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REPORT OF THE HIGH-LEVEL PANEL ON GLOBAL ASSESSMENT OF RESOURCES FOR IMPLEMENTING THE STRATEGIC PLAN FOR BIODIVERSITY 2011-2020

Executive Summary

Note by the Executive Secretary

INTRODUCTION

1. In its recommendation 4/2, the Ad Hoc Open-ended Working Group on Review of Implementation of the Convention welcomed the establishment of a high-level panel on global assessment of resources for implementing the Strategic Plan for Biodiversity 2011-2020 and invited it to report to the eleventh meeting of the Conference of the Parties. Accordingly, the Executive Secretary is circulating herewith the executive summary of the first global assessment of resources required undertaken by the High-Level Panel. The Governments of India and the United Kingdom co-sponsored this global assessment, which was prepared in order to inform discussions on targets.
2. The key messages of the Panel's assessment are reported on in the note by the Executive Secretary on the review of implementation of the strategy for resource mobilization, including the establishment of targets (UNEP/CBD/COP/11/14/Rev.1). The full report is provided as an information document (UNEP/CBD/COP/11/INF/20).
3. The document is being circulated in the form and language in which it was produced by the High-Level Panel.

* Reissued to incorporate the corrections to the figures in paragraph 29 on page 12 below and the entries under targets 5, 7 and 15 in table ES2 as contained in document UNEP/CBD/COP/11/14/Add.2/Corr.1 of 25 September 2012.

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Annex

**EXECUTIVE SUMMARY OF THE REPORT OF THE HIGH-LEVEL PANEL ON GLOBAL
ASSESSMENT OF RESOURCES FOR IMPLEMENTING THE STRATEGIC PLAN FOR
BIODIVERSITY 2011-2020**

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United Kingdom	Mr Jeremy Eppel, Mr James Vause and Ms Sarah Nelson (Department for Environment, Food and Rural Affairs [Defra])
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REPORT CONTRIBUTORS

The development of this report has been supported by a synthesis team comprising Sarah Smith, Melissa Jaques and Jerry Harrison (UNEP World Conservation Monitoring Centre) and Matt Rayment and Mavourneen Conway (ICF GHK), with Ravi Sharma, David Cooper, Markus Lehman and Kieran Noonan-Mooney (Secretariat of the Convention on Biological Diversity) to assist the work of the High-Level Panel.

It brings together the findings of studies examining the resources required to deliver different clusters of Aichi Biodiversity Targets. The cluster leads and contributors are as follows:

Cluster	Lead/Contributor
Awareness Raising (Target 1)	Mavourneen Conway (ICF GHK)
Macroeconomics (Targets 2,3,4)	Matt Rayment (ICF GHK)
Forestry (Targets 5,7,11,15)	Patrick Hardcastle (Forestry Development Specialist) and Niklas Hagelberg (United Nations Environment Programme)
Water, pollution and ecosystem services (Targets 5,8,14)	John Talberth and Erin Gray (Centre for Sustainable Economy)
Marine (Targets 6,7,10 and 11)	Simon Harding (Independent Consultant; Marine Cluster Lead and Target 10 – Coral Reefs), Marjo Vierros (United Nations University; Target 7 – Aquaculture), William Cheung (University of British Columbia; Target 6 – Fisheries) and Ian Craigie (James Cook University; Target 11 – MPAs) and Pippa Gravestock (Independent Consultant; Target 11 – MPAs)
Agriculture (Target 7)	Dominic Moran, Charlotte Leggett and Salman Hussain (Scottish Agricultural College)
Invasive Alien Species (Target 9)	Jane Turpie and Clova Jurk (Anchor Environmental Consultants), Brad Keitt and Nick Holmes (Island Conservation)
Protected Areas (Target 11)	Jamison Ervin (United Nations Development Programme) and Sarat Gidda (CBD Secretariat)
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Genetic Diversity (Target 13)	Elta Smith (ICF GHK)
Enabling Actions (Targets 16 to 20)	Ravi Sharma, Markus Lehmann, Valerie Normand, John Scott, David Duthie, Edjigayehu Seyoum-Edjigu, Beatriz Gomez and David Cooper (CBD Secretariat)

KEY MESSAGES

- **Implementation and delivery of the Aichi Biodiversity Targets requires the development of an appropriate and coherent political and institutional framework, and strong political will, particularly at national and regional levels.**
- **Investment in ‘natural capital’ will deliver significant co-benefits for sustainable development.** Expenditure to meet the Aichi Biodiversity Targets should be recognised as part of wider investment needs for promoting sustainable development.
- **Existing evidence suggests that benefits are likely to significantly outweigh costs.** Without immediate action, the social and economic costs of biodiversity loss and the loss of ecosystem services will be felt at an accelerating rate in the future and will limit growth and stability. Investments made now will reduce resource requirements in the future.
- **There are clear differences in the relative scale of investment required to deliver the various Targets. In addition, the investment needed to deliver a Target is not necessarily correlated to its importance.** Some Targets which require relatively little investment are actually crucial in helping to deliver other Targets. Some may seem less resource-intensive, but could be more difficult to achieve, particularly if they require changes in institutions, policies, priorities, attitudes and behaviour. The scales of investment can be broadly summarised as:
 - *Significant investment required:* For those Targets specifically aimed at addressing the drivers of biodiversity loss and ecosystem restoration, the required total global investment over the period 2013 to 2020 is in the order of several hundreds of billions of (US) dollars. Targets in this group fall under Strategic Goals B and D (excluding Target 16).
 - *Moderate investment required:* Targets associated with required conservation work will require total global investment over the period 2013 to 2020 in the order of hundreds of billions of (US) dollars for Target 11 (i.e. establishing and maintaining protected areas) and in the order of tens of billions of (US) dollars for the other Targets of Strategic Goal C.
 - *Low investment required:* Targets related to improving and creating necessary enabling conditions are likely to be much less resource-intensive. For these Targets, the total global investment needs over the period 2013 to 2020 will more likely be in the order of billions of (US) dollars. These Targets mostly relate to Strategic Goals A and E, as well as Target 16.
- **Many factors affect the magnitude of the estimates of the total investment and ongoing expenditure needed to achieve each of the Targets.** These include the scope of the actions and activities identified for each Target and the potential synergies among Targets as well as uncertainties arising from limitations in data and methodologies.
- **There are many inter-linkages and co-dependencies to consider, both between the Targets themselves, and between the Targets and other national policy goals.** The investment needs of one Target will often be influenced by the approach, resourcing and effectiveness of the delivery of others. Understanding these inter-linkages and co-dependencies across Targets and between Targets and policy goals for poverty alleviation, human health, agriculture, freshwater, desertification, fisheries, etc, is important in order to prioritise action and should be considered a crucial area for further work.
- **Funding from a diverse range of international and national sources, and across different policy areas, is required to secure the full range of economic and social benefits to be gained from meeting the Aichi Biodiversity Targets.** Sources of financing will include a wide range of public funding and development of innovative measures and conservation incentives such as payments for ecosystem services (PES), conservation agreements, water fees, forest carbon offsets, and green fiscal policies, as well as private sector investment.
- **Further research and analysis is vital to help further develop and refine these estimates.**

