 – 185	8 – 15	39 – 77	0.1 – 0.3	Based on low, medium and high cost scenarios
Total Goal A	**837 – 2,218**	**64 – 132**	**321 – 661**	**2.0 – 5.6**	
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use					
Target 5 – Rate of loss (Wetlands)				370.2 – 869.8	Only estimates for annual global costs (US$46.27 – 108.73 billion per year) are available. Total resource needs calculated by assuming 8 year investment period (2013 – 2020)
Target 5 – Rate of loss (Forests)					Status is pending

Target	Investment needs (US$ million)	Recurrent expenditure per annum (US$ million)	Total recurrent expenditure to 2020 (US$ million)	Total global resource needs 2013 – 2020 (US$ billion)	Further comments
Target 6 – Fisheries	130,000 – 292,000	8,400 – 11,600	67,200 – 88,000	197.2 – 380.0	Using a discount rate of 3% per annum. Lower bound and upper bound estimates were calculated.
Target 7 – Agriculture					Analysis is ongoing; expenditure is yet to be determined.
Target 7 – Aquaculture					Only a qualitative assessment has been possible to date. Analysis is ongoing; expenditure is yet to be determined.
Target 7 – Forestry					Status is pending
Target 8 – Pollution				1,128.0 – 3,200.0	Only estimates for annual global costs (US$141 – 400 billion per year) are available. Total resource needs calculated by assuming 8 year investment period (2013 – 2020)
Target 9 – Invasive alien species	75,460	10,590	73,421	148.9	Resource needs associated with research and prioritisation are still to be included. Recurrent expenditure assumed to occur between 2013-2020 for control and eradication, whilst recurrent expenditure on prevention is expected to occur between 2015 – 2020.
Target 10 – Coral reefs					Analysis is ongoing; expenditure is yet to be determined
Total Goal B				**1,844.2 – 4,598.7**	
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity					
Target 11 – Marine protected areas	1,500 – 9,700	2,200 – 3,600	11,000 – 18,000	12.5 – 27.7	Resource needs relate to additional investment required. Establishment resource needs are based on cumulative investment needs. Management costs are

Target	Investment needs (US$ million)	Recurrent expenditure per annum (US$ million)	Total recurrent expenditure to 2020 (US$ million)	Total global resource needs 2013 – 2020 (US$ billion)	Further comments
					based on annual resource needs (here assumed to relate to 2015 – 2020).
Target 11 – Terrestrial protected areas	10,000 – 15,000			80.0 – 120.0	It has only been possible to calculate provisional estimates of annual resource needs associated with effective management (assumed here to run between 2013 and 2020). Up-front investment needs have not yet been calculated. Opportunity costs (excluding costs of establishment) are estimated to be US$69.2 billion
Target 12 – Species protection				120.0	Only estimates for annual global costs are available (US$ 15 billion). A breakdown of investment vs. recurrent expenditure is not yet available. Total resource needs calculated by assuming 8 year investment period (2013 – 2020). Assumes no shared benefits. Only 15-20% of the expenditure identified were for species-specific action
Target 13 – Genetic diversity				0.2 – 0.5	Resource needs estimated for three different levels of ambition. A breakdown of investment needs vs. recurrent expenditure is not currently available.
Total Goal C				**212.7 – 148.2**	
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services					
Target 14 - Ecosystems					Analysis is ongoing; expenditure is yet to be determined.
Target 15 – Restoration of forests (carbon stocks)					Status is pending

Target	Investment needs (US$ million)	Recurrent expenditure per annum (US$ million)	Total recurrent expenditure to 2020 (US$ million)	Total global resource needs 2013 – 2020 (US$ billion)	Further comments
Target 16 – Nagoya Protocol	14 – 307			0.01 – 0.3	Estimated resource needs do not include recurrent costs for implementing the Protocol. Resource needs calculated at two different levels of ambition, for varying numbers of countries (i.e. 50, 100, 150 and all Parties to the CBD).
Total Goal D				**0.0 – 0.3**	
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building					
Target 17 – NBSAPs					
Target 18 – Traditional knowledge	78	10	76	0.2	Both investment and recurrent expenditures are calculated for the period 2013 – 2020.
Target 19 – Science base				0.8 – 2.2	Resource needs evaluated at three levels of ambition
Target 20 – Mobilisation of financial resources					
Total Goal E				**1.0 – 2.3**	

Table 5.3 Preliminary estimates of global costs for meeting the Strategic Goals

Strategic Goal	Total global resource needs (US$ billion)	Notes
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society	2 – 6	Preliminary estimates for all targets under this Goal have been calculated
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use	1,844 – 4,599	Analysis is still on-going for several Targets included within this Goal. Figure is therefore likely to be a significant underestimate
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity	213 – 148	Analysis is still on-going for several Targets included within this Goal. Figure is therefore likely to be a significant underestimate
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services	0 (0.01 – 0.31)	To date it has only been possible to estimate the resource needs associated with one of the targets associated with this goal. Figure is therefore likely to be a significant underestimate
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building	1 – 2	Analysis is still on-going for several Targets included within this Goal. Figure is therefore likely to be a significant underestimate
Total	**2,060 – 4,754**	This figure is likely to be a significant underestimate given that resource needs for several targets are still pending

5.3 Potential Sources of Finance

60.   The range of economic and social as well as environmental benefits to be gained from meeting the Aichi Targets means that there is potential to obtain funding for the actions required from a range of different sources. Many of the required resources will need to be provided through core biodiversity budgets, particularly for those actions with a more narrow focus on biodiversity conservation (such as some of the costs of protecting species or managing protected areas). However, where actions deliver a wider range of benefits, for example by furthering development opportunities or enhancing the productive potential of agriculture or fisheries, this opens up opportunities for funding from different parts of government and from international agencies. Other actions provide opportunities for business – for example in helping to achieve sustainable production or consumption or developing payments for ecosystem services – thereby opening opportunities for private sector finance.

61.   Finding new and innovative sources of finance for biodiversity conservation, and exploiting synergies with other expenditure programmes, is important in delivering the resources needed to meet the Targets, as experience shows that core national funding for biodiversity funding tends to be limited in scale.[3] Goal 4 of the Convention's Strategy for Resource Mobilization therefore seeks to: "Explore new and innovative financial mechanisms at all levels with a view to increasing funding to support the three objectives of the Convention". Options identified under this Goal include: payment for ecosystem services; biodiversity offsets; environmental fiscal reforms; markets for green products; business-biodiversity partnerships; new and innovative sources of international development finance; and funding mechanisms for climate change. Examples of potential funding opportunities identified in the cluster reports are given below.

Target	Potential funding opportunities
1 – Awareness raising	Private sponsorship of awareness raising campaigns, opportunities to negotiate discounts or free provision of "social advertising".
2 – Biodiversity values	Much of the funding is likely to come from core biodiversity budgets. However, since delivering the Target plays an essential role in achieving sustainable development globally, there will be a wide range of beneficiaries and there is scope to secure funding from a range of sources such as governments, businesses and international development agencies, building on the international partnerships that have already been established to finance both the TEEB and WAVES initiatives.
3 - Incentives	Initial work to identify negative incentives and options for positive incentives may need to be funded primarily from core biodiversity budgets, as the required action is motivated primarily by biodiversity concerns. Assessments of reform options for negative incentives, and development of action plans for reform may attract resources from other government departments, especially where a need for reform has been identified for financial, economic or social reasons – finance ministries and sectoral ministries (e.g. agriculture, fisheries, energy) may contribute to this process. The development of positive incentives will deliver benefits for both the land management sector and for beneficiaries of ecosystem services (e.g. water companies, communities, property interests and the public at large). There may be opportunities for funding from beneficiaries through PES schemes (e.g. water sector, insurers, property interests), from a range of government departments (e.g. agriculture, forestry, water resources, energy) and from development agencies (because of the importance of natural capital and ecosystem services for development).
4 – Sustainable Consumption and Production	As well as core biodiversity budgets, this Target has opportunities to attract funding from businesses. Engagement of businesses will be important in the development of SCP plans for different sectors, and should provide opportunities to secure business funding for research and action planning, helping businesses to develop the evidence base and identify the actions they need to take to reduce their impacts on biodiversity over time.
18 – Traditional knowledge	Main actions are likely to be funded through voluntary funds from mostly traditional donor countries. Potential sources of further funding could be non-traditional donors, including emerging and developing economies and economies in transition or even the private sector. Funds for developing and least developed Parties are mainly sourced through GEF.