INTRODUCTION

Introduction to the High-Level Panel and the resource assessment

1. The report has been prepared by the High-Level Panel on Global Assessment of Resources for implementing the Strategic Plan for Biodiversity 2011-2020 in order to inform discussions at the eleventh Conference of the Parties (COP 11) to the Convention on Biological Diversity (CBD) on resources required to achieve the Strategic Plan for Biodiversity 2011-2020 and to achieve the Aichi Biodiversity Targets. This Executive Summary is provided as an addendum to document UNEP/CBD/COP/11/14. The full report of the Panel is available as information document UNEP/CBD/COP/11/INF/20.
2. The High-Level Panel, co-sponsored by the governments of the United Kingdom (UK) and India, was established to contribute to the understanding of the global resources required for the Strategic Plan on Biodiversity 2011-2020 and to achieve the Aichi Biodiversity Targets. The establishment of the Panel was welcomed by the fourth meeting of the Ad Hoc Open-Ended Working Group on Review and Implementation of the Convention (WGRI 4) under recommendation 4/2; at this meeting the Panel was invited to report to COP 11 on its findings.
3. The report by the Panel provides a first assessment of the costs of meeting the Aichi Biodiversity Targets by 2020, drawn from underpinning research conducted by experts working on specific Targets or thematic 'cluster' groups of Targets. The assessment is a presentation of the range of actions and activities that would make a significant difference in delivery of the Aichi Biodiversity Targets, and the range of estimates for their associated resource needs. The variety of actions and activities chosen for the assessment of resource needs required vary significantly across each Target or cluster of Targets, and this variance is thus reflected in the estimates.
4. To some extent the report also identifies and explores possible sources of financing, such as fiscal policy instruments, mainstreaming of biodiversity, reform of perverse subsidies, positive incentives, role of the private sector, and so forth. It aims to build on and complement 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).
5. The work of the Panel is designed to contribute to the ongoing discussions on biodiversity financing that have been a focus for the CBD for some time, particularly since the adoption of the strategy for resource mobilization in support of the achievement of the Convention's objectives at the ninth Conference of the Parties (COP 9) to the CBD in 2008 (decision IX/11). The strategy set in train further discussions for the development of targets and indicators for resource mobilisation as well as other requirements for activities and initiatives to implement the strategy. As such, COP 11 is expected to adopt, inter alia, targets to mobilize financial resources from all known sources within the ambit of biodiversity financing, as well as resolve to identify sources allocated to adjacent policy areas such as freshwater management, combating desertification, improving agricultural resilience, etc which, although not their primary goal, will help achieve the Aichi Biodiversity Targets and support implementation of the Strategic Plan for Biodiversity 2011-2020.
6. Despite the range of work available on the current level of finance available for biodiversity conservation and on the costs of overall loss of biodiversity and ecosystem services, there have not been detailed estimates and assessments prepared in recent years on the global costs of, and resources required for, biodiversity conservation and sustainable use, and the fair and equitable sharing of benefits arising from the use of genetic resources. While it is well understood that mobilisation of resources (financial, human, institutional and technical) will be required to successfully reach the Targets, to date the amount of resources required to achieve the Targets, in terms of financial needs and transformational efforts, has been unknown. Against this background, the Panel's work is

intended to provide a first assessment that could help inform discussions at COP 11 on resource requirements to meet the Aichi Biodiversity Targets.

7. The objective of the Panel was therefore:
 - i) at the global level, to provide as robust an assessment as possible of the resources needed to achieve the twenty Aichi Biodiversity Targets recognizing that a comprehensive assessment may not be possible in the timeframe prior to COP 11, but a credible assessment of current knowledge would still 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 suggestions for future work which would help Parties better understand how they can finance the Strategic Plan for Biodiversity 2011-2020.
8. In developing this independent report, the Panel met formally in person on one occasion and by teleconference on four occasions. In addition, Panel members were engaged on an ongoing basis in discussions with teams conducting the underpinning research. The report draws significantly on the underpinning research and estimated costs provided by independent experts in their reports on each Target or clusters of Targets.
9. It is recognised that activities currently underway or that will be undertaken in the future in pursuit of the Targets will differ by country depending on their national priorities and circumstances, as will the costs of these activities. As far as possible, the assessment sought to understand differences in the types of activities and levels of resource needs in different parts of the world; however, because the approach for most Targets has been relatively broad rather than highly detailed, some caution is needed in interpreting the results. There are gaps and limitations in the data, understanding and methodologies underpinning this assessment and thus it should not be taken as a precise and comprehensive assessment. The assessment was also conducted within a limited timeframe and with limited resources available.
10. It will be helpful in future to compare and contrast these global estimates with country-by-country analyses (“bottom-up approach”) such as those proposed by the United Nations Development Programme (UNDP) and the CBD Secretariat. For this report 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.

Relationship to existing work - particularly GEF 6 needs assessment

11. The work of the Panel has aimed to reflect on and take into account existing processes and assessments that are underway or have taken place, such as the recent assessment of the amount of funds needed to support the implementation of commitments under the CBD for the sixth replenishment period of the Global Environment Facility (GEF 6) which was called for under decision X/26 at the tenth meeting of the Conference of the Parties (COP 10) to the CBD in 2010.
12. The estimates of funding needs prior to taking into account GEF’s incremental reasoning and any co-financing in the GEF 6 assessment are less than those proposed by the High-Level Panel for a number of reasons. Firstly, the GEF 6 needs assessment was carried out to identify funding necessary and available for the implementation of the Convention over a four year period (July 2014 to June 2018), whereas the Panel report covers the period 2013 to 2020. Secondly, the GEF needs assessment figures focus on the estimated funding needs in 155 GEF-eligible countries only (developing countries), whereas the report of the High-Level Panel estimates resource needs for both developed and developing countries. Thirdly, the GEF needs assessment covers only activities which would be eligible for GEF funding whereas the work of the Panel has not restricted the types of activities used

in the assessment. The GEF 6 needs assessment is therefore not a full global assessment, hence the magnitude of the figures presented in the GEF 6 needs assessment are lower than what has been presented by the Panel. Due to their differences in purpose, the two assessments have been undertaken using some differences in assumptions, methodologies and approaches. However the starting point of estimating costs for activities to implement the Aichi Biodiversity Targets is similar.

Underpinning research

Organisation

13. To facilitate the assessment of resources required to meet the Aichi Biodiversity Targets, the Targets were divided into thematic cluster groups defined by the CBD Secretariat. The thematic cluster groups are listed in Table ES1. The research for these Targets or groups of Targets was then carried out either under separate contracts awarded by the UK's Department for the Environment, Food and Rural Affairs (Defra) based on pre-existing research, or through assessments conducted by the CBD Secretariat. The United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and ICF GHK were contracted by Defra to assist in co-ordinating and synthesising the work of the cluster groups.

Table ES1: Thematic cluster groups for assessment of costs of Aichi Biodiversity Targets¹	Target(s)
Awareness and behaviour change	1
Macroeconomics	2, 3, 4
Marine	6, 7 (aquaculture component), 10, 11
Water, pollution and ecosystem services	5, 8, 14
Agriculture	7 (agriculture component)
Invasive alien species	9
Genetic diversity	13
Forest-related Targets	5, 7 (forest component), 11 (forest component), 15
Protected areas and endangered species	11, 12
Enabling activities	16, 17, 18, 19, 20

Methodology

14. The Aichi Biodiversity Targets are diverse in their scope and requirements, and meeting them will require a range of different activities with varying resource needs. The Target or Target cluster leads therefore applied a range of different methods to assess these resource 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.

15. The approach for each Target cluster involved:

- A review of the Targets and their context, needs and expectations, through literature reviews and consultation with global experts/stakeholders;
- Analysis of the type and scale of the actions required to meet the Targets, through literature and web reviews and consultations with selected experts, stakeholders and national authorities;

¹ Targets such as 7 and 11 that incorporate multiple themes were divided across thematic clusters.

- Identification of data on the per unit requirements of relevant actions, through literature reviews 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 ongoing expenditures, taking account of any relevant variations between countries and regions; and
 - Assessment of the investment and ongoing expenditure required to meet the Targets, specifying two scenarios (with lower and higher resource requirements), assessing resource savings and additional requirements as far as possible, and distinguishing between one-off investments and recurrent expenditures.
16. While clusters used a common methodological framework, the variety of actions and activities chosen for the assessment of resources required to meet each Target vary significantly. For some Targets (e.g. the “macroeconomic” Targets 2-4) common actions that could be undertaken by all countries were identified and the average resource requirements for each country were estimated to reach the final figures. The analysis for other Targets was based on alternative means of assessment and aggregation. For example, the approach to Target 12 (threatened species) involved detailed assessment of the resources required to conserve a substantial sample of bird species, then using data on the relationship between costs for birds and those for other taxa, the costs were extrapolated to cover all known threatened species. Table ES3 presents an overview of actions and activities included in the assessments.
17. Section VII in the full report (UNEP/CBD/COP/11/INF/20) provides a summary of the approach taken for each of the Targets.

Variations in the resource needs assessments

18. The figures represent preliminary estimates and need to be interpreted with some caution. As far as possible, the assessments were conducted using a common approach, based on the standard methodological framework outlined above. However, there are inevitable variations between the assessments, as different Targets require different approaches. These include differences in analytical approaches; types of activities; units of assessment; and definitions of scenarios.

Strengths and limitations/weaknesses

19. The time and resources available for the assessment, as well as gaps in available data, presented significant challenges. It was recognised at the outset that the assessment was unlikely to provide a comprehensive or precise assessment of the investment and ongoing 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. The estimates should be regarded only as a first order assessment of the possible resource requirements in meeting the Aichi Biodiversity Targets. While every effort has been made to develop and apply a credible and consistent analytical approach given the time and resources available for the assessment, the robustness of the resource estimates is influenced by a range of factors. These are examined further in key message 5 and include:
- The interpretation of the Targets and the assumed level of ambition in the actions identified to meet them;
 - The inclusion and treatment of actions that go beyond core biodiversity conservation activities and deliver wider benefits;

- The static and segmented nature of the analysis – which has attempted to estimate the resources required for each Target separately, and has not been able to take full account of interdependencies and sequencing of delivery;
- Limitations in the available data and methodologies - especially given the limited time and resources available for the assessment.