[Needs to be developed when information provided by other cluster groups]

62.   As well as core biodiversity budgets, potential sources of finance therefore include:

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[3] CBD Secretariat (2010) Innovative Financing for Biodiversity. http://www.cbd.int/financial/doc/global-monitoring-report-2010-en.pdf

- Other government budgets – e.g. for agriculture, fisheries, water resources, infrastructure (e.g. flood and coastal defences);
- International development finance;
- Governments in other countries;
- Businesses; and
- Funding mechanisms for climate change.

63.   The potential sources of funding can be mapped against the different Targets as follows:

Target	Other government budgets	International development finance	Governments in other countries	Businesses	Climate change funding
1. Awareness raising			X	X	
2. Biodiversity values		X	X	X	
3. Incentive measures	X	X	X	X	X
4. SCP	X	X	X	X	X
Etc…					

5.4   Benefits of meeting the Aichi Targets

64.   The assessment has examined the resources required to deliver the Aichi Targets. The analyses demonstrate that halting biodiversity loss requires a substantial increase in the resources devoted to conservation activities, both to fund investments that will deliver long term benefits for biodiversity and to finance recurrent expenditures to maintain natural capital and to prevent further losses.

65.   The underlying rationale for the Strategic Plan for Biodiversity and the Aichi Targets within it is that biodiversity plays a vital role in supporting the ecosystems on which human wellbeing and livelihoods depend, and that halting biodiversity loss is therefore vital for our future:
Biological diversity underpins ecosystem functioning and the provision of ecosystem services essential for human well-being. It provides for food security, human health, the provision of clean air and water; it contributes to local livelihoods, and economic development, and is essential for the achievement of the Millennium Development Goals, including poverty reduction.

66.   Mobilising the resources required to meet the Targets will be necessary in securing the many benefits that biodiversity provides. While this assessment has focused on the resources required to meet the Targets, rather than the benefits of action, presentation and discussion of estimated needs for investment and on-going expenditures should not lose sight of the benefits that mobilising the required resources will deliver.

67.   Global estimates have provoked much debate, but nevertheless emphasize the immense value that biodiversity and ecosystems provide to human well-being. For example, a study by Costanza et al (1997)[4] estimated the global value of ecosystem services at $33 trillion. Balmford et al (2002) estimated that the failure to protect biodiversity leads to the loss of natural services worth $140 billion a year, and that developing a global network of nature reserves on land and at sea would cost about

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[4] R. Costanza et al. (1997) Nature 387, 253-260

$45 billion a year to maintain, while protecting ecosystem services worth between $4,400 billion and $5,200 billion annually[5]. Another study examining the cost of policy inaction found that a failure to halt the loss of biodiversity could result in annual losses in ecosystem services worth $14 trillion per annum by 2050, equivalent to 7% of world GDP[6].

68.   The recent TEEB Quantitative Assessment modelled the benefits of a number of global change scenarios and estimated that a "reduced deforestation scenario" could deliver annual net benefits of $183 billion by 2030, as a result of the high per hectare values estimated for forest biomes. Other scenarios involving increased agricultural productivity and dietary changes could also deliver substantial net benefits.[7] The TEEB synthesis report provides further examples of the benefits of conserving particular ecosystems (Box 1).

Box 1 Benefits of Conserving Ecosystems and Biodiversity

Conserving forests avoids greenhouse gas emissions worth US$ 3.7 trillion. Halving deforestation rates by 2030 would reduce global greenhouse gas emissions by 1.5 to 2.7 GT CO_2 per year, thereby avoiding damages from climate change estimated at more than US$ 3.7 trillion in NPV terms. This figure does not include the many co-benefits of forest ecosystems.

Global fisheries underperform by US$ 50 billion annually. Competition between highly subsidized industrial fishing fleets coupled with poor regulation and weak enforcement of existing rules has led to over-exploitation of most commercially valuable fish stocks, reducing the income from global marine fisheries by US$ 50 billion annually, compared to a more sustainable fishing scenario.

Coral reefs provide valuable ecosystem services. Although just covering 1.2% of the world's continent shelves, coral reefs are home to an estimated 1-3 million species, including more than a quarter of all marine fish species. Some 30 million people in coastal and island communities are totally reliant on reef-based resources as their primary means of food production, income and livelihood. The net benefits of 166,000 hectares of reefs off the Main Hawaiian Islands are estimated at US$ 360 million per year.

Green products and services represent a new market opportunity. Global sales of organic food and drink have recently been increasing by over US$ 5 billion a year, reaching US $46 billion in 2007; the global market for eco-labelled fish products grew by over 50% between 2008 and 2009; and ecotourism is the fastest-growing area of the tourism industry with an estimated increase of global spending of 20% annually.

Bee keeping supports production worth US$ 213 million annually in Switzerland. A single bee colony ensured a yearly agricultural production worth US$ 1,050 in pollinated fruits and berries in the year 2002, compared to just US$ 215 for direct products from beekeeping (e.g. honey, beeswax, pollen). On average, Swiss bee colonies ensured a yearly agricultural production worth about US$ 213 million by providing pollination, about five times value of the production of honey. The total economic value of insect pollination worldwide is estimated at €153 billion, representing 9.5% of world agricultural output in 2005.
Source: TEEB Synthesis Report[8]

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[5] Andrew Balmford, Aaron Bruner, Philip Cooper, Robert Costanza, Stephen Farber, Rhys E. Green, Martin Jenkins, Paul Jefferiss, Valma Jessamy, Joah Madden, Kat Munro, Norman Myers, Shahid Naeem, Jouni Paavola, Matthew Rayment, Sergio Rosendo, Joan Roughgarden, Kate Trumper, R. Kerry Turner (2002) Economic Reasons for Conserving Wild Nature.   Science 9 August 2002: Vol. 297 no. 5583 pp. 950-953

[6] Braat and ten Brink eds (2008) http://ec.europa.eu/environment/enveco/biodiversity/index.htm#_Toc240787000 The Cost of Policy Inaction - The case of not meeting the 2010 biodiversity target.

[7] SAC (undated) The Economics of Ecosystems and Biodiversity - The Quantitative Assessment. Final Report to the United Nations Environment Programme.

[8] TEEB (2010) TEEB Synthesis Report.
http://www.teebweb.org/Portals/25/TEEB%20Synthesis/TEEB_SynthReport_09_2010_online.pdf

Conservation of biodiversity has also been shown to play a key role in poverty alleviation (Box 2).

> **Box 2 Benefits of biodiversity conservation for poverty alleviation**
>
> A recent study[9] highlighted the benefits of biodiversity conservation for alleviating global poverty, by assessing the flows of ecosystem services that priority habitats provide to the poor, both through direct benefits and through payments for ecosystem services to those stewarding natural habitats. It found that biodiversity conservation priority areas are efficient targets for benefiting human well-being through the services those areas provide. The benefits to poor communities—both directly and through potential financial compensation schemes—are particularly strong. The aggregate benefits are valued at three times the estimated opportunity costs and exceed $1 per person per day for 331 million of the world's poorest people. The top 25% of conservation priority areas could provide 56%–57% of benefits. Although trade-offs remain, these results show win–win synergies between conservation and poverty alleviation, indicate that effective financial mechanisms can enhance these synergies, and suggest biodiversity conservation as a fundamental component of sustainable economic development.