20. For these reasons the figures should be regarded as a broad approximation of the resources required, rather than precise estimates, but should nevertheless present a basis for progressing discussion on resource mobilisation.

Box ES1: Enabling policies have a major impact on resource needs

The analysis of the resources required to meet Target 5 – to halve the rate of loss of natural habitats - highlighted an important message on the interaction between Targets. We have not been able to address the potentially significant consequences of enabling policies in this report, yet they could transform some estimates of resource requirements. For example, Target 3, a commitment to reform incentives in favour of sustainable use of biodiversity, could, if met, greatly reduce the resources required to deliver a halving of habitat loss.

Our estimate for the resources required to protect wetlands under Target 5 is approximately US \$33 billion per year on average. The vast majority of this cost is for expenditure required to acquire land and to prevent it being converted to an alternative use. If incentives were aligned to the sustainable use of biodiversity, then it is likely that this pressure to convert habitats would be reduced. In the absence of conversion pressure, the remaining resource requirements would only be around site management and positive incentives to provide ecosystem services – which in the wetland example add up to around US \$3 billion per year on average – a number 11 times smaller than the initial estimate of resource needs. This implies a very strong role for investing in our economic and policy frameworks upfront to help deliver the Aichi Biodiversity Targets in the most cost-effective way we can.

KEY FINDINGS

The work of the Panel resulted in the following key messages and findings.

Enabling framework

Key Message 1: Implementation and delivery of the Targets requires the development of an appropriate and coherent political and institutional framework and strong political will, particularly at the national and regional level.

21. Careful planning and an enabling framework are prerequisites for effective and successful action as well as for securing the resources required to meet the Aichi Biodiversity Targets. Most of the Targets cannot be delivered instantaneously but will require a continuous and coherent process in which early and well planned commitments will reduce overall costs and difficulties. Many of the Aichi Biodiversity Targets cannot be met without the right institutional structures, capacity and governance in place - irrespective of the availability of resources. Therefore, in assessing resource needs it must be stressed that resource mobilisation should be accompanied by the development of appropriate capacity (including institutional and infrastructural arrangements) supported by political coherence across governments and national institutions.

Benefits of investment

Key Message 2: Investment in natural capital will deliver significant co-benefits for sustainable development.

22. For example, restoration of ecosystems such as mangroves, wetlands and reefs can deliver significant livelihood benefits to local communities and improve resilience and adaptation to climate change. At a global scale, reforestation and restoration are a cost-effective form of climate change mitigation and adaptation. Restored forest ecosystems will add to the productivity of sustainable agriculture and improve supplies of freshwater by facilitating nutrient and freshwater cycling and by preventing soil erosion. Sustainability of ocean fisheries will be enhanced by increases in Marine Protected Areas. It is thus important that Aichi Biodiversity Target expenditures are recognised as part of such wider investment needs for promoting sustainable development.
23. Part of the underlying rationale for the Strategic Plan for Biodiversity and the Aichi Biodiversity Targets is that *“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.”*
24. While focusing on the resources required to meet the Aichi Biodiversity Targets, the individual cluster assessments highlight the significant range of benefits to people and the economy that will be delivered by achieving the Targets.

Key Message 3: Existing evidence suggests that benefits are likely to significantly outweigh costs.

25. Although it is clear that significant national and international investments will be required to meet the Targets, evidence from other studies indicates that the scale of the benefits that would be provided to the economy and society at local, regional and national levels are likely to be significantly greater, and should outweigh these resource requirements. Furthermore, without immediate action, the social and economic costs of biodiversity loss and the loss of ecosystem services will be felt at an accelerating rate in the future and will limit growth and stability. Investments made now will reduce resource requirements in the future.

Estimated resources required to meet the Aichi Biodiversity Targets

26. Table ES2 presents first estimates of the financial resources required to deliver the Aichi Biodiversity Targets. These figures provide a first assessment of the **total resources** required to deliver each of the Targets. They are inclusive of current levels of resources being allocated to the relevant activities. For most of the Targets, it was not possible to estimate current (baseline) levels of investment or annual expenditures on the relevant actions. **Therefore, additional resource requirements are not known in most cases.** However, the evidence for most Targets suggests that there is a substantial gap between the resources required and those currently being allocated. Understanding additional resource needs is an area that requires further research and analysis.

Key Message 4: There are clear differences in the relative scale of investment required to deliver the various Targets. In addition, the investment needed to deliver a Target is not necessarily correlated to its importance.

27. Some Targets which require relatively little investment are actually crucial in helping to deliver other Targets. Some may seem less resource-intensive, but could be more difficult to achieve, particularly if they require changes in institutions, policies, priorities, attitudes and behaviour. The scales of investment can be broadly summarised as:

- *Significant investment required:* For those Targets specifically aimed at addressing the drivers of biodiversity loss and ecosystem restoration, the required total global investment over the period 2013 to 2020 is in the order of several hundreds of billions of (US) dollars. Targets in this group fall under Strategic Goals B and D (excluding Target 16).
- *Moderate investment required:* Targets associated with required conservation work will require total global investment over the period 2013 to 2020 in the order of hundreds of billions of (US) dollars for Target 11 (i.e. establishing and maintaining protected areas) and in the order of tens of billions of (US) dollars, for the other Targets under Strategic Goal C.
- *Low investment required:* Targets related to improving and creating necessary enabling conditions are likely to be much less resource-intensive. For these Targets, the total global investment needs over the period 2013 to 2020 will more likely be in the order of billions of (US) dollars. These Targets mostly relate to Strategic Goals A and E, as well as Target 16.

28. The results suggest that upfront investment needs tend to be greater than the resources required to fund ongoing activities. It is estimated that one-off investments account for between 60% and 70% of the overall global resource needs for delivering the Targets over the 2013 to 2020 period.

29. Through simple addition of the resource requirements identified for each Target, the costs for implementing the twenty Aichi Biodiversity Targets are estimated at between US\$ 150 billion and US\$ 440 billion per year. However, these figures need to be treated with caution especially as the Panel is very clear that these resource requirements neither should nor could be met by biodiversity finance alone. Additionally, as discussed under key message 6 below, there is potential for considerable synergies among the Targets. Thus, it is expected that co-ordinated action could substantially reduce the total estimate.

30. Some Targets require relatively little investment but are actually crucial in helping to deliver other (often more expensive) Targets, especially where they aim to create the right enabling conditions. However, while these Targets tend to be less resource-intensive, they are usually difficult to achieve as they often require changes in institutions, policies, priorities, attitudes and behaviour. Examples of key Targets which play a key enabling and facilitating role, but themselves require relatively few resources, include Targets 1 (awareness raising), Targets 2-4 relating to macroeconomic conditions, and Targets 16-20 relating to enabling actions.

Key Message 5: Many factors affect the magnitude of the estimates of the investments needed to achieve each of the Targets. These include the scope of the activities to be costed and associated investment opportunities and the potential synergies among Targets as well as uncertainties arising from limitations in data and methodologies.

31. While every effort has been made to develop and apply a credible and consistent analytical approach given the time and resources available for the assessment, the robustness of the resource estimates is influenced by a range of factors, which include:
- *The interpretation of the Targets and the assumed level of ambition in the actions identified to meet them.* It has been necessary to interpret the Targets by specifying measurable activities that could be implemented to meet them. Only a few Targets are expressed in clearly quantifiable terms, thus there is a need to infer the level of ambition. Moreover, given that the Targets provide a flexible framework that is to be applied nationally, various levels of ambition would be consistent with each Target. The resources required are sensitive to the type and scale of defined activities.
 - *The inclusion of actions that go beyond core biodiversity conservation activities and deliver wider benefits.* Some of the Targets require substantial changes in practice that are essential for biodiversity conservation but deliver much wider benefits to society as a whole (e.g. sustainable agriculture, fisheries and pollution control). The resources required are large and the way they are accounted for greatly affects the estimates produced.
 - *The static nature of the analysis.* The assessment has attempted to estimate the resources required for each Target separately, while having regard for the potential synergies and overlaps between Targets and seeking to avoid double counting. In practice, the actions taken in pursuit of some Targets will influence the type, extent and cost of action required for others, as will the timing and sequencing of these different actions.
 - *Constraints resulting from limitations in the available data and methodologies.* Limited time and resources were available for the assessment.
32. Because of these factors, a range of valid and credible estimates could be derived for each Target. This variation results from the broad scope of some of the Targets and debate about the type and scale of actions required. Through further work to “unpack” this variation in a systematic way across the Targets, sets of estimates for each Target could be derived. This would allow some of the variation to be explained, reducing the residual error and allowing more robust comparisons among the Targets.
33. Additional uncertainties arise from gaps in data and scientific understanding, wide ranges of unit costs, and difficulties in accounting for differences in costs between different regions and situations. Thus there is a variable amount of uncertainty attached to each one.
34. One of the factors that have a large bearing on the estimates is the treatment of opportunity costs. For example, for Targets that involve land-use change (e.g. 5 and 11) there will be costs related to the forgone benefits of alternative land-use, and for Targets that require substitution of production technologies (e.g. 7 and 8), there will be costs related to the incremental costs of technologies. The size of these opportunity costs and/or whether they are born by the public or private actors will depend on the planning and legislative framework in the place and the extent that relevant laws are enforced in practice.

Table ES2: Summary of preliminary cost estimates across the different Targets

Target	Investment needs (US\$ million)	Recurrent expenditure per annum ² (US\$ million)	Average annual expenditure (2013 – 2020) (US\$ million) ³	Other Aichi Targets impacted by the Target	Other Policy objectives linked to the Target
Strategic Goal A: Address the underlying causes of biodiversity loss by mainstreaming biodiversity across government and society					
Target 1 – Awareness raising	54	440 – 1,400	280 – 890	All Targets	Cross-cutting
Target 2 – Biodiversity values	450 – 610	70 – 130	100 – 160	All Targets	Natural resource management
Target 3 – Incentives	1,300 – 2,000	8 – 15	170 – 270	1,2,4,5,6,7,8,9,10,11,12, 13,14,15	Natural resource management, economic efficiency, public finance, rural development, climate change mitigation and adaptation, fresh water
Target 4 – Sustainable consumption & production ⁴	55 – 107	8 – 15	12 – 23	1,2,5,6,7,8,10,11,12, 13,14,15	Natural resource management, climate change mitigation and adaptation, food security
Strategic Goal B: Reduce the direct pressures on biodiversity and promote sustainable use					
Target 5 – Reducing habitat loss (forests ⁵ and wetlands)	152,300 – 288,800	13,300 – 13,700	39,200-52,100	6,7,8,11,12,13,14,15,16	Fresh water, flood protection, climate change mitigation and adaptation, rural development, avoidance of desertification
Target 6 – Fisheries	129,900 – 292,200	800 – 3,200	16,900 – 40,000	4,5,7,8,10,11,12,14	Fisheries, food security, economic development

² The timing of recurrent expenditures varies between the analyses. Some Targets are assumed to require annual expenditures over the whole period (2013 – 2020) while for others these expenditures are assumed to be required only after an initial investment phase. This affects the estimated annual averages over the period.

³ These figures average the estimated total global resource needs (investment plus total recurrent expenditures) over the eight year period 2013 to 2020 to give a phased average annual requirement.

⁴ These estimates focus on development of SCP studies, plans and strategies and the integration of biodiversity conservation into them. To actually achieve sustainable consumption and production would require much larger investments, estimated by the UNEP Green Economy report at US\$1.0 – 2.6 trillion.