69.   At the regional level, a recent study in the EU estimated the benefits of the Natura 2000 network of protected areas at between €200 and €300 billion per year, or 2 to 3 per cent of the EU's Gross Domestic Product. This compares with the estimated annual cost of less than €6 billion per year to implement and manage the network[10].

70.   The assessments undertaken by the different cluster groups also highlight the benefits of meeting individual Aichi Targets (Box 3). Further evidence will be provided in the final reports for this cluster, to enable this summary to be developed further.

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[9] Will R. Turner, Katrina Brandon, Thomas M. Brooks, Claude Gascon, Holly K. Gibbs, Keith S. Lawrence, Russell A. Mittermeier, and Elizabeth R. Selig (2012) Global Biodiversity Conservation and the Alleviation of Poverty. BioScience, Vol. 62 No. 1. January 2012

[10] http://www.ieep.eu/publications/2012/06/estimating-the-overall-economic-value-of-the-benefits-provided-by-the-natura-2000-network

Box 3 Benefits of meeting individual Aichi Targets

Target 2 - Integration of biodiversity values into plans, strategies and accounting systems should help to ensure that the true value of biodiversity is reflected in decision making, which in turn should help to reduce the rate of loss of biodiversity and ecosystem services. This will deliver a wide range of benefits for people and the economy. By helping to maintain natural capital, it should contribute to sustainable livelihoods and promote the long term sustainability of economic development. Natural capital accounting is helping to inform decision making about:

- Management of scarce water resources in Mexico and Australia;
- How to maximise the benefits of tourism to local economies in Zanzibar;
- The health and fisheries benefits of cleaning up Manila Bay in the Philippines;
- The management of natural resources in Andalucia, Spain; and
- Decoupling economic growth and energy consumption in Norway and the Netherlands.

Target 3 - Removal or reform of negative incentives will have a range of benefits, including:

- Protection of biodiversity;
- Maintenance of ecosystem services;
- Improvements in economic efficiency, through better pricing of natural resources and externalities, helping to ensure better allocations of resources;
- Budgetary savings, especially through reductions in subsidies.

The benefits of developing positive incentives will include:

- Enhanced conservation of biodiversity;
- Increased delivery of ecosystem services, with benefits for people and the economy;
- Enhanced attitudes of land managers and local communities to biodiversity;
- Diversification of rural incomes and new opportunities to generate income through conservation activities;
- Improvements in economic efficiency, by creating markets for services that were previously under-priced and under-delivered.

Target 4 - Achieving sustainable consumption and production offers a wide range of benefits. As well as helping to conserve biodiversity and maintain ecosystem services (which will deliver a range of benefits for people and the economy), SCP aims to contribute to achieving patterns of economic development that are sustainable in the long term. More sustainable use of resources should yield gains in efficiency and reduce costs to producers and consumers. Businesses benefit from developing and implementing SCP policies through reputational benefits, cost savings, market positioning, and access to finance.

Target 5 – Protection of wetlands will involve annual savings in expenditures on public infrastructure estimated at $11.4 billion globally.

Target 6 - Society is expected to gain from sustainably managing global fisheries through increases in resource rent. Currently, annual fisheries catch globally is around 80.2 million tonnes, providing a catch value of US $87.7 billion. The estimated potential catch at MSY is 88.7 million tonnes (82.7 – 99.4 million tonnes), or US $97.0 billion ($90.4 – $108.7 billion) in value. The current level of bad subsidies is US$ 19.2 billion. These result in a net present value (NPV) of resource rent over 8 years under the status quo to be a loss of US$ 98.7 billion. In contrast, assuming that Target 6 is successfully achieved by 2020, and that bad subsidies are eliminated, NPV of resource rent was estimated to be US $188.5 billion ($175.1 – $223.6 billion). This results in a net gain of resource rent by achieving

Target 6 relative to the status quo to be US$ 287.2 billion ($273.8 – 322.3 billion) by 2020.

Target 11 - No-take MPAs have been shown to offer numerous benefits that most other marine conservation strategies cannot claim. They include:

- Preservation of representative samples of biological diversity;
- Protection of critical sites for reproduction and growth of species;
- Protection of sites with minimal direct human stress to maximise their resilience or self-repair from other stresses such as increased ocean temperature;
- Settlement and growth areas providing spill-over recruitment to fished stocks in adjacent areas;
- Focal points for education about the nature of marine ecosystems and human interactions with them;
- Sites for nature-based recreation and tourism; and
- Undisturbed control or reference sites serving as a baseline for scientific research and for design and evaluation of management of other areas.

Target 16 - By enhancing legal certainty and promoting benefit-sharing, the Nagoya Protocol encourages the advancement of research on genetic resources which could lead to new discoveries for the benefit of all. It creates incentives to conserve and sustainably use genetic resources, and thereby enhances the contribution of biodiversity to development and human well-being. By setting-out clear provisions on access to traditional knowledge associated with genetic resources, it will assist in strengthening the ability of indigenous and local communities to benefit from the use of their knowledge, innovations and practices. It will also provide incentives for the promotion and protection of traditional knowledge by encouraging the development of community protocols, minimum requirements for mutually agreed terms and model contractual clauses related to access and benefit-sharing of traditional knowledge associated with genetic resources.

Target 18 - There is a growing appreciation of the value of traditional knowledge. This knowledge is valuable not only to those who depend on it in their daily lives, but to modern industry and agriculture as well. Many widely used products, such as plant-based medicines, health products and cosmetics, are derived from traditional knowledge. Other valuable products based on traditional knowledge include agricultural and non-wood forest products as well as handicraft. The skills and techniques of indigenous communities provide valuable information to the global community and a useful model for biodiversity policies.
Source: Cluster reports

VI TARGET BY TARGET ASSESSMENT OF RESOURCE NEEDS FOR ACHIEVING THE AICHI TARGETS

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.

ACTIONS

The assessment is based on seven proposed actions to meet this Target, including a baseline survey of awareness (and future monitoring), a national communication / awareness strategy and then five further specific awareness raising activities, which include:

    i. Running a mass media campaign
    ii. Training programmes
    iii. Integration of biodiversity into education
    iv. Workshops
    v. Events

METHOD OF APPROACH

The assessment has involved identifying examples of similar activities and their costs from different country contexts to determine the average resource needs associated with each activity. By applying various assumptions, indicative unit costs per country were estimated, which have then been scaled up to arrive at a global estimate. Different assumptions were applied to different types of countries (i.e. 124 higher and 90 lower income countries, using the World Bank classification, totalling 214 countries in the world). We have assumed that investment costs include conducting a baseline survey of awareness and developing a national awareness-raising strategy. The other activities (and further monitoring of awareness) were considered as on-going or recurrent costs. We have developed a high and low cost scenario, based on different assumptions for the recurrent costs. We have assumed that all countries implement all activities. This may not be necessary or appropriate in some contexts.

PROGRESS/RESULTS

The assessment has been completed in draft, for discussion. It is hoped that further data might be identified through desk research and consultation with stakeholders. A preliminary estimate is that meeting this Target will require a global investment of US$0.06 billion between 2013 and 2015, followed by recurrent expenditures of between US$0.8 and 2.6 billion between 2015 and 2020. These estimates break down as follows:

Expenditure	Per higher income country (US $ million)	Per lower income country (US $ million)	Global cost (US $ billion)
Investment (2013-2015)	0.26	0.28	0.06
Recurrent (2015-2020): high cost scenario	12.4	11	2.5
Recurrent (2015-2020): low cost scenario	3.3	3.7	0.75
Total (high cost scenario)	12.7	11.3	2.6
Total (low cost scenario)	3.6	4.0	0.8

DISCUSSION

The estimates are only speculative given that there is considerable flexibility in the way in which these activities could be implemented; many of the activities will have to be designed to suit specific needs or audience types, which cannot be determined a priori. Nonetheless, the estimates are based as far as possible on similar activities and their costs. The costs have been estimated with a reasonable level of confidence. In some cases, however, the range of possible variables that could influence the costs in practice does reduce the level of confidence (e.g. the cost of a mass media campaign). It is best therefore to treat the assessment as a "menu" of costed options that provides indicatives costs of different activities which can then be combined or adapted to suit the needs of each country's context. Raising awareness can potentially have significant benefits, if this translated into a change in attitudes or changes in behaviour. There is, potentially, considerable scope for innovative funding sources to be used in some of the awareness-raising activities.