⁵ The forest Targets (5, 7, 11 and 15) are inter-related and many of the costed actions contribute to more than one Target. The synthesis assigns each action to one Target to avoid double counting, while recognising that the Targets will also benefit from resources attributed to the others.

Target	Investment needs (US\$ million)	Recurrent expenditure per annum ² (US\$ million)	Average annual expenditure (2013 – 2020) (US\$ million) ³	Other Aichi Targets impacted by the Target	Other Policy objectives linked to the Target
Target 7 – Sustainable Agriculture, Aquaculture and Forestry	20,800 – 21,700	10,700 – 11,000	13,200-13,600	4,5,6,8,9,10,11,12,13, 14,15,16,18	Agriculture, rural development, food security, climate change mitigation and adaptation, protection against floods and natural hazards, avoidance of desertification
Target 8 – Pollution ⁶	77,600 – 772,700	24,400 – 42,700	35,400 – 139,200	4,5,6,7,10,11,12, 14,15	Health, fresh water, agriculture, forestry, fisheries, rural development
Target 9 – Invasive alien species	34,100 – 43,900	21,005 – 50,100	23,300 – 52,900	5,6,7,10,11,12,13, 14,15	Economic efficiency, rural development, agriculture, forestry, fisheries
Target 10 – Coral reefs ⁷	600 – 960	6 – 10	80 – 130	6,12,13	Fisheries, tourism
Strategic Goal C: To improve the status of biodiversity by safeguarding ecosystems, species and genetic diversity					
Target 11 – Protected areas (terrestrial and marine) ⁸	66,100 – 626,400	970 – 6,700	9,200 – 85,000	1,2,5,6,7,8,10,12, 13,14,15	Climate change mitigation, fresh water, flood protection, rural development
Target 12 – Species conservation	–	3,400 – 4,800	3,400 – 4,800	5,11,13	Cross-cutting
Target 13 – Genetic diversity ⁹	550 – 1,400	15 – 17	80 – 190	2,7,12	Agriculture, food security, rural and industrial

⁶ Excludes expenditure associated with reducing pollution associated with nutrient runoff from upstream agricultural operations to avoid double counting, given the overlaps with Target 7 (Agriculture).

⁷ This figure is incomplete and is an under-estimate. It assumes that all expenditure associated with establishing coastal management frameworks (ICM frameworks) will be upfront investment; in reality a proportion of these costs may also be related to ongoing management (i.e. recurrent expenditure).

⁸ This figure is that estimated by Ervin and Gidda. Separate analyses were made for the resource needs of marine protected areas (by Craigie and Gravestock), and for protecting and effectively managing terrestrial Key Biodiversity Areas (by BirdLife International and collaborators) but are not included in this table to avoid double counting. BirdLife estimated that the total costs of managing the terrestrial KBA network would be US\$76.1 billion per annum between 2011 and 2020, comprising costs of effective management of US\$17.9 billion and annual costs of expanding the PA network of US\$58.2 billion. Craigie and Gravestock estimated the costs of the MPA network at US\$0.8 to 5.9 billion per annum between 2013 and 2020, comprising one off-establishment costs averaging US\$0.19 to 1.20 billion per annum and annual management costs of US\$0.58 to 4.70 billion per annum. Summing these estimates of terrestrial and marine resource needs gives a total of US\$77 - 81 billion per annum, towards the upper end of Ervin and Gidda's large range of estimates.

⁹ Because of data gaps this figure is known to be an under-estimate.

Target	Investment needs (US\$ million)	Recurrent expenditure per annum ² (US\$ million)	Average annual expenditure (2013 – 2020) (US\$ million) ³	Other Aichi Targets impacted by the Target	Other Policy objectives linked to the Target
development					
Strategic Goal D: Enhance the benefits to all from biodiversity and ecosystem services					
Target 14 – Ecosystem restoration ¹⁰	30,000 – 299,900	–	3,750 – 37,500	5,10,11,12,13	Climate change mitigation and adaptation, fresh water, flood protection, agriculture, rural development
Target 15 – Restoration of forests	100	6,400	6,400	5,11,12,13	Climate change mitigation and adaptation, fresh water, flood protection, agriculture, rural development
Target 16 – Nagoya Protocol	55 – 313	–	7 – 39	1,2,4,5,10,11,12,13,18,19	Agriculture, rural and industrial development
Strategic Goal E: Enhance implementation through participatory planning, knowledge management and capacity building					
Target 17 – NBSAPs	114 – 1,100	110 – 560	50 – 170	All Targets	Cross-cutting
Target 18 – Traditional knowledge	210 – 340	210 – 340	210 – 340	7,13,14,15,16,19	Rural development, indigenous communities, economic development
Target 19 – Science base	1,800 – 4,200	1,400 – 1,600	1,600 – 2,100	All Targets	Cross-cutting
Target 20 – Mobilisation of financial resources	10 – 79	3 – 20	4 – 30	All Targets	Cross-cutting

¹⁰ Excludes expenditure associated with forest landscape restoration to avoid double counting, given the overlaps with Target 15 (restoration of forests).

Interlinkages between Targets and integration into policy goals

Key Message 6: There are many inter-linkages and co-dependencies to consider both between the Targets themselves, and between the Targets and other national policy goals