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

ACTIONS

The assessment is based on three proposed actions to meet this Target:

1. National assessments of biodiversity values – through a programme of TEEB-like studies in all countries.

2. Actions to raise awareness of the values of biodiversity among policy makers, and to integrate them into a range of relevant policies, strategies and processes.

3. Specific initiatives to integrate biodiversity into national accounting and reporting systems.

PROGRESS/RESULTS

The assessment has been completed in draft, for discussion. Further data are being sought from the WAVES partnership for Action 3.

A preliminary estimate is that meeting this Target will require a total investment of between US$308 and US$704 million between 2013 and 2015, followed by recurrent expenditures of between $50 million and US$100 million per annum. Total resource needs over the 2013-2020 period are estimated at between US$561 million and US$1.2 billion. These estimates break down as follows:

Costs (US$ million)	Low investment scenario	Medium investment scenario	High investment scenario
Investment needs	307.9	505.8	703.8
On-going annual expenditures	50.7	70.2	99.5
Total resources (2013-2020)	561.4	856.8	1201.0
Average annual resource needs (2013-2020)	70.2	107.1	150.1

DISCUSSION

The estimates are somewhat speculative because there is some flexibility in the scale of effort that could be devoted to the different activities identified. However, the actions identified are based on current programmes of international activity, for which the ranges of costs are known, and the likely magnitude of investments and ongoing expenditures required is therefore unlikely to diverge substantially from that estimated. Overall, the estimates should be regarded as conservative.

The Target will enhance the conservation of biodiversity and ecosystem services, delivering a wide range of benefits for people and the economy, contributing to sustainable livelihoods and promoting the long term sustainability of development.

There is scope to secure funding from a range of sources such as governments, businesses and international development agencies, building on the international partnerships already established to finance the TEEB and WAVES initiatives.

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.

ACTIONS

The assessment is based on four proposed actions to meet this Target:

1. National studies to develop inventories of biodiversity harmful incentives, set out the case for reform, identify and appraise reform options, and establish action plans for the removal or reform of these incentives.
2. Policy actions to advocate reform proposals within governments, undertake legal analyses and impact assessments, develop and implement reform packages, and engage with affected stakeholders.
3. Studies to identify and appraise options for positive incentives for biodiversity, and to develop action plans for their introduction.
4. Capacity building measures and pilot projects to develop and test positive incentive measures.

METHOD OF APPROACH

The assessment has involved identifying average resource needs per country for each of the actions listed above, and scaling this up to global level. Three investment scenarios were developed, assuming that all of these actions are required for 50 (low investment), 100 (medium investment) or 150 countries (high investment).

PROGRESS/RESULTS

The assessment has been completed in draft, for discussion. A preliminary estimate is that meeting this Target will require a total investment of between US$434 million and US$1.3 billion, followed by recurrent expenditures of between US$5 million and US$15 million per annum. Total resource needs over the 2013-2020 period are estimated at between US$460 million and US$1.4 billion. These estimates break down as follows:

Costs (US$ million)	Low investment scenario	Medium investment scenario	High investment scenario
Investment needs	434.0	877.0	1329.0
On-going annual expenditures	5.0	10.0	15.0
Total resources (2013-2020)	459.0	927.0	1404.0
Average annual resource needs (2013-2020)	57.4	115.9	175.5

DISCUSSION

The estimates are somewhat speculative because there is some flexibility in the scale of effort that could be devoted to the different activities identified. However, the costs of these actions are relatively small. Unit cost estimates for Action 4 have been assessed with a greater degree of uncertainty, being based on proposals in the GEF 6 needs assessment. Overall, estimates can be regarded as conservative given the scale of the challenge in reforming negative incentives and in developing positive incentives. The Target will deliver a range of benefits, including the protection of biodiversity, maintenance of ecosystem services, improvements in economic efficiency and budgetary savings.

There is scope to secure funding from a range of sources such as core biodiversity budgets, government departments, beneficiaries through PES schemes and development agencies.

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.

ACTIONS

The assessment is based on four proposed actions to meet this Target:

1. International collaborative studies to assess the impacts of production and consumption of different products on biodiversity, to define ecological limits, and to specify action that governments, businesses and other stakeholders can take to achieve SCP.
2. National level studies focusing on key impacts of consumption and production patterns on biodiversity at the national level, in order to identify priorities for action and the potential role of different actors in the public and private sectors.
3. Development of national SCP action plans, involving collaboration between government, businesses and stakeholder groups, designed to ensure that national production and consumption respects ecological limits.
4. Development of national public procurement strategies designed to ensure that government purchasing helps to keep the impacts of use of natural resources within safe ecological limits.

METHOD OF APPROACH

The assessment has involved identifying average resource needs per country for each of the actions listed above, and scaling this up to global level. Three investment scenarios were developed, based on the following assumptions:

1. For international studies: 10, 15 or 20 studies undertaken, including research, events and project management
2. National studies in either all 195 countries, or prioritising 100 countries.
3. National SCP action plans for either all 195 countries, or prioritising 100 countries.
4. National procurement strategies for either 100, 150 or all (195) countries, based on the costs of employing a policy advisor and conducting feasibility studies and workshops.

PROGRESS/RESULTS

The assessment has been completed in draft, for discussion. A preliminary estimate is that meeting this Target will require a total investment of between US$95 million and US$185 billion, followed by recurrent expenditures of between US$8 million and US$15 million per annum. Total resource needs over the 2013-2020 period are estimated at between about US$130 million and US$260 million. These estimates break down as follows:

Costs (US$ million)	Low investment scenario	Medium investment scenario	High investment scenario
Investment needs	94.9	173.8	184.9
On-going annual expenditures	7.8	13.3	15.3
Total resources (2013-2020)	133.9	240.0	261.3
Average annual resource needs (2013-2020)	16.7	30.0	32.7

DISCUSSION

The largest expenditures are required for action 2 (40% of the estimated overall costs). The estimates are somewhat speculative because there is some flexibility in the scale of effort that could be devoted to the different activities identified. However, the costs of these actions are relatively small, so that the assumptions employed will not have a large impact, in absolute terms, on the overall assessment of the resources required to meet the Aichi Targets. Overall, estimates can be regarded as conservative.

The Target will deliver a range of benefits, including helping to conserve biodiversity, maintenance of ecosystem services, delivering sustainable patterns of economic development and business benefits (reputational benefits, cost savings, market positioning and access to finance).

There is scope to secure funding from both core biodiversity budgets and businesses.

TARGET 5: By 2020, the rate of loss of [wetlands] is at least halved and where feasible brought close to zero, and degradation and fragmentation is significantly reduced (Target 5 addresses all natural habitats, including forests. The CSE analysis, however, is limited to the wetland component)

ACTIONS

The assessment is based on five proposed actions to meet this Target:

1. Removing harmful subsidies and other forms of public support for non-essential infrastructure that impinges on natural wetland habitats.
2. Implementing "no net loss" standards and associated wetland banking systems similar to effective programs managed in the United States and European Union.
3. Providing cost share assistance for agriculture and forestry best management practices to protect wetland communities affected by these land uses.
4. Improving national wetland inventory, monitoring and enforcement capabilities.
5. Increasing the amount of wetlands of international importance designated under the Ramsar Convention or otherwise protected in national wildlife refuges, parks, or conservation units.

METHOD OF APPROACH

The analysis focuses on a 50% reduction. The assessment first calculated the baseline rate of loss for major wetland communities so that Target 5 can be translated into hectares conserved (i.e. loss prevented) per year and totalled over the 2012 – 2020 period. The activity list was then refined into discrete means of implementation and then identified major cost considerations for each, based on various assumptions. Unit costs (high and low) were estimated based on a review of available data sources and a translation of that data into common units. Three cost scenarios were then developed to reflect the likely upper and lower limits of the annual resource needs for delivering the Target, based on different proportions of the annual target conserved by private entities by way of wetland credit purchases or public entities by way of land or development right acquisition (PES) and associated management costs.

PROGRESS/RESULTS

A summary of the assessment has been completed in draft, for discussion. A preliminary estimate is that meeting this Target will require an annual global investment of between US$46 billion to US$109 billion. These estimates break down as follows (US$ billion / year):

	Scenario 1: Minimize public costs (US$ billion / year)	**Scenario 2: Equal distribution** (US$ billion / year)	**Scenario 3: Minimize private costs** (US$ billion / year)
Acquisition	6.31	12.62	18.92
Management	5.71	4.20	2.70
Private costs	108.11	72.08	36.04
Cost savings	11.40	11.40	11.40
Net costs	**108.73**	**77.50**	**46.27**

DISCUSSION

Results indicate that achieving the wetland loss reduction target primarily through wetland banking or other forms of compensatory mitigation by private parties designed to meet a no net loss standard is likely to be the most expensive approach. It should be noted that the scenarios selected are just three of a large number of scenarios that could be run with the existing data. Unit costs, annual conservation targets, the distribution of those targets between public and private programs, the mix of public programs, and the annual hectares conserved through cost savings measures are all parameters that can be varied to create other scenarios that could provide an even wider range of overall costs. A discussion of the data gaps and shortcomings, benefits associated with meeting the Target, and different funding sources will be included in the next stage of the assessment.

TARGET 6
By 2020, all fish and invertebrate stocks 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 impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe limits.

ACTIONS
The assessment is based on two main sets of actions to meet this Target:

1. Costs of reducing fishing effort (investment/transition cost)

2. Costs of management

METHOD OF APPROACH
The method was divided into four components:

1. Estimating size of global fishing fleet
2. Estimating effort reductions required to achieve Maximum Sustainable Yield (MSY)
3. Estimating the costs of fisheries management to ensure sustainable fisheries (operation cost)
4. Estimating the cost of rebuilding global fisheries to achieve MSY (transition cost)

PROGRESS/RESULTS
A preliminary estimate is presented below:

	Investment (US$, 2012 to 2020)	Recurrent expenditures (US$ 2012-2020)
1. Costs of reducing fishing effort	130-292 billion (mean 203 billion)	
2. Costs of management		65-84 billion
Total	US$278.8 billion ($194.9-376.3 billion)	

DISCUSSION
The task of estimating the global cost of achieving Target 6 is inherently challenging given the available data and resources for this study. However, estimates used synthesised data from some of the most comprehensive databases of global fisheries catch, effort and economics available to use. The most uncertain component is the management cost required to achieve sustainable fisheries. Improved quantitative estimates of this may require country-by-country analysis to be conducted in future studies.
The estimates support large economic benefits to be obtained from achieving Target 6, from restoration of productivity of over-exploited and depleted stocks to maximise sustainable yield as well as reduction of excess capacity and elimination of harmful subsidies. The study estimates a potential net gain of resource rent relative to the status quo to be US$ 287.2 billion ($273.8-322.3 billion) by 2020.
The current level of perverse subsidies is estimated at US$19.2 billion per year. This could be used to contribute 54% (40-77%) of the cost required to achieve Target 6.

TARGET 7- i) AGRICULTURE
By 2020, areas under agriculture, aquaculture and forestry are managed sustainably, ensuring conservation of biodiversity

INTERPRETATION AND ACTIONS

There is no standard technical definition of agricultural sustainability that is universally applicable in global farming systems. Thus, a broad definition of sustainable intensification (SI) in agriculture will be used. An extensive review of the SI literature will be conducted with the aim of identifying key cost actions.

[*List of actions to be inserted*]

METHOD OF APPROACH

The method of approach will include:

  i)   Identification of a set of 10-20 actions that can be applied across a range of agricultural systems and can be costed individually
  ii) A broad cost calculation for each measure, identifying unit capital, operational and maintenance costs
  iii) For aggregation- an attempt to determine the applicability of measures to different regions of the world drawing on global databases of baseline agricultural production. Existing global aid databases will be accessed to check regional variability in measure costs.

PROGRESS/RESULTS

Progress so far has included:

  i)   Team discussion on essence of task and the definition of a methodology
  ii) Literature review completed
  iii) Currently developing a cost template
  iv) Currently scoping global agricultural/land use data bases

[*Detail in table below to be inserted*]

A preliminary estimate is that meeting this Target will require an investment of XX between 2013 and 2015, followed by recurrent expenditures of YYY per annum. These estimates break down as follows:

	Investment ($, 2013 to 2015)	Recurrent expenditures ($ p.a., 2016 onwards)
Total		

- **DISCUSSION**
  [*To be added in final draft*]
- This will include :
- Discussion of estimates of resource needs, including in terms of confidence in estimates produced and gaps;
- Benefits of delivering the Target
- Funding Opportunities

TARGET 7 ii) aquaculture	
By 2020 areas under agriculture, <mark>aquaculture</mark> and forestry are managed sustainably, ensuring conservation of biodiversity	

ACTIONS

The assessment focused on attaining the target 7 for marine and coastal aquaculture. The analysis focused on the cost of the following activities:

1. Crustacea- improved site selection; better management practices; integrated aquaculture/polyculture; closed production systems; mangrove restoration.

2. Finfish- improved site selection; dealing with pollution; integrated aquaculture; closed containment systems

METHOD OF APPROACH

Though other species groups were identified (e.g. molluscs, echinoderms and marine plants), farming of these are thought to have relatively small environmental impacts. The focus was on activities likely to have the most biodiversity impact.

PROGRESS/RESULTS

The table below summarises the results so far for both crustaceans and finfish

Species	Approximate cost
Crustaceans	Best management practices. **Low** Integrated aquaculture. **Low.** Closed containment. **High.** Based on case study (YSI Environmental) estimates of $992,000 per year Mangrove restoration. **Medium**. Estimate of $50 million likely to be highly conservative
Finfish	Improved feeding practices. **Low** Bio-filtration. **Medium to High** $6000 to $28,000 installation cost Integrated aquaculture. **Low** Profits likely to increase if additional species farmed are economically profitable Closed containment. **High**

DISCUSSION

The activities addressed – particularly integrated aquaculture and closed containment systems are still only practised on a small scale and as part of pilot operations. Thus, the information available provided cost estimates for pilot studies but, in most cases, was not enough for scaling up globally.
It is likely that both closed containment systems and integrated aquaculture will show profit in long term and demonstrating the efficiency and profitability of these systems (through research) would thus be an incentive for their introduction. [*More on benefits to be added*]
Funding for small scale operators and developing countries will likely come from governments, international organisations and farmer co-operatives, which are the same sources currently funding aquaculture [,*More to be added*]

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

ACTIONS

The assessment is based on seven proposed actions to meet this Target:

1. Increase wastewater treatment capacity to cover populations living upstream of dead zones without access to sanitation.
2. Reduce nutrient runoff from upstream agricultural operations through the use of best management practices.
3. Invest in urban stormwater retrofits for existing impervious surface areas.
4. Develop clean-up programs including mechanical cleanup of floating plastic debris and voluntary buy-back programs.
5. Invest in converting synthetic plastic production to biodegradable plastic production.
6. Install best available technologies for stationary sources of pollution including industries and coal-fired power plants.
7. Implement fuel efficiency standards for automobiles.