35. The Targets are interrelated and interdependent, such that the investment needs of one will often be influenced by the approach, resourcing and effectiveness of the delivery of others. For instance, ensuring the effective delivery of those Targets which help to establish the necessary frameworks and conditions (e.g. Targets under Strategic Goals A and E) should reduce the investment needed to deliver other Targets. Understanding these inter-linkages and co-dependencies is therefore important in order to prioritise action and should be considered a crucial area for further work. Other policy areas, extending well beyond biodiversity conservation will also be impacted by the delivery of the Aichi Biodiversity Targets. For example, national farming and fisheries policies have very important overlaps with the Aichi Biodiversity Targets focusing on sustainable agriculture and fisheries. Recognising synergies and overlaps across such important national policy objectives can significantly add to the overall availability of financing, and improve budgetary efficiencies and environmental governance.
36. The different Targets vary in the extent to which they focus on biodiversity and the degree to which they meet wider policy objectives. Some Targets – such as those relating to sustainable agriculture, fisheries and pollution control – require relatively high levels of resources but contribute to much wider policy objectives (economic, social and environmental). Often the Targets with a greater focus on biodiversity objectives have lower resource requirements. There are clear implications for the funding of the investments and ongoing expenditures required, since those Targets which help to deliver against multiple objectives will benefit from a wider range of funding opportunities.
37. There are some clear examples where Targets overlap and where particular actions will help to deliver more than one Target. For example, sustainable management of agricultural nutrients is a key action required to deliver both Targets 7 (sustainable agriculture) and 8 (pollution control). In compiling the estimates of resource needs we have sought to identify these overlaps and to avoid double counting as far as possible. However, there are some examples of areas of overlap that cannot be easily accounted for. For example, Protected Areas (Target 11) will play an important role in reducing rates of habitat loss (Target 5) as well as in contributing to ecosystem restoration (Targets 14 – 15), and there will be some degree of overlap between the estimated costs of achieving these Targets.

Potential funding sources

Key Message 7: Funding from a diverse range of international and national sources, and across different policy areas is required to secure the full range of economic and social benefits to be gained from meeting the Aichi Targets

38. As policy areas impacted by the delivery of Aichi Biodiversity Targets extend well beyond biodiversity conservation, when enumerating funding sources, budgets and provisions beyond just conservation budgets must also be considered. For example, financing for climate change mitigation and adaptation policies, and allocations to halt the ingress of desertification are closely linked to the objectives of the forest-related Aichi Biodiversity Targets. Furthermore, sources of financing will include a wide range of public funding (core national biodiversity funding sources, financing from different parts of government and its agencies, as well as international flows of Official Development Assistance and multilateral funding) and development of innovative measures and conservation incentives such as payments for ecosystem services (PES), conservation agreements, water fees, forest carbon offsets, and green fiscal policies, as well as private- and third-sector investment. This will also require engagement with a wide range of government and non-governmental stakeholders. The private sector has a key role to play in providing resources and reducing the costs of protecting biodiversity through more informed

decision making that mainstreams sustainable management of biodiversity and ecosystems in their actions. This will in turn deliver benefits for business by securing their social licence to operate, and more importantly, securing sustainable supply chains.

Further research – improving the evidence base

Key Message 8: Further research is vital to help further develop and refine these estimates.

39. The estimates of resource requirements made by the High-Level Panel are preliminary and are presented with caveats. For example, it has only been possible to conduct a ‘static assessment’ of resource needs across Targets. Although overlaps have been considered as far as possible to avoid double counting, the relationships between Targets have not been explored. In addition, the work of the Panel has not included a quantitative assessment of benefits. Further research and analysis will be needed to help further develop and refine these estimates.
40. Over the coming years, further assessments of resources required to meet the Aichi Biodiversity Targets would be useful as part of an ongoing process to improve data availability and comparability of actions and activities undertaken and those required in the future to meet the Targets. Such assessments could also be useful tools to track and monitor progress in achieving the goals of the Strategic Plan for Biodiversity 2011-2020.
41. There are a number of ways further research could be undertaken to strengthen the data and estimated resource requirements for achieving the Aichi Biodiversity Targets.
42. Firstly, further research could be undertaken to further develop and refine the current estimates to:
 - Address gaps in coverage of the Target clusters that were established for the underpinning research for this assessment.
 - Address gaps in information and data highlighted by Target-by-Target assessments and by the aggregated assessment.
43. Secondly, given the limited time and resources available for this study, future areas of work that build on this assessment could include:
 - A comprehensive global assessment involving wider stakeholder consultation and input, including information on
 - baselines (i.e. current levels of expenditure on the Aichi Biodiversity Targets in order to accurately gauge what is ‘additional’ expenditure);
 - prioritisation of Targets rather than a static assessment (i.e. dynamic assessment);
 - comprehensive analysis of the benefits of meeting the Aichi Biodiversity Targets;
 - potential sources of additional finance - including through other policy areas.
 - Country-by-country analyses (“bottom-up approach”) such as those proposed by the United Nations Development Programme (UNDP) and the CBD Secretariat on resources required to achieve the Targets
 - An assessment of actions and costs necessary to establish the right policy framework and transformational actions required at the national and regional levels, such as:
 - policy development;
 - environmental governance;
 - institutional and national planning reforms to achieve conservation and biodiversity goals and targets;
 - opportunities for mainstreaming biodiversity.

- Further exploration to understand inter-linkages and co-dependencies across Targets and between Targets and policy goals for poverty alleviation, human health, agriculture, freshwater, desertification, fisheries, etc, to prioritise action.
- Support at the national level to:
 - identify the need for further investment and progress on country level financial needs assessments;
 - support revision of National Biodiversity Strategies and Action Plans;
 - identify opportunities to direct resources and further support.

44. The Panel also recognises that a key underlying driver to biodiversity loss is climate change. While this has not been referred to specifically in this assessment, further research could be useful into the extent to which actions to support the achievement of the Aichi Biodiversity Targets can be integrated into large scale programmes and activities underway to mitigate and adapt to the effects of climate change.