METHOD OF APPROACH

Baseline pollution levels and geographic areas of focus were quantified. Data on the different activities were then sought for both developing and developed countries. However, data was severely restricted in most cases to the United States, the European Union, Japan, and Canada, and did not distinguish between investment costs and on-going costs. Data was then used to obtain a rough estimate of the pollution reduction needed to deliver the Target, comparing the global baseline against the conservation target. A range of unit cost data for each pollution measure was estimated on the basis of what information could be identified. This analysis was then translated into total global cost estimates.

PROGRESS/RESULTS

A summary of the assessment has been completed in draft, for discussion. A preliminary estimate is that meeting this Target will require an annual global investment of between roughly US$140 billion to US$400 billion. These estimates break down as follows (US$ billion / year):

Activity	Annual global cost (US$ billion / year)
Eliminating harmful marine debris	25.59 – 44.46
Improved sanitation (incremental to existing programs)	39.84 – 60.67
Agricultural best management practices	66.18 – 151.63
Stormwater controls	3.26 - 137.21
Reducing harmful air pollution (incremental to existing programs)	6.00
Total	140.87 - 399.97

DISCUSSION

It should be noted that there are multiple ways to reconfigure the assumptions to generate significantly different estimates (e.g. by adjusting assumptions regarding the extent of air and sanitation goals to be met by non-Aichi related programs or by altering the mix of stormwater or agricultural best management practices (BMPs)) . Unit costs, annual conservation targets, the distribution of those targets between public and private programs, the mix of public programs, and the annual hectares conserved through cost savings measures are all parameters that can be varied to create other scenarios that could provide an even wider range of overall costs. A discussion of the data gaps and shortcomings, benefits associated with meeting the Target, and different funding sources will be included in the next stage of the assessment.

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.

ACTIONS

The assessment is based on three proposed actions to meet this Target:

1. Research and prioritisation of IAS and pathways to be targeted;
2. Control and eradication measures (including policy and legislation) to reduce existing IAS; and
3. Measures (including policy and legislation) to prevent new introductions.

METHOD OF APPROACH

Available data on IAS, IAS costs and country statistics were collected across the different activities listed above. Data on impacts and control of IAS on mainland areas were collated by country. Information on damage and control costs were recorded for each IAS, then these were summarised into fourteen groups of IAS. All costs were first converted to 2012 values using CPI index values published by the World Bank, then converted to US dollars.

PROGRESS/RESULTS

The assessment has been completed in draft, for discussion. A preliminary estimate suggests that meeting this Target will require a total investment of US$75 billion, followed by recurrent expenditures of US$73 billion to 2020. Total resource needs over the 2013-2020 period are estimated at about US$150 billion. These estimates break down as follows:

	Investment (US$ billion)	Recurrent expenditures (US$ billion) (to 2020)
Research and prioritisation	TBD	TBD
Control and eradication measures	1.39	54.30
Prevention measures	74.07	18.95
Total	**75.46**	**73.42**

DISCUSSION

Although the final estimates for research and prioritisation have not been calculated, they are unlikely to have a significant impact on overall costs (being in the rough order of magnitude of about US$1 million). The estimates are incomplete in that not all costs have been fully taken into account. However, a significant increase in global efforts can also be expected to increase efficiency and the reduce threats generally, thus potentially reducing the expenditures required over time. Furthermore, assuming that these programmes are efficient and effective, the prevention and control actions carried out during this period should lead to a reduction in recurrent expenditures in future periods. The estimates are likely to be in the right order of magnitude for the period under consideration

Benefits associated with meeting the Target, and different funding sources will be assessed in the next stage of the assessment. However, it is likely that the benefits will be significant given that, taking indirect impacts into account, the cost of damage associated with IAS has been estimated as being about 5% of global GDP, which equates to some US$6.5 trillion per annum. A more conservative estimate of damages of about 1.5% of GDP would equate to about US$2 trillion. The recurrent expenditure of $73 billion estimated in this study is equivalent to less than 4% of the more conservative estimate of damage costs.

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**
ACTIONS   The main actions were identified as integrated coastal zone management, sustainable marine resource use (e.g., fisheries), integrated watershed and wastewater management and the use of marine protected areas to conserve biodiversity, habitats and exploited populations. As both fisheries and MPAs are already covered by other targets (6 and 11), the costs for these actions for coral reefs were not assessed. Instead the cost estimation mainly focussed on habitat degradation caused by pollution and inadequate watershed and coastal zone management. A preliminary assessment of the costs of establishing and supporting community-based fisheries management for tropical inshore waters was also undertaken to complement the analysis conducted for Target 6 within this cluster.
METHOD OF APPROACH   This assessment focussed on **tropical shallow water coral reef ecosystems** and not any other ecosystems that are vulnerable to climate change. For Target 10 the level of activity needed to minimise an anthropogenic pressure needs to be defined. This assessment proposes an assumption that the term 'minimised' is equivalent to reducing the anthropogenic pressure to 80% of its initial level. The method of assessment consisted of two types of approach: **Assessment of Existing Costs-** A review of current and recent large-scale projects to establish or improve both Integrated Coastal Zone Management (ICZM) and Integrated Water Resource Management (IWRM) involving watershed or wastewater management was undertaken to determine the costs of such actions.   **Relative Estimation of Expenditure Needs-** WRI data was used to predict the relative level of spending required for each coral reef nation or territory and identify which countries and regions will require the greatest amount of investment to meet the target.
PROGRESS/RESULTS   No overall estimate of the financial resources required to meet Target 10 for tropical coral reef ecosystems has been produced in this study. However, project examples provided give an indication of the costs to establish and support some of the actions required to meet the target. [*More to be added]*
DISCUSSION   The main reason for not attempting to make a total estimate of resource needs was the large number of data gaps and future research needs for this topic, including: • Costs of government run small-scale fisheries management for inshore water of coral reef countries and the resource needs to enable sustainable management;   • Cost estimates for the sustainable management of coastal zone activities such as coastal development (construction) and tourism;   • Water quality information for coral reef catchment areas and associated management costs   • Information on other forms of pollution such as solid domestic waste (e.g. plastics), industrial waste and pollution from land or marine-based activities (e.g. mining or oil and gas);   • Current levels of wastewater treatment for coastal populations in coral reef regions or countries;   • Further information on innovative actions to reduce stressors such as the use of composting toilets, vermiculture and bio-gas generation from livestock waste;   • Annual maintenance costs for processes such as ICZM or IWRM which were often lacking from the selected examples   [*Benefits and Funding Opportunities to be added]*

TARGET 11 i) Marine Protected Areas
By 2020, at least 17 per cent of terrestrial and inland water areas and <mark>10 per cent of coastal and marine areas,</mark> 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 lands.

ACTIONS
The process of increasing protected area coverage incurs three types of costs:

1. Establishment costs

2. Management costs

3. Opportunity costs (not quantitatively assessed for this report)

METHOD OF APPROACH
Costs were assessed using two alternative methods of estimating existing global MPA coverage 1) Sum of self reported marine protected areas 2) GIS areas and self reported areas for remainder Extrapolation of the possible establishment costs was conducted using two peer reviewed models (McCrea-Strub et. al. 2011). Assessment of management costs used the Balmford et. al. (2004) model under several scenarios:

a) Simple method based on individual MPA areas
b) Stimulation of a situation where future establishment of the MPA network would encourage establishment of a greater proportion of larger MPAs
c) Adjusting for country-to-country variation in management costs due to changes in purchasing power

PROGRESS/RESULTS
The total level of investments required to achieve Target 11 according to the estimates in this report are summarised below. This assumes linear MPA network expansion from current 2.4% to 10% global coverage by 2020

	Annual marginal increase in cost – US$ billions	Total investment required 2012-2020- US$ billions
3. Establishment costs	0.14-1	1.5-9.7 Cumulative
4. Management costs	0.27-0.45	2.2-3.6 Annually
Total	0.41-1.45	

DISCUSSION
There are a number of caveats to the estimates presented including i) models used have required large extrapolations from existing data with small sample sizes ii) limitations of WDPA data including under-representation of small MPAs and variability in quality of reported data and iii) variability in inflation rates that could not be taken into account. However, the estimates appear to be commensurate with other assessments.

The estimated costs are substantial, however, relative to the wide benefits of achieving this target they appear affordable. Assuming the current global GDP is $70 trillion then the annual costs of managing an MPA network covering 10% of the oceans is only 0.0067% of the value of the worlds' economy, and the total estimated cost is less than the annual global fisheries subsidy.

Numerous benefits of achieving the target would include protection of biodiversity; increase in resilience; benefits to fisheries in adjacent areas; opportunities for education and nature based tourism and benefits for scientific research.

TARGET 11 ii) Terrestrial Protected Areas

By 2020, at least <mark>17 per cent of terrestrial</mark> 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 lands.

METHOD OF APPROACH

Given that the wording of Target 11 calls for protected area expansion to cover "areas of particular importance for biodiversity", and that expanding current protected areas (PAs) to cover unprotected Important Bird Areas (IBAs) would increase terrestrial PA coverage to just over 17% (the threshold for terrestrial coverage called for in the target) (Butchart et al. 2012), this study attempted to obtain a robust estimate of the total financial resources required to protect and effectively manage the global IBA network, based on a sampling approach.

1) For IBAs within existing PAs
- Data on required funding for effectively managing PAs from Bruner et a;. (2004) was matched with PAs and supplemented by data from additional sites to include site level management costs for 373 sites across 48 countries.
- A model was developed to assess the impacts of variables that might explain different in management costs
- The model was used to extrapolate to all existing PAs within IBAs

2) Protecting those IBAs that are currently unprotected

It was assumed for the purposes of this analysis that for all sites full opportunity costs of conservation would need to be paid . To estimate these, individual site level opportunities costs were obtained (Naidoo and Iwamura 2007) and country level means or regional level means used for additional sites.

PROGRESS/RESULTS

Effective management. Using the model to extrapolate to all existing protected areas within IBAs has yet to be fully completed. However, **provisional results suggest a total annual cost in the region of $10-15 billion.**

Opportunity costs of protecting those IBAs not yet protected were estimated at $69.2 billion annually. This currently excludes the actual costs of establishment.

Next steps will be as follows:

1. Use the model to finalise extrapolated management costs for all currently protected IBAs globally, and for all currently unprotected IBAs.
2. Add system-level costs
3. Scale the results to cover all KBAs.
4. Consider establishment and transaction costs for new PAs
5. Compare required expenditure with published and collated estimates of country or regional-level average current expenditure and/or shortfalls in funding.

DISCUSSION [To be added]

TARGET 12
By 2020 the extinction of known threatened species has been presented and their conservation status, particularly of those most in decline has been improved and sustained

ACTIONS
Costable actions were determined on a species by species basis for a large sample of Critically Endangered bird species and for a sample of Endangered and Vulnerable species through expert consultation [detail will be available in final report]

METHOD OF APPROACH
The target was defined in terms of the change of status necessary to qualify threatened species for a downgrading to a lower red list category of extinction risk, determining the minimum such change necessary given each of the Red List criteria under which species qualified. Information on recent and required expenditure on conservation actions was collected, through expert review for 211 (17% of) threatened bird species . The sample was stratified by distribution size and mean GDP of countries within each species distribution). Costs were extrapolated to the remaining threatened species using a model to account for a range of variables related to species traits and economic development of countries that species occurr in.

PROGRESS/RESULTS
The study so far estimates a total cost of **$15 billion annually to downlist all the world's 1,253 threatened bird species by one Red List category**. This estimate presented assumes no shared benefits, however, only around 15-20% of the required costs for the sampled species were for species-specific action, such as captive breeding. Most costs were for site and habitat protection likely to benefit co-occurring species. In its next steps, the study will attempt to account for shared costs among co-occuring species through a GIS analysis. Next steps will also include: • Use of bootstrapping to generate confidence limits around estimates of required costs for each species. • Estimate costs for developed and developing countries separately. • Extrapolate to all threatened taxa based on the fact that threatened birds comprise 6.4% of all known threatened species. Refer to literature on costs in other taxa to show how they compare to those for birds. Consider that the costs of some actions will be shared across taxonomic groups. • Separate the costs for Critically Endangered species only ('preventing extinctions'), and consider how much more would be required to downlist all species to non-threatened status.

DISCUSSION [To be added]

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.

ACTIONS

The assessment is based on 15 proposed actions to meet this Target. The categories of potential activities that have been identified include:

1. Programme development / strategic planning;

2. Economic development / creating incentives;

3. Legal / regulatory initiatives; and

4. Building and maintaining collections of plant and animal genetic materials, both in-situ and ex-situ.

METHOD OF APPROACH

Rather than attempt to provide a detailed global plan to meet the Target, the proposed approach seeks to consider the activities that may help meet the Target, by identifying organisations that are already engaged in these activities and their related programmes and projects in an attempt to assess the resources required to meet Target 13 through consultation with the organisations and a review of their funding and programme documents (e.g. needs assessments, annual reports, project reviews, funding projections). Resource requirement estimates will be based on three different ambition levels (scenarios) for each activity: 3 projects, 6 projects, or 9 projects.

PROGRESS/RESULTS

The assessment in currently ongoing, with further information and data being sought. Currently available evidence suggests that the total annual investment needs per project range from approximately US$300,000 to US$4.6 million, with almost all activities likely to fall within this range. Projects can focus on a single country, a number of countries, a region, or a specific theme.

If a selection of activities is chosen across the activity types proposed, then it is likely that projects from each category of activity might be undertaken at different levels of investment, i.e. at a minimum investment of US$300,000 per year, at a moderate investment of US$1 million per year; and at maximum investment of US$4.6 million per year.

Assessing different levels of ambition (involving different numbers of projects), suggests that global resource needs for meeting this Target will require between $166 million to $497 million over the 8-year funding period (2013 – 2020). See Table below.

Level of ambition (# of projects)	**Global resource needs ($ million, 2013 – 2020)**
9 projects (3 of each investment level)	165.6
18 projects (6 of each investment level)	331.2
27 projects (9 of each investment level)	496.8

DISCUSSION

The estimates above do not provide a break-down between one-time investments and on-going (yearly) expenditures. This will be assessed in the next stage of the project. A qualitative assessment of how the projects, and their costs, might be distributed across countries, regions or elements will also be included. Data gaps and shortcomings, benefits associated with meeting the Target, and different funding sources will be assessed in the next stage of the assessment.

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

ACTIONS

The assessment is based on five proposed actions to meet this Target:

1. Removal of subsidies and other forms of public support for harmful infrastructure such as dams and new road construction that destroy, fragment, or degrade ecosystems.
2. Investments in traditional ecological knowledge (TEK) or the factual knowledge about ecological systems, processes, and uses held by traditional and indigenous peoples.
3. Restoration of wetlands through the removal of dams, coastal dikes or new constructed wetlands.
4. Forest landscape restoration, which includes "restoring functionality and productive capacity to forests and landscapes in order to provide food, fuel, and fibre, improve livelihoods, store carbon, improve adaptive capacity, conserve biodiversity, prevent erosion and improve water supply."
5. Restoration and reestablishment of coral reefs.