Table ES3: Summary of the actions and activities included in the assessment for each Target

Target	Actions/activities included in assessment
Target 1	Developing awareness surveys; national communications/awareness strategies; mass media campaigns; training programmes; integration of biodiversity into education; workshops and events.
Target 2	Undertaking national assessments of biodiversity values; 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; integration of biodiversity into national accounting and reporting systems.
Target 3	Developing inventories of harmful incentives; identification of opportunities; development of action plans and packages for reform; legal analyses and impact assessments; stakeholder engagement; identification of positive incentives and development for action plans for their introduction; capacity building measures and pilot projects to develop and test positive incentive measures.
Target 4	Assessment of impacts of production and consumption of different products on biodiversity; identification of actions to achieve SCP; identification of priorities and role for public and private sectors; national SCP action plans; national public procurement strategies.
Target 5	Wetlands: Wetland banking with “no net loss” standards; payments for ecosystem services to provide cost share assistance for agriculture and forestry best management practices; improving national wetland inventories, monitoring and enforcement capabilities; increasing the amount of wetlands of international importance designated under the Ramsar Convention or otherwise protected in national wildlife refuges, parks, or conservation units. Forests: Developing biodiversity inventories; monitoring systems; training and education of professional officers; law enforcement; creation of enabling conditions (financial incentives which counter illegality).
Target 6	Actions to reduce fishing effort and rebuild overfished stocks (investment or transition cost); improving fisheries management (operation or running cost).
Target 7	Forests: Market correction, public procurement policies; efficiency in processing; fire management in vulnerable ecosystems; product creation (tourism, PES, carbon, ABS). Agriculture: Establish a global measurement scheme for agroecosystem biodiversity; investigating global R& D into agroecosystem genetics; increasing pest/ disturbance resistance; increased nutritional uptake/ productivity; establishing regional extension costs and needs; restructuring the production side of the agricultural market; encouraging integrated conservational agriculture in a BISA setting; effective adaptation of policy and institutions; property rights. Aquaculture: Integrated multitrophic aquaculture (IMTA) – salmon; integrated multitrophic aquaculture (IMTA) – shrimp; closed containment (seabag and RS) salmon, seabrem, seabass; capacity building; mangrove restoration.
Target 8	Marine debris clean-up programs; investments in converting synthetic plastic production to biodegradable plastic production; increase in wastewater treatment capacity to cover populations living upstream of dead zones without access to sanitation; reduction of nutrient runoff from upstream agricultural operations through the use of best management practices; investments in urban stormwater retrofits for existing impervious surface areas and green infrastructure options; installation of best available technologies for stationary and mobile sources of pollution including industries and coal-fired power plants.
Target 9	Research and prioritisation of IAS and pathways to be targeted (including baseline surveys); control and eradication measures (including policy and legislation) to reduce existing IAS (including control of mainland IAS and eradication of priority IAS on islands); and measures (including policy and legislation) to prevent new introductions (including development of capacity and legal frameworks, biosecurity measures and ballast water treatment through the private sector).
Target 10	Options for integrated coastal zone management; sustainable marine resource use (e.g. fisheries); integrated watershed and wastewater management; use of marine protected areas to conserve biodiversity, habitats and exploited populations.
Target 11	Terrestrial and Marine Protected Areas: Creation of new protected areas; creation of new connectivity corridors; strengthened management effectiveness; strengthened enabling policy environments and sustainable finance; conducting key assessments. Marine Protected Areas only: Establishment costs; management costs; opportunity costs (not quantitatively assessed for this report). Forest Protected Areas: Land tenure; legal processes; and compensation for PA extension relating to forested protected areas.

Target	Actions/activities included in assessment
Target 12	Site and habitat protection; restoration and management; control/eradication of invasive alien species; species management and recovery actions; trade/harvest management; ex-situ conservation; introduction/reintroduction and education and awareness-raising.
Target 13	<i>Ex situ</i> maintenance and expansion of existing collections; developing approaches to create economic incentives for <i>in situ</i> conservation by farmers; capacity-building activities in developing countries, particularly through conservation of socio-economically and culturally valuable species.
Target 14	Removal of subsidies and public support for harmful infrastructure; investments in traditional ecological knowledge (TEK) or the factual knowledge about ecological systems, processes and uses held by traditional and indigenous peoples; restoration of wetlands through the removal of dams, coastal dikes or new constructed wetlands; forest landscape restoration, including 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; restoration and reestablishment of coral reefs.
Target 15	Restoration site selection; seeds, nursery establishment, planting; assisted natural regeneration; site protection (wildlife, fires, livestock); weeding.
Target 16	Deposit the instrument of ratification, acceptance, approval or accession of the Nagoya Protocol; revise legislative, administrative or policy measures already in place or develop new measures in order to meet the obligations set out under the Protocol; put in place the institutional structures required for implementing the Protocol, including a national focal point, one or more competent national authorities, one or more check points, and enabling conditions to actively participate in the ABS Clearing-House; building the capacity and providing the means for effective implementation of the Protocol.
Target 17	Developing and updating National Biodiversity Strategies and Action Plans (NBSAPs), including preparation; setting/Updating National Priorities and Goals and Targets (SMART); developing/Updating the Strategy and Action Plan; development/Update of Implementation Plan; institutional, Monitoring, Reporting and Exchange; adoption by the Government; EA Management Cost.
Target 18	<p>Secretariat action: Be Trust Fund- for the biennial meetings of the ad hoc open ended Working Group on Article 8(j) and related provisions; capacity building Meetings and Workshops (Train the Trainer Methodology); CEPA and Communications related to Article 8(j) and related provisions; expert studies and meetings as required; expert meetings and operationalizing indicators established for Article 8(j); effective participation of ILCs – Voluntary Biodiversity (VB) Trust Fund; additional staffing costs.</p> <p>Party-led action worldwide: National (and Regional) level strategies, including sui generis systems, for promoting/protecting traditional knowledge and the customary sustainable use of biological diversity and implementing standards adopted by the COP; capacity building initiatives to foster effective participation of Indigenous Local Communities (ILCs) in the implementation of Article 8(j), 10(c) and related provisions at regional, national and sub-national levels; 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.</p>
Target 19	Research co-operation and policy interface (global information modelling and analysis; promoting global scientific and technical co-operation; science-policy interface); monitoring and information systems (infrastructure to support such modelling and analysis).
Target 20	Development and implementation of country resource mobilization strategies and reporting frameworks.