METHOD OF APPROACH

The environmental baseline will be calculated, including baseline conditions and trends in terms of relevant metrics need to be established in order to quantify the magnitude of change sought. Data on the different activities were then sought for both developing and developed countries. A range of unit cost data for each activity will then be estimated on the basis of what information could be identified. This analysis was then translated into total global cost estimates.

PROGRESS/RESULTS

The list of activities has been refined. The activities are in the process of being costed (roughly 50% of the data is complete).

A preliminary estimate is that meeting this Target will require an investment of XXX between 2013 and 2015, followed by recurrent expenditures of YYY per annum. These estimates break down as follows (to be completed):

	Investment ($, 2013 to 2015)	Recurrent expenditures ($ p.a., 2016 onwards)
1.		
2. Etc.		
Total		

DISCUSSION

Data gaps and shortcomings, benefits associated with meeting the Target, and different funding sources will be assessed in the next stage of the assessment.

[*Target 15 to be added*]

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 level legislation

ACTIONS

Actions required to meet target 16 at a minimum level of ambition:

1. Deposit the instrument of ratification, acceptance, approval or accession of the Nagoya Protocol

2. Revise legislative, administrative or policy measures already in place or develop new measures in order to meet the obligations set out under the Protocol.

3. Put in place the institutional structures required for implementing the Protocol, including a national focal point, one or more competent national authorities and one or more check points.

Additional actions required to meet Target 16 at a higher level of ambition:

4. Action: Building the capacity and providing the means for effective implementation of the Protocol

METHOD OF APPROACH

The assessment was mainly based on SCBD in house expertise using the following main sources of information to identify and cost actions and supporting activities:

- Estimates of costs of ABS capacity building activities in the " Full assessment of the amount of funds needed for the implementation of the Convention for the sixth replenishment period of the trust fund of the GEF"

- Information from the GEF funded projects for development of national biosafety frameworks

- Priority activities identified by the Intergovernmental Committee for the Nagoya Protocol in relation to the GEF sixth replenishment period 2014-2018

PROGRESS/RESULTS

The following table summarizes the estimated resources required per country for meeting target 16 according to the different level of ambition in relation to the interpretation of the target as explained in section 2 above.

Estimated resources required at a minimum level of ambition per country	Estimated resources required at a higher level of ambition per country
280.000-590.000 USD	680.000-1.590.000 USD

DISCUSSION

Limitations of this study include the fact that the Nagoya Protocol is a new international treaty adopted in October 2010, and as a new instrument there is limited information available on assessment of resources needed with a view to make it operational. In addition, there is a great variety of country needs and circumstances for making the Protocol operations at the national level.

Benefits of delivering the Target

By enhancing legal certainty and promoting benefit-sharing, the Nagoya Protocol encourages the advancement of research on genetic resources which could lead to new discoveries for the benefit of all. The Nagoya Protocol also creates incentives to conserve and sustainably use genetic resources, and thereby enhances the contribution of biodiversity to development and human well-being.In addition, the Nagoya Protocol will assist in strengthening the ability of indigenous and local communities to benefit from the use of their knowledge, innovations and practices.

[*Target 17 to be added*]

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.

ACTIONS

Global actions through the CBD Secretariat:

1) BE Trust Fund- for the biennial meetings of the ad hoc open ended Working Group on Article 8(j) and related provisions
2) Capacity building Meetings and Workshops (Train the Trainer Methodology)
3) CEPA and Communications related to Article 8(j) and related provisions
4) Expert Studies and meetings as required
5) Expert meetings and Operationalizing indicators established for Article 8(j)
6) Effective participation of ILCs -VB Trust Fund

Main actions required to meet the target by Parties:

1) National level strategies, including sui generis systems, for promoting/protecting traditional knowledge and the customary sustainable use of biological diversity
2) Capacity building initiatives to foster effective participation of ILCs in the implementation of Article 8(j), 10(c) and related provisions at regional, national and sub-national levels.
3) Capacity building for implementation of Articles 8(j), 10(c) and related provisions and its application in ecosystem management including through ILC self-management and co-management of Protected Areas and recognition and support for indigenous community conservation areas (ICCAs) and rights to customary sustainable use of biodiversity

METHOD OF APPROACH

The above resource assessment for global actions by the Secretariat is based upon previous costs of similar work projected up to 2020, taking into account the revised programme of work and the emphasis of the plan of action on capacity building. The estimated costs for actions taken by Parties is based on COP decisions relating to the implementation of Articles 8(j), 10(c) and related provisions, taking into account to cost to developing and least developed countries only

PROGRESS/RESULTS

A preliminary estimate is that meeting this Target will require an investment of **$78,200,000 USD for the period 2013 to 2020**; followed by recurrent expenditures as captured by the global actions through the Secretariat of **$7,560,000 USD for the period 2013 to 2020 or $9,450,000 USD annually**.

DISCUSSION

Estimates of resource needs based on developing and least developed countries/Parties and do not take into account to costs of developed Party/country implementation of Target 18.

Benefits [To be added]
Potential sources of financing:

All activities listed under the Global Main Actions through the Secretariat are funded through voluntary funds from mostly traditional donor countries. Potential sources of further funding could be non-traditional donors, including emerging and developing economies and economies in transition or even the private sector. At this time, funds for developing and least developed Parties are mainly sources through GEF and do not target Article 8(j) or 10(c) related activities.

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
ACTIONS

1) At national level
    i)   Observation
    ii)   Individual and institutional capacity building and strengthening
    iii) Enabling activities
2) At regional level e.g. BioNETs regional networks
3) At global level
    i)   Global work on data collection
    ii)   Promoting scientific and technological cooperation
    iii) Strengthening the global science-policy interface

METHOD USED
The assessment builds on and amends the financial needs assessment for implementing the Strategic Plan for Biodiversity 2011-2020 and Aichi Biodiversity targets undertaken by the GEF Secretariat for the 6th replenishment cycle, complemented with existing or proposed budgets for major regional and global programmes as mechanisms.

PROGRESS/RESULTS
For 2012-2020
National activities: evaluated at three levels of ambition
    a) Implementing this activity in 100 countries would require $325 million US
    b) Implementing this activity in 155 countries would require $503.75 million US
    c) Implementing this activity in all countries would require $633.75 million US
Sub-regional and regional activities: evaluated at three levels of ambition
    a) $2 million US per year for 20 regional or sub-regional programmes, which would require $320 million US;
    b) $3 million per year for 30 regional or sub-regional programmes, which would require $720 million US:
    c) $3 million for 40 regional or sub-regional programmes, which would require $1.2 billion US.
Global activities: evaluated at three levels of ambition
    a) total requirements of $180 million US.
    b) total requirements of $288 million US.
    c) total requirements of $338 million US.
All activities: evaluated at three levels of ambition
    a) Low ambition: $825 million US (or $103 million US per year)
    b) Medium ambition: $1.516 billion US (or $190 million US per year);
    c) High ambition: $2.171 billion US (or $271 million US per year).

DISCUSSION
[To be added]

[*Target 20 to be added*]

VII Potential next steps

2   This section will make recommendations on potential next steps, including further work that might be considered useful to be conducted after COP 11 to assist the Conference of Parties to understand the required level of investment and ongoing costs to implement and meet the Aichi Biodiversity Targets; and to feed into the ongoing work to implement the Strategy for Resource Mobilization.

Considerations that will inform discussion of this section are likely to include:

- Gaps in coverage of the target clusters that were established for the underpinning research

- Gaps in information and data highlighted by target-by-target assessments and by the aggregated assessment

- The need for a more comprehensive global assessment (given the time and resources available for this study), involving wider stakeholder consultation and input

- The need for a more comprehensive assessment of the benefits of meeting the Aichi Targets and of potential sources of additional finance

- The need for further investment and progress on country level financial needs assessments, linked to the revision of National Biodiversity Strategies and Action Plans

- The balance between, and relative merits of 'top down' and 'bottom up' assessments

References

[To be added]